

# SCPI Command Reference

## Agilent Technologies E4428C/38C ESG Signal Generators

This guide applies to the following signal generator models:

**E4428C ESG Analog Signal Generator**

**E4438C ESG Vector Signal Generator**

Due to our continuing efforts to improve our products through firmware and hardware revisions, signal generator design and operation may vary from descriptions in this guide. We recommend that you use the latest revision of this guide to ensure you have up-to-date product information. Compare the print date of this guide (see bottom of page) with the latest revision, which can be downloaded from the following website:

*<http://www.agilent.com/find/esg>*



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---

# 1 SCPI Basics

This chapter describes how SCPI information is organized and presented in this guide. An overview of the SCPI language is also provided. This Chapter contains the following major sections:

- [“Command Reference Information” on page 2](#)
- [“SCPI Basics” on page 3](#)

## Command Reference Information

### SCPI Command Listings

The Table of Contents lists the Standard Commands for Programmable Instruments (SCPI) without the parameters. The SCPI subsystem name will generally have the first part of the command in parenthesis that is repeated in all commands within the subsystem. The title(s) beneath the subsystem name is the remaining command syntax. The following example demonstrates this listing:

```
Communication Subsystem (:SYSTem:COMMunicate)
:PMETer:CHANnel
:SERial:ECHO
```

The following examples show the complete commands from the above Table of Contents listing:

```
:SYSTem:COMMunicate:PMETer:CHANnel
:SYSTem:COMMunicate:SERial:ECHO
```

### Key and Data Field Cross Reference

The index is set up so applicable key and data field names can be cross-referenced to the appropriate SCPI command. There are two headings in the index where the key and data field names can be found:

- individual softkey, hardkey, or data field name
- subsystem name

### Supported Field

Within each command section, the Supported heading describes which signal generator configurations are supported by the SCPI command. When “All Models” is shown next to this heading, all signal generator configurations are supported by the SCPI command. When “All with Option xxx” is shown next to this heading, only the stated option(s) is supported.

---

## SCPI Basics

This section describes the general use of the SCPI language for the ESG. It is not intended to teach you everything about the SCPI language; the SCPI Consortium or IEEE can provide that level of detailed information. For a list of the specific commands available for the signal generator, refer to the table of contents.

For additional information, refer to the following publications:

- IEEE Standard 488.1-1987, IEEE Standard Digital Interface for Programmable Instrumentation. New York, NY, 1998.
- IEEE Standard 488.2-1992, IEEE Standard Codes, Formats, Protocols and Command Commands for Use with ANSI/IEEE Standard 488.1-1987. New York, NY, 1998.

### Common Terms

The following terms are used throughout the remainder of this section:

Command	A command is an instruction in SCPI consisting of mnemonics (keywords), parameters (arguments), and punctuation. You combine commands to form messages that control instruments.
Controller	A controller is any device used to control the signal generator, for example a computer or another instrument.
Event Command	Some commands are events and cannot be queried. An event has no corresponding setting; it initiates an action at a particular time.
Program Message	A program message is a combination of one or more properly formatted commands. Program messages are sent by the controller to the signal generator.
Query	A query is a special type of command used to instruct the signal generator to make response data available to the controller. A query ends with a question mark. Generally you can query any command value that you set.
Response Message	A response message is a collection of data in specific SCPI formats sent from the signal generator to the controller. Response messages tell the controller about the internal state of the signal generator.

## Command Syntax

A typical command is made up of keywords prefixed with colons (:). The keywords are followed by parameters. The following is an example syntax statement:

```
[ :SOURCE ] :POWER [ :LEVEL ] MAXimum|MINimum
```

In the example above, the [ :LEVEL ] portion of the command immediately follows the :POWER portion with no separating space. The portion following the [ :LEVEL ], MINimum|MAXimum, are the parameters (argument for the command statement). There is a separating space (white space) between the command and its parameter.

Additional conventions in syntax statements are shown in [Table 1-1](#) and [Table 1-2](#).

**Table 1-1 Special Characters in Command Syntax**

Characters	Meaning	Example
	A vertical stroke between keywords or parameters indicates alternative choices. For parameters, the effect of the command varies depending on the choice.	[ :SOURCE ] :AM: MOD DEEP NORMAl DEEP or NORMAl are the choices.
[ ]	Square brackets indicate that the enclosed keywords or parameters are optional when composing the command. These implied keywords or parameters will be executed even if they are omitted.	[ :SOURCE ] :FREQUENCY [ :CW ] ? SOURCE and CW are optional items.
< >	Angle brackets around a word (or words) indicate they are not to be used literally in the command. They represent the needed item.	[ :SOURCE ] :FREQUENCY: START <val><unit>  In this command, the words <val> and <unit> should be replaced by the actual frequency and unit.  :FREQUENCY:START 2.5GHZ
{ }	Braces indicate that parameters can optionally be used in the command once, several times, or not at all.	[ :SOURCE ] :LIST: POWER <val>{ ,<val> }  a single power listing: LIST:POWER 5 a series of power listings: LIST:POWER 5,10,15,20

**Table 1-2 Command Syntax**

Characters, Keywords, and Syntax	Example
Upper-case lettering indicates the minimum set of characters required to execute the command.	[:SOURCE] :FREQuency [:CW] ?, FREQ is the minimum requirement.
Lower-case lettering indicates the portion of the command that is optional; it can either be included with the upper-case portion of the command or omitted. This is the flexible format principle called forgiving listening. Refer to <a href="#">“Command Parameters and Responses” on page 7</a> for more information.	:FREQuency Either :FREQ, :FREQuency, or :FREQUENCY is correct.
When a colon is placed between two command mnemonics, it moves the current path down one level in the command tree. Refer to <a href="#">“Command Tree” on page 6</a> more information on command paths.	:TRIGger:OUTPut:POLarity? TRIGger is the root level keyword for this command.
If a command requires more than one parameter, you must separate adjacent parameters using a comma. Parameters are not part of the command path, so commas do not affect the path level.	[:SOURCE] :LIST: DWELl <val>{,<val>}
A semicolon separates two commands in the same program message without changing the current path.	:FREQ 2.5GHZ;:POW 10DBM
White space characters, such as <tab> and <space>, are generally ignored as long as they do not occur within or between keywords.  However, you must use white space to separate the command from the parameter, but this does not affect the current path.	:FREQ uency or :POWER :LEVel are not allowed.  A <space> between :LEVel and 6.2 is mandatory.  :POWER:LEVel 6.2

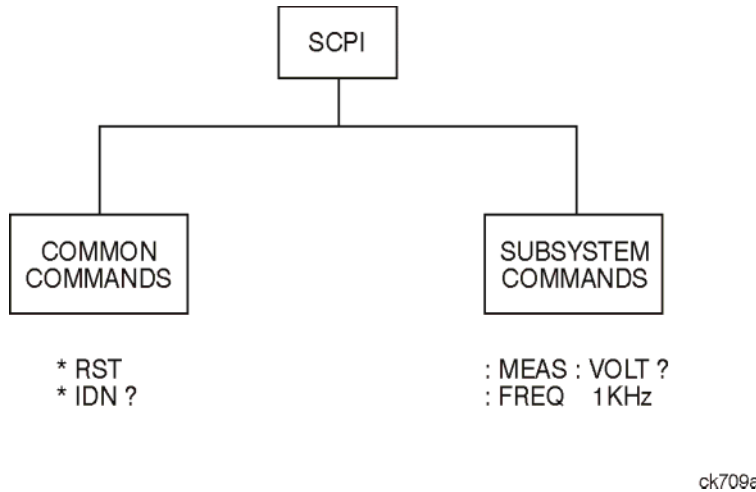
## Command Types

Commands can be separated into two groups: common commands and subsystem commands. [Figure 1-1](#), shows the separation of the two command groups.

Common commands are used to manage macros, status registers, synchronization, and data storage and are defined by IEEE 488.2. They are easy to recognize because they all begin with an asterisk. For example \*IDN?, \*OPC, and \*RST are common commands. Common commands are not part of any subsystem and the signal generator interprets them in the same way, regardless of the current path setting.

Subsystem commands are distinguished by the colon (:). The colon is used at the beginning of a command statement and between keywords, as in :FREQUency[:CW?]. Each command subsystem is a set of commands that roughly correspond to a functional block inside the signal generator. For example, the power subsystem (:POWeR) contains commands for power generation, while the status subsystem (:STATus) contains commands for controlling status registers.

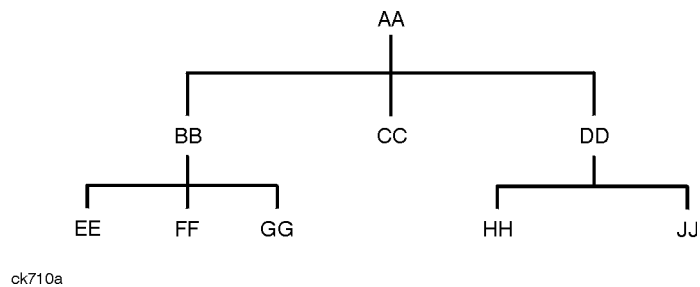
Figure 1-1 Command Types



## Command Tree

Most programming tasks involve subsystem commands. SCPI uses a structure for subsystem commands similar to the file systems on most computers. In SCPI, this command structure is called a command tree and is shown in Figure 1-2.

Figure 1-2 Simplified Command Tree



The command closest to the top is the root command, or simply “the root.” Notice that you must follow a particular path to reach lower level commands. In the following example, :POWeR represents AA, :ALC

represents BB, :SOURce represents GG. The complete command path is :POWER:ALC:SOURce? (:AA:BB:GG).

### Paths Through the Command Tree

To access commands from different paths in the command tree, you must understand how the signal generator interprets commands. The parser, a part of the signal generator firmware, decodes each message sent to the signal generator. The parser breaks up the message into component commands using a set of rules to determine the command tree path used. The parser keeps track of the current path (the level in the command tree) and where it expects to find the next command statement. This is important because the same keyword may appear in different paths. The particular path is determined by the keyword(s) in the command statement.

A message terminator, such as a <new line> character, sets the current path to the root. Many programming languages have output statements that automatically send message terminators.

---

**NOTE** The current path is set to the root after the line-power is cycled or when \*RST is sent.

---

### Command Parameters and Responses

SCPI defines different data formats for use in program and response messages. It does this to accommodate the principle of forgiving listening and precise talking. For more information on program data types refer to IEEE 488.2.

Forgiving listening means the command and parameter formats are flexible.

For example, with the :FREQuency:REFerence:STATe ON|OFF|1|0 command, the signal generator accepts :FREQuency:REFerence:STATe ON, :FREQuency:REFerence:STATe 1, :FREQ:REF:STAT ON, :FREQ:REF:STAT 1 to turn on the frequency reference mode.

Each parameter type has one or more corresponding response data types. A setting that you program using a numeric parameter returns either real or integer response data when queried. Response data (data returned to the controller) is more concise and restricted, and is called precise talking.

Precise talking means that the response format for a particular query is always the same.

For example, if you query the power state (:POWER:ALC:STATe?) when it is on, the response is always 1, regardless of whether you previously sent :POWER:ALC:STATe 1 or :POWER:ALC:STATe ON. [Table 1-3](#) shows the response for a given parameter type.

**Table 1-3**                      **Parameter and Response Types**

<b>Parameter Types</b>	<b>Response Data Types</b>
Numeric	Real, Integer
Extended Numeric	Real, Integer
Discrete	Discrete
Boolean	Numeric Boolean
String	String

**Numeric Parameters**

Numeric parameters are used in both common and subsystem commands. They accept all commonly used decimal representations of numbers including optional signs, decimal points, and scientific notation.

If a signal generator setting is programmed with a numeric parameter which can only assume a finite value, it automatically rounds any entered parameter which is greater or less than the finite value. For example, if a signal generator has a programmable output impedance of 50 or 75 ohms, and you specified 76.1 for the output impedance, the value is rounded to 75. The following are examples of numeric parameters:

- 100                                      no decimal point required
- 100.                                    fractional digits optional
- 1.23                                  leading signs allowed
- 4.56E<space>3                      space allowed after the E in exponential
- 7.89E-001                          use either E or e in exponential
- +256                                    leading + allowed
- .5                                        digits left of decimal point optional

**Extended Numeric Parameters**

Most subsystems use extended numeric parameters to specify physical quantities. Extended numeric parameters accept all numeric parameter values and other special values as well.

The following are examples of extended numeric parameters:



100	any simple numeric value
1.2GHZ	GHZ can be used for exponential (E009)
200MHZ	MHZ can be used for exponential (E006)
-100mV	negative 100 millivolts
10DEG	10 degrees

Extended numeric parameters also include the following special parameters:

DEfault	resets the parameter to its default value
UP	increments the parameter
DOWN	decrements the parameter
MINimum	sets the parameter to the smallest possible value
MAXimum	sets the parameter to the largest possible value

### Discrete Parameters

Discrete parameters use mnemonics to represent each valid setting. They have a long and a short form, just like command mnemonics. You can mix upper and lower case letters for discrete parameters.

The following examples of discrete parameters are used with the command  
`:TRIGger[:SEQUence]:SOURce BUS|IMMediate|EXTernal.`

BUS	GPIB, LAN, or RS-232 triggering
IMMediate	immediate trigger (free run)
EXTernal	external triggering

Although discrete parameters look like command keywords, do not confuse the two. In particular, be sure to use colons and spaces properly. Use a colon to separate command mnemonics from each other and a space to separate parameters from command mnemonics.

The following are examples of discrete parameters in commands:

```
TRIGger:SOURce BUS
TRIGger:SOURce IMMediate
TRIGger:SOURce EXTernal
```

### Boolean Parameters

Boolean parameters represent a single binary condition that is either true or false. The two-state boolean parameter has four arguments. The following list shows the arguments for the two-state boolean parameter:

ON	boolean true, upper/lower case allowed
OFF	boolean false, upper/lower case allowed
1	boolean true
0	boolean false

### String Parameters

String parameters allow ASCII strings to be sent as parameters. Single or double quotes are used as delimiters.

The following are examples of string parameters:

```
'This is valid'  
"This is also valid"  
'SO IS THIS'
```

### Real Response Data

Real response data represent decimal numbers in either fixed decimal or scientific notation. Most high-level programming languages that support signal generator input/output (I/O) handle either decimal or scientific notation transparently.

The following are examples of real response data:

```
+4.000000E+010, -9.990000E+002  
-9.990000E+002  
+4.00000000000000E+010  
+1  
0
```

### Integer Response Data

Integer response data are decimal representations of integer values including optional signs. Most status register related queries return integer response data.

The following are examples of integer response data:

0	signs are optional
+100	leading + allowed
-100	leading – allowed
256	never any decimal point

### Discrete Response Data

Discrete response data are similar to discrete parameters. The main difference is that discrete response data only returns the short form of a particular mnemonic, in all upper case letters.

The following are examples of discrete response data:

```

IMM
EXT
INT
NEG
  
```

### Numeric Boolean Response Data

Boolean response data returns a binary numeric value of one or zero.

### String Response Data

String response data are similar to string parameters. The main difference is that string response data returns double quotes, rather than single quotes. Embedded double quotes may be present in string response data. Embedded quotes appear as two adjacent double quotes with no characters between them.

The following are examples of string response data:

```

"This is a string"
"one double quote inside brackets: [""]"
>Hello!"
  
```

## Program Messages

The following commands will be used to demonstrate the creation of program messages:

```
[ :SOURce ] :FREQuency:START      [ :SOURce ] :FREQuency:STOP  
[ :SOURce ] :FREQuency[:CW]      [ :SOURce ] :POWer [ :LEVeL ] :OFFSet
```

### Example 1

```
:FREQuency:START 500MHZ;STOP 1000MHZ
```

This program message is correct and will not cause errors; `START` and `STOP` are at the same path level. It is equivalent to sending the following message:

```
FREQuency:START 500MHZ;FREQuency:STOP 1000MHZ
```

### Example 2

```
:POWer 10DBM;:OFFSet 5DB
```

This program message will result in an error. The message makes use of the default `POWER[:LEVeL]` node (root command). When using a default node, there is no change to the current path position. Since there is no command `OFFSet` at the root level, an error results.

The following example shows the correct syntax for this program message:

```
:POWer 10DBM;:POWer:OFFSet 5DB
```

### Example 3

```
:POWer:OFFSet 5DB;POWer 10DBM
```

This program message results in a command error. The path is dropped one level at each colon. The first half of the message drops the command path to the lower level command `OFFSet`; `POWer` does not exist at this level.

The `POWER 10DBM` command is missing the leading colon and when sent, it causes confusion because the signal generator cannot find `POWER` at the `POWER:OFFSet` level. By adding the leading colon, the current path is reset to the root. The following shows the correct program message:

```
:POWer:OFFSet 5DB;:POWer 10DBM
```

### Example 4

```
FREQ 500MHZ;POW 4DBM
```

In this example, the keyword short form is used. The program message is correct because it utilizes the default nodes of `:FREQ[:CW]` and `:POW[:LEVeL]`. Since default nodes do not affect the current path, it is not necessary to use a leading colon before `FREQ` or `POW`.

## File Name Variables

File name variables designate a data file and file path. File name variables are used in the SCPI command syntax whenever files are accessed. The name of the file is always required, but the file path can sometimes be optional or be designated using different formats. The following table shows these different file path formats:

Format	File Name Variable	Example
Format 1	"<file name>"	"Test_Data"
Format 2	"<file name@msus>"	"Test_Data@SEQ"
Format 3	"<msus:file name>"	"SEQ:Test_Data"
Format 4	"</user/directory/file name>"	"/USER/SEQ/Test_Data"

Formats 2–4 offer programming flexibility and are equivalent. Format 1 can only be used with SCPI commands that imply the path name as part of the command syntax. Typically, SCPI load commands that access user-data files do not need to have a file path designated.

See [Table 1-4 on page 14](#) for information on file types and directories.

---

**NOTE** The maximum length for a file name is 23 characters, excluding the file path.

---

### Example Using Format 1

```
:CORR:FLAT:LOAD "FLAT_DATA"
```

The preceding example loads user-flatness data from a file called `FLAT_DATA` located in the `USERFLAT` directory. No file path is needed as the command syntax implies the directory where the file is located.

### Example Using Format 2

```
:MEM:COPY "IQ_DATA@NVWFM", "Test_DATA@WFM1"
```

The preceding example copies a file named `IQ_DATA` located in the `WAVEFORM` directory to a file named `Test_DATA` in volatile waveform memory (`WFM1`).

### Example Using Format 3

```
:MEM:COPY "NVWFM:IQ_DATA", "WFM1:Test_DATA"
```

The preceding example copies a file named `IQ_DATA` located in the `WAVEFORM` directory to a file named `Test_DATA` in volatile waveform memory (`WFM1`).

### Example Using Format 4

```
:MEM:COPY "/USER/WAVEFORM/IQ_DATA", "/USER/BBG1/WAVEFORM/IQ_DATA"
```

The preceding example copies a file named IQ\_DATA located in the WAVEFORM directory to a file named IQ\_DATA in volatile waveform memory (WFM1).

The following examples show commands, with different formats, that can be used to download a waveform file named Test\_Data into the signal generator's volatile waveform memory (WFM1):

#### Command Syntax Format 3

```
:MEMory:DATA "WFM1:Test_Data", #ABC
```

#### Command Syntax Format 4

```
:MEMory:DATA "/USER/BBG1/WAVEFORM/Test_Data", #ABC
```

These commands are equivalent. The data block, #ABC, is described as follows:

- # This character indicates the beginning of the data block
- A Number of digits in the byte count B
- B Byte count in C
- C Waveform data

Refer to “:DATA” on page 105 and the *E4428C/38C ESG Signal Generators Programming Guide* for more information on data blocks and downloading waveform data.

## File Types and Directory Structure

The signal generator uses a computer directory model structure for file storage. The top level directory is called the USER directory. All other directories are subdirectories located under the USER directory. Each subdirectory is dedicated to the type of data stored. For example, the FIR directory is used to store finite impulse filter (FIR) coefficient data whereas the MARKERS directory is used to store marker data.

The following table lists signal generator the subdirectories and file paths where file types are stored.

**Table 1-4 File Types and Directory Structures**

File System	File Type	File Path	MSUS Path
BINARY <sup>a</sup>	BIN	/USER/BIN	BINARY. <sup>b</sup>
BIT <sup>a</sup>	BIT	/USER/BIT	BIT:

**Table 1-4 File Types and Directory Structures**

File System	File Type	File Path	MSUS Path
CDMA <sup>ab</sup>	CDMA	/USER/CDMA	CDMA:
DMOD - ARB digital modulation file <sup>a</sup>	DMOD	/USER/DMOD	DMOD:
DWCDMA - ARB downlink W-CDMA file <sup>a</sup>	DWCD	/USER/DWCDMA	DWCDMA:
FCDMA - ARB forward link cdma2000 file <sup>a</sup>	FCDM	/USER/FCDMA	FCDMA:
FIR - finite impulse response filter file	FIR	/USER/FIR	FIR:
FSK - frequency shift keying modulation file <sup>a</sup>	FSK	/USER/FSK	FSK:
HDR1 - volatile arbitrary waveform header file <sup>a</sup>	HDR1	/USER/BBG1/HEADER	HDR1:
I/Q - modulation file <sup>a</sup>	IQ	/USER/IQ	IQ:
LIST - sweep list file	LIST	/USER/LIST	LIST:
MCDMA - ARB multicarrier CDMA file <sup>a</sup>	MCMD	/USER/MCDMA	MCDMA:
MDMOD - ARB multicarrier digital modulation file <sup>a</sup>	MDM	/USER/MDMOD	MDMOD:
MDWCDMA - ARB multicarrier downlink W-CDMA file <sup>a</sup>	MDWC	/USER/MDWCDMA	MDWCDMA:
MFCDMA - ARB multicarrier forward link cdma2000 file <sup>a</sup>	MFCD	/USER/MFCDMA	MFCDMA:
MKR1 - volatile arbitrary waveform marker file <sup>a</sup>	MKR1	/USER/BBG1/MARKERS	MKR1:
MTONE - ARB multitone file <sup>a</sup>	MTON	/USER/MTONE	MTONE:
NVHDR - non-volatile arbitrary waveform header file <sup>a</sup>	NVHDR	/USER/HEADER	NVHDR:
NVMKR - non-volatile arbitrary waveform marker file <sup>a</sup>	NVMKR	/USER/MARKERS	NVMKR:

**Table 1-4 File Types and Directory Structures**

File System	File Type	File Path	MSUS Path
NVWFM - non-volatile arbitrary waveform file <sup>a</sup>	NVWFM	/USER/WAVEFORM	NVWFM:
RCDMA - ARB reverse link cdma2000 file <sup>a</sup>	RCDM	/USER/RCDM	RCDM:
SEQ - ARB sequence file <sup>a</sup>	SEQ	/USER/SEQ	SEQ:
SHAPE - burst shape file <sup>a</sup>	SHAP	/USER/SHAPE	SHAPE:
STATE	STAT	/USER/STATE	STATE:
USERFLAT - user-flatness file	UFLT	/USER/USERFLAT	USERFLAT:
UWCDMA - ARB uplink W-CDMA file <sup>a</sup>	UWCD	/USER/UWCDMA	UWCDMA:
WFM1 - waveform file <sup>a</sup>	WFM1	/USER/BBG1/WAVEFORM	WFM1:

- a. This feature does not apply to the E4428C.
- b. This msus designator is optional.

## MSUS (Mass Storage Unit Specifier) Variable

The variable "<msus>" enables a command to be file type specific when working with user files. Some commands use it as the only command parameter, while others can use it in conjunction with a file name when a command is not file type specific. When used with a file name, it is similar to Format 2 in the "File Name Variables" section on page 13. The difference is the file type specifier (msus) occupies its own variable and is not part of the file name syntax.

The following examples illustrate the usage of the variable "<msus>" when it is the only command parameter:

*Command Syntax with the msus variable*

```
:MMEMory:CATalog? "<msus>"
```

*Command Syntax with the file system*

```
:MMEMory:CATalog? "LIST:"
```

The variable "<msus>" is replaced with "LIST:". When the command is executed, the output displays only the files from the List file system.



The following examples illustrate the usage of the variable "<file name>" with the variable "<msus>":

*Command Syntax with the file name and msus variables*

```
:MMEMory:DELEte[:NAME] "<file name>", ["<msus>"]
```

*Command Syntax with the file name and file system*

```
:MMEMory:DELEte:NAME "LIST_1", "LIST:"
```

The command from the above example cannot discern which file system LIST\_1 belongs to without a file system specifier and will not work without it. When the command is properly executed, LIST\_1 is deleted from the List file system.

The following example shows the same command, but using Format 2 from the [“File Name Variables”](#) section on [page 13](#):

```
:MMEMory:DELEte:NAME "LIST_1@LIST"
```

When a file name is a parameter for a command that is not file system specific, either format ("`<file name>`", "`<msus>`" or "`<file name@msus>`") will work.

Refer to [Table 1-4 on page 14](#) for a listing of the file systems and types.

## Quote Usage with SCPI Commands

As a general rule, programming languages require that SCPI commands be enclosed in double quotes as shown in the following example:

```
":FM:EXTErnal:IMPedance 600"
```

However when a string is the parameter for a SCPI command, additional quotes or other delimiters may be required to identify the string. Your programming language may use two sets of double quotes, one set of single quotes, or back slashes with quotes to signify the string parameter. The following examples illustrate these different formats:

```
"MEMory:LOAD:LIST ""myfile"" used in BASIC programming languages
```

```
"MEMory:LOAD:LIST \"myfile\" used in C, C++, Java, and PERL
```

```
"MEMory:LOAD:LIST 'myfile' accepted by most programming languages
```

Consult your programming language reference manual to determine the correct format.

## Binary, Decimal, Hexadecimal, and Octal Formats

Command values may be entered using a binary, decimal, hexadecimal, or octal format. When the binary, hexadecimal, or octal format is used, their values must be preceded with the proper identifier. The decimal format (default format) requires no identifier and the signal generator assumes this format when a numeric value is entered without one. The following list shows the identifiers for the formats that require them:

- #B identifies the number as a binary numeric value (base-2).
- #H identifies the number as a hexadecimal alphanumeric value (base-16).
- #Q identifies the number as a octal alphanumeric value (base-8).

The following are examples of SCPI command values and identifiers for the decimal value 45:

#B101101	binary equivalent
#H2D	hexadecimal equivalent
#Q55	octal equivalent

The following example sets the RF output power to 10 dBm (or the equivalent value for the currently selected power unit, such as DBUV or DBUVEMF) using the hexadecimal value 000A:

```
:POW #H000A
```

A unit of measure, such as DBM or mV, will not work with the values when using a format other than decimal.

The following example sets the bluetooth board address to FFBF7 (hexadecimal):

```
:RADio:BLUEtooth:ARB:BDADdr #HFFBF7
```

---

## 2 Basic Function Commands

This chapter provides SCPI descriptions for subsystems dedicated to signal generator operations common to most ESG Signal Generators. This chapter contains the following major sections:

- “Correction Subsystem ([:SOURce]:CORRection)” on page 20
- “Digital Modulation Subsystem—E4438C ([:SOURce])” on page 22
- “Frequency Subsystem ([:SOURce])” on page 38
- “List/Sweep Subsystem ([:SOURce])” on page 49
- “Power Subsystem ([:SOURce]:POWer)” on page 58

---

## Correction Subsystem ([:SOURCE]:CORREction)

### :FLATness:LOAD

**Supported** All Models

```
[:SOURCE]:CORREction:FLATness:LOAD "<file name>"
```

This command loads a user-flatness correction file. The "<file name>" variable is the name of the file located in the Catalog of USERFLAT Files. The directory path is implied in the command and need not be specified in the variable name. For more information on file name syntax, refer to [“File Name Variables” on page 13](#).

**Key Entry** Load From Selected File

### :FLATness:PAIR

**Supported** All Models

```
[:SOURCE]:CORREction:FLATness:PAIR <freq> [<unit>], <corr> [<unit>]
```

This command sets a frequency and amplitude correction pair.

<corr.> This variable is the power correction.

Range	Frequency	Standard	Option UNB
	Option 501: 100kHz–1GHZ	–136 to 20DB	–136 to 25DB
	Option 502: 100kHz–2GHZ	–136 to 20DB	–136 to 25DB
	Option 503: 100kHz–3GHZ	–136 to 20DB	–136 to 25DB
	Option 504: 100kHz–4GHZ	–136 to 20DB	–136 to 25DB
	Option 506: 100kHz–6GHZ	–136 to 25DB	N/A

**Key Entry** Configure Cal Array

**Remarks** The maximum number of points that can be entered is 1601. Options 501, 502, and 504 are specific to the E4438C.

### :FLATness:POINts

**Supported** All Models

```
[:SOURCE]:CORREction:FLATness:POINts?
```

This query returns the number of points in the user-flatness correction file.

## :FLATness:PRESet

**Supported** All Models

---

**CAUTION** The current correction data will be overwritten once this command is executed. Save the current data if needed. Refer to “:FLATness:STORE” on page 21 for storing user-flatness files.

---

[:SOURCE]:CORREction:FLATness:PRESet

This command presets the user-flatness correction to a factory-defined setting that consists of one point.

**Key Entry** Preset List

## :FLATness:STORE

**Supported** All Models

[:SOURCE]:CORREction:FLATness:STORE "<file name>"

This command stores the current user-flatness correction data to a file named by the :CORREction:FLATness:STORE. The directory path is implied in the command and need not be specified in the "<file name>" variable.

**Key Entry** Store To File

**Remarks** For information on file name syntax, refer to “File Name Variables” on page 13.

## [:STATe]

**Supported** All Models

[:SOURCE]:CORREction[:STATe] ON|OFF|1|0

[:SOURCE]:CORREction[:STATe] ?

This command enables or disables the user-flatness corrections.

**\*RST** 0

**Key Entry** Flatness Off On

---

## Digital Modulation Subsystem—E4438C (:SOURce)

### :BURSt:SOURce

**Supported** E4438C

[ :SOURce ] :BURSt :SOURce EXT [1] | INT [1]

[ :SOURce ] :BURSt :SOURce?

This command selects either an internally generated or an externally supplied burst source.

**\*RST** EXT

**Key Entry** **Burst Envelope Int Ext Off**

**Remarks** The external burst source is applied to the EXT 1 INPUT connector.  
The INT[1] choice will not work unless an internal burst source is active.

### :BURSt:STATe

**Supported** E4438C

[ :SOURce ] :BURSt :STATe ON | OFF | 1 | 0

[ :SOURce ] :BURSt :STATe?

This command enables or disables the burst envelope function.

**\*RST** 0

**Key Entry** **Burst Envelope Int Ext Off**

### :DM:EXTernal:ALC:BANDwidth | BWIDth

**Supported** All Models

---

**NOTE** Refer to the *Programming Compatibility Guide* for information on this command. This command was replaced by the “:ALC:BANDwidth|BWIDth” command shown on [page 58](#) and the “:ALC:BANDwidth” command on [page 59](#).

---

## **:DM:EXTernal:HCRest[:STATe]**

**Supported** E4438C

```
[ :SOURce ] :DM:EXTernal:HCRest [ :STATe ] ON|OFF|1|0  
[ :SOURce ] :DM:EXTernal:HCRest [ :STATe ] ?
```

This command changes the operating condition to accommodate I/Q inputs with a high crest factor.

ON(1) This choice turns high crest mode on for externally applied signals with high crest factors. High crest mode allows the signal generator to process these signals with less distortion. For crest factors higher than 4 dB, I/Q drive levels should be reduced by 1 dB for each dB above that level. In high crest mode, the maximum output level is reduced and power level accuracy is degraded.

OFF(0) This choice disables the high crest mode.

**\*RST** 0

**Key Entry** High Crest Mode Off On

## **:DM:EXTernal:FILTer**

**Supported** E4438C

```
[ :SOURce ] :DM:EXTernal:FILTer 40e6|THROUGH  
[ :SOURce ] :DM:EXTernal:FILTer ?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:DM:EXTernal:FILTer:AUTO” on [page 23](#) to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** 40.000 MHz Through

## **:DM:EXTernal:FILTer:AUTO**

**Supported** E4438C

```
[ :SOURce ] :DM:EXTernal:FILTer:AUTO ON|OFF|1|0  
[ :SOURce ] :DM:EXTernal:FILTer:AUTO ?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel outputs.

**Digital Modulation Subsystem—E4438C (:SOURce)**

ON(1)	This choice will automatically select a digital modulation filter optimized for the current signal generator settings.
OFF(0)	This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:DM:EXTernal:FILTer” on page 23 for selecting a filter or through path.
*RST	1
<b>Key Entry</b>	<b>I/Q Output Filter Manual Auto</b>

**:DM:EXTernal:POLarity**

**Supported** E4438C

[ :SOURce ] :DM:EXTernal:POLarity NORMal | INVert  
 [ :SOURce ] :DM:EXTernal:POLarity?

This command sets the phase polarity for the I/Q signal.

\*RST NORM

**Key Entry** Int Phase Polarity Normal Invert

**Remarks** This command is for backward compatibility with the appropriate ESG E44xxB.

**:DM:EXTernal:SOURce**

**Supported** E4438C

[ :SOURce ] :DM:EXTernal:SOURce EXTernal | INTernal | BBG1 | EXT600 | OFF | SUM  
 [ :SOURce ] :DM:EXTernal:SOURce?

This command selects the I/Q signal source that is routed to the rear panel I and Q output connectors.

EXTernal	This choice routes a portion of the externally applied signals at the 50 ohm I and Q input connectors to the rear panel I and Q output connectors.
INTernal	This choice is for backward compatibility with the appropriate ESG E44xxB and performs the same function as the BBG1 selection.
BBG1	This choice routes a portion of the baseband generator I/Q signals to the rear panel I and Q connectors and requires Option 001/601or 002/602.
EXT600	This choice routes a portion of the externally applied signals at the 600 ohm I and Q input connectors to the rear panel I and Q output connectors.
OFF	This choice disables the output to the rear panel I and Q output connectors.



<b>SUM</b>	This choice routes a portion of the summed I/Q signals from source one and two, to the rear panel I and Q output connectors. See “:DM:SRATio” on page 36 for setting the summing ratio of the I/Q signals between source one and two.
<b>*RST</b>	EXT
<b>Key Entry</b>	<b>Ext 50 Ohm    BBG1    Ext 600 Ohm    Off    Sum</b>
<b>Remarks</b>	The output is the analog component of the I and Q signals. For selecting the I/Q source, refer to “:DM:SOURce” on page 35.

**:DM:IQADjustment:BBG:QSKew**

Supported            E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :DM:IQADjustment:BBG:QSKew <val><unit>
[ :SOURce ] :DM:IQADjustment:BBG:QSKew?
```

This command affects both the rear-panel I and Q signals, and the RF output path by adjusting the phase angle (quadrature skew) of the Q vector.

Positive skew increases the angle from 90 degrees while negative skew decreases the angle from 90 degrees. When the quadrature skew is zero, the phase angle between the I and Q vectors is 90 degrees.

The <val> variable has a minimum resolution of 0.1. The command works with or without the unit variable.

**Example**

```
:DM:IQAD:BBG:QSK 4.5DEG
```

The preceding example increases the phase angle by 4.5 degrees.

**\*RST**                    +0.00000000E+000

**Range**                    -30 to 30DEG

**Key Entry**                **Quadrature Angle Adjustment**

**Remarks**                This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

To change the quadrature skew on only the RF output path, see “:DM:IQADjustment:QSKew” on page 30.

**:DM:IQADjustment:EXTernal:COFFset****Supported** E4438C

[:SOURce]:DM:IQADjustment:EXTernal:COFFset &lt;val&gt;

[:SOURce]:DM:IQADjustment:EXTernal:COFFset?

This command sets the common mode offset voltage for both the in-phase (I) and quadrature-phase (Q) signals going to the rear panel I and Q output connectors.

The variable <val> is expressed in units of volts (mV–V).

**\*RST** +0.00000000E+000**Range** –3 to 3**Key Entry** **Common Mode I/Q Offset**

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

**:DM:IQADjustment:EXTernal:DIOffset****Supported** E4438C

[:SOURce]:DM:IQADjustment:EXTernal:DIOffset &lt;val&gt;

[:SOURce]:DM:IQADjustment:EXTernal:DIOffset?

This command sets the differential offset voltage for an in-phase (I) signal routed to the I output connectors.

The variable <val> is expressed in units of volts (mV–V).

**\*RST** +0.00000000E+000**Range** –3 to 3**Key Entry** **Diff. Mode I Offset**

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

### **:DM:IQADjustment:EXTernal:DQOFFset**

**Supported** E4438C

```
[ :SOURce ] :DM:IQADjustment:EXTernal:DQOFFset <val>  
[ :SOURce ] :DM:IQADjustment:EXTernal:DQOFFset?
```

This command sets the differential offset voltage for a quadrature-phase (Q) signal routed to the Q output connectors.

**\*RST** +0.00000000E+000

**Range** -4 to 4

**Key Entry** **Diff. Mode Q Offset**

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

### **:DM:IQADjustment:EXTernal:GAIN**

**Supported** E4438C

```
[ :SOURce ] :DM:IQADjustment:EXTernal:GAIN <val>  
[ :SOURce ] :DM:IQADjustment:EXTernal:GAIN?
```

This command sets the I/Q gain ratio for signals routed to the rear panel I and Q output connectors.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -4 to 4

**Key Entry** **I/Q Out Gain Balance**

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

### **:DM:IQADjustment:EXTernal:IOFFset**

**Supported** E4438C

```
[ :SOURce ] :DM:IQADjustment:EXTernal:IOFFset <val>  
[ :SOURce ] :DM:IQADjustment:EXTernal:IOFFset?
```

**Digital Modulation Subsystem—E4438C (:SOURce)**

This command sets the offset voltage for a signal applied to the 600 ohm I input connector.

The variable <val> is expressed in units of volts (mV–V).

**\*RST** +0.00000000E+000

**Key Entry** Ext In 600 Ohm I Offset

**Range** –5 to 5

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

**:DM:IQADjustment:EXTernal:IQATten**

**Supported** E4438C

[ :SOURce ] :DM:IQADjustment:EXTernal:IQATten <val>

[ :SOURce ] :DM:IQADjustment:EXTernal:IQATten?

This command sets the I/Q output attenuation level.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +6.00000000E+000

**Range** 0–40

**Key Entry** I/Q Output Atten

**Remarks** The value set by this command is active even if the I/Q adjustment function is off.

**:DM:IQADjustment:EXTernal:QOFFset**

**Supported** E4438C

[ :SOURce ] :DM:IQADjustment:EXTernal:QOFFset <val>

[ :SOURce ] :DM:IQADjustment:EXTernal:QOFFset?

This command sets the offset voltage for a signal applied to the 600 ohm Q input connector.

The variable <val> is expressed in units of volts (mV–V).

**\*RST** +0.00000000E+000

**Range** –5 to 5

**Key Entry** Ext In 600 Ohm Q Offset

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

## **:DM:IQADjustment:GAIN**

**Supported** E4438C

[ :SOURce] :DM:IQADjustment:GAIN <val>

[ :SOURce] :DM:IQADjustment:GAIN?

This command sets the gain for the I signal relative to the Q signal.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -4 to 4

**Key Entry** **I/Q Gain Balance Source 1**

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

## **:DM:IQADjustment:IOFFset**

**Supported** E4438C

[ :SOURce] :DM:IQADjustment:IOFFset <val>

[ :SOURce] :DM:IQADjustment:IOFFset?

This command adjusts the I channel offset value.

The variable <val> is expressed in units of percent with a minimum resolution of 0.025.

**\*RST** +0.00000000E+000

**Range** -50.000 to 50.000

**Key Entry** **I Offset**

**Remarks** When using this command to minimize the LO feedthrough signal, optimum performance is achieved when the command is sent after all other I/Q path commands are executed, such as those that change the internal phase polarity or adjust the modulator attenuator. If other adjustments are made after minimizing is performed, the LO feedthrough signal may increase.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

**:DM:IQADjustment:QOFFset****Supported** E4438C[:SOURce]:DM:IQADjustment:QOFFset  
[:SOURce]:DM:IQADjustment:QOFFset?

This command adjusts the Q channel offset value.

The variable <val> is expressed in units of percent with a minimum resolution of 0.025.

**\*RST** +0.00000000E+000**Range** -50.000 to 50.000**Key Entry** **Q Offset**

**Remarks** When using this command to minimize the LO feedthrough signal, optimum performance is achieved when the command is sent after all other I/Q path commands are executed, such as those that change the internal phase polarity or adjust the modulator attenuator. If other adjustments are made after minimizing is performed, the LO feedthrough signal may increase.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

**:DM:IQADjustment:QSKew****Supported** E4438C[:SOURce]:DM:IQADjustment:QSKew <val>  
[:SOURce]:DM:IQADjustment:QSKew?

This command adjusts the phase angle (quadrature skew) between the I and Q vectors by increasing or decreasing the Q phase angle. It affects only the RF output path.

If the signal generator is operating at frequencies greater than 3.3 GHz, quadrature skew settings greater than  $\pm 5$  degrees will not be within specifications.

Positive skew increases the angle from 90 degrees while negative skew decreases the angle from 90 degrees. When the quadrature skew is zero, the phase angle between the I and Q vectors is 90 degrees.

The <val> variable is expressed in degrees with a minimum resolution of 0.1.

**Example**

:DM:IQAD:QSK 4.5

The preceding example increases the phase angle by 4.5 degrees.

<b>*RST</b>	+0.00000000E+000
<b>Range</b>	-1E1 to +1E1
<b>Key Entry</b>	<b>Quadrature Angle Adjustment</b>
<b>Remarks</b>	This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.  To change the quadrature skew for both the rear-panel I and Q signals, and RF output path, see “:DM:IQADjustment:BBG:QSKew” on page 25 (requires Option 001/601 or 002/602).

### :DM:IQADjustment:SKEW

**Supported** E4438C

```
[ :SOURCE ] :DM:IQADjustment:SKEW [ :DELay ] <val>  
[ :SOURCE ] :DM:IQADjustment:SKEW?
```

This command changes the input skew which is a time delay difference between the I and Q signals. Equal and opposite skew is applied to both I and Q and affects the RF Output and I/Q output paths simultaneously. A positive value delays the I signal relative to the Q signal, and a negative value delays the Q signal relative to the I signal.

If the internal I/Q correction path is set to RF or BB the I/Q signals are already optimized and adjusting I/Q skew would add an impairment to the signals. If the internal I/Q correction path is set to Off, then adjusting the I/Q skew could improve the I/Q signals. The I/Q skew adjustment cannot be performed on the MSK, FSK, and C4FM constant envelope modulations.

I/Q skew adjustments are preserved when the instrument state is saved. I/Q skew adjustments are also preserved when instrument settings are changed. If the signal generator is calibrated, the skew adjustments are added to the calibration value used for the given signal generator state. If the signal generator is uncalibrated, the skew adjustments are re-applied directly.

Using I/Q skew while playing a user FIR file greater than 32 symbols will generate an error.

The variable <val> is expressed in seconds. Range limits are determined by the modulation configuration but is limited to a maximum of  $\pm 2$  seconds.

#### Example

```
:DM:IQAD:SKEW .5
```

The preceding example sets the time delay difference between the I and Q signals to 500 milliseconds.

<b>*RST</b>	+0.00000000E+000
-------------	------------------

<b>Key Entry</b>	<b>I/Q Timing Skew</b>
------------------	------------------------

**:DM:IQADjustment:SKEW:Path****Supported** E4438C

[:SOURce]:DM:IQADjustment:SKEW:PATH RF BB

[:SOURce]:DM:IQADjustment:SKEW?

This command selects either the RF or BB (baseband) path as the path to which skew timing corrections will be applied. If there are no factory I/Q timing skew corrections data, then adjusting the I/Q timing skew for the selected path may improve the error vector magnitude (EVM) of the signal. Refer to the “:DM:IQADjustment:SKEW” on page 31 for more information.

If internal I/Q corrections are available for the RF or external I/Q output (BB) path then the I/Q signals are already optimized and adjusting I/Q skew for either path would add an impairment to the signal.

**Example**

:DM:IQAD:SKEW:PATH RF

The preceding example selects the RF path as the path to which skew timing adjustments will be made.

**\*RST** +0.00000000E+000**Key Entry** I/Q Timing Skew Path**:DM:IQADjustment[:STATe]****Supported** E4438C

[:SOURce]:DM:IQADjustment[:STATe] ON|OFF|1|0

[:SOURce]:DM:IQADjustment[:STATe]?

This command enables or disables the I/Q adjustments.

**Example**

:DM:IQAD 1

The preceding example enables I/Q adjustments.

**\*RST** 0**Key Entry** I/Q Adjustments Off On**:DM:MODulation:FILTer****Supported** E4438C

[:SOURce]:DM:MODulation:FILTer 2.1e6|40e6|THROUGH

[:SOURce]:DM:MODulation:FILTer?



This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter with this command automatically sets “:DM:MODulation:FILTer:AUTO” to OFF(0).

2.1E6                      This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6                      This choice applies a 40 MHz baseband filter to the I/Q signals.

THRough                 This choice bypasses filtering.

\*RST                      THR

**Key Entry                2.100 MHz    40.000 MHz    Through**

### **:DM:MODulation:FILTer:AUTO**

**Supported                E4438C**

```
[ :SOURce ] :DM:MODulation:FILTer:AUTO ON|OFF|1|0
[ :SOURce ] :DM:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1)                    This choice will automatically select a digital modulation filter.

OFF(0)                   This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:DM:MODulation:FILTer” on page 32 for selecting a filter or through path.

\*RST                      1

**Key Entry                I/Q Mod Filter Manual Auto**

### **:DM:MODulation:ATTen**

**Supported                E4438C**

```
[ :SOURce ] :DM:MODulation:ATTen <val>
[ :SOURce ] :DM:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

\*RST                      +2.00000000E+000

**Range                    0–40**

**Key Entry                Modulator Atten Manual Auto**

**:DM:MODulation:ATTen:AUTO****Supported** E4438C

[:SOURce]:DM:MODulation:ATTen:AUTO ON|OFF|1|0

[:SOURce]:DM:MODulation:ATTen:AUTO?

This command enables or disables the I/Q attenuation auto mode.

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:DM:MODulation:ATTen” on page 33 for setting the attenuation value.

**\*RST** 1**Key Entry** **Modulator Atten Manual Auto****:DM:POLarity[:ALL]****Supported** E4438C

[:SOURce]:DM:POLarity[:ALL] NORMal|INVert

[:SOURce]:DM:POLarity?

This command sets the digital modulation phase polarity.

NORMal This choice selects normal phase polarity for the I and Q signals.

INVert This choice flips the I and Q signals by routing the I signal to the Q input of the I/Q modulator and the Q signal to the I input.

**\*RST** NORM**Key Entry** **Int Phase Polarity Normal Invert**

## **:DM:SKEW:PATH**

**Supported** E4438C

[ :SOURce ] :DM:SKEW:PATH RF | BB

[ :SOURce ] :DM:SKEW:PATH?

This command selects the skew path.

**RF** When RF is selected, the skew is optimized for the I/Q signal applied to the RF Output. The BB output will be functional, but the I/Q timing skew applied will be optimized for the RF path. When using this choice, seven symbols of latency are added to the Arb based waveform. While in real-time mode, the maximum number of user symbols for the FIR is limited to 32.

**BB** When BB is selected, the skew is optimized for the I/Q signal outputs on the rear panel. The RF Output will be functional, but the I/Q timing skew applied will be optimized for the BB path. When using this choice, seven symbols of latency are added to the Arb based waveform. While in real-time mode, the maximum number of user symbols for the FIR is limited to 32.

**\*RST** INT

**Key Entry** **Int I/Q Skew Corrections RF BB Off**

## **:DM:SKEW[:STATe]**

**Supported** E4438C

[ :SOURce ] :DM:SKEW [ :STATe ] ON | OFF | 1 | 0

[ :SOURce ] :DM:SKEW [ :STATe ] ?

This command enables or disables the I/Q timing skew correction function.

**\*RST** 1

**Key Entry** **Int I/Q Skew Corrections RF BB Off**

## **:DM:SOURce**

**Supported** E4438C

[ :SOURce ] :DM:SOURce [ 1 ] | 2 EXTernal | INTernal | BBG1 | EXT600 | OFF

[ :SOURce ] :DM:SOURce?

This command selects the I/Q modulator source.

**EXTernal** This choice selects a 50 ohm impedance for the I and Q input connectors and routes the applied signals to the I/Q modulator.

## Basic Function Commands

### Digital Modulation Subsystem—E4438C ([:SOURce])

INTernal	This choice is for backward compatibility with the appropriate ESG E44xxB and performs the same function as the BBG1 selection.			
BBG1	This choice selects the baseband generator as the source for the I/Q modulator and requires Option 001/601 or 002/602.			
EXT600	This choice selects a 600 ohm impedance for the I and Q input connectors and routes the applied signals to the I/Q modulator.			
OFF	This choice disables the digital modulation source.			
*RST	EXT			
<b>Key Entry</b>	<b>Ext 50 Ohm</b>	<b>BBG1</b>	<b>Ext 600 Ohm</b>	<b>Off</b>

### :DM:SRATio

**Supported** E4438C

```
[ :SOURce ] :DM:SRATio <val><unit>  
[ :SOURce ] :DM:SRATio?
```

This command sets the power level difference (ratio) between the source one and source two signals when the two signals are summed together. A positive ratio value reduces the amplitude for source two, while a negative ratio value reduces the amplitude for source one.

The range for the summing ratio is dependent on the modulator attenuator (mod atten) setting for the signal generator that is summing the signals together. The minimum range is achieved when the modulator attenuator setting is zero and the maximum range is reached when the maximum attenuator value is used. The range can be calculated using the following formula:

$$\pm \text{Range} = 50 \text{ dB} + \text{Mod Atten}$$

\*RST +0.00000000E+000

**Range** *Min:*  $\pm 50$  dB *Max:*  $\pm 90$  dB

**Key Entry** **Summing Ratio (SRC1/SRC2) x.xx dB**

**Remarks** For real-time modulation format modulator attenuator settings, see [“:DM:MODulation:ATTen” on page 33](#) and [“:DM:MODulation:ATTen:AUTO” on page 34](#). For an Arb modulation format modulator attenuator setting, refer to the SCPI command subsystem for the Arb format being used and find the commands that contain the command mnemonics IQ:MODulation:ATTen.

## :DM:STATe

**Supported** E4438C

[ :SOURce ] :DM:STATe ON | OFF | 1 | 0

[ :SOURce ] :DM:STATe?

This command enables or disables the I/Q modulator.

ON (1) This choice enables the internal I/Q modulator.

OFF (0) This choice disables the internal I/Q modulator. You can turn off the I/Q modulation with this choice even though a digital modulation format is enabled. With this configuration, the RF output signal will not be modulated, but the I/Q signals may be present at the rear panel I and Q outputs depending on the rear panel output selection.

**\*RST** 0

**Key Entry** I/Q Off On

**Remarks** The I/Q modulator is enabled whenever a digital format is turned on.  
The I/Q annunciator will be shown on the signal generator display whenever the I/Q modulator is on.

---

## Frequency Subsystem ([:SOURCE])

### :FREQUENCY:CHANNELS:BAND

**Supported**      All Models

```
[:SOURCE]:FREQUENCY:CHANNELS:BAND NBASe|NMOBILE|BPGSm|MPGSm|BEGSm|MEGSm|  
BRGSm|MRGSm|BDCS|MDCS|BPCS|MPCS|B450|GM450|B480|M480|B850|M850|B8|M8|B15  
|M15|B390|B420|B460|B915|M380|M410|M450|M870|PHS|DECT  
[:SOURCE]:FREQUENCY:CHANNELS:BAND?
```

This command sets the frequency of the signal generator by specifying a frequency channel band.

NBASe	This choice selects Standard Base as the frequency band for NADC.
NMOBILE	This choice selects Standard Mobile as the frequency band for NADC.
BPGSm	This choice selects P-Gsm 900 Base as the frequency band for GSM.
MPGSm	This choice selects P-Gsm 900 Mobile as the frequency band for GSM.
BEGSm	This choice selects E-Gsm 900 Base as the frequency band for GSM.
MEGSm	This choice selects E-Gsm 900 Mobile as the frequency band for GSM.
BRGSm	This choice selects R-Gsm 900 Base as the frequency band for GSM.
MRGSm	This choice selects R-Gsm 900 Mobile as the frequency band for GSM.
BDCS	This choice selects DCS 1800 Base as the frequency band for GSM.
MDCS	This choice selects DCS 1800 Mobile as the frequency band for GSM.
BPCS	This choice selects PCS 1900 Base as the frequency band for GSM.
MPCS	This choice selects PCS 1900 Mobile as the frequency band for GSM.
B450	This choice selects Gsm 450 Base as the frequency band for GSM.
GM450	This choice selects Gsm 450 Mobile as the frequency band for GSM.
B480	This choice selects Gsm 480 Base as the frequency band for GSM.
M480	This choice selects Gsm 480 Mobile as the frequency band for GSM.
B850	This choice selects Gsm 850 Base as the frequency band for GSM.
M850	This choice selects Gsm 850 Mobile as the frequency band for GSM.
B8	This choice selects 800MHz Base as the frequency band for PDC.

M8 This choice selects 800MHz Mobile as the frequency band for PDC.  
 B15 This choice selects 1500MHz Base as the frequency band for PDC.  
 M15 This choice selects 1500MHz Mobile as the frequency band for PDC.  
 B390 This choice selects Base 390-400 as the frequency band for TETRA.  
 B420 This choice selects Base 420-430 as the frequency band for TETRA.  
 B460 This choice selects Base 460-470 as the frequency band for TETRA.  
 B915 This choice selects Base 915-921 as the frequency band for TETRA.  
 M380 This choice selects Mobile 380-390 as the frequency band for TETRA.  
 M410 This choice selects Mobile 410-420 as the frequency band for TETRA.  
 M450 This choice selects Mobile 450-460 as the frequency band for TETRA.  
 M870 This choice selects Mobile 870-876 as the frequency band for TETRA.  
 PHS This choice selects Standard PHS as the frequency band.  
 DECT This choice selects Standard DECT as the frequency band.

**\*RST**

BPGS

**Key Entry**

<b>P-GSM Base</b>	<b>E-GSM Base</b>	<b>R-GSM Base</b>	<b>DCS Base</b>
<b>PCS Base</b>	<b>GSM 450 Base</b>	<b>GSM 480 Base</b>	<b>GSM 850 Base</b>
<b>NADC Base</b>	<b>800MHZ Base</b>	<b>1500MHZ Base</b>	
<b>Tetra Base 390/400</b>	<b>Tetra Base 420/430</b>	<b>Tetra Base 460/470</b>	
<b>Tetra Base 915/921</b>	<b>PHS Standard</b>	<b>DECT Standard</b>	
<b>P-GSM Mobile</b>	<b>E-GSM Mobile</b>	<b>R-GSM Mobile</b>	<b>DCS Mobile</b>
<b>PCS Mobile</b>	<b>GSM 450 Mobile</b>	<b>GSM 480 Mobile</b>	<b>GSM 850 Mobile</b>
<b>NADC Mobile</b>	<b>800MHZ Mobile</b>	<b>1500MHZ Mobile</b>	
<b>Tetra Mobile 380/390</b>	<b>Tetra Mobile 410/420</b>	<b>Tetra Mobile 450/460</b>	
<b>Tetra Mobile 870/876</b>			

**Remarks**

The frequency channel state must be enabled for this command to work. Refer to “:FREQuency:CHANnels[:STATe]” on page 41.

**:FREQuency:CHANnels:NUMBer****Supported** All Models

[:SOURce]:FREQuency:CHANnels:NUMBer &lt;number&gt;

[:SOURce]:FREQuency:CHANnels:NUMBer?

This command sets the frequency of the signal generator by specifying a channel number of a given frequency band.

**\*RST** +1

<b>Range</b>	P-GSM Base/Mobile:	1–24
	E-GSM and R-GSM Base/Mobile:	1–1023
	DCS Base/Mobile:	512–885
	PCS Base/Mobile:	512–900
	GSM-450 Base/Mobile:	259–293
	GSM-480 Base/Mobile:	306–340
	GSM-850 Base/Mobile:	128–251
	NADC Base/Mobile:	1–1023
	800MHZ Base/Mobile:	0–640
	1500MHZ Base/Mobile:	0–960
	TETRA 380/390 Mobile:	3600–4000
	TETRA 390/4000 Base:	3600–4000
	TETRA 410/420 Mobile:	800–1200
	TETRA 420/430 Base:	800–1200
	TETRA 460/470: 2400 through 2800	2400–2800
	TETRA 870/876 Mobile:	600–640
	TETRA 915/921 Base:	600–940
	PHS Standard:	1–255
	DECT Standard:	0–9

**Key Entry** Channel Number

**Remarks** The frequency channel state must be enabled for this command to work. Refer to “:FREQuency:CHANnels[:STATe]” on page 41.



### **:FREQuency:CHANnels[:STATe]**

**Supported**            All Models

```
[:SOURCE]:FREQuency:CHANnels[:STATe] ON|OFF|1|0
[:SOURCE]:FREQuency:CHANnels[:STATe] ?
```

This command enables or disables the frequency channel and band selection to set the output frequency.

**\*RST**                    0

**Key Entry**            **Freq Channels Off On**

**Remarks**            To set frequency channels band refer to “:FREQuency:CHANnels:BAND” on [page 38](#).

### **:FREQuency:FIXed**

**Supported**            All Models

```
[:SOURCE]:FREQuency:FIXed <val><unit>|UP|DOWN
[:SOURCE]:FREQuency:FIXed?
```

This command sets the signal generator output frequency, or increments or decrements the current RF frequency setting.

<val>                    A frequency value.

UP                        Increases the current frequency setting by the value set with the “:FREQuency[:CW]:STEP[:INCRement]” command found on [page 47](#). The front-panel up-arrow key performs the same function.

DOWN                    Decreases the current frequency setting by the value set with the “:FREQuency[:CW]:STEP[:INCRement]” command found on [page 47](#). The front-panel down-arrow key performs the same function.

**\*RST**                    Option 501: +10000000000000E+09  
                           Option 502: +20000000000000E+09  
                           Option 503: +30000000000000E+09  
                           Option 504: +40000000000000E+09  
                           Option 506: +60000000000000E+09

**Range**                    E4438C Option 501: 100kHz–1GHZ  
                           E4438C Option 502: 100kHz–2GHZ  
                           Option 503: 100kHz–3GHZ  
                           E4438C Option 504: 100kHz–4GHZ

**Frequency Subsystem ([:SOURce])**

Option 506: 100kHz–6GHz

**Remarks** To set the frequency mode to FIXed, refer to “:FREQuency:MODE” on page 42.  
A frequency change may affect the current output power. Refer to “[:LEVel][:IMMediate][:AMPLitude]” on page 69 for the correct specified frequency and amplitude settings.

**:FREQuency:MODE**

**Supported** All Models

```
[ :SOURce ] :FREQuency:MODE CW | FIXed | LIST
[ :SOURce ] :FREQuency:MODE?
```

This command sets the frequency mode of the signal generator to CW or swept.

**CW and FIXed** These choices are synonymous with one another and stops a frequency sweep, allowing the ESG to operate at a set frequency. Refer to “:FREQuency[:CW]” on page 46 for setting the frequency in the CW mode and to “:FREQuency:FIXed” on page 41 for setting the frequency in the FIXed mode.

**LIST** This choice selects the swept frequency mode. If sweep triggering is set to immediate along with continuous sweep mode, executing the command starts the LIST or STEP frequency sweep.

**NOTE** To perform a frequency and amplitude sweep, you must also select LIST as the power mode. See “:MODE” on page 66 for selecting the list mode for an amplitude sweep.

**\*RST** CW

**Key Entry** **Frequency Freq Off**

**:FREQuency:MULTiplier**

**Supported** All Models

```
[ :SOURce ] :FREQuency:MULTiplier <val>
[ :SOURce ] :FREQuency:MULTiplier?
```

This command sets the multiplier for the signal generator carrier frequency.

**\*RST** +1.00000000E+000

**Range** Negative Values: -100 to -.001      Positive Values: .001–1000

**Key Entry** **Freq Multiplier**

**Remarks** For any multiplier other than one, the MULT indicator is shown in the frequency area of the display.

### **:FREQuency:OFFSet**

**Supported** All Models

```
[ :SOURce ] :FREQuency:OFFSet <val><unit>  
[ :SOURce ] :FREQuency:OFFSet?
```

This command sets the frequency offset.

The query of this command returns a value equal to the original output frequency times the multiplier value, plus the frequency offset value.

**\*RST** +0.00000000000000E+00

**Range** -200GHZ to 200GHZ

**Key Entry** **Freq Offset**

**Remarks** When an offset has been entered, the OFFS indicator is turned on in the frequency area of the display.

The frequency offset state is turned on when any non-zero value is entered; entering zero will turn it off. Refer to “:FREQuency:OFFSet:STATe” for setting the offset state independent of entering offset values.

### **:FREQuency:OFFSet:STATe**

**Supported** All Models

```
[ :SOURce ] :FREQuency:OFFSet:STATe ON|OFF|1|0  
[ :SOURce ] :FREQuency:OFFSet:STATe?
```

This command enables or disables the offset frequency.

**\*RST** 0

**Key Entry** **Freq Offset**

**Remarks** Entering OFF (0) will set the frequency offset to 0 Hz.

### **:FREQuency:REFerence**

**Supported** All Models

```
[ :SOURce ] :FREQuency:REFerence <val><unit>  
[ :SOURce ] :FREQuency:REFerence?
```

This command sets the output reference frequency.

## Basic Function Commands

### Frequency Subsystem ([:SOURce])

<b>*RST</b>	+0.00000000000000E+00
<b>Range</b>	Option 501: 0HZ–1GHZ Option 502: 0HZ–2GHZ Option 503: 0HZ–3GHZ Option 504: 0HZ–4GHZ Option 506: 0HZ–6GHZ
<b>Key Entry</b>	<b>Freq Ref Set</b>
<b>Remarks</b>	Options 501, 502, and 504 are specific to the E4438C.

### :FREQuency:REFeRence:STATe

**Supported** All Models

```
[ :SOURce ] :FREQuency:REFeRence:STATe ON|OFF|1|0  
[ :SOURce ] :FREQuency:REFeRence:STATe?
```

This command enables or disables the frequency reference mode.

**\*RST** 0

**Key Entry** **Freq Ref Off On**

**Remarks** When the frequency reference mode is on, subsequent frequency parameters are set relative to the reference value.

### :FREQuency:STARt

**Supported** All Models

```
[ :SOURce ] :FREQuency:STARt <val><unit>  
[ :SOURce ] :FREQuency:STARt?
```

This command sets the first frequency point in a step sweep.

**\*RST** Option 501: +10000000000000E+09  
Option 502: +20000000000000E+09  
Option 503: +30000000000000E+09  
Option 504: +40000000000000E+09  
Option 506: +60000000000000E+09

**Range** Option 501: 100kHz–1GHZ  
Option 502: 100kHz–2GHZ  
Option 503: 100kHz–3GHZ

	Option 504: 100kHz–4GHz
	Option 506: 100kHz–6GHz
<b>Key Entry</b>	<b>Freq Start</b>
<b>Remarks</b>	Options 501, 502, and 504 are specific to the E4438C.

### **:FREQuency:STOP**

<b>Supported</b>	All Models
	<code>[:SOURce]:FREQuency:STOP &lt;val&gt;&lt;unit&gt;</code>
	<code>[:SOURce]:FREQuency:STOP?</code>
	This command sets the last frequency point in a step sweep.
<b>*RST</b>	Option 501: +10000000000000E+09
	Option 502: +20000000000000E+09
	Option 503: +30000000000000E+09
	Option 504: +40000000000000E+09
	Option 506: +60000000000000E+09
<b>Range</b>	Option 501: 100kHz–1GHz
	Option 502: 100kHz–2GHz
	Option 503: 100kHz–3GHz
	Option 504: 100kHz–4GHz
	Option 506: 100kHz–6GHz
<b>Key Entry</b>	<b>Freq Stop</b>
<b>Remarks</b>	Options 501, 502, and 504 are specific to the E4438C.

### **:FREQuency:SYNThesis**

<b>Supported</b>	E4438C except with Option UNJ
	<code>[:SOURce]:FREQuency:SYNThesis 1 2</code>
	<code>[:SOURce]:FREQuency:SYNThesis?</code>
	This command sets the phase-lock loop (PLL) bandwidth to optimize phase noise for offsets above and below 10 kHz.
1	This choice will select mode 1 which optimize phase noise at offsets below 10 kHz.
2	This choice will select mode 2 which optimizes phase noise at offsets above

## Basic Function Commands

### Frequency Subsystem ([:SOURce])

10 kHz.

**\*RST** +1

**Key Entry**      **Mode 1 Optimize <10kHz Offset**      **Mode 2 Optimize >10kHz Offset**

#### **:FREQuency[:CW]**

**Supported**      All Models

[[:SOURce]:FREQuency[:CW] <val><unit>|UP|DOWN

[[:SOURce]:FREQuency[:CW]?

This command sets the signal generator output frequency for the CW frequency mode, or increments or decrements the current RF frequency setting.

<val>      A frequency value.

UP      Increases the current frequency setting by the value set with the “:FREQuency[:CW]:STEP[:INCRement]” command found on [page 47](#). The front-panel up-arrow key performs the same function.

DOWN      Decreases the current frequency setting by the value set with the “:FREQuency[:CW]:STEP[:INCRement]” command found on [page 47](#). The front-panel down-arrow key performs the same function.

**\*RST**      Option 501: +10000000000000E+09  
Option 502: +20000000000000E+09  
Option 503: +30000000000000E+09  
Option 504: +40000000000000E+09  
Option 506: +60000000000000E+09

**Range**      E4438C Option 501: 100kHz–1GHZ  
E4438C Option 502: 100kHz–2GHZ  
Option 503: 100kHz–3GHZ  
E4438C Option 504: 100kHz–4GHZ  
Option 506: 100kHz–6GHZ

**Key Entry**      **Frequency**

**Remarks**      To set the frequency mode to CW, refer to “:FREQuency:MODE” on [page 42](#).

A frequency change may affect the current output power. Refer to “[:LEVel][:IMMediate][:AMPLitude]” on [page 69](#) for the correct specified frequency and amplitude settings.

### **:FREQuency[:CW]:STEP[:INCRement]**

**Supported** All Models

```
[ :SOURce ] :FREQuency [ :CW ] :STEP [ :INCRement ] <val><unit>  
[ :SOURce ] :FREQuency [ :CW ] :STEP [ :INCRement ] ?
```

This command sets the incremental step value for the frequency parameter.

**Range** .01 Hz–99 GHz

**Key Entry** **Incr Set**

**Remarks** The value set with this command is not affected by \*RST or a power cycle.

### **:PHASe:REFerence**

**Supported** All Models

```
[ :SOURce ] :PHASe :REFerence
```

This command sets the current output phase as a zero reference.

**Key Entry** **Phase Ref Set**

**Remarks** Subsequent phase adjustments are set relative to the new reference.

### **:PHASe[:ADJust]**

**Supported** All Models

```
[ :SOURce ] :PHASe [ :ADJust ] <val><unit>  
[ :SOURce ] :PHASe [ :ADJust ] ?
```

This command adjusts the phase of the modulating signal.

The query will only return values in radians.

**\*RST** +0.00000000E+000

**Range** Radians: –3.14 to 3.14RAD      Degrees: –180 to 179DEG

**Key Entry** **Adjust Phase**

### **:ROSCillator:SOURce**

**Supported** All Models

```
[ :SOURce ] :ROSCillator :SOURce ?
```

This command queries the source of the reference oscillator. It returns either INT (internal) or EXT (external).

## **:ROSCillator:SOURce:AUTO**

**Supported** All Models except signal generators with Option UNJ

```
[ :SOURce ] :ROSCillator:SOURce:AUTO ON | OFF | 1 | 0
```

```
[ :SOURce ] :ROSCillator:SOURce:AUTO?
```

This command enables or disables the ability of the signal generator to automatically select between the internal and an external reference oscillator.

ON (1) This choice enables the signal generator to detect when a valid reference signal is present at the 10 MHz IN connector and automatically switches from internal to external frequency reference.

OFF (0) This choice selects the internal reference oscillator and disables the switching capability between the internal and an external frequency reference.

**\*RST** 1

**Key Entry** **Ref Oscillator Source Auto Off On**



## List/Sweep Subsystem ([:SOURce])

A complete sweep setup requires commands from other subsystems. [Table 2-1](#) shows the function and location of these other commands.

**Table 2-1 Location of Commands from the other Subsystems**

Sweep Type	Function	Command Location	Key Entry under Sweep/List key
List and Step	Start/stop frequency sweep	“:FREQuency:MODE” on page 42	<b>Freq Off</b>
	Start/stop amplitude sweep	“:MODE” on page 66	<b>Ampl Off</b>
	Start/stop frequency and amplitude sweep <sup>1</sup>	“:MODE” on page 66 “:FREQuency:MODE” on page 42	<b>Freq &amp; Ampl Off</b>
	Set up and control sweep triggering <sup>2</sup>	“Trigger Subsystem” on page 166	See the “Trigger Subsystem”
List	Load a list sweep file	“:LOAD:LIST” on page 123 and page 127	<b>Load From Selected File</b>
	Store list sweep data to a file	“:STORE:LIST” on page 123 and page 127	<b>Store To File</b>
Step	Start frequency sweep	“:FREQuency:START” on page 44	<b>Freq Start</b>
	Store list sweep data to a file	“:STORE:LIST” on page 123 and page 127	<b>Store To File</b>
	Start amplitude sweep	“:START” on page 67	<b>Ampl Start</b>
	Stop amplitude sweep	“:STOP” on page 68	<b>Ampl Stop</b>

1. Execute both commands to start or stop a frequency and amplitude sweep.
2. For point to point triggering, see “:LIST:TRIGger:SOURce” on page 54.

**:LIST:DIRection****Supported** All Models

[:SOURce]:LIST:DIRection UP|DOWN

[:SOURce]:LIST:DIRection?

This command sets the direction of a list or step sweep.

UP This choice enables a sweep in an ascending order:

- first to last point for a list sweep
- start to stop for a step sweep

DOWN This choice reverses the direction of the sweep.

**\*RST** UP**Key Entry** Sweep Direction Down Up**:LIST:DWELl****Supported** All Models

[:SOURce]:LIST:DWELl &lt;val&gt;{,&lt;val&gt;}

[:SOURce]:LIST:DWELl?

This command sets the dwell time for the current list sweep points.

The variable &lt;val&gt; is expressed in units of seconds with a 0.001 resolution.

---

**NOTE** The dwell time (<val>) does not begin until the signal generator has settled for the current frequency and/or amplitude change.

---

**Range** 0.001–60**Remarks** Dwell time is used when IMMEDIATE is the trigger source. Refer to [“:LIST:TRIGger:SOURce” on page 54](#) for the trigger setting.

The dwell time is the amount of time the sweep is guaranteed to pause after setting the frequency and/or power for the current point.

The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## :LIST:DWEL:POINts

**Supported** All Models

[ :SOURCE ] :LIST:DWELl :POINts?

This command queries the signal generator for the number of dwell points in the current list sweep file.

## :LIST:DWEL:TYPE

**Supported** All Models

[ :SOURCE ] :LIST:DWELl :TYPE LIST | STEP

[ :SOURCE ] :LIST:DWELl :TYPE?

This command toggles the dwell time for the list sweep points between the values defined in the list sweep and the value for the step sweep.

**LIST** This choice selects the dwell times from the list sweep. Refer to [“:LIST:DWELI” on page 50](#) for setting the list dwell points.

**STEP** This choice selects the dwell time from the step sweep. Refer to [“:SWEep:DWELI” on page 56](#) for setting the step dwell.

**\*RST** LIST

**Key Entry** Dwell Type List Step

## :LIST:FREQuency

**Supported** All Models

[ :SOURCE ] :LIST:FREQuency <val>{ , <val> }

[ :SOURCE ] :LIST:FREQuency?

This command sets the frequency values for the current list sweep points.

The variable <val> is expressed in units of Hertz.

**Range** Option 501: 100E3–1E9

Option 502: 100E3–2E9

Option 503: 100E3–3E9

Option 504: 100E3–4E9

Option 506: 100E3–6E9

List/Sweep Subsystem ([:SOURce])

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST. Options 501, 502, and 504 are specific to the E4438C. The maximum number of list sweep points is 1,601.

**:LIST:FREQuency:POINts**

**Supported** All Models

[ :SOURce ] :LIST:FREQuency:POINts?

This command queries the current list sweep file for the number of frequency points.

**:LIST:MANual**

**Supported** All Models

[ :SOURce ] :LIST:MANual <val>

[ :SOURce ] :LIST:MANual?

This command sets a list or step sweep point as the current sweep point controlling the frequency and power output.

**Range** List Sweep: 1–1601 Step Sweep: 2-65535

**Key Entry** **Manual Point**

**Remarks** If list or step mode is controlling frequency or power, or both, then the indexed point in the respective list(s) will be used.

Entering a value with this command will have no effect, unless MANual is the selected mode. Refer to “:LIST:MODE” on page 53 for setting the proper mode.

If the point selected is beyond the length of the longest enabled list, then the point will be set to the maximum possible point, and an error will be generated.

## :LIST:MODE

**Supported** All Models

```
[ :SOURce ] :LIST:MODE AUTO | MANual
```

```
[ :SOURce ] :LIST:MODE?
```

This command sets the operating mode for the current list or step sweep.

**AUTO** This choice enables the selected sweep type to perform a sweep of all points.

**MANual** This choice enables you to select a single sweep point. The selected point controls the frequency and/or amplitude according to the sweep type. Refer to “:LIST:MANual” on page 52 for selecting a sweep point.

**\*RST** AUTO

**Key Entry** **Manual Mode Off On**

## :LIST:POWer

**Supported** All Models

```
[ :SOURce ] :LIST:POWer <val> { , <val> }
```

```
[ :SOURce ] :LIST:POWer?
```

This command sets the amplitude for the current list sweep points.

**Range** Refer to “[:LEVel][:IMMediate][:AMPLitude]” on page 69 for output power ranges.

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

During an amplitude sweep operation, signal generators with Option UNB or Option 506 protect the step attenuator by automatically switching to attenuator hold (OFF) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.

The maximum number of list sweep points is 1,601.

## :LIST:POWer:POINts

**Supported** All Models

```
[ :SOURce ] :LIST:POWer:POINts?
```

This command queries the number of power points in the current list sweep file.

### :LIST:RETRace

**Supported** All Models

[ :SOURce ] :LIST:RETRace ON | OFF | 1 | 0

[ :SOURce ] :LIST:RETRace?

This command resets the single sweep to the first sweep point, or leaves it at the last sweep point upon completion of the sweep operation.

On (1) The sweep resets to the first sweep point.

Off (0) The sweep stays at the last sweep point.

\*RST 1

**Key Entry** Sweep Retrace Off On

### :LIST:TRIGger:SOURce

**Supported** All Models

[ :SOURce ] :LIST:TRIGger:SOURce BUS | IMMEDIATE | EXTERNAL | KEY

[ :SOURce ] :LIST:TRIGger:SOURce?

This command sets the trigger source for a list or step sweep event.

To set the sweep trigger, see “[:TRIGger[:SEQUENCE]:SOURce]” on page 168.

BUS This choice enables GPIB triggering using the \*TRG or GET command, or LAN and RS-232 triggering using the \*TRG command.

IMMEDIATE This choice enables immediate triggering of the sweep event.

EXTERNAL This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.

KEY This choice enables triggering by pressing the front-panel **Trigger** hardkey.

#### Example

```
:LIST:TRIG:SOUR BUS
```

The preceding example sets the trigger source to the instrument BUS.

\*RST IMM

**Key Entry** Bus Free Run Ext Trigger Key

## :LIST:TYPE

**Supported** All Models

[ :SOURCE ] :LIST:TYPE LIST|STEP

[ :SOURCE ] :LIST:TYPE?

This command toggles between the two types of sweep.

**LIST** This type of sweep has arbitrary frequencies and amplitudes.

**STEP** This type of sweep has equally spaced frequencies and amplitudes.

**\*RST** STEP

**Key Entry** Sweep Type List Step

## :LIST:TYPE:LIST:INITialize:FSTep

**Supported** All Models

---

**CAUTION** The current list sweep data will be overwritten once this command is executed. If needed, save the current data. Refer to “:STORE:LIST” on page 123 for storing list sweep files.

---

[ :SOURCE ] :LIST:TYPE:LIST:INITialize:FSTep

This command replaces the loaded list sweep data with the settings from the current step sweep data points.

**Key Entry** Load List From Step Sweep

**Remarks** You can have only one sweep list at a time.

The maximum number of list sweep points is 1,601. When copying the step sweep settings over to a list sweep, ensure that the number of points in the step sweep do not exceed the maximum list sweep points.

**:LIST:TYPE:LIST:INITialize:PRESet**

**Supported** All Models

---

**CAUTION** The current list sweep data will be overwritten once this command is executed. If needed, save the current data. Refer to “:STORE:LIST” on page 123 for storing list sweep files.

---

[ :SOURce ] :LIST:TYPE:LIST:INITialize:PRESet

This command replaces the current list sweep data with a factory-defined file consisting of one point at a frequency, amplitude, and dwell time.

**Key Entry** Preset List

**:SWEep:DWELl**

**Supported** All Models

[ :SOURce ] :SWEep:DWELl <val>

[ :SOURce ] :SWEep:DWELl?

This command enables you to set the dwell time for a step sweep.

The variable <val> is expressed in units of seconds with a 0.001 resolution.

---

**NOTE** The dwell time (<val>) does not begin until the signal generator has settled for the current frequency and/or amplitude change.

---

**\*RST** +2.00000000E-003

**Range** 0.001-60

**Key Entry** Step Dwell

**Remarks** Dwell time is used when the trigger source is set to IMMEDIATE. Refer to “:LIST:TRIGger:SOURce” on page 54 for the trigger setting.

The dwell time is the amount of time the sweep is guaranteed to pause after setting the frequency and/or power for the current point.



## :SWEep:POINts

**Supported**            All Models

[ :SOURCE ] :SWEep:POINts <val>

[ :SOURCE ] :SWEep:POINts?

This command defines the number of step sweep points.

**\*RST**                    2

**Range**                    2–65535

**Key Entry**                # Points

---

## Power Subsystem ([:SOURce]:POWer)

### :ALC:BANDwidth | BWIDth

**Supported** All Models

```
[:SOURce]:POWer:ALC:BANDwidth|BWIDth 100HZ|1KHZ|10KHZ
[:SOURce]:POWer:ALC:BANDwidth|BWIDth?
```

This command sets the bandwidth of the automatic leveling control (ALC) loop. This is one of two commands that replace the :DM:EXTernal:ALC:BANDwidth|BWIDth NORMal|NARRow command. The NARRow parameter in the old command corresponds to the 100HZ selection. The NORMal parameter in the old command corresponds to the ON parameter in the command “:ALC:BANDwidth” on page 59.

100HZ	This choice selects a 100 Hz ALC bandwidth. This bandwidth has the longest settling time, but the least signal degradation and lowest error vector magnitude for digital signals. This is the auto selection for digital modulation.
1KHZ	This choice selects a 1 kHz ALC bandwidth. This bandwidth is the auto selection for pulse modulation and AM modulation to a carrier frequency of 500 kHz.
10KHZ	This choice selects a 10 kHz ALC bandwidth. This bandwidth has the fastest settling time, but the most signal degradation and highest error vector magnitude for digital signals. This is the auto selection for AM modulation above a 500 kHz carrier frequency and with FM/ΦM modulation.

#### Example

```
:POW:ALC:BWID 1KHZ
```

The preceding example sets the ALC bandwidth to 1 kHz.

```
*RST 10000
```

**Key Entry**      **100 Hz   1kHz   10 kHz**

**Remarks**      Use this command when the ALC is set to on. Refer to “:ALC[:STATe]” on page 62 for selecting the ALC on or off state. Refer to the *E4428C/38C ESG Signal Generators User’s Guide* for information on ALC bandwidth.

## **:ALC:BANDwidth**

**Supported**            All Models

```
[ :SOURce ] :POWER:ALC:BANDwidth | BWIDth:AUTO ON | OFF | 1 | 0
[ :SOURce ] :POWER:ALC:BANDwidth | BWIDth:AUTO?
```

This command turns the bandwidth (BW) auto state on or off.

The bandwidth auto function allows the signal generator to automatically select a bandwidth for the automatic leveling control (ALC) circuit. This is one of two commands that replace the `:DM:EXTernal:ALC:BANDwidth | BWIDth NORMal | NARROW` command. The ON (1) selection in this command corresponds to the NORMal parameter in the old command. The NARROW parameter in the old command corresponds to the 100HZ parameter used with the command `“:ALC:BANDwidth|BWIDth”` on page 58.

ON (1)                    This choice allows the signal generator to automatically select an ALC BW. The selection of the ALC BW depends on the signal generator modulation type as shown in the following table.

Modulation Type	Auto ALC Bandwidth Selection
Digital Modulation	100 Hz
Pulse Modulation	1 kHz
AM Modulation	10 kHz <sup>1</sup> or 1 kHz
FM/ΦM Modulation	10 kHz

1. 10 kHz ALC bandwidth for carrier frequencies above 500 kHz

OFF (0)                    This choice disables automatic selection of the ALC BW, allowing you to select one of three ALC BWs: 100 Hz, 1 kHz, or 10 kHz. To select the desired ALC bandwidth, use the `“:ALC:BANDwidth|BWIDth”` command shown on page 58.

**\*RST**                    1

**Key Entry**            **Auto**

**Remarks**            For more information on ALC bandwidth, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:ALC:LEVel****Supported** All Models

[:SOURce]:POWer:ALC:LEVel &lt;value&gt;dB

[:SOURce]:POWer:ALC:LEVel?

This command sets the automatic leveling control (ALC) level. Use this command after setting the attenuation auto mode to On. Refer to “:ATTenuation:AUTO” on page 65 for setting the attenuation auto mode.

The ALC is used to maintain the signal generator’s output power level by compensating for power fluctuations due to drift, band changes, or load variations. After you set the ALC level, the signal generator’s output power is monitored and corrected so that the power level setting is maintained.

**Example**

:POW:ALC:LEV 10DB

The preceding example sets the ALC to 10 dB.

**\*RST** +1.00000000E+000**Range** -20 to 20**Key Entry** **Set ALC Level****:ALC:SEARCh****Supported** All Models

[:SOURce]:POWer:ALC:SEARCh ON|OFF|1|0|ONCE

[:SOURce]:POWer:ALC:SEARCh?

This command sets the internal power search mode. A power search is recommended for pulse-modulated signals with pulse widths less than one microsecond.

ON (1) This choice executes the power search automatically with each change in RF frequency or power.

OFF (0) This choice disables the automatic power search routine.

ONCE This choice executes a single power search of the current RF output signal.

**\*RST** 0**Key Entry** **Power Search Manual Auto** **Do Power Search**

**Remarks** Use this command when the ALC state is set to OFF (0). Refer to “:ALC[:STATE]” on page 62 for setting the ALC state.

If ON was previously selected, executing ONCE will cause OFF to be the current

selection after the power search is completed.

### **:ALC:SEARch:REFeRence**

**Supported** All Models

[ :SOURce ] :POWer:ALC:SEARch:REFeRence FIXed|MODulated  
[ :SOURce ] :POWer:ALC:SEARch:REFeRence?

This command sets either fixed or modulated modes of power search.

**FIXed** This choice uses a 0.5 volt reference.

**MODulated** This choice uses the RMS value of the current I/Q modulation.

**\*RST** MOD

**Key Entry** **Power Search Reference Fixed Mod**

### **:ALC:SEARch:SPAN:START**

**Supported** All Models

[ :SOURce ] :POWer:ALC:SEARch:SPAN:START  
[ :SOURce ] :POWer:ALC:SEARch:SPAN:START?

This command sets the start frequency for a span power search over a user specified range.

**Key Entry** **Start Frequency**

**Remarks** The start frequency has no default value. The start frequency value will be the last value set before powering off the instrument.

### **:ALC:SEARch:SPAN:STOP:SPAN:STOP**

**Supported** All Models

[ :SOURce ] :POWer:ALC:SEARch:SPAN:STOP  
[ :SOURce ] :POWer:ALC:SEARch:SPAN:STOP?

This command sets the stop frequency for a span power search over a user specified range.

**Key Entry** **Stop Frequency**

**Remarks** The stop frequency has no default value. The stop frequency value will be the last value set before powering off the instrument.

### **:ALC:SEARch:SPAN:TYPE**

**Supported**            All Models

```
[ :SOURce ] :POWer:ALC:SEARch:SPAN:TYPE FULL|USER  
[ :SOURce ] :POWer:ALC:SEARch:SPAN:TYPE?
```

This command enables you to select the frequency range for a span power search. You can specify the range (USER) or you can select the full range (FULL) of the signal generator.

**Key Entry**            **Span Type User Full**

### **:ALC:SEARch:SPAN[:STATe]**

**Supported**            All Models

```
[ :SOURce ] :POWer:ALC:SEARch:SPAN[:STATe] ON|OFF|1|0  
[ :SOURce ] :POWer:ALC:SEARch:SPAN[:STATe]?
```

This command enables (1) or disables (0) the span mode, allowing you to perform power searches over a selected range of frequencies. The power search corrections are then stored and used whenever the signal generator is tuned within the selected range.

### **:ALC[:STATe]**

**Supported**            All Models

```
[ :SOURce ] :POWer:ALC[:STATe] ON|OFF|1|0  
[ :SOURce ] :POWer:ALC[:STATe]?
```

This command enables or disables the automatic leveling control (ALC) circuit.

**\*RST**                    1

**Key Entry**            **ALC Off On**

**Remarks**            The purpose of the ALC circuit is to hold output power at a desired level by adjusting the signal generator's power circuits to compensate for power drift. Power drift occurs over time and changes in temperature. Refer to the *E4428C/38C ESG Signal Generators User's Guide* for more information on the ALC.

## :ALternate:AMPLitude

**Supported** All Models except signal generators with Option UNB or 506.

```
[ :SOURce ] :POWer:ALternate:AMPLitude <val>
```

```
[ :SOURce ] :POWer:ALternate:AMPLitude?
```

This command sets the delta value for the alternate amplitude.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -156 to 156

**Key Entry** **Alt Amp Delta**

**Remarks** The actual RF output amplitude is equal to the Alternate Amplitude Delta value plus the RF output amplitude; this sum cannot exceed the minimum and maximum amplitude limits of the signal generator. For example, if the Alternate Amplitude Delta is set to -156 dB and the RF output amplitude is set to 20 dB, the sum is equal to -136 dB.

## :ALternate:MANual

**Supported** All Models

```
[ :SOURce ] :POWer:ALternate:MANual MAIN|DELTA
```

```
[ :SOURce ] :POWer:ALternate:MANual?
```

This command toggles the alternate amplitude manual trigger source between main and alternate (delta).

**MAIN** The main power is present at the RF output.

**DELTA** The alternate power is present at the RF output.

**\*RST** MAIN

**Key Entry** **Manual Trigger Main Delta**

**Remarks** This command is effective only if MANual is the selection for the trigger source. Refer to “:ALternate:TRIGger[:SOURce]” on page 64 for more information.

**:ALternate:STATe**

**Supported** All Models

```
[:SOURCE]:POWER:ALternate:STATe ON|OFF|1|0
[:SOURCE]:POWER:ALternate:STATe?
```

This command enables or disables the alternate amplitude.

**\*RST** 0

**Key Entry** **Alt Ampl Off On**

**:ALternate:TRIGger[:SOURCE]**

**Supported** All Models except with Option UNB or 506

```
[:SOURCE]:POWER:ALternate:TRIGger[:SOURCE] INTernal|EXTernal|MANual
[:SOURCE]:POWER:ALternate:TRIGger[:SOURCE]?
```

This command sets the trigger source for the alternate amplitude signal.

**INTernal** This choice is available only for an E4438C with Option 001/601 or 002/602. The baseband generator triggers each timeslot to output a power level set with either the user-selected main or alternate amplitude parameter.

Each timeslot is allowed to output power with a user-selected main or alternate amplitude. This choice requires the Option 001/601 or 002/602 baseband generator option.

This choice requires a baseband generator option. Each timeslot is allowed to output power with a user-selected main or alternate amplitude.

**EXTernal** This choice requires an external trigger to the TRIG IN rear panel connector to toggle the RF output power between main and alternate amplitudes.

**MANual** This choice enables the RF output power to be toggled between main and alternate amplitudes using the front-panel **Trigger** hardkey.

**\*RST** MAN

**Key Entry** **Int Ext Manual**



## **:ATTenuation**

**Supported**            All Models

```
[:SOURCE]:POWER:ATTenuation <val><unit>
[:SOURCE]:POWER:ATTenuation?
```

This command sets the signal generator’s attenuator level. Before setting the attenuator level, set the “:ATTenuation:AUTO” function to Off which will disable ALC control.

In normal operation the attenuator level is selected by the signal generator’s automatic loop control (ALC) which maintains the output power by adjusting internal circuits to compensate for any power fluctuations due to drift, band changes, or load variations. In some applications, such as fast pulse modulation, the ALC may not respond quickly enough to compensate for the pulse rise times. In this case you can set the attenuator and override any ALC adjustments.

The output power is the ALC level minus the attenuator setting. The attenuator is set in increments of 5 dB.

### **Example**

```
:POW:ATT 10DB
```

The preceding example sets the attenuator to 10 dB.

**\*RST**                    +115  
**Range**                    0 to 115 dB  
**Key Entry**                **Set Atten**

## **:ATTenuation:AUTO**

**Supported**            All Models

```
[:SOURCE]:POWER:ATTenuation:AUTO ON|OFF|1|0
[:SOURCE]:POWER:ATTenuation:AUTO?
```

This command sets the state of the attenuator auto mode function.

**ON (1)**                    This selection allows the signal generator’s automatic loop control (ALC) to adjust the attenuator so that a specified RF power level, at the ESG’s RF output connector, is maintained.

**OFF (0)**                    This choice allows for a user-selected attenuator setting that is not affected by the signal generator’s ALC circuitry.

The OFF (0) selection can be used to eliminate power discontinuity normally associated with attenuator switching during power adjustments.

**\*RST**                    1

**Power Subsystem ([:SOURce]:POWer)**

**Key Entry**            **Atten Hold Off On**

**Remarks**            During an amplitude sweep operation, signal generators with Option UNB or 506 protect the step attenuator from fast amplitude changes by automatically switching to attenuator auto Off mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB. Refer to the “:ALC:LEVel” on page 60 for more information.

**:MODE**

**Supported**            All Models

```
[:SOURce]:POWer:MODE FIXed|LIST
[:SOURce]:POWer:MODE?
```

This command sets the signal generator power mode to fixed or swept.

**FIXed**                    This choice stops a power sweep, allowing the signal generator to operate at a fixed power level. Refer to “[:LEVel][:IMMediate][:AMPLitude]” on page 69 for setting the output power level.

**LIST**                    This choice selects the swept power mode. If sweep triggering is set to immediate along with continuous sweep mode, executing the command starts the LIST or STEP power sweep.

---

**NOTE**                    To perform a frequency and amplitude sweep, you must also select LIST as the frequency mode. See “:FREQuency:MODE” on page 42 for selecting the list mode for a frequency sweep.

---

**\*RST**                    FIX

**Key Entry**            **Amplitude    Ampl    Off**

**:REFERENCE**

**Supported**            All Models

```
[:SOURce]:POWer:REFErence <val><unit>
[:SOURce]:POWer:REFErence?
```

This command sets the power level for the signal generator RF output reference.

**\*RST**                    +0.00000000E+000

**Range**                    -400 to 300DBM

**Key Entry**            **Ampl Ref Set**

**Remarks** The RF output power is referenced to the value entered in this command.

**:REFerence:STATe**

**Supported** All Models

```
[ :SOURce ] :POWer:REFerence:STATe ON|OFF|1|0
[ :SOURce ] :POWer:REFerence:STATe?
```

This command enables or disables the RF output reference.

**ON(1)** This choice will set the power reference state to ON. The unit displayed for commands, “:ANNotation:AMPLitude:UNIT” on page 85 and “:POWer” on page 170 will be expressed in DB.

**OFF(0)** This choice will set the power reference state to OFF.

**\*RST** 0

**Key Entry** **Ampl Ref Off On**

**Remarks** Once the reference state is ON, all subsequent output power settings are set relative to the reference value.

Amplitude offsets can be used with the amplitude reference mode.

**:STARt**

**Supported** All Models

```
[ :SOURce ] :POWer:STARt <val><unit>
[ :SOURce ] :POWer:STARt?
```

This command sets the first amplitude point in a step sweep.

**\*RST** -1.35000000E+002

**Range** Refer to “[:LEVel][:IMMediate][:AMPLitude]” on page 69 for the output power ranges.

**Key Entry** **Ampl Start**

**Remarks** During an amplitude sweep operation, signal generators with Option UNB or 506 protect the step attenuator by automatically switching to attenuator hold (ON) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.

**:STOP****Supported** All Models

[:SOURce]:POWer:STOP &lt;val&gt;&lt;unit&gt;

[:SOURce]:POWer:STOP?

This command sets the last amplitude point in a step sweep.

**\*RST** -1.35000000E+002**Range** Refer to “[[:LEVel][:IMMediate][:AMPLitude]]” on page 69 for the output power ranges.**Key Entry** **Ampl Stop****Remarks** During an amplitude sweep operation, signal generators with Option UNB or 506 protect the step attenuator by automatically switching to attenuator hold (ON) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.**[:LEVel][:IMMediate]:OFFSet****Supported** All Models

[:SOURce]:POWer[:LEVel] [:IMMediate]:OFFSet &lt;val&gt;&lt;unit&gt;

[:SOURce]:POWer[:LEVel] [:IMMediate]:OFFSet?

This command sets the power offset value.

**\*RST** +0.00000000E+000**Range** -200DB to 200DB**Key Entry** **Ampl Offset****Remarks** This simulates a power level at a test point beyond the RF OUTPUT connector without changing the actual RF output power. The offset value only affects the displayed amplitude setting.

You can enter an amplitude offset any time in either normal operation or amplitude reference mode.

**[[:LEVel]][:IMMediate]][:AMPLitude]**

**Supported**            All Models

```
[ :SOURce ] :POWer [ :LEVel ] [ :IMMediate ] [ :AMPLitude ] <val><unit>
[ :SOURce ] :POWer [ :LEVel ] [ :IMMediate ] [ :AMPLitude ] ?
```

This command sets the RF output power.

**\*RST**                    -1.35000000E+002

<b>Range</b>	<i>Frequency</i>	<i>Standard</i>	<i>Option UNB</i>	<i>Option 506</i>
	250kHz–250MHz	-136 to 11dBm	-136 to 15dBm	-136 to 12dBm
	>250MHz–1GHz	-136 to 13dBm	-136 to 17dBm	-136 to 14dBm
	> 1–3GHz	-136 to 10dBm	-136 to 16dBm	-136 to 13dBm
	> 3–4GHz	-136 to 7dBm	-136 to 13dBm	-136 to 10dBm
	> 4–6GHz	N/A	N/A	-136 to 10dBm

**Key Entry**            **Amplitude**

**Remarks**            The ranges for this command are specified values from the data sheet.

**[[:LEVel]][:IMMediate]][:AMPLitude]:STEP**

**Supported**            All Models

```
[ :SOURce ] :POWer [ :LEVel ] [ :IMMediate ] [ :AMPLitude ] :STEP [ :INCRement ]
<val><unit> | UP | DOWN
[ :SOURce ] :POWer [ :LEVel ] [ :IMMediate ] [ :AMPLitude ] :STEP [ :INCRement ] ?
```

This command sets the incremental step value for the amplitude parameter, or increments or decrements the current RF output power level by the specified <val> value.

<val>                    The increment power value.

UP                        Increases the current output power by the amount set with <val>. The front-panel up arrow key performs the same function.

DOWN                    Decreases the current output power by the amount set with <val>. The front-panel down arrow key performs the same function.

**Range**                    .02–100dB

**Key Entry**            **Incr Set**

**Remarks**            The value set with this command is not affected by \*RST or a power cycle.



---

## 3 System Commands

This chapter provides SCPI descriptions for subsystems dedicated to peripheral signal generator operations common to all ESG models. This chapter contains the following major sections:

- “Calibration Subsystem (:CALibration)” on page 72
- “Communication Subsystem (:SYSTem:COMMunicate)” on page 75
- “Diagnostic Subsystem (:DIAGnostic[:CPU]:INFORMation)” on page 81
- “Display Subsystem (:DISPlay)” on page 85
- “IEEE 488.2 Common Commands” on page 88
- “Memory Subsystem (:MEMory)” on page 94
- “Mass Memory Subsystem (:MMEMory)” on page 124
- “Output Subsystem (:OUTPut)” on page 128
- “Route Subsystem (:ROUte:HARDware:DGENerator)” on page 130
- “Status Subsystem (:STATus)” on page 136
- “System Subsystem (:SYSTem)” on page 154
- “Trigger Subsystem” on page 166
- “Unit Subsystem (:UNIT)” on page 170

---

## Calibration Subsystem (:CALibration)

### :DCFM

**Supported** All

:CALibration:DCFM

This command initiates a DCFM or DC $\Phi$ M calibration depending on the currently active modulation. This calibration eliminates any dc or modulation offset of the carrier signal.

---

**NOTE** If the calibration is performed with a dc signal applied, any deviation provided by the dc signal will be removed and the new zero reference point will be at the applied dc level. The calibration will have to be performed again when the dc signal is disconnected to reset the carrier signal to the correct zero reference.

---

**Key Entry** DCFM/DCFM Cal

**Remarks** Use this calibration for externally applied signals. While the calibration can also be performed for internally generated signals, dc offset is not a normal characteristic for them.

### :IQ

**Supported** E4438C

:CALibration:IQ

This command initiates an I/Q calibration.

**Key Entry** Execute Cal

### :IQ:DC

**Supported** E4438C

:CALibration:IQ:DC

This command performs a one to two second adjustment that is not traceable to a standard. However, it will minimize errors associated with offset voltages. This adjustment minimizes errors for the current signal generator setting and at a single frequency. The DC adjustment is volatile and must be repeated with each signal generator setting change. This command can be sent while the RF On/Off is set to Off and the adjustment will still be valid when the RF is enabled.



The I/Q DC adjustment is dependent upon a number of instrument settings. If any of the instrument settings change, the adjustment will become invalid. The dependent instrument settings are:

- RF frequency
- I/Q attenuation level
- Baseband generator settings
- I/Q polarity settings
- Baseband filter settings
- Path settings (Internal I/Q Mux Path 1 or Path 2)
- I/Q calibration (the I/Q DC calibration will be invalidated if any other I/Q calibration is executed or if the **Revert to Factory Default** key is pressed)
- Temperature ( $\pm 5$  degrees)

The following instrument states will not invalidate the I/Q DC calibration:

- Power level changes
- I/Q Impairments

**Key Entry**                    **Execute Cal** (with **Calibration Type User Full** set to DC)

### **:IQ:DEfault**

**Supported**                    E4438C

:CALibration:IQ:DEfault

This command will restore the original factory calibration data for the internal I/Q modulator.

**Key Entry**                    **Revert to Default Cal Settings**

### **:IQ:FULL**

**Supported**                    E4438C

:CALibration:IQ:FULL

This command performs an adjustment to the I/Q offset, gain and quadrature for the full-frequency range (regardless of the start and stop frequency settings) and stores the results in the signal generator's firmware.

**Key Entry**                    **Execute Cal** (with **Calibration Type User Full** set to Full)

**Remarks**                    Start and stop frequencies will default to the full frequency range of the signal generator.

### :IQ:START

**Supported** E4438C

:CALibration:IQ:START <val><unit>

:CALibration:IQ:START?

This command sets the start frequency and automatically sets the calibration type to User for an I/Q calibration.

**Range** Option 501: 100kHz–1GHz  
Option 502: 100kHz–2GHz  
Option 503: 100kHz–3GHz  
Option 504: 100kHz–4GHz  
Option 506: 100kHz–6GHz

**Key Entry** **Start Frequency**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### :IQ:STOP

**Supported** E4438C

:CALibration:IQ:STOP <val><unit>

:CALibration:IQ:STOP?

This command sets the stop frequency and automatically sets the calibration type to User for an I/Q calibration.

**Range** Option 501: 100kHz–1GHz  
Option 502: 100kHz–2GHz  
Option 503: 100kHz–3GHz  
Option 504: 100kHz–4GHz  
Option 506: 100kHz–6GHz

**Key Entry** **Stop Frequency**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

---

## Communication Subsystem (:SYSTem:COMMunicate)

### :GPIB:ADDRes

**Supported** All

```
:SYSTem:COMMunicate:GPIB:ADDRes <number>  
:SYSTem:COMMunicate:GPIB:ADDRes?
```

This command sets the signal generator's GPIB address.

**Range** 0–30

**Key Entry** GPIB Address

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### :GTLocal

**Supported** All

```
:SYSTem:COMMunicate:GTLocal
```

This command sets the signal generator to local mode which enables front panel operation.

**Key Entry** Local

### :LAN:CONFig

**Supported** All Models

```
:SYSTem:COMMunicate:LAN:CONFig DHCP|MANual  
:SYSTem:COMMunicate:LAN:CONFig?
```

This command sets the signal generator's internet protocol (IP) address.

MANual The user assigns an IP address to the signal generator.

DHCP The network assigns an IP address to the signal generator.

#### Example

```
:SYST:COMM:LAN:CONF DHCP
```

The preceding example sets up the signal generator LAN configuration to use a DHCP IP address.

**Key Entry** LAN Config

### :LAN:GATEway

**Supported** All

```
:SYSTEM:COMMunicate:LAN:GATEway "<ipstring>"
```

```
:SYSTEM:COMMunicate:LAN:GATEway?
```

This command sets the gateway for local area network (LAN) access to the signal generator from outside the current sub-network.

**Key Entry**            **Default Gateway**

**Remarks**            Using an empty string restricts access to the signal generator to local hosts on the LAN.

### :LAN:HOSTname

**Supported** All

```
:SYSTEM:COMMunicate:LAN:HOSTname "<string>"
```

```
:SYSTEM:COMMunicate:LAN:HOSTname?
```

This command sets the signal generator's local area network (LAN) connection hostname.

**Key Entry**            **Hostname**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### :LAN:IP

**Supported** All

```
:SYSTEM:COMMunicate:LAN:IP "<ipstring>"
```

```
:SYSTEM:COMMunicate:LAN:IP?
```

This command sets the signal generator's local area network (LAN) internet protocol (IP) address for your IP network connection.

**Key Entry**            **IP Address**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## :LAN:SUBNet

**Supported** All

```
:SYSTem:COMMunicate:LAN:SUBNet "<ipstring>"  
:SYSTem:COMMunicate:LAN:SUBNet?
```

This command sets the signal generator's local area network (LAN) subnet mask address for your internet protocol (IP) network connection.

**Key Entry** Subnet Mask

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## :PMETer:ADDRess

**Supported** All

```
:SYSTem:COMMunicate:PMETer:ADDRess <val>  
:SYSTem:COMMunicate:PMETer:ADDRess?
```

This command sets the address for a power meter that is controlled by the signal generator.

**Range** 0–30

**Key Entry** Meter Address

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

The power meter is controlled only through a GPIB cable.

Ensure that the power meter address is different from the signal generator address.

## :PMETer:CHANnel

**Supported** All

```
:SYSTem:COMMunicate:PMETer:CHANnel A|B  
:SYSTem:COMMunicate:PMETer:CHANnel?
```

This command sets the measurement channel on the power meter that is controlled by the signal generator.

**Key Entry** Meter Channel A B

**Remarks** A single-channel power meter uses channel A and selecting channel B will have no effect.

**Communication Subsystem (:SYSTEM:COMMunicate)**

The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

The power meter is controlled only through a GPIB cable.

**:PMETer:IDN**

**Supported** All

:SYSTEM:COMMunicate:PMETer:IDN E4418B | E4419B | E4416A | E4417A

:SYSTEM:COMMunicate:PMETer:IDN?

This command sets the model number of the power meter that is controlled by the signal generator.

**Key Entry** **Power Meter**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

The power meter is controlled only through a GPIB cable.

**:PMETer:TIMEout**

**Supported** All

:SYSTEM:COMMunicate:PMETer:TIMEout <num> [<time suffix>]

:SYSTEM:COMMunicate:PMETer:TIMEout?

This command sets the period of time which the signal generator will wait for a valid reading from the power meter.

The variable <num> has a resolution of 0.001.

**Range** 1mS–100S

**Key Entry** **Meter Timeout**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

The power meter is controlled only through a GPIB cable.

If a time-out occurs, the signal generator reports an error message.

## :SERial:BAUD

**Supported** All

```
:SYSTem:COMMunicate:SERial:BAUD <number>
```

```
:SYSTem:COMMunicate:SERial:BAUD?
```

This command sets the baud rate for the rear panel RS-232 interface labeled RS-232.

**Key Entry** **RS-232 Baud Rate**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## :SERial:ECHO

**Supported** All

```
:SYSTem:COMMunicate:SERial:ECHO ON|OFF
```

```
:SYSTem:COMMunicate:SERial:ECHO?
```

This command enables or disables the RS-232 echo.

**Key Entry** **RS-232 ECHO Off On**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## :SERial:RESet

**Supported** All

```
:SYSTem:COMMunicate:SERial:RESet
```

This event command resets the RS-232 buffer and will discard any unprocessed SCPI input received by the RS-232 port.

**Key Entry** **Reset RS-232**

## :SERial:TOUT

**Supported** All

:SYSTEM:COMMunicate:SERial:TOUT <val>

:SYSTEM:COMMunicate:SERial:TOUT?

This command sets the RS-232 serial port time-out value.

If further input is not received within the time-out period specified, while a SCPI command is being processed, the command is aborted and the input buffer is cleared.

The variable <val> is entered in units of seconds.

**Range** 1–25

**Key Entry** **RS-232 Timeout**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.



---

## Diagnostic Subsystem (:DIAGnostic[:CPU]:INFORMATION)

### :BOARDs

**Supported**      All

:DIAGnostic[:CPU]:INFORMATION:BOARDs?

This query returns a list of the installed boards in the signal generator. The information will be returned in the following format:

"<board name,part number,serial number,version number,status>"

This information format will repeat with as many iterations as the number of detected boards in the signal generator.

**Key Entry**      **Installed Board Info**

### :CCOunt:ATTenuator

**Supported**      All

:DIAGnostic[:CPU]:INFORMATION:CCOunt:ATTenuator?

This query returns the cumulative number of times that the attenuator has been switched.

**Key Entry**      **Diagnostic Info**

### :CCOunt:PON

**Supported**      All

:DIAGnostic[:CPU]:INFORMATION:CCOunt:PON?

This query returns the cumulative number of times the signal generator has been powered-on.

**Key Entry**      **Diagnostic Info**

### :CCOunt:PROTection

**Supported**      All

:DIAGnostic[:CPU]:INFORMATION:CCOunt:PROTection?

This query returns the cumulative number of times the reverse power protection has been cycled.

**Key Entry**      **Diagnostic Info**

### **:DISPlay:OTIME**

**Supported** All Models

`:DIAGnostic[:CPU]:INFORMATION:DISPlay:OTIME?`

This query returns the cumulative number of hours the display has been on.

**Key Entry** **Diagnostic Info**

### **:LICense:AUXiliary**

**Supported** E4438C with Option 001/600 or 002.602

`:DIAGnostic[:CPU]:INFORMATION:LICense:AUXiliary?`

This query returns a list of licenses for software applications associated with the signal generator that have the software license file installed on the PC, as opposed to a license key installed on the signal generator. However this query does not return demo licenses for Arb-based applications.

**Key Entry** **Auxiliary Software Options**

**Remarks** If you use the signal generator with a PC that has a copy of a software application for which a license shows with this query, the software automatically accesses and installs the license on the PC.

To access Arb-based demo software licenses, see “[:LICense:WAVEform](#)”. To view option numbers for software applications that use license keys, see “[:OPTions](#)” on page 83.

### **:LICense:WAVEform**

**Supported** E4438C with Option 001/600 or 002/602

`:DIAGnostic[:CPU]:INFORMATION:LICense:WAVEform?`

This query returns a list of Arb-based licenses (including demo) for software applications associated with the signal generator that have the software license file installed on the PC, as opposed to a license key installed on the signal generator. These waveform licenses are created by the software application in a license file on the PC. Refer to “[:WLICence\[:VALue\]](#)” on page 84 for more information.

The response format is a series of comma-separated entries enclosed in quotation marks. The first field is the waveform type number and the second is a text description of the license.

**Key Entry** **Waveform Licenses**

**Remarks** If a license appears in this list, this means that you can transfer waveform files, created with the associated Arb-based software application to another signal generator if the other signal generator has the same license. For more information,

refer to the command, “:LICense:AUXiliary” on page 82.

For a list of option numbers for software applications that use license keys, see “:OPTions”.

## :OPTions

**Supported** All Models

:DIAGnostic[:CPU]:INFORMATION:OPTions?

This query returns a list of internally installed signal generator options.

**Key Entry**            **Options Info**

## :OPTions:DETail

**Supported** All Models

:DIAGnostic[:CPU]:INFORMATION:OPTions:DETail?

This query returns the options that are installed along with the option revision and DSP version if applicable.

**Key Entry**            **Options Info**

## :OTIME

**Supported** All Models

:DIAGnostic[:CPU]:INFORMATION:OTIME?

This query returns the cumulative number of hours that the signal generator has been on.

**Key Entry**            **Diagnostic Info**

## :REVision

**Supported** All Models

:DIAGnostic[:CPU]:INFORMATION:REVision?

This query returns the CPU bootstrap read only memory (boot ROM) revision date. In addition, the query returns the revision, creation date, and creation time of the main firmware.

**Key Entry**            **Diagnostic Info**

**Diagnostic Subsystem (:DIAGnostic[:CPU]:INFORMATION)**

**:SDATe**

**Supported**            All Models

:DIAGnostic[:CPU]:INFORMATION:SDATe?

This query returns the date and time of the main firmware.

**Key Entry**            **Diagnostic Info**

**:WLICence[:VALue]**

**Supported**            E4438C with Option 001/601 or 002/602

:DIAGnostic[:CPU]:INFORMATION:WLICence[:VALue]? <type\_num>

This query returns the number of seconds remaining on the waveform license for the type of waveform designated by the <type\_num> variable number. The type variable number is obtained using the “:LICence:WAVEform” command shown on [page 82](#). Zero is returned for non-existent and expired licenses. The value 2<sup>32</sup> -1 (4,294,967,295) is returned for licenses that do not expire. Refer to the *E4428C/38C ESG Signal Generators Key and Data Field Reference* for information on the waveform licence.

---

## Display Subsystem (:DISPlay)

### :ANNotation:AMPLitude:UNIT

**Supported** All Models

```
:DISPlay:ANNotation:AMPLitude:UNIT DBM|DBUV|DBUVEFMF|V|VEMF|DB  
:DISPlay:ANNotation:AMPLitude:UNIT?
```

This command sets the displayed front panel amplitude units.

If the amplitude reference state is set to on, the query returns units expressed in DB. Setting any other unit will cause a setting conflict error stating that the amplitude reference state must be set to off. Refer to, “:REFerence:STATE” on page 67 for more information.

**\*RST** DBM

### :ANNotation:CLOCK:DATE:FORMat

**Supported** All Models

```
:DISPlay:ANNotation:CLOCK:DATE:FORMat MDY|DMY  
:DISPlay:ANNotation:CLOCK:DATE:FORMat?
```

This command enables the selection of the date format. The choices are month-day-year (MDY) or day-month-year (DMY) format.

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### :ANNotation:CLOCK[:STATe]

**Supported** All Models

```
:DISPlay:ANNotation:CLOCK[:STATe] ON|OFF|1|0  
:DISPlay:ANNotation:CLOCK[:STATe]?
```

This command enables or disables the digital clock view in the lower right side of the front panel display.

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## :BRIGhtness

**Supported** All Models

:DISPlay:BRIGhtness <val>

:DISPlay:BRIGhtness?

This command sets the display brightness (intensity). The brightness can be set to the minimum level (0.02), maximum level (1), or in between by using fractional numeric values (0.03–0.99).

**Range** 0.02–1

**Key Entry** **Brightness**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## :CAPTure

**Supported** All Models

:DISPlay:CAPTure

This event command enables the user to capture the current display and store it in the signal generator's memory.

**Remarks** The display capture is stored as DISPLAY.BMP in the Binary file system. This file is overwritten with each subsequent display capture. The file can be down-loaded in the following manner:

1. Log on to the signal generator using ftp.
2. Change (cd) to the BIN directory.
3. Retrieve the file by using the get command.

## :CONTRast

**Supported** All Models

:DISPlay:CONTRast <val>

:DISPlay:CONTRast?

This command sets the contrast of the LCD display. The contrast can be set to the maximum level (1), minimum level (0), or in between by using fractional numeric values (0.001–0.999).

**Range** 0–1

**Key Entry** Display contrast hardkeys are located below the display.

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### **:INVerse**

**Supported** All Models

:DISPlay:INVerse ON|OFF|1|0

:DISPlay:INVerse?

This command sets the display of the source to inverse video mode.

**Key Entry** **Inverse Video Off On**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### **:REMote**

**Supported** All Models

:DISPlay:REMote ON|OFF|1|0

:DISPlay:REMote?

This command enables or disables the display updating when the signal generator is remotely controlled.

ON (1) This choice updates the signal generator display so you can see the settings as the commands are executed, however, this will degrade the signal generator speed.

OFF (0) This choice turns off the display updating while further optimizing the signal generator for speed.

**Key Entry** **Update in Remote Off On**

**Remarks** The setting enabled by this command is not affected by signal generator preset or \*RST. However, cycling the signal generator power will reset it to zero.

### **[:WINDow][:STATe]**

**Supported** All Models

:DISPlay[:WINDow][:STATe] ON|OFF|1|0

:DISPlay[:WINDow][:STATe] ?

This command is used to either blank out (OFF or 0) the display screen or turn it on (ON or 1).

**Remarks** The setting enabled by this command is not affected by \*RST. However, presetting the signal generator or cycling the power will turn the display on.

---

## IEEE 488.2 Common Commands

### \*CLS

**Supported** All Models

\*CLS

The Clear Status (CLS) command clears the Status Byte Register, the Data Questionable Event Register, the Standard Event Status Register, the Standard Operation Status Register and any other registers that are summarized in the status byte.

### \*ESE

**Supported** All Models

\*ESE <data>

The Standard Event Status Enable (ESE) command sets the Standard Event Status Enable Register.

The variable <data> represents the sum of the bits that will be enabled.

**Range** 0–255

**Remarks** The setting enabled by this command is not affected by signal generator preset or \*RST. However, cycling the signal generator power will reset this register to zero.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### \*ESE?

**Supported** All Models

\*ESE?

The Standard Event Status Enable (ESE) query returns the value of the Standard Event Status Enable Register.

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.



## \*ESR?

**Supported** All Models

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

\*ESR?

The Standard Event Status Register (ESR) query returns the value of the Standard Event Status Register.

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## \*IDN?

**Supported** All Models

\*IDN?

The Identification (IDN) query outputs an identifying string. The response will show the following information:

<company name>, <model number>, <serial number>, <firmware revision>

**Key Entry** **Diagnostic Info**

**Remarks** The identification information can be modified. Refer to “:IDN” on page 156 for more information.

## \*OPC

**Supported** All Models

\*OPC

The Operation Complete (OPC) command sets bit 0 in the Standard Event Status Register when all pending operations have finished.

**\*OPC?**

**Supported**            All Models

\*OPC?

The Operation Complete (OPC) query returns the ASCII character 1 in the Standard Event Status Register when all pending operations have finished.

**\*OPT?**

Supported            All Models

\*OPT?

The options (OPT) query returns a comma-separated list of all of the instrument options currently installed on the signal generator.

**Key Entry**            **Instrument Options**

**\*PSC**

**Supported**

\*PSC ON|OFF|1|0

The Power-On Status Clear (PSC) command controls the automatic power-on clearing of the Service Request Enable Register, the Standard Event Status Enable Register, and device-specific event enable registers.

ON (1)                This choice enables the power-on clearing of the listed registers.

OFF (0)              This choice disables the clearing of the listed registers and they retain their status when a power-on condition occurs.

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

**\*PSC?**

**Supported**            All Models

\*PSC?

The Power-On Status Clear (PSC) query returns the flag setting as enabled by the \*PSC command.

**\*RCL**

**Supported**            All Models

\*RCL <reg>, <seq>

The Recall (RCL) command recalls the state from the specified memory register <reg> of the specified sequence <seq>.

**Range**                      Registers: 0–99              Sequences: 0–9

**Key Entry**                **RECALL Reg**            **Select Seq:**

## \*RST

**Supported**                All Models

\*RST

The Reset (RST) command resets most signal generator functions to factory-defined conditions.

**Remarks**                Each command shows the \*RST value if the setting is affected.

## \*SAV

**Supported**                All Models

\*SAV <reg>, <seq>

The Save (SAV) command saves signal generator settings to the specified memory register <reg> of the specified sequence <seq>.

**Range**                      *Registers: 0–99              Sequences: 0–9*

**Key Entry**                **Save Reg**            **Save Seq[n] Reg[nn]**

**Remarks**                The save function does not save all signal generator settings. Refer to the *E4428C/38C ESG Signal Generators User's Guide* for more information on the save function. Refer to [“\\*RCL” on page 90](#) for information on recalling saved signal generator settings.

## \*SRE

**Supported**                All Models

\*SRE <data>

The Service Request Enable (SRE) command sets the value of the Service Request Enable Register.

The variable <data> is the decimal sum of the bits that will be enabled. Bit 6 (value 64) is ignored and cannot be set by this command.

**Range**                      0–255

**Remarks**                Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming*

*Guide* for more information.

Entering values from 64 to 127 is equivalent to entering values from 0 to 63.

The setting enabled by this command is not affected by signal generator preset or \*RST. However, cycling the signal generator power will reset it to zero.

**\*SRE?**

**Supported** All Models

\*SRE?

The Service Request Enable (SRE) query returns the value of the Service Request Enable Register.

**Range** 0–63 or 128–191

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**\*STB?**

**Supported** All Models

\*STB?

The Read Status Bye (STB) query returns the value of the status byte including the master summary status (MSS) bit.

**Range** 0–255

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**\*TRG**

**Supported** All Models

\*TRG

The Trigger (TRG) command triggers the device if BUS is the selected trigger source, otherwise, \*TRG is ignored.

**\*TST?**

**Supported** All Models

\*TST?

The Self-Test (TST) query initiates the internal self-test and returns one of the following results:

0 This shows that all tests passed.  
1 This shows that one or more tests failed.

**Key Entry**      **Run Complete Self Test**

### **\*WAI**

**Supported**      All Models

\*WAI

The Wait-to-Continue (WAI) command causes the signal generator to wait until all pending commands are completed, before executing any other commands.

## Memory Subsystem (:MEMory)

### :CATalog:BINary

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:BINary?

This command outputs a list of the binary files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** Binary

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:BIT

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:BIT?

This command outputs a list of the bit files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** Bit

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:CDMa

---

**NOTE** Refer to the *E4428C/38C ESG Signal Generators Programming Compatibility Guide* for information on this command. This command is still valid for backward compatibility and was replaced by “:CATalog:CDMA”.

---

## :CATalog:CDMA

**Supported** E4438C with Option 401

:MEMory:CATalog:CDMA?

This command outputs a list of the arbitrary waveform CDMA files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** **CDMA**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:DMOD

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:DMOD?

This command outputs a list of the arbitrary waveform digital modulation files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** **DMOD**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:DWCDma

**Supported** E4438C with Option 400

:MEMory:CATalog:DWCDma?

This command outputs a list of the arbitrary waveform downlink W-CDMA files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** DWCDMA

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:FCDMa

**Supported** E4438C with Option 401

:MEMory:CATalog:FCDMa?

This command outputs a list of the arbitrary waveform forward link cdma2000 files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** FCDMA

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.



## :CATalog:FIR

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:FIR?

This command outputs a list of the finite impulse response filter files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** FIR

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:FSK

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:FSK?

This command outputs a list of the FSK files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** FIR

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:IQ

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:IQ?

This command outputs a list of the IQ files. The return data will be in the following form:

<mem used>,<mem free>{,"<file listing>"}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

"<file name,file type,file size>"

**Key Entry** I/Q

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:LIST

**Supported** All Models

:MEMory:CATalog:LIST?

This command outputs a list of the list sweep files. The return data will be in the following form:

<mem used>,<mem free>{,"<file listing>"}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

"<file name,file type,file size>"

**Key Entry** List

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:MCDMa

**Supported** E4438C with Option 401

:MEMory:CATalog:MCDMa?

This command outputs a list of the arbitrary waveform multicarrier IS-95 CDMA files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** MCDMA

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:MDMod

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:MDMod?

This command outputs a list of the arbitrary waveform multicarrier digital modulation files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** MDMOD

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:MDWCdma

**Supported** E4438C with Option 400

:MEMory:CATalog:MDWCdma?

This command outputs a list of the arbitrary waveform multicarrier downlink W-CDMA files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** MDWCDMA

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:MFCdma

**Supported** E4438C with Option 401

:MEMory:CATalog:MFCdma?

This command outputs a list of the arbitrary waveform multicarrier forward link cdma2000 files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** MFCDMA

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:MTONe

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:MTONe?

This command outputs a list of the arbitrary waveform multitone files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** MTONE

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:RCDMa

**Supported** E4438C with Option 401

:MEMory:CATalog:RCDMa?

This command outputs a list of the arbitrary waveform files for reverse link cdma2000. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** RCDMA

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:SEQ

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:SEQ?

This command outputs a list of the arbitrary waveform sequence files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** SEQ

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:SHAPE

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:CATalog:SHAPE?

This command outputs a list of the burst shape files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** SHAPE

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:STATe

**Supported** All Models

:MEMory:CATalog:STATe?

This command outputs a list of the state files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** **State**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :CATalog:UFLT

**Supported** All Models

:MEMory:CATalog:UFLT?

This command outputs a list of the user-flatness correction files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** **User Flatness**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog:UWCDma

**Supported** E4438C with Option 400

:MEMory:CATalog:UWCDma?

This command outputs a list of the arbitrary waveform uplink W-CDMA files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** UWCDMA

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :CATalog[:ALL]

**Supported** All Models

:MEMory:CATalog[:ALL]?

This command outputs a list of all the files in the memory subsystem. However it does not include files stored on the Option 001/601 or 002/602 baseband generator. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the memory subsystem. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**Key Entry** All

**Remarks** Refer to the [Table on page 14](#) for a listing of the file types and [“File Name Variables” on page 13](#) for information on the "<file name>" syntax.



## :COPY[:NAME]

**Supported** All Models

```
:MEMory:COPY[:NAME] "<file name>","<file name>"
```

This command makes a duplicate of the requested file.

**Key Entry** Copy File

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

When copying a waveform file from volatile to non-volatile memory, the marker file and file header, associated with the waveform file, will automatically be copied at the same time.

## :DATA

**Supported** E4438C with Option 001/601 or 002/602

```
:MEMory:DATA "<file_name>",<data_block>
```

```
:MEMory:DATA? "<file_name>"
```

This command loads waveform data into signal generator memory using the <data\_block> parameter and saves the data to a file designated by the "<file\_name>" variable. The query returns the file contents of the file as a datablock.

The waveform file must be located in volatile waveform memory (WFM1) before it can be played by the signal generator’s dual ARB player.

For downloads directly into volatile waveform memory use the path "WFM1:<file\_name>". For downloads to non-volatile waveform memory, use the path "NVWFM:<file\_name>".

"<file\_name>" This variable names the destination file, including the directory path.

<data\_block> This parameter represents the data and file length parameters. The data in the file is represented by the <data\_block> variable.

Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on programming the status registers.

---

**NOTE** ARB waveform files created using the :DATA command cannot be retrieved or uploaded. Attempting to do so will cause the signal generator to display the message: ERROR:221, Access denied. To download ARB data to files for later retrieval, use the “:DATA:UNPRotected” command on [page 116](#).

---

**Memory Subsystem (:MEMory)****Example**

```
:MEM:DATA "NVWFM:IQ_Data",#210Qaz37pY9oL
```

The preceding example downloads 10 bytes of data to a file, IQ\_Data., in the signal generator's non-volatile memory. The table shown below describes the command parameters.

- |                   |  |
|-------------------|--|
| • "NVWFM:IQ_Data" | IQ_Data is the file name. The directory path is not needed. The path "/USER/WAVEFORM/" is implied. |
| • #210Qaz37pY9oL  | Data block   |
| #                 | This character indicates the beginning of the data block   |
| 2                 | Number of digits in the byte count   |
| 10                | Byte count   |
| Qaz37pY9oL        | 10 bytes of data   |

---

**NOTE** The data, Qaz37pY9oL, in the above command are not valid and are shown for example purposes only. Typically, ascii characters representing data are unprintable.

---

**Remarks** See [“File Name Variables” on page 13](#) for information on the file name syntax.

**:DATA:APPend**

**Supported** E4438C with Option 001/601 or 002/602

```
:MEMory:DATA:APPend "<file_name>",<data_block>
```

This commands appends data to an existing file stored in signal generator memory.

"<file\_name>" This variable names the destination file and directory path.

<data\_block> This parameter represents the data and file length parameters. The data in the file is represented by the <data\_block> variable. The file length parameters are used by the signal generator for allocating memory.

Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on downloading and using files.

**Example**

```
:MEM:DATA:APPend "NVWFM:IQ_Data",#14Y9oL
```

The preceding example downloads and appends the data, Y9oL, to an existing file named IQ\_Data stored in the signal generator’s non-volatile memory (NVWFM).

- "NVWFM:IQ\_Data"                    IQ\_Data the file name. The directory path is not needed. The path "/USER/WAVEFORM/" is implied.
- #14Y9oL                            Data block
  - #                                    This character indicates the beginning of the data block
  - 1                                    Number of digits in the byte count
  - 4                                    Byte count
  - Y9oL                                4 bytes of data

**Remarks**                    Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:DATA:BIT**

**Supported**                    E4438C with Option 001/601 or 002/602

```
:MEMory:DATA:BIT "<file_name>",<bit_count>,<data_block>
:MEMory:DATA:BIT? "<file_name>"
```

This command loads bit data into signal generator memory using the <bit\_count> and <data\_block> parameters and saves the data to a file designated by the "<file\_name>" variable. The query returns the bit count, file length information, and the data.

- "<file\_name>"    This variable names the destination file and the directory path.
- <bit\_count>        This number represents the number of bits in the data block.
- <data\_block>      This parameter represents the data and file length parameters. The data in the file is represented by the <data\_block> variable. The file length parameters are used by the signal generator for allocating memory.

Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on downloading and using files.

**Example**

```
:MEM:DATA:BIT "Test_Data",16,#12Qz
```

The preceding example downloads bit data to the file, Test\_Data. The table below describes the command parameters.

Memory Subsystem (:MEMory)

- "Test\_Data" Test\_Data is the file name. The directory path is not needed. The path "/USER/BIT/" is implied.
- 16 Number of bits in the data block
- #12Qz Data block
  - # This character indicates the beginning of the data block
  - 1 Number of digits in the byte count
  - 2 Byte count
  - Qz 16 bits of data (ascii representation of bit data)

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:DATA:FIR**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DATA:FIR "<file\_name>",osr,coefficient{,coefficient}

:MEMory:DATA:FIR? "<file\_name>"

This command loads oversample ratio (OSR) and user-defined finite impulse response (FIR) coefficient data into a file in the signal generator’s non-volatile memory (NVWFM). The query returns the oversample ratio and coefficient data.

"<file\_name>" This variable is the file name of the destination file. The directory path, /USER/FIR is not required as it is implied by the command.

osr The OSR is the number of filter taps per symbol.

coefficient This variable is the FIR coefficient. The maximum number of coefficients is 1024.

{,coefficient} This optional variable is used when you enter additional coefficients.

Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on downloading and using files.

**Example**

```
:MEM:DATA:FIR "FIR_1",4,0,0,0,0,0,0.000001,0.000012,0.000132,  
0.001101,0.006743,0.030588,0.103676,0.265790,0.523849,0.809508,1,1,  
0.809508,0.523849,0.265790,0.103676,0.030588,0.006743,0.001101,0.000132,  
0.000012,0.000001,0,0,0,0,0
```

The preceding example downloads FIR coefficient and oversampling ratio data to the signal generator’s non-volatile memory in a file named FIR\_1. Notice that the signal generator directory

path, /USER/FIR, is not needed as it is implied by the command. Refer to “File Name Variables” on page 13 for information on the file name syntax.

**Range**                    *osr*: 1–32  
                               *coefficient*: –1000 to 1000

**Key Entry**            **Oversample Ratio**

**:DATA:FSK**

Supported                E4438C with Option 001/601 or 002/602

```
:MEMory:DATA:FSK "<file_name>",<num_states>,<f0>,<f1>,...<f(n)>
[,<diff_state>,<num_diff_states>,<diff1>,...<diff(n)>]
:MEMory:DATA:FSK? "<file_name>"
```

This command loads custom frequency shift keying (FSK) data into a file in the signal generator’s non-volatile memory (NVWFM).

The query returns data in the following form:

```
<num_states>,<f0>,<f1>,...<f(n)>,<diff_state>,<num_diff_states>,<diff1>,
...<diff(n)>
```

"<file\_name>"    This variable string identifies the name of the FSK file. The filename must be enclosed with quotation marks.

<num\_states>    This variable identifies the number of frequency states.

<f0>             This variable identifies the value of the first frequency state.

<f1>,...<f(n)>    This variable identifies the value of the second and subsequent frequency states with a frequency resolution of 0.1Hz.

<diff\_state>    This variable enables or disables differential encoding.

<num\_diff\_states> This variable identifies the number of differential states.

<diff0>           This variable identifies the value of the first differential state.

<diff1>,...<diff(n)> This variable identifies the value of the second and subsequent differential states.

Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on downloading and using files.

**Example**

```
:MEM:DATA:FSK "4FSK",4,-2kHz,-1kHz,2kHz,1kHz,ON,2,1,0
```

The preceding example downloads a four-level FSK data to a file named 4FSK. There are four states (frequencies): -2kHz, -1kHz, 2kHz, 1kHz; differential encoding is toggled ON, and there are two differential states 1 and 0. The table shown below describes the command parameters.

- "4FSK"                                    4FSK is the FSK file name. The directory path is not needed. The path "/USER/FSK" is implied.
- 4    Number of states
- -2kHz                                    First frequency state
- -1kHz                                    Second frequency state
- 2kHz                                     Third frequency state
- 1kHz                                     Fourth frequency state
- ON                                        Differential encoding is on
- 2                                         Number of differential states
- 1                                         Value of the first differential state.
- 0                                         Value of the second differential state.

**Range**                    *num\_diff\_states:* 0–256  
                               *num\_states:* 2–16  
                               *f0–f(n):* -20MHZ to 20MHZ  
                               *diff0–diff(n):* -128 to 127

**Remarks**                Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:DATA:IQ**

**Supported**                E4438C with Option 001/601 or 002/602

```
:MEMory:DATA:IQ "<file_name>",<offsetQ>,<num_states>,<i0>,<q0>,<i1>,<q1>,...<i(n)>,<q(n)>[,<diff_state>,<num_diff_states>,<diff0>,<diff1>,...<diff(n)>]
```

```
:MEMory:DATA:IQ? "<file_name>"
```

This command loads custom I/Q data into a file in the signal generator’s non-volatile waveform memory (NVWFM).

The query returns data in the following form:

<offsetQ>, <num\_states>, <i0>, <q0>, <i1>, <q1>, ... <i(n)>, <q(n)>, <diff\_state>  
 , <num\_diff\_states>, <diff0>, <diff1>, ... <diff(n)>

"<file\_name>" This variable string identifies the name of the I/Q file. The filename must be enclosed with quotation marks.

<offsetQ> This variable enables (1) or disables (0) the Q output delay by 1/2 symbol from the I output.

<num\_states> This is the number of symbols.

<i0>...<i(n)> This is the I value of the first and subsequent I symbols.

<q0>...<q(n)> This is the Q value of the first and subsequent Q symbols.

<diff\_state> This variable enables and disables differential encoding.

<num\_diff\_states> This variable identifies the number of differential states.

<diff0> This variable identifies the value of the first differential state.

<diff1, ... diff(n)> This variable identifies the value of the second and subsequent differential states.

Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on downloading and using files.

**Example**

```
:MEM:DATA:IQ "Test_BPSK",1,2,1,0,0,0
```

The preceding example loads and stores a two-symbol I/Q file named `Test_BPSK` that has a Q offset. The table shown below describes the command parameters.

- "Test\_BPSK"                      Test\_BPSK is the file name. The directory path is not needed. The path "/USER/IQ" is implied.
- 1                                      Q Offset. The Q output delay is enabled.
- 2                                      Number of symbols
- 1                                      Value of the first I symbol
- 0                                      Value of the first Q symbol.
- 0                                      Value of the second I symbol
- 0                                      Value of the second Q symbol

**Memory Subsystem (:MEMory)**

<b>Range</b>	<i>num_states</i> : 2–256 <i>i0–i(n)</i> : –1 to 1 <i>q0–q(n)</i> : –1 to 1 <i>num_diff_states</i> : 0–256 <i>diff0–diff(n)</i> : –128 to 127
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 13 for information on the file name syntax.

**:DATA:PRAM:FILE:BLOCK**

**Supported** E4438C with Option 001/601 or 002/602

`:MEMory:DATA:PRAM:FILE:BLOCK "<file_name>", <data_block>`

This command loads block-formatted data directly into pattern RAM volatile memory (WFM1). Pattern RAM memory describes how memory (WFM1) is used and is not a distinct piece of memory. A PRAM file is specified as an array of bytes.

"<file\_name>" This variable names the destination file. No directory path name is needed.

<data\_block> This parameter represents the data and file length parameters. The data in the file is represented by the <data\_block> variable. The file length parameters are used by the signal generator for allocating memory.

Pattern Ram files are binary files downloaded directly into waveform memory as an array of bytes. Each byte specifies a data bit (LSB 0), a burst bit (BIT 2), and an Event 1 output bit (BIT 6). Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on pattern RAM downloading.

**Example**

`:MEM:DATA:PRAM:FILE:BLOC "PRAM_Data", #14Yq8L`

The preceding example downloads PRAM data to a file named PRAM\_Data into the signal generator’s volatile memory (WFM1).

- "PRAM\_Data" PRAM\_Data is the file name. PRAM files are saved to the signal generator’s volatile memory (WFM1).
- #14Yq8L Data block
  - # This character indicates the beginning of the data block
  - 1 Number of digits in the byte count
  - 4 Byte count
  - Yq8L 4 bytes of data



---

**NOTE** The data, Yq8L, in the above command is not valid and is used for example purposes only. Typically, ASCII characters representing data are unprintable.

---

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

## **:DATA:PRAM:FILE:LIST**

**Supported** E4438C with Option 001/601 or 002/602

MEMory:DATA:PRAM:FILE:LIST "<file\_name>", <uint8> [, <uint8>, <...>]

This command loads list-formatted data directly into pattern RAM volatile memory (WFM1). Pattern RAM memory describes how memory (WFM1) is used and is not a distinct piece of memory. A PRAM file is specified as an array of bytes.

---

**NOTE** This command should be preceded by a \*WAI (Wait-to-Continue) command to ensure that all pending operations are completed, before loading the list.

---

"<file\_name>" This variable names the destination file.

<uint8> This variable is any of the valid 8-bit, unsigned integer values between 0 and 255.

[, <uint8>, <...>] This variable identifies the value of the second and subsequent 8-bit unsigned integer variables.

Pattern Ram files are binary files downloaded directly into waveform memory as an array of bytes. Each byte specifies a data bit (LSB 0), a burst bit (BIT 2), and an Event 1 output bit (BIT 6). Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on pattern RAM downloading.

### **Example**

```
:MEM:DATA:PRAM:LIST "Pram_Data", 85,21,21,20,20,100
```

The preceding example downloads PRAM data, in list format, to a file named `Pram_Data` in the signal generator’s volatile memory (WFM1).

- "Pram\_Data" Pram\_Data is the file name. PRAM files are saved to the signal generator’s volatile memory (WFM1).
- 85 The first 8-bit integer value
- 21,21,20,20,100 Subsequent 8-bit integer values.

**Memory Subsystem (:MEMory)**

<b>Range</b>	0–255
<b>Remarks</b>	Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:DATA:PRAM**


---

<b>NOTE</b>	Refer to the <i>E4428C/38C ESG Signal Generators Programming Compatibility Guide</i> for information on this command. This command is still valid for backward compatibility with earlier signal generator models.
-------------	--

---

**:DATA:PRAM:BLOCK**


---

<b>NOTE</b>	Refer to the <i>E4428C/38C ESG Signal Generators Programming Compatibility Guide</i> for information on this command. This command was replaced by “:DATA:PRAM:FILE:BLOCK” on page 112.
-------------	---

---

**:DATA:PRAM:LIST**


---

<b>NOTE</b>	Refer to the <i>E4428C/38C ESG Signal Generators Programming Compatibility Guide</i> for information on this command. This command has been replaced by “:DATA:PRAM:FILE:LIST” on page 113.
-------------	---

---

**:DATA:SHAPE**

**Supported** E4438C with Option 001/601 or 002/602

```
:MEMory:DATA:SHAPE "<filename>",<num_rise_points>,<rp0>,<rp1>,  
...<num_fall_points>,<fp0>,<fp1>,...<fp(n)>  
:MEMory:DATA:SHAPE? "<filename>"
```

This command creates a new burst shape file and stores it in the signal generator non-volatile memory.

"<filename>" This variable string identifies the name of the burst shape file.

num\_rise\_points This variable specifies how many rise points used in the command.

rp0,...rp(n) This variable defines each successive rise point, where 0 is no power and 1 is full power.

num\_fall\_points This variable specifies how many fall points used in the command.

fp0,...fp(n)      This variable defines each successive fall point, where 0 is no power and 1 is full power.

**Range**            num\_rise\_points: 2–256    num\_fall\_points: 2–256  
                       rp0–rp(n): 0.0–1.0      fp0–fp(n): 0.0–1.0

## **:DATA:SHAPE**

**Supported**        E4438C with Option 001/601 or 002/602

```
:MEMory:DATA:SHAPE
"<file_name>",<rise_pnts>,<rp0>,<rp1>,...<fall_points>,<fp0>,<fp1>,...<fp(n)>
:MEMory:DATA:SHAPE? "<file_name>"
```

This command loads a burst shape file into the signal generator's non-volatile memory (NVWFM).

"<file\_name>"    This variable names the destination file and directory path.

rise\_pnts        This variable indicates the number of rise points used to describe the burst shape rising slope.

rp0,...rp(n)    This variable defines each successive rise point, where 0 is no power and 1 is full power.

fall\_points     This variable indicates the number of fall points used to describe the burst shape falling slope.

fp0,...fp(n)    This variable defines each successive fall point, where 1 is full power and 0 is no power.

Refer the *E4428C/38C ESG Signal Generators Programming Guide* for more information on downloading and using files.

### **Example**

```
:MEM:DATA:SHAP "Shape_File",6,0,0.2,0.4,0.6,0.8,1.0,2,0.5,0
```

The preceding example loads shape data to a file named `Shape_File` in the signal generator's non-volatile memory.

- "Shape\_File"                      `Shape_File` is the shape data filename. The directory path is not needed. The path `"/USER/SHAPE/"` is implied.
- 6                                      Number of rise points describing the burst shape.
- 0,0.2,0.4,0.6,0.8,1.0              Rise point values.
- 2                                      Number of fall points describing the burst shape.
- 0.5,0                                Fall point values.

**Memory Subsystem (:MEMory)**

<b>Range</b>	<i>num_rise_points:</i> 2–256
	<i>num_fall_points:</i> 2–256
	<i>rp0–rp(n):</i> 0.0–1.0
	<i>fp0–fp(n):</i> 0.0–1.0

**:DATA:UNPRotected**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DATA:UNPRotected "<file\_name>", <data\_block>

This command allows you to download data and store it in a file on the signal generator with the ability to retrieve it. This command is intended for downloading waveform data; however you can use it to download other types of data.

---

**NOTE** If you do not use the *UNPRotected* command when downloading a waveform file, you will not be able to retrieve or upload the file. Attempting to do so will cause the signal generator to display the message: `ERROR:221, Access denied`.

---

"<file\_name>" This variable names the destination file and directory path. The file type determines how you must format the "<file\_name>" variable as described in the following list.

- **Binary file** The "<file\_name>" variable requires only a file name. A file name without a file path is automatically stored in the Binary memory catalog. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.
- **Encrypted file** The "<file\_name>" variable requires a path that includes the SECUREWAVE directory. The securewave directory path is SNVWFM: for non-volatile waveform memory and SWFM1: for volatile waveform memory.
- **All other file types** The "<file\_name>" variable requires a path that includes the destination directory for the file type. Refer to the [Table on page 14](#), and [“File Name Variables” on page 13](#) for more information.

<data\_block> This parameter represents the data and file length parameters. The data in the file is represented by the <data\_block> variable.

Refer to the *E4428C/38C ESG Signal Generators Programming Guide* for more information on downloading and using files.

**Example**

```
:MEM:DATA:UNPR "NVWFM:Data_File",#18Qz37pY9o
```

The preceding example downloads waveform data to a file named Data\_File in the signal generator's non-volatile securewave directory. The table shown below describes the command parameters.

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• "NVWFM:Data_File"</li> <li>• #18Qz37pY9o</li> <li style="padding-left: 2em;">#</li> <li style="padding-left: 2em;">1</li> <li style="padding-left: 2em;">8</li> <li style="padding-left: 2em;">Qz37pY9o</li> </ul> | <p>Data_File is the filename. The directory path is not needed. The path "/USER/SECUREWAVE" is implied.</p> <p>Data block</p> <p>This character indicates the beginning of the data block</p> <p>Number of digits in the byte count</p> <p>Byte count</p> <p>8 bytes of data</p> |
|---|--|

---

**NOTE**            The data, Qz37pY9o, in the above command is not valid and is used for example purposes only. Typically, ascii characters representing data are unprintable.

---

**:DElete:ALL**

**Supported**            All Models

---

**CAUTION**            Using this command deletes all user files including binary, list, state, and flatness correction files, and any saved setups which use the front panel table editor. However, this does not include files stored on the Option 001/601 or 002/602 baseband generator. You cannot recover the files after executing this command.

---

```
:MEMory:DELeTe:ALL
```

This command clears the file system of all user files.

**Key Entry**            **Delete All Files**

### **:DElete:BINary**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:BINary

This command deletes all binary files.

**Key Entry** Delete All Binary Files

### **:DElete:BIT**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:BIT

This command deletes all bit files.

**Key Entry** Delete All Bit Files

### **:DElete:CDMa**

---

**NOTE** Refer to the *E4428C/38C ESG Signal Generators Programming Compatibility Guide* for information on this command. This command is still valid for backward compatibility and was replaced by “:DELeTe:CDMA”.

---

### **:DElete:CDMA**

**Supported** E4438C with Option 401

:MEMory:DELeTe:CDMA

This command deletes all arbitrary waveform IS-95 CDMA files.

**Key Entry** Delete All ARB CDMA Files

### **:DElete:DMOD**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:DMOD

This command deletes all arbitrary waveform digital modulation files.

**Key Entry** Delete All ARB DMOD Files

### **:DElete:DWCDma**

**Supported** E4438C with Option 400

:MEMory:DELeTe:DWCDma

This command deletes all arbitrary waveform downlink W-CDMA files.

**Key Entry** Delete All ARB DWCDMA Files

### **:DElete:FCDMa**

**Supported** E4438C with Option 401

:MEMory:DELeTe:FCDMa

This command deletes all arbitrary waveform forward link W-CDMA files.

**Key Entry** Delete All ARB FCDMA Files

### **:DElete:FIR**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:FIR

This command deletes all finite impulse response filter files.

**Key Entry** Delete All FIR Files

### **:DElete:FSK**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:FSK

This command deletes all FSK files.

**Key Entry** Delete All FSK Files

### **:DElete:IQ**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:IQ

This command deletes all I/Q files.

**Key Entry** Delete All I/Q Files

### **:DElete:LIST**

**Supported** All Models

:MEMory:DElete:LIST

This command deletes all List files.

**Key Entry** Delete All List Files

### **:DElete:MCDMa**

**Supported** E4438C with Option 401

:MEMory:DElete:MCDMa

This command deletes all arbitrary waveform multicarrier IS-95 CDMA files.

**Key Entry** Delete All ARB MCDMA Files

### **:DElete:MDMod**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DElete:MDMod

This command deletes all arbitrary waveform multicarrier digital modulation files.

**Key Entry** Delete All ARB MDMOD Files

### **:DElete:MDWCdma**

**Supported** E4438C with Option 400

:MEMory:DElete:MDWCdma

This command deletes all arbitrary waveform multicarrier downlink W-CDMA files.

**Key Entry** Delete All ARB MDWCdma Files

### **:DElete:MFCdma**

**Supported** E4438C with Option 401

:MEMory:DElete:MFCdma

This command deletes all arbitrary waveform multicarrier forward link cdma2000 files.

**Key Entry** Delete All ARB MFCdma Files



### **:DElete:MTONe**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:MTONe

This command deletes all arbitrary waveform multitone files.

**Key Entry** Delete All ARB MTONE Files

### **:DElete:RCDMa**

**Supported** E4438C with Option 401

:MEMory:DELeTe:RCDMa

This command deletes all arbitrary waveform reverse link cdma2000 files.

**Key Entry** Delete All ARB RCDMA Files

### **:DElete:SEQ**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:SEQ

This command deletes all sequence files.

**Key Entry** Delete All Sequence Files

### **:DElete:SHApe**

**Supported** E4438C with Option 001/601 or 002/602

:MEMory:DELeTe:SHApe

This command deletes all burst shape files.

**Key Entry** Delete All Shape Files

### **:DElete:STATe**

**Supported** All Models

:MEMory:DELeTe:STATe

This command deletes all state files.

**Key Entry** Delete All Models State Files

### **:DElete:UFLT**

**Supported** All Models

:MEMory:DElete:UFLT

This command deletes all user-flatness correction files.

**Key Entry** Delete All UFLT Files

### **:DElete:UWCDma**

**Supported** E4438C with Option 400

:MEMory:DElete:UWCDma

This command deletes all arbitrary waveform uplink W-CDMA files.

**Key Entry** Delete All ARB UWCDMA Files

### **:DElete[:NAME]**

**Supported** All Models

:MEMory:DElete[:NAME] "<file name>"

This command clears the user file system of "<file name>".

**Key Entry** Delete File

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

When deleting a waveform (WFM1) file from memory, the marker file and file header, associated with the waveform file, will also be deleted.

### **:FREE[:ALL]**

**Supported** All Models

:MEMory:FREE[:ALL] ?

This command returns the number of bytes left in the user file system.

**Key Entry** All

## :LOAD:LIST

**Supported** All Models

```
:MEMory:LOAD:LIST "<file name>"
```

This command loads a list sweep file.

**Key Entry** Load From Selected File

## :MOVE

**Supported** All Models

```
:MEMory:MOVE "<src_file>","<dest_file>"
```

This command renames the requested file in the memory catalog.

**Key Entry** Rename File

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :STAtE:COMMeNt

**Supported** All Models

```
:MEMory:STAtE:COMMeNt <reg_num>,<seq_num>,"<comment>"
```

```
:MEMory:STAtE:COMMeNt? <reg_num>,<seq_num>
```

This command lets you to add a descriptive comment to the saved state <reg\_num>,<seq\_num>. Comments can be up to 55 characters long.

**Key Entry** Add Comment To Seq[n] Reg[nn]

## :STORe:LIST

**Supported** All Models

```
:MEMory:STORe:LIST "<file name>"
```

This command stores the current list sweep data to a file.

**Key Entry** Store To File

---

## Mass Memory Subsystem (:MMEMory)

### :CATalog

**Supported** All Models

```
:MMEMory:CATalog? "<msus>"
```

This command outputs a list of the files from the specified file system.

The variable "<msus>" (mass storage unit specifier) represents "<file system>". The file systems and types are shown in [Table 1-4 on page 14](#).

The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

The signal generator will return the two memory usage parameters and as many file listings as there are files in the specified file system. Each file listing will be in the following format:

```
"<file name>,<file type>,<file size>"
```

<b>Key Entry</b>	<b>Binary</b>	<b>List</b>	<b>State</b>	<b>User Flatness</b>	<b>FIR</b>	<b>Shape</b>	<b>Bit</b>	<b>FSK</b>
	<b>IQ</b>	<b>Seq</b>	<b>DMOD</b>	<b>MTONE</b>	<b>MDMOD</b>	<b>CDMA</b>	<b>MCDMA</b>	<b>FCDMA</b>
	<b>MFCDMA</b>	<b>RCDMA</b>	<b>WCDMA</b>	<b>FWCDMA</b>	<b>MFWCDMA</b>	<b>RWCDMA</b>		
	<b>DWCDMA</b>	<b>MDWCDMA</b>	<b>UWCDMA</b>	<b>WFM1</b>	<b>NVMKR</b>	<b>NVWFM</b>		

**Remarks** Refer to “[MSUS \(Mass Storage Unit Specifier\) Variable](#)” on page 16 for information on the use of the "<msus>" variable.

### :COPY

**Supported** All Models

```
:MMEMory:COPY "<file name>","<file name>"
```

This command makes a duplicate of the requested file.

**Key Entry** **Copy File**

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

When copying a waveform file from volatile to non-volatile memory, the marker file and file header, associated with the waveform file, will automatically be copied at the same time.

## :DATA

**Supported** E4438C with Option 001/601 or 002/602

:MMEMory:DATA "<file name>", <datablock>

:MMEMory:DATA? "<file name>"

This command loads <datablock> into the memory location "<file name>".

The query returns the <datablock> associated with the "<file name>".

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :DElete:NVWFm

**Supported** E4438C with Option 001/601 or 002/602

:MMEMory:DElete:NVWFm

This command clears the user file system of all non-volatile arbitrary waveform files.

**Key Entry** Delete All NVWFm Files

## :DElete:WFM

**Supported** E4438C with Option 001/601 or 002/602

:MMEMory:DElete:WFM

This command clears the user file system of all arbitrary waveform files, which is the same function as performed by the command shown in [“:DElete:WFM1”](#).

**Key Entry** Delete All WFM1 Files

## :DElete:WFM1

**Supported** E4438C with Option 001/601 or 002/602

:MMEMory:DElete:WFM1

This command clears the user file system of all arbitrary waveform files, which is the same function as performed by the command shown in [“:DElete:WFM1”](#).

**Key Entry** Delete All WFM1 Files

### :DElete[:NAME]

**Supported** All

```
:MMEMory:DElete[:NAME] "<file name>", ["<msus>"]
```

This command clears the user file system of "<file name>" with the option of specifying the file system separately.

The variable "<msus>" (mass storage unit specifier) represents the file system. For a list of the file systems refer to the [Table on page 14](#).

**Key Entry** Delete File

**Remarks** If the optional variable "<msus>" is omitted, the file name needs to include the file system extension. Refer to [“File Name Variables” on page 13](#) and [“MSUS \(Mass Storage Unit Specifier\) Variable” on page 16](#) for information on the use of the file variables.

When deleting a waveform file from memory, the marker file and file header, associated with the waveform file, will also be deleted.

### :HEADer:CLEar

**Supported** E4438C with Option 001/601 or 002/602

```
:MMEMory:HEADer:CLEar "<file name>"
```

This command sets the file header field settings to unspecified for the "<file name>" variable.

**Key Entry** Clear Header

**Remarks** This command does not require a personality modulation to be on. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### :HEADer:DESCription

**Supported** E4438C with Option 001/601 or 002/602

```
:MMEMory:HEADer:DESCription "<file name>", "<description>"
```

```
:MMEMory:HEADer:DESCription? "<file name>"
```

This command inserts a description for the file header.

**Key Entry** Edit Description

**Remarks** The header description is limited to 32 characters. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :LOAD:LIST

**Supported** All

:MMEMory:LOAD:LIST "<file name>"

This command loads a List sweep file.

**Key Entry** Load From Selected File

## :MOVE

**Supported** All

:MMEMory:MOVE "<src\_file>", "<dest\_file>"

This command renames the requested file in the memory catalog.

**Key Entry** Rename File

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :STORe:LIST

**Supported** All

:MMEMory:STORe:LIST "<file name>"

This command stores the current list sweep data to a file.

**Key Entry** Store To File

---

## Output Subsystem (:OUTPut)

### :BLANKing:AUTO

**Supported** All

:OUTPut:BLANKing:AUTO ON|OFF|1|0

:OUTPut:BLANKing:AUTO?

This command turns the RF output on or off during frequency band changes. Frequency band changes can cause the signal generator's RF output to fluctuate. The output blanking function, when active, turns off the RF output until the frequency settles.

ON (1) The RF output turns off when crossing a frequency band.

OFF (0) The RF output stays on when crossing a frequency band.

\*RST 1

**Key Entry** Output Blanking Off On Auto

**Remarks** Refer to the signal generator's data sheet for information on frequency switching speeds, settling times, and frequency band information.

### :BLANKing:STATe

**Supported** All

:OUTPut:BLANKing:STATe ON|OFF|1|0

:OUTPut:BLANKing:STATe?

This command enables or disables the RF output blanking state.

ON (1) The RF output turns off during frequency changes.

OFF (0) The RF output stays on during frequency changes.

\*RST 1

**Remarks** Refer to the signal generator's data sheet for information on frequency switching speeds, settling times, and frequency band information.



## **:MODulation[:STATe]**

**Supported** All

:OUTPut:MODulation[:STATe] ON|OFF|1|0

:OUTPut:MODulation[:STATe]?

This command enables or disables the modulation of the RF output with the currently active modulation type(s).

**\*RST** 1

**Key Entry** **Mod On/Off**

**Remarks** Some modulation types can be simultaneously enabled such as pulse and AM.

An annunciator on the signal generator is always displayed to indicate whether modulation is switched on or off.

## **[:STATe]**

**Supported** All

:OUTPut[:STATe] ON|OFF|1|0

:OUTPut[:STATe]?

This command enables or disables the RF output.

**\*RST** 0

**Key Entry** **RF On/Off**

**Remarks** Although you can configure and engage various modulations, no signal is available at the RF OUTPUT connector until this command is executed.

An annunciator is always displayed on the signal generator to indicate whether the RF output is switched on or off.

---

## Route Subsystem (:ROUTE:HARDware:DGENERator)

### :INPut:BPOLarity

**Supported** E4438C with Option 001/601 or 002/602

:ROUTE:HARDware:DGENERator:INPut:BPOLarity POSitive|NEGative

:ROUTE:HARDware:DGENERator:INPut:BPOLarity?

This command configures the polarity of the TTL input signal at the BURST GATE IN connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Burst Gate In Polarity Neg Pos**

**Remarks** This command performs the same function as [“:IPOLarity:BGATE”](#) on page 131.

### :INPut:CPOLarity

**Supported** E4438C with Option 001/601 or 002/602

:ROUTE:HARDware:DGENERator:INPut:CPOLarity POSitive|NEGative

:ROUTE:HARDware:DGENERator:INPut:CPOLarity?

This command configures the polarity of the TTL input signal at the DATA CLOCK connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Data Clock Polarity Neg Pos**

**Remarks** This command performs the same function as [“:IPOLarity:CLOCK”](#) on page 132.

## :INPut:DPOLarity

**Supported** E4438C with Option 001/601 or 002/602

```
:ROUTE:HARDware:DGENERator:INPut:DPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:INPut:DPOLarity?
```

This command configures the polarity of the TTL input signal at the DATA connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Data Polarity Neg Pos**

**Remarks** This command performs the same function as [“:IPOLarity:DATA”](#) on page 132.

## :INPut:SPOLarity

**Supported** E4438C with Option 001/601 or 002/602

```
:ROUTE:HARDware:DGENERator:INPut:SPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:INPut:SPOLarity?
```

This command configures the polarity of the TTL input signal at the SYMBOL SYNC connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Symbol Sync Polarity Neg Pos**

**Remarks** This command performs the same function as [“:IPOLarity:SSYNc”](#) on page 132.

## :IPOLarity:BGATe

**Supported** E4438C with Option 001/601 or 002/602

```
:ROUTE:HARDware:DGENERator:IPOLarity:BGATe POSitive|NEGative  
:ROUTE:HARDware:DGENERator:IPOLarity:BGATe?
```

This command configures the polarity of the input signal at the BURST GATE IN connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Burst Gate In Polarity Neg Pos**

**Remarks** This command performs the same function as [“:INPut:BPOLarity”](#) on page 130.

**:IPOLarity:CLOCK**

**Supported** E4438C with Option 001/601 or 002/602

:ROUTE:HARDware:DGENERator:IPOLarity:CLOCK POSitive|NEGative

:ROUTE:HARDware:DGENERator:IPOLarity:CLOCK?

This command configures the polarity of the TTL input signal at the DATA CLOCK connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Data Clock Polarity Neg Pos**

**Remarks** This command performs the same function as [“:INPut:CPOLarity” on page 130](#).

**:IPOLarity:DATA**

**Supported** E4438C with Option 001/601 or 002/602

:ROUTE:HARDware:DGENERator:IPOLarity:DATA POSitive|NEGative

:ROUTE:HARDware:DGENERator:IPOLarity:DATA?

This command configures the polarity of the TTL input signal at the DATA connector. POSitive refers to normal logic, while NEGative refers the inverted logic.

**\*RST** POS

**Key Entry** **Data Polarity Neg Pos**

**Remarks** This command performs the same function as [“:INPut:DPOLarity” on page 131](#).

**:IPOLarity:SSYNc**

**Supported** E4438C with Option 001/601 or 002/602

:ROUTE:HARDware:DGENERator:IPOLarity:SSYNc POSitive|NEGative

:ROUTE:HARDware:DGENERator:IPOLarity:SSYNc?

This command configures the polarity of the TTL input signal at the SYMBOL SYNC connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Symbol Sync Polarity Neg Pos**

**Remarks** This command performs the same function as [“:INPut:SPOLarity” on page 131](#).

**:OPOLarity:CLOCK**

**Supported** E4438C with Option 001/601 or 002/602

```
:ROUTe:HARDware:DGENerator:OPOLarity:CLOCK POSitive|NEGative
```

```
:ROUTe:HARDware:DGENerator:OPOLarity:CLOCK?
```

This command configures the polarity of the TTL output Data Clock Out signal at the DATA CLK OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while the NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Data Clock Out Neg Pos**

**Remarks** This command performs the same function as “:OUTPut:CPOLarity” on [page 134](#).

**:OPOLarity:DATA**

**Supported** E4438C with Option 001/601 or 002/602

```
:ROUTe:HARDware:DGENerator:OPOLarity:DATA POSitive|NEGative
```

```
:ROUTe:HARDware:DGENerator:OPOLarity:DATA?
```

This command configures the polarity of the TTL output DATA OUT signal at the DATA OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Data Out Polarity Neg Pos**

**Remarks** This command performs the same function as “:OUTPut:DPOLarity” on [page 135](#).

### :OPOLarity:SSYNc

**Supported** E4438C with Option 001/601 or 002/602

:ROUTE:HARDware:DGENERator:OPOLarity:SSYNc POSitive|NEGative

:ROUTE:HARDware:DGENERator:OPOLarity:SSYNc?

This command configures the polarity of the TTL output SYMBOL SYNC signal at the SYM SYNC OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Symbol Sync Out Polarity Neg Pos**

**Remarks** This command performs the same function as [“:OUTPut:SPOLarity” on page 135](#).

### :OUTPut:CPOLarity

**Supported** E4438C with Option 001/601 or 002/602

:ROUTE:HARDware:DGENERator:OUTPut:CPOLarity POSitive|NEGative

:ROUTE:HARDware:DGENERator:OUTPut:CPOLarity?

This command configures the polarity of the TTL output DATA CLOCK OUT signal at the DATA CLK OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** **Data Clock Polarity Neg Pos**

**Remarks** This command performs the same function as [“:OPOLarity:CLOCK” on page 133](#).

### **:OUTPut:DCS[:STATe]**

**Supported** E4438C with Option 001/601 or 002/602

:ROUTe:HARDware:DGENERator:OUTPut:DCS[:STATe] ON|OFF|1|0

:ROUTe:HARDware:DGENERator:OUTPut:DCS[:STATe] ?

This command is used to enable or disable the output DATA OUT, DATA CLK OUT, and SYM SYNC OUT signals from the rear panel AUX I/O connector. Normally, these output signals should be enabled (On). However, disabling these outputs will decrease the spurs that are sometimes present when operating at high symbol rates.

**\*RST** 1

**Key Entry** DATA/CLK/SYNC Rear Outputs Off On

### **:OUTPut:DPOLarity**

**Supported** E4438C with Option 001/601 or 002/602

:ROUTe:HARDware:DGENERator:OUTPut:DPOLarity POSitive|NEGative

:ROUTe:HARDware:DGENERator:OUTPut:DPOLarity?

This command configures the polarity of the TTL output signal at the DATA OUT connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** Data Out Polarity Neg Pos

**Remarks** This command performs the same function as “:OPOLarity:DATA” on page 133.

### **:OUTPut:SPOLarity**

**Supported** E4438C with Option 001/601 or 002/602

:ROUTe:HARDware:DGENERator:OUTPut:SPOLarity POSitive|NEGative

:ROUTe:HARDware:DGENERator:OUTPut:SPOLarity?

This command configures the polarity of the TTL input signal at the SYMBOL SYNC connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** Symbol Sync Out Polarity Neg Pos

## Status Subsystem (:STATus)

### :OPERation:BASEband:CONDition

**Supported** E4438C with Option 001/601 or 002/602

:STATus:OPERation:BASEband:CONDition?

This query returns the decimal sum of the bits in the Baseband Operation Condition Register. For example, if the baseband is busy (bit 0), the value 1 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects the current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### :OPERation:BASEband:ENABLE

**Supported** E4438C with Option 001/601 or 002/602

:STATus:OPERation:BASEband:ENABLE <val>

:STATus:OPERation:BASEband:ENABLE?

This command determines which bits in the Baseband Operation Event Register will set the Baseband is Busy bit (bit 10) in the Standard Operation Condition Register.

The variable <num> is the sum of the decimal values of the bits you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.



### **:OPERation:BASEband:NTRansition**

**Supported** E4438C with Option 001/601 or 002/602

```
:STATUS:OPERation:BASEband:NTRansition <val>  
:STATUS:OPERation:BASEband:NTRansition?
```

This command determines which bits in the Baseband Operation Condition Register will set the corresponding bit in the Baseband Operation Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:OPERation:BASEband:PTRansition**

**Supported** E4438C with Option 001/601 or 002/602

```
:STATUS:OPERation:BASEband:PTRansition <val>  
:STATUS:OPERation:BASEband:PTRansition?
```

This command determines which bits in the Baseband Operation Condition Register will set the corresponding bit in the Baseband Operation Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:OPERation:BASEband[:EVENT]**

**Supported** E4438C with Option 001/601 or 002/602

:STATus:OPERation:BASEband[:EVENT]?

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

This query returns the decimal sum of the bits in the Standard Operation Baseband Event Register.

**Range** 0–32767

**Remarks** The equivalent PTR and NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:OPERation:CONDition**

**Supported** All

:STATus:OPERation:CONDition?

This query returns the decimal sum of the bits for the registers that are set to one and are part of the Standard Operation Status Group. For example, if a sweep is in progress (bit 3), the value 8 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## **:OPERation:ENABLE**

**Supported** All

:STATus:OPERation:ENABLE <val>

:STATus:OPERation:ENABLE?

This command determines which bits in the Standard Operation Event Register will set the Standard Operation Status Summary bit (bit 7) in the Status Byte Register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## **:OPERation:NTRansition**

**Supported** All

:STATus:OPERation:NTRansition <val>

:STATus:OPERation:NTRansition?

This command determines which bits in the Standard Operation Condition Register will set the corresponding bit in the Standard Operation Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## :OPERation:PTRansition

**Supported** All

```
:STATus:OPERation:PTRansition <val>  
:STATus:OPERation:PTRansition?
```

This command determines which bits in the Standard Operation Condition Register will set the corresponding bit in the Standard Operation Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## :OPERation[:EVENT]

**Supported** All

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

```
:STATus:OPERation[:EVENT]?
```

This query returns the decimal sum of the bits in the Standard Operation Event Register.

**Range** 0–32767

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## :PRESet

**Supported** All

```
:STATus:PRESet
```

This command presets all transition filters, enable registers, and error/event queue enable registers.

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:BERT:CONDition**

**Supported** E4438C with Option UN7, 300 or both

:STATus:QUESTionable:BERT:CONDition?

This query returns the decimal sum of the bits in the Data Questionable BERT Condition Register. For example, if no clock signal has been input for more than three seconds during the bit error rate measurement (bit 0), then a value of 1 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects the current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:BERT:ENABLE**

**Supported** E4438C with Option UN7, 300 or both

:STATus:QUESTionable:BERT:ENABLE <val>

:STATus:QUESTionable:BERT:ENABLE?

This command determines which bits in the Data Questionable BERT Event Register will set the Data Questionable BERT Summary bit (bit 12) in the Data Questionable Condition Register.

The variable <val> is the sum of the decimal values of the bits you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### :QUESTionable:BERT:NTRansition

**Supported** E4438C with Option UN7, 300 or both

:STATUS:QUESTionable:BERT:NTRansition <val>

:STATUS:QUESTionable:BERT:NTRansition?

This command determines which bits in the Data Questionable BERT Condition Register will set the corresponding bit in the Data Questionable BERT Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects the current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### :QUESTionable:BERT:PTRansition

**Supported** E4438C with Option UN7, 300 or both

:STATUS:QUESTionable:BERT:PTRansition <val>

:STATUS:QUESTionable:BERT:PTRansition?

This command determines which bits in the Data Questionable BERT Condition Register will set the corresponding bit in the Data Questionable BERT Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTIONable:BERT[:EVENT]**

**Supported** E4438C with Option UN7, 300 or both

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

`:STATUS:QUESTIONable:BERT[:EVENT]?`

This command returns the decimal value of the sum of the bits in the Data Questionable BERT Event Register.

**Range** 0–32767

**Remarks** Note that the register requires that the equivalent PTR or NTR filters be set before a condition register bit can set a bit in the Event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTIONable:CALibration:CONDition**

**Supported** All

`:STATUS:QUESTIONable:CALibration:CONDition?`

This query returns the decimal sum of the bits in the Data Questionable Calibration Condition Register. For example, if the DCFM or DCΦM zero calibration fails (bit 0), a value of 1 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects the current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTIONable:CALibration:ENABLE**

**Supported** All

`:STATUS:QUESTIONable:CALibration:ENABLE <val>`

`:STATUS:QUESTIONable:CALibration:ENABLE?`

This command determines which bits in the Data Questionable Calibration Event Register will set the calibration summary bit (bit 8) in the Data Questionable Condition Register.

**Status Subsystem (:STATUS)**

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTIONable:CALibration:NTRansition**

**Supported** All

```
:STATUS:QUESTIONable:CALibration:NTRansition <val>  
:STATUS:QUESTIONable:CALibration:NTRansition?
```

This command determines which bits in the Data Questionable Calibration Condition Register will set the corresponding bit in the Data Questionable Calibration Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTIONable:CALibration:PTRansition**

**Supported** All

```
:STATUS:QUESTIONable:CALibration:PTRansition <val>  
:STATUS:QUESTIONable:CALibration:PTRansition?
```

This command determines which bits in the Data Questionable Calibration Condition Register will set the corresponding bit in the Data Questionable Calibration Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.



### **:QUESTIONable:CALibration[:EVENT]**

**Supported** All

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

`:STATus:QUESTIONable:CALibration[:EVENT]?`

This command returns the decimal sum of the bits in the Data Questionable Calibration Event Register.

**Range** 0–32767

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTIONable:CONDition**

**Supported** All

`:STATus:QUESTIONable:CONDition?`

This query returns the decimal sum of the bits in the Data Questionable Condition Register. For example, if the reference oscillator oven is cold (bit 4), a value of 16 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTionable:ENABle****Supported** All`:STATUS:QUESTionable:ENABle <val>``:STATUS:QUESTionable:ENABle?`

This command determines which bits in the Data Questionable Event Register will set the Data Questionable Status Group Summary bit (bit 3) in the Status Byte Register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTionable:FREQuency:CONDition****Supported** All`:STATUS:QUESTionable:FREQuency:CONDition?`

This query returns the decimal sum of the bits in the Data Questionable Frequency Condition Register. For example, if the 1 GHz internal reference clock is unlocked (bit 2), a value of 4 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTionable:FREQuency:ENABle****Supported** All`:STATUS:QUESTionable:FREQuency:ENABle <val>``:STATUS:QUESTionable:FREQuency:ENABle?`

This command determines which bits in the Data Questionable Frequency Event Register will set the frequency summary bit (bit 5) in the Data Questionable Condition Register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:FREQuency:NTRansition**

**Supported** All

```
:STATUS:QUESTionable:FREQuency:NTRansition <val>  
:STATUS:QUESTionable:FREQuency:NTRansition?
```

This command determines which bits in the Data Questionable Frequency Condition Register will set the corresponding bit in the Data Questionable Frequency Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:FREQuency:PTRansition**

**Supported** All

```
:STATUS:QUESTionable:FREQuency:PTRansition <val>  
:STATUS:QUESTionable:FREQuency:PTRansition?
```

This command determines which bits in the Data Questionable Frequency Condition Register will set the corresponding bit in the Data Questionable Frequency Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:FREQuency[:EVENT]**

**Supported** All

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

```
:STATUS:QUESTionable:FREQuency[:EVENT]?
```

This query returns the decimal sum of the bits in the Data Questionable Frequency Event Register.

**Range** 0–32767

**Status Subsystem (:STATus)**

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTionable:MODulation:CONDition**

**Supported** All

`:STATus:QUESTionable:MODulation:CONDition?`

This command returns the decimal sum of the bits in the Data Questionable Modulation Condition Register. For example, if the modulation is uncalibrated (bit 4), a value of 16 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTionable:MODulation:ENABLE**

**Supported** All

`:STATus:QUESTionable:MODulation:ENABLE <val>`

`:STATus:QUESTionable:MODulation:ENABLE?`

This command determines which bits in the Data Questionable Modulation Event Register will set the modulation summary bit (bit 7) in the Data Questionable Condition Register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:MODulation:NTRansition**

**Supported**            All

```
:STATUS:QUESTionable:MODulation:NTRansition <val>
:STATUS:QUESTionable:MODulation:NTRansition?
```

This command determines which bits in the Data Questionable Modulation Condition Register will set the corresponding bit in the Data Questionable Modulation Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range**                0–32767

**Remarks**            Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:MODulation:PTRansition**

**Supported**            All

```
:STATUS:QUESTionable:MODulation:PTRansition <val>
:STATUS:QUESTionable:MODulation:PTRansition?
```

This command determines which bits in the Data Questionable Modulation Condition Register will set the corresponding bit in the Data Questionable Modulation Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range**                0–32767

**Remarks**            Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

### **:QUESTionable:MODulation[:EVENT]**

**Supported**            All

---

**CAUTION**            This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

```
:STATUS:QUESTionable:MODulation[:EVENT]?
```

This query returns the decimal sum of the bits in the Data Questionable Modulation Event Register.

**Range**                0–32767

**Status Subsystem (:STATus)**

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUEStionable:NTRansition**

**Supported** All

```
:STATus:QUEStionable:NTRansition <val>  
:STATus:QUEStionable:NTRansition?
```

This command determines which bits in the Data Questionable Condition Register will set the corresponding bit in the Data Questionable Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUEStionable:POWer:CONDition**

**Supported** All

```
:STATus:QUEStionable:POWer:CONDition?
```

This query returns the decimal sum of the bits in the Data Questionable Power Condition Register. For example, if the RF output signal is unlevelled (bit 1), a value of 2 is returned.

**Range** 0–32767

**Remarks** The data in this register is continuously updated and reflects current conditions.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## **:QUESTionable:POWer:ENABle**

**Supported** All

```
:STATus:QUESTionable:POWer:ENABle <val>  
:STATus:QUESTionable:POWer:ENABle?
```

This command determines which bits in the Data Questionable Power Event Register will set the power summary bit (bit 3) in the Data Questionable Condition Register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## **:QUESTionable:POWer:NTRansition**

**Supported** All

```
:STATus:QUESTionable:POWer:NTRansition <val>  
:STATus:QUESTionable:POWer:NTRansition?
```

This command determines which bits in the Data Questionable Power Condition Register will set the corresponding bit in the Data Questionable Power Event Register when that bit has a negative transition (1 to 0).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## **:QUESTionable:POWer:PTRansition**

**Supported** All

```
:STATus:QUESTionable:POWer:PTRansition <val>  
:STATus:QUESTionable:POWer:PTRansition?
```

This command determines which bits in the Data Questionable Power Condition Register will set the corresponding bit in the Data Questionable Power Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Status Subsystem (:STATus)**

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTionable:POWer[:EVENT]**

**Supported** All

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

`:STATus:QUESTionable:POWer[:EVENT]?`

This query returns the decimal sum of the bits in the Data Questionable Power Event Register.

**Range** 0–32767

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

**:QUESTionable:PTRansition**

**Supported** All

`:STATus:QUESTionable:PTRansition <val>`

`:STATus:QUESTionable:PTRansition?`

This command determines which bits in the Data Questionable Condition Register will set the corresponding bit in the Data Questionable Event Register when that bit has a positive transition (0 to 1).

The variable <val> is the sum of the decimal values of the bits that you want to enable.

**Range** 0–32767

**Remarks** Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.



## :QUEStionable[:EVENT]

**Supported** All

---

**CAUTION** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

---

:STATus:QUEStionable[:EVENT]?

This query returns the decimal sum of the bits in the Data Questionable Event Register.

**Range** 0–32767

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to Chapter 3 of the *E4428C/38C ESG Signal Generators Programming Guide* for more information.

## System Subsystem (:SYSTem)

### :CAPability

**Supported** All

:SYSTem:CAPability?

This query returns the signal generator's capabilities and outputs the appropriate specifiers:

```
(RFSOURCE WITH ( (AM|FM|PULM|PM|LFO) & (FSSWEEP|FLIST) & (PSSWEEP|PLIST)
&TRIGGER&REFERENCE) )
```

This is a list of the SCPI-defined basic functionality of the signal generator and the additional capabilities it has in parallel (a&b) and singularly (alb).

### :DATE

**Supported** All

:SYSTem:DATE <year>, <month>, <day>

:SYSTem:DATE?

This command sets the date as shown in the lower right area of the signal generator display.

<year> This variable requires a four digit integer.

The query returns the date in the following format:

```
<+year>, <+month>, <+day>
```

**Range** <month>: 1–12 <day>: 1–31

**Key Entry** Time/Date

## **:ERRor[:NEXT]**

**Supported** All

:SYSTem:ERRor[:NEXT]?

This query returns the most recent error message from the signal generator error queue. If there are no error messages, the query returns the following output:

```
+0, "No error"
```

When there is more than one error message, the query will need to be sent for each message.

**Key Entry**            **Error Info**    **View Next Error Message**

**Remarks**            The ESG deletes the error messages after viewing the last message.

## **:ERRor:SCPI[:SYNTax]**

**Supported** All

:SYSTem:ERRor:SCPI[:SYNTax] ON|OFF|1|0

:SYSTem:ERRor:SCPI[:SYNTax]?

This command enables or disables the reporting of SCPI syntax errors to the error queue. The query returns only the numeric value of 1 or 0.

**\*RST**                    0

**Remarks**            The setting ON/1 is persistent through preset and \*RST. This setting will not survive a power cycle.

## **:FILEsystem:SAFEmode**

**Supported** All

:SYSTem:FILEsystem:SAFEmode ON|OFF|1|0

:SYSTem:FILEsystem:SAFEmode?

This command selects the safe mode for file handling. When safe mode is set to OFF, volatile waveform files can be edited and saved while the signal generator plays the file without signal interruption. However, it is possible with complex waveforms, for corruption of memory to occur which will be reported as an error on the front-panel display and require a reboot of the signal generator to resolve.

### **Example**

```
:SYST:FILE:SAVE ON
```

The preceding example enables the safe mode setting and waveform files cannot be edited without

## System Commands

### System Subsystem (:SYSTem)

signal disruption while the signal generator plays them.

**\*RST**                    On

#### **:HELP:MODE**

**Supported**            All

:SYSTem:HELP:MODE SINGle|CONTInuous

:SYSTem:HELP:MODE?

This command sets the help function mode of the signal generator.

**SINGle**                Help is provided only for the next key that you press.

**CONTInuous**        Help is provided for each key you press. In addition, the function of the key is executed.

When the help dialog box is displayed, pressing the **Help** hardkey in either mode will turn help off.

**Key Entry**            **Help Mode Single Cont**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

#### **:IDN**

**Supported**            All

:SYSTem:IDN "<string>"

This command modifies the identification string that the \*IDN? query returns. Sending an empty string returns the query output of \*IDN? to its factory shipped setting. The maximum string length is 72 characters.

**Remarks**            Modification of the \*IDN? query output enables the signal generator to identify itself as another signal generator when used as a replacement.

The display diagnostic information, shown by pressing the **Diagnostic Info** softkey, is not affected by this command.

#### **:LANGuage**

**Supported**            All

:SYSTem:LANGuage "SCPI"|"COMP"|"NADC"|"PDC"|"PHS"|"8648"

:SYSTem:LANGuage?

This command sets the remote language for the signal generator.

SCPI	This choice provides compatibility for SCPI commands.
COMP	This choice provides compatibility for the 8656B, 8657A/B signal generator which is supported by using the GPIB interface.
NADC	This choice provides compatibility for the 8657D NADC personality which is supported only through a GPIB interface (E4438C only).
PDC	This choice provides compatibility for the 8657D PDC personality which is supported only through a GPIB interface (E4438C only).
PHS	This choice provides compatibility for the 8657J PHS personality which is supported only through a GPIB interface (E4438C only).
8648	This choice provides compatibility for the 8648A/B/C/D signal generator which is supported only through a GPIB interface.
<b>Key Entry</b>	<b>SCPI    8656B,8657A/B    8657D NADC    8657D PDC    8657J PHS 8648A/B/C/D</b>
<b>Remarks</b>	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.  For more information on supported SCPI commands and programming codes, refer to the <i>Programming Compatibility Guide</i> .

## :OPT

**Supported**      All

:SYSTem:OPT "<string>"

This command modifies the option string that the \*OPT? query returns. Sending an empty string sets the query output of \*OPT? to the signal generator's factory shipped setting. The maximum string length is 72 characters.

**Remarks**      Modification of the \*OPT? query output enables the signal generator, with a set of options, to *identify* itself as another signal generator when used as a replacement

The display diagnostic information, shown by pressing the **Diagnostic Info** softkey, is not affected by this command.

## :PON:TYPE

**Supported**      All

:SYSTem:PON:TYPE PRESet | LAST

:SYSTem:PON:TYPE?

**System Subsystem (:SYSTem)**

This command sets the defined conditions for the signal generator at power on.

- PRESet** This choice sets the conditions to factory- or user-defined as determined by the choice for the preset type. Refer to “:PRESet:TYPE” on page 160 for selecting the type of preset.
- LAST** This choice retains the settings at the time the signal generator was last powered down.

---

**NOTE** When LAST is selected, no signal generator interaction can occur for at least 3 seconds prior to cycling the power for the current settings to be saved.

---

- Key Entry** **Power On Last Preset**
- Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

**:PRESet**

- Supported** All

SYSTem:PRESet

This command returns the signal generator to a set of defined conditions. It is equivalent to pressing the front panel **Preset** hardkey.

- Key Entry** **Preset**
- Remarks** The defined conditions are either factory- or user-defined. Refer to “:PRESet:TYPE” on page 160 for selecting the type of defined conditions.

**:PRESet:ALL**

- Supported** All

:SYSTem:PRESet:ALL

This command sets all states of the signal generator back to their factory default settings, including states that are not normally affected by signal generator power-on, preset, or \*RST.

**:PRESet:LANGUage**

- Supported** All

:SYSTem:PRESet:LANGUage"SCPI" | "COMP" | "NADC" | "PDC" | "PHS" | "8648"  
:SYSTem:PRESet:LANGUage?

This command sets the remote language that is available when the signal generator is preset.

SCPI	This choice provides compatibility for SCPI commands.				
COMP	This choice provides compatibility for the 8656B, 8657A/B signal generator which is supported by using the GPIB interface.				
NADC	This choice provides compatibility for the 8657D NADC personality which is supported only through a GPIB interface (E4438C only).				
PDC	This choice provides compatibility for the 8657D PDC personality which is supported only through a GPIB interface (E4438C only).				
PHS	This choice provides compatibility for the 8657J PHS personality which is supported only through a GPIB interface (E4438C only).				
8648	This choice provides compatibility for the 8648A/B/C/D signal generator which is supported only through a GPIB interface.				
*RST	"SCPI"				
<b>Key Entry</b>	<b>SCPI</b>	<b>8656B,8657A/B</b>	<b>8657D NADC</b>	<b>8657D PDC</b>	<b>8657J PHS</b>
	<b>8648A/B/C/D</b>				

### **:PRESet:PERSistent**

**Supported** All

:SYSTem:PRESet:PERSistent

This command sets the states that are not affected by signal generator power-on, preset, or \*RST to their factory default settings.

**Key Entry**            **Restore Sys Defaults**

### **:PRESet:PN9**

**Supported** E4438C Option with Option 001/601 or 002/602

:SYSTem:PRESet:PN9 NORMal | QUICk

:SYSTem:PRESet:PN9?

This command sets the preset length of the PN9 sequence for personalities that require software PRBS generation.

NORMal            This choice produces a maximal length PN9 sequence.

QUICk            This choice produces a truncated (216 bits) PN9 sequence.

\*RST            NORM

**Key Entry**            **PN9 Mode Preset**

### **:PRESet:TYPE**

**Supported**            All

```
:SYSTem:PRESet:TYPE NORMAL|USER
:SYSTem:PRESet:TYPE?
```

This command toggles the preset state between factory- and user-defined conditions.

**Key Entry**            **Preset Normal User**

**Remarks**            Refer to “:PRESet[:USER]:SAVE” for saving the USER choice preset settings.

The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### **:PRESet[:USER]:SAVE**

**Supported**            All

```
:SYSTem:PRESet [:USER] :SAVE
```

This command saves your user-defined preset conditions to a state file.

**Key Entry**            **Save User Preset**

**Remarks**            Only one user-defined preset file can be saved. Subsequent saved user-defined preset files will overwrite the previously saved file.

### **:SECurity:DISPlay**

**Supported**            All Models

```
:SYSTem:SECurity:DISPlay ON|OFF|1|0
:SYSTem:SECurity:DISPlay?
```

This command enables or disables the secure display mode.

On(1)                    This selection turns the signal generator display back on, showing the current settings. Cycling the signal generator power also restores the display, however the current settings may change depending on the power-on configuration choice. See “:PON:TYPE” on page 157 for information on the power-on choices available.

OFF(0)                    This selection blanks the signal generator’s display, hiding the settings and disabling the front panel keys. While in this mode, the display shows  
\*\*\* SECURE DISPLAY ACTIVATED \*\*\*.

For more information about security functions, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.



**Example**

```
:SYST:SEC:DISP OFF
```

The preceding example enables the secure display mode.

<b>*RST</b>	1
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Activate Security Display</b>

**:SECurity:ERASeall**

**Supported** All Models

```
:SYSTem:SECurity:ERASall
```

This command removes all user files, flatness correction files, and baseband generator files. In addition, all table editor files are returned to their original factory values.

This command differs from the :DELeTe:ALL command, which does not reset table editors to factory values. For more information about security functions, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

<b>Key Entry</b>	<b>Erase All</b>
------------------	------------------

**:SECurity:LEVel**

**Supported** All Models

```
:SYSTem:SECurity:LEVel NONE|ERASe|OVERwrite|SANitize  
:SYSTem:SECurity:LEVel?
```

This command selects the security level operation for the signal generator.

NONE	This selection causes the signal generator to reset to factory default settings.
ERASe	This selection removes all user files, table editor files, flatness correction files, and baseband generator files.
OVERwrite	This selection removes all user files, table editor files, flatness correction files, and baseband generator files. The memory is then overwritten with random data.
SRAM	All addressable locations will be overwritten with random characters.
Hard Disk	All addressable locations will be overwritten with random characters.
Flash Memory	The flash blocks will be erased.

**System Subsystem (:SYSTem)**

**SANitize** This selection removes all user files, table editor files, flatness correction files, and baseband generator files using the same techniques as the **OVERwrite** selection for SRAM and flash memory. For the hard disk, the signal generator overwrites all addressable locations with a single character, its complement, and then with a random character.

Once you select the security level, you must execute the command from “:SECurity:LEVel:STATe” to arm the security level.

---

**NOTE** Once you select a security level and arm it, you cannot change the level.

---

For other cleaning and security operation descriptions, see “:SECurity:ERASeall” on page 161, “:SECurity:OVERwrite” on page 163, and “:SECurity:SANitize” on page 163. For more information about security functions, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**Example**

```
:SYST:SEC:LEV NONE
```

The preceding example sets the secure mode so it resets the signal generator to factory settings after completing the security operation.

**Key Entry**      **None**   **Erase**   **Overwrite**   **Sanitize**

**:SECurity:LEVel:STATe**

**Supported**      All Models

---

**CAUTION** Ensure that you select the security level prior to executing this command with the **ON (1)** selection. Once you enable the state, you cannot reduce the security level.

---

```
:SYSTem:SECurity:LEVel:STATe ON|OFF|1|0  
:SYSTem:SECurity:LEVel:STATe?
```

This command arms and executes the current security level parameter.

**On (1)** This selection arms and prevents any changes to the current security level. Refer to “:SECurity:LEVel” on page 161 for setting the security level.

**OFF (0)** This selection performs the actions required for the current security level setting. Cycling the signal generator power also performs the same function.

For more information about security functions, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### Example

```
:SYST:SEC:LEV:STAT ON
```

The preceding example arms the secure mode selected with the SYSTem:SECurity:LEVel command.

**Key Entry**            **Enter Secure Mode**

### :SECurity:OVERwrite

**Supported**            All Models

```
:SYSTem:SECurity:OVERwrite
```

This command removes all user files, table editor files values, flatness correction files, and baseband generator files. The memory is then overwritten with random data as described below. For more information about security functions, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

SRAM                    All addressable locations will be overwritten with random characters.

HARD DISK              All addressable locations will be overwritten with random characters.

FLASH MEMORY         The flash blocks will be erased.

**Key Entry**            **Erase and Overwrite All**

### :SECurity:SANitize

**Supported**            All Models

```
:SYSTem:SECurity:SANitize
```

This command removes all user files, table editor files values, flatness correction files, and baseband generator files. The memory is then overwritten with a sequence of data as described below. For more information about security functions, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

SRAM                    All addressable locations will be overwritten with random characters.

HARD DISK              All addressable locations will be overwritten with a single character and then a random character.

FLASH MEMORY         The flash blocks will be erased.

**Key Entry**            **Erase and Sanitize All**

### :SSAVer:DELay

**Supported**            All

```
:SYSTem:SSAVer:DELay <val>  
:SYSTem:SSAVer:DELay?
```

This command sets the amount of time before the display light or display light and text is switched off. This will occur if there is no input via the front panel during the delay period.

The variable <val> is a whole number measured in hours.

**Range** 1–12

**Key Entry** **Screen Saver Delay:**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

Refer to “:SSAVer:MODE” on page 164 for selecting the screen saver mode.

### :SSAVer:MODE

**Supported** All

:SYSTem:SSAVer:MODE LIGHT|TEXT

:SYSTem:SSAVer:MODE?

This command toggles the screen saver mode between light only or light and text.

**LIGHT** This choice enables only the light to turn off during the screen saver operation while leaving the text visible on the darkened screen.

**TEXT** This choice enables both the display light and text to turn off during the screen saver operation.

**Key Entry** **Screen Saver Mode**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

### :SSAVer:STATe

**Supported** All

:SYSTem:SSAVer:STATe ON|OFF|1|0

:SYSTem:SSAVer:STATe?

This command enables or disables the display screen saver.

**Key Entry** **Screen Saver Off On**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## **:TIME**

**Supported** All

:SYSTem:TIME <hour>, <minute>, <second>

:SYSTem:TIME?

This command sets the time displayed in the lower right area of the signal generator's display.

**Range** <hour>: 0–23 <minute>: 0–59 <second>: 0–59

**Key Entry** Time/Date

## **:VERSion**

**Supported** All

:SYSTem:VERSion?

This command returns the SCPI version number with which the signal generator complies.

## Trigger Subsystem

### :ABORt

**Supported** All

:ABORt

This command causes the List or Step sweep in progress to abort. If INIT:CONT[:ALL] is set to ON, the sweep will immediately re-initiate. The pending operation flag affecting \*OPC, \*OPC?, and \*WAI will undergo a transition once the sweep has been reset.

### :INITiate:CONTinuous[:ALL]

**Supported** All

:INITiate:CONTinuous[:ALL] ON|OFF|1|0

:INITiate:CONTinuous[:ALL]?

This command selects either a continuous or single list or step sweep. Execution of this command does not affect a sweep in progress.

ON (1) This choice selects continuous sweep where, after the completion of the previous sweep, the current sweep will restart automatically or wait until the appropriate trigger source is received.

OFF (0) This choice selects a single sweep. Refer to “:INITiate:IMMediate[:ALL]” on [page 167](#) for single sweep triggering information.

\*RST 0

**Key Entry** Sweep Repeat Single Cont

**Remarks** Execution of this command will not affect a sweep in progress.

## **:INITiate[:IMMediate][:ALL]**

**Supported** All

```
:INITiate[:IMMediate][:ALL]
```

This command either sets or sets and starts a single List or Step sweep, depending on the trigger type. The command performs the following:

- arms a single sweep when BUS, EXTERNAL, or KEY is the trigger source selection
- arms and starts a single sweep when IMMEDIATE is the trigger source selection

This command is ignored if a sweep is in progress. See “:INITiate:CONTinuous[:ALL]” on page 166 for setting continuous or single sweep. See “:TRIGger[:SEQuence]:SOURce” on page 168 to select the trigger source.

In some atypical cases, the :INIT command could be ignored if it immediately follows an \*OPC? command. If the :INIT command is ignored, then use a 10ms sleep function before sending the command.

**Key Entry** Single Sweep

## **:TRIGger:OUTPut:POLarity**

**Supported** All

```
:TRIGger:OUTPut:POLarity POSitive|NEGative  
:TRIGger:OUTPut:POLarity?
```

Sets the TTL signal level present at the TRIGGER OUT connector to either high (5 vdc) or low (0 vdc). The trigger out is asserted after the frequency and/or power is set while the sweep is waiting for its step trigger. In addition, the swept-sine sends a pulse to the TRIGGER OUT at the beginning of each sweep.

### **Example**

```
:TRIG:OUTP:POL NEG
```

The preceding example enables the continuous mode as the sweep type.

**\*RST** POS

**Key Entry** Trigger Out Polarity Neg Pos

## :TRIGger[:SEQuence]:SLOPe

**Supported** All

:TRIGger[:SEQuence]:SLOPe POSitive|NEGative

:TRIGger[:SEQuence]:SLOPe?

This command sets the polarity of the ramp or sawtooth waveform slope present at the TRIG IN connector that will trigger a list or step sweep.

**\*RST** POS

**Key Entry** **Trigger In Polarity Neg Pos**

## :TRIGger[:SEQuence]:SOURce

**Supported** All

:TRIGger[:SEQuence]:SOURce BUS|IMMEDIATE|EXTernal|KEY

:TRIGger[:SEQuence]:SOURce?

This command sets the sweep trigger source for a list or step sweep.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**IMMEDIATE** This choice enables immediate triggering of the sweep event.

**EXTernal** This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.

**KEY** This choice enables triggering through front panel interaction by pressing the **Trigger** hardkey.

**\*RST** IMM

**Remarks** The wait for the BUS, EXTernal, or KEY trigger can be bypassed by sending the :TRIGger[:SEQuence][:IMMEDIATE] command.

### Example

```
:TRIG:SOUR BUS
```

The preceding example sets the sweep trigger source to BUS.

**\*RST** IMM

**Key Entry** **Bus Free Run Ext Trigger Key**



## **:TRIGger[:SEQuence][:IMMediate]**

**Supported**            All Models

:TRIGger [:SEQuence] [:IMMediate]

This event command causes an armed List or Step sweep to immediately start without the selected trigger occurring.

In some atypical cases, the :TRIG command could be ignored if it immediately follows an\*OPC? command. If the :TRIG command is ignored, then use a 10ms sleep function before sending the command.

## Unit Subsystem (:UNIT)

### :POWer

**Supported** All

```
:UNIT:POWer DBM|DBuV|DBuVemf|V|Vemf|DB  
:UNIT:POWer?
```

This command terminates an amplitude value in the selected unit of measure.

If the amplitude reference state is set to on, the query returns units expressed in DB and the DB choice will be displayed. Setting any other unit will cause a setting conflict error stating that the amplitude reference state must be set to off. Refer to, “[:REFerence:STATe](#)” on page 67 for more information.

**\*RST** DBM

**Key Entry** dBm dBuV dBuVemf mV uV mVemf uVemf DB

**Remarks** All power values in this chapter are shown with DBM as the unit of measure. If a different unit of measure is selected, replace DBM with the newly selected unit whenever it is indicated for the value.

---

## 4 Analog Commands

This chapter provides SCPI descriptions for subsystems dedicated to analog commands common to all ESG signal generator models. This chapter contains the following major sections:

- “Amplitude Modulation Subsystem ([:SOURce])” on page 172
- “Frequency Modulation Subsystem ([:SOURce])” on page 179
- “Low Frequency Output Subsystem ([:SOURce]:LFOOutput)” on page 186
- “Phase Modulation Subsystem ([:SOURce])” on page 191
- “Pulse Modulation Subsystem ([:SOURce]:PULM)” on page 199

---

## Amplitude Modulation Subsystem ([:SOURce])

### :AM[1]|2...

**Supported** All Models

[ :SOURce ] :AM[1] | 2 . . .

This prefix enables the selection of the AM path and is part of most SCPI commands associated with this subsystem. The two paths are equivalent to the **AM Path 1 2** softkey.

AM[1] **AM Path 1 2** with 1 selected

AM2 **AM Path 1 2** with 2 selected

When just AM is shown in a command, this means the command applies globally to both paths.

Each path is set up separately. When a SCPI command uses AM[1], only path one is affected. Consequently, when AM2 is selected, only path two is set up. However, the depth of the signals for the two paths can be coupled.

Depth coupling links the depth value of AM[1] to AM2. Changing the deviation value for one path will change it for the other path.

These two paths can be on at the same time provided the following conditions have been met:

- DUALsine or SWEPTSine is not the selection for the waveform type
- each path uses a different source (Internal 1, Ext1, or Ext2)

### :AM:INTernal:FREQuency:STEP[:INCRement]

**Supported** All Models

[ :SOURce ] :AM:INTernal:FREQuency:STEP[:INCRement] <num>

[ :SOURce ] :AM:INTernal:FREQuency:STEP[:INCRement] ?

This command sets the step increment for the amplitude modulation internal frequency.

The variable <num> is expressed in units of Hertz.

**Range** 0.5–1E6

**Key Entry** **Incr Set**

**Remarks**            The value set by this command is used with the UP and DOWN choices for the AM frequency setting. Refer to “:AM[1]|2:INTErnal[1]:FREQUency” on page 174 for more information.

                              The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

**:AM:WIDeband:STATe**

**Supported**            All Models

[ :SOURce ] :AM:WIDeband:STATe ON|OFF|1|0  
 [ :SOURce ] :AM:WIDeband:STATe?

This command enables or disables the wideband amplitude modulation for the selected path.

**\*RST**                    0

**Key Entry**            **AM Off On**

**Remarks**            The RF carrier is modulated when the modulation state of the signal generator is set to ON, see “:MODUlation[:STATe]” on page 129 for more information.

                              Whenever amplitude modulation is enabled, the AM annunciator is turned on in the display

**:AM[1] | 2:EXTernal[1] | 2:COUPling**

**Supported**            All Models

[ :SOURce ] :AM[1] | 2:EXTernal [1] | 2:COUPling AC|DC  
 [ :SOURce ] :AM[1] | 2:EXTernal [1] | 2:COUPling?

This command sets the coupling for the amplitude modulation source through the selected external input connector.

AC                        This choice will only pass ac signal components.

DC                        This choice will pass both ac and dc signal components.

**\*RST**                    DC

**Key Entry**            **Ext Coupling DC AC**

**Remarks**            The command does not change the currently active source or switch the current modulation on or off. The modulating signal may be the sum of several signals, either internal or external sources.

**Amplitude Modulation Subsystem ([:SOURce])****:AM[1] | 2:INTernal[1]:FREQuency****Supported** All Models

```
[:SOURce]:AM[1] | 2:INTernal [1] :FREQuency <val><unit> | UP | DOWN
[:SOURce]:AM[1] | 2:INTernal [1] :FREQuency?
```

This command sets the internal amplitude modulation rate for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

**\*RST** +4.00000000E+002

**Range** Dual Sine, Swept-Sine & Sine: 0.1HZ–100kHZ  
All Other Waveforms: 0.1HZ–20kHZ

**Key Entry** **AM Tone 1 Rate** **AM Start Rate** **AM Rate**

**:AM[1] | 2:INTernal[1]:FREQuency:ALternate****Supported** All Models

```
[:SOURce]:AM[1] | 2:INTernal [1] :FREQuency:ALternate <val><unit>
[:SOURce]:AM[1] | 2:INTernal [1] :FREQuency:ALternate?
```

This command sets the frequency for the alternate signal.

**\*RST** +4.00000000E+002

**Range** Dual-Sine: 0.1HZ–100kHZ Swept-Sine: 0.1HZ–100kHZ

**Key Entry** **AM Tone 2 Rate** **AM Stop Rate**

**Remarks** The alternate signal frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to “:AM[1]2:INTernal[1]:FUNctioN:SHAPE” on page 175 for the waveform selection.

### **:AM[1]|2:INteRnal[1]:FREQuency:ALteRnate:AMPLitude:PERCent**

**Supported**            All Models

```
[ :SOURCE ] :AM [ 1 ] | 2 : INteRnal [ 1 ] : FREQuency : ALteRnate : AMPLitude :  

PERCent <val><unit>  

[ :SOURCE ] :AM [ 1 ] | 2 : INteRnal [ 1 ] : FREQuency : ALteRnate : AMPLitude : PERCent ?
```

This command sets the amplitude of the second tone for a dual-sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

**\*RST**                    +5.00000000E+001

**Range**                    0–100PCT

**Key Entry**                **AM Tone 2 Ampl Percent Of Peak**

**Remarks**                Refer to “:AM[1]2:INteRnal[1]:FUNctIon:SHAPE” on page 175 for the waveform selection.

### **:AM[1]|2:INteRnal[1]:FUNctIon:SHAPE**

**Supported**            All Models

```
[ :SOURCE ] :AM [ 1 ] | 2 : INteRnal [ 1 ] : FUNctIon : SHAPE SINE | TRIangle | SQUare | RAMP |  

NOISe | DUALsine | SWEPTsine  

[ :SOURCE ] :AM [ 1 ] | 2 : INteRnal [ 1 ] : FUNctIon : SHAPE ?
```

This command sets the AM waveform type.

**\*RST**                    SINE

**Key Entry**                **Sine    Triangle    Square    Ramp    Noise    Dual-Sine    Swept-Sine**

### **:AM[1]|2:INteRnal[1]:SWEep:TIME**

**Supported**            All Models

```
[ :SOURCE ] :AM [ 1 ] | 2 : INteRnal [ 1 ] : SWEep : TIME <val><unit>  

[ :SOURCE ] :AM [ 1 ] | 2 : INteRnal [ 1 ] : SWEep : TIME ?
```

This command sets the sweep rate for the amplitude-modulated, swept-sine waveform.

**\*RST**                    +1.00000000E–001

**Range**                    1mS–65.535S

**Key Entry**                **AM Sweep Time**

**:AM[1] | 2:INTernal[1]:SWEep:TRIGger****Supported** All Models

```
[:SOURce]:AM[1] | 2:INTernal [1] :SWEep:TRIGger BUS | IMMEDIATE | EXTernal | KEY
[:SOURce]:AM[1] | 2:INTernal [1] :SWEep:TRIGger?
```

This command sets the trigger source for the amplitude modulated swept-sine waveform.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**IMMEDIATE** This choice enables immediate triggering of the sweep event.

**EXTernal** This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.

**KEY** This choice enables triggering through front panel interaction by pressing the **Trigger** hardkey.

**\*RST** IMM

**Key Entry** **Bus** **Free Run** **Ext** **Trigger Key**

**Remarks** Refer to “:AM[1]2:INTernal[1]:FUNCTION:SHAPE” on page 175 for the waveform selection.

**:AM[1] | 2:SOURce****Supported** All Models

```
[:SOURce]:AM[1] | 2:SOURce INT [1] | EXT [1] | EXT2
[:SOURce]:AM[1] | 2:SOURce?
```

This command sets the source to generate the amplitude modulation.

**INT** This choice selects the internal source to provide an ac-coupled signal.

**EXT** This choice selects the EXT 1 INPUT or the EXT 2 INPUT connector to provide an externally applied signal that can be ac- or dc-coupled.

**\*RST** INT

**Key Entry** **Internal** **Ext1** **Ext2**

**Remarks** A 1.0 V<sub>p</sub> input is required for calibrated AM depth settings.

The externally applied, ac-coupled input signal is tested for a voltage level and a display annunciator will report a high or low condition if that voltage is > ±3% of 1 V<sub>p</sub>.



## **:AM[1] | 2:STATe**

**Supported**            All Models

[ :SOURce ] :AM [1] | 2 :STATe ON | OFF | 1 | 0

[ :SOURce ] :AM [1] | 2 :STATe?

This command enables or disables the amplitude modulation for the selected path.

**\*RST**                    0

**Key Entry**            **AM Off On**

**Remarks**            The RF carrier is modulated when you have set the signal generator’s modulation state to ON, see “:MODulation[:STATe]” on page 129 for more information.

Whenever amplitude modulation is enabled, the AM annunciator is turned on in the display.

The two paths for amplitude modulation can be simultaneously enabled. Refer to “:AM[1]2...” on page 172 for more information.

## **:AM[1] | 2[:DEPTH]**

**Supported**            All Models

[ :SOURce ] :AM [1] | 2 [ :DEPTH ] [ :LINear ] <val><unit> | UP | DOWN

[ :SOURce ] :AM [1] | 2 [ :DEPTH ] [ :LINear ] ?

This commands sets the amplitude modulation depth in percent.

**\*RST**                    +1.00000000E-001

**Range**                    0.00–100PCT

**Key Entry**            **AM Depth**

**Remarks**            The value of AM depth applies only to whichever AM path configuration (AM[1]2) you have currently selected. AM Depth is fixed for wideband AM.

When the depth values are coupled, a change made to one path is applied to both. Refer to “:AM[1]2[:DEPTH]:TRACK” on page 178 for AM depth value coupling.

Refer to “:AM[:DEPTH]:STEP[:INCRement]” on page 178 for setting the value associated with UP and DOWN choices.

**:AM[1] | 2[:DEPTH]:TRACK****Supported** All Models

[:SOURce] :AM[1] | 2[:DEPTH] [:LINear] :TRACk ON|OFF|1|0

[:SOURce] :AM[1] | 2[:DEPTH] [LINear] :TRACk?

This command enables or disables the coupling of the AM depth values between the paths (AM[1] and AM2).

ON (1) This choice will link the depth value of AM[1] with AM2; AM2 will assume the AM[1] depth value. For example, if AM[1] depth is set to 15% and AM2 is set to 11%, enabling the depth tracking will cause the AM2 depth value to change to 15%. This applies regardless of the path (AM[1] or AM2) selected in this command

OFF (0) This choice disables the coupling and both paths will have independent depth values.

**\*RST** 0**Key Entry** **AM Depth Couple Off On****Remarks** When the depth values are coupled, a change made to one path is applied both.**:AM[:DEPTH]:STEP[:INCRement]****Supported** All Models

[:SOURce] :AM[:DEPTH] :STEP[:INCRement] &lt;val&gt;&lt;unit&gt;

[:SOURce] :AM[:DEPTH] :STEP[:INCRement] ?

This command sets the AM depth step increment.

**Range** 0.1–100PCT**Key Entry** **Incr Set**

**Remarks** The value set by this command is used with the UP and DOWN choices for the AM depth setting. Refer to “:AM[1]2[:DEPTH]” on page 177 for more information.

The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## Frequency Modulation Subsystem ([:SOURce])

### :FM[1] | 2...

**Supported**            All Models

[[:SOURce] :FM[1] | 2 . . .

This prefix enables the selection of the FM path and is part of most SCPI commands associated with this subsystem. The two paths are equivalent to the **FM Path 1 2** softkey.

FM[1]                    **FM Path 1 2** with 1 selected

FM2                     **FM Path 1 2** with 2 selected

When just FM is shown in a command, this means the command applies globally to both paths.

Each path is set up separately. When a SCPI command uses FM[1], only path one is affected. Consequently, when FM2 is selected, only path two is set up. However, the deviation of the signals for the two paths can be coupled.

Deviation coupling links the deviation value of FM[1] to FM2. Changing the deviation value for one path will change it for the other path.

These two paths can be on at the same time provided the following conditions have been met:

- DUALsine or SWEPTSine is not the selection for the waveform type
- each path uses a different source (Internal 1, Ext1, or Ext2)
- FM2 must be set to a deviation less than FM[1]

**:FM:INTernal:FREQuency:STEP[:INCRement]****Supported** All Models

[:SOURce] :FM:INTernal:FREQuency:STEP[:INCRement] &lt;num&gt;

[:SOURce] :FM:INTernal:FREQuency:STEP[:INCRement] ?

This command sets the step increment for the internal frequency modulation.

The variable <num> sets the entered value in units of Hertz.

**\*RST** +5.00000000E+002**Range** 0.5–1E6**Key Entry** **Incr Set**

**Remarks** The value set by this command is used with the UP and DOWN choices for the FM frequency setting. Refer to “:FM[1]|2:INTernal[1]:FREQuency” on page 181 for more information.

The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

**:FM[1] | 2:EXTernal[1] | 2:COUPLing****Supported** All Models

[:SOURce] :FM[1] | 2:EXTernal [1] | 2:COUPLing AC|DC

[:SOURce] :FM[1] | 2:EXTernal [1] | 2:COUPLing?

This command sets the coupling for the frequency modulation source through the selected external input connector.

AC This choice will only pass ac signal components.

DC This choice will pass both ac and dc signal components.

**\*RST** DC**Key Entry** **Ext Coupling DC AC**

**Remarks** The command does not change the currently active source or switch the current modulation on or off. The modulating signal may be the sum of several signals, either internal or external sources.

**:FM[1] | 2:INTernal[1]:FREQuency**

**Supported**            All Models

```
[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : FREQuency <val><unit> | UP | DOWN
[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : FREQuency?
```

This command sets the internal frequency modulation rate for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

**\*RST**                    +4.00000000E+002

**Range**                 Dual-Sine: 0.1HZ–100KHZ        Swept-Sine: 0.1HZ–100KHZ  
                              All Other Waveforms: 0.1HZ–20KHZ

**Key Entry**            **FM Tone 1 Rate**        **FM Start Rate**        **FM Rate**

**:FM[1] | 2:INTernal[1]:FREQuency:ALternate**

**Supported**            All Models

```
[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : FREQuency:ALternate <val><unit>
[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : FREQuency:ALternate?
```

This command sets the frequency for the alternate signal.

**\*RST**                    +4.00000000E+002

**Range**                 Dual-Sine: 0.5HZ–1MHZ        Swept-Sine: 1HZ–1MHZ

**Key Entry**            **FM Tone 2 Rate**        **FM Stop Rate**

**Remarks**            The alternate signal frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to “:FM[1]2:INTernal[1]:FUNctio:n:SHAPE” on page 182 for the waveform selection.

**:FM[1] | 2:INTernal[1]:FREQuency:ALternate:AMPLitude:PERCent****Supported** All Models[:SOURce] :FM[1] | 2:INTernal [1] :FREQuency:ALternate:AMPLitude:  
PERCent <val><unit>

[:SOURce] :FM[1] | 2:INTernal [1] :FREQuency:ALternate:AMPLitude:PERCent?

This command sets the amplitude of the second tone for a dual-sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

**\*RST** +1.00000000E+002**Range** 0–100PCT**Key Entry** **FM Tone 2 Ampl Percent Of Peak****Remarks** Refer to “:FM[1]2:INTernal[1]:FUNction:SHAPE” for the waveform selection.**:FM[1] | 2:INTernal[1]:FUNction:SHAPE****Supported** All Models[:SOURce] :FM[1] | 2:INTernal [1] | :FUNction:SHAPE SINE|TRIangle|SQUare|RAMP|  
NOISe|DUALsine|SWEPTsine

[:SOURce] :FM[1] | 2:INTernal [1] | :FUNction:SHAPE?

This command sets the FM waveform type.

**\*RST** SINE**Key Entry** **Sine Triangle Square Ramp Noise Dual-Sine Swept-Sine****Remarks** The waveform selection is only valid when INT[1] is the source selection. Refer to “:FM[1]2:SOURce” on page 184 for type source selection.

### **:FM[1] | 2:INTernal[1]:SWEep:TIME**

**Supported**            All Models

[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : SWEep : TIME <val><unit>

[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : SWEep : TIME?

This command sets the sweep time for the swept-sine waveform.

**\*RST**                    +1.00000000E-001

**Range**                 1.0mS-65.535S

**Key Entry**            **FM Sweep Time**

**Remarks**            Refer to “:FM[1]2:INTernal[1]:FUNction:SHApe” on page 182 for the waveform selection.

### **:FM[1] | 2:INTernal[1]:SWEep:TRIGger**

**Supported**            All Models

[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : SWEep : TRIGger BUS | IMMEDIATE | EXTERNAL | KEY

[ :SOURce ] : FM [ 1 ] | 2 : INTernal [ 1 ] : SWEep : TRIGger?

This command sets the trigger source for the frequency modulated swept-sine waveform.

**BUS**                    This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**IMMEDIATE**            This choice enables immediate triggering of the sweep event.

**EXTERNAL**            This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.

**KEY**                    This choice enables triggering through front panel interaction by pressing the **Trigger** hardkey.

**\*RST**                    IMM

**Key Entry**            **Bus    Free Run    Ext    Trigger Key**

**Remarks**            Refer to “:FM[1]2:INTernal[1]:FUNction:SHApe” on page 182 for the waveform selection.

## Frequency Modulation Subsystem ([:SOURce])

**:FM[1] | 2:SOURce****Supported** All Models

[:SOURce] :FM[1] | 2:SOURce INT [1] | EXT1 | EXT2

[:SOURce] :FM[1] | 2:SOURce?

This command sets the source to generate the frequency modulation.

**INT** This choice selects the internal source to provide an ac-coupled signal.**EXT** This choice selects the EXT 1 INPUT or the EXT 2 INPUT connector to provide an externally applied signal that can be ac- or dc-coupled.**\*RST** INT**Key Entry** **Internal Ext1 Ext2****Remarks** The externally applied, ac-coupled input signal is tested for a voltage level and a display annunciator will report a high or low condition if that voltage is  $> \pm 3\%$  of  $1 V_p$ .**:FM[1] | 2:STATe****Supported** All Models

[:SOURce] :FM[1] | 2:STATe ON | OFF | 1 | 0

[:SOURce] :FM[1] | 2:STATe?

This command enables or disables the frequency modulation for the selected path.

**\*RST** 0**Key Entry** **FM Off On****Remarks** The RF carrier is modulated when you set the signal generator's modulation state to ON, see “[:MODulation[:STATe]]” on page 129 for more information.

Whenever frequency modulation is enabled, the FM annunciator is turned on in the display.

The two paths for frequency modulation can be simultaneously enabled. Refer to “[:FM[1]2...” on page 179 for more information.



## **:FM[1] | 2[:DEVIation]**

**Supported** All Models

[:SOURCE]:FM[1] | 2[:DEVIation] <val><unit>

[:SOURCE]:FM[1] | 2[:DEVIation] ?

This command sets the frequency modulation deviation.

**\*RST** +1.00000000E+003

<b>Range</b>	<i>Frequency</i>	<i>Deviation</i>	Deviation Option UNJ
	250kHz–249.999MHZ	0–8MHZ	0–1MHZ
	> 249.999–500MHZ	0–4MHZ	0–500kHz
	> 500MHZ–1GHZ	0–8MHZ	0–1MHZ
	> 1–2GHZ	0–16MHZ	0–2MHZ
	> 2–4GHZ	0–32MHZ	0–4MHZ
	> 4–6GHZ	0–8MHZ	0–8MHZ

**Key Entry** **FM DEV**

**Remarks** If deviation tracking is ON, a change to the deviation value on one path will apply to both. Refer to “[:FM\[1\]|2\[:DEVIation\]:TRACK](#)” on page 185 for more information and setting the deviation tracking.

## **:FM[1] | 2[:DEVIation]:TRACK**

**Supported** All Models

[:SOURCE]:FM[1] | 2[:DEVIation]:TRACK ON|OFF|1|0

[:SOURCE]:FM[1] | 2[:DEVIation]:TRACK?

This command enables or disables the deviation coupling between the paths (FM[1] and FM2).

ON (1) This choice will link the deviation value of FM[1] with FM2; FM2 will assume the FM[1] deviation value. For example, if FM[1] deviation is set to 500 Hz and FM2 is set to 2 kHz, enabling the deviation tracking will cause the FM2 deviation value to change to 500 Hz. This applies regardless of the path (FM[1] or FM2) selected in this command

OFF (0) This choice disables the coupling and both paths will have independent deviation values.

**\*RST** 0

**Key Entry** **FM Dev Couple Off On**

**Remarks** This command uses exact match tracking, not offset tracking.

---

## Low Frequency Output Subsystem ([:SOURce]:LFOutput)

### :AMPLitude

**Supported** All Models

[:SOURce]:LFOutput:AMPLitude <val><unit>

[:SOURce]:LFOutput:AMPLitude?

This command sets the amplitude for the signal at the LF OUTPUT connector.

**\*RST** 0.00

**Range** 0.000VP–5.0VP

**Key Entry** **LF Out Amplitude**

### :FUNction[1]:FREQuency

**Supported** All Models

[:SOURce]:LFOutput:FUNction[1]:FREQuency <val><unit>

[:SOURce]:LFOutput:FUNction[1]:FREQuency?

This command sets the internal modulation frequency for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

**\*RST** +4.00000000E+002

**Range** Sine: 0.1HZ–100KHZ    Dual-Sine: 0.1HZ–100KHZ  
Swept-Sine: 0.1HZ–100KHZ  
All Other Waveforms: 0.1HZ–20KHZ

**Key Entry** **LF Out Tone 1 Freq**    **LF Out Start Freq**    **LF Out Freq**

**Remarks** Refer to “:FUNction[1]:SHApe” on page 189 for selecting the waveform type.

**:FUNCTION[1]:FREQUENCY:ALTERNATE****Supported** All Models

[:SOURce]:LFOutput:FUNCTION[1]:FREQUENCY:ALTERNATE &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNCTION[1]:FREQUENCY:ALTERNATE?

This command sets the frequency for the alternate LF output signal.

**\*RST** +4.00000000E+002**Range** Dual-Sine: 0.1HZ–100KHZ Swept-Sine: 0.1HZ–100KHZ**Key Entry** **LF Out Tone 2 Freq** **LF Out Stop Freq****Remarks** The alternate frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to “:FUNCTION[1]:SHAPE” on page 189 for selecting the waveform type.

**:FUNCTION[1]:FREQUENCY:ALTERNATE:AMPLITUDE:PERCENT****Supported** All Models

[:SOURce]:LFOutput:FUNCTION[1]:FREQUENCY:ALTERNATE:AMPLITUDE:

PERCENT &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNCTION[1]:FREQUENCY:ALTERNATE:AMPLITUDE:PERCENT?

This command sets the amplitude of the second tone for a dual-sine waveform as a percentage of the total LF output amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

**\*RST** +5.00000000E+001**Range** 0–100PCT**Key Entry** **LF Out Tone 2 Ampl % of Peak****Remarks** Refer to “:FUNCTION[1]:SHAPE” on page 189 for selecting the waveform type.

**:FUNction[1]:PERiod****Supported** All Models

[:SOURce]:LFOutput:FUNction[1]:PERiod &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNction[1]:PERiod?

This command sets the pulse period of the internally generated pulsed low frequency waveform.

**\*RST** +1.60000000E-005**Range** 16uS-30S**Key Entry** **LF Out Period****:FUNction[1]:PWIDth****Supported** All Models

[:SOURce]:LFOutput:FUNction[1]:PWIDth &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNction[1]:PWIDth?

This command sets the pulse width of the internally-generated pulsed low frequency waveform.

The upper limit range value is restricted by the current value of the pulse period. For example, if the pulse period value is set to 16  $\mu$ S, the pulse width is limited to a maximum range value of 16  $\mu$ S.

**\*RST** +8.00000000E-006**Range** 8uS-30S**Key Entry** **LF Out Width****Remarks** To change the pulse period value, refer to “:FUNction[1]:PERiod” on page 188.

**:FUNCTION[1]:SHAPE****Supported** All Models

[:SOURce]:LFOutput:FUNCTION[1]:SHAPE SINE|DUALsine|SWEptsine|TRIangle|SQUare|RAMP|PULSe|NOISe|DC

[:SOURce]:LFOutput:FUNCTION[1]:SHAPE?

This command sets the waveform type for the generated signal at the LF output.

**\*RST** SINE

<b>Key Entry</b>	<b>Sine</b>	<b>Dual-Sine</b>	<b>Swept-Sine</b>	<b>Triangle</b>	<b>Square</b>	<b>Ramp</b>	<b>Pulse</b>
	<b>Noise</b>	<b>DC</b>					

**Remarks** Function Generator must be the source selection to support DUALsine or the SWEptsine waveform. Refer to “[:SOURce]” on page 190.**:FUNCTION[1]:SWEep:TIME****Supported** All Models

[:SOURce]:LFOutput:FUNCTION[1]:SWEep:TIME &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNCTION[1]:SWEep:TIME?

This command sets the sweep time for an internally generated swept-sine signal at the LF output.

**\*RST** +1.00000000E-001**Range** 1mS-65.535S**Key Entry** **LF Out Sweep Time****:FUNCTION[1]:SWEep:TRIGger****Supported** All Models

[:SOURce]:LFOutput:FUNCTION[1]:SWEep:TRIGger BUS|IMMEDIATE|EXTernal|KEY

[:SOURce]:LFOutput:FUNCTION[1]:SWEep:TRIGger?

This command sets the trigger source for the internally generated swept-sine waveform signal at the LF output.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.**IMMEDIATE** This choice enables immediate triggering of the sweep event.**EXTernal** This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.

## Analog Commands

### Low Frequency Output Subsystem ([:SOURce]:LFOutput)

<b>KEY</b>	This choice enables triggering through front panel interaction by pressing the <b>Trigger</b> hardkey.
<b>*RST</b>	IMM
<b>Key Entry</b>	<b>Bus</b> <b>Free Run</b> <b>Ext</b> <b>Trigger Key</b>
<b>Remarks</b>	Refer to “:FUNCTION[1]:SHAPE” on page 189 for selecting the waveform type.

### :SOURce

**Supported**      All Models

```
[ :SOURce ] :LFOutput :SOURce INT [ 1 ] | FUNction  
[ :SOURce ] :LFOutput :SOURce ?
```

This command sets the low frequency source for the LF output.

**INT[1]**      This choice enables you to output a signal where the frequency and shape of the signal is set by the internal source as it is being used by a modulation. For example, if the internal source is currently assigned to an AM path configuration and AM is turned on, the signal output at the LF OUTPUT connector will have the frequency and shape of the amplitude modulating signal.

**FUNction**      This choice enables the selection of an internal function generator.

**\*RST**      FUNC

**Key Entry**      **Internal Monitor**      **Function Generator**

### :STATe

**Supported**      All Models

```
[ :SOURce ] :LFOutput :STATe ON | OFF | 1 | 0  
[ :SOURce ] :LFOutput :STATe ?
```

This command enables or disables the low frequency output.

**\*RST**      0

**Key Entry**      **LF Out Off On**

---

## Phase Modulation Subsystem ([:SOURCE])

### :PM[1]|2...

**Supported**            All Models

[[:SOURCE] :PM[1] | 2 . . .

This prefix enables the selection of the  $\Phi$ M path and is part of most SCPI commands associated with this subsystem. The two paths are equivalent to the  **$\Phi$ M Path 1 2** softkey.

PM[1]                     **$\Phi$ M Path 1 2** with 1 selected

PM2                      **$\Phi$ M Path 1 2** with 2 selected

When just PM is shown in a command, this means the command applies globally to both paths.

Each path is set up separately. When a SCPI command uses PM[1], only path one is affected. Consequently, when PM2 is selected, only path two is set up. However, the deviation of the signals for the two paths can be coupled.

Deviation coupling links the deviation value of PM[1] to PM2. Changing the deviation value for one path will change it for the other path.

These two paths can be on at the same time provided the following conditions have been met:

- DUALsine or SWEPTsine is not the selection for the waveform type
- each path uses a different source (Internal 1, Ext1, or Ext2)
- PM2 must be set to a deviation less than or equal to PM[1]

**Phase Modulation Subsystem (:SOURce)****:PM:INTernal:FREQuency:STEP[:INCRement]****Supported** All Models

[:SOURce] :PM:INTernal:FREQuency:STEP[:INCRement] &lt;num&gt;

[:SOURce] :PM:INTernal:FREQuency:STEP[:INCRement] ?

This command sets the step increment of the phase modulation internal frequency.

The variable <num> sets the entered value in units of Hertz.

**Range** 0.5–1E6**Key Entry** **Incr Set**

**Remarks** The value set by this command is used with the UP and DOWN choices for the FM frequency command. Refer to “:PM[1]2:INTernal[1]:FREQuency” on [page 193](#) for more information.

The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

**:PM[1] | 2:BANDwidth | BWIDth****Supported** All Models

[:SOURce] :PM[1] | 2:BANDwidth | BWIDth NORMal | HIGH

[:SOURce] :PM[1] | 2:BANDwidth | BWIDth ?

This command toggles between normal phase modulation and high bandwidth phase modulation mode.

**\*RST** NORM**Key Entry** **FM ΦM Normal High BW**



### **:PM[1] | 2:EXtErnal[1]:COUPling**

**Supported**            All Models

[ :SOURce ] : PM [ 1 ] | 2 : EXtErnal [ 1 ] : COUPling AC | DC

[ :SOURce ] : PM [ 1 ] | 2 : EXtErnal [ 1 ] : COUPling?

This command sets the coupling for the phase modulation source through the selected external input connector.

AC                      This choice will only pass ac signal components.

DC                      This choice will pass both ac and dc signal components.

**\*RST**                    DC

**Key Entry**            **Ext Coupling DC AC**

**Remarks**            This command does not change the currently active source or switch the current modulation on or off. The modulating signal may be the sum of several signals, either internal or external sources.

### **:PM[1] | 2:INtErnal[1]:FREQuency**

**Supported**            All Models

[ :SOURce ] : PM [ 1 ] | 2 : INtErnal [ 1 ] : FREQuency <val><unit> | UP | DOWN

[ :SOURce ] : PM [ 1 ] | 2 : INtErnal [ 1 ] : FREQuency?

This command sets the internal modulation frequency rate for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

**\*RST**                    +4.00000000E+002

**Range**                    Dual-Sine: 0.1HZ–100KHZ      Swept-Sine: 0.1HZ–100KHZ

All Other Waveforms: 0.1HZ–20KHZ

**Key Entry**            **ΦMTone 1 Rate      ΦM Start Rate      ΦM Rate**

**Remarks**            Refer to [“:FUNCTION\[1\]:SHAPE” on page 189](#) for selecting the waveform type.

**:PM[1]|2:INTernal[1]:FREQuency:ALternate****Supported** All Models

[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALternate &lt;val&gt;&lt;unit&gt;

[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALternate?

This command sets the frequency for the alternate signal.

**\*RST** +4.00000000E+002**Range** Dual-Sine: 0.1HZ–100KHZ Swept-Sine: 0.1HZ–100KHZ**Key Entry** **ΦM Stop Rate** **ΦM Tone 2 Rate****Remarks** The alternate frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to “:PM[1]|2:INTernal[1]:FUNctIon:SHApe” on page 195 for the waveform selection.

**:PM[1]|2:INTernal[1]:FREQuency:ALternate:AMPLitude:PERCent****Supported** All Models

[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALternate:AMPLitude:

PERCent &lt;val&gt;&lt;unit&gt;

[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALternate:AMPLitude:PERCent?

This command sets the amplitude of the second tone for the dual-sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

**\*RST** +5.00000000E+001**Range** 0–100PCT**Key Entry** **ΦM Tone 2 Ampl Percent of Peak****Remarks** Refer to “:PM[1]|2:INTernal[1]:FUNctIon:SHApe” on page 195 for the waveform selection.

### **:PM[1] | 2:INTernal[1]:FUNction:SHAPE**

**Supported** All Models

```
[:SOURCE]:PM[1] | 2:INTernal[1]:FUNction:SHAPE SINE|TRIangle|SQUare|RAMP|
NOISe|DUALsine|SWEPTsine
```

```
[:SOURCE]:PM[1] | 2:INTernal[1]:FUNction:SHAPE?
```

This command sets the phase modulation waveform type.

**\*RST** SINE

**Key Entry** Sine Triangle Square Ramp Noise Dual-Sine Swept-Sine

**Remarks** The waveform selection is only valid when INT[1] is the source selection. Refer to “:PM[1]2:SOURCE” on page 196 for type source selection.

### **:PM[1] | 2:INTernal[1]:SWEep:TIME**

**Supported** All Models

```
[:SOURCE]:PM[1] | 2:INTernal[1]:SWEep:TIME <val><unit>
```

```
[:SOURCE]:PM[1] | 2:INTernal[1]:SWEep:TIME?
```

This command sets the sweep time for a phase-modulated, swept-sine waveform.

**\*RST** +1.00000000E-001

**Range** 1.0mS-65.535S

**Key Entry**  $\Phi$ M Sweep Time

**Remarks** Refer to “:PM[1]2:INTernal[1]:FUNction:SHAPE” for the waveform selection.

### **:PM[1] | 2:INTernal[1]:SWEep:TRIGger**

**Supported** All Models

```
[:SOURCE]:PM[1] | 2:INTernal[1]:SWEep:TRIGger BUS|IMMediate|EXTernal|KEY
```

```
[:SOURCE]:PM[1] | 2:INTernal[1]:SWEep:TRIGger?
```

This command sets the trigger source for the phase-modulated, swept-sine waveform.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**IMMediate** This choice enables immediate triggering of the sweep event.

**EXTernal** This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.

**Phase Modulation Subsystem ([:SOURce])**

<b>KEY</b>	This choice enables triggering through front panel interaction by pressing the <b>Trigger</b> hardkey.
<b>*RST</b>	IMM
<b>Key Entry</b>	<b>Bus</b> <b>Free Run</b> <b>Ext</b> <b>Trigger Key</b>
<b>Remarks</b>	Refer to “:PM[1]2:INTernal[1]:FUNCTion:SHAPE” on page 195 for the waveform selection.

**:PM[1] | 2:SOURce**

<b>Supported</b>	All Models
	[ :SOURce ] :PM[1]   2:SOURce INT [1]   EXT1   EXT2 [ :SOURce ] :PM[1]   2:SOURce?
	This command sets the source to generate the phase modulation.
<b>INT</b>	This choice selects internal source 1 to provide an ac-coupled signal.
<b>EXT</b>	This choice selects the EXT 1 INPUT or the EXT 2 INPUT connector to provide an externally applied signal that can be ac- or dc-coupled.
<b>*RST</b>	INT
<b>Key Entry</b>	<b>Internal 1</b> <b>Ext1</b> <b>Ext2</b>
<b>Remarks</b>	The externally applied, ac-coupled input signal is tested for a voltage level and a display annunciator will report a high or low condition if that voltage is $> \pm 3\%$ of $1 V_p$ .

**:PM[1] | 2:STATe**

<b>Supported</b>	All Models
	[ :SOURce ] :PM[1]   2:STATe ON   OFF   1   0 [ :SOURce ] :PM[1]   2:STATe?
	This command enables or disables the phase modulation for the selected path.
<b>*RST</b>	0
<b>Key Entry</b>	<b>ΦM Off On</b>
<b>Remarks</b>	The RF carrier is modulated when you set the signal generator’s modulation state to ON, see “:MODulation[:STATe]” on page 129 for more information.  Whenever phase modulation is enabled, the ΦM annunciator is turned on in the display

The two paths for phase modulation can be simultaneously enabled. Refer to “:PM[1]2...” on page 191 for more information.

### **:PM[1] | 2[:DEVIation]**

**Supported**      All Models

```
[:SOURce]:PM[1] | 2[:DEVIation] <val><unit>|UP|DOWN
[:SOURce]:PM[1] | 2[:DEVIation]?
```

This command sets the deviation of the phase modulation.

The variable <unit> will accept RAD (radians), PIRAD (pi-radians), and DEG (degrees); however, the query will only return values in radians.

**\*RST**              +0.00000000E+000

<b>Range</b>	<i>Frequency</i>	<i>Normal Bandwidth</i>	<i>High Bandwidth</i>
	250kHz–249.999MHz	0–10RAD	0–1RAD
	> 249.999–500MHz	0–5RAD	0–0.5RAD
	> 500MHz–1GHz	0–10RAD	0–1RAD
	> 1–2GHz	0–20RAD	0–2RAD
	> 2–4GHz	0–40RAD	0–4RAD
	> 4–6GHz	0–80RAD	0–8RAD

**Key Entry**        **ΦM Dev**

**Remarks**        If deviation tracking is active, a change to the deviation value on one path will apply to both.

Refer to “:PM[:DEVIation]:STEP[:INCRement]” on page 198 for setting the value associated with the UP and DOWN choices.

### **:PM[1] | 2[:DEVIation]:TRACk**

**Supported**      All Models

```
[:SOURce]:PM[1] | 2[:DEVIation]:TRACk ON|OFF|1|0
[:SOURce]:PM[1] | 2[:DEVIation]:TRACk?
```

This command enables or disables the deviation coupling between the paths (PM[1] and PM2).

ON (1)              This choice will link the deviation value of PM[1] with PM2; PM2 will assume the PM[1] deviation value. For example, if PM[1] deviation is set to 500 Hz and

**Phase Modulation Subsystem ([:SOURce])**

PM2 is set to 2 KHZ, enabling the deviation tracking will cause the PM2 deviation value to change to 500 Hz. This applies regardless of the path (PM[1] or PM2) selected in this command.

**OFF (0)** This choice disables the coupling and both paths will have independent deviation values.

**\*RST** 0

**Key Entry** **ΦM Dev Couple Off On**

**Remarks** This command uses exact match tracking, not offset tracking.

**:PM[:DEVIation]:STEP[:INCRement]**

**Supported** All Models

[:SOURce]:PM[:DEVIation]:STEP[:INCRement] <val><unit>  
[:SOURce]:PM[:DEVIation]:STEP[:INCRement]?

This command sets the phase modulation deviation step increment.

**Range** 0.001–1E3RAD

**Key Entry** **Incr Set**

**Remarks** The value set by this command is used with the UP and DOWN choices for the FM deviation command. Refer to “:PM[1]2[:DEVIation]” on page 197 for more information.

The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

## Pulse Modulation Subsystem ([:SOURce]:PULM)

### :INTErnal[1]:FREQUency

**Supported**            All Models

```
[:SOURce]:PULM:INTErnal [1]:FREQUency <val><unit>|UP|DOWN
[:SOURce]:PULM:INTErnal [1]:FREQUency?
```

This command sets the rate of the internal square wave pulse modulation source.

**\*RST**                    +4.00000000E+002

**Range**                 0.1HZ–20.0kHz

**Key Entry**            **Pulse Rate**

**Remarks**            This command is used when SQUare is the current pulse modulation type. Refer to “[:SOURce]” on page 202 for the pulse modulation type selection.

### :INTErnal[1]:FREQUency:STEP

**Supported**            All Models

```
[:SOURce]:PULM:INTErnal [1]:FREQUency:STEP [:INCREment] <frequency>MIN|MAX
[:SOURce]:PULM:INTErnal [1]:FREQUency:STEP [INCREment]?
```

This command sets the step value for the internally-generated square wave pulse rate.

This command is used when SQUare is the pulse modulation type. Refer to “[:SOURce]” on page 202 for the pulse modulation type selection. The step value, set with this command, is used with the UP and DOWN choices in the :INTErnal[1]:FREQUency command.

The step value set with this command is not affected by a power-on, preset, or \*RST command.

#### Example

```
:PULM:INT:FREQ:STEP MIN
```

The preceding example sets the step value for the square wave pulse rate to 0.1 Hz, the minimum rate.

**Range**                 0.1HZ–20kHz

**:INteRnal[1]:FUNctIon:SHApe****Supported** All Models

[:SOURce]:PULM:INteRnal[1]:FUNctIon:SHApe PULSe|SQUare

[:SOURce]:PULM:INteRnal[1]:FUNctIon:SHApe?

This command sets the internal pulse modulation waveform type.

**\*RST** PULS**Key Entry** Internal Square Internal Pulse**:INteRnal[1]:PERiod****Supported** All Models

[:SOURce]:PULM:INteRnal[1]:PERiod &lt;val&gt;&lt;unit&gt;|UP|DOWN

[:SOURce]:PULM:INteRnal[1]:PERiod?

This command sets the period for the internally generated pulse modulation source.

**\*RST** +8.00000000E-005**Range** 8uS–30S**Key Entry** Pulse Period**Remarks** If the entered value for the pulse period is equal to or less than the value for the pulse width, the pulse width changes to a value that is equal to the pulse period.Refer to “[:INteRnal\[1\]:PERiod:STEP\[:INCRement\]](#)” on page 200 for setting the value associated with the UP and DOWN choices.**:INteRnal[1]:PERiod:STEP[:INCRement]****Supported** All Models

[:SOURce]:PULM:INteRnal[1]:PERiod:STEP[:INCRement] &lt;val&gt;&lt;unit&gt;|UP|DOWN

[:SOURce]:PULM:INteRnal[1]:PERiod:STEP[:INCRement]?

This command sets the period time step increment for the internally-generated pulse modulation source.

**\*RST** +1.00000000E-006**Range** 4uS–30S**Key Entry** Incr Set



**Remarks**            The value set by this command is used with the UP and DOWN choices for the pulse period command. Refer to “:INTernal[1]:PERiod” on page 200 for more information.

### **:INTernal[1]:PWIDth**

**Supported**            All Models

```
[:SOURCE]:PULM:INTernal [1]:PWIDth <val><unit> |UP|DOWN
[:SOURCE]:PULM:INTernal [1]:PWIDth?
```

This command sets the pulse width for the internally generated pulse modulation source.

**NOTE**                A power search is recommended for signals with pulse widths less than one microsecond. Refer to “:ALC:SEARCh” on page 60.

**\*RST**                 +4.00000000E-005

**Range**                4uS–30S

**Key Entry**           **Pulse Width**

**Remarks**            If the entered value for the pulse width is equal to or greater than the value for the pulse period, the pulse width will change to a value that is equal to the pulse period.

Refer to “:INTernal[1]:PWIDth:STEP” on page 201 for setting the value associated with the UP and DOWN choices.

### **:INTernal[1]:PWIDth:STEP**

**Supported**            All Models

```
[:SOURCE]:PULM:INTernal [1]:PWIDth:STEP <num> [<time suffix>]
[:SOURCE]:PULM:INTernal [1]:PWIDth:STEP?
```

This command sets the step increment for the pulse width.

The optional variable [<time suffix>] accepts nS (nano-seconds) to S (seconds).

**\*RST**                 +1.00000000E-006

**Range**                4uS–30S

**Remarks**            The value set by this command is used by the UP and DOWN choices for the pulse width command. Refer to “:INTernal[1]:PWIDth” on page 201 for more information.

**Pulse Modulation Subsystem ([:SOURce]:PULM)**

**:SOURce**

**Supported** All Models

[ :SOURce ] :PULM :SOURce INT | EXT [1] | EXT2

[ :SOURce ] :PULM :SOURce?

This command sets the source that will generate the pulse modulation.

**\*RST** INT

**Key Entry** Internal Square Internal Pulse Ext1 DC-Coupled Ext2 DC-Coupled

**:STATe**

**Supported** All Models

[ :SOURce ] :PULM :STATe ON | OFF | 1 | 0

[ :SOURce ] :PULM :STATe?

This command enables or disables the operating state of the pulse modulation source.

**\*RST** 0

**Key Entry** Pulse Off On

**Remarks** When pulse modulation is enabled, the PULSE annunciator is shown in the display

---

## 5 Component Test Digital Commands

This chapter provides SCPI descriptions for commands dedicated to digital component testing using the E4438C ESG Vector Signal Generator. This chapter contains the following major sections:

- “All Subsystem–Option 001/601 or 002/602 ([:SOURce])” on page 204
- “AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB)” on page 205
- “CDMA ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA:ARB)” on page 215
- “CDMA2000 ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000:ARB)” on page 240
- “Dmodulation Subsystem–Option 001/601 or 002/602 ([:SOURce]:RADio:DMODulation:ARB)” on page 270
- “Dual ARB Subsystem–Option 001/601 or 002/602 ([:SOURce]:RADio:ARB)” on page 294
- “Multitone Subsystem–Option 001/601 or 002/602 ([:SOURce]:RADio:MTONe:ARB)” on page 326
- “Wideband CDMA ARB Subsystem–Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)” on page 340

## All Subsystem–Option 001/601 or 002/602 ([:SOURce])

### :RADio:ALL:OFF

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:ALL:OFF

This command disables the digital modulation formats.

**Remarks** This command does not affect analog modulation.

---

## AWGN ARB Subsystem—Option 403 ([:SOURce]:RADio:AWGN:ARB)

### :BWIDth

**Supported** E4438C with Option 403

[ :SOURce ] :RADio:AWGN:ARB:BWIDth <val>

[ :SOURce ] :RADio:AWGN:ARB:BWIDth?

This command adjusts the bandwidth of the AWGN waveform.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+006

**Range** 5E4–1.5E7

**Key Entry** **Bandwidth**

### :IQ:EXTernal:FILTer

**Supported** E4438C with Option 403

[ :SOURce ] :RADio:AWGN:ARB:IQ:EXTernal:FILTer 40e6 |THRough

[ :SOURce ] :RADio:AWGN:ARB:IQ:EXTernal:FILTer?

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter setting with this command will automatically set the “:IQ:EXTernal:FILTer:AUTO” on page 206 command to Off mode.

40e6 This choice applies a 40 MHz baseband filter.

THRough This choice bypasses filtering.

**\*RST** THR

**Key Entry** **40.000 MHz** **Through**

**:IQ:EXternal:FILTer:AUTO**

**Supported** E4438C with Option 403

[ :SOURce ] :RADio:AWGN:ARB:IQ:EXternal:FILTer:AUTO ON|OFF|1|0

[ :SOURce ] :RADio:AWGN:ARB:IQ:EXternal:FILTer:AUTO?

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “[:IQ:EXternal:FILTer](#)” on page 205 for selecting a filter or through path.

\*RST ON

**Key Entry** I/Q Output Filter Manual Auto

**:HEADer:CLEar**

**Supported** E4438C with Option 403

[ :SOURce ] :RADio:AWGN:ARB:HEADer:CLEar

This command clears the header information from the file header used by this modulation format.

**Key Entry** Clear Header

**Remarks** The **AWGN Off On** softkey must be set to On for this command to function.

**:HEADer:SAVE**

**Supported** E4438C with Option 403

[ :SOURce ] :RADio:AWGN:ARB:HEADer:SAVE

This command saves the header information to the file header used by this modulation format.

**Key Entry** Save Setup To Header

**Remarks** The **AWGN Off On** softkey must be set to On for this command to function.

### **:IQ:MODulation:ATTen**

**Supported**            E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:ATTen <val>  
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST**                    +2.00000000E+000

**Range**                   0–40

**Key Entry**              **Modulator Atten Manual Auto**

### **:IQ:MODulation:ATTen:AUTO**

**Supported**            E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0  
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

ON (1)                    This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0)                   This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” for setting the attenuation value.

**\*RST**                    1

**Key Entry**              **Modulator Atten Manual Auto**

**:IQ:MODulation:FILTer**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter with this command will automatically set “:IQ:MODulation:ATTen:AUTO” on page 207 to Off(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** 2.100 MHz 40.000 MHz Through

**:IQ:MODulation:FILTer:AUTO**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[ :SOURce ] :RADio:AWGN:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 299 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Mod Filter Manual Auto



## :MDEStination:AAMPlitude

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4  
[ :SOURce ] :RADio:AWGN:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry**      **None**    **Marker 1**    **Marker 2**    **Marker 3**    **Marker 4**

## :MDEStination:ALCHold

**Supported** E4438C with Option 403

---

**CAUTION**      Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURce ] :RADio:AWGN:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4  
[ :SOURce ] :RADio:AWGN:ARB:MDEStination:ALCHold?
```

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “[:MARKer:[SET]]” on page 302.

Use the ALC hold function when you have a waveform signal that has idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “[:MPOlarity:MARKer1|2|3|4]” on page 370.

---

**NOTE**      Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

---

For more information on the marker ALC hold function, see the *E4428C/38C ESG Signal Generators User’s Guide*. For setting the marker points, see “[:MARKer:[SET]]” on page 302.

**NONE** This terminates the marker ALC hold function.

**M1–M4** These are the marker choices. The ALC hold feature uses only one marker at a time.

**\*RST** NONE

**Example**

```
:RAD:AWGB:ARB:MDES:ALCH M1
```

The preceding example routes marker 1 to the ALC Hold function.

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
<b>Remarks</b>	N/A				

**:MDEStination:PULSe**

**Supported** E4438C with Option 403

---

**CAUTION** The pulse function incorporates ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURce ] :RADio:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4
[:SOURce]:RADio:ARB:MDEStination:PULSe?
```

This command enables or disables the marker pulse/RF blanking function for the selected marker.

This function automatically uses the ALC hold function, so there is no need to select both the ALC hold and the pulse/RF blanking for the same marker.

---

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 333.

---

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 302 for setting the marker points.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

---

For more information on the marker RF blanking function, see the *E4428C/38C ESG Signal Generators User’s Guide*.

NONE This terminates the marker RF blanking/pulse function.

M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

**Example**

```
:RAD:ARB:MDES:PULS M2
```

The preceding example routes marker 2 to Pulse/RF Blanking.

```
*RST NONE
```

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
------------------	-------------	-----------------	-----------------	-----------------	-----------------

**:MPOLarity:MARKer1 | 2 | 3 | 4**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[ :SOURce ] :RADio:AWGN:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 ?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

**\*RST** POS

**Key Entry**            **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

**:LENGth**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:LENGth 1048576 | 524288 | 262144 | 131072 | 65536 |
32768 | 16384
[ :SOURce ] :RADio:AWGN:ARB:LENGth ?
```

This command specifies the length (number of points) of the AWGN waveform.

**\*RST** +524288

**Key Entry**            **1048576    524288    262144    131072    65536    32768    16384**

**Remarks** A longer waveform yields a statistically more correct waveform.

**:REference:EXternal:FREQuency**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:REference:EXternal:FREQuency <val>
[ :SOURce ] :RADio:AWGN:ARB:REference:EXternal:FREQuency ?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Key Entry**            **Reference Freq**

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “[:REFerence[:SOURce]]” on page 281.

### **:REFerence[:SOURce]**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:REFerence [ :SOURce ] INTernal | EXTernal  
[ :SOURce ] :RADio:AWGN:ARB:REFerence [ :SOURce ] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

**Key Entry** **ARB Reference Ext Int**

**Remarks** If the EXTernal choice is selected, the external frequency *value must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “[:REFerence:EXTernal:FREQuency]” on page 280 to enter the external reference frequency.

### **:SCLock:RATE**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:SCLock:RATE <val>  
[ :SOURce ] :RADio:AWGN:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the AWGN modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATE]” on page 214 to activate the modulation format.

**:SEED**

**Supported** E4438C with Option 403

[:SOURce]:RADio:AWGN:ARB:SEED FIXed | RANDom

[:SOURce]:RADio:AWGN:ARB:SEED?

This command toggles the AWGN waveform noise seed value type.

**FIXed** This choice selects a fixed noise seed value.

**RANDom** This choice selects a randomly generated noise seed value.

**\*RST** FIX

**Key Entry** Noise Seed Fixed Random

**[:STATe]**

**Supported** E4438C with Option 403

[:SOURce]:RADio:AWGN:ARB[:STATe] ON | OFF | 1 | 0

[:SOURce]:RADio:AWGN:ARB[:STATe] ?

This command enables or disables the AWGN generator function.

**\*RST** 0

**Key Entry** Arb AWGN Off On

---

## CDMA ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA:ARB)

### :CLIPping:I

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:CLIPping:I <val>  
[:SOURce]:RADio:CDMA:ARB:CLIPping:I?
```

This command clips (limits) the modulation level of the waveform's I component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip |I| To**

### :CLIPping:POSition

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:CLIPping:POSition PRE|POST  
[:SOURce]:RADio:CDMA:ARB:CLIPping:POSition?
```

This command specifies whether a waveform is clipped before (PRE) or after (POST) FIR filtering.

**\*RST** PRE

**Key Entry** **Clip At PRE POST FIR Filter**

### :CLIPping:Q

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:CLIPping:Q <val>  
[:SOURce]:RADio:CDMA:ARB:CLIPping:Q?
```

This command clips (limits) the modulation level of the waveform's Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**CDMA ARB Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA:ARB)**

**Range** 10–100  
**Key Entry** **Clip |Q| To**

**:CLIPping:TYPE**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIo:CDMA:ARB:CLIPping:TYPE IJQ|IORQ
[ :SOURCE ] :RADIo:CDMA:ARB:CLIPping:TYPE?
```

This command selects either IJQ or IORQ as the clipping type.

IJQ The combined I and Q waveform will be clipped (*circular clipping*).

IORQ The I and Q components of the waveform are clipped independently (*rectangular clipping*). I and Q can be clipped to different levels using this mode.

**\*RST** IJQ

**Key Entry** **Clipping Type |I+jQ| |I|,|Q|**

**:CLIPping[:IJQ]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIo:CDMA:ARB:CLIPping[:IJQ] <val>
[ :SOURCE ] :RADIo:CDMA:ARB:CLIPping[:IJQ]?
```

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip |I+jQ| To**

**:CRATe**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIo:CDMA:ARB:CRATe <val>
[ :SOURCE ] :RADIo:CDMA:ARB:CRATe?
```

This command sets the chip rate value.

The variable <val> is expressed as chips per second (cps–Mcps).



**\*RST** +1.22880000E+006  
**Range** 10–8E6  
**Key Entry** **Chip Rate**

**:IQ:EXTeRnal:FiLTeR**

**Supported** E4438C with Option 401  
[:SOURce]:RADio:CDMA:ARB:IQ:EXTeRnal:FiLTeR 40e6|THRough  
[:SOURce]:RADio:CDMA:ARB:IQ:EXTeRnal:FiLTeR?

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTeRnal:FiLTeR:AUTO” on [page 217](#) to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.  
THRough This choice bypasses filtering.  
**\*RST** THR  
**Key Entry** **40.000 MHz Through**

**:IQ:EXTeRnal:FiLTeR:AUTO**

**Supported** E4438C with Option 401  
[:SOURce]:RADio:CDMA:ARB:IQ:EXTeRnal:FiLTeR:AUTO ON|OFF|1|0  
[:SOURce]:RADio:CDMA:ARB:IQ:EXTeRnal:FiLTeR:AUTO?

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.  
OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTeRnal:FiLTeR” on [page 217](#) for selecting a filter or through path.  
**\*RST** 1  
**Key Entry** **I/Q Output Filter Manual Auto**

**:FILTer**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA:ARB:FILTer RNYquist | NYquist | GAUSSian | RECTangle |
IS95 | IS95_EQ | IS95_MOD | IS95_MOD_EQ | WCDMA | AC4Fm | IS2000SR3DS | UGGaussian |
"<user FIR>"
[ :SOURCE ] :RADio:CDMA:ARB:FILTer?
```

This command selects the pre-modulation filter type.

- IS95 This choice selects a filter that meets the criteria of the IS-95 standard.
- IS95\_EQ This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
- IS95\_MOD This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
- IS95\_MOD\_EQ This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
- WCDMa This choice selects a 0.22 Nyquist filter optimized for ACP.
- AC4Fm This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
- IS2000SR3DS This choice selects an IS-2000 standard, spread rate 3 direct spread filter.
- UGGaussian This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
- "<user FIR>" This variable is any FIR filter file that you have stored in memory. The variable needs no directory path indicating the location of the file, such as FIR: or /USER/FIR. The command assumes the FIR directory. Refer to [“File Name Variables” on page 13](#) for more information on file names.

**\*RST** IS95\_MOD\_EQ

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>WCDMA</b>	<b>APCO 25 C4FM</b>	<b>IS-2000 SR3 DS</b>	
	<b>UN3/4 GSM Gaussian</b>	<b>User FIR</b>				

## :FILTer:ALPHA

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA:ARB:FILTer:ALPHA <val>

[ :SOURce ] :RADio:CDMA:ARB:FILTer:ALPHA?

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** Filter Alpha

**Remarks** To change the current filter type, refer to “:FILTer” on page 218.

## :FILTer:BBT

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA:ARB:FILTer:BBT <val>

[ :SOURce ] :RADio:CDMA:ARB:FILTer:BBT?

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** Filter BbT

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 218.

**:FILTER:CHANnel**

**Supported** E4438C with Option 401

[ :SOURCE ] :RADio:CDMA:ARB:FILTer:CHANnel EVM|ACP

[ :SOURCE ] :RADio:CDMA:ARB:FILTer:CHANnel ?

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 218.

**:HEADer:CLEAr**

**Supported** E4438C with Option 401

[ :SOURCE ] :RADio:CDMA:ARB:HEADer:CLEAr

This command clears the header information from the file header used by this modulation format.

**Key Entry** **Clear Header**

**Remarks** The **CDMA Off On** softkey must be set to On for this command to function.

**:HEADer:SAVE**

**Supported** E4438C with Option 401

[ :SOURCE ] :RADio:CDMA:ARB:HEADer:SAVE

This command saves the header information to the file header used by this modulation format.

**Key Entry** **Save Setup To Header**

**Remarks** The **CDMA Off On** softkey must be set to On for this command to function.

## :IQMap

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:IQMap NORMAL | INVerted  
[ :SOURce ] :RADio:CDMA:ARB:IQMap?
```

This command selects whether the Q output will be normal or inverted.

**NORMAL** This choice selects normal polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **I/Q Mapping Normal Invert**

**Remarks** Inverting the Q output inverts the RF spectrum after the modulation.

## :IQ:MODulation:ATTen

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:ATTen <val>  
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000

**Range** 0–40

**Key Entry** **Modulator Atten Manual Auto**

## :IQ:MODulation:ATTen:AUTO

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:ATTen:AUTO ON | OFF | 1 | 0  
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

**ON (1)** This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

**OFF (0)** This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 221 for setting the attenuation value.

**CDMA ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA:ARB)**

**\*RST** 1  
**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:FILTer**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:FILTer 2.1e6 | 40e6 | THROugh
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “[:IQ:MODulation:ATTen:AUTO](#)” on page 221 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.  
 40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.  
 THROugh This choice bypasses filtering.

**\*RST** THR  
**Key Entry** **2.100 MHz 40.000 MHz Through**

**:IQ:MODulation:FILTer:AUTO**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:FILTer:AUTO ON | OFF | 1 | 0
[ :SOURce ] :RADio:CDMA:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.  
 OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “[:IQ:MODulation:FILTer](#)” on page 299 for selecting a filter or through path.

**\*RST** 1  
**Key Entry** **I/Q Mod Filter Manual Auto**

**:MDESTination:AAMPLitude**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:MDESTination:AAMPLitude NONE | M1 | M2 | M3 | M4
```

`[:SOURce]:RADio:CDMA:ARB:MDEStination:AAMPlitude?`

This command routes the selected marker to the Alternate Amplitude function. The `NONE` parameter clears the marker for the Alternate Amplitude function.

<b>*RST</b>	<code>NONE</code>				
<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>

## **:MDEStination:ALCHold**

**Supported**      E4438C with Option 401

---

**CAUTION**      Incorrect automatic level control (ALC) sampling can create a sudden unleveled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

`[:SOURce]:RADio:CDMA:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4`  
`[:SOURce]:RADio:CDMA:ARB:MDEStination:ALCHold?`

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “:MARKer:SET” on page 302.

Use the ALC hold function when you have a waveform signal that has idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 226.

---

**NOTE**      Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

---

For more information on the marker ALC hold function, see the *E4428C/38C ESG Signal Generators User’s Guide*. For setting the marker points, see “[:MARKer:[SET]]” on page 302.

**NONE** This terminates the marker ALC hold function.

**M1–M4** These are the marker choices. The ALC hold feature uses only one marker at a time.

**\*RST** NONE

### Example

```
:RAD:AWGB:ARB:MDES:ALCH M1
```

The preceding example routes marker 1 to the ALC Hold function.

**Key Entry**        **None**    **Marker 1**    **Marker 2**    **Marker 3**    **Marker 4**

**Remarks**        N/A

## :MDEStination:PULSe

**Supported**        E4438C with Option 401

---

**CAUTION** The pulse function incorporates ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[:SOURce]:RADio:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:ARB:MDEStination:PULSe?
```

This command enables or disables the marker pulse/RF blanking function for the selected marker.

This function automatically uses the ALC hold function, so there is no need to select both the ALC hold and the pulse/RF blanking for the same marker.

---

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---



The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker's polarity, see “:MPOLarity:MARKer1|2|3|4” on page 226.

---

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 302 for setting the marker points.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform's routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

---

For more information on the marker RF blanking function, see the *E4428C/38C ESG Signal Generators User's Guide*.

NONE This terminates the marker RF blanking/pulse function.

M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

### Example

```
:RAD:ARB:MDES:PULS M2
```

The preceding example routes marker 2 to Pulse/RF Blanking.

```
*RST NONE
```

Key Entry	None	Marker 1	Marker 2	Marker 3	Marker 4
-----------	------	----------	----------	----------	----------

**:MPOLarity:MARKer1 | 2 | 3 | 4****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[:SOURCE]:RADio:CDMA:ARB:MPOLarity:MARKer1 | 2 | 3 | 4?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

**\*RST** POS

**Key Entry**            **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

**:OSAMple****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:OSAMple <val>
[:SOURCE]:RADio:CDMA:ARB:OSAMple?
```

This command sets the oversampling ratio (number of filter taps per symbol) for CDMA modulation.

**\*RST** +5**Range** 2–8**Key Entry**            **Oversample Ratio**

**Remarks**            The upper limit of the oversample ratio is adjusted based on the waveform length and chip rate.

Using larger oversample ratios result in more completely filtered images, but this action also uses up more waveform memory.

The maximum oversample ratio is the smaller of 8, 40 Mcps/Chip Rate, or 32/Waveform Length (number of CDMA short codes).

**:REFerence:EXTernal:FREQuency****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:REFerence:EXTernal:FREQuency <val>
[:SOURCE]:RADio:CDMA:ARB:REFerence:EXTernal:FREQuency?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Reference Freq**

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFeRence[:SOURce]” on page 227.

### **:REFeRence[:SOURce]**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:REFeRence [ :SOURce ] INTernal | EXTeRnal
[ :SOURce ] :RADio:CDMA:ARB:REFeRence [ :SOURce ] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

**Key Entry** **ARB Reference Ext Int**

**Remarks** If the EXTeRnal choice is selected, the external frequency value *must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFeRence:EXTeRnal:FREQuency” on page 226 to enter the external reference frequency.

### **:RETRigger**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:RETRigger ON | OFF | IMMEDIATE
[ :SOURce ] :RADio:CDMA:ARB:RETRigger ?
```

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

ON(1) This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.

OFF(0) This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.

**CDMA ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA:ARB)**

**IMMEDIATE** This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** ON

**Key Entry** **On Off Immediate**

**:SCLock:RATE**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA:ARB:SCLock:RATE <val>

[ :SOURce ] :RADio:CDMA:ARB:SCLock:RATE?

This command sets the sample clock rate for the CDMA modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on [page 239](#) to activate the modulation format.

**:SETup**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA:ARB:SETup FWD9 | FWD32 | FWD64 | PILot | REVerse | MCARrier |  
"<file name>"

[ :SOURce ] :RADio:CDMA:ARB:SETup?

This command selects a pre-defined CDMA channel setup or multicarrier, and turns multicarrier off or on (see the MCARrier choice description).

**FWD9** This CDMA setup consists of 9 forward channels (pilot, paging, sync, and 6 traffic channels) at IS-97-defined power levels.

**FWD32** This CDMA setup consists of 32 forward channels (pilot, paging, sync, and 29 traffic channels) at IS-97-defined power levels.

**FWD64** This CDMA setup consists of 64 forward channels (pilot, 7 paging, sync, and 55 traffic channels) at IS-97-defined power levels.

**PILot** This choice selects single pilot channel.

REVerse	A single reverse link traffic channel.
MCARrier	This choice selects multicarrier and turns it on. Selecting any other setup such as FWD9 or FWD64 turns multicarrier off. To select the multicarrier setup, see “:SETup:MCARrier” on page 230.
*RST	FWD9
<b>Key Entry</b>	<b>9 Ch Fwd    32 Ch Fwd    64 Ch Fwd    Pilot    Reverse    Multicarrier Off On</b> <b>Multicarrier Off On    Custom CDMA State</b>
<b>Remarks</b>	Refer to “File Name Variables” on page 13 for information on the file name syntax.

### **:SETup:CHANnel**

**Supported**            E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:SETup:CHANnel IS97|EQUal|SCALe|NONE {,PILOt|
SYNC|PAGing|TRAFfic,<walsh_value>,<power_value>,<pn_offset>,RANDom|
<data_value>}
[:SOURce]:RADio:CDMA:ARB:SETup:CHANnel?
```

This command defines the channel parameters of the CDMA signal. This allows for customizing of the channel type, the channel parameters, and the data value.

The variable <power\_value> is expressed in units of decibels (dB).

IS97	This choice sets the channel power levels to IS-97-defined power levels.
EQUAL	This choice sets the channel power levels so that all channels are of equal power and the total power equals 0 dBm.
SCALe	This choice scales all of the current channel powers so that the total power equals 0 dB while keeping the previous power ratios between the individual channels.
NONE	This choice bypasses the power level setting.
PILOt	This choice selects a single traffic channel.
SYNC	This choice selects a sync channel.
PAGing	This choice selects a paging channel.
TRAFfic	This choice selects a traffic channel.
RANDom	This choice selects a randomly generated data value.

**CDMA ARB Subsystem—Option 401 ([:SOURCE]:RADIO:CDMA:ARB)**

The channel type, walsh code, power, PN offset, and data values are returned when a query is initiated. The output format is as follows:

<channel\_type>, <walsh\_value>, <power>, <pn\_offset>, <data\_value>

*RST	Channel #	Channel Type	Walsh Code	Power	PN Offset	Data
	1	PIL	+0	-7.0000000E+000	+0	+0
	2	PAG	+1	-7.26000023E+000	+0	RAND
	3	TRAF	+8	-1.02600002E+001	+0	RAND
	4	TRAF	+9	-1.02600002E+001	+0	RAND
	5	TRAF	+10	-1.02600002E+001	+0	RAND
	6	TRAF	+11	-1.02600002E+001	+0	RAND
	7	TRAF	+12	-1.02600002E+001	+0	RAND
	8	TRAF	+13	-1.02600002E+001	+0	RAND
	9	SYNC	+32	-1.02600002E+001	+0	RAND

**Range**                    <power\_value>: -40 to 0    <walsh\_value>: 0-63    <pn\_offset>: 0-511

**Key Entry**                **IS-97 Levels**    **Equal Powers**    **Scale to 0dB**    **Sync**    **Pilot**    **Paging**    **Traffic**

**:SETup:MCARrier**

**Supported**                E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA:ARB:SETup:MCARrier CAR3|CAR4| "<file name>"
[:SOURCE]:RADIO:CDMA:ARB:SETup:MCARrier?
```

This command selects a pre-defined or user-defined multicarrier CDMA setup.

**CAR3**                      This choice selects three 9 channel forward carriers with a power level of 0.00 dB, the first with a -1.25 MHz frequency offset, the second with no frequency offset, and the third with +1.25 MHz frequency offset.

**CAR4**                      This choice selects four 9 channel forward carriers with a power level of 0.00 dB, the first with a -1.875 MHz frequency offset, the second with a -625 kHz frequency offset, the third with +625 kHz frequency offset, and the fourth with a +1.875 MHz frequency offset.

"<file name>"              This choice selects a file consisting of the user-defined number of channel forward carriers, power levels, and frequency offsets.

**\*RST**                      CAR3

**Key Entry**                **3 Carriers**    **4 Carriers**    **Custom CDMA Multicarrier**

**Remarks**                Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## **:SETup:MCARrier:STORe**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier:STORe "<file name>"
```

This command stores the current multicarrier setup information.

The stored file contains information including the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

**Key Entry** **Store Custom Multicarrier**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## **:SETup:MCARrier:TABLE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier:TABLE {FWD9|FWD32|FWD64|PILot|
CUSTom,"<file name>"|"",<freq_offset>,<power>}
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier:TABLE?
```

This command defines the multicarrier CDMA waveform.

The variable <freq\_offset> is expressed in units of Hertz (kHz to MHz).

The variable <power> is expressed in units of decibels (dB).

The carrier type, carrier name, frequency offset, and power level are returned when a query is initiated. The output format is as follows:

```
<carrier type>,<carrier_name>,<freq_offset>,<power>
```

**FWD9** This CDMA setup consists of 9 forward channels (pilot, paging, sync, and 6 traffic channels) at IS-97-defined power levels.

**FWD32** This CDMA setup consists of 32 forward channels (pilot, paging, sync, and 29 traffic channels) at IS-97-defined power levels.

**FWD64** This CDMA setup consists of 64 forward channels (pilot, 7 paging, sync, and 55 traffic channels) at IS-97-defined power levels.

**PILot** This choice selects single pilot channel.

**CUSTom,"<file name>"** This choice selects a custom user-defined CDMA setup.

**" "** A null string, entered for any non-custom carrier.

**CDMA ARB Subsystem—Option 401 ([:SOURCE]:RADio:CDMA:ARB)**

<b>*RST</b>	carrier type: FWD9      <freq_offset>: +1.25000000E+006 <power>: +0.00000000E+000
<b>Range</b>	<freq_offset>: -7.5E6 to 7.5E6      <power>: -40 to 0
<b>Key Entry</b>	<b>9 Ch Fwd    32 Ch Fwd    64 Ch Fwd    Pilot    Custom CDMA State</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax. To store a multicarrier setup refer to <a href="#">“:SETup:MCARrier:STORE” on page 231</a>  The file name specified must be a single carrier CDMA file.

**:SETup:STORE**

**Supported**            E4438C with Option 401

[ :SOURCE ] :RADio:CDMA:ARB:SETup:STORE "<file name>"

This command stores the current custom CDMA state, using a designated file name, to the signal generator non-volatile memory.

Along with the contents of the CDMA channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator non-volatile memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- chip rate
- waveform length
- oversample ratio
- ARB reference clock source (internal or external)
- ARB reference clock frequency

**Key Entry**            **Store Custom CDMA State**

**Remarks**            Recall the stored file by executing the following command:

[ :SOURCE ] :RADio:CDMA:ARB:SETup: "<file name>"

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.



## :TRIGger:TYPE

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA:ARB:TRIGger:TYPE CONTInuous | SINGle | GATE  
[ :SOURCE ] :RADio:CDMA:ARB:TRIGger:TYPE?
```

This command sets the trigger mode (type) that controls the waveform’s playback.

Triggers control the playback by telling the ESG when to play the modulating signal (waveform). Depending on the trigger settings for the ESG, the waveform playback can occur once, continuously, or the ESG may start and stop playing the waveform repeatedly (GATE mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the ESG to trigger on either state of the trigger signal. It is common to have multiple triggers, also referred to as trigger occurrences or events, occur when the signal generator requires only a single trigger. In this situation, the ESG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the waveform. This is because the ESG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the waveform’s final I and Q levels determine whether you will see the carrier signal or not (zero = no carrier, other values = carrier visible). At the end of most files, the final I and Q points are set to a value other than zero.

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the waveform’s transmission.
- Setting the waveform’s response to triggers:
  - CONTInuous, see “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 234
  - SINGle, see “:RETRigger” on page 227
  - GATE, selecting the mode also sets the response
- Selecting the trigger source (see “:TRIGger[:SOURCE]” on page 235), which determines how the ESG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.
- Setting the trigger polarity when using an external source:
  - CONTInuous and SINGle see “:TRIGger[:SOURCE]:EXTErnal:SLOPe” on page 237
  - GATE, see “:TRIGger:TYPE:GATE:ACTive” on page 235

For more information on triggering, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the trigger type command choices:

CONTInuous      Upon triggering, the waveform repeats continuously.

SINGLE	Upon triggering, the waveform segment or sequence plays once.
GATE	An external trigger signal repeatedly starts and stops the waveform’s playback (transmission). The time duration for playback depends on the duty period of the trigger signal and the gate polarity selection (see <a href="#">“:TRIGger:TYPE:GATE:ACTive” on page 235</a> ). The waveform plays during the inactive state and stops during the active polarity selection state. The active state can be set high or low. The gate mode works only with an external trigger source.

---

**NOTE** The ARB gating behavior described above is opposite to the gating behavior for real-time custom mode.

---

<b>*RST</b>	<b>CONT</b>		
<b>Key Entry</b>	<b>Continuous</b>	<b>Single</b>	<b>Gated</b>

### **:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger |
RESet
[ :SOURCE ] :RADio:CDMA:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see [“:TRIGger:TYPE” on page 233](#).

The following list describes the waveform’s response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

<b>*RST</b>	FREE		
<b>Key Entry</b>	<b>Free Run</b>	<b>Trigger &amp; Run</b>	<b>Reset &amp; Run</b>

### **:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[ :SOURce ] :RADio:CDMA:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 233.

The following list describes the ESG’s gating behavior for the polarity selections:

- |      |  |
|------|--|
| LOW  | The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state). |
| HIGH | The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state). |

<b>*RST</b>	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

### **:TRIGger[:SOURce]**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] KEY|EXT|BUS
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 233. The following list describes the command choices:

- |     |  |
|-----|--|
| KEY | This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.  |
| EXT | An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger: |

**CDMA ARB Subsystem—Option 401 ([:SOURCE]:RADio:CDMA:ARB)**

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTErnal[:SOURCE]” on page 238.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 235
  - continuous and single modes, see “:TRIGger[:SOURCE]:EXTErnal:SLOPe” on page 237
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURCE]:EXTErnal:DELaY” on page 236
  - turning the delay on, see “:TRIGger[:SOURCE]:EXTErnal:DELaY:STATe” on page 237

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

Key Entry	Trigger Key	Ext	Bus
-----------	-------------	-----	-----

**:TRIGger[:SOURCE]:EXTErnal:DELaY**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA:ARB:TRIGger [ :SOURCE ] :EXTErnal:DELaY <val>
[ :SOURCE ] :RADio:CDMA:ARB:TRIGger [ :SOURCE ] :EXTErnal:DELaY?
```

This command sets the amount of time to delay the ESG’s response to an external trigger.

The delay is a path (time) delay between when the ESG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of two seconds, causes the ESG to wait two seconds after receipt of the trigger before the ESG plays the waveform.

The delay does not occur until you turn it on (see “:TRIGger[:SOURCE]:EXTErnal:DELaY:STATe” on page 237). You can set the delay value either before or after turning it on.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 235.

The unit of measurement for the variable <val> is in seconds (nsec–sec).

**\*RST**                    +1.00000000E-003  
**Range**                1E-8 to 4E1  
**Key Entry**            **Ext Delay Time**

### **:TRIGger[:SOURce]:EXTernal:DELay:STATe**

**Supported**            E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe ON|OFF|
1|0
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURce]:EXTernal:DELay” on page 236, and for more information on configuring an external source, see “:TRIGger[:SOURce]” on page 235.

**\*RST**                    0  
**Key Entry**            **Ext Delay Off On**

### **:TRIGger[:SOURce]:EXTernal:SLOPe**

**Supported**            E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|
NEGative
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 235.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 235.

**\*RST**                    NEG  
**Key Entry**            **Ext Polarity Neg Pos**

**:TRIGger[:SOURCE]:EXTernal[:SOURCE]****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:TRIGger[:SOURCE]:EXTernal[:SOURCE] EPT1|EPT2|
EPTRIGGER1|EPTRIGGER2
[:SOURCE]:RADio:CDMA:ARB:TRIGger[:SOURCE]:EXTernal[:SOURCE]?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 235. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

**:WLENgth****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:WLENgth <val>
[:SOURCE]:RADio:CDMA:ARB:WLENgth?
```

This command specifies the waveform length (in short codes).

**\*RST** +1**Range** 1–6**Key Entry** **Waveform Length**

**Remarks** The upper limit is adjusted based on the oversample ratio to fit the signal within the available memory.

The maximum waveform length is 32/oversample ratio.

## [:STATe]

**Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA:ARB[:STATe] ON|OFF|1|0

[:SOURCE]:RADIO:CDMA:ARB[:STATe]?

This command enables or disables the CDMA modulation format.

Executing the command [:SOURCE]:RADIO:CDMA:ARB[:STATe] ON sets up the internal hardware to generate the currently selected CDMA signal selection. This also activates the I/Q state and sets the I/Q source to internal.

ON (1) This choice sets up the internal hardware to generate the currently selected CDMA signal selection. This also activates the I/Q state and sets the I/Q source to internal.

OFF (0) This choice disables the CDMA modulation format.

\*RST 0

**Key Entry** CDMA Off On

**Remarks** The enabled modulation is not present on RF carrier until you have activated the modulation by executing the command :OUTPut:MODulation[:STATe] ON.

Overriding the I/Q state and I/Q source functions can be achieved by using the I/Q menu.

---

## CDMA2000 ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA2000:ARB)

### :CLIPping:I

**Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000:ARB:CLIPping:I <val>

[:SOURce]:RADio:CDMA2000:ARB:CLIPping:I?

This command clips (limits) the modulation level of the waveform's I component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip |I| To**

### :CLIPping:POSition

**Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000:ARB:CLIPping:POSition PRE|POST

[:SOURce]:RADio:CDMA2000:ARB:CLIPping:POSition?

This command specifies whether a waveform is clipped before (PRE) or after (POST) FIR filtering.

**\*RST** PRE

**Key Entry** **Clip At PRE POST FIR Filter**

### :CLIPping:Q

**Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000:ARB:CLIPping:Q <val>

[:SOURce]:RADio:CDMA2000:ARB:CLIPping:Q?

This command clips (limits) the modulation level of the waveform's Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip |Q| To**



### **:CLIPping:TYPE**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping:TYPE IJQ|IORQ
[:SOURce]:RADio:CDMA2000:ARB:CLIPping:TYPE?
```

This command selects either IJQ or IORQ as the clipping type.

**IJQ** This choice clips (circular clipping) the combined I and Q waveform.

**IORQ** This choice independently clips (rectangular clipping) I and Q components of the waveform. I and Q can be clipped to different levels using this mode.

**\*RST** IORQ

**Key Entry** **Clipping Type** |I+jQ| |I|,|Q|

### **:CLIPping[:IJQ]**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping[:IJQ] <val>
[:SOURce]:RADio:CDMA2000:ARB:CLIPping[:IJQ]?
```

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip** |I+jQ| **To**

### **:IQ:EXTernal:FILTer**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:EXTernal:FILTer 40e6|THRough
[:SOURce]:RADio:CDMA2000:ARB:IQ:EXTernal:FILTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTernal:FILTer:AUTO” on [page 242](#) to OFF(0) mode.

**40e6** This choice applies a 40 MHz baseband filter.

**THRough** This choice bypasses filtering.

**\*RST**                   THR  
**Key Entry**           **40.000 MHz**   **Through**

**:IQ:EXtErnal:FILTer:AUTO**

**Supported**           E4438C with Option 401

```
[:SOURce]:RADio:ARB:IQ:EXtErnal:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:ARB:IQ:EXtErnal:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1)                This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0)              This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXtErnal:FILTer” on page 241 for selecting a filter or through path.

**\*RST**                   1

**Key Entry**           **I/Q Output Filter Manual Auto**

**:FILTer**

**Supported**           E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|
IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|WCDMA|IS2000SR3DS|UGGaussian|
"<user FIR>"
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

This command selects the pre-modulation filter type.

IS95                 This choice selects a filter that meets the criteria of the IS-95 standard.

IS95\_EQ             This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

IS95\_MOD            This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

IS95\_MOD\_EQ        This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

WCDMa	This choice selects a 0.22 Nyquist filter optimized for ACP.																		
AC4Fm	This choice selects the Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.																		
IS2000SR3DS	This choice selects an IS-2000 standard, spread rate 3 direct spread filter.																		
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.																		
"<user FIR>"	This variable is any FIR filter file that you have stored in memory. The variable needs no directory path indicating the location of the file, such as FIR: or /USER/FIR. The command assumes the FIR directory. Refer to “File Name Variables” on page 13 for more information on file names.																		
<b>*RST</b>	IS95_MOD_EQ																		
<b>Key Entry</b>	<table> <tr> <td><b>Root Nyquist</b></td> <td><b>Nyquist</b></td> <td><b>Gaussian</b></td> <td><b>Rectangle</b></td> <td><b>IS-95</b></td> <td><b>IS-95 w/EQ</b></td> </tr> <tr> <td><b>IS-95 Mod</b></td> <td><b>IS-95 Mod w/EQ</b></td> <td><b>APCO 25 C4FM</b></td> <td><b>WCDMA</b></td> <td></td> <td></td> </tr> <tr> <td><b>UN3/4 GSM Gaussian</b></td> <td><b>IS-2000 SR3 DS</b></td> <td><b>User FIR</b></td> <td></td> <td></td> <td></td> </tr> </table>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APCO 25 C4FM</b>	<b>WCDMA</b>			<b>UN3/4 GSM Gaussian</b>	<b>IS-2000 SR3 DS</b>	<b>User FIR</b>			
<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>														
<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APCO 25 C4FM</b>	<b>WCDMA</b>																
<b>UN3/4 GSM Gaussian</b>	<b>IS-2000 SR3 DS</b>	<b>User FIR</b>																	

**:FILTer:ALPHa**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000:ARB:FILTer:ALPHa <val>
[ :SOURce ] :RADio:CDMA2000:ARB:FILTer:ALPHa?
```

This command changes the Nyquist or root Nyquist filter alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 242.

**:FILTER:BBT**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000:ARB:FILTER:BBT <val>
```

```
[ :SOURCE ] :RADIO:CDMA2000:ARB:FILTER:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “[:FILTER](#)” on page 242.

**:FILTER:CHANnel**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000:ARB:FILTER:CHANnel EVM|ACP
```

```
[ :SOURCE ] :RADIO:CDMA2000:ARB:FILTER:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “[:FILTER](#)” on page 242.

### **:HEADer:CLEar**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:HEADer:CLEar

This command clears the header information from the file header used by this modulation format.

**Key Entry** **Clear Header**

**Remarks** The **CDMA2000 Off On** softkey must be set to On for this command to function.

### **:HEADer:SAVE**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:HEADer:SAVE

This command saves the header information to the file header used by this modulation format.

**Key Entry** **Save Setup To Header**

**Remarks** The **CDMA2000 Off On** softkey must be set to On for this command to function.

### **:IQ:MODulation:ATTen**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:IQ:MODulation:ATTen <val>

[ :SOURce ] :RADio:CDMA2000:ARB:IQ:MODulation:ATTen?

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000

**Range** 0–40

**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:ATTen:AUTO****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODualtion:ATTen:AUTO ON|OFF|1|0
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 245 for setting the attenuation value.

\*RST 1

**Key Entry** Modulator Atten Manual Auto

**:IQ:MODulation:FILTer****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 246 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THROUGH This choice bypasses filtering.

\*RST THR

**Key Entry** 2.100 MHz 40.000 MHz Through

**:IQ:MODulation:FILTer:AUTO****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 246 for selecting a filter or through path.

\*RST 1

**Key Entry** I/Q Mod Filter Manual Auto

## :IQMap

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQMap NORMal|INVerted
[:SOURce]:RADio:CDMA2000:ARB:IQMap?
```

This command selects whether the Q output will be normal or inverted.

NORMal This choice selects normal polarity.

INVerted This choice inverts the internal Q signal.

\*RST NORM

**Key Entry** I/Q Mapping Normal Invert

**Remarks** Inverting the Q output inverts the RF spectrum after the modulation.

## :LINK

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK FORWard|REVerse
[:SOURce]:RADio:CDMA2000:ARB:LINK?
```

This command selects the CDMA2000 forward or reverse link channel setup.

FORW This choice selects a basestation to mobile configuration.

REV This choice selects a mobile to basestation configuration.

\*RST FORW

**Key Entry** Link Forward Reverse

## :LINK:FORWard:SETup

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup S1Pilot|S3DPilot|
S3MPilot|S19Chan|S3D9chan|S3M9chan|MCArrier|"<file name>"
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
```

**CDMA2000 ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA2000:ARB)**

This command selects a previously defined channel configuration for the CDMA2000 forward link or multicarrier, and turns multicarrier off or on (see the MCARrier choice description).

S1Pilot	This choice selects a spread rate 1, pilot-channel setup.										
S3DPilot	This choice selects a spread rate 3, direct spread, pilot-channel setup.										
S3MPilot	This choice selects a spread rate 3, multicarrier spread, pilot-channel setup.										
S19Chan	This choice selects a spread rate 1, 9-channel setup.										
S3D9Chan	This choice selects a spread rate 3, direct spread, 9-channel setup.										
S3M9Chan	This choice selects a spread rate 3, multicarrier spread, 9-channel setup.										
MCARrier	This choice selects multicarrier and turns it on. Selecting any other setup such as S1Pilot or S3D9Chan turns multicarrier off. To select the multicarrier setup, see “:LINK:FORWARD:SETup:MCARrier” .										
<b>*RST</b>	S19C										
<b>Key Entry</b>	<table border="0"> <tr> <td><b>Pilot</b></td> <td><b>9 Channel</b></td> <td><b>Spread Rate 1</b></td> <td><b>Spread Rate 3</b></td> <td><b>Multicarrier Off On</b></td> </tr> <tr> <td><b>Spreading Type</b></td> <td><b>Direct Mcarrier</b></td> <td colspan="3"><b>Custom CDMA2000 Carrier</b></td> </tr> </table>	<b>Pilot</b>	<b>9 Channel</b>	<b>Spread Rate 1</b>	<b>Spread Rate 3</b>	<b>Multicarrier Off On</b>	<b>Spreading Type</b>	<b>Direct Mcarrier</b>	<b>Custom CDMA2000 Carrier</b>		
<b>Pilot</b>	<b>9 Channel</b>	<b>Spread Rate 1</b>	<b>Spread Rate 3</b>	<b>Multicarrier Off On</b>							
<b>Spreading Type</b>	<b>Direct Mcarrier</b>	<b>Custom CDMA2000 Carrier</b>									
<b>Remarks</b>	Refer to “File Name Variables” on page 13 for information on the file name syntax.										

**:LINK:FORWARD:SETup:MCARrier**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier CAR2 | CAR3 | CAR4 |
"<file name>"
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier?
```

This command defines the type of multicarrier CDMA2000 setup.

CAR2	<p>This choice specifies the following standard 2-carrier setup:</p> <p>Carrier 1: spread rate 3, direct spread, 9 channel; -2.5 MHz frequency offset; 0 dB power</p> <p>Carrier 2: spread rate 3, direct spread, 9 channel; 2.5 MHz frequency offset; 0 dB power</p>
CAR3	<p>This choice specifies the following standard 3-carrier setup:</p> <p>Carrier 1: spread rate 1, 9 channel; -1.25 MHz frequency offset; 0 dB power</p> <p>Carrier 2: spread rate 1, 9 channel; 0 kHz frequency offset; 0 dB power</p> <p>Carrier 3: spread rate 1, 9 channel; 1.25 MHz frequency offset; 0 dB power</p>



CAR4	This choice specifies the following standard 2-carrier setup: Carrier 1: spread rate 1, 9 channel; -1.875 MHz frequency offset; 0 dB power Carrier 2: spread rate 1, 9 channel; -625 kHz frequency offset; 0 dB power Carrier 3: spread rate 1, 9 channel; 625 kHz frequency offset; 0 dB power Carrier 4: spread rate 1, 9 channel; 1.875 MHz frequency offset; 0 dB power
*RST	CAR2
<b>Key Entry</b>	<b>2 SR3 Carriers      3 Carriers      4 Carriers      Custom CDMA2000 Multicarrier</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 13 for information on the file name syntax.

### **:LINK:FORWARD:SETup:MCARrier:STORe**

**Supported**      E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:
STORe "<file name>"
```

This command stores the current multicarrier setup information.

The stored file contains information including the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

**Key Entry**      Store Custom Multicarrier

**Remarks**      Recall stored files from memory by executing the following command:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:
MCARrier "<file name>"
```

Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

### **:LINK:FORWARD:SETup:MCARrier:TABLE**

**Supported**      E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:TABLE INIT |
APPend|<chan_num>,S1Pilot|S3DPilot|S3MPilot|S19Chan|S3D9chan|S3M9chan|
"<file name>",<freq_offset>,<power>
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:
TABLE? <chan_num>
```

This command defines the multicarrier CDMA2000 waveform.

**CDMA2000 ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA2000:ARB)**

The variable <freq\_offset> is expressed in units of Hertz (MHz).

The variable <power> is expressed in units of decibels (dB).

Channel type, frequency offset, and power level are returned when a query is initiated. The output format is as follows:

<channel type>, <freq\_offset>, <power>

<b>INIT</b>	This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.				
<b>APPend</b>	This choice adds rows to an existing table. The maximum number of rows for one table is 25.				
<b>S1Pilot</b>	This choice sets a single SR1 Pilot forward channel.				
<b>S3DPilot</b>	This choice sets a single direct spread pilot forward channel.				
<b>S3MPilot</b>	This choice sets a single SR3 multicarrier spread pilot forward channel.				
<b>S19Chan</b>	This choice sets a SR1 9 forward channel.				
<b>S3D9chan</b>	This choice sets a SR3 direct spread forward channel.				
<b>S3M9chan</b>	This choice sets a SR3 multicarrier spread 9 forward channel.				
<b>*RST</b>	channel type: S3D9CHAN      <freq_offset>: -2.50000000E+006 <power>: +0.00000000E+000				
<b>Range</b>	<freq_offset>: -15E6 to 15E6      <power>: -40 to 0				
<b>Key Entry</b>	<b>Select File</b>	<b>Insert Row</b>	<b>SR1 Pilot</b>	<b>SR3 Direct Pilot</b>	<b>SR3 Mcarrier Pilot</b>
	<b>SR3 Mcarrier Pilot</b>	<b>SR1 9 Channel</b>	<b>SR3 Direct 9 Channel</b>		
	<b>SR3 Mcarrier 9 Channel</b>	<b>Custom CDMA2000 Carrier</b>			
<b>Field Entry</b>	Freq Offset		Power		
<b>Remarks</b>	Refer to “File Name Variables” on page 13 for information on the file name syntax.				

**:LINK:FORWARD:SETup:MCARrier:TABLE:NCARriers**

**Supported**      E4438C with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:TABLE:NCARriers?

This command queries the number of carriers specified for the multicarrier CDMA2000 waveform.

**\*RST**      +2

## **:LINK:FORWARD:SETup:STORe**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:STORe "<file name>"
```

This command stores the current custom CDMA2000 state, using a designated file name, to the signal generator memory.

Along with the contents of the CDMA2000 channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- link
- spread type
- spread rate
- ARB reference clock source (internal or external)
- ARB reference clock frequency
- clipping
- multicarrier spacing
- radio configuration

**Key Entry**            **Store Custom CDMA State**

**Remarks**            Recall this stored file by executing the following command:

```
[:SOURCE]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup "<file name>"
```

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## **:LINK:FORWARD:SETup:TABLE:APPLy**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE:APPLy
```

This command generates a CDMA2000 signal based on the current values in the CDMA2000 channel setup table editor.

**Key Entry**            Apply Channel Setup

**:LINK:FORWARD:SETup:TABLE:CHANnel**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE:CHANnel INIT|
APPend|<chan_num>,<chan_type>,<config>,<data_rate>,<walsh>,<power>,<
pn_offset>,RANDOM|<data_val>
```

```
[ :SOURCE ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE:
CHANnel? <chan_num>
```

This command defines the channel parameters of the CDMA2000 signal.

The variable <power> is expressed in units of decibels (dB).

The variable <data\_rate> is expressed in units bits per second (bps).

The channel type, configuration type, data rate, walsh code, power, pn offset, and data value are returned when a query is initiated. The output format is as follows:

```
<chan_type>,<config>,<data_rate>,<walsh>,<power>,<pn_offset>,<data_val>
```

**INIT** This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

**APPend** This choice adds rows to an existing table.

**RANDom** This choice selects a randomly generated data value.

<data\_val> This variable specifies a specific data value.

**\*RST** channel type: PIL <config>: +3 <data\_rate>: +3.84000000E+004  
<walsh>: +0 <power>: -7.00000000E+000 <pn\_offset>: +0  
<data\_val>: 0

**Range** <data\_rate>: 1500–307200 <walsh>: 0–63 <power>: –40 to 0  
<pn\_offset>: 0–511 <data\_val>: 0000000–11111111

**Key Entry** **Edit Channel Setup** **Insert Row** **Config** **Rate**  
**Walsh Code** **PN Offset**

**Remarks** Queries initiated for this command must be followed by a specific channel number.

The above \*RST value represents a query of channel one.

### **:LINK:FORWard:SETup:TABLE:NCHannels**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLE:NCHannels?

This command queries the number of channels specified for the CDMA2000 link setup.

**\*RST** +9

### **:LINK:FORWard:SETup:TABLE:PADJust**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLE:PADJust EQUal |  
SCALE

This command sets the code domain power (the relative power in each of the channels).

**EQUal** Sets all channels to equal power, and the total power to 0 dB.

**SCALE** Scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.

**Key Entry** **Equal Powers** **Scale To 0dB**

### **:LINK:REVerse:RCONfig**

**Supported** E4438C with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:RCONfig <val>  
[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:RCONfig?

This command sets the radio configuration for all reverse link channels.

**\*RST** +1

**Range** 1–4

**Key Entry** **Radio Config**

**Remarks** Changing the radio configuration results in changes to the channel data rate.

**:LINK:REVerse:SETup****Supported** E4438C with Option 401

```
[ :SOURce] :RADio:CDMA2000:ARB:LINK:REVerse:SETup S1Pilot|S3Pilot|
S15Chan|S35Chan|S18Chan| "<file name>"
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

This command selects a previously defined channel configuration for the CDMA2000 reverse link.

S1Pilot This choice selects a spread rate 1, pilot-channel setup.

S3Pilot This choice selects a spread rate 3, pilot-channel setup.

S15Chan This choice selects a spread rate 1, 5-channel setup.

S35Chan This choice selects a spread rate 3, 5-channel setup.

S18Chan This choice selects a spread rate 1, 8-channel setup.

**\*RST** S15Chan

<b>Key Entry</b>	<b>Pilot</b>	<b>5 Channel</b>	<b>8 Channel</b>	<b>Custom CDMA2000 State</b>
	<b>Spread Rate 1</b>	<b>Spread Rate 3</b>		

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:LINK:REVerse:SETup:STORE****Supported** E4438C with Option 401

```
[ :SOURce] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:STORE "<file name>"
```

This command stores the current custom CDMA2000 state, using a designated file name, to the signal generator memory.

Along with the contents of the CDMA2000 channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- link
- spread type

spread rate  
 ARB reference clock source (internal or external)  
 ARB reference clock frequency  
 clipping  
 multicarrier spacing  
 radio configuration

**Key Entry**            **Store Custom CDMA State**

**Remarks**            Recall this stored file by executing the following command:

```
[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:
SETUp "<file name>"
```

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### **:LINK:REVerse:SETup:TABLE:APPLY**

**Supported**            E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLE:APPLY
```

This command generates a CDMA2000 signal based on the current values in the CDMA2000 channel setup table editor.

**Key Entry**            **Apply Channel Setup**

### **:LINK:REVerse:SETup:TABLE:CHANnel**

**Supported**            E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLE:CHANnel INIT |
APPend|<chan_num>, <chan_type>, <data_rate>, <power>, RANDOM|<data_val>
[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLE:
CHANnel? <chan_num>
```

This command defines the channel parameters for the CDMA2000 signal.

The channel number, configuration type, data rate, walsh code, power, pn offset, and data value are returned when a query is initiated. The output format is as follows:

```
<chan_type>,<data_rate>,<power>,<data_val>
```

The variable <data\_rate> is expressed as bits per second (bps).

The variable <power> is expressed in units of decibels (dB).

INIT                    This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

**CDMA2000 ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA2000:ARB)**

<b>APPend</b>	This choice adds rows to an existing table. The maximum number of channels in a table is eight.
<b>RANDom</b>	This choice selects a randomly generated data value.
<b>&lt;data_val&gt;</b>	This variable customizes a specific data value.
<b>*RST</b>	<i>channel type</i> : PIL <i>&lt;data_rate&gt;</i> : +3.84000000E+004 <i>&lt;power&gt;</i> : -7.00000000E+000 <i>&lt;pn_offset&gt;</i> : +0 <i>&lt;data_val&gt;</i> : 0
<b>Range</b>	<i>&lt;data_rate&gt;</i> : 1500–9600 <i>&lt;power&gt;</i> : –40 to 0 <i>&lt;data_val&gt;</i> : 0000000–11111111
<b>Key Entry</b>	<b>Edit Channel Setup      Insert Row      Config      Rate</b> <b>Walsh Code      PN Offset</b>
<b>Remarks</b>	Queries initiated for this command must be followed by a specific channel number.  The above *RST value represents a query of channel one.

**:LINK:REVerse:SETup:TABLE:NCHannels**

<b>Supported</b>	E4438C with Option 401
	[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLE:NCHannels?
	This command query returns the number of channels for the CDMA2000 link reverse setup.
<b>*RST</b>	+5

**:LINK:REVerse:SETup:TABLE:PADJust**

<b>Supported</b>	E4438C with Option 401
	[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLE:PADJust EQUal   SCALE
	This command customizes the code domain power (the relative power in each of the channels).
<b>EQUal</b>	This choice changes all channels to equal power, and the total power to 0 dB.
<b>SCALE</b>	This choice scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.
<b>Key Entry</b>	<b>Equal Powers      Scale To 0dB</b>



## **:MDEStination:AAMPlitude**

**Supported**            E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4  
[ :SOURCE ] :RADio:CDMA2000:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST**                    NONE

**Key Entry**            **None**    **Marker 1**    **Marker 2**    **Marker 3**    **Marker 4**

## **:MDEStination:ALCHold**

**Supported**            E4438C with Option 401

---

**CAUTION**            Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURCE ] :RADio:CDMA2000:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4  
[ :SOURCE ] :RADio:CDMA2000:ARB:MDEStination:ALCHold?
```

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “[:MARKer:\[SET\]](#)” on page 302.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “[:MPOLarity:MARKer1|2|3|4](#)” on page 260.

---

**NOTE**                    Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform's routing settings.

---

For more information on the marker ALC hold function, see the *E4428C/38C ESG Signal Generators User's Guide*. For setting the marker points, see “:MARKer:[SET]” on page 302.

**NONE** This terminates the marker ALC hold function.

**M1–M4** These are the marker choices. The ALC hold feature uses only one marker at a time.

**\*RST** NONE

### Example

```
:RAD:AWGB:ARB:MDES:ALCH M1
```

The preceding example routes marker 1 to the ALC Hold function.

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
<b>Remarks</b>	N/A				

## :MDEStination:PULSe

**Supported** E4438C with Option 401

---

**CAUTION** The pulse function incorporates ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURce ] :RADio:CDMA2000:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4  
[ :SOURce ] :RADio:CDMA2000:ARB:MDEStination:PULSe?
```

This command enables or disables the marker pulse/RF blanking function for the selected marker.

This function automatically uses the ALC hold function, so there is no need to select both the ALC hold and pulse/RF blanking functions for the same marker.

---

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 260.

---

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 302 for setting the marker points.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

---

For more information on the marker RF blanking function, see the *E4428C/38C ESG Signal Generators User’s Guide*.

NONE This terminates the marker RF blanking/pulse function.

M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

**Example**

```
:RAD:ARB:MDES:PULS M2
```

The preceding example routes marker 2 to Pulse/RF Blanking.

```
*RST NONE
```

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
------------------	-------------	-----------------	-----------------	-----------------	-----------------

**:MPOLarity:MARKer1 | 2 | 3 | 4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[:SOURCE]:RADIO:CDMA2000:ARB:MPOLarity:MARKer1 | 2 | 3 | 4?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

**\*RST** POS

**Key Entry**            **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

**:REFerence:EXTernal:FREQuency****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:REFerence:EXTernal:FREQuency <val>
[:SOURCE]:RADIO:CDMA2000:ARB:REFerence:EXTernal:FREQuency?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (KHz–MHz).

**\*RST** +1.00000000E+007**Range** 2.5E5–1E8**Key Entry**            **Reference Freq**

**Remarks**            The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to  
[“:REFerence\[:SOURCE\]” on page 260.](#)

**:REFerence[:SOURCE]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:REFerence[:SOURCE] INTernal | EXTernal
[:SOURCE]:RADIO:CDMA2000:ARB:REFerence[:SOURCE] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

<b>Key Entry</b>	ARB Reference Ext Int
<b>Remarks</b>	<p>If the EXTERNAL choice is selected, the external frequency value <i>must</i> be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.</p> <p>Refer to “:REFerence:EXternal:FREquency” on page 260 to enter the external reference frequency.</p>

**:RETRigger**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:RETRigger ON|OFF|IMMEDIATE
[:SOURce]:RADio:CDMA:ARB:RETRigger?
```

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

**ON (1)** This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.

**OFF (0)** This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.

**IMMEDIATE** This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** ON

**Key Entry** **On Off Immediate**

**:REVISION**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:REVISION?
```

This command queries the revision number of the current CDMA2000 format.

**\*RST** 8

**:SCLock:RATE**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000:ARB:SCLock:RATE <val>
```

```
[ :SOURce ] :RADio:CDMA2000:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the CDMA2000 modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STaTe]” on [page 269](#) to activate the modulation format.

**:SPReading:RATE**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000:ARB:SPReading:RATE 1 | 3
```

```
[ :SOURce ] :RADio:CDMA2000:ARB:SPReading:RATE?
```

This command opens a submenu that provides the available spread rate choices for the CDMA2000 waveform.

**\*RST** +1

**Key Entry** **Spread Rate 1**      **Spread Rate 3**

**Remarks** The spread rate multiplied by 1.2288 MHz is equal to the chip rate. For example, spread rate 3 equals a 3.6864 Mcps chip rate.

Higher data rates can be achieved using spread rate 3, though offset by greater bandwidth/spectrum usage.

Changing the spread rate to either 1 or 3 will also change the initial setup menu, resulting in a configuration that is specific to the current spread rate.

## :SPReading:TYPE

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE DIRect |MCARrier  
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE?
```

This command selects the spreading type for a CDMA2000 waveform.

**\*RST** DIR

**Key Entry** Spreading Type Direct Mcarrier

**Remarks** Multicarrier is not available in the reverse link setup.

Note that changing the spreading type will result in the setup changing to a setup for the current spreading type.

## :SPReading:TYPE:MCARrier:SPACing

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing 1.23MHz |  
1.25MHz  
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing?
```

This command selects the multicarrier frequency spacing.

**\*RST** +1.25000000E+006

**Key Entry** 1.23 MHz 1.25 MHz

**Remarks** Cellular band uses 1.23 MHz and PCS band uses 1.25 MHz.

## :TRIGger:TYPE

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONTinuous |SINGLE |GATE  
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

### :TRIGger:TYPE

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE CONTinuous |SINGLE |GATE  
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE?
```

This command sets the trigger mode (type) that controls the waveform's playback.

Triggers control the playback by telling the ESG when to play the modulating signal (waveform). Depending on the trigger settings for the ESG, the waveform playback can occur once, continuously, or the ESG may start and stop playing the waveform repeatedly (GATE mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the ESG to trigger on either state of the trigger signal. It is common to have multiple triggers, also referred to as trigger occurrences or events, occur when the signal generator requires only a single trigger. In this situation, the ESG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the waveform. This is because the ESG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the waveform's final I and Q levels determine whether you will see the carrier signal or not (zero = no carrier, other values = carrier visible). At the end of most files, the final I and Q points are set to a value other than zero.

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the waveform's transmission.
- Setting the waveform's response to triggers:
  - CONTInuous, see “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 265
  - SINGle, see “:RETRigger” on page 261
  - GATE, selecting the mode also sets the response
- Selecting the trigger source (see “:TRIGger[:SOURce]” on page 266), which determines how the ESG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.
- Setting the trigger polarity when using an external source:
  - CONTInuous and SINGle see “:TRIGger[:SOURce]:EXTernal:SLOPe” on page 268
  - GATE, see “:TRIGger:TYPE:GATE:ACTive” on page 266

For more information on triggering, see the *E4428C/38C ESG Signal Generators User's Guide*.

The following list describes the trigger type command choices:

CONTInuous	Upon triggering, the waveform repeats continuously.
SINGle	Upon triggering, the waveform segment or sequence plays once.



**GATE** An external trigger signal repeatedly starts and stops the waveform’s playback (transmission). The time duration for playback depends on the duty period of the trigger signal and the gate polarity selection (see “:TRIGger:TYPE:GATE:ACTive” on page 266). The waveform plays during the inactive state and stops during the active polarity selection state. The active state can be set high or low. The gate mode works only with an external trigger source.

---

**NOTE** The ARB gating behavior described above is opposite to the gating behavior for real-time custom mode.

---

**\*RST** CONT  
**Key Entry** Continuous Single Gated

### :TRIGger:TYPE:CONTInuous[:TYPE]

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE |
TRIGger | RESet
[ :SOURce ] :RADio:CDMA2000:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 263.

The following list describes the waveform’s response to each of the command choices:

<b>FREE</b>	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
<b>TRIGger</b>	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
<b>RESet</b>	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
<b>*RST</b>	FREE
<b>Key Entry</b>	Free Run Trigger & Run Reset & Run

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 263.

The following list describes the ESG’s gating behavior for the polarity selections:

LOW The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).

HIGH The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).

\*RST HIGH

**Key Entry** Gate Active Low High

**:TRIGger[:SOURCE]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger [ :SOURCE ] KEY|EXT|BUS
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger [ :SOURCE ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 263. The following list describes the command choices:

KEY This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

EXT An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 269.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User's Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 266
  - continuous and single modes, see “:TRIGger[:SOURce]:EXTernal:SLOPe” on page 268
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURce]:EXTernal:DELay” on page 267
  - turning the delay on, see “:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 268

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

<b>*RST</b>	<b>EXT</b>			
<b>Key Entry</b>	<b>Trigger Key</b>	<b>Ext</b>	<b>Bus</b>	

### **:TRIGger[:SOURce]:EXTernal:DELay**

**Supported** E4438C with Option 401

```
[ :SOURce ] :RADio:CDMA2000:ARB:TRIGger [ :SOURce ] :EXTernal:DELay <val>
[ :SOURce ] :RADio:CDMA2000:ARB:TRIGger [ :SOURce ] :EXTernal:DELay?
```

This command sets the amount of time to delay the ESG's response to an external trigger.

The delay is a path (time) delay between when the ESG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of two seconds, causes the ESG to wait two seconds after receipt of the trigger before the ESG plays the waveform.

The delay does not occur until you turn it on (see “:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 268). You can set the delay value either before or after turning it on.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 266.

The unit of measurement for the variable <val> is in seconds (nsec–sec).

**\*RST** +1.00000000E–003

**Range** 1E–8 to 4E1

**Key Entry** Ext Delay Time

### :TRIGger[:SOURCE]:EXTErnal:DELAy:STATe

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger [ :SOURCE ] :EXTErnal:DELAy:STATe ON | OFF | 1 | 0
```

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger [ :SOURCE ] :EXTErnal:DELAy:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURCE]:EXTErnal:DELAy” on page 267, and for more information on configuring an external source, see “:TRIGger[:SOURCE]” on page 266.

**\*RST** 0

**Key Entry** Ext Delay Off On

### :TRIGger[:SOURCE]:EXTErnal:SLOPe

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger [ :SOURCE ] :EXTErnal:SLOPe POSitive | NEGative
```

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger [ :SOURCE ] :EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 266.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 266.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**:TRIGger[:SOURce]:EXTeRnal[:SOURce]**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTeRnal[:SOURce] EPT1 |
EPT2 | EPTRIGGER1 | EPTRIGGER2
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTeRnal[:SOURce] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 266. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

**[:STAtE]**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB[:STAtE] ON|OFF|1|0
[:SOURce]:RADio:CDMA2000:ARB[:STAtE] ?
```

This command enables or disables the CDMA2000 modulation format.

ON (1)	This choice enables the CDMA2000 modulation capability and sets up the internal hardware to generate the currently selected CDMA2000 signal selection.  This choice also activates the I/Q state and sets the I/Q source to internal.
OFF (0)	This choice disables the CDMA2000 baseband signal capability.
<b>*RST</b>	0
<b>Key Entry</b>	<b>CDMA2000 Off On</b>

---

## Dmodulation Subsystem—Option 001/601 or 002/602 ([:SOURce]:RADio:DMODulation:ARB)

### :IQ:EXTernal:FILTer

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTernal:FILTer 40e6|THROUGH
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTernal:FILTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTernal:FILTer:AUTO” on [page 270](#) to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THROUGH This choice bypasses filtering.

\*RST THR

**Key Entry** 40.000 MHz Through

### :IQ:EXTernal:FILTer:AUTO

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTernal:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTernal:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTernal:FILTer” on [page 270](#) for selecting a filter or through path.

\*RST 1

**Key Entry** I/Q Output Filter Manual Auto

**:FILTer**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:FILTer RNYQuist | NYQuist | GAUSSian |
RECTangle | IS95 | IS95_EQ | IS95_MOD | IS95_MOD_EQ | WCDMa | AC4Fm | IS2000SR3DS |
UGGaussian | "<user FIR>"
[ :SOURce ] :RADio:DMODulation:ARB:FILTer?
```

This command specifies the pre-modulation filter type.

IS95	This choice selects a filter that meets the criteria of the IS-95 standard.
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
WCDMa	This choice selects a 0.22 Nyquist filter optimized for ACP.
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
IS2000SR3DS	This choice selects an IS-2000 standard, spread rate 3 direct spread filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any FIR filter file that you have stored in memory. The variable needs no directory path indicating the location of the file, such as FIR: or /USER/FIR. The command assumes the FIR directory. Refer to <a href="#">“File Name Variables” on page 13</a> for more information on file names.

**\*RST** RNYQ

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>WCDMA</b>	<b>IS-2000 SR3 DS</b>	<b>APCO 25 C4FM</b>	
	<b>UN3/4 GSM Gaussian</b>	<b>User FIR</b>				

**:FILTer:ALPHa**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:FILTer:ALPHa <val>
```

```
[ :SOURCE ] :RADio:DMODulation:ARB:FILTer:ALPHa?
```

This command changes the Nyquist or root Nyquist filter alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +3.50000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 271.

**:FILTer:BBT**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:FILTer:BBT <val>
```

```
[ :SOURCE ] :RADio:DMODulation:ARB:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 271.



**:FILTer:CHANnel**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:FILTer:CHANnel EVM|ACP
[ :SOURce ] :RADio:DMODulation:ARB:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 271.

**:HEADer:CLEar**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:HEADer:CLEar
```

This command clears the header information from the file header used by this modulation format.

**Key Entry** **Clear Header**

**Remarks** The **Digital Modulation Off On** softkey must be set to On for this command to function.

**:HEADer:SAVE**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:HEADer:SAVE
```

This command saves the header information to the file header used by this modulation format.

**Key Entry** **Save Setup To Header**

**Remarks** The **Digital Modulation Off On** softkey must be set to On for this command to function.

**:IQ:MODulation:ATTen**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:ATTen <val>
```

```
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:ATTen?
```

This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000

**Range** 0–40

**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:ATTen:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0
```

```
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

**ON (1)** This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

**OFF (0)** This choice holds the attenuator at its current setting or at a selected value. Refer to “[:IQ:MODulation:ATTen](#)” on page 207 for setting the attenuation value.

**\*RST** 1

**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:FILTer**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:FILTer 2.1e6 | 40e6 | THROugh
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “[:IQ:MODulation:FILTer:AUTO](#)” on page 275 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THROugh This choice bypasses filtering.

**\*RST** THR

**Key Entry** 2.100 MHz 40.000 MHz Through

**:IQ:MODulation:FILTer:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:FILTer:AUTO ON | OFF | 1 | 0
[ :SOURce ] :RADio:DMODulation:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “[:IQ:MODulation:FILTer](#)” on page 275 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Mod Filter Manual Auto

**:MDEStination:AAMPlitude**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4
[ :SOURCE ] :RADio:DMODulation:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry**      **None**    **Marker 1**    **Marker 2**    **Marker 3**    **Marker 4**

**:MDEStination:ALCHold**

**Supported** E4438C with Option 403

---

**CAUTION** Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURCE ] :RADio:DMODulation:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4
[ :SOURCE ] :RADio:DMODulation:ARB:MDEStination:ALCHold?
```

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “:MARKer:[SET]” on page 302.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOlarity:MARKer1|2|3|4” on page 280.

---

**NOTE** Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform's routing settings.

---

For more information on the marker ALC hold function, see the *E4428C/38C ESG Signal Generators User's Guide*. For setting the marker points, see “:MARKer:[SET]” on page 302.

NONE This terminates the marker ALC hold function.

M1–M4 These are the marker choices. The ALC hold feature uses only one marker at a time.

\*RST NONE

### Example

```
:RAD:AWGB:ARB:MDES:ALCH M1
```

The preceding example routes marker 1 to the ALC Hold function.

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
<b>Remarks</b>	N/A				

## :MDESTination:PULSe

**Supported** E4438C with Option 001/601 or 002/602

---

**CAUTION** The pulse function incorporates ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURce ] :RADio:DMODulation:ARB:MDESTination:PULSe NONE | M1 | M2 | M3 | M4
[:SOURce]:RADio:DMODulation:ARB:MDESTination:PULSe?
```

This command enables or disables the marker pulse/RF blanking function for the selected marker.

This function automatically uses the ALC hold function, so there is no need to select both the ALC hold and pulse/RF blanking functions for the same marker.

---

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 280.

---

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 302 for setting the marker points.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

---

For more information on the marker RF blanking function, see the *E4428C/38C ESG Signal Generators User’s Guide*.

NONE This terminates the marker RF blanking/pulse function.

M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

### Example

```
:RAD:ARB:MDES:PULS M2
```

The preceding example routes marker 2 to Pulse/RF Blanking.

```
*RST NONE
```

Key Entry	None	Marker 1	Marker 2	Marker 3	Marker 4
-----------	------	----------	----------	----------	----------

**:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:MODulation:FSK[:DEVIation] <val>
```

```
[ :SOURCE ] :RADio:DMODulation:ARB:MODulation:FSK[:DEVIation] ?
```

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by ten, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 279.

Refer to “:SRATe” on page 286 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:MODulation[:TYPE] BPSK | QPSK | IS95QPSK |
GRAYQPSK | OQPSK | IS95OQPSK | P4DQPSK | PSK8 | PSK16 | D8PSK | EDGE | MSK | FSK2 | FSK4 |
FSK8 | FSK16 | C4FM | QAM4 | QAM16 | QAM32 | QAM64 | QAM128 | QAM256
[ :SOURCE ] :RADio:DMODulation:ARB:MODulation[:TYPE] ?
```

This command sets the modulation type for the digital modulation personality.

**\*RST** P4DQPSK

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>	<b>OQPSK</b>			
	<b>IS-95 OQPSK</b>	<b><math>\pi/4</math> DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>EDGE</b>	<b>MSK</b>	
	<b>2-Lvl FSK</b>	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	
	<b>32QAM</b>	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>				

**:MPOLarity:MARKer1 | 2 | 3 | 4****Supported** E4438C with Option 401

[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive

[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer1 | 2 | 3 | 4?

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

**\*RST** POS

**Key Entry**            **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

**:REFerence:EXTernal:FREQuency****Supported** E4438C with Option 001/601 or 002/602

[:SOURce]:RADio:DMODulation:ARB:REFerence:EXTernal:FREQuency &lt;val&gt;

[:SOURce]:RADio:DMODulation:ARB:REFerence:EXTernal:FREQuency?

This command conveys the expected reference frequency value of an externally applied reference the signal generator.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+007**Range** 2.5E5–1E8**Key Entry**            **Reference Freq**

**Remarks**            The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURce]” on page 281.



**:REFerence[:SOURce]**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:DMODulation:ARB:REFerence[:SOURCE] INTernal | EXTernal
[:SOURCE]:RADio:DMODulation:ARB:REFerence[:SOURCE] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

**Key Entry** **ARB Reference Ext Int**

**Remarks** If the EXTernal choice is selected, the external frequency value *must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFerence:EXTernal:FREQuency” on page 280 to enter the external reference frequency.

**:RETRigger**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:DMODulation:ARB:RETRigger ON | OFF | IMMEDIATE
[:SOURCE]:RADio:DMODulation:ARB:RETRigger ?
```

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

ON (1) This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.

OFF (0) This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.

IMMEDIATE This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** ON

**Key Entry** **On Off Immediate**

**:SCLock:RATE**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:SCLock:RATE <val>
```

```
[ :SOURce ] :RADio:DMODulation:ARB:SCLock:RATE?
```

This command sets the sample clock rate.

The variable <val> is expressed in units of Hertz (Hz – MHz)

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on [page 293](#) to activate the modulation format.

**:SETup**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:SETup GSM|NADC|PDC|PHS|DECT|AC4Fm|
```

```
ACQPsk|CDPD|PWT|EDGE|TETRA|MCARrier| "<file name>"
```

```
[ :SOURce ] :RADio:DMODulation:ARB:SETup?
```

This command selects the digital modulation format type or multicarrier, and turns multicarrier off or on (see the MCARrier choice description).

The *MCARrier* choice selects multicarrier and turns it on. Selecting any other setup such as GSM or CDPD turns multicarrier off. To select the multicarrier setup, see “[:SETup:MCARrier]” .

**\*RST** NADC

<b>Key Entry</b>	<b>GSM</b>	<b>NADC</b>	<b>PDC</b>	<b>PHS</b>	<b>DECT</b>	<b>APCO 25 w/C4FM</b>	<b>APCO w/CQPSK</b>
	<b>CDPD</b>	<b>PWT</b>	<b>EDGE</b>	<b>TETRA</b>	<b>Multicarrier Off On</b>	<b>Select File</b>	

**Remarks** Refer to “File Name Variables” on [page 13](#) for information on the file name syntax.

**:SETup:MCARrier**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier GSM|NADC|PDC|PHS|DECT|
AC4Fm|ACQPsK|CDPD|PWT|EDGE|TETRA, <num carriers>, <freq spacing> |
"<file name>"
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier?
```

This command builds a table with the specified number of carriers and frequency spacing or retrieves the setup stored in the specified user file.

The carrier type, number of carriers, and frequency spacing value are returned when a query is initiated. The output format is as follows:

```
<carrier type>, <num carriers>, <freq spacing>
```

If a specific file is loaded and then queried, only the file name is returned.

The variable <freq spacing> is expressed in units of Hertz (kHz–MHz).

```
*RST          Carrier: NADC    <num carriers>: 2
              <freq spacing>: +1.0000000000000E+06
```

```
Range          <num carriers>: 2–100
              <freq spacing>: 2 ÷ (<num carriers> – 1) × 80 MHz
```

```
Key Entry      GSM    NADC    PDC    PHS    DECT    APCO 25 w/C4FM    APCO w/CQPSK
                  CDPD    PWT    EDGE    TETRA    # of Carriers    Freq Spacing
Custom Digital Mod State
```

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

To store a multicarrier setup refer to [“:SETup:MCARrier:STORe” on page 284](#).

**:SETup:MCARrier:PHASe**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier:PHASe FIXed|RANDOM
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier:PHASe?
```

This command toggles the phase settings for multicarrier digital modulation.

**FIXed** This choice sets the phase of all carriers to 0.

**RANDom** This choice sets random phase values for all of the carriers.

**\*RST**                      **FIX**  
**Key Entry**                **Carrier Phases Fixed Random**

### :SETup:MCARrier:STORE

**Supported**                E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:DMODulation:ARB:SETup:MCARrier:STORE "<file name>"
```

This command stores the current multicarrier setup information.

The stored file contains information that includes the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

**Key Entry**                **Load/Store**

**Remarks**                The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

### :SETup:MCARrier:TABLE

**Supported**                E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:DMODulation:ARB:SETup:MCARrier:TABLE INIT|APPend|
<carrier_num>, GSM|NADC|PDC|PHS|DECT|AC4Fm|ACQpsk|CDPD|PWT|EDGE|TETRA|
"<file name>",<freq_offset>,<power>
[:SOURCE]:RADio:DMODulation:ARB:SETup:MCARrier:TABLE? <carrier_num>
```

This command modifies the parameters of one of the available multicarrier digital modulation formats.

The variable <freq\_offset> is expressed in units of Hertz (kHz–MHz).

The variable <power> is expressed in units of decibels (dB).

**INIT**                      This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

**APPend**                    This choice adds rows to an existing table.

**<carrier\_num>**            This variable specifies the number of the carriers in the multicarrier table that will be modified.

The value of the variable <carrier\_num> must be specified prior to selecting the digital modulation format.

**Dmodulation Subsystem—Option 001/601 or 002/602 ([:SOURCE]:RADio:DMODulation:ARB)**

Carrier type, frequency offset, and power level are returned when a query is initiated. The output format is as follows:

<carrier type>, <freq\_offset>, <power>

**\*RST**            carrier type: NADC    <freq\_offset>: -5.00000000E+004  
                          <power>: +0.00000000E+000

**Range**            <freq\_offset>: -1E5 to 1E6    <power>: -40 to 0

**Key Entry**        **Initialize Table    Insert Row    GSM    NADC    PDC    PHS    DECT**  
                          **APCO 25 w/C4FM    APCO w/CQPSK    CDPD    PWT    EDGE    TETRA**  
                          **Custom Digital Mod State**

**Remarks**        Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

To store a multicarrier setup refer to “[:SETup:MCARrier:STORE](#)” on page 284.

**:SETup:MCARrier:TABLE:NCARriers**

**Supported**        E4438C with Option 001/601 or 002/602

[:SOURCE]:RADio:DMODulation:ARB:SETup:MCARrier:TABLE:NCARriers?

This query returns the number of carriers in the current multicarrier setup.

**\*RST**            +2

**Range**            1–100

**Key Entry**        **# of Carriers**

**:SETup:STORE**

**Supported**        E4438C with Option 001/601 or 002/602

[:SOURCE]:RADio:DMODulation:ARB:SETup:STORE "<file name>"

This command stores the current custom digital modulation state.

The saved file contains information that includes the modulation type, filter and symbol rate for the custom modulation setup.

**Key Entry**        **Store Custom Dig Mod State**

**Remarks**        Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:SRATe**

**Supported** E4438C with Option 001/601 or 002/602

[:SOURce]:RADio:DMODulation:ARB:SRATe <val>

[:SOURce]:RADio:DMODulation:ARB:SRATe?

This command sets the transmission symbol rate.

The variable <val> is expressed in units of symbols per second (sps–Mps) and the maximum range value is dependent upon the modulation type, and filter.

**\*RST** +2.43000000E+004

Modulation Type	Bits per Symbol	Internal Data
BPSK	1	1sps–50 Mps
FSK2		
MSK		
C4FM	2	1sps–50 Mps
FSK4		
OQPSK		
OQPSK195		
P4QPPSK		
QAM4		
QPSK		
QPSKIS95		
QPSKISAT		
D8PSK		
EDGE		
FSK8		
PSK8		
FSK16	4	1sps–25 Mps
PSK16		
QAM16		
QAM32	5	1sps–20 Mps
QAM64	6	1sps–16.67 Mps
QAM256	8	1sps–12.50 Mps

**Key Entry** **Symbol Rate**

**Remarks** When user-defined filters are selected using the command in section “:FILTer” on page 271, the upper bit rate will be restricted in line with the following symbol rate restriction:

- FIR filter length > 32 symbols: upper limit is 12.5 Mps

- FIR filter length > 16 symbols: upper limit is 25 Msps

When internal FIR filters are used, the limits of the above table always apply. For higher symbol rates, the FIR filter length will be truncated as follows:

- Above 12.5 Msps, the FIR length will be truncated to 32 symbols
- Above 25 Msps, the FIR length will be truncated to 16 symbols

This will impact the relative timing of the modulated data, as well as the actual filter response.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 279.

## :TRIGger:TYPE

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE CONTInuous|SINGle|GATE
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE?
```

This command sets the trigger mode (type) that controls the waveform’s playback.

Triggers control the playback by telling the ESG when to play the modulating signal (waveform). Depending on the trigger settings for the ESG, the waveform playback can occur once, continuously, or the ESG may start and stop playing the waveform repeatedly (GATE mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the ESG to trigger on either state of the trigger signal. It is common to have multiple triggers, also referred to as trigger occurrences or events, occur when the signal generator requires only a single trigger. In this situation, the ESG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the waveform. This is because the ESG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the waveform’s final I and Q levels determine whether you will see the carrier signal or not (zero = no carrier, other values = carrier visible). At the end of most files, the final I and Q points are set to a value other than zero.

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the waveform’s transmission.
- Setting the waveform’s response to triggers:
  - CONTInuous, see “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 288
  - SINGle, see “:RETRigger” on page 281
  - GATE, selecting the mode also sets the response

**Dmodulation Subsystem—Option 001/601 or 002/602 (:SOURce]:RADio:DMODulation:ARB)**

- Selecting the trigger source (see “:TRIGger[:SOURce]” on page 290), which determines how the ESG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.
- Setting the trigger polarity when using an external source:
  - CONTInuous and SINGle see “:TRIGger[:SOURce]:EXTErnal:SLOPe” on page 292
  - GATE, see “:TRIGger:TYPE:GATE:ACTIve” on page 289

For more information on triggering, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the trigger type command choices:

CONTInuous	Upon triggering, the waveform repeats continuously.
SINGle	Upon triggering, the waveform segment or sequence plays once.
GATE	An external trigger signal repeatedly starts and stops the waveform’s playback (transmission). The time duration for playback depends on the duty period of the trigger signal and the gate polarity selection (see “:TRIGger:TYPE:GATE:ACTIve” on page 289). The waveform plays during the inactive state and stops during the active polarity selection state. The active state can be set high or low. The gate mode works only with an external trigger source.

---

**NOTE** The ARB gating behavior described above is opposite to the gating behavior for real-time custom mode.

---

<b>*RST</b>	CONT		
<b>Key Entry</b>	<b>Continuous</b>	<b>Single</b>	<b>Gated</b>

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE |
TRIGger | RESet
[ :SOURce ] :RADio:DMODulation:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 287.



The following list describes the waveform's response to each of the command choices:

<b>FREE</b>	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
<b>TRIGger</b>	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
<b>RESet</b>	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
<b>*RST</b>	FREE
<b>Key Entry</b>	<b>Free Run      Trigger &amp; Run      Reset &amp; Run</b>

### **:TRIGger:TYPE:GATE:ACTive**

**Supported**      E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[ :SOURCE ] :RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 287.

The following list describes the ESG's gating behavior for the polarity selections:

<b>LOW</b>	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
<b>HIGH</b>	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
<b>*RST</b>	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

**:TRIGger[:SOURCE]**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:DMODulation:ARB:TRIGger [ :SOURCE ] KEY | EXT | BUS

[ :SOURCE ] :RADio:DMODulation:ARB:TRIGger [ :SOURCE ] ?

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 287. The following list describes the command choices:

**KEY** This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

**EXT** An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 292.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 289
  - continuous and single modes, see “:TRIGger[:SOURCE]:EXTernal:SLOPe” on page 292
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURCE]:EXTernal:DELay” on page 291
  - turning the delay on, see “:TRIGger[:SOURCE]:EXTernal:DELay:STATe” on page 291

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** EXT

**Key Entry**      **Trigger Key**      **Ext**      **Bus**

**:TRIGger[:SOURce]:EXTErnal:DELay**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:TRIGger [ :SOURce ] :EXTErnal:DELay <val>
[ :SOURce ] :RADio:DMODulation:ARB:TRIGger [ :SOURce ] :EXTErnal:DELay?
```

This command sets the amount of time to delay the ESG's response to an external trigger.

The delay is a path (time) delay between when the ESG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of two seconds, causes the ESG to wait two seconds after receipt of the trigger before the ESG plays the waveform.

The delay does not occur until you turn it on (see “:TRIGger[:SOURce]:EXTErnal:DELay:STATE” on page 291). You can set the delay value either before or after turning it on.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 290.

The unit of measurement for the variable <val> is in seconds (nsec–sec).

**\*RST** +1.00000000E-003

**Range** 1E-8 to 4E1

**Key Entry** Ext Delay Time

**:TRIGger[:SOURce]:EXTErnal:DELay:STATE**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:DMODulation:ARB:TRIGger [ :SOURce ] :EXTErnal:DELay:
STATE ON|OFF|1|0
[ :SOURce ] :RADio:DMODulation:ARB:TRIGger [ :SOURce ] :EXTErnal:DELay:STATE?
```

This command enables or disables the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURce]:EXTErnal:DELay” on page 291, and for more information on configuring an external source, see “:TRIGger[:SOURce]” on page 290.

**\*RST** 0

**Key Entry** Ext Delay Off On

**:TRIGger[:SOURce]:EXTErnal:SLOPe**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTErnal:
SLOPe POSitive|NEGative
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “**:TRIGger:TYPE:GATE:ACTive**” on page 289.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “**:TRIGger[:SOURce]**” on page 290.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**:TRIGger[:SOURce]:EXTErnal[:SOURce]**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:
EXTErnal[:SOURce] EPT1|EPT2|EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTErnal[:SOURce]?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “**:TRIGger[:SOURce]**” on page 290. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

- EPT1 This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
- EPT2 This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
- EPTRIGGER1 This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.

**Dmodulation Subsystem—Option 001/601 or 002/602 ([:SOURCE]:RADio:DMODulation:ARB)**

**EPTRIGGER2** This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

**\*RST** EPT1

**Key Entry** **Patt Trig In 1** **Patt Trig In 2**

**[ :STATE ]**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:DMODulation:ARB [ :STATE ] ON | OFF | 1 | 0  
[ :SOURCE ] :RADio:DMODulation:ARB [ :STATE ] ?

This command enables or disables the digital modulation capability.

**ON (1)** This choice sets up the internal hardware to generate the currently selected digital modulation format signal selection.

**OFF (0)** This choice disables the digital modulation capability.

**\*RST** 0

**Key Entry** **Digital Modulation Off On**

**Remarks** When ON is selected, the I/Q state is activated and the I/Q source is set to internal.

---

## Dual ARB Subsystem—Option 001/601 or 002/602 ([:SOURce]:RADio:ARB)

### :CLIPping

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:ARB:CLIPping "<file name>", IJQ| IORQ, <val> [, <val>]
```

This command sets the clipping level of the selected waveform segment to a percentage of its highest peak.

The variable <val> is expressed in units of percent.

**IJQ** This choice clips the composite I/Q waveform.

**IORQ** This choice clips I and Q separately. When this choice is enabled, percentage values for both I and Q must be specified.

**\*RST** IJQ <val>: +100

**Range** <val>: 10–100 (0.1% resolution)

**Key Entry** **Clipping Type** |I+jQ| |I|,|Q|

**Remarks** A value of 100 percent equates to no clipping.

Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

### :GENerate:SINE

**Supported** E4438C with Option 001/ 601 or 002/602

```
[:SOURce]:RADio:ARB:GENerate:SINE ["<file_name>"] [, <osr>] , [<scale>] ,  
[I|Q|IQ]
```

This command creates a sine wave waveform file and saves it in the signal generator’s volatile waveform memory (WFM1).

"<file\_name>" This variable names the file used to save the generated sine wave data.

<osr> This variable sets the oversample ratio, which must be an even number and  $\geq 4$ . The <osr> variable is expressed in samples. If the oversample ratio is  $< 60$  (the minimum number of samples or I/Q points required for a waveform), multiple waveform periods are generated to create a waveform file with  $\geq 60$  samples. The number of periods created is  $60 \div \text{<osr>}$  (quotient will round up to an integer value). A waveform with an oversample ratio  $\geq 60$  has one period.

<scale>	This variable sets the scale factor for the waveform. The scale factor is a real number from zero to one.
I Q IQ	Selects I, Q, or I and Q paths for the waveform data. Sinewave data is generated and applied to the I path if the I path is selected; Q data are set to zeros. Sine data is generated and applied to the Q path if the Q path is selected; I data are set to zeros. If the I and Q paths are selected, sinewave data are applied to the I and Q paths.

**Example**

```
:RAD:ARB:GEN:SINE "Sine_Wave",60,.5,IQ
```

The preceding example generates an I/Q sine wave and saves the data to a file named Sine\_Wave. The oversampling ratio is 60, the scaling is set for 50%, and the data is applied to both the I and Q paths.

The signal generator's baseband option and available baseband memory determine the maximum number of samples for the waveform.

<b>Range</b>	<i>OSR Option 001/601:</i> 4E0 – 8E6
	<i>OSR Option 002/602:</i> 4E0 – 32E6
	<i>Scale:</i> 0–1

**:HEADer:CLEar**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:HEADer:CLEar
```

This command clears the header information from the file header used by this modulation format.

**Key Entry** **Clear Header**

**Remarks** The **ARB Off On** softkey must be set to On for this command to function.

**:HEADer:RMS**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:HEADer:RMS "<file_name>",<val>|UNSPecified  
[ :SOURce ] :RADio:ARB:HEADer:RMS? "<file_name>"
```

This command sets the file header RMS value for the selected waveform file. The ESG uses the RMS value with the dual ARB's real-time noise function.

The signal generator reads the RMS value from the file header when real-time noise is enabled and the dual ARB turned on.

When the waveform file is saved from volatile waveform memory (WFM1) to non-volatile waveform memory (NVWFM), the RMS value, auto-calculated or user-defined, is also saved.

"<file\_name>" This variable names the waveform file to which the RMS value will be applied. The file name variable can designate a file in the WFM1, NVWFM, or SEQ directories. For information on the file name syntax, refer to [“File Name Variables” on page 13](#).

<val> This variable is the user-measured RMS value for the specified waveform. The following figure shows the RMS calculation.

$$\sqrt{\sum_{n=1}^N (i_n^2 + q_n^2) \times \frac{1}{N}}$$

N = # of Samples

UNSpecified Using this variable in the command clears the RMS value and sets it to unspecified. An unspecified RMS value causes the signal generator to calculate the value when real-time noise is applied to the waveform during play back by the dual ARB player. The RMS calculation includes rise times and does not include consecutive zero level samples. DC offsets and noise are also included in the RMS measurement. Because the signal generator calculation uses so many parameters, you may achieve better results calculating your own RMS value.

### Examples

```
[:SOURCE]:RADio:ARB:HEADER:RMS "WFM1:Sine_Wave", .835
```

The first example shows a user-measured RMS value for the Sine\_Wave waveform file in the waveform's file header.

```
:RAD:ARB:HEADER:RMS "WFM1:Sine_Wave", UNSP
```

In the second example, the signal generator calculates the RMS value.

The RMS value is expressed in volts.

Range 0 – 1.414213562373095



## **:HEADer:SAVE**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:ARB:HEADer:SAVE

This command saves the header information to the file header used by this modulation format.

**Key Entry** **Save Setup To Header**

**Remarks** The **ARB Off On** softkey must be set to On for this command to function.

## **:HCRest[:STATe]**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:ARB:HCRest [ :STATe ] ON | OFF | 1 | 0

[ :SOURCE ] :RADio:ARB:HCRest [ :STATe ] ?

This command enables or disables the operating state of the high crest mode.

ON(1) This choice turns high crest mode on for arbitrary I/Q waveforms with high crest factors (such as downloaded Signal Studio for 802.11 signals). High crest mode reduces the ALC vernier level by 7.5 dB, allowing the signal generator to process these signals with less distortion and improved EVM. For crest factors higher than 4 dB, I/Q drive levels should be reduced by 1 dB for each dB above that level. In high crest mode, the maximum output level is reduced and power level accuracy is degraded.

OFF(0) This choice disables the high crest mode.

**\*RST** 0

**Key Entry** **High Crest Mode Off On**

**Remarks** The high crest mode is automatically turned on by some Signal Studio applications. You can manually override this automatic selection at any time.

**:IQ:EXTeRnal:FiLTeR**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:IQ:EXTeRnal:FiLTeR 40e6 | THROugh
[ :SOURce ] :RADio:ARB:IQ:EXTeRnal:FiLTeR?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. The filter has not effect on the modulated RF signal. Selecting a filter using this command will automatically set “:IQ:EXTeRnal:FiLTeR:AUTO” on page 298 to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THROugh This choice bypasses filtering.

**\*RST** THR

**Key Entry** 40.000 MHz Through

**:IQ:EXTeRnal:FiLTeR:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:IQ:EXTeRnal:FiLTeR:AUTO ON | OFF | 1 | 0
[ :SOURce ] :RADio:ARB:IQ:EXTeRnal:FiLTeR:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTeRnal:FiLTeR” on page 298 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Output Filter Manual Auto

**:IQ:MODulation:ATTeN**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:IQ:MODulation:ATTeN <val>
[ :SOURce ] :RADio:ARB:IQ:MODulation:ATTeN?
```

This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000  
**Range** 0–40  
**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:ATTen:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:IQ:MODulation:ATTen:AUTO ON | OFF | 1 | 0
[ :SOURce ] :RADio:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

**ON (1)** This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

**OFF (0)** This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 298 for setting the attenuation value.

**\*RST** 1  
**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:FILTer**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:IQ:MODulation:FILTer 2.1e6 | 40e6 | THROugh
[ :SOURce ] :RADio:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. This filter has no effect on the I/Q signal out the rear panel. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 300 to OFF(0) mode.

**2.1E6** This choice applies a 2.1 MHz baseband filter to the I/Q signals.

**40E6** This choice applies a 40 MHz baseband filter to the I/Q signals.

**THROugh** This choice bypasses filtering.

**\*RST** THR  
**Key Entry** **2.100 MHz    40.000 MHz    Through**

**:IQ:MODulation:FILTer:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[ :SOURce ] :RADio:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “[:IQ:MODulation:FILTer](#)” on page 299 for selecting a filter or through path.

\*RST 1

**Key Entry** I/Q Mod Filter Manual Auto

**:MARKer:CLEar**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:MARKer:CLEar "<file_name>",<marker>,<first_point>,<last_point>
```

This command clears a single marker point or a range of marker points on a waveform segment for the selected marker (1–4). The dual ARB player and all of the ARB modulation formats use this command.

"<file\_name>" This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN\_WAVEFORM file when clearing marker points for an active ARB format. The ESG automatically creates a file, using current settings, and names it AUTOGEN\_WAVEFORM whenever an ARB format is turned on (except dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file is still in waveform memory (WFM1) and available for use by the dual ARB player. For information on the file name syntax, see “[File Name Variables](#)” on page 13.

<marker> This variable selects the marker number; an integer value from one to four.

<first\_point> This variable defines the first point in a range of points. The number must be greater than or equal to one, and less than or equal to the total number of waveform points.

If you enter a value for either the first marker point or the last marker point that would make the first marker point occur after the last, the last marker point automatically adjusts to match the first marker point.

<last\_point> This variable defines the last point in a range of points. The number must be greater than or equal to the first point, and less than or equal to the total number of waveform points.

To clear a single marker point, use the same marker point for the first and last point variables. For more information on markers and ARB files, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

### Example

```
:RAD:ARB:MARK:CLE "Test_Data",1,1,300
```

The preceding example clears marker 1 from the first point through the 300th point in the Test\_Data file.

**Range**                    <marker>: 1–4  
                              <first\_Point>: 1–number of waveform points  
                              <last\_point>: <first\_Point>–number of waveform points

**Key Entry**                **Set Marker Off Range Of Points    Marker 1 2 3 4    First Mkr Point    Last Mkr Point**

## :MARKer:CLEar:ALL

**Supported**                E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:ARB:MARKer:CLEar:ALL "<file_name>", <marker>
```

This command clears all marker points on a waveform segment for the selected marker (1–4). The dual ARB player and all of the ARB formats use this command. With all marker points cleared, the event output signal level is set low.

"<file\_name>"              This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN\_WAVEFORM file when clearing all marker points for the currently active ARB format. The ESG automatically creates a file, using current settings, and names it AUTOGEN\_WAVEFORM whenever an ARB format is turned on (except dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file is still in waveform memory (WFM1) and available for use by the dual ARB player. For information on the file name syntax, see [“File Name Variables” on page 13](#).

<marker>                    This variable selects the marker number; an integer value from one to four.

### Example

```
:RAD:ARB:MARK:CLE:ALL "Test_Data",1
```

The preceding example clears marker 1 from the all waveform points in the Test\_Data file.

**Range**                    1–4  
**Key Entry**                **Marker 1 2 3 4    Set Marker Off All Points**

**:MARKer:ROTate**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:ARB:MARKer:ROTate "<file_name>", <rotate_count>
```

This command shifts the marker points for all markers in a waveform segment earlier or later by the value of the <rotate\_count> variable. The dual ARB player and all of the ARB formats use this command.

You can use a positive or negative value. When a marker point is close to the end of the waveform and the <rotate\_count> value is greater than the number of remaining marker points, but less than the total number of marker points, the marker points that would move beyond the end of the waveform wrap to the beginning of the waveform. For example, if a marker point resides at sample point 195 out of 200, and the <rotate\_count> value is twenty-five, the marker point wraps to the beginning of the waveform and continues out to the twentieth waveform point.

To set the marker points in a waveform, refer to “:MARKer:[SET]” on page 302.

"<file\_name>" This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN\_WAVEFORM file when rotating marker points for the currently active ARB format and then save the file using a different file name. The ESG automatically creates a file, using current settings, and names it AUTOGEN\_WAVEFORM whenever an ARB format is turned on (except dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file is still in waveform memory (WFM1) and available for use by the dual ARB player. For information on the file name syntax, see “File Name Variables” on page 13.

**Example**

```
:RAD:ARB:MARK:ROT "Test_Data", 100
```

The preceding example shifts all markers set in the Test\_Data file 100 points later. If the first set point in the file is at 50, then after sending this command, the first set point will be 150 (assuming the Test\_Data file has at least 150 points) and no later set points wrapped around to the beginning of the file.

**Range**  $-(n - 1)$  to  $(n - 1)$   
 $n$  = number of points in the waveform

**:MARKer:[SET]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:ARB:MARKer: [SET] "<file_name>", <marker>, <first_point>, <last_point>, <skip_count>
```

This command sets a single marker point or a range of marker points on a waveform segment for the selected marker (1–4). The dual ARB player and all of the ARB formats use this command.

The ESG provides four independent markers. Each marker routes an output signal to the rear-panel event connector number (BNC—EVENT 1 and EVENT 2 or AUXILIARY I/O—EVENT 3 and EVENT 4) that corresponds to the marker number. A marker consists of marker points placed at defined sample points in a waveform segment. This means that a marker point cannot be less than one or greater than the last sample point in the waveform. Marker points are cumulative, so multiple command executions with different range values, without first clearing the existing points, places additional marker points on the waveform. Because of this cumulative behavior, it is a good practice to clear existing marker points prior to setting new points. This will eliminate unexpected marker pulses. Refer to “:MARKer:CLEar” on page 300 and “:MARKer:CLEar:ALL” on page 301 for information on clearing marker points.

For waveforms generated on the signal generator (baseband generator), the ESG automatically places a marker point at the first waveform sample for markers one and two.

---

**NOTE** You can set markers for either positive or negative polarity. The following discussions for this command assume positive marker polarity. When using negative marker polarity, the marker pulses occur during the periods of no marker points.

---

There are three ways to place marker points using this command:

- consecutive marker points over a range that collectively create a single marker pulse that spans the range
- equally spaced marker points over a range, so that a marker pulse occurs at each sample point that coincides with a marker point (Using this method, you can configure a clock signal by setting the <skip\_count> variable to one.)
- a single marker point placed at a specific sample point in the waveform, which outputs a single pulse relative to the marker point location (To configure a single marker point, set the first and last points to the same number.)

For more information on markers, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

The following list describes the command variables:

"<file\_name>" This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN\_WAVEFORM file when setting marker points for the currently active ARB format and then save the file using a different file name. The ESG automatically creates a file, using current settings, and names it AUTOGEN\_WAVEFORM whenever an ARB format is turned on (except dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file is still in waveform memory (WFM1) and available for use by the

dual ARB player. For information on the file name syntax, see “File Name Variables” on page 13.

<marker>	This variable selects the marker number; an integer value from one to four.
<first_point>	This variable defines the first point in the range over which the marker is placed. This number must be greater than or equal to one, and less than or equal to the total number of waveform points.  If you enter a value for either the first marker point or the last marker point that would make the first marker point occur after the last, the last marker point is automatically adjusted to match the first marker point.
<last_point>	This variable defines the last point in the range over which the marker will be placed. This value must be greater than or equal to the first point, and less than or equal to the total number of waveform points.
<skip_count>	This variable defines the marker point pattern across the range. A zero value means the marker points occur consecutively across the range. A value greater than zero creates a repeating marker point pattern across the range, where the gap between the marker points is equal to the <skip_count> value. The gaps begin after the first marker point. Each marker point in the pattern, which is only one point wide, produces a marker pulse.

### Example

```
:RAD:ARB:MARK "Test_Data",1,40,100,2
```

The preceding example sets marker 1 on the first point, 40, the last point, 100, and every third point (skip 2) between 40 and 100 (assuming the Test\_Data file has at least 100 points).

### Range

<marker>: 1–4

<first\_Point>: 1–number of waveform points

<last\_point>: <first\_Point>–number of waveform points

<skip\_count>: 0–number of points in the range

### Key Entry

Set Marker on Range Of Points	Marker 1	2	3	4	First Mkr Point	Last Mkr Point
# Skipped Points						Apply to Waveform



## :MDEStination:AAMPlitude

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4  
[ :SOURce ] :RADio:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The `NONE` parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry**      **None**    **Marker 1**    **Marker 2**    **Marker 3**    **Marker 4**

## :MDEStination:ALCHold

**Supported** E4438C with Option 001/601 or 002/602

---

**CAUTION** Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURce ] :RADio:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4  
[ :SOURce ] :RADio:ARB:MDEStination:ALCHold?
```

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “[:MARKer:SET]” on page 302.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “[:MPOlarity:MARKer1|2|3|4]” on page 308.

---

**NOTE** Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

---

For more information on the marker ALC hold function, see the *E4428C/38C ESG Signal Generators User’s Guide*. For setting the marker points, see “:MARKer:[SET]” on page 302.

NONE This terminates the marker ALC hold function.

M1–M4 These are the marker choices. The ALC hold feature uses only one marker at a time.

\*RST NONE

**Example**

:RAD:ARB:MDES:ALCH M1

The preceding example routes marker 1 to the ALC Hold function.

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
<b>Remarks</b>	N/A				

**:MDEStination:PULSe**

**Supported** E4438C with Option 001/601 or 002/602

---

**CAUTION** The pulse function incorporates ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

[:SOURce]:RADio:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4  
[:SOURce]:RADio:ARB:MDEStination:PULSe?

This command enables or disables the marker pulse/RF blanking function for the selected marker.

This function automatically uses the ALC hold function, so there is no need to select both the ALC hold and pulse/RF blanking functions for the same marker.

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 308.

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 302 for setting the marker points.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

For more information on the marker RF blanking function, see the *E4428C/38C ESG Signal Generators User’s Guide*.

NONE This terminates the marker RF blanking/pulse function.

M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

**Example**

```
:RAD:ARB:MDES:PULS M2
```

The preceding example routes marker 2 to Pulse/RF Blanking.

```
*RST NONE
```

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
------------------	-------------	-----------------	-----------------	-----------------	-----------------

**:MPOLarity:MARKer1 | 2 | 3 | 4**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[ :SOURce ] :RADio:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 ?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

**Example**

```
:RAD:ARB:MPOL:MARK3 NEG
```

The preceding example sets the polarity for marker 3 to negative.

**\*RST** POS

Key Entry	Marker 1 Polarity Neg Pos	Marker 2 Polarity Neg Pos	Marker 3 Polarity Neg Pos
	Marker 4 Polarity Neg Pos		

**:NOISe:BFACTOR**

**Supported** E4438C with Option 403

```
[ :SOURce ] :RADio:ARB:NOISe:BFACTOR 1 | 2
[ :SOURce ] :RADio:ARB:NOISe:BFACTOR ?
```

This command sets the flat noise bandwidth for the real-time noise applied to the waveform.

- |   |  |
|---|--|
| 1 | This sets the noise bandwidth to at least 0.8 times the sample rate.                                     |
| 2 | This sets the noise bandwidth to at least 1.6 times the sample rate, with a maximum bandwidth of 80 MHz. |

**NOTE**

For the bandwidth factor of 2, 50 MHz is the maximum sample rate. If 2 is the current selection, you cannot set the sample rate above 50 MHz, and if the sample rate is above 50 MHz, you cannot select 2. See “:SCLock:RATE” on page 313 for setting the sample rate.

The flat noise bandwidth increases with any oversampling by a factor equal to the oversampling amount.

### Example

```
:RAD:ARB:NOIS:BFAC 2
```

The preceding example sets the bandwidth factor to 2 and increases the flat noise bandwidth by at least 1.6 times the ARB sample clock rate.

**\*RST** +1

**Key Entry**            **Noise Bandwidth Factor**

### **:NOIS:CBWidth**

**Supported**            E4438C with Option 403

```
[ :SOURCE ] :RADio:ARB:NOIS:CBWidth <val><unit>  
[ :SOURCE ] :RADio:ARB:NOIS:CBWidth?
```

This command selects the carrier bandwidth over which the additive white gaussian noise (AWGN) is applied. The noise power will be integrated over the selected bandwidth for the purposes of calculating carrier to noise ratio (C/N). The carrier bandwidth is limited to the ARB sample rate, but cannot exceed 80 MHz. For more information, refer to “:NOIS[:STATe]” and “:NOIS:BFACtor”.

**\*RST** +1.00000000E+000

**Range** 1HZ–80 MHZ

**Key Entry**            **Carrier Bandwidth**

### **:NOIS:CN**

**Supported**            E4438C with Option 403

```
[ :SOURCE ] :RADio:ARB:NOIS:CN <val><unit>  
[ :SOURCE ] :RADio:ARB:NOIS:CN?
```

This command sets the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal. For more information, refer to “:NOIS:CBWidth” on page 309.

### Example

```
:RAD:ARB:NOIS:CN 50DB
```

The preceding example sets the carrier to noise ratio to 50 dB.

**\*RST** +0.00000000E+000

**Range** –100 to 100DB

**Key Entry**            **Carrier to Noise Ratio**

**:NOISe[:STATe]****Supported** E4438C with Option 403

```
[:SOURce]:RADio:ARB:NOISe[:STATe] ON|OFF|1|0
[:SOURce]:RADio:ARB:NOISe[:STATe]?
```

This command enables or disables adding real-time additive white gaussian noise (AWGN) to the carrier modulated by the waveform being played by the dual ARB waveform player. The noise bandwidth will be at least 0.8 times the sample rate, or 1.6 times the sample rate depending on the bandwidth factor. For information on the bandwidth factor, refer to “:NOISe:BFACtor”.

When the bandwidth factor is 2 and the sample rate is greater than 50 megasamples per/second, noise cannot be enabled. Maximum bandwidth cannot exceed 80 MHz. Any oversampling in the waveform increases the noise bandwidth by a factor equal to the oversampling.

**Example**

```
:RAD:ARB:NOIS ON
```

The preceding example applies real-time AWGN to the carrier.

```
*RST 0
```

**Key Entry** Real-time Noise Off On**:REFerence:EXTernal:FREQuency****Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:ARB:REFerence:EXTernal:FREQuency <value>
[:SOURce]:RADio:ARB:REFerence:EXTernal:FREQuency?
```

This command enters the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (Hz–MHz).

```
*RST +1.00000000E+007
```

```
Range 2.5E5–1E8
```

**Key Entry** Reference Freq

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURce]” on page 311.

**:REFerence[:SOURce]**

**Supported**            E4438C with Option 001/601 or 002/602  
[:SOURCE]:RADio:ARB:REFerence[:SOURCE] INTernal|EXTernal  
[:SOURCE]:RADio:ARB:REFerence[:SOURCE]?

This command selects either an internal or external reference for the waveform clock.

**\*RST**                    INT  
**Key Entry**            **ARB Reference Ext Int**

**Remarks**            If the EXTernal choice is selected, the external frequency value *must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.  
  
Refer to “:REFerence:EXTernal:FREQuency” on page 310 to enter the external reference frequency.

**:RETRigger**

**Supported**            E4438C with Option 001/601 or 002/602  
[:SOURCE]:RADio:ARB:RETRigger ON|OFF|1|0|IMMediate  
[:SOURCE]:RADio:ARB:RETRigger?

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

ON (1)                    This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.  
  
OFF (0)                    This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.  
  
IMMediate                This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST**                    ON  
**Key Entry**            **On   Off   Immediate**

**:RSCALing**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:ARB:RSCALing <val>
```

```
[:SOURCE]:RADio:ARB:RSCALing?
```

This command adjusts the scaling value that is applied to a waveform while it is playing. The variable <val> is expressed as a percentage. Runtime scaling does not alter the waveform data file. For more information about runtime scaling, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**Example**

```
:RAD:ARB:RSC 50
```

The preceding example applies a 50% scaling factor to the selected waveform.

**\*RST** +7.00000000E+001

**Range** 1–100

**Key Entry** **Waveform Runtime Scaling**

**Remarks** Runtime scaling does not alter the waveform data file.

**:SCALing**

**Supported** E84438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:ARB:SCALing "<file_name>", <val>
```

This command scales the designated "<file\_name>" waveform file while it is being played by the dual ARB player. The variable <val> is expressed as a percentage, 1–100%. For information on file name syntax, see [“File Name Variables” on page 13](#).

Scaling is additive and permanent. You cannot scale up. If you scale a waveform file by 60% and then scale it again to 80% you will scale down the 60% waveform file. For more information about waveform file scaling, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**Example**

```
:RAD:ARB:SCAL "Test_Data", 50
```

The preceding example applies a 50% scaling factor to the Test\_Data waveform file.

**Range** 1–100

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.



<b>Key Entry</b>	<b>Scaling</b>	<b>Scale Waveform Data</b>
<b>Remarks</b>	Refer to “File Name Variables” on page 13 for information on the file name syntax.	

**:SCLock:RATE**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:SCLock:RATE <val>
```

```
[ :SOURce ] :RADio:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the dual ARB format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**:SEQuence**

**Supported** All with Option 001/601 or 002/602

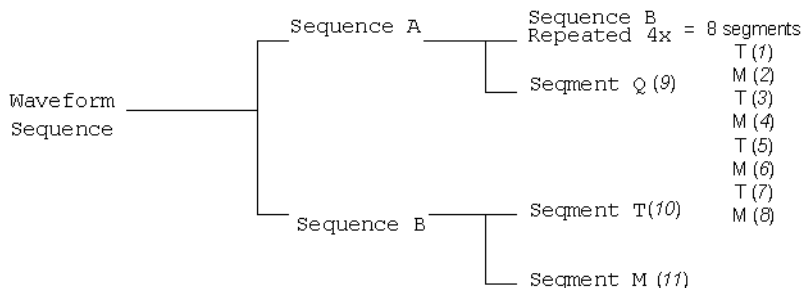
```
[ :SOURce ] :RADio:ARB:SEQuence
```

```
"<file_name>", "<waveform1>", <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | ALL, { "<waveform2>", <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | ALL }
```

```
[ :SOURce ] :RADio:ARB:SEQuence? "<file_name>"
```

This command creates a waveform sequence. A waveform sequence is made up of segments and other sequences. Any number of segments, up to a segment count limit of 32768, can be used to create a sequence. The count limit is determined by the number of segments in the waveform sequence. Repeated segments are included in the count limit.

For example, using the figure below, suppose a waveform is created using two sequences: Sequence\_A and Sequence\_B. Sequence\_A consists of Sequence\_B and Segment\_Q with Sequence\_B repeated four times. The total segment count for this waveform sequence would be eleven.



The query returns the contents and segment settings of the waveform sequence file

The segments and sequences play in the same order as placed into the waveform sequence by the command. Once you create the file, you cannot edit the segment settings or add further waveform segments unless you use the signal generator's front panel. Using the same waveform sequence name overwrites the existing file with that name. To use a segment's marker settings, you must enable the segment's markers within the segment or within the waveform sequence. A sequence is stored in the catalog of SEQ files USER/SEQ or SEQ: directory.

When you create a waveform sequence, the ESG also creates a file header for the sequence. This file header takes priority over segment or nested sequence file headers. Refer to the *E4428C/38C ESG Signal Generators User's Guide* for more information on file headers. To save the file header, see [“:HEADer:SAVE” on page 297](#).

- "<file\_name>" This variable names the waveform *sequence* file. For information on the file name syntax, see [“File Name Variables” on page 13](#).
- "<waveform1>" This variable specifies the name of an existing waveform *segment* or sequence file. A waveform segment or the waveform segments in a specified sequence must reside in volatile memory, WFM1, before it can be played by the dual ARB player. For information on the file name syntax, see [“File Name Variables” on page 13](#), and for more information on waveform segments, see the *E4428C/38C ESG Signal Generators User's Guide*.
- "<waveform2>" This variable specifies the name of a second existing waveform *segment* or sequence file. The same conditions required for waveform1 apply for this segment or sequence. Additional segments and other sequences can be inserted into the file.
- <reps> This variable sets the number of times a segment or sequence plays (repeats) before the next segment or sequence plays.

NONE	This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segment's or sequence's marker settings.
M1, M2, M3, M4	These choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.
ALL	This choice enables all four markers in the waveform segment or sequence.

**Example**

```
:RAD:ARB:SEQ "SEQ:Test_Data","WFM1:ramp_test_wfm",25,M1M4,
"WFM1:sine_test_wfm",100,ALL
```

---

**NOTE** A carriage return or line feed is never included in a SCPI command. The example above contains a carriage return so that the text will fit on the page.

---

The preceding example creates a waveform sequence file named Test\_Data. This file consists of the factory-supplied waveform segments, ramp\_test\_wfm and sine\_test\_wfm. The waveform is stored in the signal generator's SEQ: directory.

- The first segment, ramp\_test\_wfm, has 25 repetitions with markers 1 and 4 enabled.
- The second segment, sine\_test\_wfm, has 100 repetitions with all four markers enabled.

**Range** <reps>: 1–65535

**Key Entry**      **Build New Waveform Sequence**    **Name and Store**      **Insert Waveform**  
**Edit Repetitions**    **Toggle Marker 1**    **Toggle Marker 2**    **Toggle Marker 3**  
**Toggle Marker 4**

**:TRIGger:TYPE**

**Supported**      E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:TRIGger:TYPE CONTInuous | SINGle | GATE | SADVance
[ :SOURce ] :RADio:ARB:TRIGger:TYPE?
```

This command sets the trigger mode (type) that controls the waveform's playback.

Triggers control the playback by telling the ESG when to play the modulating signal (waveform). Depending on the trigger settings for the ESG, the waveform playback can occur once, continuously, or the ESG may start and stop playing the waveform repeatedly (GATE mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the ESG to trigger on either state of the trigger signal. It is common to have multiple triggers, also referred to as trigger occurrences or events, occur when the

signal generator requires only a single trigger. In this situation, the ESG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the waveform. This is because the ESG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the waveform's final I and Q levels determine whether you will see the carrier signal or not (zero = no carrier, other values = carrier visible). At the end of most files, the final I and Q points are set to a value other than zero.

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the waveform's transmission.
- Setting the waveform's response to triggers:
  - CONTInuous, see [“:TRIGger:TYPE:CONTInuous\[:TYPE\]” on page 317](#)
  - SINGle, see [“:RETRigger” on page 311](#)
  - GATE, selecting the mode also sets the response
- Selecting the trigger source (see [“:TRIGger\[:SOURce\]” on page 320](#)), which determines how the ESG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.
- Setting the trigger polarity when using an external source:
  - CONTInuous and SINGle see [“:TRIGger\[:SOURce\]:EXTernal:SLOPe” on page 322](#)
  - GATE, see [“:TRIGger:TYPE:GATE:ACTive” on page 317](#)

For more information on triggering, see the *E4428C/38C ESG Signal Generators User's Guide*.

The following list describes the trigger type command choices:

CONTInuous	Upon triggering, the waveform repeats continuously.
SINGle	Upon triggering, the waveform segment or sequence plays once.
GATE	An external trigger signal repeatedly starts and stops the waveform's playback (transmission). The time duration for playback depends on the duty period of the trigger signal and the gate polarity selection (see <a href="#">“:TRIGger:TYPE:GATE:ACTive” on page 317</a> ). The waveform plays during the inactive state and stops during the active polarity selection state. The active state can be set high or low. The gate mode works only with an external trigger source.

---

**NOTE** The ARB gating behavior described above is opposite to the gating behavior for real-time custom mode.

---

<b>*RST</b>	CONT			
<b>Key Entry</b>	<b>Continuous</b>	<b>Single</b>	<b>Gate</b>	<b>Segment Advance</b>

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This command selects the waveform's response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see [“:TRIGger:TYPE” on page 315](#).

The following list describes the waveform's response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
<b>*RST</b>	FREE
<b>Key Entry</b>	<b>Free Run</b> <b>Trigger &amp; Run</b> <b>Reset &amp; Run</b>

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:GATE:ACTive LOW | HIGH
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:GATE:ACTive ?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see [“:TRIGger:TYPE” on page 315](#).

The following list describes the ESG's gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
*RST	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

### :TRIGger:TYPE:SADVance[:TYPE]

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:SADVance [ :TYPE ] SINGLE | CONTinuous
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:SADVance [ :TYPE ] ?
```

This command customizes the segment advance trigger type setting.

SINGLE	This choice will play the next segment in the sequence only once.
CONTinuous	This choice will instruct the sequencer to continually play the next segments in the waveform sequence in a continuous pattern.
*RST	CONT
<b>Key Entry</b>	<b>Single    Continuous</b>
<b>Remarks</b>	This command is valid when SADVance has been selected as the trigger type.

To select SADVance as the trigger type, refer to “:TRIGger:TYPE” on page 315.

### :TRIGger:TYPE:SADVance[:TYPE]

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:SADVance [ :TYPE ] SINGLE | CONTinuous
[ :SOURce ] :RADio:ARB:TRIGger:TYPE:SADVance [ :TYPE ] ?
```

This commands selects the waveform's response to a trigger signal while using the segment advance (SADVance) trigger mode.

When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest. For more information on triggering and to select segment advance as the trigger mode, see “:TRIGger:TYPE” on page 315.

The following list describes the waveform’s response to each of the command choices:

- |            |  |
|------------|--|
| SINGle     | <p>Each segment in the sequence requires a trigger to play, and a segment plays only once, ignoring a segment’s repetition value (see “:SEQUence” on page 313 for repetition information). The following list describes a sequence’s playback behavior with this choice:</p> <ul style="list-style-type: none"><li>• After receiving the first trigger, the first segment plays to completion.</li><li>• When the waveform receives a trigger after a segment completes, the sequence advances to the next segment and plays that segment to completion.</li><li>• When the waveform receives a trigger during play, the current segment plays to completion. Then the sequence advances to the next segment, and it plays to completion.</li><li>• When the waveform receives a trigger either during or after the last segment in a sequence plays, the sequence resets and the first segment plays to completion.</li></ul> |
| CONTInuous | <p>Each segment in the sequence requires a trigger to play. After receiving a trigger, a segment plays continuously until the waveform receives another trigger. The following list describes a sequence’s playback behavior with this choice:</p> <ul style="list-style-type: none"><li>• After receiving the first trigger, the first segment plays continuously.</li><li>• A trigger during the current segment play causes the segment to play to the end of the segment file, then the sequence advances to the next segment, which plays continuously.</li><li>• When last segment in the sequence receives a trigger, the sequence resets and the first segment plays continuously.</li></ul>   |

**Example**

```
:RAD:ARB:TRIG:TYPE:SADV CONT
```

The preceding example selects the continuous segment advance mode.

<b>*RST</b>	CONT
<b>Key Entry</b>	<b>Single    Continuous</b>

**:TRIGger[:SOURce]**

**Supported** E4438C with Option 001/601 or 002/602

[:SOURce]:RADio:ARB:TRIGger[:SOURce] KEY|EXT|BUS

[:SOURce]:RADio:ARB:TRIGger[:SOURce]?

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 315. The following list describes the command choices:

**KEY** This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

**EXT** An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURce]:EXTErnal[:SOURce]” on page 323.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 317
  - continuous and single modes, see “:TRIGger[:SOURce]:EXTErnal:SLOPe” on page 322
- The delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[SOURce]:EXTErnal:DELAy[:TIME]” on page 322 or “:TRIGger[:SOURce]:EXTErnal:DELAy:SAMPles” on page 321
  - turning the delay on, see “:TRIGger[:SOURce]:EXTErnal:DELAy:STATe” on page 321

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** EXT

**Key Entry**      **Trigger Key**      **Ext**      **Bus**



### **:TRIGger[:SOURCE]:EXTeRnal:DELAy:SAMPles**

**Supported**            E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:ARB:TRIGger[:SOURCE]:EXTeRnal:DELAy:SAMPles <val>
[:SOURCE]:RADio:ARB:TRIGger[:SOURCE]:EXTeRnal:DELAy:SAMPles?
```

This command sets the number of samples to delay the ESG’s response to an external trigger.

The delay is between when the ESG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of 100 samples, causes the ESG to wait 100 samples after receipt of the external trigger before the ESG plays the waveform. The delay does not occur until you select **SAMPles** as the delay type. For more information, see “[:TRIGger\[:SOURCE\]:EXTeRnal:DELAy:STATe](#)” on page 321). You can set the delay value either before or after selecting **SAMPles**.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURCE\]](#)” on page 320.

The unit of measurement for the variable <val> is in samples.

**\*RST**                    +0

**Range**                   0–100E6

**Key Entry**              **Ext Delay Samples**

### **:TRIGger[:SOURCE]:EXTeRnal:DELAy:STATe OFF | ON | 1 | 0**

**Supported**            E4438C with Option 001/601 or 002/602

---

**NOTE**                    Refer to the *Programming Compatibility Guide* for information on this command. This command was replaced by the “[:TRIGger\[:SOURCE\]:EXTeRnal:DELAy:STATe](#)” command.

---

### **:TRIGger[:SOURCE]:EXTeRnal:DELAy:STATe**

**Supported**            E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:ARB:TRIGger[:SOURCE]:EXTeRnal:DELAy:STATe OFF | TIME |
SAMPles
[:SOURCE]:RADio:ARB:TRIGger[:SOURCE]:EXTeRnal:DELAy:STATe?
```

This command enables the delay feature by selecting the external trigger delay type or disables the external trigger delay function.

**TIME** Selects time as the delay value in units of nanoseconds to seconds. For setting the time delay value, see “[:TRIGger[:SOURCE]:EXTErnal:DELay[:TIME]]” on page 322.

**SAMPles** Selects samples as the delay value. For setting the sample delay value, see “[:TRIGger[:SOURCE]:EXTErnal:DELay:SAMPles]” on page 321.

For information on configuring an external source, see “[:TRIGger[:SOURCE]]” on page 320.

**\*RST** OFF

**Key Entry** Ext Delay Off Time Samples

### **:TRIGger[:SOURCE]:EXTErnal:DELay[:TIME]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:ARB:TRIGger [ :SOURCE ] :EXTErnal:DELay [ :TIME ] <val>
[ :SOURCE ] :RADio:ARB:TRIGger [ :SOURCE ] :EXTErnal:DELay [ :TIME ] ?
```

This command sets the amount of time to delay the ESG’s response to an external trigger.

The delay is a path (time) delay between when the ESG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of two seconds, causes the ESG to wait two seconds after receipt of the trigger before the ESG plays the waveform. The delay does not occur until you select TIME as the delay type. For more information, see “[:TRIGger[:SOURCE]:EXTErnal:DELay:STATE]” on page 321. You can set the delay value either before or after selecting TIME.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger[:SOURCE]]” on page 320.

The unit of measurement for the variable <val> is in seconds (nsec–sec).

**\*RST** +1.00000000E–003

**Range** 1E–8 to 4E1

**Key Entry** Ext Delay Time

### **:TRIGger[:SOURCE]:EXTErnal:SLOPe**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:ARB:TRIGger [ :SOURCE ] :EXTErnal:SLOPe POSitive|NEGative
[ :SOURCE ] :RADio:ARB:TRIGger [ :SOURCE ] :EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “[:TRIGger:TYPE:GATE:ACTive]” on page 317.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 320.

<b>*RST</b>	NEG
<b>Key Entry</b>	<b>Ext Polarity Neg Pos</b>

### **:TRIGger[:SOURce]:EXTErnal[:SOURce]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:TRIGger [ :SOURce ] :EXTErnal [ :SOURce ] EPT1 | EPT2 |
EPTRIGGER1 | EPTRIGGER2
[ :SOURce ] :RADio:ARB:TRIGger [ :SOURce ] :EXTErnal [ :SOURce ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 320. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

### **:WAVEform**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:ARB:WAVEform "WFM1:file_name" | "SEQ:file_name"
```

```
[:SOURce]:RADio:ARB:WAVEform?
```

This command selects a waveform file or sequence, for the dual ARB player to play. The file must be present in volatile memory, WFM1, or in the SEQ directory. If a file is in non-volatile memory (NVWFM), use the command “:COPY[:NAME]” on page 105 to copy the file to WFM1.

"WFM1:file\_name" This variable names a waveform file residing in volatile memory (WFM1:). For information on the file name syntax, see “File Name Variables” on page 13.

"SEQ:file\_name" This variable names a sequence file residing in the catalog of sequence files. For more information on the file name syntax, see “File Name Variables” on page 13.

### Example

```
:RAD:ARB:WAV "WFM1:Test_Data"
```

The preceding example selects the file Test\_Data from the list of files in volatile waveform memory, WFM1, and applies its file header settings.

**Key Entry**                    **Select Waveform**

## :Waveform:NHEAders

**Supported**                    E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:ARB:WAVEform:NHEAders "WFM1:file_name" | "SEQ:filename"
[:SOURce]:RADio:ARB:WAVEform:NHEAders?
```

This command, for the dual ARB mode, allows for a fast selection of a segment or sequence waveform file. No header information or settings are applied to the segment or sequence waveform file when this command is used. This will improve the access or loading speed of the waveform file to approximately 100 mS for a single segment. The file must be in volatile waveform memory (WFM1), or in the SEQ directory. If a file is in non-volatile waveform memory (NVWFM), use the command “:COPY[:NAME]” on page 105 to copy files to WFM1.

"WFM1:file\_name" This variable names a waveform file residing in volatile memory:WFM1. For information on the file name syntax, see “File Name Variables” on page 13.

"SEQ:filename" This variable names a sequence file residing in the catalog of sequence files. For more information on the file name syntax, see “File Name Variables” on page 13.

### Example

```
:RAD:ARB:WAV:NHEA "Test_Data"
```

The preceding example selects the file Test\_Data, without applying header settings.

## [:STATe]

**Supported**                    E4438C with Option 001/601 or 002/602

**Dual ARB Subsystem—Option 001/601 or 002/602 ([:SOURCE]:RADio:ARB)**

```
[:SOURCE]:RADio:ARB[:STATe] ON|OFF|1|0
```

```
[:SOURCE]:RADio:ARB[:STATe] ?
```

This command enables or disables the arbitrary waveform generator function.

**\*RST**                    0

**Key Entry**            **ARB Off On**

---

## Multitone Subsystem—Option 001/601 or 002/602 ([:SOURce]:RADio:MTONe:ARB)

### Creating a Multitone Waveform

Use the following steps to create a multitone waveform:

1. Initialize the phase for the multitone waveform. Refer to “:SETup:TABLE:PHASe:INITialize” on page 338.
2. Assign the frequency spacing between the tones. Refer to “:SETup:TABLE:FSPacing” on page 337.
3. Define the number of tones within the waveform. Refer to “:SETup:TABLE:NTONes” on page 337.
4. Modify the power level, phase, and state of any individual tones. Refer to “:ROW” on page 334.

### :HEADer:CLEar

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:MTONe:ARB:HEADer:CLEar

This command clears the header information from the file header used by this modulation format.

**Key Entry** **Clear Header**

**Remarks** The **Multitone Off On** softkey must be set to On for this command to function.

### :HEADer:SAVE

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:MTONe:ARB:HEADer:SAVE

This command saves the header information to the file header used by this modulation format.

**Key Entry** **Save Setup To Header**

**Remarks** The **Multitone Off On** softkey must be set to On for this command to function.

**:IQ:EXternal:FILTer**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:MTONE:ARB:IQ:EXternal:FILTer 40e6 | THRough
[ :SOURCE ] :RADio:MTONE:ARB:IQ:EXternal:FILTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXternal:FILTer:AUTO” on [page 327](#) to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THRough This choice bypasses filtering.

**\*RST** THR

**Key Entry** 40.000 MHz Through

**:IQ:EXternal:FILTer:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:MTONE:ARB:IQ:EXternal:FILTer:AUTO ON | OFF | 1 | 0
[ :SOURCE ] :RADio:MTONE:ARB:IQ:EXternal:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXternal:FILTer” on [page 327](#) for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Output Filter Manual Auto

**:IQ:MODulation:ATTen**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:MTONe:ARB:IQ:MODulation:ATTen <val>

[ :SOURce ] :RADio:MTONe:ARB:IQ:MODulation:ATTen?

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000

**Range** 0–40

**Key Entry** **Modulator Atten Manual Auto**

**:IQ:MODulation:ATTen:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:MTONe:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0

[ :SOURce ] :RADio:MTONe:ARB:IQ:MODulation:ATTen:AUTO?

This command enables or disables the I/Q attenuation auto mode.

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 328 for setting the attenuation value.

**\*RST** 1

**Key Entry** **Modulator Atten Manual Auto**



**:IQ:MODulation:FILTer**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:FILTer 2.1e6 | 40e6 | THROugh
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 329 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THROugh This choice bypasses filtering.

**\*RST** THR

**Key Entry** 2.100 MHz 40.000 MHz Through

**:IQ:MODulation:FILTer:AUTO**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:FILTer:AUTO ON | OFF | 1 | 0
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 329 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Mod Filter Manual Auto

**:MDEStination:AAMPlitude**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:MTONE:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4
[ :SOURce ] :RADio:MTONE:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

*RST	NONE				
Key Entry	None	Marker 1	Marker 2	Marker 3	Marker 4

**:MDEStination:ALCHold**

**Supported** E4438C with Option 001/601 or 002/602

---

**CAUTION** Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[:SOURCE]:RADio:MTONE:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURCE]:RADio:MTONE:ARB:MDEStination:ALCHold?
```

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “:MARKer:[SET]” on page 302.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 333.

---

**NOTE** Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

---

For more information on the marker ALC hold function, see the *E4428C/38C ESG Signal Generators User's Guide*. For setting the marker points, see “:MARKer:[SET]” on page 302.

NONE	This terminates the marker ALC hold function.
M1–M4	These are the marker choices. The ALC hold feature uses only one marker at a time.
*RST	NONE

### Example

```
:RAD:AWGB:ARB:MDES:ALCH M1
```

The preceding example routes marker 1 to the ALC Hold function.

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
<b>Remarks</b>	N/A				

## :MDEStination:PULSe

**Supported** E4438C with Option 001/601 or 002/602

---

**CAUTION** The pulse function incorporates ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURce ] :RADio:MTONE:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4
[ :SOURce ] :RADio:MTONE:ARB:MDEStination:PULSe?
```

This command enables or disables the marker pulse/RF blanking function for the selected marker.

This function automatically incorporates the ALC hold function, so there is no need to select both the ALC hold and pulse/RF blanking functions for the same marker.

---

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform's output amplitude.

---

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker's polarity, see “:MPOLarity:MARKer1|2|3|4” on page 333.

---

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 302 for setting the marker points.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

---

For more information on the marker RF blanking function, see the *E4428C/38C ESG Signal Generators User’s Guide*.

NONE This terminates the marker RF blanking/pulse function.

M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

### Example

```
:RAD:ARB:MDES:PULS M2
```

The preceding example routes marker 2 to Pulse/RF Blanking.

```
*RST NONE
```

Key Entry	None	Marker 1	Marker 2	Marker 3	Marker 4
-----------	------	----------	----------	----------	----------

### **:MPOLarity:MARKer1 | 2 | 3 | 4**

**Supported**            E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:MTONe:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[ :SOURce ] :RADio:MTONe:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 ?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

**\*RST**                    POS

**Key Entry**            **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

### **:REFerence:EXTernal:FREQuency**

**Supported**            E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:MTONe:ARB:REFerence:EXTernal:FREQuency <val>
[ :SOURce ] :RADio:MTONe:ARB:REFerence:EXTernal:FREQuency ?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST**                    +1.00000000E+007

**Range**                 2.5E5–1E8

**Key Entry**            **Reference Freq**

**Remarks**            The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to  
[“:REFerence\[:SOURce\]” on page 333.](#)

### **:REFerence[:SOURce]**

**Supported**            E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:MTONe:ARB:REFerence [ :SOURce ] INTernal | EXTernal
[ :SOURce ] :RADio:MTONe:ARB:REFerence [ :SOURce ] ?
```

This command selects either an internal or external reference for the waveform clock.

**Multitone Subsystem—Option 001/601 or 002/602 ([:SOURce]:RADio:MTONe:ARB)**

**\*RST** INT

**Key Entry** ARB Reference Ext Int

**Remarks** If the EXTERNAL choice is selected, the external frequency *value must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFERENCE:EXTERNAL:FREQUENCY” on page 333 to enter the external reference frequency.

**:ROW**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:MTONe:ARB:SETup:TABLE:ROW <row_number>, <power>,
<phase>, <state>
[:SOURce]:RADio:MTONe:ARB:SETup:TABLE:ROW? <row_number>
```

This command modifies the indicated tone (row) of the multitone waveform.

<row\_number> The number of rows for this variable are determined by the :SETup:TABLE command.

The variable <power> is expressed in units of decibels (dB).

The variable <phase> is expressed in units of degrees (deg).

Frequency offset, power, phase, and state value are returned when a query is initiated. The output format is as follows:

```
<frequency offset>, <power>, <phase>, <state>
```

**\*RST** *frequency offset*: -3.5000000E+004 *<power>*: +0.0000000E+000  
*<phase>*: +0.0000000E+000 *<state>*: 1

**Range** *frequency offset*: -4E7 to 4E7 *<power>*: -80 to 0 *<phase>*: 0-359  
*<state>*: 1

**Key Entry** **Goto Row** **Toggle State**

**Remarks** Refer to “:SETup:TABLE” on page 336 for information on how to change the number of rows.

This command is the final step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 326 for all four steps.

**:RSCAling**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:MTONe:ARB:RSCAling <val>
```

```
[ :SOURCE ] :RADio:MTONe:ARB:RSCAling?
```

This command adjusts the scaling value that is applied to the Multitone waveform while it is playing. The variable <val> is expressed as a percentage. Runtime scaling does not alter the waveform data file. For more information about runtime scaling, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**Example**

```
:RAD:MTON:ARB:RSC 50
```

The preceding example applies a 50% scaling factor to the selected waveform.

**\*RST** +7.00000000E+001

**Range** 1–100

**Key Entry** **Waveform Runtime Scaling**

**Remarks** Runtime scaling does not alter the waveform data file.

**:SCLock:RATE**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:MTONe:ARB:SCLock:RATE <val>
```

```
[ :SOURCE ] :RADio:MTONe:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the Multitone modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATE]” on [page 339](#) to activate the modulation format.

**:SETup**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:MTONE:ARB:SETup "<file name>"
```

```
[:SOURce]:RADio:MTONE:ARB:SETup?
```

This command retrieves a multitone waveform file.

**Key Entry** Load From Selected File

**Remarks** The name of a multitone waveform file is stored in the signal generator file system of MTONE files. This information is held in memory until you send the command that turns the waveform on.

Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:SETup:STORe**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:MTONE:ARB:SETup:STORe "<file name>"
```

This command stores the current multitone waveform setup in the signal generator file system of MTONE files.

**Key Entry** **Store To File**

**:SETup:TABLE**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURce]:RADio:MTONE:ARB:SETup:TABLE <freq_spacing>,
<num_tones>, {<phase>, <state>}
```

```
[:SOURce]:RADio:MTONE:ARB:SETup:TABLE?
```

This command creates and configures a multitone waveform.

The frequency offset, power, phase, and state value are returned when a query is initiated. The output format is as follows:

```
<frequency offset>, <power>, <phase>, <state>
```

The variable <freq\_spacing> is expressed in units of Hertz (Hz–MHz).

The variable <power> is expressed in units of decibels (dB).

*RST	Tone	<frequency offset>	<power>	<phase>	<state>
	Tone 1	-35000	+0.00000000E+000	+0	+1



**Multitone Subsystem—Option 001/601 or 002/602 ([:SOURCE]:RADio:MTONE:ARB)**

*RST	Tone	<frequency offset>	<power>	<phase>	<state>
	Tone 2	-25000	+0.00000000E+000	+0	+1
	Tone 3	-15000	+0.00000000E+000	+0	+1
	Tone 4	-5000	+0.00000000E+000	+0	+1
	Tone 5	+5000	+0.00000000E+000	+0	+1
	Tone 6	+15000	+0.00000000E+000	+0	+1
	Tone 7	+25000	+0.00000000E+000	+0	+1
	Tone 8	+35000	+0.00000000E+000	+0	+1

**Range** <freq\_spacing> (2 tones): 1E4–8E7 <num\_tones>: 2–64  
 <freq\_spacing> (>2 tones): 1E4 to (80 MHz ÷ (num\_tones – 1))  
 <phase>: 0–359

**Key Entry** Freq Spacing      Number Of Tones      Toggle State

**Remarks** To set the frequency spacing, refer to “:SETup:TABLE:FSPacing” on page 337.

**:SETup:TABLE:FSPacing**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:FSPacing <freq\_spacing>

[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:FSPacing?

This command sets the frequency spacing between the tones.

The variable <freq\_spacing> is expressed in units of Hertz (Hz–MHz).

\*RST +1.00000000E+004

**Range** <freq\_spacing> (2 tones): 1E4–8E7  
 <freq\_spacing> (>2 tones): 1E4 to (80 MHz ÷ (num\_tones – 1))

**Key Entry** Freq Spacing

**Remarks** To set frequency spacing and additional parameters required to create or configure a multitone waveform, refer to “:SETup:TABLE” on page 336.

This command is the second step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 326 for all four steps.

**:SETup:TABLE:NTONes**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:NTONes <num\_tones>

[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:NTONes?

This command defines the number of tones in the multitone waveform.

<b>*RST</b>	+8
<b>Range</b>	2–64
<b>Key Entry</b>	<b>Number Of Tones</b>
<b>Remarks</b>	To specify the number of tones and additional parameters required to create or configure a multitone waveform, refer to “:SETup:TABLE” on page 336.  This command is the third step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 326 for all four steps.

**:SETup:TABLE:PHASe:INITialize**

<b>Supported</b>	E4438C with Option 001/601 or 002/602
	[ :SOURCE ] :RADio:MTONe:ARB:SETup:TABLE:PHASe:INITialize FIXed RANDOM [ :SOURCE ] :RADio:MTONe:ARB:SETup:TABLE:PHASe:INITialize?

This command initializes the phase in the multitone waveform table.

<b>FIXed</b>	This choice sets the phase of all tones to the fixed value of 0 degrees.
<b>RANDom</b>	This choice sets the phase of all tones to random values based on the setting on the random seed generator.
<b>*RST</b>	FIX

**Key Entry**      **Initialize Phase Fixed Random**

**Remarks**      To change the random number generator seed value, refer to “:SETup:TABLE:PHASe:INITialize:SEED” on page 338.  
  
This command is the first step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 326 for all four steps.

**:SETup:TABLE:PHASe:INITialize:SEED**

<b>Supported</b>	E4438C with Option 001/601 or 002/602
	[ :SOURCE ] :RADio:MTONe:ARB:SETup:TABLE:PHASe:INITialize:SEED FIXed RANDOM [ :SOURCE ] :RADio:MTONe:ARB:SETup:TABLE:PHASe:INITialize:SEED?

This command initializes the random number generator seed that is used to generate the random phase values for the multitone waveform.

<b>FIXed</b>	This choice sets the random number generator seed to a fixed value.
<b>RANDom</b>	This choice sets the random number generator seed to a random value. This changes the phase value after each initialization of the phase.

**Multitone Subsystem—Option 001/601 or 002/602 (:SOURce:RADio:MTONE:ARB)**

**\*RST**                   FIX

**Key Entry**           **Random Seed Fixed Random**

**[ :STATe ]**

**Supported**           E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:MTONE:ARB [ :STATe ] ON | OFF | 1 | 0

[ :SOURce ] :RADio:MTONE:ARB [ :STATe ] ?

This command enables or disables the multitone waveform generator function.

**\*RST**                   0

**Key Entry**           **Multitone Off On**

## Wideband CDMA ARB Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)

### :CLIPping:I

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:I <val>
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:I?
```

This command limits the modulation level of the waveform's I component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip |I| To**

### :CLIPping:POSition

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:POSition PRE|POST
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:POSition?
```

This command specifies whether a waveform is clipped before (PRE) or after (POST) FIR filtering.

**\*RST** PRE

**Key Entry** **Clip At PRE POST FIR Filter**

### :CLIPping:Q

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:Q <val>
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:Q?
```

This command limits the modulation level of the waveform's Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100  
**Key Entry** **Clip |Q| To**

**:CLIPping:TYPE**

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:TYPE IJQ|IORQ
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:TYPE?
```

This command selects either IJQ or IORQ as the clipping type.

**IJQ** The combined I and Q waveform will be clipped (*circular clipping*).

**IORQ** The I and Q components of the waveform are clipped independently (*rectangular clipping*). I and Q can be clipped to different levels using this mode.

**\*RST** IJQ

**Key Entry** **Clipping Type |I+jQ| |I|,|Q|**

**:CLIPping[:IJQ]**

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping[:IJQ] <val>
[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping[:IJQ]?
```

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip |I+jQ| To**

**:CRATe**

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CRATe <val>
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:CRATe?
```

This command sets the chip rate value.

**\*RST** +3.84000000E+006

**Range** 3456000–4224000

**Key Entry** **Chip Rate**

**:FILTer**

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:FILTer RNYQuist|NYQuist|GAUSSian|
```

```
RECTangle|WCDMA|AC4Fm|IS2000SR3DS|UGGaussian|"<user FIR>"
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:FILTer?
```

This command selects the pre-modulation filter type.

**WCDMA** This choice selects a 0.22 Nyquist filter optimized for ACP.

**AC4Fm** This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**IS2000SR3DS** This choice selects an IS-2000 standard, spread rate 3 direct spread filter.

**UGGaussian** This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.

**"<user FIR>"** This variable is any FIR filter file that you have stored in memory. The variable needs no directory path indicating the location of the file, such as **FIR:** or **/USER/FIR**. The command assumes the **FIR** directory. Refer to [“File Name Variables” on page 13](#) for more information on file names.

**\*RST** NYQ

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>WCDMA</b>
	<b>APCO 25 C4FM</b>	<b>IS-95</b>	<b>UN3/4 GSM Gaussian</b>	<b>IS-2000 SR3 DS</b>	
	<b>User FIR</b>				

**:FILTER:ALPHA**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:FILTer:ALPHa <val>
```

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:FILTer:ALPHa?
```

This command sets the alpha value for the Nyquist or root Nyquist filter.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +2.20000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTER” on page 342.

**:FILTER:BBT**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:FILTer:BBT <val>
```

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTER” on page 342.

**:FILTer:CHANnel**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:CHANnel EVM|ACP
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** ACP

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 342.

**:HEADer:CLEAr**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:HEADer:CLEAr
```

This command clears the header information from the file header used by this modulation format.

**Key Entry** **Clear Header**

**Remarks** The **W-CDMA Off On** softkey must be set to On for this command to function.

**:HEADer:SAVE**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:HEADer:SAVE
```

This command saves the header information to the file header used by this modulation format.

**Key Entry** **Save Setup To Header**

**Remarks** The **W-CDMA Off On** softkey must be set to On for this command to function.

**:IQ:EXTErnal:FILTer**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:IQ:EXTErnal:FILTer 40e6|THROUGH
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:IQ:EXTErnal:FILTer?
```



**Wideband CDMA ARB Subsystem–Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP:ARB)**

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTERNAL:FILTER:AUTO” on [page 345](#) to OFF(0) mode.

40e6                      This choice applies a 40 MHz baseband filter.

THRough                This choice bypasses filtering.

\*RST                    THR

**Key Entry              40.000 MHz      Through**

**:IQ:EXTERNAL:FILTER:AUTO**

**Supported              E4438C with Option 400**

```
[ :SOURCE ] :RADIo:WCDMA:TGPP:ARB:IQ:EXTErnal:FILTEr:AUTO ON|OFF|1|0
[ :SOURCE ] :RADIo:WCDMA:TGPP:ARB:IQ:EXTErnal:FILTEr:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1)                    This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0)                   This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTERNAL:FILTER” on [page 344](#) for selecting a filter or through path.

\*RST                    1

**Key Entry              I/Q Output Filter Manual Auto**

**:IQMap**

**Supported              E4438C with Option 400**

```
[ :SOURCE ] :RADIo:WCDMA:TGPP:ARB:IQMap NORMal|INVert
[ :SOURCE ] :RADIo:WCDMA:TGPP:ARB:IQMap?
```

This command selects whether or not the I/Q outputs will be inverted.

NORMal                 This choice selects normal polarity.

INVerted                This choice inverts the internal Q signal.

\*RST                    NORM

**Key Entry              I/Q Mapping Normal Invert**

**:IQ:MODulation:ATTen****Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:ATTen <val>
[:SOURce]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+00**Range** 0–40**Key Entry** **Modulator Atten Manual Auto****:IQ:MODulation:ATTen:AUTO****Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0
[:SOURce]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 346 for setting the attenuation value.

**\*RST** 1**Key Entry** **Modulator Atten Manual Auto****:IQ:MODulation:FILTer****Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[:SOURce]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 347 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THROUGH This choice bypasses filtering.

**\*RST**                    THR  
**Key Entry**            2.100 MHz    40.000 MHz    Through

### **:IQ:MODulation:FILTer:AUTO**

**Supported**            E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1)                    This choice will automatically select a digital modulation filter.

OFF(0)                   This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 346 for selecting a filter or through path.

**\*RST**                    1  
**Key Entry**            I/Q Mod Filter Manual Auto

### **:LINK**

**Supported**            E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK DOWN|UP
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK?
```

This command selects either a downlink or uplink channel configuration.

**\*RST**                    DOWN  
**Key Entry**            Link Down Up

### **:LINK:DOWN:OACP**

**Supported**            E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:OACP ADJ|ALT
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:OACP?
```

This command selects the channel power optimization type for any downlink channel W-CDMA setup.

ADJ                      This choice optimizes for adjacent channel power.

ALT                      This choice optimizes for alternate channel power.

<b>*RST</b>	ADJ
<b>Key Entry</b>	<b>Optimize ACP ADJ ALT</b>
<b>Remarks</b>	This command is operational for any downlink channel W-CDMA setup. To change the current W-CDMA setup information, refer to “:LINK:DOWN:SETup” on page 348.

**:LINK:DOWN:SETup**

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup DPCH1 | DPCH3 | PPSCH |
PPDPCH1 | PPDPCH3 | TM1D16 | TM1D32 | TM1D64 | TM2 | TM3D16 | TM3D32 | TM4 | TM5H2 | TM5H4 |
TM5H8 | MCArrier | "<file name>"
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup?
```

This command selects a predefined channel setup or multicarrier, and turns multicarrier off or on (see the MCArrier choice description).

DPCH1	This choice selects 1 dedicated physical channel.
DPCH3	This choice selects 3 dedicated physical channels.
PPSCH	This choice selects a primary command control physical channel (PCCPCH) with a synchronization channel (SCH).
PPDPCH1	This choice selects a primary command control physical channel (PCCPCH) with a dedicated physical channel (DPCH).
PPDPCH3	This choice selects a primary command control physical channel (PCCPCH) with 3 dedicated physical channels.
TM1D16	This choice selects a Test Model 1 with 16 dedicated physical channels.
TM1D32	This choice selects a Test Model 1 with 32 dedicated physical channels.
TM1D64	This choice selects a Test Model 1 with 64 dedicated physical channels.
TM2	This choice selects a Test Model 2 downlink W-CDMA setup.
TM3D16	This choice selects a Test Model 3 with 16 dedicated physical channels.
TM3D32	This choice selects a Test Model 3 with 32 dedicated physical channels.
TM4	This choice selects a Test Model 4 downlink W-CDMA setup.
TM5H2	This choice selects a Test Model 5 with 6 DPCH and 2 HS-PDSCH (high speed physical shared channel) channels downlink W-CDMA setup.
TM5H4	This choice selects a Test Model 5 with 14 DPCH and 4 HS-PDSCH (high

## Wideband CDMA ARB Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP:ARB)

	speed-physical downlink shared channel) channels downlink W-CDMA setup.																								
TM5H8	This choice selects a Test Model 5 with 30 DPCH and 8 HS-PDSCH (high speed physical shared channel) channels downlink WCDMA setup.																								
MCARrier	This choice selects multicarrier and turns it on. Selecting any other setup such as DPCH1 or TM1D16 turns multicarrier off. To select the multicarrier setup, see “:LINK:DOWN:SETup:MCARrier”.																								
"<file name>"	This choice selects a user-defined channel setup file. Refer to “File Name Variables” on page 13 for information on the file name syntax.																								
*RST	DPCH1																								
Key Entry	<table> <tr> <td>1 DPCH</td> <td>3DPCH</td> <td>PCCPCH + SCH</td> <td>PCCPCH + SCH + 1 DPCH</td> </tr> <tr> <td>PCCPCH + SCH + 3 DPCH</td> <td></td> <td>Test Model 1 w/ 16 DPCH</td> <td></td> </tr> <tr> <td>Test Model 1 w/ 32 DPCH</td> <td></td> <td>Test Model 1 w/ 64 DPCH</td> <td>Test Model 2</td> </tr> <tr> <td>Test Model 3 w/ 16 DPCH</td> <td></td> <td>Test Model 3 w/ 32 DPCH</td> <td>Test Model 4</td> </tr> <tr> <td>Test Model 5 w/2HSPDSCH</td> <td></td> <td>Test Model 5 w/4HSPDSCH</td> <td></td> </tr> <tr> <td>Test Model 5 w/ 8HSPDPCH</td> <td></td> <td>Multicarrier Off On</td> <td>Custom W-CDMA State</td> </tr> </table>	1 DPCH	3DPCH	PCCPCH + SCH	PCCPCH + SCH + 1 DPCH	PCCPCH + SCH + 3 DPCH		Test Model 1 w/ 16 DPCH		Test Model 1 w/ 32 DPCH		Test Model 1 w/ 64 DPCH	Test Model 2	Test Model 3 w/ 16 DPCH		Test Model 3 w/ 32 DPCH	Test Model 4	Test Model 5 w/2HSPDSCH		Test Model 5 w/4HSPDSCH		Test Model 5 w/ 8HSPDPCH		Multicarrier Off On	Custom W-CDMA State
1 DPCH	3DPCH	PCCPCH + SCH	PCCPCH + SCH + 1 DPCH																						
PCCPCH + SCH + 3 DPCH		Test Model 1 w/ 16 DPCH																							
Test Model 1 w/ 32 DPCH		Test Model 1 w/ 64 DPCH	Test Model 2																						
Test Model 3 w/ 16 DPCH		Test Model 3 w/ 32 DPCH	Test Model 4																						
Test Model 5 w/2HSPDSCH		Test Model 5 w/4HSPDSCH																							
Test Model 5 w/ 8HSPDPCH		Multicarrier Off On	Custom W-CDMA State																						

**:LINK:DOWN:SETup:MCARrier**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier CAR2 | CAR3 | CAR4 |
CAR4TM1D64 | "<file name>"
```

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier?
```

This command defines the type of multicarrier W-CDMA setup.

CAR2 a standard 2-carrier setup with the following settings:

Carrier 1: PCCPCH + SCH, -7.5 MHz frequency offset, 0 dB power

Carrier 2: PCCPCH + SCH, 7.5 MHz frequency offset, 0 dB power

CAR3 a standard 3-carrier setup with the following settings:

Carrier 1: PCCPCH + SCH, -5 MHz frequency offset, 0 dB power

Carrier 2: PCCPCH + SCH, 0 kHz frequency offset, 0 dB power

Carrier 3: PCCPCH + SCH, 5 MHz frequency offset, 0 dB power

**Wideband CDMA ARB Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)**

CAR4	a standard 4-carrier setup with the following settings:  Carrier 1: PCCPCH + SCH, -7.5 MHz frequency offset, 0 dB power Carrier 2: PCCPCH + SCH, -2.5 MHz frequency offset, 0 dB power Carrier 3: PCCPCH + SCH, 2.5 MHz frequency offset, 0 dB power Carrier 4: PCCPCH + SCH, 7.5 MHz frequency offset, 0 dB power
CAR4TM1D64	a standard 4-carrier test model 1 with 64 dedicated physical channels setup with the following settings:  Carrier 1: Test Model 1 w/64 DPCH, -7.5 MHz frequency offset, 0 dB power Carrier 2: Test Model 1 w/64 DPCH, -2.5 MHz frequency offset, 0 dB power Carrier 3: Test Model 1 w/64 DPCH, 2.5 MHz frequency offset, 0 dB power Carrier 4: Test Model 1 w/64 DPCH, 7.5 MHz frequency offset, 0 dB power
<b>*RST</b>	CAR2
<b>Key Entry</b>	<b>2 Carriers    3 Carriers    4 Carriers</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on <a href="#">page 13</a> for information on the file name syntax.

**:LINK:DOWN:SETup:MCARrier:CLIPping:I**

<b>Supported</b>	E4438C with Option 400
	<code>[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:I &lt;val&gt;</code> <code>[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:I?</code>
	This command limits the modulation level of the waveform’s I component to a percentage of full scale.
	The variable <val> is expressed in units of percent.
<b>*RST</b>	+1.00000000E+002
<b>Range</b>	10–100
<b>Key Entry</b>	<b>Clip  I  To</b>

**:LINK:DOWN:SETup:MCARrier:CLIPping:Q****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:Q &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:Q?

This command limits the modulation level of the waveform's Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002**Range** 10–100**Key Entry** **Clip | Q | To****:LINK:DOWN:SETup:MCARrier:CLIPping:TYPE****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:

TYPE IJQ | IORQ

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:TYPE?

This command selects either IJQ or IORQ as the clipping type.

**IJQ** The combined I and Q waveform will be clipped (*circular* clipping).**IORQ** The I and Q components of the waveform are clipped independently (*rectangular* clipping). I and Q can be clipped to different levels using this mode.**\*RST** IJQ**Key Entry** **Clipping Type | I+jQ | | I |, | Q |****:LINK:DOWN:SETup:MCARrier:CLIPping[:IJQ]****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:

CLIPping[:IJQ] &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping[:IJQ]?

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

<b>Range</b>	10–100
<b>Key Entry</b>	<b>Clip  I+jQ  To</b>

**:LINK:DOWN:SETup:MCARrier:SCODE:AINCrement**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:SCODE:AINCrement
```

This command will sort carriers by frequency offset and auto-increment scramble codes starting from the current scramble code value for the lowest frequency carrier.

**Key Entry** **Increment Scramble Code**

**Remarks** If the lowest frequency carrier has a scramble code value of N/A, the auto-increment value will start at 0.

**:LINK:DOWN:SETup:MCARrier:STORE**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:STORE "<file name>"
```

This command stores the current multicarrier setup information.

The stored file contains information including the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

**Key Entry** **Store Custom Multicarrier**

**Remarks** User defined files created using firmware prior to C.02.40 did not save the setting for Increment Scramble Code, Increment Timing Offset, and Clipping Type settings. When loading user defined files created with firmware prior to C.02.40, Increment Scramble Code and Increment Timing Offset will default to Off and the Clipping Type settings will default to 100%. Firmware C.02.40 will save the Increment Scramble Code, Increment Timing Offset and Clipping Type settings.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.



**:LINK:DOWN:SETup:MCARrier:TABLE****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:TABLE INIT|
APPend|<carrier_num>,DPCH1|DPCH3|PPSCH|PPDPCH1|PPDPCH3|TM1D16|TM1D32|
TM1D64|TM2|TM3D16|TM3D32|TM4|TM5H2|TM5H4|TM5H8|"<filename>",<freq_offset
>,<power>[,<scramble code>,<timing offset>,<initial phase>,<pre-FIR circular clipping>[<clipping units {pct}|dB>],
<post-FIR circularclipping>[<clipping units {pct}|dB>]]
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:
TABLE? <carrier_num>
```

This command defines the multicarrier format and waveform.

Use INIT to clear the table and define the parameters for the first carrier; use APPend to add new channels. To edit an existing carrier, use its carrier number (<carrier\_num>).

The variable <freq\_offset> is expressed in units of Hertz (kHz–MHz).

The variable <power> is expressed in units of decibels (dB).

The carrier type, frequency offset, and power level are returned when a query is initiated. The output format is as follows:

```
<carrier type>,<freq_offset>,<power>
```

INIT	This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.
APPend	This choice adds rows to an existing table. The maximum number of rows for one table is 16.
DPCH1	This choice selects 1 dedicated physical channel.
DPCH3	This choice selects 3 dedicated physical channels.
PPSCH	This choice selects a primary command control physical channel (PCCPCH) with a synchronization channel (SCH).
PPDPCH1	This choice selects a primary command control physical channel (PCCPCH) with a dedicated physical channel (DPCH).
PPDPCH3	This choice selects a primary command control physical channel (PCCPCH) with 3 dedicated physical channels.
TM1D16	This choice selects a test model 1 with 16 dedicated physical channels.
TM1D32	This choice selects a test model 1 with 32 dedicated physical channels.
TM1D64	This choice selects a test model 1 with 64 dedicated physical channels.

TM2	This choice selects a test model 2.
TM3D16	This choice selects a test model 3 with 16 dedicated physical channels.
TM3D32	This choice selects a test model 3 with 32 dedicated physical channels.
TM4	This choice selects a test model 4.
TM5H2	This choice selects a Test Model 5 with 6 DPCH and 2 HS-PDSCH (high speed physical shared channel) channels downlink W-CDMA setup.
TM5H4	This choice selects a Test Model 5 with 14 DPCH and 4 HS-PDSCH (high speed-physical downlink shared channel) channels downlink W-CDMA setup.
TM5H8	This choice selects a Test Model 5 with 30 DPCH and 8 HS-PDSCH (high speed physical shared channel) channels downlink W-CDMA setup.
<scramble code>	This variable sets the scramble code value.
<timing offset>	This variable sets the timing offset value.
<initial phase>	This variable sets the initial phase value. The units are not specified but the value represents degrees.
<clipping>	This variable sets the clipping value. If the units are not specified, the value will default to percent.
<carrier_num>	This variable specifies the number of multicarriers.
<b>*RST</b>	<i>carrier type</i> : PPSCH <i>&lt;freq_offset&gt;</i> : +7.50000000E+006 <i>&lt;power&gt;</i> : +0.00000000E+000
<b>Range</b>	<i>&lt;freq_offset&gt;</i> : -37.5E6 to 37.5E6 <i>&lt;power&gt;</i> : -40 to 0 <i>scramble code</i> : 0-511 <i>timing offset</i> : 0-149 <i>initial phase</i> : 0-359 <i>clipping(in units of percent)</i> : 0.0-100.0 or 0.0 to -20.0 (if units are dB)
<b>Key Entry</b>	<b>1 DPCH      3 DPCH      PCCPCH + SCH      PCCPCH + SCH + 1 DPCH</b> <b>PCCPCH + SCH + 3 DPCH      Test Model 1 w/ 16 DPCH</b> <b>Test Model 1 w/ 32 DPCH      Test Model 1 w/ 64 DPCH      Test Model 2</b> <b>Test Model 3 w/ 16 DPCH      Test Model 3 w/ 32 DPCH      Test Model 4</b> <b>Test Model 5 w/2HSPDSCH      Test Model 5 w/4HSPDSCH</b> <b>Test Model 5 w/8HSPDSCH</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 13 for information on the file name syntax.  If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to

“:LINK:DOWN:SETup:TABLE:APPLy” on page 356.

### **:LINK:DOWN:SETup:MCARrier:TABLE:NCARriers**

**Supported**            E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:TABLE:NCARriers?

This command queries the number of carriers specified for the W-CDMA multicarrier waveform.

**\*RST**                    +2

### **:LINK:DOWN:SETup:MCARrier:TOFFset:AInCrement**

**Supported**            E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:TOFFset:  
AInCrement

This command will sort carriers by frequency offset and auto-increment timing offsets. The new values will start with the current timing offset for the lowest frequency carrier and increment by one for each subsequent carrier.

**Key Entry**            **Increment Timing Offset**

### **:LINK:DOWN:SETup:STORe**

**Supported**            E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:STORe "<file name>"

This command stores the current downlink setup information into the memory catalog with the entered file name.

Along with the contents of the W-CDMA channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- increment scramble code
- increment timing offset
- link
- spread type

**Wideband CDMA ARB Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)**

spread rate  
 ARB reference clock source (internal or external)  
 ARB reference clock frequency  
 clipping  
 multicarrier spacing  
 radio configuration

**Key Entry**            **Store Custom W-CDMA State**

**Remarks**            Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:LINK:DOWN:SETup:TABLE:APPLY**

**Supported**            E4438C with Option 400

[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:TABLE:APPLY

This command generates a W-CDMA signal based on the current values in the W-CDMA channel setup table editor.

**Key Entry**            **Apply Channel Setup**

**:LINK:DOWN:SETup:TABLE:CHANnel**

**Supported**            E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:TABLE:CHANnel INIT |
APPend | <chan_num>, <chan_type>, <symbol_rate>, <spread_code>, <power>,
<timing_offset>, <TFCI>, <TPC>, <scramble_code>, STANdard | RALTErnate |
LALTErnate, <scramble_offset>, RANDom | PN9 | PINdicator |
<data_val>, <TFCI_power>, <TPC_power>, <pilot_power>, <pilot_bits>
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:TABLE:CHANnel? <chan_num>
```

This command sets up the W-CDMA downlink channel type parameters.

Use INIT to clear the table editor and define the parameters for the first channel; use APPend to add new channels. To edit an existing channel, use its channel number <chan\_num>.

The <power>, <TFCI\_power>, <TPC\_power>, and <pilot\_power> variables are expressed in units of decibels (dB).

The channel type, symbol rate, spread code, power, timing offset, TFCI value, TPC value, scramble code, scramble type, scramble offset, data type, TFCI power, TPC power, pilot power, and the number of pilot bits are returned when a query is initiated. The output format is as follows:

```
<chan_type>, <symbol_rate>, <spread_code>, <power>, <tDPCH_offset>, <TFCI>,
<TPC>, <scramble_code>, <scramble_type>, <scramble_code>, <scramble_offset>,</pre>

```

<data\_type>, <TFCI\_power>, <TPC\_power>, <pilot\_power>, <pilot\_bits>

INIT This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

APPend This choice adds a row to an existing table.

<chan\_num> This variable sets the physical channel number.

<chan\_type> This variable sets the channel type.

<timing\_offset> This variable sets the symbol offset.

<TFCI> This variable sets the transport format combination indicator.

<TPC> This variable sets the transmit power control.

STANdard This choice sets the scramble type to standard.

RALternate This choice sets the scramble type to right alternate.

LALternate This choice sets the scramble type to left alternate.

RANDom This choice sets a randomly generated pseudo-random sequence pattern as output data.

PN9 This choice sets an internally generated 9-bit pseudo-random sequence pattern as output data.

PINDicator This choice sets the paging indicator channel (PICH).

<data\_val> This variable sets the data value.

<TFCI\_power> This variable sets the transport format combination indicator power offset.

<TPC\_power> This variable sets the transport power control power offset.

<pilot\_power> This variable sets the pilot power offset.

<pilot\_bits> This variable sets the number of pilot bits that will be in the dedicated physical channel (DPCH).

**Table 5-1 Variables and Channel Types**

	<b>SSCH</b>	<b>CPICH</b>	<b>PCCPCH</b>	<b>SCCPCH</b>	<b>PICH</b>	<b>DPCH</b>	<b>OCNS</b>	<b>PSCH</b>
Channel number	X	X	X	X	X	X	X	X
Symbol rate	N/A	N/A	N/A	X	N/A	X	X	N/A
Spread code	N/A	X	X	X	X	X	X	N/A

**Table 5-1** Variables and Channel Types

	<b>SSCH</b>	<b>CPICH</b>	<b>PCCPCH</b>	<b>SCCPCH</b>	<b>PICH</b>	<b>DPCH</b>	<b>OCNS</b>	<b>PSCH</b>
Power	X	X	X	X	X	X	X	X
Symbol offset	N/A	N/A	N/A	N/A	X	X	N/A	N/A
TFCI	N/A	N/A	N/A	X	N/A	X	N/A	N/A
TPC	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A
Scramble code	X	X	X	X	X	X	X	N/A
Standard	X	X	X	N/A	X	X	X	N/A
Right alternate	X	X	X	N/A	X	X	X	N/A
Left alternate	X	X	X	N/A	X	X	X	N/A
Scramble offset	X	X	X	X	X	X	X	N/A
Random	N/A	N/A	X	X	X	X	X	N/A
PN9	N/A	N/A	X	X	X	X	X	N/A
Paging Indicator	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A
Data value	N/A	N/A	X	N/A	X	X	X	N/A
TFCI power	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A
Pilot power offset	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A
Pilot bits	N/A	N/A	N/A	X	X	N/A	N/A	N/A

**Table 5-2** Variables and Channel Types

	<b>HSPDSCH</b>	<b>HSSCCH</b>
Channel number	X	X
Symbol rate	N/A (fixed to 30ksps)	N/A (fixed to 240ksps)
Spread code	X	X

**Table 5-2**                      **Variables and Channel Types**

	<b>HSPDSCH</b>	<b>HSSCCH</b>
Power	X	X
Symbol offset	X	X
TFCI	N/A	N/A
TPC	N/A	N/A
Scramble code	X	X
Standard	X	X
Right alternate	X	X
Left alternate	X	X
Scramble offset	X	X
Random	X	X
PN9	X	X
Paging Indicator	N/A	N/A
Data value	X	X
TFCI power	N/A	N/A
Pilot power offset	N/A	N/A
Pilot bits	N/A	N/A

```
*RST      <chan_type>: DPCH  <symbol_rate>: +3.00000000E+004
          <spread_code>: +8   <scramble_offset>: +0.00000000E+000
          power: +0.00000000E+000   <tDPCH_offset>: +0   <TFCI>: +0
          <TPC>: #H5555   <scramble_code>: +0   scramble type: STAN
          <TFCI_power>: +0.00000000E+000
          <TPC_power>: +0.00000000E+000   <pilot_power>: +0.00000000E+000
          <pilot_bits>: +4
```

**Wideband CDMA ARB Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)**

**Range** <chan\_type>: PSCH SSCH CPICH PCCPch SCCPch  
 DPCH PICH OCNS HSSCch HSPDsch  
 <power>: -40 to 0 <tDPCH\_offset>: 0-149 <TFCI>: 0-1023  
 <TPC>: 0000-7FFF <scramble\_code>: 0-511  
 <scramble\_offset>: 0-15 <data\_val>: 00000000-11111111  
 <TFCL\_power>: -20 to 20 <TPC\_power>: -20 to 20  
 <pilot\_power>: 0000-7FFF <pilot\_bits>: 0-511

**SCCPCH Channel**

<symbol_rate>	<spread_code>	*<pilot_bits>
15 ksps	0-256	0,8
30 ksps	0-128	0,8
60 ksps	0-64	0,8
120 ksps	0-32	0,8
240 ksps	0-16	0,16
480 ksps	0-8	0,16
960 ksps	0-4	0,16

**All Other Channels**

<symbol_rate>	<spread_code>	<pilot_bits>
7.5 ksps	0-511	4
15 ksps	0-255	2,4,8
30 ksps	0-127	4,8
60 ksps	0-63	8
120 ksps	0-31	8
240 ksps	0-15	16
480 ksps	0-7	16
960 ksps	0-3	16

**Key Entry**

Channel	Type	Symbol Rate	First Spread Code	Power			
<b>Spread Code</b>		<b>TFCI Field Off On</b>	<b>Scramble Code</b>	<b>Scramble Offset</b>			
<b>Random</b>	<b>PN9</b>	<b>Standard</b>	<b>Left Alternate</b>	<b>Right Alternate</b>			
<b>PCCPCH</b>	<b>SCCPCH</b>	<b>PSCH</b>	<b>SSCH</b>	<b>CPICH</b>	<b>DPCH</b>	<b>PICH</b>	<b>OCNS</b>
<b>HSPDsch</b>	<b>HSSCCH</b>						

**Field Entry**

Spread Code	Power	Timing Offset	TFCI	Scramble Code
TFCI Power	TPC Power	Pilot Power	Pilot Bits	Data
Scramble Type	Scramble Offset			



**Remarks** For additional information, refer to the 3GPP TS 25.211 (V 3.7) standard.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:LINK:DOWN:SETup:TABLE:APPLY” on page 356.

### **:LINK:DOWN:SETup:TABLE:NCHannels?**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:TABLE:NCHannel?

This command queries the number of channels being used for the carrier.

**\*RST** 1

### **:LINK:DOWN:SETup:TABLE:PADJust**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:TABLE:PADJust EQUalSCALE

This command sets the code domain power.

**EQUal** This choice will adjust all channel powers to have equal energy per symbol, referenced to 7.5 ksps and increasing by 3 dB for each doubling of the symbol rate.

**SCALE** This choice will scale the channel power levels so that the sum of the powers are equal to 0 dB.

**Key Entry** **Equal Energy per Symbol** **Scale To 0dB**

**Remarks** This command is available in downlink only.

### **:LINK:DOWN:TFCI**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:TFCI ON|OFF|1|0

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:TFCI?

This command enables or disables the transport format combination indicator (TFCI) field for all channels.

**\*RST** 1

**Key Entry** **TCFI Field Off On**

**:LINK:UP:OACP****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:OACP ADJ|ALT  
[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:OACP?

This command selects the channel power optimization type for any uplink channel W-CDMA setup.

**ADJ** This choice optimizes for adjacent channel power.**ALT** This choice optimizes for alternate channel power.**\*RST** ADJ**Key Entry** **Optimize ACP ADJ ALT****Remarks** This command is only operational for any uplink channel W-CDMA setup.

To change the current W-CDMA setup information, refer to “:LINK:UP:SETup” on page 363.

**:LINK:UP:SCRAMBLE****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:SCRAMBLE <val>  
[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:SCRAMBLE?

This command sets the scramble code for the uplink.

**\*RST** #H000000**Range** #H0–FFFFFFF**Key Entry** **Scramble Code****:LINK:UP:SDPDch****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:SDPDch I|Q  
[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:SDPDch?

This command selects whether the second dedicated physical data channel (SDPDCH) will be put onto I or Q.

**\*RST** Q**Key Entry** **Second DPDCH I Q**

**:LINK:UP:SETup**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup DPCCH|DDPDCH1|DDPDCH2|
DDPDCH3|DDPDCH4|DDPDCH5|"<file name>"
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup?
```

This command selects a dedicated physical control channel (DPCCH) for uplink with the option to add one or more dedicated physical data channel (DPDCH) or a previously stored setup.

DPCCH	This choice selects 1 dedicated physical control channel.
DDPDCH1	This choice selects 1 dedicated physical control channel and 1 dedicated physical data channel.
DDPDCH2	This choice selects 1 dedicated physical control channel and 2 dedicated physical data channel.
DDPDCH3	This choice selects 1 dedicated physical control channel and 3 dedicated physical data channel.
DDPDCH4	This choice selects 1 dedicated physical control channel and 4 dedicated physical data channel.
DDPDCH5	This choice selects 1 dedicated physical control channel and 5 dedicated physical data channel.

**\*RST** DPCCH

Key Entry	<b>DPCCH</b>	<b>DPCCH + 1 DPDCH</b>	<b>DPCCH + 2 DPDCH</b>	<b>DPCCH + 3 DPDCH</b>
	<b>DPCCH + 4 DPDCH</b>	<b>DPCCH + 5 DPDCH</b>	<b>Custom WCDMA State</b>	

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:LINK:UP:SETup:TABLE:APPLY” on page 364](#).

**:LINK:UP:SETup:STORe**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:STORe "<file name>"
```

This command stores the current state into a designated file name.

**Key Entry** **Store To File**

**Remarks** You can recall a saved state from signal generator memory (non-volatile) by executing the following commands (using a designated file name):

For downlink, refer to “:LINK:DOWN:SETup” on page 348.

For uplink, refer to “:LINK:UP:SETup” on page 363.

Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:LINK:UP:SETup:TABLE:APPLy**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:APPLy
```

This command applies the signal based on the current values in the W-CDMA channel setup table editor.

**Key Entry** **Apply Channel Setup**

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:LINK:UP:SETup:TABLE:CHANnel**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:CHANnel  
INIT|APPend|<chan_num>,<chan_type>,<symbol_rate>,<spread_code>,<power>,<TF  
CI>,<TCP>,<RANDOM|<data_val>,<fbi_bits_count>,<fbi_bits_value>  
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:CHANnel? <chan_num>
```

This command defines the channel parameters of the signal.

Use INIT to clear the table editor and define the parameters for the first channel; use APPend to add new channels. To edit an existing channel, use its channel number <chan\_num>.

The variable <power> is expressed in units of decibels (dB).

## Wideband CDMA ARB Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP:ARB)

The channel type, symbol rate, spread code, power, TFCI value, TPC value, data value, FBI bit count, and FBI bit value are returned when a query is initiated. The output format is as follows:

```
<chan_type>, <symbol_rate>, <spread_code>, <power>, <TFCI>, <TCP>, <data_val>,
<fbi_bits_count>, <fbi_bits_value>
```

**INIT** This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

**APPend** This choice adds a row to an existing table.

**RANDom** This choice selects random data format for the digital modulation signal.

**<fbi\_bits\_count>** This variable sets the number of feedback information (FBI) bits.

**<fbi\_bits\_value>** This variable sets the value of the FBI bits.

```
*RST      <chan_type>: DPCH      <symbol_rate>: +1.50000000E+
          <spread_code>: +0      <power>: +0.00000000E+000      <TFCI>: +0
          <TPC>: #H5555      <data_val>: RAND      <FBI Bits Count: +0
          <FBI Bit Count: +0
```

```
Range   <power>: -40 to 0      <data_val>: 00000000-11111111
          <fbi_bits_count>: 0-2      <fbi_bits_value>: 0-3
```

<b>&lt;symbol_rate&gt;</b>	<b>&lt;spread_rate&gt;</b>
7.5 ksps	0-511
15 ksps	0-255
30 ksps	0-127
60 ksps	0-63
120 ksps	0-31
240 ksps	0-15
480 ksps	0-7
960 ksps	0-3

<b>Key Entry</b>	<b>Channel</b>	<b>Type</b>	<b>Symbol Rate</b>	<b>First Spread Code</b>	<b>Power</b>
	<b>Spread Code</b>		<b>TFCI Field Off On</b>	<b>Scramble Code</b>	<b>Scramble Offset</b>
	<b>Random</b>				

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:LINK:UP:SETup:TABLE:APPLY” on page 364](#).

**:LINK:UP:SETup:TABLE:GUNit**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:GUNit DB|LINear|INDex
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:GUNit?
```

This command selects the uplink power measurement units.

**DB** The power is set in decibels-exponential.

**LINear** The power is set to increase linearly.

**INDex** The power is set at an index level - steps.

**\*RST** DB

**Key Entry** **Gain Unit dB Lin Index**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:LINK:UP:SETup:TABLE:APPLY”](#) on page 364.

**:LINK:UP:SETup:TABLE:NCHannel**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:NCHannels?
```

This command queries the setup table for the number of uplink channels.

**\*RST** 1

**:LINK:UP:TFCI**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:UP:TFCI ON|OFF|1|0
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:UP:TFCI?
```

This command enables or disables the transport format combination indicator (TFCI) field for all channels in the table.

**\*RST** 1

**Key Entry** **TFCI Field Off On**

**:MDEStination:AAMPlitude****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4
[:SOURCE]:RADio:WCDMa:TGPP:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker to the Alternate Amplitude function.

**\*RST** NONE

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
------------------	-------------	-----------------	-----------------	-----------------	-----------------

**:MDEStination:ALCHold****Supported** E4438C with Option 400

---

**CAUTION** Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4
[:SOURCE]:RADio:WCDMa:TGPP:ARB:MDEStination:ALCHold?
```

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “:MARKer:[SET]” on page 302.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 370.

---

**NOTE** Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

---

For more information on the marker ALC hold function, see the *E4428C/38C ESG Signal Generators User’s Guide*. For setting the marker points, see “:MARKer:[SET]” on page 302.

NONE This terminates the marker ALC hold function.

M1–M4 These are the marker choices. The ALC hold feature uses only one marker at a time.

\*RST NONE

**Example**

```
:RAD:AWGB:ARB:MDES:ALCH M1
```

The preceding example routes marker 1 to the ALC Hold function.

<b>Key Entry</b>	<b>None</b>	<b>Marker 1</b>	<b>Marker 2</b>	<b>Marker 3</b>	<b>Marker 4</b>
<b>Remarks</b>	N/A				

**:MDEStination:PULSe**

**Supported** E4438C with Option 400

---

**CAUTION** The pulse function uses the ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

---

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:MDEStination:PULSe?
```

This command enables or disables the marker pulse/RF blanking function for the selected marker.



This function automatically uses the ALC hold function, so there is no need to select both the ALC hold and the pulse/RF blanking for the same marker.

---

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

---

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 370.

---

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 302 for setting the marker points.

---

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

---

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

---

For more information on the marker RF blanking function, see the *E4428C/38C ESG Signal Generators User’s Guide*.

**NONE** This terminates the marker RF blanking/pulse function.

**M1–M4** These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

### Example

```
:RAD:ARB:MDES:PULS M2
```

The preceding example routes marker 2 to Pulse/RF Blanking.

```
*RST NONE
```

Key Entry	None	Marker 1	Marker 2	Marker 3	Marker 4
-----------	------	----------	----------	----------	----------

**:MPOLarity:MARKer1 | 2 | 3 | 4**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 ?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

**\*RST** POS

**Key Entry**      **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

**:REFerence:EXTernal:FREQuency**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:REFerence:EXTernal:FREQuency <val>
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:REFerence:EXTernal:FREQuency ?
```

This command sets the external reference frequency.

The variable <val> is expressed in hertz (Hz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to  
[“:REFerence\[:SOURce\]” on page 370.](#)

**:REFerence[:SOURce]**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:REFerence [ :SOURce ] INTernal | EXTernal
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:REFerence [ :SOURce ] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** 0

<b>Key Entry</b>	<b>ARB Reference Ext Int</b>
<b>Remarks</b>	<p>If the EXTERNAL choice is selected, the external frequency value <i>must</i> be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.</p> <p>Refer to “:REFERENCE:EXTERNAL:FREQUENCY” on page 370 to enter the external reference frequency.</p>

**:RETRigger**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:RETRigger ON | OFF | IMMEDIATE
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:RETRigger?
```

This command sets the retrigger mode.

ON	This choice specifies that if a trigger occurs while a waveform is initiated, the waveform will retrigger at the end of the previous waveform sequence and play once more.
OFF	This choice specifies that if a trigger occurs while a waveform is initiated, the action will be ignored.
IMMEDIATE	This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** 0

**Key Entry** **Retrigger Mode Off On**

**:REVISION**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:REVISION?
```

This command checks the 3GPP supported standard for the arbitrary waveform generator firmware.

**:SCLock:RATE**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:SCLock:RATE <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the W-CDMA modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATE]” on [page 378](#) to activate the modulation format.

**:TRIGger:TYPE**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:TRIGger:TYPE CONTinuous | SINGLE | GATE
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:TRIGger:TYPE?
```

This command sets the trigger mode (type) that controls the waveform’s playback.

Triggers control the playback by telling the ESG when to play the modulating signal (waveform). Depending on the trigger settings for the ESG, the waveform playback can occur once, continuously, or the ESG may start and stop playing the waveform repeatedly (GATE mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the ESG to trigger on either state of the trigger signal. It is common to have multiple triggers, also referred to as trigger occurrences or events, occur when the signal generator requires only a single trigger. In this situation, the ESG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the waveform. This is because the ESG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the waveform’s final I and Q levels determine whether you will see the carrier signal or not (zero = no carrier, other values = carrier visible). At the end of most files, the final I and Q points are set to a value other than zero.

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the waveform’s transmission.
- Setting the waveform’s response to triggers:
  - CONTInuous, see “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 374
  - SINGle, see “:RETRigger” on page 371
  - GATE, selecting the mode also sets the response
- Selecting the trigger source (see “:TRIGger[:SOURCE]” on page 375), which determines how the ESG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.
- Setting the trigger polarity when using an external source:
  - CONTInuous and SINGle see “:TRIGger[:SOURCE]:EXTernal:SLOPe” on page 377
  - GATE, see “:TRIGger:TYPE:GATE:ACTive” on page 374

For more information on triggering, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the trigger type command choices:

CONTInuous	Upon triggering, the waveform repeats continuously.
SINGle	Upon triggering, the waveform segment or sequence plays once.
GATE	An external trigger signal repeatedly starts and stops the waveform’s playback (transmission). The time duration for playback depends on the duty period of the trigger signal and the gate polarity selection (see “:TRIGger:TYPE:GATE:ACTive” on page 374). The waveform plays during the inactive state and stops during the active polarity selection state. The active state can be set high or low. The gate mode works only with an external trigger source.

---

**NOTE** The ARB gating behavior described above is opposite to the gating behavior for real-time custom mode.

---

<b>*RST</b>	CONT		
<b>Key Entry</b>	<b>Continuous</b>	<b>Single</b>	<b>Gated</b>

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:TRIGger:CONTInuous [ :TYPE ] FREE |
TRIGger | RESet
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:TRIGger:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform's response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see [“:TRIGger:TYPE” on page 372](#).

The following list describes the waveform's response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
*RST	FREE
<b>Key Entry</b>	<b>Free Run      Trigger &amp; Run      Reset &amp; Run</b>

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:TRIGger:TYPE:GATE:ACTive LOW | HIGH
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see [“:TRIGger:TYPE” on page 372](#).

The following list describes the ESG's gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
*RST	HIGH
Key Entry	Gate Active Low High

**:TRIGger[:SOURCE]**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMA:TGPP:ARB:TRIGger [ :SOURCE ] KEY | EXT | BUS
[ :SOURCE ] :RADio:WCDMA:TGPP:ARB:TRIGger [ :SOURCE ] ?
```

This command sets the trigger source.

For more information on triggering, see “[:TRIGger:TYPE](#)” on page 372. The following list describes the command choices:

KEY	This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.
EXT	An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “[:TRIGger\[:SOURCE\]:EXTErnal\[:SOURCE\]](#)” on page 377.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.

- The trigger signal polarity:
  - gating mode, see “[:TRIGger:TYPE:GATE:ACTive](#)” on page 374
  - continuous and single modes, see “[:TRIGger\[:SOURCE\]:EXTErnal:SLOPe](#)” on page 377
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “[:TRIGger\[:SOURCE\]:EXTErnal:DELAy](#)” on page 376
  - turning the delay on, see “[:TRIGger\[:SOURCE\]:EXTErnal:DELAy:STATe](#)” on page 376

**Wideband CDMA ARB Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)**

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**Key Entry**      **Trigger Key**      **Bus**      **Ext**

**:TRIGger[:SOURce]:EXTernal:DELay**

**Supported**      E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command sets the amount of time to delay the ESG's response to an external trigger.

The delay is a path (time) delay between when the ESG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of two seconds, causes the ESG to wait two seconds after receipt of the trigger before the ESG plays the waveform.

The delay does not occur until you turn it on (see “[:TRIGger\[:SOURce\]:EXTernal:DELay:STATe](#)” on [page 376](#)). You can set the delay value either before or after turning it on.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURce\]](#)” on [page 375](#).

The unit of measurement for the variable <val> is in seconds (nsec–sec).

**\*RST**      +1.00000000E–003

**Range**      1E–8 to 4E1

**Key Entry**      **Ext Delay Time**

**Remarks**      This command is effective only if an external trigger is selected as the trigger source. Refer to “[:TRIGger\[:SOURce\]](#)” on [page 375](#).

**:TRIGger[:SOURce]:EXTernal:DELay:STATe**

**Supported**      E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay:
STATe ON|OFF|1|0
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?
```

This command enables or disables the arbitrary waveform generator's external trigger delay.



For setting the delay time, see “:TRIGger[:SOURCE]:EXTErnal:DELay” on page 376, and for more information on configuring an external source, see “:TRIGger[:SOURCE]” on page 375.

\*RST 0

**Key Entry** Ext Delay Off On

### :TRIGger[:SOURCE]:EXTErnal:SLOPe

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURCE]:EXTErnal:
SLOPe POSitive|NEGative
```

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURCE]:EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 374.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 375.

\*RST NEG

**Key Entry** Ext Polarity Neg Pos

### :TRIGger[:SOURCE]:EXTErnal[:SOURCE]

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURCE]:EXTErnal
```

```
[:SOURCE] EPT1|EPT2|EPTRIGGER1|EPTRIGGER2
```

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURCE]:EXTErnal[:SOURCE]?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 375. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

**Wideband CDMA ARB Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)**

The following list describes the command choices:

<b>EPT1</b>	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
<b>EPT2</b>	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>EPTRIGGER1</b>	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
<b>EPTRIGGER2</b>	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Choices</b>	EPT1    EPT2    EPTRIGGER1    EPTRIGGER2

**[:STATe]**

**Supported**            E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB [ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :RADio:WCDMa:TGPP:ARB [ :STATe ] ?
```

This command enables or disables the W-CDMA modulation format.

<b>ON (1)</b>	This choice enables the W-CDMA modulation capability and sets up the internal hardware to generate the currently selected W-CDMA signal selection.
<b>OFF (0)</b>	This choice disables the W-CDMA baseband signal capability.
<b>*RST</b>	0
<b>Key Entry</b>	<b>W-CDMA Off On</b>
<b>Remarks</b>	This choice also activates the I/Q state and sets the I/Q source to internal.

---

## 6 Digital Signal Interface Module Commands

This chapter provides SCPI descriptions for commands available with the N5102A Digital Signal Interface Module. Refer to the *E4428C/38C ESG Signal Generators User's Guide* and *E4428C/38C ESG Signal Generators Key and Data Field Reference* for more information on the N5102A module.

- [“Digital Subsystem—Option 003 and 004 \(\[:SOURce\]\)” on page 380](#)

## Digital Subsystem—Option 003 and 004 ([:SOURce])

### :DIGital:CLOCK:CPS 1|2|4

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:CPS 1|2|4  
:DIGital:CLOCK:CPS?
```

This command selects the number of clock cycles per sample. The command is used with parallel or parallel interleaved port configurations. If this command is executed with a serial port configuration or an IF signal type, the parameter value is changed, but it is not used by the interface module until the port configuration is changed to parallel or parallel interleaved, *and* the signal type is changed to IQ.

The query returns the currently set value. Regardless of the port configuration, you must query all four states (clocks per sample, port configuration, data direction, and signal type) to know the interface module's current setup.

#### Example

```
:DIG:CLOC:CPS 2
```

The preceding example sets two clock cycles for each sample.

**\*RST** 1

**Range** 1,2,or 4

**Key Entry** **Clocks Per Sample**

### :DIGital:CLOCK:PHASe

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:PHASe <val>  
:DIGital:CLOCK:PHASe?
```

This command sets the phase for the clock relative to the leading edge transition of the data. At 0 degrees the clock and leading edge of the data signal are aligned. Any phase value between 0 and 360 degrees can be used in the command, however, the signal generator rounds up or down to get 90, 180, 270 and 0 degree settings. For example, entering 140 degrees will cause the signal generator to use the 180 degree setting.

If this command is executed when the clock rate is less than 10 MHz or greater than 200 MHz, the resolution changes to 180 degrees, and the maximum phase defaults to 180 degrees.

### Example

```
:DIG:CLOC:PHAS 90DEG
```

The preceding example sets the clock phase to 90 degrees. The clock signal leading edge transition will be delayed by 1/4 of a clock period relative to the leading edge data transition.

**\*RST** +0.00000000E+000

**Range** 0 – 360 deg

**Key Entry** **Clock Phase**

### :DIGital:CLOCK:POLarity

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:POLarity POSitive|NEGative
```

```
:DIGital:CLOCK:POLarity?
```

This command sets the alignment for the clock signal to positive or negative. Positive selects the leading edge transition of the clock signal to align with the leading edge data transition and negative selects the falling edge transition of the clock signal to align with the leading edge of the data.

### Example

```
:DIG:CLOC:POL NEG
```

The preceding example sets the clock falling edge transition to align with the leading edge data transition.

**\*RST** POS

**Key Entry** **Clock Polarity**

## :DIGital:CLOCK:RATE

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:RATE <val>  
:DIGital:CLOCK:RATE?
```

This command sets the clock rate. If an external clock is used, the rate set with this command must match the external clock rate. Only clock phase settings of 0 or 180 degrees are valid for a clock rate setting below 10 MHz or above 200 MHz. The variable <val> is expressed in hertz

### Example

```
:DIG:CLOC:RATE 200MHZ
```

The preceding example sets the clock rate to 200 megahertz.

**\*RST** +1.00000000E+008

**Range** 1 kHz–400 MHz

**Key Entry** Clock Rate

## :DIGital:CLOCK:REFERENCE:FREQUENCY

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:REFERENCE:FREQUENCY <freq>  
:DIG:CLOC:REF:FREQ?
```

This command allows you to specify the frequency of the external reference supplied to the Freq Ref connector. This command is valid only when the clock source is set to internal.

If this command is executed when the clock source is not set to internal, the parameter value is changed, but it is not used by the signal generator until the clock source is changed to internal.

Because a query returns the currently set value, regardless of the clock source, you must query both states (reference frequency and clock source) to know the signal generator's current setup.

### Example

```
:DIG:CLOC:REF:FREQ 50MHZ
```

The preceding example specifies a 50 megahertz external reference frequency.

**\*RST** +1.00000000E+007

**Range** 1kHz–100 MHz

**Key Entry** Reference Frequency

## **:DIGital:CLOCK:SKEW**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:SKEW <val>  
:DIGital:CLOCK:SKEW?
```

This command sets the clock signal skew value. The skew is a fine-tune adjustment for the course tune clock phase function and helps to align the clock with valid data states. This is useful at high clock rates and available only for clock frequencies above 10 megahertz. The variable <val> is expressed in nanoseconds.

### **Example**

```
:DIG:CLOC:SKEW 2NS
```

The preceding example sets the clock skew to 2 nanoseconds.

**\*RST** +0.00000000E+000

**Range** -5ns to 5ns

**Key Entry** **Clock Skew**

## **:DIGital:CLOCK:SOURCe**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:CLOCK:SOURCe INTernal|EXTernal|DEVice  
:DIG:CLOC:SOURCe?
```

This command selects one of three possible clock sources.

### **Example**

```
:DIG:CLOC:SOUR DEV
```

The preceding example uses the “Device Interface Connector” input clock.

**\*RST** INT

**Key Entry** **Clock Source**

### **:DIGital:DATA:ALIGNment**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:ALIGNment MSB|LSB  
:DIGital:DATA:ALIGNment?
```

This command selects the bit alignment for a word less than 16 bits in length. The MSB (most significant bit) selection maintains the MSB of the word on the same data line while the LSB (least significant bit) will move depending on the word size. The opposite effect occurs when the alignment is set to LSB.

#### **Example**

```
:DIG:DATA:ALIG MSB
```

The preceding example sets the MSB word format.

**\*RST** LSB

**Key Entry** Word Alignment

### **:DIGital:DATA:BORDER**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:BORDER MSB|LSB  
:DIGital:DATA:BORDER?
```

This command selects the bit order for data transmitted through the N5102A module. Data can be in least significant (LSB) bit first or most significant (MSB) bit first.

#### **Example**

```
:DIG:DATA:BORD MSB
```

The preceding example specifies data in MSB first format.

**\*RST** LSB

**Key Entry** Bit Order



## **:DIGital:DATA:DIRection**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:DIRection OUTPut | INPut  
:DIGital:DATA:DIRection?
```

This command selects an input or output direction for data flow through the N5102A module.

### **Example**

```
:DIG:DATA:DIR INP
```

The preceding example selects input as the direction of data flow.

**\*RST** OUTP (unless only Option 004 is installed)

**Key Entry**            **Direction**

## **:DIGital:DATA:IGain**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:IGain <val>  
:DIGital:DATA:IGain?
```

This command adjust the gain of the I data in the N5102A module. The adjustment does not affect the Q data.

The variable <val> is expressed as a percentage delta from 100%. The offset is an adjustment to the analog level that is represented by the digital sample. The analog voltage is limited to a 16-bit data sample.

### **Example**

```
:DIG:DATA:IG 10
```

The preceding example sets the I data gain to 10%.

**\*RST** +0.00000000E+000

**Range** -12.5 through 12.5

**Key Entry**            **I Gain**

## :DIGital:DATA:INEGate

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:INEGate OFF|ON|0|1  
:DIGital:DATA:INEGate?
```

This command enables or disables the negation of the I data sample. Negation changes the sample by expressing it in two's complement form, multiplying by negative one, and converting back to the selected numeric format. This can be done for I samples, Q samples, or both.

The sample or word represents a quantized analog voltage level. This analog voltage can be added or multiplied. For a 16-bit sample, the range is from 0 to 65535 in offset binary or -32768 to +32767 in 2's complement mode.

### Example

```
:DIG:DATA:INEG ON
```

The preceding example enables negation of the I data.

```
*RST 0
```

**Key Entry**        **Negate I**

## :DIGital:DATA:IOFFset

Supported E4438C Option with option 003

```
:DIGital:DATA:IOFFset <val>  
:DIGital:DATA:IOFFset?
```

This command adjusts the DC offset for I data. The command is available for the N5102A module output mode. The variable <val> is expressed as a +/- 100% of the full scale value.

### Example

```
:DIG:DATA:IOFF 40
```

The preceding example sets the I offset to 40% of full scale.

```
*RST +0.00000000E+000
```

**Range**            -100 to +100

**Key Entry**        **I Offset**

## **:DIGital:DATA:IQSWap**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:IQSWap OFF|ON|0|1  
:DIGital:DATA:IQSWap?
```

This command enables or disables swapping of the I and Q data. When enabled, the I data is sent to the N5102A's Q bus and the Q data is sent to the I bus.

### **Example**

```
:DIG:DATA:IQSW ON
```

The preceding example enables swapping of I and Q data.

**\*RST** 0

**Key Entry** **Swap IQ**

## **:DIGital:DATA:NFORmat**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:NFORmat OBINary|TCOMplement  
:DIGital:DATA:NFORmat?
```

This command selects the binary format used to represent the transmitted data values. The selections are offset binary or 2's complement.

### **Example**

```
:DIG:DATA:NFOR OBIN
```

The preceding example selects the offset binary format to represent data values.

**\*RST** TCOM

**Key Entry** **Numeric Format**

## **:DIGital:DATA:POLarity:FRAME**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:POLarity:FRAMe POSitive|NEGative  
:DIGital:DATA:POLarity:FRAMe?
```

This command selects the polarity of the frame marker for serial transmission. The frame marker indicates the beginning of each sample or byte of data. The command is valid for serial transmission only.

**Digital Subsystem—Option 003 and 004 ([:SOURce])**

- POS                    This choice selects a positive polarity. The frame marker is high for the first data sample.
- NEG                   This choice selects a negative polarity. The frame marker is low for the first data sample.

**Example**

```
:DIG:DATA:POL:FRAM NEG
```

The preceding example selects a negative polarity for the frame marker.

**\*RST**                POS

**Key Entry**         **Frame Polarity**

**:DIGital:DATA:POLarity:IQ**

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:POLarity:IQ POSitive|NEGative
```

```
:DIGital:DATA:POLarity:IQ?
```

This command selects the logic level for I and Q data. Positive selects a high logic level at the output as a digital one and negative selects a low logic level at the output as a digital one.

POS                   This choice selects a logic high level as digital one.

NEG                   This choice selects a logic low level as a digital one.

**Example**

```
:DIG:DATA:POL:IQ NEG
```

The preceding example sets low level logic.

**\*RST**                POS

**Key Entry**         **IQ Polarity**

**:DIGital:DATA:QGain**

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:QGain <val>
```

```
:DIGital:DATA:QGain?
```

This command adjusts the gain for Q data in the N5102A module. The adjustment does not affect the I data.

The variable <val> is expressed as a percentage delta from 100%. The offset is an adjustment to the analog level that is represented by the digital sample. The analog voltage is limited to a 16-bit data sample.

**Example**

```
:DIG:DATA:QG 10
```

The preceding example increases the gain for Q data by 10%.

**\*RST** +0.00000000E+000

**Range** -12.5 through 12.5

**Key Entry** **Q Gain**

**:DIGital:DATA:QNEGate**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:QNEGate OFF|ON|0|1
```

```
:DIGital:DATA:QNEGate?
```

This command enables or disables the negation of the Q data sample. Negation changes the sample by expressing it in two's complement form, multiplying by negative one, and converting back to the selected numeric format.

The sample or word represents a quantized analog voltage level. This analog voltage can be added or multiplied. For a 16-bit sample, the range is from 0 to 65535 in offset binary or -32768 to +32767 in 2's complement mode.

**Example**

```
:DIG:DATA:QNEG ON
```

The preceding example enables negation of the Q data.

**\*RST** 0

**Key Entry** **Negate Q**

### **:DIGital:DATA:QOFFset**

Supported            E4438C Option with option 003

```
:DIGital:DATA:QOFFset <val>  
:DIGital:DATA:QOFFset?
```

This command adjusts the DC offset for Q data. The command is available for the N5102A module output mode. The variable <val> is expressed as a +/- 100% of the full scale value.

#### **Example**

```
:DIG:DATA:QOFF 40
```

The preceding example sets the Q offset to 40% of full scale.

**\*RST**                +0.00000000E+000

**Range**              -100 through 100

**Key Entry**         **Q Offset**

### **:DIGital:DATA:ROTation**

Supported            E4438C Option with option 003

```
:DIGital:DATA:ROTation <val>  
:DIGital:DATA:ROTation?
```

This command rotates the IQ data in the IQ plane. This command is valid for the N5102A output mode. The variable <val> is expressed in degrees with a range from 0 to 360.

#### **Example**

```
:DIG:DATA:ROT 45
```

The preceding example rotates the IQ constellation 45 degrees.

**\*RST**                +1.00000000E+000

**Range**              0–360

**Key Entry**         **Rotation**

## **:DIGital:DATA:SCALing**

Supported E4438C Option with option 003

```
:DIGital:DATA:SCALing <val>  
:DIGital:DATA:SCALing?
```

This command enables scaling of the I and Q data to the level indicated by the <val> variable. This command is valid for the N5102A output mode. The variable <val> is expressed as a percentage.

### **Example**

```
:DIG:DATA:SCAL 50
```

The preceding example scales the I and Q data to amplitude to 50%.

**\*RST** +1.00000000E+002

**Range** -100 through 100

**Key Entry** **Scaling**

## **:DIGital:DATA:SIZE**

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:SIZE <val>  
:DIGital:DATA:SIZE?
```

This command selects the number of bits in each sample. A sample can have a maximum word length of 16 bits.

### **Example**

```
:DIG:DATA:SIZE 8
```

The preceding example sets the sample word size to eight bits.

**\*RST** +1.600000000E+001

**Range** 4–16

**Key Entry** **Word Size**

## :DIGital:DATA:STYPe

Supported E4438C Option with option 003

```
:DIGital:DATA:STYPe IQ|IF  
:DIGital:DATA:STYPe?
```

This command selects the output format for the IQ data. The IQ selection outputs digital I and Q data. Whereas the IF (intermediate frequency) selection modulates the I and Q data onto the IF frequency. The IF is calculated as 1/4 the clock sample rate. This command is valid only for the N5102A output mode.

**IQ** This choice outputs I and Q digital data.

**IF** This choice outputs a modulated signal.

### Example

```
:DIG:DATA:STYP IF
```

The preceding example sets the I and Q output data to modulate the intermediate frequency.

```
*RST IQ
```

**Key Entry**      **Signal Type**

## :DIGital:DATA:TYPE

Supported E4438C Option with option 003 or 004 or both

```
:DIGital:DATA:TYPE SAMPlEs|PFSSamPlEs  
:DIGital:DATA:TYPE?
```

This command selects filtered baseband data or unfiltered baseband data as the transmitted data type.

If this command is executed while an ARB modulation format is active, the parameter choice is changed, but it is not *used* by the interface module until a real-time modulation format is turned on.

Because a query returns the current choice, regardless of whether or not an ARB format is active, you must query both states (data type and the modulation format) to know the signal generator's current setup.

**SAMPlEs** This choice selects DAC samples as the data transmitted.

**PFSSamPlEs** This choice selects pre-filtered samples which are unfiltered I and Q data.



### Example

```
:DIG:DATA:TYPE PFS
```

The preceding example sets the data type to pre-filtered I and Q data.

```
*RST          SAMP
```

**Key Entry**            **Data Type**

## :DIGital:DIAGnostic:LOOPback

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:DIAGnostic:LOOPback? DIGBus|CABLe|N5102A|DEVIce
```

This command selects and executes a loop back test that validates the integrity of digital data. Refer to the E4428C/38C ESG Signal Generators Key and Data Field Reference for more information.

DIGBus                This choice selects a loop back test using the Digital Bus Loop Back Fixture test board.

CABLe                 This choice selects a loop back test on the ESG Digital Bus connector at the signal generator side.

N5102A                This choice selects a loop back test for the N5102A module.

DEVIce                This choice selects a loop back test using the LOOP BACK TEST SINGLE ENDED IO DUAL 40 PIN board.

### Example

```
:DIG:DIAG:LOOP? DEV
```

The preceding example runs the diagnostic test on the Single Ended IO Dual 40 Pin device and returns a pass or fail condition.

```
*RST          Device Intfc
```

**Key Entry**            **Loop Back Test Type**

## :DIGital:LOGic[:TYPE]

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:LOGic[:TYPE] LVDS|LVTT1|CMOS15|CMOS18|CMOS25|CMOS33  
:DIGital:LOGic[:TYPE]?
```

This command selects the logic data type used by the device being tested.

LVDS                 This choice selects low voltage differential signaling as the logic data type.

## Digital Signal Interface Module Commands

### Digital Subsystem—Option 003 and 004 ([:SOURce])

LVTT1	This choice selects a low voltage TTL signal as the logic data type.
CMOS15	This choice selects a 1.5 volt CMOS signal as the logic data type.
CMOS18	This choice selects a 1.8 volt CMOS signal as the logic data type.
CMOS25	This choice selects a 2.5 volt CMOS signal as the logic data type.
CMOS33	This choice selects a 3.3 volt CMOS signal as the logic data type.

#### Example

```
:DIG:LOG CMOS15
```

The preceding example selects 1.5 volt CMOS as the logic data type.

```
*RST CMOS33
```

**Key Entry**            **Logic Type**

### :DIGital:PCONfig

Supported            E4438C Option with option 003 or 004 or both

```
:DIGital:PCONfig PARallel|SERial|PINTIQ|PINTI  
:DIGital:PCONfig?
```

This command selects the data transmission type used for communication between the N5102A module and the device under test. Refer to the E4428C/38C ESG Signal Generators Key and Data Field Reference for more information.

PARallel	This choice selects parallel data transmission.
SERial	This choice selects serial data transmission.
PINTIQ	This choice selects parallel interleaving data transmission. The I data is transmitted on the rising clock edge and the Q data on the falling edge.
PINTI	This choice selects parallel interleaving data transmission. The Q data is transmitted on the rising clock edge and the I data on the falling edge.

#### Example

```
:DIG:PCON PINTI
```

The preceding example selects parallel interleaving format

```
*RST PAR
```

**Key Entry**            **Port Config**

## **:DIGital:PRESet:PTHRough**

Supported E4438C Option with option 003 or 004 or both

:DIGital:PRESet:PTHRough

This command sets up the preset condition for the N5102A module and allows transmission of data through the module with no modifications. The command is valid only when a modulation format is active.

### **Example**

:DIG:PRESet:PTHR

The preceding example sets the N5102A module to a preset condition and allows data to pass through unmodified.

**Key Entry**            **Pass Through Preset**

## **:DIGital[:STATe]**

Supported E4438C Option with option 003 or 004 or both

:DIGital[:STATe] 0|1|OFF|ON

:DIGital[:STATe]?

This command enables or disables the operating state of the N5102A module.

### **Example**

:DIG ON

The preceding example turns on the N5102A module.

**\*RST**            **OFF**

**Key Entry**            **N5102A Off On**

Digital Signal Interface Module Commands  
**Digital Subsystem—Option 003 and 004 ([:SOURce])**

---

## 7 Bit Error Rate Test (BERT) Commands

This chapter provides SCPI description for commands dedicated to BERT testing using the E4438C ESG Vector Signal Generator. This chapter contains the following sections:

- “Calculate Subsystem–Option UN7 and 300 (:CALCulate:BERT)” on page 398
- “Data Subsystem–Option UN7 and 300 (:DATA)” on page 408
- “Input Subsystem–Option UN7 (:INPut:BERT[: BASeband])” on page 416
- “Measure Subsystem–Option 300 (:MEASure[:SCALar]:BERT:BTS:LOOPback)” on page 422
- “Sense Subsystem–Options UN7 and 300 ([:SOURce]:SENSE:BERT)” on page 425

---

## Calculate Subsystem—Option UN7 and 300 (:CALCulate:BERT)

### :BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria:ERATe

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria:  
ERATe <val>

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria:ERATe?

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 0.0–1.0

**Key Entry** Error Rate

### :BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria[:SElect]

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:  
CRITeria[:SElect] ERATe|NOLimit

:CALCulate:BERT:BTS:LOOPback:EDGE:ETCH:F43:COMParator:CRITeria[:SElect]?

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** **Error Rate** **No Limits**

### **:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria:ERATe**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria:ERATe <val>  
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria:ERATe?
```

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST**                    +1.00000000E-001

**Range**                 0.0–1.0

**Key Entry**            **Error Rate**

### **:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria[:SElect]**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:  
CRITeria[:SElect] ERATe|NOLimit  
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS5:COMParator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe**                 This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit**              This choice disables the pass/fail indication.

**\*RST**                    NOLimit

**Key Entry**            **Error Rate**        **No Limits**

### **:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria:ERATe**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria:ERATe <val>  
:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria:ERATe?
```

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST**                    +1.00000000E-001

**Range**                 0.0–1.0

**Key Entry**            **Error Rate**

**Calculate Subsystem—Option UN7 and 300 (:CALCulate:BERT)**

**:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:  
CRITeria[:SElect] ERATe|NOLimit

:CALCulate:BERT:BTS:LOOPback:EDGE:MCS9:COMParator:CRITeria[:SElect]?

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** **Error Rate** **No Limits**

**:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria:ERATe**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria:  
ERATe <val>

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria:ERATe?

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +2.00000000E-002

**Range** 0.0–1.0

**Key Entry** **Error Rate**



### **:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:  
CRITeria[:SElect] ERATelNOLimit

:CALCulate:BERT:BTS:LOOPback:EDGE:UNCoded:COMParator:CRITeria[:SElect]?

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** **Error Rate** **No Limits**

### **:BTS:LOOPback:GSM:CS1:COMParator:CRITeria:ERATe**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMParator:CRITeria:  
ERATe <val>

:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMParator:CRITeria:ERATe?

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 0.0–1.0

**Key Entry** **Error Rate**

**Calculate Subsystem—Option UN7 and 300 (:CALCulate:BERT)**

**:BTS:LOOPback:GSM:CS1:COMParator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMParator:
CRITeria[:SElect] ERATelNOLimit
:CALCulate:BERT:BTS:LOOPback:GSM:CS1:COMParator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

**ERATe** This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.

**NOLimit** This choice disables the pass/fail indication.

**\*RST** NOLimit

**Key Entry** **Error Rate** **No Limits**

**:BTS:LOOPback:GSM:CS4:COMParator:CRITeria:ERATe**

**Supported** E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMParator:CRITeria:
ERATe <val>
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMParator:CRITeria:ERATe?
```

This command sets the error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 0.0–1.0

**Key Entry** **Error Rate**

**:BTS:LOOPback:GSM:CS4:COMParator:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMParator:
CRITeria[:SElect] ERATelNOLimit
:CALCulate:BERT:BTS:LOOPback:GSM:CS4:COMParator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

ERATe	This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.	
NOLimit	This choice disables the pass/fail indication.	
*RST	NOLimit	
<b>Key Entry</b>	<b>Error Rate</b>	<b>No Limits</b>

**:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria:ERATe**

<b>Supported</b>	E4438C with Option 300	
	:CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria: ERATe <val> :CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria:ERATe?	
	This command sets the error rate pass/fail threshold value.	
	The variable <val> is a decimal notation representing a percentage value.	
*RST	+1.00000000E-001	
<b>Range</b>	0.0–1.0	
<b>Key Entry</b>	<b>Error Rate</b>	

**:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria[:SElect]**

<b>Supported</b>	E4438C with Option 300	
	:CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator: CRITeria[:SElect] ERATe NOLimit :CALCulate:BERT:BTS:LOOPback:GSM:MCS1:COMParator:CRITeria[:SElect]?	
	This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.	
ERATe	This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the error rate.	
NOLimit	This choice disables the pass/fail indication.	
*RST	ERAT	
<b>Key Entry</b>	<b>Error Rate</b>	<b>No Limits</b>

**Calculate Subsystem—Option UN7 and 300 (:CALCulate:BERT)**

**:BTS:LOOPback:GSM:COMParator:CRITeria:CIB**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CIB <val>

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CIB?

This command sets the Class II residual bit error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +4.00000000E-003

**Range** 0.0–1.0

**Key Entry** **Class Ib RBER**

**:BTS:LOOPback:GSM:COMParator:CRITeria:CII**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CII <val>

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:CII?

This command sets the Class Ib residual bit error rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +2.00000000E-002

**Range** 0.0–1.0

**Key Entry** **Class II RBER**

**:BTS:LOOPback:GSM:COMParator:CRITeria:FERasure**

**Supported** E4438C with Option 300

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:FERasure <val>

:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria:FERasure?

This command sets the frame erasure rate pass/fail threshold value.

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-003

**Range** 0.0–1.0

**Key Entry** **Frame Erasure**

**:BTS:LOOPback:GSM:COMParator:CRITeria[:SElect]**

**Supported**            E4438C with Option 300

```
:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria[:SElect] FERasure|
CLIB|CLII|ANY|NOLimit
:CALCulate:BERT:BTS:LOOPback:GSM:COMParator:CRITeria[:SElect]?
```

This command determines which of the following pass/fail limit (comparator) criteria is applied to the measurement.

- FERasure            This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for frame erasure ratio.
- CLIB                This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the number of Class Ib errors detected in the measurement.
- CLII                This choice reports, on the front panel display of the signal generator, the pass or fail status compared to the specified threshold for the number of Class II errors detected in the measurement.
- ANY                This choice reports, on the front panel display of the signal generator, the pass or fail status compared to all of the specified comparator criteria.
- NOLimit            This choice disables the pass/fail indication.

**\*RST**                NOLimit

<b>Key Entry</b>	<b>Frame Erasure</b>	<b>Class Ib RBER</b>	<b>Class II RBER</b>	<b>Exceeds Any Limit</b>
------------------	----------------------	----------------------	----------------------	--------------------------

**No Limits**

**[:BAsEband]:COMParator:MODE**

**Supported**            E4438C with Option UN7

```
:CALCulate:BERT[:BAsEband]:COMParator:MODE CEND|FHOLD
:CALCulate:BERT[:BAsEband]:COMParator:MODE?
```

This command selects the pass/fail judgement mode of the comparator function.

- CEND                This choice selects the cycle end mode and each BER measurement result is compared with the limit value to make a pass/fail assessment at the end of a cycle.
- FHOLD               This choice selects the fail hold mode and only one fail judgement is allowed during that BER measurement loop. Any failed judgement after the first failure is ignored.

## Bit Error Rate Test (BERT) Commands

### Calculate Subsystem—Option UN7 and 300 (:CALCulate:BERT)

<b>*RST</b>	CEND
<b>Key Entry</b>	<b>Cycle End      Fail Hold</b>
<b>Remarks</b>	For automated tests, the results of this command can be accessed from the rear panel BER TEST OUT pin on the AUX I/O connector. For more information about the rear panel AUX I/O connector pin configuration, refer to the <i>E4428C/38C ESG Signal Generators User's Guide</i> .

### [ :BASEband ] : COMPArator : THReshold

<b>Supported</b>	E4438C with Option UN7
	:CALCulate:BERT[:BASEband]:COMPArator:THReshold <val> :CALCulate:BERT[:BASEband]:COMPArator:THReshold?
	This command specifies the threshold value for the pass/fail judgement function. The variable <val> is a decimal notation representing a percentage value.
<b>*RST</b>	+1.00000000E-002
<b>Range</b>	0.0000001–1.00
<b>Key Entry</b>	<b>Pass/Fail Limits</b>
<b>Remarks</b>	This command is valid only while the BER pass/fail command is active. Refer to “[ :BASEband ] : COMPArator [ :STATe ] ” on page 406.

### [ :BASEband ] : COMPArator [ :STATe ]

<b>Supported</b>	E4438C with Option UN7
	:CALCulate:BERT[:BASEband]:COMPArator[:STATe] ON OFF 1 0 :CALCulate:BERT[:BASEband]:COMPArator[:STATe]?
	This command enables or disables the pass/fail judgement function.
<b>*RST</b>	0
<b>Key Entry</b>	<b>Pass/Fail Off On</b>

### [ :BASEband ] :DISPlay:MODE:

**Supported** E4438C with Option UN7

```
:CALCulate:BERT[:BASEband]:DISPlay:MODE PERCent|SCIENTific  
:CALCulate:BERT[:BASEband]:DISPlay:MODE?
```

This command selects the display mode for the bit error rate (BER) measurement.

**PERCent** This choice reports measurement results as a percentage.

**SCIENTific** This choice reports measurement results in scientific notation.

**\*RST** PERC

**Key Entry** **BER Display % Exp**

### [ :BASEband ] :DISPlay:UPDate:

**Supported** E4438C with Option UN7

```
:CALCulate:BERT[:BASEband]:DISPlay:UPDate CEND|CONT  
:CALCulate:BERT[:BASEband]:DISPlay:UPDate?
```

This command selects the display update mode during bit error rate (BER) measurements.

**CEND** This choice selects the cycle end mode and the previous BER measurement result is displayed during the current measurement cycle.

**CONT** This choice selects the continuous mode and the display shows the real-time intermediate results during that BER measurement cycle.

**\*RST** CONT

**Key Entry** **Update Display Cycle End Cont**

---

## Data Subsystem—Option UN7 and 300 (:DATA)

### :BERT:BTS:LOOPback:EDGE:ETCH:F43[:DATA]

**Supported** E4438C with Option 300

```
:DATA:BERT:BTS:LOOPback:EDGE:ETCH:F43[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse
```

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

IEC	This choice provides the intermediate error count with the following range: <Integer> 0 to 1500000.
IEBC	This choice provides the intermediate non-erased bit error blocks with the following range: <Integer> 0 to 1500000.
DEFc	This choice provides the intermediate downlink error frame count with the following range: <Integer> 0 to 750000.
BCO	This choice provides the intermediate block or bit count with the following range: <Integer> 0 to 1500000 (block).
IER	This choice provides the intermediate error ratio with the following range: <Real> 0 to 1 (0 to 100%).
IABer	This choice provides the intermediate average BER within blocks that have errors. The range is as follows: <Real> 0 to 1.
ALL	This choice returns all intermediate values (IEC, IEBC, DEFc, BCO, IER, and IABer) at the same time.
TEC	This choice provides the total error count with the following range: <Integer> 0 to 1500000 (block).
TEBC	This choice provides the total non-erased bit error blocks count with the following range: <Integer> 0 to 1500000.
TDEFc	This choice provides the total downlink error frame count with the following range: <Integer> 0 to 65535.



TBCO	This choice provides the total block count with the following range: <Integer> 0 to 1500000 (block).
TER	This choice provides the total error ratio with the following range: <Real> 0 to 1 (0 to 100%).
TABer	This choice provides the total average BER within blocks that have errors. The range is as follows: <Real> 0 to 1.
TALL	This choice returns all total values (TEC, TEBC, TDEFc, TBCO, TER, TABer, JUDGE, STOP, and SCAuse) at the same time. If accidental TCH synchronization loss caused the measurement to stop, TSLoss is returned.
JUDGE	This choice provides the pass or fail string. If pass/fail criteria is NOLimit, NONE is returned.
STOP	This choice checks to see if the stop threshold is met and returns one of the following values: <Enumerated set> TRUE FALSE. When threshold to stop criteria is NONE, FALSE is returned.
SCAuse	This choice provides the stop cause by returning one of the following values: <Enumerated set> NONE Ebit EBlock TSL. If accidental TCH synchronization loss caused the measurement to stop, TSL is returned.

### **:BERT:BTS:LOOPback:EDGE:MCS5[:DATA]**

**Supported**            E4438C with Option 300

```
:DATA:BERT:BTS:LOOPback:EDGE:MCS5[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|
ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse
```

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

### **:BERT:BTS:LOOPback:EDGE:MCS9[:DATA]**

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:EDGE:MCS9[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGe|STOP|SCAuse

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGe|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

### **:BERT:BTS:LOOPback:EDGE:UNCoded[:DATA]**

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:EDGE:UNCoded[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGe|STOP|SCAuse

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGe|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

### **:BERT:BTS:LOOPback:GSM[:DATA]**

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:GSM[:DATA]? IBC|IIC|FEC|DFEC|FRC|IBBer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGe|STOP|SCAuse

This data query returns the measurement result value for each variable.

IBC|IIC|FEC|DFEC|FRC|IBBer|IIBer|FER are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns intermediate values at the same time.

At the end of the measurement, the final values are stored to:

TIBC|TIIC|TFEC|TDEFc|TFRC|TIBBer|TIIBer|TFER variables. These variables and JUDGE|JCAuse|STOP|SCAuse are not updated until the next BER measurement is completed. TALL returns all of the total values at the same time.

IBC	This choice provides the intermediate class Ib error count with the following range: <Integer> 0 to 792000000.
IIC	This choice provides the intermediate class II error count with the following range: <Integer> 0 to 468000000.
FEC	This choice provides the intermediate frame erasure count with the following range: <Integer> 0 to 6000000.
DEFc	This choice provides the intermediate downlink error frame count with the following range: <Integer> 0 to 65535.
FRC	This choice provides the intermediate frame count with the following range: <Integer> 0 to 6000000.
IBBer	This choice provides the intermediate class Ib error ratio with the following range: <Real> 0 to 1 (0 to 100%).
IIBer	This choice provides the intermediate class II error ratio with the following range: <Real> 0 to 1 (0 to 100%).
FER	This choice provides the intermediate frame erasure ratio with the following range: <Real> 0 to 1 (0 to 100%).
ALL	This choice provides all intermediate values (IBC, IIC, FEC, DEFc, FRC, IBBer, IIBer, FER) at the same time.
TIBC	This choice provides the total class Ib bit error count with the following range: <Integer> 0 to 792000000.
TIIC	This choice provides the total class II bit error count with the following range: <Integer> 0 to 468000000.
TFEC	This choice provides the total frame erasure count with the following range: <Integer> 0 to 6000000.
TDEFc	This choice provides the total downlink error frame count with the following range: <Integer> 0 to 65535.
TFRC	This choice provides the total frame count with the following range: <Integer> 0 to 6000000.
TIBBer	This choice provides the total class Ib error ratio with the following range: <Real> 0 to 1 (0 to 100%).

## Bit Error Rate Test (BERT) Commands

### Data Subsystem—Option UN7 and 300 (:DATA)

TIIBer	This choice provides the total class II error ratio with the following range: <Real> 0 to 1 (0 to 100%).
TFER	This choice provides the total frame erasure ratio with the following range: <Real> 0 to 1 (0 to 100%).
TALL	This choice returns all total values (TIBC TIIC TFEC TDEFc TFRC TIBBer TIIBer TFER JUDGE JCAuse STOP SCAuse) at the same time. If accidental TCH synchronization loss caused the measurement to stop, TSLoss is returned.
JUDGE	This choice provides the comparator result (TEST OUT) with the following values: <Enumerated set> FAIL PASS NONE. If pass/fail criteria is NOLimit, NONE is returned
JCAuse	This choice provides which limit was met to cause the comparator result by returning one of the following values: <Enumerated set> NOLimit FER CIB CII
STOP	This choice checks to see if the stop threshold is met and returns one of the following values: <Enumerated set> TRUE FALSE. When threshold to stop criteria is NONE, FALSE is returned.
SCAuse	This choice provides the stop cause by returning one of the following values: <Enumerated set> NONE FE CIB CII TSLoss. If accidental TCH synchronization loss caused the measurement to stop, TSLoss is returned.

### :BERT:BTS:LOOPback:GSM:CS1[:DATA]

**Supported** E4438C with Option 300

:DATA:BERT:BTS:LOOPback:GSM:CS1[:DATA]? IEC|IEBC|DEFc|BCO|IER|IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGE|STOP|SCAuse

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFc|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGE|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

## **:BERT:BTS:LOOPback:GSM:CS4[:DATA]**

**Supported** E4438C with Option 300

```
:DATA:BERT:BTS:LOOPback:GSM:CS4[:DATA]? IEC|IEBC|DEFC|BCO|IER|  
IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGe|STOP|SCAuse
```

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFC|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGe|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

## **:BERT:BTS:LOOPback:GSM:MCS1[:DATA]**

**Supported** E4438C with Option 300

```
:DATA:BERT:BTS:LOOPback:GSM:MCS1[:DATA]? IEC|IEBC|DEFC|BCO|IER|  
IABer|ALL|TEC|TEBC|TDEFc|TBCO|TER|TABer|TALL|JUDGe|STOP|SCAuse
```

This data query returns the measurement result value for each variable.

IEC|IEBC|DEFC|BCO|IER|IABer are intermediate values, so during the measurement, these variables are updated as well as the display information. ALL returns all intermediate values at the same time.

At the end of the measurement, the final values are stored to: TEC|TEBC|TDEFc|TBCO|TER|TABer variables. These variables and JUDGe|STOP|SCAuse are not updated until the next BER measurement is completed.

For more information on the parameters, refer to [page 408](#).

## **:BERT:AUXout**

**Supported** E4438C with Option UN7

```
:DATA:BERT[:BASEband]:AUXout ERROR|REFerence|PN9  
:DATA:BERT[:BASEband]:AUXout?
```

This command selects a pre-defined output signal configuration for pins on the AUX I/O rear panel connector. Refer to [Table 7-1](#) for the output pin configuration and signal type.

**ERROR** This choice selects the bit error rate (BER) information output.

**REFerence** This choice selects the reference information output.

Bit Error Rate Test (BERT) Commands  
**Data Subsystem—Option UN7 and 300 (:DATA)**

PN9                      This choice selects a pseudo-random data output.

**Table 7-1                      AUX I/O pin configurations**

Pin#	ERRor	REference	PN9
1	BER Meas End	BER Data Out	PN9 Data
4	BER Sync Loss	Sync Start	No signal
20	BER Test Out	BER Clock Out	PN9 Clock
21	BER Error Out	BER Error Out	BER Error Out
22	BER No Data	Reference Data	No signal

- BER Meas End      A signal at this pin indicates the status of the bit error rate (BER) measurements. BER measurements are being executed when the signal is high.
- BER Sync loss      A low signal at this pin indicates that the synchronization is lost. This signal is valid only when the signal at the BER Meas End pin is high.
- BER Test Out      A signal at this pin indicates the test result of the bit error rate measurements. The result is guaranteed at the falling edge of the BER Meas End signal. The result is pass when the signal is low; the result is fail when the signal is high. The signal is also high when the pass/fail judgment is set to off.
- BER Error Out      A signal at this pin indicates the number of the error bits. The output is normally low. One pulse signal (pulse width matches the input clock) indicates one error bit. Pulses for the error bits of one measurement cycle are not synchronized with the rear panel connector BER CLK IN signal and are output when the BER Meas End signal is high.
- BER No Data      A low signal at this pin indicates the no data status. The no data status is reported when there has been no clock inputs for more than 3 seconds or there has been no data change for more than 200 bits. This signal is valid only when the signal of the BER Meas End output signal is high.
- BER Clock Out      The BER Clock Out signal monitors the rear panel BER CLK IN signal after polarity control, delay control, and gate control (if applicable) have taken place.
- BER Data Out      This is a data stream for the bit error rate measurements. The clock signal is used to trigger the reading of the data.
- Sync Start      This signal indicates the timing when the PN generator starts to generate a PN sequence. This signal can also indicate if the hardware is triggering a PN synchronization or making a measurement when the signal is high.

PN9 Clock	This signal is the clock signal for the PN9 Data. The falling edge of the PN9 Clock indicates the center of PN9 Data. The PN9 Clock rate is 37.5Mbits per second.		
PN9 Data	This signal is PN9 data for the self-loopback test.		
Reference Data	This signal uses the pseudo-random bit stream as the reference signal.		
<b>*RST</b>	ERRor		
<b>Key Entry</b>	<b>Error Out</b>	<b>Reference Out</b>	<b>PN9 Out</b>

**[ :DATA ]**

**Supported** E4438C with Option UN7

:DATA [ :DATA ] ? BEC | BITC | BER | ALL | TBEC | TBIT | TBER | JUDGE

This query returns the data measurement for the selected variable.

BEC	This choice provides the intermediate bit error count result.
BITC	This choice provides the intermediate bit count result.
BER	This choice provides the intermediate bit error rate result.
ALL	This choice provides the values of the bit error count, bit error rate, and bit count in the following format: <bit count>, <error count>, <bit error rate>
TBEC	This choice provides the total bit error count at the end of each cycle.
TBIT	This choice provides the total bit count at the end of each cycle.
TBER	This choice provides the total bit error rate at the end of each cycle.
JUDGE	This choice provides the pass or fail string.

---

## Input Subsystem—Option UN7 (:INPut:BERT[: BASEband])

### :CGATe:DELay:CLOCK

**Supported** E4438C with Option UN7

:INPut :BERT [ :BASEband] :CGATe:DELay:CLOCK <val>

:INPut :BERT [ :BASEband] :CGATe:DELay:CLOCK?

This command sets the number of delay bits for the signal applied to the BER GATE IN rear panel connector.

One bit corresponds with one bit of delay for the input clock.

**\*RST** 1

**Range** 1–16384

**Key Entry** Gate Clk Delay

**Remarks** The gate delay mode must be set to CLOCK for this command to work. Refer to “:CGATe:DELay:MODE”. Also, the gate and gate delay must be enabled for this command to work. Refer to “:CGATe[:STATE]” on page 418 and “:CGATe:DELay[:STATE]” on page 417.

### :CGATe:DELay:MODE

**Supported** E4438C with Option UN7

:INPut :BERT [ :BASEband] :CGATe:DELay:MODE TIME | CLOCK

:INPut :BERT [ :BASEband] :CGATe:DELay:MODE : ?

This command selects the operating mode of the gate delay.

**TIME** This choice selects the time mode which makes it possible to set the gate time delay in absolute time and the resolution.

**CLOCK** This choice selects the clock mode which enables you to set the gate delay by a set number of bits.

**\*RST** TIME

**Key Entry** Gate Mode Time Clk

**Remarks** The gate state and gate delay state must be enabled for this command to work. Refer to “:CGATe[:STATE]” on page 418 and “:CGATe:DELay[:STATE]” on page 417.



## :CGATe:DELay:TIME

**Supported** E4438C with Option UN7

:INPut:BERT[:BASEband]:CGATe:DELay:TIME <val><unit>

:INPut:BERT[:BASEband]:CGATe:DELay:TIME?

This command sets the delay time of the gate signal. The gate delay time must be the multiple of the minimum resolution value and if not, the delay resolution is automatically rounded to the nearest multiplied value of the gate time delay value.

The variable <val> is expressed in units of seconds (s), milliseconds (ms), microseconds ( $\mu$ s), and nanoseconds (ns).

**\*RST** +2.67000000E-008

**Range** 2.67 ns–1.0 s

**Key Entry** Gate Time Delay

**Remarks** Gate Delay Off On must be set to On and Gate Mode Time Clk set to Time for this command to work. Refer to “:CGATe:DELay[:STATe]” on page 417 and “:CGATe:DELay:MODE” on page 416.

To set the resolution, refer to “:CLOCK:DELay:RESolution” on page 418.

## :CGATe:DELay[:STATe]

**Supported** E4438C with Option UN7

:INPut:BERT[:BASEband]:CGATe:DELay[:STATe] ON|OFF|1|0

:INPut:BERT[:BASEband]:CGATe:DELay[:STATe]?

This command enables or disables the operating state of the gate delay.

ON This choice enables the gate delay adjustment function.

OFF This choice disables the gate delay adjustment function.

**\*RST** 0

**Key Entry** Gate Delay Off On

**Remarks** The gate must be enabled for this command to work. To enable the gate, refer to “:CGATe[:STATe]” on page 418.

### :CGATe:POLarity

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CGATe:POLarity POSitive|NEGative
:INPut:BERT[:BASEband]:CGATe:POLarity?
```

This command sets the input polarity of the gate signal supplied to the BER GATE IN rear panel connector.

**POS** With this choice, the signal is valid when the gate signal is high.

**NEG** With this choice, the signal is valid when the gate signal is low.

**\*RST** POS

**Key Entry** Gate Polarity Neg Pos

### :CGATe[:STATe]

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CGATe[:STATe] ON|OFF|1|0
:INPut:BERT[:BASEband]:CGATe[:STATe]?
```

This command sets the operating state of the clock gate function.

**ON** This choice enables the clock gate function.

**OFF** This choice disables the clock gate function.

**\*RST** 0

**Key Entry** Gate Off On

### :CLOCK:DELAy:RESolution

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CLOCK:DELAy:RESolution <val><unit>
:INPut:BERT[:BASEband]:CLOCK:DELAy:RESolution?
```

This command sets the resolution of the clock delay. The minimum resolution is 13.3 ns and it corresponds to 1/75 MHz. The 75 MHz is the sampling clock for the BERT board. The input value must be a multiple of the minimum resolution. If the set value is not a multiple value, the delay resolution is automatically rounded to the nearest multiple value with reference to the set value.

**\*RST** +1.33000000E-008

**Range** 13.3ns–80µs

<b>Key Entry</b>	<b>Resolution</b>
<b>Remarks</b>	The clock delay or the gate delay must be enabled for this command to work. Refer to “:CLOCK:DELAy[:STATe]” on page 419 and “:CGATe:DELAy[:STATe]” on page 417. A change in the resolution value can affect both the clock and the gate delay time automatically.

### **:CLOCK:DELAy:TIME**

<b>Supported</b>	E4438C with Option UN7
	:INPut:BERT[:BASEband]:CLOCK:DELAy:TIME <val><unit> :INPut:BERT[:BASEband]:CLOCK:DELAy:TIME?
	This command sets the clock signal delay time.
	The variable <val> is expressed in units of seconds (s), milliseconds (ms), microseconds ( $\mu$ s), and nanoseconds (ns).
<b>*RST</b>	+2.67000000E-008
<b>Range</b>	26.7ns-999.9967600ms
<b>Key Entry</b>	<b>Clock Time Delay</b>
<b>Remarks</b>	The clock delay must be enabled for this command to work. Refer to “:CLOCK:DELAy[:STATe]” on page 419.

### **:CLOCK:DELAy[:STATe]**

<b>Supported</b>	E4438C with Option UN7
	:INPut:BERT[:BASEband]:CLOCK:DELAy[:STATe] ON OFF 1 0 :INPut:BERT[:BASEband]:CLOCK:DELAy[:STATe]?
	This command sets the operating state of the clock delay function.
ON	This choice enables the clock delay adjustment.
OFF	This choice disables the clock delay adjustment.
<b>*RST</b>	0
<b>Key Entry</b>	<b>Clock Delay Off On</b>

### :CLOCK:POLarity

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:CLOCK:POLarity POSitive|NEGative  
:INPut:BERT[:BASEband]:CLOCK:POLarity?
```

This command sets the input polarity of the clock signal supplied to the BER CLK IN rear panel connector.

POS With this choice, the signal is valid when the clock signal is high.

NEG With this choice, the signal is valid when the clock signal is low.

\*RST POS

**Key Entry** Clock Polarity Neg Pos

### :DATA:POLarity

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:DATA:POLarity POSitive|NEGative  
:INPut:BERT[:BASEband]:DATA:POLarity?
```

This command sets the input polarity of the data signal supplied to the BER DATA IN rear panel connector.

POS With this choice, the signal is valid when the data signal is high.

NEG With this choice, the signal is valid when the data signal is low.

\*RST POS

**Key Entry** Data Polarity Neg Pos

### :IMPedance

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:IMPedance OHM_75|HIGH  
:INPut:BERT[:BASEband]:IMPedance?
```

This command sets the input termination mode of the BER CLK IN, BER DATA IN, and BER GATE IN rear panel connectors.

\*RST HIGH

**Key Entry** Impedance 75 Ohm High

## :THReshold

**Supported** E4438C with Option UN7

```
:INPut:BERT[:BASEband]:THReshold V0_7|V1_4|V1_65|V2_5  
:INPut:BERT[:BASEband]:THReshold?
```

This command sets the threshold voltage level of the BER CLK IN, BER DATA IN, and BER GATE IN rear panel connectors.

- |       |   |
|-------|---|
| V0_7  | This choice selects 0.7 volts (normal TTL) as the turn-on voltage for the input signal.                                     |
| V1_4  | This choice selects 1.4 volts (Schmit TTL) as the turn-on voltage for the input signal.                                     |
| V1_65 | This choice selects 1.65 volts (CMOS 3.3 volts is the maximum operating range) as the turn-on voltage for the input signal. |
| V2_5  | This choice selects 2.5 volts (CMOS 5 volts is the maximum operating range) as the turn-on voltage for the input signal.    |

**\*RST** V1\_4

**Key Entry** **0.7V** **1.4V** **1.65V** **2.5V**

---

## Measure Subsystem—Option 300 (:MEASure[:SCALar]:BERT:BTS:LOOPback)

### :EDGE:MCS5[:SENSitivity]

**Supported** E4438C with Option 300

```
:MEASure[:SCALAR]:BERT:BTS:LOOPback:EDGE:MCS5[:SENSitivity]?  
<high amplitude><unit>,<low amplitude><unit>,<pass amplitude><unit>,  
<error sensitivity limit>,<block count>,<initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail, -999.00” is displayed.

There are two other status errors that may be returned; SERR or DERR.

**SERR** This indicates that RF synchronization is lost during search and the search is aborted.

**DERR** This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of -1.0.

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks** The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.

### :EDGE:MCS9[:SENSitivity]

**Supported** E4438C with Option 300

```
:MEASure[:SCALAR]:BERT:BTS:LOOPback:EDGE:MCS9[:SENSitivity]?  
<high amplitude><unit>,<low amplitude><unit>,<pass amplitude><unit>,  
<error sensitivity limit>,<block count>,<initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail, -999.00” is displayed.

There are two other status errors that may be returned; SERR or DERR.

SERR                    This indicates that RF synchronization is lost during search and the search is aborted.

DERR                    This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of  $-1.0$ .

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks**            The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.

### **:EDGE:UNCoded[:SENSitivity]**

**Supported**            E4438C with Option 300

```
:MEASure[:SCALAr]:BERT:BTS:LOOPback:EDGE:UNCoded[:SENSitivity]?  
<high amplitude><unit>,<low amplitude><unit>,<pass amplitude><unit>,  
<error sensitivity limit>,<block count>,<initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail,  $-999.00$ ” is displayed.

There are two other status errors that may be returned; SERR or DERR.

SERR                    This indicates that RF synchronization is lost during search and the search is aborted.

DERR                    This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of  $-1.0$ .

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks**            The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.

## :GSM[:SENSitivity]

**Supported** E4438C with Option 300

```
:MEASure[:SCALAR]:BERT:BTS:LOOPback:GSM[:SENSitivity]?  
<high amplitude><unit>,<low amplitude><unit>,<pass amplitude><unit>,  
<error sensitivity limit>,<block count>,<initial block count>
```

This query returns either PASS or FAIL and the result for the measured sensitivity level. When this command is executed before the signal generator is synchronized with the BTS, the message “Fail, -999.00” is displayed.

There are two other status errors that may be returned; SERR or DERR.

SERR This indicates that RF synchronization is lost during search and the search is aborted.

DERR This indicates that a downlink error occurred during search and the search is aborted.

When these errors are returned, the sensitivity search returns a value of -1.0.

This command can be used in both the BER% measurement or the sensitivity search mode. After this command is executed, the measurement mode is in the sensitivity search mode.

**Remarks** The trigger source must be set to IMMEDIATE to execute this command. If the trigger source selection is BUS, error “-214 Trigger deadlock” is generated and no data is returned.



---

## Sense Subsystem–Options UN7 and 300 ([:SOURce]:SENSe:BERT)

### :BTS:LOOPback:EDGE:ETCH:F43:BLOCK:COUNT

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:BLOCK:COUNT <val>

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1–1500000

**Key Entry** **Block Count**

### :BTS:LOOPback:EDGE:ETCH:F43:CONTain

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:CONTain ON|OFF|1|0

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:CONTain?

This command enables or disables the BER measurement for ETCH/F43 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

**:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria:EBLock <val>

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria:EBLock?

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

**:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria[:SElect] EBlock | NONE

:SENSe:BERT:BTS:LOOPback:EDGE:ETCH:F43:STOP:CRITeria[:SElect]?

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBlock** This choice enables you to specify the number of erased blocks.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Block Erasure No Thresholds**

### **:BTS:LOOPback:EDGE:FTRigger:EXternal:DElay**

**Supported**            E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:FTRigger:EXternal:DElay <val>

:SENSE:BERT:BTS:LOOPback:EDGE:FTRigger:EXternal:DElay?

This command specifies the delay time of the external frame trigger. This delay is the offset from the beginning of timeslot 0.

The variable <val> is expressed in symbols with a resolution of 0.25.

**\*RST**                +0.00000000E+000

**Range**              -1250 to 1250

**Key Entry**         **Ext Frame Trigger Delay**

**Remarks**         Refer to the *E4428C/38C ESG Signal Generators User's Guide* for information on how to calculate the delay value.

### **:BTS:LOOPback:EDGE:FTRigger:EXternal:POLarity**

**Supported**            E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger:EXternal:POLarity POSitive  
NEGative

:SENSe:BERT:BTS:LOOPback:EDGE:FTRigger:EXternal:POLarity?

This command specifies the external frame trigger polarity.

**POS**                This selects the reference edge to be the rising edge of the pulse.

**NEG**                This selects the reference edge to be the falling edge of the pulse.

**\*RST**                POS

**Key Entry**         **External Frame Trigger Polarity Neg Pos**

**:BTS:LOOPback:EDGE:FTRigger[SElect]**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:FTRigger[:SElect] INTernal|EXTernal

:SENSE:BERT:BTS:LOOPback:EDGE:FTRigger[:SElect]?

This command specifies the frame trigger source to be used by the baseband generator.

INTernal This choice enables internal triggering.

EXTernal This choice enables the triggering by an externally applied signal at the rear panel connector.

**\*RST** INT

**Key Entry** Frame Trigger Source Int Ext

**Remarks** To enable this command, the frame trigger synchronization source must be PDCH. Refer to “:BTS:LOOPback:EDGE:SYNC[:SOURCE]” on page 438.

**:BTS:LOOPback:EDGE:MCS5:BLOCK:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:BLOCK:COUNT <value>

:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1–1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:EDGE:MCS5:CONTain**

**Supported**            E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:CONTain ON|OFF|1|0  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:CONTain?
```

This command enables or disables the BER measurement for MCS-5 channels in addition to the BLER measurement.

**ON**                    With this choice, data bits of the specified number of blocks are measured.

**OFF**                   This choice disables the measurement.

**\*RST**                   1

**Key Entry**            **BER Mode Off On**

### **:BTS:LOOPback:EDGE:MCS5:ESENSitivity**

**Supported**            E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:ESENSitivity <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:ESENSitivity?
```

This command specifies the target error rate when performing a sensitivity search.

The variable <val> is a decimal notation representing a percentage value.

**\*RST**                   +1.00000000E-001

**Range**                   1E-6 to 1

**Key Entry**            **Target BER %**

### **:BTS:LOOPback:EDGE:MCS5:HAMPLitude**

**Supported**            E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:HAMPLitude <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:HAMPLitude?
```

This command specifies the maximum amplitude level for performing a sensitivity search. The high amplitude value can not be lower than the low amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST**                   -9.00000000E+001

**Range**                   -136 to 20

**Key Entry**            **High Amplitude**

### **:BTS:LOOPback:EDGE:MCS5:LAMplitude**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:LAMplitude <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:LAMplitude?

This command specifies the minimum amplitude level for performing a sensitivity search. The low amplitude value can not be higher than the high amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -1.1000000E+002

**Range** -136.0 to 20

**Key Entry** **Low Amplitude**

### **:BTS:LOOPback:EDGE:MCS5:PAMplitude**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:PAMplitude <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:PAMplitude?

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -1.0100000E+002

**Range** -136.0 to 20

**Key Entry** **Pass Amplitude**

### **:BTS:LOOPback:EDGE:MCS5:SBlock:COUNT**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:SBlock:COUNT <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS5:SBlock:COUNT?

This command specifies the total number of blocks for each measurement during the sensitivity search.

**\*RST** +1200

**Range** 1-1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:EDGE:MCS5:SBlock:INITial**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:SBlock:INITial <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:SBlock:INITial?
```

This command specifies the total number of blocks to be measured at the beginning of each measurement during the sensitivity search.

**\*RST** +600

**Range** 1–1500000

**Key Entry** Initial Block Count

### **:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria:EBLock <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria:EBLock?
```

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** Block Erasure

### **:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria[:SElect] EBlock|NONE  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS5:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBlock** This choice enables you to specify the number of erased blocks or bit errors.

**NONE** This choice disables the stop measurement threshold criteria function.

**Key Entry** Block Erasure No Thresholds

### **:BTS:LOOPback:EDGE:MCS9:BLOCK:COUNT**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:BLOCK:COUNT <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

Only even values can be entered. If odd numbers are entered, the value increments by one to make it an even value.

**\*RST** +600

**Range** 2–1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:EDGE:MCS9:CONTain**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:CONTain ON|OFF|1|0

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:CONTain?

This command enables or disables the BER measurement for MCS-9 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

### **:BTS:LOOPback:EDGE:MCS9:ESENSitivity**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:ESENSitivity <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:ESENSitivity?

The variable <val> is a decimal notation representing a percentage value.

**\*RST** +1.00000000E-001

**Range** 1E–6 to 1

**Key Entry** **Target BER %**



### **:BTS:LOOPback:EDGE:MCS9:HAMplitude**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:HAMplitude <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:HAMplitude?
```

This command specifies the maximum amplitude level for performing a sensitivity search. The high amplitude value can not be lower than the low amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -8.00000000E+001

**Range** -136.0 to 20

**Key Entry** **High Amplitude**

### **:BTS:LOOPback:EDGE:MCS9:LAMplitude**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:LAMplitude <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:LAMplitude?
```

This command specifies the minimum amplitude level for performing a sensitivity search. The low amplitude value can not be higher than the high amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -1.00000000E+002

**Range** -136.0 to 20

**Key Entry** **Low Amplitude**

### **:BTS:LOOPback:EDGE:MCS9:PAMplitude**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:PAMplitude <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:PAMplitude?

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -9.1500000E+001

**Range** -136.0 to 20

**Key Entry** Pass Amplitude

### **:BTS:LOOPback:EDGE:MCS9:SBlock:COUNT**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:COUNT <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:COUNT?

This command specifies the total number of blocks to be measured at each measurement during the sensitivity search.

Only even values can be entered. If odd numbers are entered, the value increments by one to make it an even value.

**\*RST** +1200

**Range** 2–1500000

**Key Entry** Block Count

### **:BTS:LOOPback:EDGE:MCS9:SBlock:INITIAL**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:INITIAL <val>

:SENSe:BERT:BTS:LOOPback:EDGE:MCS9:SBlock:INITIAL?

This command specifies the total number of blocks to be measured at the beginning of each measurement during the sensitivity search.

Only even values can be entered. If odd numbers are entered, the value increments by one to make it an even value.

**\*RST** +600

**Range**                    2–1500000  
**Key Entry**                **Initial Block Count**

**:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria:EBLock**

**Supported**                E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria:EBLock <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria:EBLock?

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST**                        +60  
**Range**                        0–1500000  
**Key Entry**                **Block Erasure**

**:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria[:SElect]**

**Supported**                E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria[:SElect] EBlock|NONE  
:SENSE:BERT:BTS:LOOPback:EDGE:MCS9:STOP:CRITeria[:SElect]?

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBlock**                    This choice enables you to specify the number of non-erased blocks that contain bit errors.  
**NONE**                        This choice disables the stop measurement threshold criteria function.  
**\*RST**                        NONE  
**Key Entry**                **Block Erasure    No Thresholds**

**:BTS:LOOPback:EDGE:MEASurement:STOP**

**Supported**                E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:MEASurement:STOP

This command immediately stops any current measurement and releases the PRBS synchronization. After the synchronization is released, a new PRBS synchronization is attempted.

**Key Entry**                **Stop Measurement**

### :BTS:LOOPback:EDGE:MEASurement:TSLot

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement:TSLot 0|1|2|3|4|5|6|7
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement:TSLot?
```

This command specifies the timeslot number in which the measurement is to be performed.

The following EDGE timeslot configuration conditions will generate error message “-221 Settings Conflict”:

- If the specified timeslot does not have one of the BLER/BER measurable channel types, which are uncoded, E-TCH/43.2NT, MCS-9, and MCS-5.
- If the specified timeslot type is not set to “NORMAL.”

**\*RST** +0

**Key Entry** Timeslot

**Remarks** This command couples the selected timeslot number with the EDGE configuration.

Changing the timeslot configuration with EDGE on will not generate an error message if EDGE BERT is off and the timeslot is off.

### :BTS:LOOPback:EDGE:MEASurement[:MODE]

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement[:MODE] BLER|SSEarch
:SENSe:BERT:BTS:LOOPback:EDGE:MEASurement[:MODE]?
```

This command specifies the measurement mode.

**BLER** This choice specifies BLER% as the measurement mode.

**SSEarch** This choice specifies sensitivity search as the measurement mode.

**\*RST** BLER

**Key Entry** Measurement Mode BLER% Search

**Remarks** If the BLER% measurement is already running, this command will abort the BLER% measurement.

### **:BTS:LOOPback:EDGE:SINVert**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:SINVert ON|OFF|1|0  
:SENSe:BERT:BTS:LOOPback:EDGE:SINVert?
```

This command sets the operating state of the spectrum inverting function.

**ON** This choice specifies that the EDGE demodulator invert the spectrum of the received RF signal.

**OFF** This choice leaves the spectrum of the received RF signal unaffected.

**\*RST** 1

**Key Entry** **Spectrum Invert Off On**

### **:BTS:LOOPback:EDGE:SYNC:AGAI**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:SYNC:AGAI
```

This command adjusts the input signal level of the internal demodulator. Use this adjustment when switching from BCH synchronization to PDCH synchronization.

**Key Entry** **Adjust Gain**

**Remarks** This command is ignored unless the status displays "Waiting for PDCH."

### **:BTS:LOOPback:EDGE:SYNC:RF**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:EDGE:SYNC:RF
```

This command releases the current synchronization with the BTS and immediately starts to try to synchronize to either a BCH or PDCH signal as selected with the SYNC[:SOURCE] command. This command will also stop the current measurement.

**Key Entry** **Synchronize to BCH/PDCH**

**:BTS:LOOPback:EDGE:SYNC[:SOURCE]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:SYNC[:SOURCE] BCH|PDCH  
 :SENSe:BERT:BTS:LOOPback:EDGE:SYNC[:SOURCE] ?

This command specifies the synchronization source from the BTS under test.

- BCH This choice specifies the traffic channel as the synchronization source.
- PDCH This choice specifies the packet data channel as the synchronization source.
- \*RST BCH

**Key Entry** Sync Source BCH PDCH

**:BTS:LOOPback:EDGE:TRIGger[:SOURCE]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:TRIGger[:SOURCE] IMMEDIATE|KEY|EXT|BUS  
 :SENSe:BERT:BTS:LOOPback:EDGE:TRIGger[:SOURCE] ?

This command determines the trigger source for the EDGE loopback bit error rate measurement.

- IMMEDIATE This choice begins the measurement directly after synchronization has been achieved.
- KEY This choice begins the measurement when the front panel **Trigger** key is pressed, provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.
- EXT This choice begins the measurement as soon as a trigger signal is applied to the rear panel connector provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.
- BUS This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

\*RST KEY

**Key Entry** Immediate Trigger Key Ext Bus

**Remarks** An inherent variable delay will always exist when starting a measurement because the measurement must await the start of the next speech frame after the trigger. The delay can vary between 0 and 23 ms (5 frames) depending on where the trigger falls within the TDMA multiframe.

A trigger is ignored unless the EDGE loopback operating state is turned on.

### **:BTS:LOOPback:EDGE:ULINK:OFFSet**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:ULINK:OFFSet <val>

:SENSE:BERT:BTS:LOOPback:EDGE:ULINK:OFFSet?

This command specifies, in symbols, the amount of compensation for the insertion of equipment such as fading simulators into the uplink RF path.

**\*RST** +0

**Range** -500 to 10000

**Key Entry** Uplink Timing Advance

### **:BTS:LOOPback:EDGE:UNCoded:BIT:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:BIT:COUNT <value>

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:BIT:COUNT?

This command specifies the total number of bits to be measured for the uncoded channel.

**\*RST** +139200

**Range** 1392-2147483647

**Key Entry** Bit Count

### **:BTS:LOOPback:EDGE:UNCoded:ESENSitivity**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:ESENSitivity <val>

:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:ESENSitivity?

This command specifies the target error rate when performing a sensitivity search.

**\*RST** +2.00000000E-002

**Range** 1E-6 to 1

**Key Entry** Target BER %

### **:BTS:LOOPback:EDGE:UNCoded:HAMPlitude**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:HAMPlitude <val>

:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:HAMPlitude?

This command specifies the maximum amplitude level for performing a sensitivity search. The high amplitude value can not be lower than the low amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -8.50000000E+001

**Range** -136.0 to 20

**Key Entry** **High Amplitude**

### **:BTS:LOOPback:EDGE:UNCoded:LAMPlitude**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:LAMPlitude <val>

:SENSe:BERT:BTS:LOOPback:EDGE:UNCoded:LAMPlitude?

This command specifies the minimum amplitude level for performing a sensitivity search. The low amplitude value can not be higher than the high amplitude value.

The variable <val> is expressed in units of dBm.

**\*RST** -1.05000000E+002

**Range** -136.0 to 20

**Key Entry** **Low Amplitude**



### **:BTS:LOOPback:EDGE:UNCoded:PAMPlitude**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:PAMPlitude <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:PAMPlitude?
```

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -9.50000000E+001

**Range** -136.0 to 20

**Key Entry** Pass Amplitude

### **:BTS:LOOPback:EDGE:UNCoded:SBIT:COUNT**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:COUNT <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:COUNT?
```

This command specifies the total number of bits to be measured during a sensitivity search for the uncoded channel.

**\*RST** +139200

**Range** 1392–2147483647

**Key Entry** Bit Count

### **:BTS:LOOPback:EDGE:UNCoded:SBIT:INITial**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:INITial <val>  
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:SBIT:INITial?
```

This command specifies the total number of bits to be measured at the beginning of the sensitivity search for the uncoded channel.

**\*RST** +13920

**Range** 1392–2147483647

**Key Entry** Initial Bit Count

**:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria:EBIT**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria:EBIT <val>
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria:EBIT?
```

This command specifies the number of block erasures or bit errors, depending on the measurement channel type, for the threshold limit to stop the measurement.

**\*RST** +2784

**Range** 0–2147483647

**Key Entry** **Error Count**

**:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria[:SElect] EBIT|NONE
:SENSE:BERT:BTS:LOOPback:EDGE:UNCoded:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBIT** This choice enables you to specify the number of bit errors.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Error Count No Thresholds**

**:BTS:LOOPback:EDGE[:STATe]**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:EDGE[:STATe] ON|OFF|1|0
:SENSE:BERT:BTS:LOOPback:EDGE[:STATe]?
```

This command sets the operating state of the EDGE loopback bit error rate (BER) function.

**ON** This choice enables the EDGE loopback BER function.

**OFF** This choice disables the EDGE loopback BER function.

**\*RST** 0

**Key Entry** **EDGE BERT Off On**

**Remarks**                    Although you can configure the measurement parameters while the operating state is off, any command triggers sent will be ignored until the operating state is turned on.

**:BTS:LOOPback:GSM:CS1:BLOCK:COUNT**

**Supported**                    E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:CS1:BLOCK:COUNT <val>  
:SENSe:BERT:BTS:LOOPback:GSM:CS1:BLOCK:COUNT?
```

This command specifies the total number of blocks to be measured.

**\*RST**                            +600

**Range**                            1–1500000

**Key Entry**                    **Block Count**

**:BTS:LOOPback:GSM:CS1:CONTain**

**Supported**                    E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:CS1:CONTain ON|OFF|1|0  
:SENSe:BERT:BTS:LOOPback:GSM:CS1:CONTain?
```

This command enables or disables the BER measurement for CS-1 channels in addition to the BLER measurement.

**ON**                                With this choice, data bits of the specified number of blocks are measured.

**OFF**                                This choice disables the BER measurement.

**\*RST**                                1

**Key Entry**                    **BER Mode Off On**

**:BTS:LOOPback:GSM:CS1:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria:EBLock <val>
:SENSE:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria:EBLock?
```

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

**:BTS:LOOPback:GSM:CS1:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria[:SElect] EBlock|NONE
:SENSE:BERT:BTS:LOOPback:GSM:CS1:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBlock** This choice enables you to specify the number of erased blocks.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Block Erasure No Thresholds**

**:BTS:LOOPback:GSM:CS4:BLOCK:COUNT**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS4:BLOCK:COUNT <value>
:SENSE:BERT:BTS:LOOPback:GSM:CS4:BLOCK:COUNT?
```

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1 to 1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:GSM:CS4:CONTain**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS4:CONTain ON|OFF|1|0  
:SENSE:BERT:BTS:LOOPback:GSM:CS4:CONTain?
```

This command enables or disables the BER measurement for CS-4 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the BER measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

### **:BTS:LOOPback:GSM:CS4:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria:EBLock <val>  
:SENSE:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria:EBLock?
```

This command specifies the threshold limit to stop the measurement which is the number of erased blocks that contain bit errors.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**

### **:BTS:LOOPback:GSM:CS4:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria[:SElect] EBLock|NONE  
:SENSE:BERT:BTS:LOOPback:GSM:CS4:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBLock** This choice enables you to specify the number of erased blocks.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Block Erasure** **No Thresholds**

### **:BTS:LOOPback:GSM:ESENSitivity**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:ESENSitivity <val>  
:SENSE:BERT:BTS:LOOPback:GSM:ESENSitivity?
```

This command specifies the target error rate when performing a sensitivity search.

**\*RST** +2.00000000E-002

**Range** 1E-6 to 1

**Key Entry** **Target BER%**

### **:BTS:LOOPback:GSM:FRAMe:CIB**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:FRAMe:CIB?
```

This query returns the total number of Class Ib bits to be measured which are calculated from the total number of frames specified to be measured.

### **:BTS:LOOPback:GSM:FRAMe:CII**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:FRAMe:CII?
```

This query returns the total number of Class II bits to be measured which are calculated from the total number of frames specified to be measured.

### **:BTS:LOOPback:GSM:FRAME:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:FRAME:COUNT <val>

:SENSE:BERT:BTS:LOOPback:GSM:FRAME:COUNT?

This command determines the length of the measurement specified by the total number of frames included in one measurement.

**\*RST** +100

**Range** 1–6000000

**Key Entry** **Frame Count**

### **:BTS:LOOPback:GSM:HAMPLitude**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:HAMPLitude <val>

:SENSE:BERT:BTS:LOOPback:GSM:HAMPLitude?

This command specifies the maximum amplitude level for performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** –9.00000000E+001

**Range** –136.0 to 20

**Key Entry** **High Amplitude**

### **:BTS:LOOPback:GSM:LAMPLitude**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:LAMPLitude <val>

:SENSE:BERT:BTS:LOOPback:GSM:LAMPLitude?

This command specifies the minimum amplitude level for performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** –1.15000000E+002

**Range** –136.0 to 20

**Key Entry** **Low Amplitude**

### **:BTS:LOOPback:GSM:MCS1:BLOCK:COUNT**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:BLOCK:COUNT <val>

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:BLOCK:COUNT?

This command specifies the total number of blocks to be measured.

**\*RST** +600

**Range** 1–1500000

**Key Entry** **Block Count**

### **:BTS:LOOPback:GSM:MCS1:CONTain**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:CONTain ON|OFF|1|0

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:CONTain?

This command enables or disables the BER measurement for MCS-1 channels in addition to the BLER measurement.

**ON** With this choice, data bits of the specified number of blocks are measured.

**OFF** This choice disables the BER measurement.

**\*RST** 1

**Key Entry** **BER Mode Off On**

### **:BTS:LOOPback:GSM:MCS1:STOP:CRITeria:EBLock**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria:EBLock <val>

:SENSE:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria:EBLock?

This command specifies the number of erased blocks that contain bit errors for the threshold limit to stop the measurement.

**\*RST** +60

**Range** 0–1500000

**Key Entry** **Block Erasure**



### **:BTS:LOOPback:GSM:MCS1:STOP:CRITeria[:SElect]**

**Supported**            E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria[:SElect] EBLock|NONE
:SENSE:BERT:BTS:LOOPback:GSM:MCS1:STOP:CRITeria[:SElect]?
```

This command determines which of the following threshold criteria is used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

**EBLock**                This choice enables you to specify the number of erased blocks.  
**NONE**                 This choice disables the stop measurement threshold criteria function.  
**\*RST**                 NONE

**Key Entry**            **Block Erasure    No Thresholds**

### **:BTS:LOOPback:GSM:MEASurement:STOP**

**Supported**            E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:MEASurement:STOP
```

This command stops any current measurement and releases the current PRBS synchronization. After the synchronization is released, a new PRBS synchronization is attempted.

**Key Entry**            **Stop Measurement**

### **:BTS:LOOPback:GSM:MEASurement:TSLot**

**Supported**            E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:MEASurement:TSLot 0|1|2|3|4|5|6|7
:SENSE:BERT:BTS:LOOPback:GSM:MEASurement:TSLot?
```

This command specifies the timeslot number in which the measurement is to be performed. This command couples the selected timeslot number with the GSM configuration.

The following GSM timeslot configuration conditions will generate error message “-221 Settings Conflict”:

- If the specified timeslot E field fails to designate either MPN9 or MPN15.
- If the specified timeslot is not set to “Normal.”

**\*RST**                 +0

**Key Entry**            **Timeslot**

**Remarks**            Changing the timeslot configuration with GSM on will not generate error messages if GSM BERT is off and the timeslot is off.

### **:BTS:LOOPback:GSM:MEASurement[:MODE]**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:MEASurement [:MODE] BER|SSEarch
:SENSe:BERT:BTS:LOOPback:GSM:MEASurement [:MODE] ?
```

This command specifies the measurement mode.

**BER** This choice specifies BER% as the measurement mode.

**SSEarch** This choice specifies sensitivity search as the measurement mode.

**\*RST** BER

**Key Entry** **Measurement Mode BER% Search**

**Remarks** If the BER% measurement is already running, this command will abort the BER% measurement.

### **:BTS:LOOPback:GSM:PAMPlitude**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:PAMPlitude <val>
:SENSe:BERT:BTS:LOOPback:GSM:PAMPlitude?
```

This command specifies the threshold amplitude for pass/fail comparator results when performing a sensitivity search.

The variable <val> is expressed in units of dBm.

**\*RST** -1.04000000E+002

**Range** -136.0 to 20

**Key Entry** **Pass Amplitude**

### **:BTS:LOOPback:GSM:SFRame:COUNT**

**Supported** E4438C with Option 300

```
:SENSe:BERT:BTS:LOOPback:GSM:SFRame:COUNT <val>
:SENSe:BERT:BTS:LOOPback:GSM:SFRame:COUNT?
```

This command specifies the total number of frames to be measured for the final measurements during the sensitivity search.

**\*RST** +100

**Range** 1-6000000

**Key Entry** Frame Count

### **:BTS:LOOPback:GSM:SFRame:INITial**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:SFRame:INITial <val>

:SENSE:BERT:BTS:LOOPback:GSM:SFRame:INITial?

This command specifies the number of frames to be measured while sensitivity search is running rough searching to gain search speed. It is the first phase of sensitivity search.

**\*RST** +26

**Range** 1–6000000

**Key Entry** Initial Frame Count

### **:BTS:LOOPback:GSM:SINVert**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:SINVert ON|OFF|1|0

:SENSE:BERT:BTS:LOOPback:GSM:SINVert?

This command sets the operating state of the spectrum inverting function.

**ON** This choice specifies that the GSM demodulator invert the spectrum of the received RF signal.

**OFF** This choice leaves the spectrum of the received RF signal unaffected.

**\*RST** 1

**Key Entry** Spectrum Invert Off On

### **:BTS:LOOPback:GSM:STOP:CRITeria:CIB**

**Supported** E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CIB <val>

:SENSE:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CIB?

This command specifies the threshold number of Class Ib errors to stop the measurement.

**\*RST** 300

**Range** 0–1000000

**Key Entry** Class Ib Bit Error

**Remarks** Refer to “:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]” on page 452 for information on the use of the file variables.

### **:BTS:LOOPback:GSM:STOP:CRITeria:CII**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CII <val>

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:CII?

This command specifies the threshold number of Class II errors to stop the measurement.

**\*RST** 300

**Range** 0–1000000

**Key Entry** **Class II Bit Error**

**Remarks** Refer to “:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]” on page 452 for information on the use of the file variables.

### **:BTS:LOOPback:GSM:STOP:CRITeria:FERasure**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:FERasure <val>

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria:FERasure?

This command specifies the threshold number of erased frames to stop the measurement.

**\*RST** 120

**Range** 0–1000000

**Key Entry** **Frame Erasure**

**Remarks** Refer to “:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]” for information on the use of the file variables.

### **:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria[:SElect] FERasure|CIB|CII|  
ANY|NONE

:SENSe:BERT:BTS:LOOPback:GSM:STOP:CRITeria[:SElect]?

This command sets the threshold criteria used to prematurely stop the measurement prior to the normal measurement end. In each case, the measurement will terminate no later than 200 ms after the threshold is exceeded.

FERasure	This selection ends the measurement when the number of erased frames exceeds the specified threshold.		
CIB	This selection ends the measurement when the number of Class Ib errors detected exceeds the specified threshold.		
CII	This selection ends the measurement when the number of Class II errors detected exceeds the specified threshold.		
ANY	This selection ends the measurement when any of the above stop measurement threshold criteria is exceeded.		
NONE	This selection disables the stop measurement threshold criteria function, so that the measurement runs for the specified number of speech frames.		
*RST	NONE		
<b>Key Entry</b>	<b>Frame Erasure</b>	<b>Class Ib Bit Error</b>	<b>Class II Bit Error</b>
	<b>Exceeds Any Thresholds</b>	<b>No Thresholds</b>	

**:BTS:LOOPback:GSM:SYNC:RF**

**Supported**            E4438C with Option 300

:SENSE:BERT:BTS:LOOPback:GSM:SYNC:RF

This command releases the current synchronization with the BTS and immediately starts to try to synchronize to either a BCH or TCH signal as selected with the SYNC[:SOURCE] command. This command will also stop the current measurement.

**Key Entry**            **Synchronize to BCH/TCH**

**Remarks**            The test equipment can use a BCH signal from the BTS to determine the required transmit timeslot, frame and multiframe timing. The BCH signal is always transmitted in timeslot 0 and contains multiframe information. Use BCH when a BCH subset is present which contains SCH bursts with a properly coded T2 parameter.

Use TCH when providing a TCH/FS training sequence from the BTS. However, only one timeslot from the BTS can be active at a time and you must specify to the receiver which timeslot is being received since it has no absolute reference (unlike a BCH signal, which is always transmitted in timeslot 0).

**:BTS:LOOPback:GSM:SYNC[:SOURce]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:SYNC[:SOURce] BCH|TCH  
 :SENSe:BERT:BTS:LOOPback:GSM:SYNC[:SOURce] ?

This command specifies the synchronization source from the BTS under test.

**BCH** This choice specifies the broadcast channel as the synchronization source.

**TCH** This choice specifies the traffic channel as the synchronization source.

**\*RST** BCH

**Key Entry** Sync Source BCH TCH

**:BTS:LOOPback:GSM:TRIGger[:SOURce]**

**Supported** E4438C with Option 300

:SENSe:BERT:BTS:LOOPback:GSM:TRIGger[:SOURce] IMMEDIATE|KEY|EXT|BUS  
 :SENSe:BERT:BTS:LOOPback:GSM:TRIGger[:SOURce] ?

This command determines the trigger source for the GSM loopback bit error rate measurement.

**IMMEDIATE** This choice begins the measurement directly after synchronization has been achieved.

**KEY** This choice begins the measurement when the front panel **Trigger** key is pressed, provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**EXT** This choice begins the measurement as soon as a trigger signal is applied to the rear panel connector provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**\*RST** KEY

**Key Entry** Immediate Trigger Key Ext Bus Aux

**Remarks** An inherent variable delay will always exist when starting a measurement because the measurement must await the start of the next speech frame after the trigger. The delay can vary between 0 and 23 ms (5 frames) depending on where the trigger falls within the TDMA multiframe.

A trigger is ignored unless the GSM loopback operating state is turned on.

### **:BTS:LOOPback:GSM:ULINK:OFFSet**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM:ULINK:OFFSet <value>
:SENSE:BERT:BTS:LOOPback:GSM:ULINK:OFFSet?
```

This command specifies the amount of compensation for the insertion of equipment such as fading simulators into the uplink RF path.

**\*RST** +0

**Range** -500 to 10000

**Key Entry** Uplink Timing Advance

### **:BTS:LOOPback:GSM[:STATe]**

**Supported** E4438C with Option 300

```
:SENSE:BERT:BTS:LOOPback:GSM[:STATe] ON|OFF|1|0
:SENSE:BERT:BTS:LOOPback:GSM[:STATe]?
```

This command enables (1) or disables (0) the operating state of the GSM loopback bit error rate function. Although you can configure the measurement parameters while the operating state is off, any command triggers sent will be ignored until the operating state is turned on.

**\*RST** 0

**Key Entry** GSM BERT Off On

### **[:BASEband]:PRBS:FUNCTION:SPIgnore:DATA**

**Supported** E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:PRBS:FUNCTION:SPIgnore:DATA ALL_0|ALL_1
:SENSE:BERT[:BASEband]:PRBS:FUNCTION:SPIgnore:DATA?
```

This command selects the bit parameter of the special pattern ignore function.

**ALL\_0** This choice ignores a bit pattern of 160 or more consecutive 0's.

**ALL\_1** This choice ignores a bit pattern of 160 or more consecutive 1's.

**\*RST** ALL\_0

**Key Entry** Spcl Pattern 0's 1's

**Remarks** This command is valid only when the special pattern ignore function is enabled (On). Refer to “[[:BASEband]:PRBS:FUNCTION:SPIgnore[:STATe]]”. The special pattern of 160 or more 1's or 0's can appear at any position in the bit stream.

### [:BASEband]:PRBS:FUNCTION:SPIgnore[:STATE]

**Supported** E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:PRBS:FUNCTION:SPIgnore[:STATE] ON|OFF|1|0
:SENSE:BERT[:BASEband]:PRBS:FUNCTION:SPIgnore[:STATE] ?
```

This command enables (1) or disables (0) the special pattern ignore function.

**ON** This choice detects 160 or more consecutive bits of 0's or 1's in the incoming bit stream and ignores these bits when making BER measurements. To select 0's or 1's refer to [“\[:BASEband\]:PRBS:FUNCTION:SPIgnore:DATA”](#)

**OFF** This choice disables the special pattern ignore mode for the BER measurement.

**\*RST** 0

**Key Entry** **Spcl Pattern Ignore Off On**

### [:BASEband]:PRBS[:DATA]

**Supported** E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:PRBS[:DATA] PN9|PN11|PN15|PN20|PN23
:SENSE:BERT[:BASEband]:PRBS[:DATA] ?
```

This command selects the incoming data pattern for making BER measurements.

**PN9–PN23** These choices select an internally generated pseudo-random pattern for BER measurements.

**\*RST** PN9

**Key Entry** **PN9 PN11 PN15 PN20 PN23**

### [:BASEband]:RSYNc:THReshold

**Supported** E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:RSYNc:THReshold <val>
:SENSE:BERT[:BASEband]:RSYNc:THReshold?
```

This command specifies the threshold level for the resynchronizing function.

**\*RST** 0.40

**Range** 0.05–0.40

**Key Entry** **Resync Limits**

**Remarks** This command is valid only when the BERT resynchronizing function is on. Refer to [“\[:BASEband\]:RSYNc\[:STATE\]”](#) on page 457.



### **[:BASEband]:RSYNc[:STATe]**

**Supported**            E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:RSYNc[:STATe] ON|OFF|1|0  
:SENSE:BERT[:BASEband]:RSYNc[:STATe] ?
```

This command sets the operating state of the resynchronization function.

**ON**                    This choice enables the resynchronization function.

**OFF**                  This choice disables the resynchronization function.

**\*RST**                 1

**Key Entry**            **BERT Resync Off On**

### **[:BASEband]:STATe**

**Supported**            E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:STATe ON|OFF|1|0  
:SENSE:BERT[:BASEband]:STATe ?
```

This command sets the operating state of the bit error rate test (BERT) measurement.

**ON**                    This choice enables the BERT measurement.

**OFF**                  This choice disables the BERT measurement.

**\*RST**                 0

**Key Entry**            **BERT Off On**

### **[:BASEband]:STOP:CRITeria:EBIT**

**Supported**            E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:STOP:CRITeria:EBIT <val>  
:SENSE:BERT[:BASEband]:STOP:CRITeria:EBIT ?
```

This command specifies the threshold limit to stop the measurement.

**\*RST**                 100

**Range**                0–1000000000

**Key Entry**            **Error Count**

## Bit Error Rate Test (BERT) Commands

### Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSe:BERT)

**Remarks** When the stop mode criteria is set to EBIT, the signal generator monitors the error bits and when it exceeds the set value, the signal generator stops the current BER measurement and waits for the next trigger.

EBIT must be the selection for this command to work. To select EBIT refer to “[:BASEband]:STOP:CRITeria[:SElect]”.

#### [:BASEband]:STOP:CRITeria[:SElect]

**Supported** E4438C with Option UN7

```
:SENSe:BERT[:BASEband]:STOP:CRITeria[:SElect] EBIT|NONE  
:SENSe:BERT[:BASEband]:STOP:CRITeria[:SElect]?
```

This command determines which threshold criteria is used to prematurely stop the measurement.

**EBIT** This choice enables a specified number of bit errors to prematurely stop the measurement.

**NONE** This choice disables the stop measurement threshold criteria function.

**\*RST** NONE

**Key Entry** **Error Count** **No Thresholds**

**Remarks** The measurement will terminate no later than 200 ms after the threshold is exceeded.

#### [:BASEband]:TBITs

**Supported** E4438C with Option UN7

```
:SENSe:BERT[:BASEband]:TBITs <val>  
:SENSe:BERT[:BASEband]:TBITs?
```

This command specifies the total bit count to be measured in one measurement cycle.

**\*RST** +10000

**Range** 100–4294967295

**Key Entry** **Total Bits**

### **[:BASEband]:TRIGger:BDElay**

**Supported** E4438C with Option UN7

:SENSE:BERT[:BASEband]:TRIGger:BDElay <val>

:SENSE:BERT[:BASEband]:TRIGger:BDElay?

This command specifies the number of bits to delay the trigger signal.

**\*RST** 0

**Range** 0–65535

**Key Entry** **Delay Bits**

**Remarks** This command is valid only when the trigger bit delay function is on. Refer to “[:BASEband]:TRIGger:BDElay:STATE”.

### **[:BASEband]:TRIGger:BDElay:STATE**

**Supported** E4438C with Option UN7

:SENSE:BERT[:BASEband]:TRIGger:BDElay:STATE ON|OFF|1|0

:SENSE:BERT[:BASEband]:TRIGger:BDElay:STATE?

This command sets the operating state of the trigger delay function.

**ON** This choice enables the trigger delay function.

**OFF** This choice disables the trigger delay function.

**\*RST** 0

**Key Entry** **Bit Delay Off On**

**Remarks** This command needs to be set to ON before the number of bits for the trigger delay can be set. Refer to “[:BASEband]:TRIGger:BDElay”.

### **[:BASEband]:TRIGger:COUNT**

**Supported** E4438C with Option UN7

:SENSE:BERT[:BASEband]:TRIGger:COUNT <val>

:SENSE:BERT[:BASEband]:TRIGger:COUNT?

This command sets the number of times the bit error rate test (BERT) measurements will repeat.

**\*RST** 1

**Range** 0–65535

**Key Entry** **Cycle Count**

## Bit Error Rate Test (BERT) Commands

### Sense Subsystem—Options UN7 and 300 ([:SOURCE]:SENSE:BERT)

**Remarks** With 0 set, the BER measurements are repeated until you set the BERT operating state is set to off. Refer to “[:BASEband]:STATE” on page 457.

### [:BASEband]:TRIGger:POLarity

**Supported** E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:TRIGger:POLarity POSitive|NEGative  
:SENSE:BERT[:BASEband]:TRIGger:POLarity?
```

This command selects the polarity of the trigger signal.

**POSitive** This choice triggers on the rising edge of the input data signal.

**NEGative** This choice triggers on the falling edge of the input data signal.

**\*RST** POS

**Key Entry** Aux I/O Trigger Polarity Pos Neg

**Key Entry** Aux I/O Trigger Polarity Pos Neg

### [:BASEband]:TRIGger[:SOURCE]

**Supported** E4438C with Option UN7

```
:SENSE:BERT[:BASEband]:TRIGger[:SOURCE] IMMEDIATE|KEY|EXT|BUS|AUX  
:SENSE:BERT[:BASEband]:TRIGger[:SOURCE]?
```

This command selects the triggering type for starting the bit error rate test (BERT) measurements.

**IMMEDIATE** This choice begins the measurement directly after synchronization has been achieved.

**KEY** This choice begins the measurement when the front panel **Trigger** key is pressed, provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**EXT** This choice begins the measurement as soon as a trigger signal is applied to the rear panel connector provided that synchronization has been achieved. If synchronization has not occurred, the trigger is ignored.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**AUX** This choice triggers an event using the rear panel AUX I/O connector pin #22. Refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**\*RST** KEY

**Key Entry** Immediate    Trigger Key    Ext    Bus    Aux I/O

---

## 8 Receiver Test Digital Commands

This chapter provides SCPI descriptions for commands dedicated to digital real-time testing using the E4438C ESG Vector Signal Generator. This chapter contains the following sections:

- “All Subsystem–Option 001/601 or 002/602 ([:SOURce])” on page 462
- “AWGN Real-Time Subsystem–Option 403 ([:SOURce]:RADio:AWGN:RT)” on page 463
- “Bluetooth Subsystem–Option 406 ([:SOURce]:RADio:BLUeetooth:ARB)” on page 464
- “CDMA2000 BBG Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000[:BBG])” on page 479
- “Custom Subsystem–Option 001/601 or 002/602 ([:SOURce]:RADio:CUSTom)” on page 548
- “DECT Subsystem–Option 402 ([:SOURce]:RADio:DECT)” on page 573
- “EDGE Subsystem–Option 402 ([:SOURce]:RADio:EDGE)” on page 622

## All Subsystem–Option 001/601or 002/602 ([:SOURce])

### :RADio:ALL:OFF

**Supported** E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:ALL:OFF

This command disables all digital modulation personalities on a particular baseband.

**Remarks** This command does not affect analog modulation.

---

## AWGN Real-Time Subsystem—Option 403 (:SOURce):RADio:AWGN:RT)

### :BWIDth

**Supported** E4438C with Option 403

[ :SOURce ] :RADio:AWGN:RT:BWIDth <val>

[ :SOURce ] :RADio:AWGN:RT:BWIDth?

This command adjusts the real-time AWGN bandwidth value.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+006

**Range** 5E4–8E7

**Key Entry** **Bandwidth**

### [ :STATe ]

**Supported** E4438C with Option 403

[ :SOURce ] :RADio:AWGN:RT [ :STATe ] ON|OFF|1|0

[ :SOURce ] :RADio:AWGN:RT [ :STATe ] ?

This command enables or disables the operating state of real-time AWGN.

**\*RST** 0

**Key Entry** **Real-time AWGN Off On**

---

## Bluetooth Subsystem—Option 406 ([:SOURCE]:RADio:BLUEtooth:ARB)

### :AMADdr

**Supported** E4438C with Option 406406

```
[:SOURCE]:RADio:BLUEtooth:ARB:AMADdr <val>
```

```
[:SOURCE]:RADio:BLUEtooth:ARB:AMADdr?
```

This command sets the 3-bit active member address (AM\_ADDR).

**\*RST** +1

**Range** 0–7

**Key Entry** **AM\_ADDR**

**Remarks** In a piconet, one or more slaves are connected to a single master; a temporary 3-bit address (AM\_ADDR) is used to identify each active slave.

### :BDADdr

**Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUEtooth:ARB:BDADdr <val>
```

```
[:SOURCE]:RADio:BLUEtooth:ARB:BDADdr?
```

This command sets the unique hexadecimal Bluetooth device address (BD\_ADDR) with up to 48 bits.

**\*RST** #H0000000000008

**Range** #H0–#HFFFFFFFFFFFF

**Key Entry** **BD\_ADDR**

**Remarks** The address is derived from the IEEE802 standard.

### :BURSt[:STATe]

**Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUEtooth:ARB:BURSt[:STATe] ON|OFF|1|0
```

```
[:SOURCE]:RADio:BLUEtooth:ARB:BURSt[:STATe]?
```

This command enables or disables the burst function.

ON(1) This choice will ramp up the signal power prior to transmitting the packet and ramp it down after the end of the packet transmission.



OFF(0)	This choice provides a linked series of packet transmissions with no power ramping.
*RST	1
<b>Key Entry</b>	<b>Burst Off On</b>

**:CGDelay**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:CGDelay <val>
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:CGDelay?
```

This command sets the number of symbols to shift the output symbol clock (EVENT 1 rear panel connector) and gate (EVENT 2 rear panel connector) signals relative to the Bluetooth signal. The shifting of these signals is used to compensate for any packet delay through the DUT during BER tests.

\*RST +0.00000000E+000

**Range** 0.0–24999.9

**Key Entry** **Clock/Gate Delay**

**Remarks** This command is only effective with a continuous PN9 (CPN9) payload data and is intended for bit error rate testing (BERT, Option UN7). Refer to “:DATA” on [page 465](#) for selecting the CPN9 data choice.

When the clock and gate delay is set to zero (0), the rising edge of the symbol clock lines up with the middle of each symbol and the gate is high during the user payload field (PN9 data).

**:DATA**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:DATA TPN9 | CPN9 | <val>
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:DATA?
```

This command sets the user payload data type; user payload data is the voice or data information (less the payload header) that is carried in a packet.

TPN9 This choice places a truncated PN9 sequence consisting of 216 bits into a single packet.

CPN9 This choice places 8 continuous PN9 sequences into 19 packets, followed by one packet with no user payload. This ensures that the SEQN bit is properly alternated which is a requirement to filter out packet re-transmission at the destination.

**Bluetooth Subsystem—Option 406 ([:SOURCE]:RADio:BLUetooth:ARB)**

<val>	This variable lets you set your own 8 bit data pattern for a single packet. A change in the user payload data type resets the eight bit pattern to a value of 00000000.		
<b>*RST</b>	TPN9		
<b>Range</b>	<val>: #B0–#B11111111 or 0–255		
<b>Key Entry</b>	<b>Truncated PN9</b>	<b>Continuous PN9</b>	<b>8 Bit Pattern</b>
<b>Remarks</b>	The PN9 sequence (511 bits) is standard based. The sequence begins with the first one of nine consecutive ones.		

**:IQ:EXternal:FILTER**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:EXternal:FILTER 40e6 | THROUGH
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:EXternal:FILTER?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter with this command will automatically set “:IQ:EXternal:FILTER:AUTO” on [page 466](#) to OFF (0) mode.

40e6	This choice applies a 40 MHz baseband filter.
THROUGH	This choice bypasses filtering.
<b>*RST</b>	THR
<b>Key Entry</b>	<b>40.000 MHz</b> <b>Through</b>

**:IQ:EXternal:FILTER:AUTO**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:EXternal:FILTER:AUTO ON | OFF | 1 | 0
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:EXternal:FILTER:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON (1)	This choice will automatically select a digital modulation filter optimized for the current signal generator settings.
OFF (0)	This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXternal:FILTER” on <a href="#">page 466</a> for selecting a filter or through path.
<b>*RST</b>	1
<b>Key Entry</b>	<b>I/Q Output Filter Manual Auto</b>

## :HEADER:CLEAR

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:HEADER:CLEAR

This command clears the header information from the header file used by this format.

**Key Entry** Clear Header

**Remarks** The **Bluetooth Off On** softkey must be set to On for this command to function.

## :HEADER:SAVE

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:HEADER:SAVE

This command saves the header information to the header file used by this format.

**Key Entry** Save Setup To Header

**Remarks** The **Bluetooth Off On** must be set to On for this command to function.

## :IMPAIRMENTS

**Supported** E4438C with Option 406

[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS ON|OFF|1|0  
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPAIRMENTS?

This command enables or disables the Bluetooth signal impairment function.

ON(1) This choice enables the current impairment settings.

OFF(0) This choice disables the impairments.

\*RST 0

**Key Entry** Impairments Off On

**:IMPairments:AWGN**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN ON|OFF|1|0
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN?
```

This choice enables or disables the additive white gaussian noise (AWGN) impairment.

**\*RST** 0

**Key Entry** **AWGN Off On**

**Remarks** The AWGN impairment is not added to the signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” for enabling the impairments.

**:IMPairments:AWGN:CNR**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN:CNR <val>
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN:CNR?
```

This command sets the carrier to noise ratio expressed in a 1 MHz bandwidth for the additive white gaussian noise (AWGN) impairment.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +21

**Range** 10–40

**Key Entry** **C/N[1MHz]**

**Remarks** The value set by this command does not affect the Bluetooth signal until both the AWGN impairment and the Bluetooth signal impairment function are enabled. Refer to “:IMPairments:AWGN” on page 468 for more information.

### :IMPairments:AWGN:NSEed

**Supported** E4438C with Option 406

[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN:NSEed <val>

[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:AWGN:NSEed?

This command sets the noise seed value for the additive white gaussian noise (AWGN) impairment.

**\*RST** +1

**Range** 1–65535

**Key Entry** **Noise Seed**

**Remarks** A change in the seed value changes the noise pattern.

The value set by this command does not affect the Bluetooth signal until both the AWGN impairment and the Bluetooth signal impairment function are enabled. Refer to “:IMPairments:AWGN” on page 468 for more information.

### :IMPairments:DDEVIation

**Supported** E4438C with Option 406

[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:DDEVIation <val>

[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:DDEVIation?

This command sets the maximum linear or sinusoidal carrier frequency drift deviation during the Bluetooth packet transmission.

The variable <val> is expressed in units of kilohertz (–kHz to kHz) with a minimum resolution of 1 kHz.

**\*RST** +0.00000000E+000

**Range** –1E5 to –1E3, 0, 1E3 to 1E5

**Key Entry** **Drift Deviation**

**Remarks** Refer to “:IMPairments:FDType” on page 470 for selecting either a linear or sinusoidal frequency drift.

The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on page 467 for more information.

**:IMPairments:FDType**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPairments:FDType LINear | SINE
```

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPairments:FDType?
```

This command sets the carrier frequency drift impairment type that will occur during the length of the Bluetooth packet transmission.

**LINear** This choice enables the carrier frequency to drift linearly from the signal generator carrier frequency setting to the value entered for the frequency drift.

**SINE** This choice enables the carrier frequency to drift sinusoidally above and below the signal generator carrier frequency setting. For example, if the carrier signal generator setting is 2.4 GHz and the drift value was 100 kHz, the carrier frequency would sinusoidally drift to 2.4001 GHz, back to 2.4 GHz and continue drifting to frequency values less than 2.4 GHz until the packet transmission ends. With a negative drift value, the carrier frequency deviation would begin drifting toward 2.3999 GHz at the beginning of the drift cycle.

**\*RST** SINE

**Key Entry** **Freq Drift Type Linear Sine**

**Remarks** To set a drift value, refer to [“:IMPairments:DDEViation” on page 469](#).

The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to [“:IMPairments” on page 467](#) for more information.

The carrier frequency value on the signal generator display does not change during the drift impairment.

**:IMPairments:FOffset**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPairments:FOffset <val>
```

```
[ :SOURCE ] :RADIO:BLUETOOTH:ARB:IMPairments:FOffset?
```

This command sets a carrier frequency offset impairment value as part of a Bluetooth setup.

The variable <val> is expressed in units of kilohertz (–kHz to kHz) with a minimum resolution of 1 kHz.

**\*RST** +0.00000000E+000

**Range** –1E5 to –1E3, 0, 1E3 to 1E5

<b>Key Entry</b>	<b>Freq Offset</b>
<b>Remarks</b>	The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on <a href="#">page 467</a> for more information.  The carrier frequency value on the signal generator display does not change during the offset impairment.

### **:IMPairments:MINdex**

<b>Supported</b>	E4438C with Option 406
	<code>[ :SOURce ] :RADio:BLUetooth:ARB:IMPairments:MINdex &lt;val&gt;</code> <code>[ :SOURce ] :RADio:BLUetooth:ARB:IMPairments:MINdex?</code>
	This command sets the modulation index impairment value for the Bluetooth waveform.
<b>*RST</b>	+3.1500000E-001
<b>Range</b>	2.5E-1 to 4E-1
<b>Key Entry</b>	<b>Mod Index</b>
<b>Remarks</b>	The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on <a href="#">page 467</a> for more information.  Only the peak-to-peak frequency deviation is changed by this command; the bit rate (1 MHz) remains constant. The modulation index is derived from the following formula:

$$\text{Mod Index} = \frac{\text{Peak-to-Peak Frequency Deviation}}{\text{Bit Rate}}$$

**:IMPairments:STError**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:STError <val>
```

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IMPairments:STError?
```

This command sets the symbol timing error impairment value for the Bluetooth waveform.

The variable <val> is expressed in units of parts per million (ppm) and in units of hertz (Hz). A 20 ppm timing error corresponds to a 20 Hz shift in the symbol rate. The range value indicated below applies to both units of measurement.

**\*RST** +0

**Range** -50 to 50

**Key Entry** **Symbol Timing Err**

**Remarks** The value set by this command does not affect the Bluetooth signal until the Bluetooth signal impairment function is enabled. Refer to “:IMPairments” on [page 467](#) for more information.

**:IQ:MODulation:ATTen**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:MODulation:ATTen <val>
```

```
[ :SOURCE ] :RADio:BLUetooth:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on [page 472](#) for setting the attenuation value.

**\*RST** +2.00000000E+000

**Range** 0–40

**Key Entry** **Modulator Atten Manual Auto**



## **:IQ:MODulation:ATTen:AUTO**

**Supported** E4438C with Option 406

```
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0  
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

**\*RST** 1

**Key Entry** **Modulator Atten Manual Auto**

## **:IQ:MODulation:FILTer**

**Supported** E4438C with Option 406

```
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH  
[ :SOURce ] :RADio:BLUetooth:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter with this command will set “:IQ:MODulation:ATTen:AUTO” on page 473 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** **2.100 MHz 40.000 MHz Through**

**:IQ:MODulation:FILTer:AUTO****Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUEtooth:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURCE]:RADio:BLUEtooth:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 473 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Mod Filter Manual Auto

**:MDEStination:AAMPlitude****Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUEtooth:ARB:MDEStination:AAMplitude NONE|M1|M2|M3|M4
[:SOURCE]:RADio:BLUEtooth:ARB:MDEStination:AAMplitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**:MDEStination:ALCHold****Supported** E4438C with Option 406

```
[:SOURCE]:RADio:BLUEtooth:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURCE]:RADio:BLUEtooth:ARB:MDEStination:ALCHold?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

## **:MDEStination:PULSe**

**Supported**            E4438C with Option 406

```
[ :SOURce ] :RADio:BLUetooth:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4
[ :SOURce ] :RADio:BLUetooth:ARB:MDEStination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking function.

**\*RST**                    NONE

**Key Entry**            **None    Marker 1    Marker 2    Marker 3    Marker 4**

## **:MPOLarity:MARKer1 | 2 | 3 | 4**

**Supported**            E4438C with Option 406

```
[ :SOURce ] :RADio:BLUetooth:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative | POSitive
[ :SOURce ] :RADio:BLUetooth:ARB:MPOLarity:MARKer1 | 2 | 3 | 4?
```

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

### **Example**

```
:RAD:ARB:MPOL:MARK3 NEG
```

The preceding example sets the polarity for marker 3 to negative.

**\*RST**                    POS

**Key Entry**            **Marker 1 Polarity Neg Pos    Marker 2 Polarity Neg Pos    Marker 3 Polarity Neg Pos**  
**Marker 4 Polarity Neg Pos**

## **:MPOLarity:MARKer1**

**Supported**            E4438C with Option 406

```
[ :SOURce ] :RADio:BLUetooth:ARB:MPOLarity:MARKer1 NEGative | POSitive
[ :SOURce ] :RADio:BLUetooth:ARB:MPOLarity?
```

This command sets the polarity for marker 1.

**\*RST**                    POS

**Key Entry**            **Marker 1 Polarity Neg Pos**

### **:MPOLarity:MARKer2**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** **Marker 2 Polarity Neg Pos**

### **:MPOLarity:MARKer3**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** **Marker 3 Polarity Neg Pos**

### **:MPOLarity:MARKer4**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer4 NEGative|POSitive  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST** POS

**Key Entry** **Marker 4 Polarity Neg Pos**

### **:PACKet**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUETOOTH:ARB:PACKet DH1  
[ :SOURCE ] :RADio:BLUETOOTH:ARB:PACKet?
```

This command selects a DH1 packet.

**\*RST** DH1

**Choices** DH1

<b>Key Entry</b>	<b>Packet (DH1)</b>
<b>Remarks</b>	A DH1 packet covers a single timeslot.

**:REFerence:EXTernal:FREQuency**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUEtooth:ARB:REFerence:EXTernal:FREQuency <val>
[ :SOURCE ] :RADio:BLUEtooth:ARB:REFerence:EXTernal:FREQuency?
```

This command sets the lock frequency of the internal ARB waveform clock to match the externally applied ARB waveform clock reference at the BASEBAND GEN REF IN connector.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.00000000+007

**Range** 2.5E5–1E8

**Key Entry** **Reference Freq**

**Remarks** Use this command when EXTernal is the ARB waveform clock reference source. Refer to “:REFerence[:SOURCE]” on page 477 for selecting either the internal or an external source.

**:REFerence[:SOURCE]**

**Supported** E4438C with Option 406

```
[ :SOURCE ] :RADio:BLUEtooth:ARB:REFerence [ :SOURCE ] INTernal | EXTernal
[ :SOURCE ] :RADio:BLUEtooth:ARB:REFerence [ :SOURCE ] ?
```

This command selects either an internal or external reference for the ARB waveform clock.

**\*RST** INT

**Key Entry** **ARB Reference Ext Int**

**Remarks** If the EXTernal choice is selected, the frequency of the external reference must be entered into the signal generator and the signal must be applied to the BASEBAND GEN REF IN connector. Refer to “:REFerence:EXTernal:FREQuency” on page 477 for entering the frequency value.

**:RSYMBOLS**

**Supported** E4438C with Option 406

[:SOURCE]:RADIO:BLUETOOTH:ARB:RSYMBOLS <val>

[:SOURCE]:RADIO:BLUETOOTH:ARB:RSYMBOLS?

This command controls how long it takes the RF burst to ramp up at the beginning of the packet transmission and down at the end.

The variable <val> is expressed in symbols (1 symbol interval equals 1  $\mu$ s).

**\*RST** +6

**Range** 1–10

**Key Entry** **Burst Power Ramp**

**:SCLOCK:RATE**

**Supported** E4438C with Option 406

[:SOURCE]:RADIO:BLUETOOTH:ARB:SCLOCK:RATE <val>

[:SOURCE]:RADIO:BLUETOOTH:ARB:SCLOCK:RATE?

This command sets the sample clock rate for the Bluetooth modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**[:STATE]**

**Supported** E4438C with Option 406

[:SOURCE]:RADIO:BLUETOOTH:ARB[:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:BLUETOOTH:ARB[:STATE]?

This command enables or disables the Bluetooth waveform generator.

**\*RST** 0

**Key Entry** **Bluetooth Off On**

---

## CDMA2000 BBG Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000[:BBG])

### :LMODE

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:LMODE FORWard|RT12|RA12|RT34|RE34|RC34
[:SOURce]:RADio:CDMA2000[:BBG]:LMODE?
```

This command selects either forward or reverse link Real Time CDMA2000.

**FORWard** This choice selects the forward link mode.

**RT12** This choice selects the reverse traffic channel for radio configurations one and two.

**RA12** This choice selects the reverse access channel for radio configurations one and two.

**RT34** This choice selects the reverse traffic channel for radio configurations three and four.

**RE34** This choice selects the reverse enhanced access channel for radio configurations three and four.

**RC34** This choice selects the reverse common control channel for radio configurations three and four.

**\*RST** FORW

<b>Key Entry</b>	<b>Link Forward Reverse</b>	<b>RadioConfig 1/2 Traffic</b>	<b>RadioConfig 1/2 Access</b>
	<b>RadioConfig 3/4 Traffic</b>	<b>RadioConfig 3/4 Enhanced Access</b>	
	<b>RadioConfig 3/4 Common Control</b>		

**[:FORWARD]:BBCLock****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:BBCLock INT [1] | EXT [1]
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:BBCLock?
```

This command selects the baseband data clock source for the forward link.

**\*RST** INT**Field Entry** BBG Data Clock

**Remarks** If the EXT choice is selected, the external frequency must be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

**[:FORWARD]:CHIPrate****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:CHIPrate <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:CHIPrate?
```

This command adjusts the chip rate value.

The variable <val> is expressed in units of chips per second (cps–Mcps).

**\*RST** +1.22880000E+006**Range** 1E3–1.3E6**Field Entry** Chip Rate

**Remarks** The default value (1.228800 Mcps) is in accordance with the IS-2000 specification.

**[:FORWARD]:ESDelay****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:ESDelay <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:ESDelay?
```

This command modifies the even second clock pulse.

**\*RST** +2.00000000E+001**Range** 0.5–128.0**Field Entry** Even Second Delay



**Remarks** The even second clock pulse sets the delay to align the RF with the trigger.

When the noise function is set to ON, this value will increase. Refer to “[:FORWARD]:NOISE[:STATE]” on page 506 for more information.

## [:FORWARD]:FILTER

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER RNYQuist|NYQuist|
GAUSSian|RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|
"<user FIR>"|
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FILTER?
```

This command specifies the filter type.

IS95	This choice selects a filter that meets the criteria of the IS-95 standard.																		
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.																		
IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.																		
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.																		
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.																		
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.																		
"<user FIR>"	This variable is any filter file that you have stored into memory.																		
<b>*RST</b>	IS95_EQ																		
<b>Key Entry</b>	<table> <tr> <td><b>Root Nyquist</b></td> <td><b>Nyquist</b></td> <td><b>Gaussian</b></td> <td><b>Rectangle</b></td> <td><b>IS-95</b></td> <td><b>IS-95 w/EQ</b></td> </tr> <tr> <td><b>IS-95 Mod</b></td> <td><b>IS-95 MOD w/EQ</b></td> <td><b>APCO 25 C4FM</b></td> <td><b>UN3/4 GSM Gaussian</b></td> <td></td> <td></td> </tr> <tr> <td><b>User FIR</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>	<b>IS-95 Mod</b>	<b>IS-95 MOD w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM Gaussian</b>			<b>User FIR</b>					
<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>														
<b>IS-95 Mod</b>	<b>IS-95 MOD w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM Gaussian</b>																
<b>User FIR</b>																			

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**[:FORWARD]:FILTer:ALPHa**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FILTer:ALPHa <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FILTer:ALPHa?
```

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +2.20000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “[:FORWARD]:FILTer” on page 481.

**[:FORWARD]:FILTer:BBT**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FILTer:BBT <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time filter value.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “[:FORWARD]:FILTer” on page 481.

**[:FORWARD]:FILTer:CHANnel**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FILTer:CHANnel EVM|ACP
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

<b>EVM</b>	This choice provides the most ideal passband.
<b>ACP</b>	This choice improves stopband rejection.
<b>*RST</b>	EVM
<b>Key Entry</b>	<b>Optimize FIR For EVM ACP</b>
<b>Remarks</b>	To change the current filter type, refer to “[:FORWARD]:FILTer” on page 481.

**[:FORWARD]:LCState**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG] [:FORWARD]:LCState <val>
[:SOURCE]:RADio:CDMA2000[:BBG] [:FORWARD]:LCState?
```

This command sets the long code seed used to generate the long code for the forward link.

**\*RST** #H0000000000

**Range** #H0–#H3FFFFFFFFF

**Field Entry** Long Code State

**Remarks** The storage register for the long code state allows a 42-bit binary number to be entered.

**[:FORWARD]:FFCH:DATA**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG] [:FORWARD]:FFCH:DATA PN9 | PN15 | FIX4 |
"<file name>" | EXT
[:SOURCE]:RADio:CDMA2000[:BBG] [:FORWARD]:FFCH:DATA?
```

This command configures the data field for the forward fundamental channel.

**\*RST** PN9

**Key Entry** **PN9** **PN15** **FIX4** **User File** **Ext**

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**[:FORWARD]:FFCH:DATA:FIX4****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:DATA:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:DATA:FIX4?

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****[:FORWARD]:FFCH:EBNO****Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:EBNO &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the forward fundamental channel.

**\*RST** +0.00000000E+000

**Range** min EbNo:  $10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power} + \text{RCFactor}$

max EbNo:  $10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power} + \text{RCFactor}$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJust” on page 508 for adjusting the code domain power.

RCFactor is dependent on the selected radio configuration. The following table shows the RCFactor by radio configuration.

RC	RCFactor
1	$10\log_{10} \left[ \frac{1}{2} \left( \frac{11}{11 + \frac{9600}{\text{Bit Rate}}} \right) \right]$
2	$10\log_{10} \left[ \frac{1}{2} \left( \frac{23}{23 + \frac{14400}{\text{Bit Rate}}} \right) \right]$

RC	RCFactor
3, 4	$10\log_{10}\left[\frac{11}{11 + \frac{9600}{\text{Bit Rate}}}\right]$
5	$10\log_{10}\left[\frac{11}{11 + \frac{14400}{\text{Bit Rate}}}\right]$

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

### [:FORWARD]:FFCH:FOFFset

**Supported** E4438C with Option 401

[:SOURCE]:RADio:CDMA2000[:BBG] [:FORWARD]:FFCH:FOFFset <val>

[:SOURCE]:RADio:CDMA2000[:BBG] [:FORWARD]:FFCH:FOFFset?

This command sets the frame offset value for the forward fundamental channel.

**\*RST** +0

**Range** 0–15

**Field Entry** Frame Offset

**Remarks** Changing this value also changes the frame offset value for the forward supplemental channels (FSCH1 and FSCH2).

### [:FORWARD]:FFCH:LCMask

**Supported** E4438C with Option 401

[:SOURCE]:RADio:CDMA2000[:BBG] [:FORWARD]:FFCH:LCMask?

This command outputs the contents of the long code mask field for the forward fundamental channel.

**\*RST** #H3180000000

**Remarks** This value is shared by the forward supplemental channels (FSCH1 and FSCH2).

**[:FORWARD]:FFCH:LCMask:ESN**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FFCH:LCMask:ESN <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FFCH:LCMask:ESN?
```

This command sets the permuted electronic serial number (ESN) for the long code mask, which is used to identify a particular mobile.

**\*RST** #H00000000

**Range** #H0–#HFFFFFFF

**Field Entry** Permuted ESN

**Remarks** Changing this value also changes the permuted ESN for the long code mask in the forward supplemental channels (FSCH1 and FSCH2).

**[:FORWARD]:FFCH:LCMask:HEADer**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FFCH:LCMask:HEADer <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FFCH:LCMask:HEADer?
```

This command sets the header for the long code mask, which is used to identify a particular mobile.

**\*RST** #H318

**Range** 000–3FF

**Field Entry** Header

**Remarks** Changing this value also changes the header for the long code mask in the forward supplemental channels (FSCH1 and FSCH2).

**[:FORWARD]:FFCH:POWer**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FFCH:POWer <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FFCH:POWer?
```

This command sets the power for the forward fundamental channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** –40 to 0

**Field Entry** Power

**[:FORWARD]:FFCH:PRAMP****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:PRAMP ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:PRAMP?
```

This command sets the power puncturing operating state for the forward fundamental channel.

**\*RST** 1**Field Entry** Ramp**[:FORWARD]:FFCH:PRTIME****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:PRTIME <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:PRTIME?
```

This command sets the power ramp time indicator values for the forward fundamental channel.

Power frame indicators are used to command the mobile (increasing or decreasing power). For example, if 4 is the selected value, it will cause the mobile to respond with 4 sequential power increases, then 4 power decreases. This pattern will continue indefinitely.

The variable <val> is expressed in

**\*RST** +1**Range** 1–80**Field Entry** Ramp Time**[:FORWARD]:FFCH:QOF****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:QOF <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH:QOF?
```

This command sets the quasi-orthogonal function channel value.

**\*RST** +0**Range** 0–3**Field Entry** QOF

**[:FORWARD]:FFCH:RATE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:RATE 1.2kbps|1.5kbps|
1.8kbps|2.4kbps|2.7kbps|3.6kbps|4.8kbps|7.2kbps|9.6kbps|14.4kbps
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:RATE?
```

This command sets the data rate for the forward paging channel.

The variable <val> is expressed in units of bits per second (bps–Mbps).

**\*RST** +9.60000000E+003

**Range** 1.2E3–1.44E4

**Field Entry** Bit Rate

**[:FORWARD]:FFCH:RCONfig**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:RCONfig <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:RCONfig?
```

This command sets the radio configuration value for the forward fundamental channel.

**\*RST** +3

**Range** 1–5

**Field Entry** Radio Config

**[:FORWARD]:FFCH:WALSh**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:WALSh <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FFCH:WALSh?
```

Execute this command to set the Walsh code for the forward fundamental channel.

**\*RST** +10

**Range** RC1,2,3, & 5: 0–63 RC4: 0–127

**Field Entry** Walsh



**[[:FORWARD]:FFCH[:STATE]]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FFCH[:STATE] ?
```

This command enables or disables the operating state of the forward fundamental channel.

**\*RST** 0**Field Entry** State**[[:FORWARD]:FPCH:DATA]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:DATA DEFAULT|"<file name>"
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:DATA?
```

This command configures the data field for the forward paging channel.

**\*RST** DEFAULT**Key Entry** **Default** **User File****Remarks** A user-defined file can have a maximum length of 512 bytes.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**[[:FORWARD]:FPCH:EBNO]****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FPCH:EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the forward paging channel.

**\*RST** +0.00000000E+000

**CDMA2000 BBG Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000[:BBG])**

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJust” on page 508 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[:FORWARD]:FPCH:LCMask**

**Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask?

This command outputs the contents of the long code mask field for the forward paging channel.

**\*RST** +0.00000000E+000

**[:FORWARD]:FPCH:LCMask:F1**

**Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F1 <val>

[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F1?

This command sets the value of field one for the forward paging channel long code mask.

**\*RST** #H18CD

**Range** #H0–#H1FFF

**Field Entry** Field 1

**[:FORWARD]:FPCH:LCMask:F2**

**Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F2 <val>

[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F2?

This command sets the value of field two for the forward paging channel long code mask.

**\*RST** #H00  
**Range** #H00–#H1F  
**Field Entry** Field 2

**[:FORWARD]:FPCH:LCMask:F3**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F3 <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:LCMask:F3?
```

This command sets the value of field three for the forward paging channel long code mask.

**\*RST** #H000  
**Range** #H0–#HFFF  
**Field Entry** Field 3

**[:FORWARD]:FPCH:MESSAge**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:MESSAge <bit_count>,
<datablock>
```

This command sends a bit count and a data block (to queue up messaging), generated as a one-time paging message (asynchronous paging message), to the paging channel.

After a one-time paging message is generated, the signal generator reverts to synchronous paging file messages.

**[:FORWARD]:FPCH:POWer**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:POWer <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:FPCH:POWer?
```

Execute this command to set the power for the forward paging channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000  
**Range** –40 to 0  
**Field Entry** Power

**[[:FORWARD]:FPCH:RATE]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FPCH:RATE 4.8kbps | 9.6kbps
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FPCH:RATE?
```

This command sets the data rate for the forward paging channel.

The variable <val> is expressed in units of bits per second (bps–Mbps).

**\*RST** +9.60000000E+003

**Field Entry** Bit Rate

**[[:FORWARD]:FPCH:WALSh]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FPCH:WALSh <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FPCH:WALSh?
```

This command sets the Walsh code for the forward paging channel.

**\*RST** +1

**Range** 0–63

**Field Entry** Walsh

**[[:FORWARD]:FPCH[:STATE]]**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FPCH [ :STATE ] ON | OFF | 1 | 0
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FPCH [ :STATE ] ?
```

Execute this command to set the operating state for the forward paging channel.

**\*RST** 0

**Field Entry** State

**[:FORWARD]:FPICH:ECNO**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:ECNO <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:ECNO?
```

This command sets the ratio of energy per chip to the noise power spectral density (expressed in dB) for the forward pilot channel.

**\*RST** +0.00000000E+000

**Range** min EcNo: -30 + Normalized Power

max EcNo: 30 + Normalized Power

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJUST” on page 508 for adjusting the code domain power.

**Field Entry** EcNo

**Remarks** Changes to the EcNo values also change the EbNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[:FORWARD]:FPICH:POWER**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:POWER <val>
```

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FPICH:POWER?
```

This command sets the power for the forward pilot channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**[:FORWARD]:FPICH[:STATe]****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG] [:FORWARD]:FPICH[:STATe] ON|OFF|1|0
[:SOURce]:RADio:CDMA2000[:BBG] [:FORWARD]:FPICH[:STATe] ?
```

This command enables or disables the operating state of the forward pilot channel.

**\*RST** 1**Field Entry** State**[:FORWARD]:FSCH[1]|2:DATA****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA PN9|PN15|FIX4|
"<file name>"|EXT
[:SOURce]:RADio:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA?
```

This command configures the data field for the forward supplemental traffic channels.

**\*RST** PN9**Key Entry** PN9 PN15 FIX4 User File EXT**[:FORWARD]:FSCH[1]|2:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA:FIX4 <val>
[:SOURce]:RADio:CDMA2000[:BBG] [:FORWARD]:FSCH[1]|2:DATA:FIX4?
```

This command selects a fixed 4-bit data pattern that repeats as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** FIX4

**[:FORWARD]:FSCH[1] | 2:EBNO**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1] | 2:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1] | 2:EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse access channel.

**\*RST** +0.00000000E+000

**Range**

$$\text{min EbNo: } 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\text{max EbNo: } 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWARD]:PADJUS” on page 508 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[:FORWARD]:FSCH[1] | 2:FOFFset**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1] | 2:FOFFset <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1] | 2:FOFFset?
```

This command sets the frame offset value for the forward supplemental traffic channels.

**\*RST** +0

**Range** 0–15

**Field Entry** Frame Offset

**Remarks** Changing this value also changes the frame offset value for the forward fundamental channel (FFCH).

**[:FORWARD]:FSCH[1] | 2:LCMask****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask?

This query outputs the contents of the long code mask field for the forward supplemental traffic channels.

**\*RST** 0**Remarks** This value is shared with the forward fundamental channel (FFCH).**[:FORWARD]:FSCH[1] | 2:LCMask:ESN****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:ESN &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:ESN?

This command defines the permuted electronic serial number (ESN) for the long code mask, which is used to identify a particular mobile.

**\*RST** #H00000000**Range** #H0–#HFFFFFFF**Field Entry** Permuted ESN**Remarks** Changing this value also changes the permuted ESN for the long code mask in the forward fundamental channel (FFCH).**[:FORWARD]:FSCH[1] | 2:LCMask:HEADer****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:HEADer &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2:LCMask:HEADer?

This command sets the header for the long code mask, which is used to identify a particular mobile.

**\*RST** #H318**Range** 000–3FF**Field Entry** Header**Remarks** Changing this value also changes the header for the long code mask in the forward fundamental channel (FFCH).



**[[:FORWARD]:FSCH[1] | 2:POWER****Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [1] | 2:POWER <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [1] | 2:POWER?
```

This command sets the power for the forward supplemental traffic channels.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** -40 to 0**Field Entry** Power**[[:FORWARD]:FSCH[1] | 2:QOF****Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [1] | 2:QOF <val>
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [1] | 2:QOF?
```

This command sets the quasi-orthogonal function value for the forward supplemental traffic channels.

**\*RST** +0**Range** 0–3**Field Entry** QOF**[[:FORWARD]:FSCH[1] | 2:RATE****Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [1] | 2:RATE 19.2kbps |
28.8kbps | 38.4kbps | 57.6kbps | 76.8kbps | 115.2kbps | 153.6kbps | 230.4kbps |
307.2kbps
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] [ :FORWARD ] :FSCH [1] | 2:RATE?
```

This command sets the data rate for the forward supplemental traffic channels.

**\*RST** +1.92000000E+004**Field Entry** Bit Rate**Remarks** Values preceded by an asterisk indicate data rate values that are eligible for turbo coding.

**[[:FORWARD]:FSCH[1]|2:RCONfig]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:RCONfig 3|4|5
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:RCONfig?
```

This command sets the radio configuration value for the forward supplemental channels.

**\*RST** +3**Field Entry** Radio Config**[[:FORWARD]:FSCH[1]|2:TCODE]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:TCODE ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:TCODE?
```

This command enables or disables the turbo coding operating state for the forward supplemental traffic channels.

**\*RST** 0**Field Entry** Turbo Coding**Remarks** Turbo coding is available for all data rates, excluding the following radio configurations (highest data rate of each radio configuration):

RC3: 153.6

RC4: 307.2

RC5: 230.4

To change the data rate for the forward supplemental traffic channel, refer to “[:FORWARD]:FSCH[1]|2:RATE” on page 497.

**[[:FORWARD]:FSCH[1]|2:WALSh]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:WALSh <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSCH[1]|2:WALSh?
```

This command sets the Walsh code for the forward supplemental traffic channels.

**\*RST** FSCH1: 12 FSCH2: 14

## CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])

Range	<i>RC3</i>	<i>RC4</i>	<i>RC5</i>
	Data Rate=19.2: 0–31	Data Rate=19.2: 0–63	Data Rate=28.8: 0–31
	Data Rate=38.4: 0–15	Data Rate=38.4: 0–31	Data Rate=57.6: 0–15
	Data Rate=76.8: 0–7	Data Rate=76.8: 0–15	Data Rate=115.2: 0–7
	Data Rate=307.2: 0–3	Data Rate=153.6: 0–7	Data Rate=230.4: 0–3
		Data Rate=307.2: 0–3	
<b>Field Entry</b>	Walsh		

**[:FORWARD]:FSCH[1] | 2[:STATE]**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSCH[1] | 2[:STATE] ?
```

This command enables or disables the operating state of the forward supplemental traffic channel.

**\*RST** 0

**Field Entry** State

**[:FORWARD]:FSYNc:CFrequency**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:CFrequency <val>
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:CFrequency?
```

This command directs the mobile station to a CDMA channel having a primary paging channel.

**\*RST** +50

**Range** 0–2047

**Field Entry** CDMA Freq

**[:FORWARD]:FSYNc:DAYLt**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:DAYLt 1|0
[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:DAYLt?
```

This command sets the daylight savings time offset for the forward synchronization channel, where 1 = on and 0 = off.

**\*RST** +0

**Field Entry** DAYLT

## [:FORWard]:FSYNc:EBNO

**Supported** E4438C with Options 401 and 403

[:SOURce]:RADio:CDMA2000[:BBG][:FORWard]:FSYNc:EBNO <val>

[:SOURce]:RADio:CDMA2000[:BBG][:FORWard]:FSYNc:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the quick paging channel.

**\*RST** +0.00000000E+000

**Range**  $\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$

$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:FORWard]:PADJust” on page 508 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

## [:FORWard]:FSYNc:ECFRequency

**Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG][:FORWard]:FSYNc:ECFRequency <val>

[:SOURce]:RADio:CDMA2000[:BBG][:FORWard]:FSYNc:ECFRequency?

This command direct the mobile station to a CDMA channel having a primary paging channel. The mobile tunes to the Ext CDMA Freq field when it has a protocol revision level of 6 or greater, and it supports either the quick paging channel or radio configurations greater than 2. Otherwise, the mobile tunes to the CDMA Freq field for the CDMA channel.

This command sets the extended CDMA frequency for the forward synchronization channel.

**\*RST** +0

**Range** 0–2047

**Field Entry** Ext CDMA Freq

**[:FORWARD]:FSYNc:LPSec****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:LPSec &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:LPSec?

This command sets the leap seconds value for the forward synchronization channel.

**\*RST** +0**Range** 0–255**Field Entry** Leap Seconds**[:FORWARD]:FSYNc:LTMoff****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:LTMoff &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:LTMoff?

This command sets the current local time offset from the basestation for the forward synchronization channel, where 1= 30 minutes, 2= 60 minutes, 3= 90 minutes, and so on.

**\*RST** +0**Range** 0–63**Field Entry** LTM OFF**[:FORWARD]:FSYNc:MPREv****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:MPREv &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:MPREv?

This command sets the minimum protocol revision level for the forward synchronization channel.

**\*RST** +1**Range** 0–255**Field Entry** P Rev Min

**[[:FORWARD]:FSYNc:MSGType****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG][[:FORWARD]:FSYNc:MSGType &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG][[:FORWARD]:FSYNc:MSGType?

This command sets the message type value for the forward synchronization channel.

**\*RST** +1**Range** 0–255**Field Entry** Message Type**[[:FORWARD]:FSYNc:NID****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG][[:FORWARD]:FSYNc:NID &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG][[:FORWARD]:FSYNc:NID?

This command sets the network identification value for the forward synchronization channel.

**\*RST** +1**Range** 0–65535**Key Entry** Network ID**[[:FORWARD]:FSYNc:POWER****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG][[:FORWARD]:FSYNc:POWER &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG][[:FORWARD]:FSYNc:POWER?

This command sets the power for the forward synchronization channel.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power

**[:FORWARD]:FSYNc:PRATe****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:PRATe &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:PRATe?

This command sets the base station paging rate for the forward supplemental channel.

**\*RST** +0**Range** 0–3**Field Entry** PRAT**[:FORWARD]:FSYNc:PREV****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:PREV &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:PREV?

This command sets the protocol revision level for the forward synchronization channel.

**\*RST** +1**Range** 0–255**Field Entry** P Rev**[:FORWARD]:FSYNc:RESERVED****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:RESERVED &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG] [:FORWARD]:FSYNc:RESERVED?

This command sets the reserved field value for the forward synchronization channel.

**\*RST** +0**Range** 0–7**Key Entry** **Reserved****Remarks** Currently, base stations and mobiles ignore reserved bits, so the reserved field should be set to “0” with the query returning the same value.

**[[:FORWARD]:FSYNc:SID****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FSYNc:SID <val>
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FSYNc:SID?
```

This command sets the system identification for the forward synchronization channel.

**\*RST** +7**Range** 0–32767**Field Entry** System ID**[[:FORWARD]:FSYNc:STYPe****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FSYNc:STYPe IS95|JSTD8|IS2000
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FSYNc:STYPe?
```

This command selects the forward synchronization channel type.

**IS95** This choice selects a channel type that is compatible with the IS95 CDMA standard.

**JSTD8** This choice selects a channel type that is compatible with PCS CDMA standard personal station requirements for 1.9 to 2.0 GHz.

**IS2000** This choice selects a channel type that is compatible with the IS2000 CDMA standard.

**\*RST** JSTD8**Key Entry** **IS95 JSTD8 IS2000****[[:FORWARD]:FSYNc:SYSTime****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FSYNc:SYSTime <val>
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:FSYNc:SYSTime?
```

This command sets the system time value for the forward synchronization channel.

**\*RST** #H000000000**Range** #H0–#HFFFFFFF**Field Entry** Time



**[:FORWARD]:FSYNc:WALSh****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:WALSh <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc:WALSh?
```

This command sets the Walsh code for the forward synchronization channel.

**\*RST** +32**Range** 0–63**Field Entry** walsh**[:FORWARD]:FSYNc[:STATe]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc[:STATe] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:FSYNc[:STATe]?
```

This command enables or disables the operating state for the forward synchronization channel.

**\*RST** 0**Field Entry** State**[:FORWARD]:NOISe:CN****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:NOISe:CN <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:NOISe:CN?
```

This command sets the carrier to noise ratio for the forward link.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –30 to 30**Key Entry** C/N**Remarks** The carrier to noise ratio is the ratio of the carrier power to in-channel noise power.

A change to the carrier to noise ratio will change all EbNo/EcNo field values.

**[:FORWARD]:NOISe[:STATe]**

**Supported** E4438C with Options 401 and 403

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:NOISe[:STATe] ON|OFF|1|0
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:NOISe[:STATe] ?
```

This command enables or disables the noise function for the CDMA2000 baseband forward link.

---

**NOTE** When this command is enabled, an immediate increase in the Even Second Delay value will occur. The Even Second Delay value will increase by an increment of 11.5 chips. The chip increase will be seen in the appropriate fields on the display.

Changes to Even Second Delay and Trigger Advance will not affect synchronization; automatic compensation is performed internally.

---

**\*RST** 0

**Key Entry** **Noise Off On**

**Remarks** Both the carrier and noise power value will be adjusted to match the specified carrier to noise ratio. Refer to “[:FORWARD]:NOISe:CN” on page 505 to change the carrier to noise ratio.

The noise function can only be turned on with Option 403 installed.

**[:FORWARD]:OCNS:EBNO**

**Supported** E4438C with Options 401 and 403

```
[:SOURce]:RADio[1]|2|3|4:CDMA2000[:BBG][:FORWARD]:OCNS:EBNO <val>
[:SOURce]:RADio[1]|2|3|4:CDMA2000[:BBG][:FORWARD]:OCNS:EBNO?
```

This command sets the energy per bit to noise power (EbNo) density ratio for the forward link orthogonal channel noise simulator (OCNS).

The variable <val> is expressed in units of decibels (dB).

**Range** min EbNo:  $10\log_{10}\left(\frac{\text{Chip Rate}}{1000(\text{Bit Rate})}\right) + \text{Normalized Power}$

max EbNo:  $10\log_{10}\left(\frac{1000(\text{Chip Rate})}{\text{Bit Rate}}\right) + \text{Normalized Power}$

The OCNS bit rate is fixed at 19.2 kilo-bits per second.

**CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])**

The Normalized Power is the channel amplitude after adjusting the code domain power to 0 dB. Refer “[:FORWARD]:PADJust” on page 508.

**Range** min EbNo:  $10\log_{10} \left( \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right) + \text{Normalized Power}$

max EbNo:  $10\log_{10} \left( \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right) + \text{Normalized Power}$

The OCNS bit rate is fixed at 19.2 kilo-bits per second.

The Normalized Power is the channel amplitude after adjusting the code domain power to 0 dB. Refer “[:FORWARD]:PADJust” on page 508.

**Field Entry** EbNo

**Remarks** EbNo is available for all channels except the pilot channel.

The noise function must be turned on for this setting to work. Refer to “[:FORWARD]:NOISE[:STATE]” on page 506 for turning on the noise.

**[:FORWARD]:OCNS:POWER**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:OCNS:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:OCNS:POWER?
```

This command sets the power level for the orthogonal channel noise simulator.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**[[:FORWARD]:OCNS:WALSh]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:OCNS:WALSh <val>
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:OCNS:WALSh?
```

This command sets the Walsh code for the orthogonal channel noise simulator.

**\*RST** +61**Range** 0–63**Field Entry** walsh**[[:FORWARD]:OCNS[:STATE]]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:OCNS[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:OCNS[:STATE]?
```

This command turns the orthogonal channel noise simulator on or off.

**\*RST** 0**Field Entry** State**[[:FORWARD]:PADJust]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:FORWARD]:PADJust EQUAL|SCALE
```

This command sets the code domain power (the relative power in each of the channels).

**EQUAL** Sets all channels to equal power, and the total power to 0 dB.

**SCALE** Scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.

**Key Entry** **Equal Powers**      **Scale To 0dB**

**[:FORWARD]:POLarity****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:POLarity NORMAL|INVERTed
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:POLarity?
```

This command sets the rotation direction for the phase modulation vector.

**NORMAL** This choice selects normal phase polarity.

**INVERTed** This choice inverts the internal Q signal.

**\*RST** NORM

**Field Entry** Phase Polarity

**[:FORWARD]:QPCH:CCI****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:CCI <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:CCI?
```

This command selects the configuration change indicator for the quick paging channel.

**\*RST** +3

**Range** 0–3

**Field Entry** Change

**[:FORWARD]:QPCH:EBNO****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:EBNO <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the quick paging channel.

**\*RST** +0.00000000E+000

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to

**CDMA2000 BBG Subsystem—Option 401 ([:SOURce]:RADio:CDMA2000[:BBG])**

0 dB. Refer to “[:FORWARD]:PADJust” on page 508 for adjusting the code domain power.

**Field Entry**

EbNo

**Remarks**

Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**[:FORWARD]:QPCH:PI****Supported**

E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:PI <val>
```

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:PI?
```

This command selects the paging slots for the quick paging channel.

**\*RST**

+0

**Field Entry**

Paging Indicator

**Remarks**

When the bit rate is 2400, a value of 191 turns all paging slots on.

When the bit rate is 4800, a value of 383 turns all paging slots on.

When the bit rate is either 2400 or 4800, a value of -1 turns all paging slots off.

To change the bit rate value, refer to “[:FORWARD]:QPCH:RATE” on page 511.

**[:FORWARD]:QPCH:POWer****Supported**

E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:POWer <val>
```

```
[:SOURce]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:POWer?
```

This command sets the power value for the quick paging channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST**

+0.00000000E+000

**Range**

-40 to 0

**Field Entry**

Power

**[:FORWARD]:QPCH:RATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:RATE 2.4kbps|4.8kbps
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:RATE?
```

This command sets the bit rate for the quick paging channel.

**\*RST** +4.80000000E+003**Field Entry** Bit Rate**[:FORWARD]:QPCH:WALSh****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:WALSh <val>
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH:WALSh?
```

This command sets the Walsh code for the quick paging channel.

**\*RST** +80**Range** 0–127**Field Entry** Walsh**[:FORWARD]:QPCH[:STATE]****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH[:STATE] ON|OFF|1|0
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:QPCH[:STATE]?
```

This command enables or disables the operating state of the quick paging channel.

**\*RST** 0**Field Entry** State**[:FORWARD]:SRATe****Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG][:FORWARD]:SRATe?
```

This command returns the value of the current spreading rate.

**\*RST** +1

**:PNOffset**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:PNOffset <val>
```

```
[:SOURce]:RADio:CDMA2000[:BBG]:PNOffset?
```

This command sets the current pseudorandom number (PN) offset value.

**\*RST** +1

**Range** 0–511

**Field Entry** PN Offset

**Remarks** The PN offset value is the time offset in the short code assigned to each basestation, allotting a unique identity for each.

**:REVerse:BBCLock**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:BBCLock INT[1] | EXT[1]
```

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:BBCLock?
```

This command selects the data clock source.

**\*RST** INT

**Key Entry** **Internal** **External**

**Remarks** If the EXT choice is selected, the REFerence selection will automatically be set to internal. The external data clock source must be connected to the DATA CLOCK front panel BNC input connector, and its frequency must match the specified chip rate.



**:REVerse:CHIPrate**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:CHIPrate <val>
```

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:CHIPrate?
```

Execute this command to adjust the chip rate.

The variable <val> is expressed in units of chips per second (cps–Mcps).

**\*RST** +1.22880000E+006

**Range** 1E3–1.3E6

**Field Entry** Chip Rate

**Remarks** The default value (1.228800 Mcps) is in accordance with the IS-2000 specification.

**:REVerse:ESDelay**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:ESDelay <val>
```

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:ESDelay?
```

This command modifies the even second clock pulse.

**\*RST** +2.75000000E+001

**Range** 0.5–128.0

**Field Entry** Even Second Delay

**Remarks** The even second clock pulse sets the delay to align the RF with the trigger.

When the noise function is set to ON, this value will increase. Refer to “:REVerse:NOISe[:STATE]” on page 518 for more information.

**:REVerse:FILTer**

**Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:FILTer RNYQuist|NYQuist|GAUSSian|
RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|
"<user FIR>"
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:FILTer?
```

This command specifies the filter type for the reverse link.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ** This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**AC4Fm** This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**UGGaussian** This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.

**"<user FIR>"** This variable is any filter file that you have stored into memory.

**\*RST**

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 MOD w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM Gaussian</b>		
	<b>User FIR</b>					

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:REVerse:FILTer:ALPHa**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:FILTer:ALPHa <val>
```

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:FILTer:ALPHa?
```

This command changes the alpha value on the Nyquist or root Nyquist filter.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +2.20000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** This command is effective only after choosing the root Nyquist or Nyquist filter. It does not effect other types of filters.

To change the current filter type, refer to “[:REVerse:FILTer]” on page 514.

**:REVerse:FILTer:BBT**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:FILTer:BBT <val>
```

```
[ :SOURCE ] :RADio:CDMA2000 [ :BBG ] :REVerse:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time filter value.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.500–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing the Gaussian filter. It does not effect other types of filters.

To change the current filter type, refer to “[:REVerse:FILTer]” on page 514.

**:REVerse:FILTer:CHANnel**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:FILTer:CHANnel EVM|ACP
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “[:REVerse:FILTer](#)” on page 514.

**:REVerse:LCMask**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:LCMask <val>
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:LCMask?
```

This command specifies a unique serial number code to identify a mobile station.

**\*RST** #H00000000000

**Range** #H0–#H3FFFFFFFF

**Field Entry** Long Code Mask

**:REVerse:LCState**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:LCState <val>
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:LCState?
```

This command sets a unique code to address a mobile station.

**\*RST** #H00000000000

**Range** #H0–#H3FFFFFFFF

**Field Entry** Long Code State

**Remarks** The storage register for the long code state allows a 42-bit binary number to be entered.

**:REVERSE:PADJust**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:PADJust EQUAL|SCALE
```

Execute this command to set the code domain power.

**EQUAL** Sets all channels to equal power, and the total power to 0 dB.

**SCALE** Scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.

**Key Entry** **Equal Powers** **Scale To 0dB**

**:REVERSE:POLarity[:ALL]**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:POLarity[:ALL] NORMAL|INVERTed
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:POLarity[:ALL]?
```

This command sets the phase polarity to either normal or inverted.

**NORMAL** This choice selects normal phase polarity.

**INVERTed** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **Normal** **Inverted**

**:REVERSE:NOISe:CN**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:NOISe:CN <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:NOISe:CN?
```

This command sets the carrier to noise ratio for the reverse link.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -30 to 30

**CDMA2000 BBG Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000[:BBG])****Key Entry** C/N

**Remarks** The carrier to noise ratio is the ratio of the carrier power to in-channel noise power, expressed in decibels (dB).

A change to the carrier to noise ratio will only align the EbNo/EcNo field values in the active operating mode.

**:REVerse:NOISe[:STATe]****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:NOISe[:STATe] ON|OFF|1|0
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:NOISe[:STATe] ?
```

This command enables or disables the noise function for the baseband reverse link.

---

**NOTE** When this command is enabled, an immediate increase in the Even Second Delay and Trigger Advance values will occur. The Even Second Delay value will increase by an increment of 11.5 chips and the Trigger Advance value will increase by an increment of 12 chips. The chip increase will be seen in the appropriate field on the display.

Changes to Even Second Delay and Trigger Advance will not affect synchronization; automatic compensation is performed internally.

---

**\*RST** 0**Key Entry** **Noise Off On**

**Remarks** Both the carrier and noise power value will be adjusted to match the specified carrier to noise ratio. Refer to “:REVerse:NOISe:CN” on page 517 to change the carrier to noise ratio.

The noise function can only be turned on with Option 403 installed.

**:REVerse:RC12:ACCess:RACH:DATA****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:DATA PN9|PN15|
FIX4|"<file name>"
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:DATA?
```

Execute this command to configure the data field for the reverse access channel.

<b>*RST</b>	PN9
<b>Key Entry</b>	<b>PN9 PN15 FIX4 User File</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 13 for information on the file name syntax.

**:REverse:RC12:ACCess:RACH:DATA:FIX4**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC12:ACCess:RACH:DATA:FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC12:ACCess:RACH:DATA:FIX4?
```

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

<b>*RST</b>	#B0000
<b>Range</b>	#B0000–#B1111 or 0–15
<b>Key Entry</b>	FIX4

**:REverse:RC12:ACCess:RACH:EBNO**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC12:ACCess:RACH:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC12:ACCess:RACH:EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse access channel.

<b>*RST</b>	+0.00000000E+000
<b>Range</b>	$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$ $\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “[:REverse:PADJust](#)” on page 517 for adjusting the code domain power.

<b>Field Entry</b>	EbNo
<b>Remarks</b>	Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).  Queries of this command are only valid for the current operating state.

**:REVerse:RC12:ACCess:RACH:FLENgth****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:FLENgth?

This command queries the frame length for the reverse access channel.

The frame length is expressed as seconds (ms).

**\*RST** +20**Field Entry** Frame Length**:REVerse:RC12:ACCess:RACH:FOFFset****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:FOFFset &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:FOFFset?

This command sets the frame offset value for the reverse access channel.

**\*RST** +0**Range** 0–15**Field Entry** Frame Offset**:REVerse:RC12:ACCess:RACH:POWer****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:POWer &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC12:ACCess:RACH:POWer?

This command sets the power for the reverse access channel.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power



**:REVERSE:RC12:ACCESS:RACH:RCONFIG****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:RCONFIG 1|2

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:RCONFIG?

This command select the radio configuration value for the reverse access channel.

**\*RST** +1**Field Entry** Radio Config**:REVERSE:RC12:ACCESS:RACH:RATE****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH:RATE?

This command queries the data rate for the reverse access channel.

**\*RST** +4.80000000E+003**Field Entry** Bit Rate**:REVERSE:RC12:ACCESS:RACH[:STATE]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH[:STATE] ON|OFF|

1|0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:ACCESS:RACH[:STATE]?

This command enables or disables the operating state for the reverse access channel.

**\*RST** +1**Field Entry** State

**:REVERSE:RC12:TRAFFIC:RSCH:DATA****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:DATA PN9|PN15|
FIX4|"<file name>"
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:DATA?
```

This command configures the data field for the reverse supplemental traffic channel.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File**

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:REVERSE:RC12:TRAFFIC:RSCH:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:DATA:FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:DATA:FIX4?
```

This command sets a fixed 4-bit data pattern that repeats as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****:REVERSE:RC12:TRAFFIC:RSCH:FLENgth****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:FLENgth?
```

This command queries the frame length value for the reverse supplemental traffic channel.

**\*RST** +20

**:REVERSE:RC12:TRAFFIC:RSCH:FOFFset****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:FOFFset <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:FOFFset?
```

This command sets the frame offset value for the reverse supplemental traffic channel.

**\*RST** +0**Range** 0–15**Field Entry** Frame Offset**:REVERSE:RC12:TRAFFIC:RSCH:POWER****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:POWER?
```

This command sets the power for the reverse supplemental traffic channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power**:REVERSE:RC12:TRAFFIC:RSCH:RATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:RATE 1.2kbps |
1.8kbps | 2.4kbps | 3.6kbps | 4.8kbps | 7.2kbps | 9.6kbps | 14.4kbps
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:RATE?
```

This command sets the data rate for the reverse supplemental traffic channel.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate

**:REVERSE:RC12:TRAFFIC:RSCH:RCONfig****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:RCONfig 1|2  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH:RCONfig?

This command sets the data rate for the reverse supplemental traffic channel.

**\*RST** +1**Field Entry** Radio Config**:REVERSE:RC12:TRAFFIC:RSCH[:STATe]****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH[:STATe] ON|OFF|  
1|0  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC12:TRAFFIC:RSCH[:STATe]?

This command sets the operating state for the reverse supplemental traffic channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:CCONtrol:RCCCh:DATA****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONtrol:RCCCh:DATA PN9|  
PN15|FIX4|"<file name>"  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONtrol:RCCCh:DATA?

This command configures the data field for the reverse common control channel.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File****Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:REVerse:RC34:CControl:RCCCh:DATA:FIX4****Supported** E4438C with Option 401[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:CControl:RCCCh:DATA:  
FIX4 <val>

[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:CControl:RCCCh:DATA:FIX4?

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****:REVerse:RC34:CControl:RCCCh:EBNO****Supported** E4438C with Options 401 and 403

[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:CControl:RCCCh:EBNO &lt;val&gt;

[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:CControl:RCCCh:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse common control channel.

**\*RST** +0.00000000E+000**Range**  $\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$  $\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$ 

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVerse:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EbNo**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:CCONTROL:RCCCh:FLENgth****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FLENgth 5|10|20

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FLENgth?

This command sets the frame length value for the reverse common control channel.

The frame length is expressed as seconds (ms).

**\*RST** +20**Field Entry** Frame Length**:REVERSE:RC34:CCONTROL:RCCCh:FOFFset****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FOFFset &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:FOFFset?

This command sets the frame offset value for the reverse common control channel.

The frame offset value is expressed as seconds (ms).

**\*RST** +0

**Range** Frame Length=5: 0–3  
 Frame Length=10: 0–7  
 Frame Length=20: 0–20

**Field Entry** Frame Offset**:REVERSE:RC34:CCONTROL:RCCCh:POWEr****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:POWEr &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:POWEr?

This command sets the power for the reverse common control channel.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power

**:REVERSE:RC34:CCONTROL:RCCCh:RCONfig****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:RCONfig 3|4  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:RCONfig?

This command selects the radio configuration value for the reverse common control channel.

**\*RST** +3**Field Entry** Radio Config**:REVERSE:RC34:CCONTROL:RCCCh:RATE****Supported** E4438C with Option 401[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:RATE 9.6kbps|  
19.2kbps|38.4kbps  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:RATE?

This command adjusts the data rate value for the reverse common control channel.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate**:REVERSE:RC34:CCONTROL:RCCCh:WALSh****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh:WALSh?

This command queries the Walsh code for the reverse common control channel.

**\*RST** +2**Field Entry** Walsh

**:REVERSE:RC34:CCONTROL:RCCCh[:STATE]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh[:STATE] ON | OFF | 1 | 0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RCCCh[:STATE] ?

This command sets the operating state for the reverse common control channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:CCONTROL:RPICh:ECNO****Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICh:ECNO &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICh:ECNO?

This command sets the ratio of energy per chip to the noise power spectral density (expressed in dB) for the reverse common control pilot channel.

**\*RST** +0.00000000E+000**Range** min EcNo: -30 + Normalized Power

max EcNo: 30 + Normalized Power

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EcNo**Remarks** Changes to the EcNo values also change the EbNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.



**:REVERSE:RC34:CCONTROL:RPICH:GRATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICH:GRATE FULL|
HALF|QUARTER
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICH:GRATE?
```

This command configures the gating data field for the reverse common control pilot channel.

**FULL** This choice transmits all sixteen power control bits.

**HALF** This choice transmits eight power control bits.

**QUARTER** This choice transmits four power control bits.

**\*RST** FULL

**Key Entry** Full Half Quarter

**:REVERSE:RC34:CCONTROL:RPICH:POWER****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICH:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICH:POWER?
```

This command sets the power for the reverse common control pilot channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**:REVERSE:RC34:CCONTROL:RPICH:WALSH****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:CCONTROL:RPICH:WALSH?
```

This command queries the Walsh code for the reverse common control pilot channel.

**\*RST** +0

**Field Entry** Walsh

**:REVerse:RC34:CCONtrol:RPICh[:STATe]****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:CCONtrol:RPICh[:STATe] ON|OFF|1|0

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:CCONtrol:RPICh[:STATe] ?

This command sets the operating state for the reverse common control pilot channel.

**\*RST** 1**Field Entry** State**:REVerse:RC34:EACCess:REACH:DATA****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:DATA PN9|PN15|FIX4|"&lt;file name&gt;"

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:DATA?

This command configures the data field for the reverse enhanced access channel.

**\*RST** PN9**Key Entry** **PN9 PN15 FIX4 User File**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:REVerse:RC34:EACCess:REACH:DATA:FIX4****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:DATA:FIX4 &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:DATA:FIX4?

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4**

**:REVERSE:RC34:EACCESS:REACH:EBNO**

**Supported** E4438C with Options 401 and 403

[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:EACCESS:REACH:EBNO <val>

[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:EACCESS:REACH:EBNO?

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse enhanced access channel.

**\*RST** +0.00000000E+000

**Range**  $\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$

$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJUST” on page 517 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:EACCESS:REACH:FOFFset**

**Supported** E4438C with Option 401

[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:EACCESS:REACH:FOFFset <val>

[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:EACCESS:REACH:FOFFset?

This command sets the frame offset value for the reverse enhanced access channel.

**\*RST** +0

**Range** Frame Length=5: 0–3 Frame Length=10: 0–7  
Frame Length=20: 0–15

**Field Entry** Frame Offset

**:REVerse:RC34:EACCess:REACH:POWer****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:POWer <val>
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:POWer?
```

This command sets the power level for the reverse enhanced access channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** -40 to 0**Field Entry** Power**:REVerse:RC34:EACCess:REACH:RCONfig****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:RCONfig 3|4
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:RCONfig?
```

This command sets the radio configuration for the reverse enhanced access channel.

**\*RST** +3**Field Entry** Radio Config**:REVerse:RC34:EACCess:REACH:RATE****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:RATE 9.6kbps |
19.2kbps | 38.4kbps
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:REACH:RATE?
```

This command adjusts the data rate value for the reverse enhanced access channel.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate

**:REVERSE:RC34:EACCESS:REACH:WALSH****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH:WALSH?

This command queries the Walsh code for the reverse enhanced access channel.

**\*RST** +2**Field Entry** walsh**:REVERSE:RC34:EACCESS:REACH[:STATE]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH[:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:REACH[:STATE]?

This command sets the operating state for the reverse enhanced access channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:EACCESS:RPICH:ECNO****Supported** E4438C with Options 401 and 403

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:ECNO &lt;val&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH:ECNO?

This command sets the ratio of energy per chip to the noise power spectral density (expressed in dB) for the reverse enhanced access pilot channel.

**\*RST** +0.00000000E+000**Range** min EcNo: -30 + Normalized Power

max EcNo: 30 + Normalized Power

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJUST” on page 517 for adjusting the code domain power.

**Field Entry** EcNo**Remarks** Changes to the EcNo values also change the EbNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVerse:RC34:EACCess:RPICh:GRATe****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:RPICh:GRATe FULL|
HALF|QUARter
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:RPICh:GRATe?
```

This command configures the gating data field for the reverse enhanced access pilot channel.

**FULL** This choice transmits all sixteen power control bits.

**HALF** This choice transmits eight power control bits.

**QUARter** This choice transmits four power control bits.

**\*RST** FULL

**Key Entry** Full Half Quarter

**:REVerse:RC34:EACCess:RPICh:POWer****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:RPICh:POWer <val>
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:RPICh:POWer?
```

This command sets the power for the reverse enhanced access pilot channel.

The variable <val> is expressed in unit of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**:REVerse:RC34:EACCess:RPICh:WALSh****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:EACCess:RPICh:WALSh?
```

This command queries the Walsh code for the reverse enhanced access pilot channel.

**\*RST** +0

**Field Entry** Walsh

**:REVERSE:RC34:EACCESS:RPICH[:STATE]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH[:STATE] ON|
OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:EACCESS:RPICH[:STATE]?
```

This command sets the operating state for the reverse enhanced access pilot channel.

**\*RST** 1**Field Entry** State**:REVERSE:RC34:TRAFFIC:RDCCH:DATA****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA PN9|
PN15|FIX4|"<file name>"
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA?
```

This command configures the data field for the reverse traffic dedicated control channel.

**\*RST** PN9**Key Entry** **PN9 PN15 FIX4 User File**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:REVERSE:RC34:TRAFFIC:RDCCH:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA:
FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCH:DATA:FIX4?
```

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4**

**:REVerse:RC34:TRAFfic:RDCCh:EBNO**

**Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RDCCh:EBNO <val>
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RDCCh:EBNO?
```

This command sets the ratio of energy per bit, per the noise power spectral density (expressed in dB) for the reverse traffic dedicated control channel.

**\*RST** +0.00000000E+000

**Range**

$$\text{min EbNo: } 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\text{max EbNo: } 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVerse:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVerse:RC34:TRAFfic:RDCCh:FLENgth**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RDCCh:FLENgth 5 | 20
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RDCCh:FLENgth?
```

This command sets the frame length value for the reverse traffic dedicated control channel.

The frame length is expressed as seconds (ms).

**\*RST** +20

**Field Entry** Frame Length

**:REVerse:RC34:TRAFfic:RDCCh:FOFFset**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RDCCh:FOFFset <val>
[:SOURCE]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RDCCh:FOFFset?
```

This command sets the frame offset value for the reverse traffic dedicated control channel.



**\*RST** +0  
**Range** Frame Length=5: 0–3 Frame Length=20: 0–7  
**Field Entry** Frame Offset

**:REVERSE:RC34:TRAFFIC:RDCCh:POWER**

**Supported** E4438C with Option 401  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:POWER <val>  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:POWER?

This command sets the power for the reverse traffic dedicated control channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0  
**Range** –40 to 0  
**Field Entry** Power

**:REVERSE:RC34:TRAFFIC:RDCCh:RATE**

**Supported** E4438C with Option 401  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:RATE?

This command queries the data rate for the reverse traffic dedicated control channel.

**\*RST** Frame Length=5: RC3/4= +9.60000000E+003  
Frame Length=10: RC3= +9.60000000E+003  
Frame Length=20: RC3= +1.44000000E+004  
**Field Entry** Bit Rate

**:REVERSE:RC34:TRAFFIC:RDDCh:RCONfig**

**Supported** E4438C with Option 401  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDDCh:RCONfig 3|4  
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDDCh:RCONfig?

This command selects the radio configuration value for the reverse traffic dedicated control channel.

**\*RST** +3  
**Field Entry** Radio Config

**:REVERSE:RC34:TRAFFIC:RDCCh:WALSh****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh:WALSh?

This command queries the Walsh code for the reverse traffic dedicated control channel.

**\*RST** +8**Range** 0–15**Field Entry** Walsh**:REVERSE:RC34:TRAFFIC:RDCCh[:STATe]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh[:STATe] ON | OFF | 1 | 0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RDCCh[:STATe] ?

This command sets the operating state for the reverse traffic dedicated control channel.

**\*RST** 0**Field Entry** State**:REVERSE:RC34:TRAFFIC:RFCH:DATA****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA PN9 | PN15 | FIX4 | "&lt;file name&gt;"

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA?

This command configures the data field for the reverse fundamental traffic channel.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File****Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:REVERSE:RC34:TRAFFIC:RFCH:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA:FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:DATA:FIX4?
```

This command selects a fixed 4-bit data pattern to be repeated as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****:REVERSE:RC34:TRAFFIC:RFCH:EBNO****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:EBNO?
```

This command sets the ratio of energy per bit, per the noise power spectral density (expressed in dB) for the reverse fundamental traffic channel.

**\*RST** +0.00000000E+000

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJust” on page 517 for adjusting the code domain power.

**Field Entry** EbNo**Remarks** Changes to the EbNo values also change the EcNo values for all other

channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:TRAFFIC:RFCH:FLENGTH****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:FLENGTH 5|20
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:FLENGTH?
```

This command sets the frame length value for the reverse fundamental traffic channel.

The frame length is expressed as seconds (ms).

**\*RST** +20**Field Entry** Frame Length**:REVERSE:RC34:TRAFFIC:RFCH:FOFFSET****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:FOFFSET <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:FOFFSET?
```

This command sets the frame offset value for the reverse fundamental traffic channel.

**\*RST** +0

**Range** Frame Length=5: 0–3  
Frame Length=20: 0–15

**Field Entry** Frame Offset**:REVERSE:RC34:TRAFFIC:RFCH:POWER****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:POWER <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RFCH:POWER?
```

This command sets the power for the reverse fundamental traffic channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power

**:REverse:RC34:TRAFfic:RFCH:RCONfig****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC34:TRAFfic:RFCH:RCONfig 3|4
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC34:TRAFfic:RFCH:RCONfig?
```

This command sets the radio configuration value for the reverse fundamental traffic channel.

**\*RST** +3**Field Entry** Radio Config**:REverse:RC34:TRAFfic:RFCH:RATE****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC34:TRAFfic:RFCH:RATE 1.2kbps|
1.5kbps|1.8kbps|2.7kbps|3.6kbps|4.8kbps|7.2kbps|9.6kbps|14.4kbps
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC34:TRAFfic:RFCH:RATE?
```

This command sets the data rate value for the reverse fundamental traffic channel.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate**:REverse:RC34:TRAFfic:RFCH:WALSh****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC34:TRAFfic:RFCH:WALSh?
```

This command queries the Walsh code for the reverse fundamental traffic channel.

**\*RST** +4**Field Entry** Walsh**:REverse:RC34:TRAFfic:RFCH[:STATe]****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC34:TRAFfic:RFCH[:STATe] ON|OFF|
1|0
[:SOURCE]:RADIO:CDMA2000[:BBG]:REverse:RC34:TRAFfic:RFCH[:STATe]?
```

This command sets the operating state for the reverse fundamental traffic channel.

**\*RST** 0**Field Entry** State

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA PN9 |
PN15 | FIX4 | "<file name>"
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA?
```

This command configures the data field for the reverse supplemental channels.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA:FIX4****Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA:
FIX4 <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA:FIX4?
```

This command sets a fixed 4-bit data pattern that repeats as necessary to fill the selected data area.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:DATA:EBNO****Supported** E4438C with Options 401 and 403

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:EBNO <val>
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:EBNO?
```

This command sets the ratio of energy per bit to noise power spectral density (expressed in dB) for the reverse supplemental traffic channels.

**\*RST** +0.00000000E+000

## CDMA2000 BBG Subsystem–Option 401 ([:SOURCE]:RADIO:CDMA2000[:BBG])

**Range**

$$\min EbNo: 10\log_{10} \left[ \frac{\text{Chip Rate}}{1000(\text{Bit Rate})} \right] + \text{Normalized Power}$$

$$\max EbNo: 10\log_{10} \left[ \frac{1000(\text{Chip Rate})}{\text{Bit Rate}} \right] + \text{Normalized Power}$$

Normalized Power is the channel amplitude after adjusting the code power to 0 dB. Refer to “:REVERSE:PADJUST” on page 517 for adjusting the code domain power.

**Field Entry** EbNo

**Remarks** Changes to the EbNo values also change the EcNo values for all other channels in the current link (forward or reverse).

Queries of this command are only valid for the current operating state.

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:FLENGTH**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RSCH [1] | 2 :
FLENGTH 20 | 40 | 80
```

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RSCH [1] | 2 :FLENGTH?
```

This command sets the frame length value for the reverse supplemental channels.

**\*RST** +20

**Field Entry** Frame Length

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:FOFFSET**

**Supported** E4438C with Option 401

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RSCH [1] | 2 :
FOFFSET <val>
```

```
[ :SOURCE ] :RADIO:CDMA2000 [ :BBG ] :REVERSE:RC34:TRAFFIC:RSCH [1] | 2 :FOFFSET?
```

This command sets the frame offset value for the reverse supplemental channels.

**\*RST** +0

**Range** 0–63

**Range** Frame Length=20: 0–15    Frame Length=40: 0–31  
 Frame Length=80: 0–63

**Field Entry** Frame Offset

**:REVerse:RC34:TRAFfic:RSCH[1] | 2:POWer****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RSCH[1] | 2:POWer &lt;val&gt;

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RSCH[1] | 2:POWer?

This command sets the power level for the reverse supplemental channels.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** –40 to 0**Field Entry** Power**:REVerse:RC34:TRAFfic:RSCH[1] | 2:RCONfig****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RSCH[1] | 2:RCONfig 3 | 4

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RSCH[1] | 2:RCONfig?

This command selects the radio configuration value for the reverse supplemental channels.

**\*RST** +3**Field Entry** Radio Config**:REVerse:RC34:TRAFfic:RSCH[1] | 2:RATE****Supported** E4438C with Option 401

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RSCH[1] | 2:

RATE 1.2kbps | 1.350kbps | 1.5kbps | 1.8kbps | 2.4kbps | 2.7kbps | 3.6kbps | 4.8kbps | 7.2kbps | 9.6kbps | 14.4kbps

[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:RC34:TRAFfic:RSCH[1] | 2:RATE?

Execute this command to set the data rate for the reverse supplemental channels.

**\*RST** +9.60000000E+003**Field Entry** Bit Rate**Remarks** To change the frame length value, refer to  
“:REVerse:RC34:TRAFfic:RSCH[1] | 2:FLENgth” on page 543



**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:TCODE****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:TCODE ON | OFF | 1 | 0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:TCODE?

This command enables or disables the operating state of the turbo coding function for the reverse supplemental channels.

**\*RST** 0**Field Entry** Turbo Coding

**Remarks** To ensure that this function is being executed with the correct data rate, refer to “:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:RATE” on page 544.

**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:WALSH****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH1:WALSH &lt;1 | 2&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH2:WALSH &lt;2 | 6&gt;

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2:WALSH?

This command sets the Walsh code value for the reverse supplemental channels.

**\*RST** Channel 1: +1 Channel 2: +2**Field Entry** Walsh**:REVERSE:RC34:TRAFFIC:RSCH[1] | 2[:STATE]****Supported** E4438C with Option 401

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] |

2[:STATE] ON | OFF | 1 | 0

[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:RC34:TRAFFIC:RSCH[1] | 2[:STATE] ?

This command enables or disables the operating state of the reverse supplemental channels.

**\*RST** 0**Field Entry** State

**:REVerse:REFerence:EXTernal:FREQuency****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFerence:EXTernal:
FREQuency <val><unit>
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFerence:EXTernal:FREQuency?
```

This command sets the expected frequency of the external reference signal.

**\*RST** +1.96608000E+007**Range** 1–100 MHz**Field Entry** Ext BBG Ref Freq**Remarks** This setting must match the frequency of the signal that is supplied to the BASEBAND GEN REF IN rear panel BNC connector.**:REVerse:REFerence[:SOURce]****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFerence[:SOURce] INTernal |
EXTernal
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:REFerence[:SOURce]?
```

This command selects the reference clock source.

**EXTernal** This choice sets the instrument to use an external reference signal. The external reference frequency must be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

**INTernal** This choice sets the instrument to use the internal reference.

**\*RST** INT**Field Entry** BBG Reference**Remarks** If the EXT choice is selected, the BBCLock selection will automatically be set to internal.**:REVerse:TADVance****Supported** E4438C with Option 401

```
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:TADVance <val>
[:SOURce]:RADio:CDMA2000[:BBG]:REVerse:TADVance?
```

This command selects the number of chips to advance the trigger time slot for the reverse link.

<b>*RST</b>	+28
<b>Range</b>	0–2457599
<b>Field Entry</b>	Trigger Advance
<b>Remarks</b>	When the noise function is set to ON, this value will increase. Refer to “:REVERSE:NOISE[:STATE]” on page 518 for more information.

**:REVERSE:TEDGE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:TEDGE RISING|FALLING
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:TEDGE?
```

This command selects a falling or rising trigger edge state for the reverse link.

<b>RISING</b>	This choice selects a trigger on the rising edge of the signal applied to the PATT TRIG IN rear panel connector.
<b>FALLING</b>	This choice selects a trigger on the falling edge of the signal applied to the PATT TRIG IN rear panel connector.
<b>*RST</b>	FALL
<b>Key Entry</b>	<b>Rising</b> <b>Falling</b>

**:REVERSE:SRATE**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG]:REVERSE:SRATE?
```

This command returns the value of the current spreading rate for the reverse channel.

**\*RST** +1

**[:STATE]**

**Supported** E4438C with Option 401

```
[:SOURCE]:RADIO:CDMA2000[:BBG][:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:CDMA2000[:BBG][:STATE]?
```

This command enables or disables the CDMA2000 baseband generator modulation format.

<b>*RST</b>	0
<b>Key Entry</b>	CDMA2000 Off On

---

## Custom Subsystem—Option 001/601or 002/602 ([:SOURce]:RADio:CUSTom)

### :ALPha

**Supported** E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio :CUSTom :ALPha <val>

[ :SOURce ] :RADio :CUSTom :ALPha ?

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to a minimum level (0), a maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +3.50000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 561.

### :ASK

**Supported** E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio [1] | 2 | 3 | 4 :CUSTom :ASK [ :DEPTh ] <val>

[ :SOURce ] :RADio [1] | 2 | 3 | 4 :CUSTom :ASK [ :DEPTh ] ?

This command changes the depth for the amplitude shift keying (ASK) modulation. Depth is set as a percentage of the full power on level.

**\*RST** +???

**Range** 0–100

**Key Entry** **ASK**

**Remarks** The modulation is applied to the I signal, the Q value is always kept at zero.

**:BBClock**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADIO:CUSTOM:BBClock INT [1] | EXT [1]
```

```
[ :SOURCE ] :RADIO:CUSTOM:BBClock?
```

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**INT[1]** This choice selects the signal generator internal data clock.

**EXT[1]** This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **BBG Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

This will be ignored if the external reference is set to EXTERNAL. To change the external reference type, refer to “:EREFERENCE” on page 560.

**:BBT**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADIO:CUSTOM:BBT <val>
```

```
[ :SOURCE ] :RADIO:CUSTOM:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E-001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTER” on page 561.

**:BRATe**

Supported E4438C with Option 402

[:SOURCE]:RADio:CUSTom:BRATe &lt;val&gt;

[:SOURCE]:RADio:CUSTom:BRATe?

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables.

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects the filter length.

For higher bit rates, the signal generator may truncate the FIR filter length (if the minimum filter size allows it). This will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 565). Refer to “:FILTer” on page 561 for information on filter symbol widths.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

\*RST +4.68000000E+004

Range	Modulation Type	Bit Rate Range for PRAM or External Serial Data		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps

FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

The previous table lists the range for PRAM or external serial data in the Custom format.

The Custom format has two modes for processing data, serial and parallel. When the data-rate exceeds 50 Mbps, the signal generator processes the data in parallel mode (symbol by symbol) versus serial mode where the data is processed bit by bit. This capability exists when using a continuous data stream, which means it does not apply to a PRAM file. The following table shows the various data rates by modulation type and filter width.

Range	Modulation Type	Bit Rate Range for Internal Data		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25 Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–100Mbps	2bps–50Mbps	2bps–25Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–150Mbps	3bps–75Mbps	3bps–37.5Mbps
	FSK16, PSK16, QAM16	4bps–200Mbps	4bps–100Mbps	4bps–50Mbps
	QAM32	5bps–250Mbps	5bps–125Mbps	5bps–62.5Mbps
	QAM64	6bps–300Mbps	6bps–150Mbps	6bps–75Mbps
	QAM128	7bps–350Mbps	7bps–175Mbps	7bps–87.5Mbps
	QAM256	8bps–400Mbps	8bps–200Mbps	8bps–100Mbps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**            **Symbol Rate**

### **:BURSt:SHAPe:FALL:DELay**

**Supported**            E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:CUSTom: BURSt : SHAPe : FALL : DELay <val>

[ :SOURce ] :RADio:CUSTom: BURSt : SHAPe : FALL : DELay?

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST**                    +0.00000000E+000

**Range**                    -22.3750 to 99

**Key Entry**            **Fall Delay**

**Remarks**            To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.  
Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 553 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:FALL:TIME**

**Supported**            E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:CUSTom: BURSt : SHAPe : FALL : TIME <val>

[ :SOURce ] :RADio:CUSTom: BURSt : SHAPe : FALL : TIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST**                    +1.00000000E+001

**Range**                    0.1250–255.8750

**Key Entry**            **Fall Time**



**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 553 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### :BURSt:SHAPe:FDElay

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:CUSTom:BURSt:SHAPe:FDElay <val>
[:SOURCE]:RADio:CUSTom:BURSt:SHAPe:FDElay?
```

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -22.3750 to 99

**Key Entry** **Fall Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DElay” on page 552 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### :BURSt:SHAPe:FTIME

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:CUSTom:BURSt:SHAPe:FTIME <val>
[:SOURCE]:RADio:CUSTom:BURSt:SHAPe:FTIME?
```

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

<b>Range</b>	0.1250–255.8750
<b>Key Entry</b>	<b>Fall Time</b>
<b>Remarks</b>	To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATe” on page 565 for a list of the minimum and maximum symbol rate values.  “:BURSt:SHAPe:FALL:TIME” on page 552 performs the same function; in compliance with the SCPI standard, both commands are listed.  For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i> .

**:BURSt:SHAPe:RDELay**

<b>Supported</b>	E4438C with Option 001/601or 002/602
	<code>[:SOURce]:RADio:CUSTom:BURSt:SHAPe:RDELay &lt;val&gt;</code> <code>[:SOURce]:RADio:CUSTom:BURSt:SHAPe:RDELay?</code>
	This command sets the burst shape rise delay.  The variable <val> is expressed in bits.
<b>*RST</b>	+0.00000000E+000
<b>Range</b>	–17.3750 to 99
<b>Key Entry</b>	<b>Rise Delay</b>
<b>Remarks</b>	To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATe” on page 565 for a list of the minimum and maximum symbol rate values.  “:BURSt:SHAPe:RISE:DELay” on page 554 performs the same function; in compliance with the SCPI standard, both commands are listed.  For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i> .

**:BURSt:SHAPe:RISE:DELay**

<b>Supported</b>	E4438C with Option 001/601or 002/602
	<code>[:SOURce]:RADio:CUSTom:BURSt:SHAPe:RISE:DELay &lt;val&gt;</code> <code>[:SOURce]:RADio:CUSTom:BURSt:SHAPe:RISE:DELay?</code>
	This command sets the burst shape rise delay.  The variable <val> is expressed in bits.

<b>*RST</b>	+0.00000000E+000
<b>Range</b>	−17.3750 to 99
<b>Key Entry</b>	<b>Rise Delay</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RDElay” on page 554 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPE:RISE:TIME**

<b>Supported</b>	E4438C with Option 001/601 or 002/602
	[:SOURce]:RADio:CUSTom:BURSt:SHAPE:RISE:TIME <val> [:SOURce]:RADio:CUSTom:BURSt:SHAPE:RISE:TIME?
	This command sets the burst shape rise time.
	The variable <val> is expressed in bits.
<b>*RST</b>	+1.00000000E+001
<b>Range</b>	0.1250–121.5000
<b>Key Entry</b>	<b>Rise Time</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPE:RTIME” on page 556 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPe:RTIME**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe: RTIME <val>
```

```
[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe: RTIME?
```

This command sets the burst shape rise time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.1250–121.5000

**Key Entry** **Rise Time**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564. Refer to “:SRATE” on page 565 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 555 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe[:TYPE]**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe [ :TYPE ] SINE | "<file name>"
```

```
[ :SOURce ] :RADio:CUSTom: BURSt: SHAPe [ :TYPE ] ?
```

This command specifies the burst shape ("<file name>").

**SINE** This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

**"<file name>"** This choice selects a user designated file from signal generator memory (non-volatile).

**\*RST** SINE

**Key Entry** **Sine User File**

**:CHANnel**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:CUSTom:CHANnel EVM|ACP

[ :SOURCE ] :RADio:CUSTom:CHANnel?

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** ACP

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 561.

**:DATA**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADio:CUSTom:DATA PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|  
EXT|P4|P8|P16|P32|P64|PRAM

[ :SOURCE ] :RADio:CUSTom:DATA?

This command sets the data pattern for unframed transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
	<b>64 1's &amp; 64 0's</b>		<b>PRAM File</b>					

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:DATA:FIX4**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADio:CUSTom:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the custom modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must be already be defined as the data type.

**:DATA:PRAM**

**Supported** E4438C with Option 001/601or 002/602001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:DATA:PRAM "<file_name>"
```

```
[ :SOURCE ] :RADio:CUSTom:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for a custom communications format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

**:DENCode**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADIO:CUSTOM:DENCode ON | OFF | 1 | 0

[ :SOURCE ] :RADIO:CUSTOM:DENCode?

This command enables or disables the differential data encoding function.

**\*RST** 0

**Key Entry** **Diff Data Encode Off On**

**Remarks** Executing this command encodes the data bits prior to modulation; each modulated bit is 1 if the data bit is different from the previous one, or 0 if the data bit is the same as the previous one.

**:EDATa:DELay**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADIO:CUSTOM:EDATa:DELay?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks** When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**:EDCLock**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADIO:CUSTOM:EDCLock SYMBOL | NORMal

[ :SOURCE ] :RADIO:CUSTOM:EDCLock?

This command sets the external data clock use.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** **Ext Data Clock Normal Symbol**

**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBCLock” on page 549 to select EXT as the data clock type.

## :EREFerence

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:EREFerence INTernal | EXTernal
[ :SOURCE ] :RADio:CUSTom:EREFerence?
```

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** **BBG Ref Ext Int**

**Remarks** If the EXTernal choice is selected, the external frequency value must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence:VALue” on page 560 to enter the external reference frequency.

## :EREFerence:VALue

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:EREFerence:VALue <val>
[ :SOURCE ] :RADio:CUSTom:EREFerence:VALue?
```

This command conveys the expected reference frequency value of an externally applied reference to the signal generator.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence” on page 560 to select EXTernal as the reference for the bit clock reference of the data generator.



**:FILTer**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADIO:CUSTOM:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|IS95|
IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|"<user FIR>"
[:SOURCE]:RADIO:CUSTOM:FILTer?
```

This command selects the pre-modulation filter type.

IS95	This choice selects a filter that meets the criteria of the IS-95 standard.
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory. Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

The following table shows the filter type and minimum number of symbols. Refer to [“:SRATe” on page 565](#) for information on symbol rate. User-defined filters are not truncated. Internal filters are typically run with 16 or 32 symbols unless the minimum size is larger.

Filter	Minimum Number of Symbols
Gaussian, Nyquist, Root Nyquist, Rectangle	0
Edge	5
UN3/4 GSM Gaussian	8
IS-95, IS-95 w/EQ	16
IS-95 Mod, IS-95 Mod w/EQ	24
IS-2000	27
APCO 25 C4FM	32

**\*RST**                    RNYQ

**Key Entry**            **Root Nyquist**    **Nyquist**    **Gaussian**    **Rectangle**    **IS-95**    **IS-95 w/EQ**

**IS-95 Mod**    **IS-95 Mod w/EQ**    **APCO 25 C4FM**    **UN3/4 GSM Gaussian**

**User FIR**

**:IQ:SCALe**

**Supported**            E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio:CUSTom:IQ:SCALe <val>  
 [ :SOURce ] :RADio:CUSTom:IQ:SCALe?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST**                    +70

**Range**                    1–200

**Key Entry**            **I/Q Scaling**

**Remarks**            This command has no effect with MSK or FSK modulation.

### **:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADIO :CUSTOM :MODulation :FSK [ :DEVIation ] <val>

[ :SOURCE ] :RADIO :CUSTOM :MODulation :FSK [ :DEVIation ] ?

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.

Refer to “:SRATe” on page 565 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

### **:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 001/601 or 002/602

[ :SOURCE ] :RADIO :CUSTOM :MODulation :MSK [ :PHASe ] <val>

[ :SOURCE ] :RADIO :CUSTOM :MODulation :MSK [ :PHASe ] ?

This command sets the MSK phase deviation value.

The variable <val> is expressed in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

**:MODulation:UFSK**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:CUSTom:MODulation:UFSK "<file name>"
```

```
[:SOURCE]:RADio:CUSTom:MODulation:UFSK?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 564](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:MODulation:UIQ**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:CUSTom:MODulation:UIQ "<file name>"
```

```
[:SOURCE]:RADio:CUSTom:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 564](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 001/601 or 002/602

```
[:SOURCE]:RADio:CUSTom:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|GRAYQPSK|
OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|FSK8|FSK16|C4FM|
QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|UIQ|UFSK
[:SOURCE]:RADio:CUSTom:MODulation[:TYPE]?
```

This command sets the modulation type for the Custom personality.

<b>*RST</b>	P4DQPSK							
<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>		<b>OQPSK</b>		
	<b>IS-95 OQPSK</b>	$\pi/4$ <b>DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

**:POLarity[:ALL]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:CUSTom:POLarity[:ALL] NORMal | INVerted
[ :SOURCE ] :RADio:CUSTom:POLarity[:ALL] ?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **Phase Polarity Normal Invert**

**:SRATe**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:CUSTom:SRATe <val>
[ :SOURCE ] :RADio:CUSTom:SRATe ?
```

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to “:BRATe” on page 550 for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–Mps) and the maximum symbol rate depends on the filter. Refer to “:FILTer” on page 561 for minimum filter symbol widths.

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 564.

\*RST +2.43000000E+004

The following table shows the symbol range for internal Custom data operation.

Range	16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	1sps–50Msps	1sps–25Msps	1sps–12.5Msps

The limits shown in the following table apply to Custom PRAM and Custom external serial data.

Range	Modulation Type	Symbol Rate For PRAM and External Serial Data		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKI95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 Msps	3sps–8.333333333 Msps	3sps–4.166666666Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.333333333 Msps	6sps–4.166666666 Msps	6sps–2.083333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

**Key Entry**

**Symbol Rate**

**:STANdard:SElect**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:CUSTom:STANdard:SElect NONE | AC4Fm | ACQPsk | BLUEtooth | CDPD
[ :SOURCE ] :RADio:CUSTom:STANdard:SElect?
```

This command selects a predefined setup for Custom (with the appropriate defaults) and/or clears the selection.

**NONE** This choice clears the current predefined Custom format.

**AC4Fm** This choice sets up an Association of Public Safety Communications Officials (APCO) compliant, compatible 4-level frequency modulation (C4FM) format.

**ACQPsk** This choice sets up an Association of Public Safety Communications Officials (APCO) compliant, compatible quadrature phase shift keying (CQPSK) format.

**BLUEtooth** This choice sets up a Bluetooth (2-level frequency shift keying) format.

**CDPD** This choice sets up a minimum shift keying Cellular Digital Packet Data (CDPD) format.

**\*RST** NONE

**Key Entry**      **None**      **APCO 25w/C4FM**      **APCO 25 w/CQPSK**      **Bluetooth**      **CDPD**

**:TRIGger:TYPE**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURCE ] :RADio:CUSTom:TRIGger:TYPE CONTInuous | SINGLE | GATE
[ :SOURCE ] :RADio:CUSTom:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTInuous** The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 568.

**SINGLE** The framed data sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST** CONT

**Key Entry**      **Continuous**      **Single**      **Gated**

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet
[ :SOURCE ] :RADio:CUSTom:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform's response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see [“:TRIGger:TYPE” on page 567](#).

The following list describes the waveform's response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
<b>*RST</b>	FREE
<b>Key Entry</b>	<b>Free Run      Trigger &amp; Run      Reset &amp; Run</b>

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:TRIGger:TYPE:GATE:ACTive LOW | HIGH
[ :SOURCE ] :RADio:CUSTom:TRIGger:TYPE:GATE:ACTive ?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see [“:TRIGger:TYPE” on page 567](#).



The following list describes the ESG's gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
*RST	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

### :TRIGger[:SOURce]

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] KEY | EXT | BUS
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 567. The following list describes the command choices:

KEY	This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.
EXT	An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURce]:EXTernal[:SOURce]” on page 571.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User's Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 568
  - continuous and single modes, see “:TRIGger[:SOURce]:EXTernal:SLOPe” on page 571
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURce]:EXTernal:DELay” on page 570
  - turning the delay on, see “:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 570

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

**Key Entry**      **Trigger Key**      **Ext**      **Bus**

### **:TRIGger[:SOURCE]:EXTernal:DELay**

**Supported**      E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:TRIGger [ :SOURCE ] :EXTernal:DELay <val>
```

```
[ :SOURCE ] :RADio:CUSTom:TRIGger [ :SOURCE ] :EXTernal:DELay?
```

This command sets the number of bits to delay the ESG's response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “[:TRIGger\[:SOURCE\]:EXTernal:DELay:STATe](#)” on [page 570](#). You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURCE\]](#)” on [page 569](#).

**\*RST**      +0

**Range**      0–1048575

**Key Entry**      **Ext Delay Bits**

### **:TRIGger[:SOURCE]:EXTernal:DELay:STATe**

**Supported**      E4438C with Option 001/601or 002/602

```
[ :SOURCE ] :RADio:CUSTom:TRIGger [ :SOURCE ] :EXTernal:DELay:STATe ON|OFF|1|0
```

```
[ :SOURCE ] :RADio:CUSTom:TRIGger [ :SOURCE ] :EXTernal:DELay:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “[:TRIGger\[:SOURCE\]:EXTernal:DELay](#)” on [page 570](#), and for more information on configuring an external source, see “[:TRIGger\[:SOURCE\]](#)” on [page 569](#).

**\*RST**      0

**Key Entry**      **Ext Delay Off On**

**:TRIGger[:SOURce]:EXTErnal:SLOPe**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTErnal:SLOPe POSitive | NEGative
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “[:TRIGger:TYPE:GATE:ACTive](#)” on page 568.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURce\]](#)” on page 569.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**:TRIGger[:SOURce]:EXTErnal[:SOURce]**

**Supported** E4438C with Option 001/601 or 002/602

```
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTErnal [ :SOURce ] EPT1 | EPT2 |
EPTRIGGER1 | EPTRIGGER2
[ :SOURce ] :RADio:CUSTom:TRIGger [ :SOURce ] :EXTErnal [ :SOURce ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURce\]](#)” on page 569. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

**Custom Subsystem—Option 001/601or 002/602 ([:SOURCE]:RADio:CUSTom)**

**\*RST**                    EPT1  
**Key Entry**            **Patt Trig In 1**      **Patt Trig In 2**

**[ :STATe ]**

**Supported**            E4438C with Option 001/601or 002/602

[ :SOURce ] :RADio :CUSTom [ :STATe ] ON | OFF | 1 | 0  
[ :SOURce ] :RADio :CUSTom [ :STATe ] ?

This command enables or disables the Custom modulation.

**\*RST**                    0  
**Key Entry**            Custom Off On

**Remarks**            Although the Custom modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.

## DECT Subsystem—Option 402 ([:SOURce]:RADio:DECT)

### :ALPha

**Supported**            E4438C with Option 402

```
[:SOURce]:RADio:DECT:ALPha <val>
[:SOURce]:RADio:DECT:ALPha?
```

This command changes the Nyquist or root Nyquist filter’s alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST**                    +5.00000000E–001

**Range**                 0.000–1.000

**Key Entry**            **Filter Alpha**

**Remarks**            To change the current filter type, refer to “:FILTer” on page 585.

### :BBCLock

**Supported**            E4438C with Option 402

```
[:SOURce]:RADio:DECT:BBCLock INT[1] |EXT[1]
[:SOURce]:RADio:DECT:BBCLock?
```

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

INT[1]                 This choice selects the signal generator internal data clock.

EXT[1]                 This choice selects an external data clock input.

**\*RST**                    INT

**Key Entry**            **BBG Data Clock Ext Int**

**Remarks**            A data clock or continuous symbol sync input must be supplied when external mode is used.

**:BBT**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:BBT <val>
```

```
[ :SOURCE ] :RADIO:DECT:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E–001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 585.

**:BRATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:BRATe <val><units>
```

```
[ :SOURCE ] :RADIO:DECT:BRATe?
```

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects a filter length.

For higher bit rates, the FIR filter length may be truncated (if the minimum filter size allows it) which will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 658). Refer to “:FILTer” on page 585 for information on filter symbol widths.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 588.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

**\*RST** +1.15200000E+004

Range	Modulation Type	Bit Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps
	FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
	QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
	QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
	QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
	QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

**Key Entry**                      **Symbol Rate**

**:BURSt:PN9**

**Supported**                      E4438C with Option 402

[ :SOURCE ] :RADio:DECT: BURSt: PN9 NORMal | QUICk  
 [ :SOURCE ] :RADio:DECT: BURSt: PN9?

This command controls the software PN9 generation.

**NORMal**                      This choice produces a maximum length PN9 sequence.

**QUICk**                      This choice produces a truncated PN9 sequence.

**\*RST**                      NORM

**Key Entry**                      **PN9 Mode Normal Quick**

**Remarks**                      Use Normal mode for bit-error-rate tests where a maximum length PN9 sequence is required.

**:BURSt:SHAPe:FALL:DELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:FALL:DELay <val>
```

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:FALL:DELay?
```

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -10.5625 to 99

**Key Entry** **Fall Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 577 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:FALL:TIME**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:FALL:TIME <val>
```

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:FALL:TIME?
```

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.0625–127.9375

**Key Entry** **Fall Time**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 577 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.



## **:BURSt:SHAPe:FDElay**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FDElay <val>

[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FDElay?

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -10.5625 to 99

**Key Entry** **Fall Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATe” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DElay” on page 576 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:FTIME**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FTIME <val>

[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:FTIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.0625–127.9375

**Key Entry** **Fall Time**

**DECT Subsystem—Option 402 (:SOURCE]:RADio:DECT)**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATe” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:TIME” on page 576 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:RDELaY**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:RDELaY <val>
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:RDELaY?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -0.5625 to 99

**Key Entry** **Rise Delay**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATe” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELaY” on page 578 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:RISE:DELaY**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:RISE:DELaY <val>
[ :SOURCE ] :RADio:DECT:BURSt:SHAPe:RISE:DELaY?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

<b>Range</b>	–0.5625 to 99
<b>Key Entry</b>	<b>Rise Delay</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPe:RDELay” on page 578 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

### **:BURSt:SHAPe:RISE:TIME**

<b>Supported</b>	E4438C with Option 402
	<pre>[ :SOURCE ] :RADIO:DECT:BURSt:SHAPe:RISE:TIME &lt;val&gt; [ :SOURCE ] :RADIO:DECT:BURSt:SHAPe:RISE:TIME?</pre>
	<p>This command sets the burst shape rise time.</p> <p>The variable &lt;val&gt; is expressed in bits.</p>
<b>*RST</b>	+1.00000000E+001
<b>Range</b>	0.0625–10.6250
<b>Key Entry</b>	<b>Rise Time</b>
<b>Remarks</b>	<p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATE” on page 658 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPe:RTIME” on page 580 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPe:RTIME**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:RTIME <val>
```

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe:RTIME?
```

This command sets the burst shape rise time.

The variable <val> is expressed in bits.

**\*RST** +1.00000000E+001

**Range** 0.0625–10.6250

**Key Entry** **Rise Time**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 588. Refer to “:SRATe” on page 658 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 579 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe[:TYPE] SINE | "<file name>"
```

```
[ :SOURCE ] :RADIo:DECT:BURSt:SHAPe[:TYPE] ?
```

This command specifies the burst shape as either SINE or a user-defined file (“<file name>”).

**SINE** This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

**"<file name>"** This choice selects a user-defined file from signal generator memory (non-volatile).

**\*RST** SINE

**Key Entry** **Sine User File**

## **:BURSt[:STATe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:BURSt [ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :RADio:DECT:BURSt [ :STATe ] ?
```

This command enables or disables the burst function.

**ON (1)** This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

**OFF (0)** This choice enables the transmission of unframed data.

**\*RST** 0

**Key Entry** **Data Format Pattern Framed**

## **:CHANnel**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:CHANnel EVM | ACP
[ :SOURce ] :RADio:DECT:CHANnel ?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 585.

**DECT Subsystem—Option 402 ([:SOURCE]:RADIO:DECT)****:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:DATA PN9 | PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT |
P4 | P8 | P16 | P32 | P64 | PRAM
```

```
[ :SOURCE ] :RADIO:DECT:DATA?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file) for unframed data transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>				
	<b>64 1's &amp; 64 0's</b>	<b>PRAM File</b>						

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:DATA:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:DECT:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADIO:DECT:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the DECT modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to [“:DATA” on page 582](#).

## :DATA:PRAM

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:DATA:PRAM "<file_name>"
```

```
[:SOURCE]:RADio:DECT:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the DECT (Digital Enhanced Cordless Telecommunications) format.

"<file\_name>" This variable designates the PRAM file in WFM1. No directory path name is needed. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

## :DEFault

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:DEFault
```

This command returns all of the DECT modulation format parameters to factory settings. It does not affect any other signal generator parameters.

**Key Entry** **Restore Dect Factory Default**

## :EDATa:DELay

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:EDATa:DELay?
```

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks** When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**:EDCLock**

**Supported** E4438C with Option 402

[:SOURCE]:RADio:DECT:EDCLock SYMBOL|NORMal

[:SOURCE]:RADio:DECT:EDCLock?

This command sets the external data clock use.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** Ext Data Clock Normal Symbol

**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBCLock” on page 573 to select EXT as the data clock type.

**:EREFerence**

**Supported** E4438C with Option 402

[:SOURCE]:RADio:DECT:EREFerence INT|EXT

[:SOURCE]:RADio:DECT:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** BBG Ref Ext Int

**Remarks** If the EXT choice is selected, the external source’s frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

Refer to, “:EREFerence:VALue” on page 585 to enter the external reference frequency setting.



## **:EREFerence:VALue**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:DECT:EREFerence:VALue <val>
```

```
[:SOURCE]:RADio:DECT:EREFerence:VALue?
```

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST**                    +1.30000000E+007

**Range**                 2.5E5–1E8

**Key Entry**            **Ext BBG Ref Freq**

**Remarks**            The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “[:EREFerence](#)” on page 584 to select EXT (external source) as the reference for the bit-clock.

## **:FILTer**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:DECT:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|"<user FIR>"
```

```
[:SOURCE]:RADio:DECT:FILTer?
```

This command specifies the pre-modulation filter type.

**IS95**                    This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ**                This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD**              This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ**          This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**AC4Fm**                 This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**DECT Subsystem–Option 402** ([:SOURce]:RADio:DECT)

<b>UGaussian</b>	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.					
"<user FIR>"	This variable is any filter file that you have stored into memory.					
<b>*RST</b>	GAUS					
<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>UN3/4 GSM Gaussian</b>		<b>APCO 25 C4FM</b>	
	<b>User FIR</b>					
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.					

**:IQ:SCALe**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:IQ:SCALe <val>

[ :SOURce ] :RADio:DECT:IQ:SCALe?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST** +100

**Range** 1–200

**Key Entry** **I/Q Scaling**

**Remarks** This command has no effect with MSK or FSK modulation.

**:MODulation:FSK[:DEViation]**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:MODulation:FSK[:DEViation] <val>

[ :SOURce ] :RADio:DECT:MODulation:FSK[:DEViation]?

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +2.88000000E+005

**Range** 0–2E7

**Key Entry**            **Freq Dev**

**Remarks**            To change the modulation type, refer to “:MODulation[:TYPE]” on page 588.  
Refer to “:SRATe” on page 658 for a list of the minimum and maximum symbol rate values.  
To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

### **:MODulation:MSK[:PHASe]**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:MODulation:MSK[:PHASe] <val>  
[:SOURCE]:RADIO:DECT:MODulation:MSK[:PHASe]?
```

This command sets the MSK phase deviation value.

The variable <val> is expressed in units of degrees.

**\*RST**                    +9.00000000E+001

**Range**                    0–100

**Key Entry**            **Phase Dev**

### **:MODulation:UFSK**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:MODulation:UFSK "<file name>"  
[:SOURCE]:RADIO:DECT:MODulation:UFSK?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry**            **User FSK**

**Remarks**            The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to “:MODulation[:TYPE]” on page 588 to change the current modulation type.  
Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:MODulation:UIQ**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:MODulation:UIQ "<file name>"
```

```
[ :SOURCE ] :RADio:DECT:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “[:MODulation\[:TYPE\]](#)” on page 588 to change the current modulation type.

Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|GRAYQPSK|
OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|FSK8|FSK16|C4FM|
QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|UIQ|UFSK
[ :SOURCE ] :RADio:DECT:MODulation[:TYPE] ?
```

This command sets the modulation type for the DECT personality.

**\*RST** FSK2

Key Entry	BPSK	QPSK	IS-95 QPSK	Gray Coded QPSK	OQPSK		
	IS-95 OQPSK	$\pi/4$ DQPSK	8PSK	16PSK	D8PSK	MSK	2-Lvl FSK
	4-Lvl FSK	8-Lvl FSK	16-Lvl FSK	C4FM	4QAM	16QAM	32QAM
	64QAM	128QAM	256QAM	User I/Q	User FSK		

**:POLarity[:ALL]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:POLarity[:ALL] NORMal|INVerted
```

```
[ :SOURCE ] :RADio:DECT:POLarity[:ALL] ?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

INVerted                    This choice inverts the internal Q signal.

\*RST                        NORM

**Key Entry                    Phase Polarity Normal Invert**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11[:TYPE]**

**Supported                    E4438C with Option 402**

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 [ :TYPE ]
CUSTom | TRAFFic | LcAPacity | ZTRaffic | ZLcAPacity
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 [ :TYPE ] ?
```

This command specifies the timeslot type for the selected timeslot in the portable part link.

\*RST                        Timeslot 0: TRAF      Timeslots 1–4: CUST

**Key Entry                    Custom      Traffic Bearer      Low Capacity      Traffic Bearer with Z field  
   Low Capacity with Z field**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom**

**Supported                    E4438C with Option 402**

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :CUSTom PN9 |
PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | FDEV1_HS | FDEV1_FS | FDEV2_FS |
FACCuracy | DM1 | DM0 | P4 | P8 | P16 | P32 | P64
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :CUSTom?
```

This command customizes the selected custom timeslot for a portable part link.

\*RST                        PN9

**Key Entry                    PN9    PN11    PN15    PN20    PN23    FIX4    User File    Ext    FDEV1\_HS  
   FDEV1\_FS    FDEV2\_FS    FACC    DM1    DM0    4 1's & 4 0's  
   8 1's & 8 0's    16 1's & 16 0's    32 1's & 32 0's    64 1's & 64 0's**

**Remarks                    Refer to “File Name Variables” on page 13 for information on the file name syntax.**

**DECT Subsystem—Option 402 ([:SOURCE]:RADio:DECT)****:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :CUSTom:
FIX4 <val>
```

```
[ :SOURCE ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :CUSTom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern which is used in the portable part custom data field of the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to “:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom” on page 589.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:A**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :LCAPacity:
A <val>
```

```
[ :SOURCE ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :LCAPacity:A?
```

This command customizes the A field for the selected low-capacity timeslot in the portable part link.

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** **A field**

**Remarks** The A field carries signaling data (48 bits) and error correction (16 bits).

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:P**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :LCAPacity:

P <val>

[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :LCAPacity:P?

This command customizes the preamble (P) field of the selected low-capacity timeslot in the portable part link.

**\*RST** #H5555

**Range** #H0–#HFFFF

**Key Entry** P

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:S**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :LCAPacity:

S <val>

[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :LCAPacity:S?

This command customizes the synchronization pattern of the selected low-capacity timeslot in the portable part link.

**\*RST** #H1675

**Range** #H0–#HFFFF

**Key Entry** S

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]****Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file) for the B field of the selected portable part low-capacity timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]:FIX4****Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4 <val>
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected portable part low-capacity timeslot B field.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. Refer to “[:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]]” on page 592 to change the data type.



**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:POWer**

**Supported**            E4438C with Option 402

```
[ :SOURce] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:
POWER MAIN|DELTA
```

```
[ :SOURce] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:
POWER?
```

This command defines the RF output power level for the selected timeslot.

**MAIN**                    This choice specifies RF output as the main power level.

**DELTA**                   This choice specifies RF output as the alternative power level.

**\*RST**                    MAIN

**Key Entry**             **Timeslot Ampl Main Delta**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe**

**Supported**            E4438C with Option 402

```
[ :SOURce] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe ON|OFF|
1|0
```

```
[ :SOURce] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe?
```

This command enables or disables the operating state of the selected portable part timeslot.

**\*RST**                    Timeslot 0: 1      Timeslots 1–11: 0

**Key Entry**             **Timeslot Off On**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:A**

**Supported**            E4438C with Option 402

```
[ :SOURce] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:
A <val>
```

```
[ :SOURce] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:A?
```

This command customizes the A field for the selected traffic bearer timeslot in the portable part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST**                    #H0000FFFF0000FFFF

**Range**                   #H0–#HFFFFFFFFFFFFFFFF

**Key Entry**             **A field**

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:P****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:

P &lt;val&gt;

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:P?

This command customizes the preamble (P) field of the selected traffic bearer timeslot in the portable part link.

**\*RST** #H5555**Range** #H0-#HFFFF**Key Entry** P**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:S****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:

S &lt;val&gt;

[:SOURCE]:RADIO:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:

S?

This command sets the synchronization pattern for the selected traffic bearer timeslot in the portable part link.

**\*RST** #H1675**Range** #H0-#HFFFF**Key Entry** S

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :
TRAFfic[:B]  PN9|PN11|PN15|PN20|PN23|FIX4 | "<file name>" | EXT | FDEV1_HS |
FDEV1_FS | FDEV2_FS | FACCuracy | DM1 | DM0 | P4 | P8 | P16 | P32 | P64
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 : TRAFfic[:B] ?
```

This command sets the B field data pattern for the selected traffic bearer timeslot in the portable part link.

**\*RST**                    PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks**            Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 : TRAFfic[:B] :
FIX4 <val>
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 : TRAFfic[:B] :
FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the portable part traffic bearer B field of the selected timeslot.

**\*RST**                    #B0000

**Range**                    #B0000–#B1111 or 0–15

**Key Entry**              **FIX4**

**Remarks**              FIX4 must already be defined as the data type.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A****Supported** E4438C with Option 402[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:  
A <val>

[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A?

This command customizes the A field for the selected low-capacity with Z field timeslot in the portable part link.

The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H000FFFFF0000FFFF**Range** #H0–#HFFFFFFF**Key Entry** A**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P****Supported** E4438C with Option 402[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:  
P <val>

[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P?

This command customizes the preamble (P) field of the selected low-capacity with Z field timeslot in the portable part link.

**\*RST** #H5555**Range** #H0–#HFFFF**Key Entry** P**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:S****Supported** E4438C with Option 402[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:  
S <val>

[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:S?

This command customizes the synchronization pattern of the selected low-capacity with Z field timeslot in the portable part link.

**\*RST** #H1675**Range** #H0–#HFFFF**Key Entry** S

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]?
```

This command sets the data pattern for the B field of the selected portable part low-capacity with Z field timeslot.

**\*RST**                    PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks**            Refer to “[File Name Variables](#)” on [page 13](#) for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]:FIX4**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]:FIX4 <val>
[:SOURCE]:RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the portable part low-capacity with Z field B field of the selected timeslot.

**\*RST**                    #B0000

**Range**                    #B0000–#B1111 or 0–15

**Key Entry**              **FIX4**

**Remarks**              FIX4 must already be defined as the data type.

**DECT Subsystem—Option 402 (:SOURce]:RADio:DECT)****:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:A****Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :ZTRaffic :
A <val>
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :ZTRaffic :A?
```

This command customizes the A field for the selected traffic bearer with Z field timeslot in the portable part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFF**Key Entry** A field**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:P****Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :ZTRaffic :
P <val>
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :ZTRaffic :P?
```

This command customizes the preamble (P) field of the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST** #H5555**Range** #H0–#HFFFF**Key Entry** P**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:S****Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :ZTRaffic :
S <val>
[ :SOURce ] :RADio:DECT:PPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :ZTRaffic :S?
```

This command sets the synchronization pattern for the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST** #H1675**Range** #H0–#HFFFF**Key Entry** S

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZTRaffic[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]?
```

This command sets the B field data pattern for the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]:
FIX4 <val>
[ :SOURce ] :RADio:DECT:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]:
FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the portable part traffic bearer with Z field B field of the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. Refer to “:PPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]” on page 599 to change the data type.

**DECT Subsystem—Option 402** ([:SOURCE]:RADIO:DECT)**:RFPart:SLOT0** [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11[:TYPE]**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPart:SLOT0 [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11[:TYPE]
CUSTom|DUMM[1] |DUMM2|TRAFfic|LCAPacity|ZTRaffic|ZLCapacity
[:SOURCE]:RADIO:DECT:RFPart:SLOT0 [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11[:TYPE]?
```

This command selects the timeslot type for the selected timeslot in the radio fixed part link.

**\*RST** Timeslot 0: TRAF Timeslots 1–4: CUST

**Key Entry**

<b>Custom</b>	<b>Dummy Bearer 1</b>	<b>Dummy Bearer 2</b>	<b>Traffic Bearer</b>
<b>Low Capacity</b>	<b>Traffic Bearer with Z field</b>	<b>Low Capacity with Z field</b>	

**:RFPart:SLOT0** [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11:CUSTom**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPart:SLOT0 [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11:CUSTom PN9 |
PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | FDEV1_HS | FDEV1_FS | FDEV2_FS |
FACCuracy | DM1 | DM0 | P4 | P8 | P16 | P32 | P64
[:SOURCE]:RADIO:DECT:RFPart:SLOT0 [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11:CUSTom?
```

This command sets the data pattern for the data field of the selected custom timeslot in the radio fixed part link.

**\*RST** PN9

**Key Entry**

<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.



### **:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:  
FIX4 <val>
```

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:CUSTom:  
FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. Refer to [“:RFPart:SLOT0|\[1\]|2|3|4|5|6|7|8|9|10|11:CUSTom” on page 600](#) to change the data type.

### **:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:A**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:  
A <val>
```

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:A?
```

This command customizes the A field for the selected dummy 2 timeslot in the radio fixed part link.

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** **A field**

**Remarks** The A field carries signaling data (48 bits) and error correction (16 bits).

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:P****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:

P &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:P?

This command customizes the preamble (P) field for the selected dummy 2 timeslot in the radio fixed part link.

**\*RST** #HAAAA**Range** #H0–#HFFFF**Key Entry** P**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:S****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:

S &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM2:S?

This command customizes the synchronization (S) field of the selected dummy 2 timeslot in the radio fixed part link.

**\*RST** #HE98A**Range** #H0–#HFFFF**Key Entry** S**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:A****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:

A &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:A?

This command customizes the A field for the selected dummy 1 timeslot in the radio fixed part link.

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFF**Key Entry** A field

**Remarks** The 64-bit A field carries signaling data (48 bits) and error correction (16 bits).

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:P**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :

P <val>

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :P?

This command customizes the preamble (P) field for the selected dummy 1 timeslot in the radio fixed part link.

**\*RST** #HAAAA

**Range** #H0–#HFFFF

**Key Entry** P

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1]:S**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :

S <val>

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:DUMM[1] :S?

This command customizes the synchronization (S) field of the selected dummy 1 timeslot in the radio fixed part link.

**\*RST** #HE98A

**Range** #H0–#HFFFF

**Key Entry** S

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:A**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:

A <val>

[ :SOURce ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:A?

This command customizes the A field for the selected low-capacity timeslot in the radio fixed part link.

**\*RST** #H0000FFFF0000FFFF

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** A field

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:P****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:  
P <val>

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:P?

This command customizes the preamble (P) field of the selected low-capacity timeslot in the portable part link.

**\*RST** #HAAAA**Range** #H0–#H1111**Key Entry** P**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:S****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:  
S <val>

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:S?

This command customizes the synchronization pattern of the selected low-capacity timeslot in the portable part link.

**\*RST** #HE98A**Range** #H0–#H1111**Key Entry** S**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]****Supported** E4438C with Option 402[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:  
LCAPacity[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1\_HS|  
FDEV1\_FS|FDEV2\_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:  
LCAPacity[:B]?

This command sets the data pattern for the B field of the selected portable part low-capacity timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9 PN11 PN15 PN20 PN23 FIX4 User File Ext FDEV1_HS</b>
	<b>FDEV1_FS FDEV2_FS FACC DM1 DM0 4 1's &amp; 4 0's</b>
	<b>8 1's &amp; 8 0's 16 1's &amp; 16 0's 32 1's &amp; 32 0's 64 1's &amp; 64 0's</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity[:B]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4 <val>
```

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:
LCAPacity[:B]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part low-capacity timeslot B field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:LCAPacity:POWer**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:POWer MAIN|
DELTA
```

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:POWer?
```

This command defines the RF output power level for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.

**DELTA** This choice specifies RF output as the alternative power level.

**\*RST** MAIN

**Key Entry** **Timeslot Ampl Main Delta**

**DECT Subsystem—Option 402 (:SOURce):RADio:DECT)****:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe****Supported** E4438C with Option 402

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe ON|OFF|1|0

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:STATe?

This command enables or disables the operating state of the selected timeslot in the radio fixed part.

**\*RST** Timeslot 0: 1 Timeslots 1–11: 0**Key Entry** Timeslot Off On**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:A****Supported** E4438C with Option 402

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:A &lt;val&gt;

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:A?

This command customizes the A field for the selected traffic bearer timeslot in the portable part link.

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFF**Key Entry** A field**Remarks** The A field carries signaling data (48 bits) and error correction (16 bits).**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:P****Supported** E4438C with Option 402

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:P &lt;val&gt;

[:SOURce]:RADio:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:P?

This command customizes the preamble (P) field of the selected traffic bearer timeslot in the radio fixed part link.

**\*RST** #HAAAA**Range** #H0–#HFFFF**Key Entry** P

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:S**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADIo:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:

S <val>

[ :SOURce ] :RADIo:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic:S?

This command customizes the synchronization (S) field of the selected traffic bearer timeslot in the radio fixed part link.

**\*RST**                    #HE98A

**Range**                    #H0–#HFFFF

**Key Entry**                S

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADIo:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:

TRAFfic[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1\_HS|

FDEV1\_FS|FDEV2\_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64

[ :SOURce ] :RADIo:DECT:RFPart:SLOT0 |[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]?

This command sets the B field's data pattern for the selected traffic bearer timeslot in the radio fixed part during framed data transmission.

**\*RST**                    PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>	<b>FDEV1_HS</b>
	<b>FDEV1_FS</b>	<b>FDEV2_FS</b>	<b>FACC</b>	<b>DM1</b>	<b>DM0</b>	<b>4 1's &amp; 4 0's</b>			
	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>					

**Remarks**                Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part traffic bearer timeslot B field.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type, refer to “:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:TRAFfic[:B]” on page 607.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A****Supported** E4438C with Option 402

[:SOURCE]:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:A?

This command customizes the A field for the selected low-capacity with Z field timeslot in the radio fixed part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFF**Key Entry** **A field****:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:P?

This command customizes the preamble (P) field of the selected low-capacity with Z field timeslot in the radio fixed part link.



**\*RST** #HAAAA  
**Range** #H0–#HFFFF  
**Key Entry** P

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:S**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:
S <val>
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity:
S?
```

This command customizes the synchronization (S) field of the selected low-capacity with Z field timeslot in the radio fixed part link.

**\*RST** #HE98A  
**Range** #H0–#HFFFF  
**Key Entry** S

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B] PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|FDEV1_HS|
FDEV1_FS|FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZLCapacity[:B]?
```

This command sets the B field’s data pattern for the selected low-capacity with Z field timeslot in the radio fixed part during framed data transmission.

**\*RST** PN9  
**Key Entry** PN9 PN11 PN15 PN20 PN23 FIX4 User File Ext FDEV1\_HS  
FDEV1\_FS FDEV2\_FS FACC DM1 DM0 4 1’s & 4 0’s  
8 1’s & 8 0’s 16 1’s & 16 0’s 32 1’s & 32 0’s 64 1’s & 64 0’s

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZLCapacity[:B]:FIX4****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:

ZLCapacity[:B]:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:

ZLCapacity[:B]:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part low-capacity with Z field timeslot B field.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****Remarks** FIX4 must already be defined as the data type.**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:A****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:

A &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:A?

This command customizes the A field for the selected traffic bearer timeslot in the radio fixed part link. The A field carries signaling data (48 bits) and error correction (16 bits).

**\*RST** #H0000FFFF0000FFFF**Range** #H0–#HFFFFFFFFFFFFFFFF**Key Entry** **A field****:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:P****Supported** E4438C with Option 402

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:

P &lt;val&gt;

[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:P?

This command customizes the preamble (P) field of the selected traffic bearer with Z field timeslot in the radio fixed part link.

**\*RST**                   #HAAAA  
**Range**                #H0–#HFFFF  
**Key Entry**           **P**

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:S**

**Supported**           E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:
S <val>
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic:S?
```

This command customizes the synchronization (S) field of the selected traffic bearer with Z field timeslot in the radio fixed part link.

**\*RST**                   #HE98A  
**Range**                #H0–#HFFFF  
**Key Entry**           **S**

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]**

**Supported**           E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZTRaffic[:B] PN9|PN15|FIX4|"<file name>"|EXT|FDEV1_HS|FDEV1_FS|
FDEV2_FS|FACCuracy|DM1|DM0|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:DECT:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:
ZTRaffic[:B]?
```

This command sets the B field data pattern for the selected traffic bearer with Z field timeslot in the portable part link.

**\*RST**                   PN9  
**Key Entry**           **PN9   PN11   PN15   PN20   PN23   FIX4   User File   Ext   FDEV1\_HS**  
**FDEV1\_FS   FDEV2\_FS   FACC   DM1   DM0   4 1's & 4 0's**  
**8 1's & 8 0's   16 1's & 16 0's   32 1's & 32 0's   64 1's & 64 0's**

**Remarks**           Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:RFPart:SLOT0|[1]|2|3|4|5|6|7|8|9|10|11:ZTRaffic[:B]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :
ZTRaffic [:B] :FIX4 <val>
[ :SOURCE ] :RADio:DECT:RFPart:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 :
ZTRaffic [:B] :FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected radio fixed part traffic bearer with Z field timeslot B field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:SECOndary:RECall**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:SECOndary:RECall
```

This command recalls the secondary frame configuration, overwriting the current state.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “[:SECOndary:SAVE]” on page 612.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “[:SECOndary[:STATE]]” on page 613.

**:SECOndary:SAVE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:SECOndary:SAVE
```

This command saves the current frame configuration as the secondary frame with the filename DECT\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “[:SECOndary:RECall]” on page 612.

**:SECondary:TRIGger[:SOURce]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:SECondary:TRIGger [ :SOURce ] KEY | EXT | BUS
[ :SOURce ] :RADio:DECT:SECondary:TRIGger [ :SOURce ] ?
```

This command selects the type of triggering for the secondary frame.

- KEY                    This choice enables triggering by pressing the front panel **Trigger** hardkey.
- EXT                   This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to [“:TRIGger\[:SOURce\]:EXTernal\[:SOURce\]” on page 620](#).
- BUS                    This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry**            **Trigger Key      Ext      Bus**

**:SECondary[:STATe]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:SECondary [ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :RADio:DECT:SECondary [ :STATe ] ?
```

This command enables or disables the ability to switch to the secondary frame.

**\*RST**                    0

**Key Entry**            **Secondary Frame Off On**

**Remarks**            A frame must already be saved as the secondary frame in order to turn the secondary state function on.

To save a frame as the secondary frame, refer to [“:SECondary:SAVE” on page 612](#).

**DECT Subsystem—Option 402 ([:SOURCE]:RADio:DECT)****:SOUT**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:SOUT FRAME | SLOT | ALL

[ :SOURCE ] :RADio:DECT:SOUT?

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

Key Entry	Begin Frame	Begin Timeslot #	All Timeslots
-----------	-------------	------------------	---------------

**:SOUT:OFFSet**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:DECT:SOUT:OFFSet <val>

[ :SOURCE ] :RADio:DECT:SOUT:OFFSet?

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed in bits.

**\*RST** +0

**Range** -479 to 479

**Key Entry** **Sync Out Offset**

**Remarks** Negative values move the synchronization output signal earlier; positive values move it later.

To change the output of the EVENT1 rear panel connector to SLOT, refer to [“:SOUT” on page 614](#).

## **:SOUT:SLOT**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:DECT:SOUT:SLOT <val>

[ :SOURce ] :RADio:DECT:SOUT:SLOT?

This command selects the timeslot that will trigger a 1-bit signal at the EVENT 1 rear panel connector.

**\*RST**                    +1

**Range**                 Radio Fixed Part Link: 0–12            Portable Part Link: 1–11

**Key Entry**            **Begin Timeslot #**

**Remarks**            To change the output of the EVENT1 rear panel connector to SLOT, refer to [“:SOUT” on page 614](#).

## **:SRATe**

**Supported**            E4438C with Option 001/601 or 002/602

[ :SOURce ] :RADio:DECT:SRATe <val>

[ :SOURce ] :RADio:DECT:SRATe?

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to [“:BRATe” on page 574](#) for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–Mps) and the maximum symbol rate depends on the filter. Refer to [“:FILTer” on page 585](#) for minimum filter symbol width

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to [“:MODulation\[:TYPE\]” on page 588](#).

**\*RST**                    +1.15200000E+006

Range	Modulation Type	Symbol Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 Msps	3sps–8.333333333 Msps	3sps–4.166666666Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.333333333 Msps	6sps–4.166666666 Msps	6sps–2.083333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**            **Symbol Rate**

## :TRIGger:TYPE

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO:DECT:TRIGger:TYPE CONTinuous | SINGle | GATE
[:SOURCE]:RADIO:DECT:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTinuous**            The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTinuous[:TYPE]” on page 617.

**SINGle**                 The framed data sequence plays once for every trigger received.



**GATE**                    An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST**                    **CONT**

**Key Entry**            **Continuous**      **Single**      **Gated**

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:DECT:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet  
 [ :SOURce ] :RADio:DECT:TRIGger:TYPE:CONTInuous [ :TYPE ] ?

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 616.

The following list describes the waveform’s response to each of the command choices:

**FREE**                    Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.

**TRIGger**                The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

**RESet**                    The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

**\*RST**                    **FREE**

**Key Entry**            **Free Run**      **Trigger & Run**      **Reset & Run**

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURCE]:RADio:DECT:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 616.

The following list describes the ESG’s gating behavior for the polarity selections:

LOW The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).

HIGH The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).

\*RST HIGH

**Key Entry** Gate Active Low High

**:TRIGger[:SOURCE]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:DECT:TRIGger[:SOURCE] KEY|EXT|BUS
[:SOURCE]:RADio:DECT:TRIGger[:SOURCE]?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 616. The following list describes the command choices:

KEY This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

EXT An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 620.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 618
  - continuous and single modes, see “:TRIGger[:SOURce]:EXTErnal:SLOPe” on page 620
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURce]:EXTErnal:DELay” on page 619
  - turning the delay on, see “:TRIGger[:SOURce]:EXTErnal:DELay:STATe” on page 621

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

<b>Key Entry</b>	<b>Trigger Key</b>	<b>Ext</b>	<b>Bus</b>
------------------	--------------------	------------	------------

### **:TRIGger[:SOURce]:EXTErnal:DELay**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:DECT:TRIGger [ :SOURce ] :EXTErnal:DELay <val>
[ :SOURce ] :RADio:DECT:TRIGger [ :SOURce ] :EXTErnal:DELay?
```

This command sets the number of bits to delay the ESG’s response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “:TRIGger[:SOURce]:EXTErnal:DELay:STATe” on page 621. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 618.

**\*RST** +0

**Range** 0–1048575

**Key Entry** **Ext Delay Bits**

**:TRIGger[:SOURCE]:EXTErnal:SLOPe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXTErnal:SLOPe POSitive |NEGative
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “**:TRIGger:TYPE:GATE:ACTive**” on page 618.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “**:TRIGger[:SOURCE]**” on page 618.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**:TRIGger[:SOURCE]:EXTErnal[:SOURCE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXTErnal [ :SOURCE ] EPT1 |EPT2 |
EPTRIGGER1 |EPTRIGGER2
[ :SOURCE ] :RADio:DECT:TRIGger [ :SOURCE ] :EXTErnal [ :SOURCE ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “**:TRIGger[:SOURCE]**” on page 618. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

**\*RST**                    EPT1  
**Key Entry**            **Patt Trig In 1      Patt Trig In 2**

**:TRIGger[:SOURce]:EXTErnal:DELAy:STATe**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:DECT:TRIGger [ :SOURce ] :EXTErnal:DELAy:STATe ON|OFF|1|0  
 [ :SOURce ] :RADio:DECT:TRIGger [ :SOURce ] :EXTErnal:DELAy:STATe?

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURce]:EXTErnal:DELAy” on page 619, and for more information on configuring an external source, see “:TRIGger[:SOURce]” on page 618.

**\*RST**                    0  
**Key Entry**            **Ext Delay Off On**

**[:STATe]**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:DECT [ :STATe ] ON|OFF|1|0  
 [ :SOURce ] :RADio:DECT [ :STATe ] ?

This command enables or disables the DECT modulation format.

**\*RST**                    0  
**Key Entry**            **Dect Off On**

**Remarks**            Although the DECT modulation is enabled with this command, the RF carrier is not modulated unless you enable the modulation by pressing the front panel **Mod On/Off** hardkey.

---

## EDGE Subsystem—Option 402 ([:SOURCE]:RADio:EDGE)

### :ALPHa

**Supported** E4438C with Option 402

[:SOURCE]:RADio:EDGE:ALPHa <val>

[:SOURCE]:RADio:EDGE:ALPHa?

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 634.

### :BBCLock

**Supported** E4438C with Option 402

[:SOURCE]:RADio:EDGE:BBCLock INT[1] |EXT[1]

[:SOURCE]:RADio:EDGE:BBCLock?

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

INT[1] This choice selects the signal generator internal data clock.

EXT[1] This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **Ext Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

This will be ignored if the external reference is set to EXTERNAL. To change the external reference type, refer to “:EREFerence” on page 633.

## :BBT

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BBT <val>

[ :SOURce ] :RADio:EDGE:BBT?

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +3.00000000E–001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 634.

## :BURSt:SHAPe:FALL:DELay

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FALL:DELay <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FALL:DELay?

This command sets the period of time that the start of the burst fall is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** –16.2000 to 99

**Key Entry** **Fall Delay**

**EDGE Subsystem—Option 402 ([:SOURCE]:RADio:EDGE)**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATe” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 624 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:FDELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPe:FDELay <val>
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPe:FDELay?
```

This command sets the period of time that the start of the burst fall is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** –16.2000 to 99

**Key Entry** **Fall Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATe” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DELay” on page 623 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.



## :BURSt:SHAPe:FALL:TIME

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FALL:TIME <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FALL:TIME?

This command sets the period of time where the burst decreases from full power to minimum power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.2000–409.2000

**Key Entry** **Fall Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 625 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:FTIME

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FTIME <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPe:FTIME?

This command sets the period of time where the burst decreases from full power to minimum power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** 0.2000–409.2000

**Key Entry** **Fall Time**

**EDGE Subsystem—Option 402 ([:SOURCE]:RADio:EDGE)**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATe” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:TIME” on page 625 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:RDELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPe:RDELay <val>
[ :SOURCE ] :RADio:EDGE:BURSt:SHAPe:RDELay?
```

This command sets the period of time that the start of the burst rise is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -7.2000 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATe” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELay” on page 627 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPE:RISE:DELay**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPE:RISE:DELay <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPE:RISE:DELay?

This command sets the period of time that the start of the burst rise is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -7.2000 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPE:RDELay” on page 626 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPE:RISE:TIME**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:BURSt:SHAPE:RISE:TIME <val>

[ :SOURce ] :RADio:EDGE:BURSt:SHAPE:RISE:TIME?

This command sets the period of time where the burst increases from a minimum power to full power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.2000–16.4000

**Key Entry** **Rise Time**

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RTIME” on page 628 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:RTIME**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:EDGE:BUrSt:SHAPe:RTIME <val>
[ :SOURCE ] :RADIo:EDGE:BUrSt:SHAPe:RTIME?
```

This command sets the period of time where the burst increases from a minimum power to full power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.2000–16.4000

**Key Entry** **Rise Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637. Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 627 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPE[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE:BURSt:SHAPE[:TYPE] SINE | "<file name>"
[ :SOURce ] :RADio:EDGE:BURSt:SHAPE[:TYPE] ?
```

This command sets the burst shape type.

**SINE** This choice selects a burst shape defined by the burst rise and fall \*RST values.

"<file name>" This choice selects a user-defined file from signal generator memory.

**\*RST** SINE

**Key Entry** **Sine User File**

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### **:BURSt[:STATe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE:BURSt[:STATe] ON|OFF|1|0
[ :SOURce ] :RADio:EDGE:BURSt[:STATe] ?
```

This command enables or disables the burst function.

**ON (1)** This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

**OFF (0)** This choice enables the transmission of unframed data.

**\*RST** 0

**Key Entry** **Data Format Pattern Framed**

**:CHANnel****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:CHANnel EVM|ACP

[:SOURCE]:RADIO:EDGE:CHANnel?

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

EVM This choice provides the most ideal passband.

ACP This choice improves stopband rejection.

**\*RST** ACP**Key Entry** **Optimize FIR For EVM ACP****Remarks** To change the current filter type, refer to “[:FILTer](#)” on page 634.**:DATA****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:DATA PN9|PN11|PN15|PN20|PN23|FIX4|"&lt;file name&gt;"|EXT|P4|P8|P16|P32|P64|PRAM

[:SOURCE]:RADIO:EDGE:DATA?

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file) for unframed data transmission.

**\*RST** PN9**Key Entry** **PN9 PN11 PN15 PN20 PN23 FIX4 User File Ext****4 1's & 4 0's 8 1's & 8 0's 16 1's & 16 0's 32 1's & 32 0's****64 1's & 64 0's PRAM File****Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

## :DATA:PRAM

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:DATA:PRAM "<file_name>"
```

```
[ :SOURCE ] :RADIO:EDGE:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the EDGE (Enhanced Data GSM Environment) format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#)

## :DATA:FIX4

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADIO:EDGE:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the EDGE modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

To change the data type, refer to [“:DATA” on page 630](#).

**:DEFAULT**

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:DEFAULT

This command returns all of the EDGE modulation format parameters to factory settings. It does not affect any other signal generator parameters.

**Key Entry** Restore EDGE Factory Default

**:EDATa:DELay**

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:EDATa:DELay?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**\*RST** +0.00000000E+000

**Remarks** When the EDGE format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**:EDCLock**

**Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:EDCLock SYMBOL|NORMAL

[:SOURCE]:RADIO:EDGE:EDCLock?

This command sets the external data clock use.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMAL** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** Ext Data Clock Normal Symbol

**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBCLock” on [page 622](#) to select EXT as the data clock type.



## :EREFerence

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:EREFerence INT|EXT

[ :SOURce ] :RADio:EDGE:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** **BBG Ref Ext Int**

**Remarks** If the EXT choice is selected, the external source's frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

Refer to, “:EREFerence:VALue” on page 633 to enter the external reference frequency setting.

## :EREFerence:VALue

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:EREFerence:VALue <val>

[ :SOURce ] :RADio:EDGE:EREFerence:VALue?

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence” on page 633 to select EXT (external source) as the reference for the bit-clock.

**:FILTER**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:FILTER RNYquist|NYquist|GAUSSian|RECTangle|IS95|
IS95_EQ|IS95_MOD|IS95_MOD_EQ|EDGE|AC4Fm|UGGaussian|"<user FIR>"
[:SOURCE]:RADIO:EDGE:FILTER?
```

This command selects the pre-modulation filter type.

IS95	This choice selects a filter that meets the criteria of the IS-95 standard.																		
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.																		
IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.																		
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.																		
EDGE	This choice selects Laurant's decomposition of a Gaussian filter with a 0.300 fixed BbT.																		
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.																		
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.																		
"<user FIR>"	This variable is any filter file that you have stored into memory.																		
<b>*RST</b>	EDGE																		
<b>Key Entry</b>	<table> <tr> <td><b>Root Nyquist</b></td> <td><b>Nyquist</b></td> <td><b>Gaussian</b></td> <td><b>Rectangle</b></td> <td><b>IS-95</b></td> <td><b>IS-95 w/EQ</b></td> </tr> <tr> <td><b>IS-95 Mod</b></td> <td><b>IS-95 Mod w/EQ</b></td> <td><b>EDGE</b></td> <td><b>APCO 25 C4FM</b></td> <td></td> <td></td> </tr> <tr> <td><b>UN3/4 GSM Gaussian</b></td> <td><b>User FIR</b></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>EDGE</b>	<b>APCO 25 C4FM</b>			<b>UN3/4 GSM Gaussian</b>	<b>User FIR</b>				
<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>														
<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>EDGE</b>	<b>APCO 25 C4FM</b>																
<b>UN3/4 GSM Gaussian</b>	<b>User FIR</b>																		
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.																		

## **:IQ:SCALe**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:IQ:SCALe <val>

[ :SOURce ] :RADio:EDGE:IQ:SCALe?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST** +113

**Range** 1–200

**Key Entry** **I/Q Scaling**

**Remarks** This command has no effect with MSK or FSK modulation.

## **:MODulation:FSK[:DEViation]**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:MODulation:FSK[:DEViation] <val>

[ :SOURce ] :RADio:EDGE:MODulation:FSK[:DEViation] ?

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 637.

Refer to “:SRATE” on page 658 for a list of minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

**:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:MODulation:MSK[:PHASe] <val>
```

```
[ :SOURCE ] :RADio:EDGE:MODulation:MSK[:PHASe] ?
```

This command sets the MSK phase deviation value.

The variable <val> is expressed in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

**:MODulation:UFSK**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:MODulation:UFSK "<file name>"
```

```
[ :SOURCE ] :RADio:EDGE:MODulation:UFSK ?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 637](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:MODulation:UIQ**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:MODulation:UIQ "<file name>"
```

```
[ :SOURCE ] :RADio:EDGE:MODulation:UIQ ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks**                    The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “:MODulation[:TYPE]” on page 637 to change the current modulation type.

Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported**                    E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|GRAYQPSK|
OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|FSK8|FSK16|C4FM|
QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|EDGE|UIQ|UFSK
[:SOURCE]:RADio:EDGE:MODulation[:TYPE]?
```

This command sets the modulation type for the EDGE personality.

**\*RST**                            EDGE

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>	<b>OQPSK</b>			
	<b>IS-95 OQPSK</b>	<b><math>\pi/4</math> DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>EDGE</b>	<b>User I/Q</b>	<b>User FSK</b>		

**:POLarity[:ALL]**

**Supported**                    E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:POLarity[:ALL] NORMal|INVerted
[:SOURCE]:RADio:EDGE:POLarity[:ALL]?
```

This command sets the rotation direction for the phase modulation vector.

**NORMal**                        This choice selects normal phase polarity.

**INVerted**                      This choice inverts the internal Q signal.

**\*RST**                            NORM

**Key Entry**                    **Phase Polarity Normal Invert**

**:SECondary:RECall****Supported** E4438C with Option 402

[:SOURCE]:RADio:EDGE:SECondary:RECall

This command recalls the secondary frame configuration, overwriting the current frame.

**Key Entry** **Recall Secondary Frame State****Remarks** To save a secondary frame state, refer to “:SECondary:SAVE” on page 638.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “:SECondary[:STATE]” on page 639.

**:SECondary:SAVE****Supported** E4438C with Option 402

[:SOURCE]:RADio:EDGE:SECondary:SAVE

This command saves the current frame configuration as the secondary frame with the filename EDGE\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State****Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “:SECondary:RECall” on page 638.**:SECondary:TRIGger[:SOURCE]****Supported** E4438C with Option 402[:SOURCE]:RADio:EDGE:SECondary:TRIGger[:SOURCE] KEY|EXT|BUS  
[:SOURCE]:RADio:EDGE:SECondary:TRIGger[:SOURCE]?

This command selects the type of triggering for the secondary frame.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connection, refer to “:TRIGger[:SOURCE]:EXTErnal[:SOURCE]” on page 665.**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.**Key Entry** **Trigger Key Ext Bus**

**:SECondary[:STATe]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:SECondary[:STATe] ON|OFF|1|0
[:SOURCE]:RADIO:EDGE:SECondary[:STATe]?
```

This command enables or disables the ability to switch to the secondary frame.

**\*RST** 0

**Key Entry** **Secondary Frame Off On**

**Remarks** A frame must already be saved as the secondary frame in order to turn the secondary state function on.

To save a frame as the secondary frame, refer to “:SECondary:SAVE” on page 638.

**:SLOT0|[1]|2|3|4|5|6|7:CUSTom**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom PN9|PN11|PN15|PN20|
PN23|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1’s and 0’s, data from an external source, or a user file) for framed data transmission.

**\*RST** PN9

**Key Entry** **PN9 PN15 FIX4 User File Ext 4 1’s & 4 0’s 8 1’s & 8 0’s**  
**16 1’s & 16 0’s 32 1’s & 32 0’s 64 1’s & 64 0’s**

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

Refer to “:SLOT0|[1]|2|3|4|5|6|7[:TYPE]” on page 656

**:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected custom timeslot.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****Remarks** FIX4 must already be defined as the data type.

To change the data type, refer to “:SLOT0|[1]|2|3|4|5|6|7:CUSTom” on page 639.

**:SLOT0|[1]|2|3|4|5|6|7:CUSTom:GUARd****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:

GUARd &lt;24 or 27 bit\_pattern&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:CUSTom:GUARd?

This command defines the hexadecimal value for the guard time field in the selected custom timeslot.

**\*RST** Timeslots 0 & 4: #H7FFFFFFF

Timeslots: 1, 2, 3, 5, 6, &amp;7: #H0FFFFFFF

**Range** Timeslots 0 & 4: #H0–#H7FFFFFFF

Timeslots: 1, 2, 3, 5, 6, &amp;7: #H0–#H0FFFFFFF

**Key Entry** **G****Remarks** The guard time field is always modulated (but not bursted), even when the timeslot is off.

If the guard time and T2 symbols of the current timeslot and the T1 symbols of the next timeslot do not match, the burst shape may not be smooth (even if the current timeslot is turned off).

To change the current timeslot type, refer to “:SLOT0|[1]|2|3|4|5|6|7[:TYPE]” on page 656.



## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCrypTion**

**Supported**            E4438C with Option 402

```
[ :SOURce] :RADio:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCrypTion PN9 | PN15 |
FIX4 | "<file name>" | P4 | P8 | P16 | P32 | P64 | TCHFS | CS1 | CS4 | DMCS1 | UMCS1
[:SOURce] :RADio:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCrypTion?
```

This command selects the data pattern type or the multiframe channel (structure) for the selected GMSK timeslot.

There are two types of multiframe structures, a 26 and a 52 frame structure. The 26 frame structure has the following attributes:

- frame 12 contains the slow associated control channel (SACCH)
- frame 25 is idle and incorporates RF blanking

The 52 frame structure has the following attributes:

- frames 12 and 38 contain tail and control bits with the payload bits set to zero.
- Frames 25 and 51 are idle and incorporate RF blanking.

**PN9, PN15**            These choices are standard PN sequences. For bursted data, the PN sequences continuously repeat from one timeslot in a frame to the matching timeslot in the next frame.

**FIX4**                 This choice selects a repeating 4-bit pattern.

**"<file name>"**        This choice selects a user-defined data file from signal generator memory. The file must supply enough bits to fill the desired number of timeslots. In timeslots where there is not enough bits to fill the encryption fields, the ESG ignores the data.

**P4**                    This choice selects a data pattern with four ones followed by four zeros. The pattern repeats as needed to fill the encryption fields.

**P8**                    This choice selects a data pattern with eight ones followed by eight zeros. The pattern repeats as needed to fill the encryption fields.

**P16**                  This choice selects a data pattern with 16 ones followed by 16 zeros. The pattern repeats as needed to fill the encryption fields.

**P32**                  This choice selects a data pattern with 32 ones followed by 32 zeros. The pattern repeats as needed to fill the encryption fields.

**P64**                  This choice selects a data pattern with 64 ones followed by 64 zeros. The pattern repeats as needed to fill the encryption fields.

**TCHFS**              This multiframe choice selects a traffic channel with full rate speech (TCH/FS).

**EDGE Subsystem–Option 402 ([:SOURCE]:RADIO:EDGE)**

CS-1	This multiframe choice selects the packet data traffic channel that uses the packet data block type 1 coding scheme in accordance with the 3GPP standard GSM 05.03.
CS4	This multiframe choice selects the packet data traffic channel that uses the packet data block type 4 coding scheme in accordance with the 3GPP standard GSM 05.03.
DMCS1	This multiframe choice selects the downlink packet data traffic channel that uses the packet data block type 5 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.
UMCS1	This multiframe choice selects the uplink packet data traffic channel that uses the packet data block type 5 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.
<b>*RST</b>	PN9
<b>Key Entry</b>	<b>PN9    PN15    FIX4    User File    Ext    4 1's &amp; 4 0's    8 1's &amp; 8 0's</b> <b>16 1's &amp; 16 0's    32 1's &amp; 32 0's    64 1's &amp; 64 0's    TCH/FS    CS-1</b> <b>CS-4    Downlink MCS-1    Uplink MCS-1</b>

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCRyption:CS1:DATA**

**Supported**            E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:CS1:DATA PN9 | PN15

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCRyption:CS1:DATA?

This command selects the encryption field data for the selected GMSK timeslot that uses the packet data block type 1 coding scheme.

**\*RST**                    PN9

**Key Entry**            **PN9    PN15**

**Remarks**            Refer to “[:SLOT0|\[1\]|2|3|4|5|6|7:GMSK:ENCRyption](#)” on page 641 for selecting the coding scheme.

## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption:CS4:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCryption:CS4:DATA PN9 |  
PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCryption:CS4:DATA?
```

This command selects the encryption field data for the selected GMSK timeslot that uses the packet data block type 4 coding scheme.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption” on page 641 for selecting the coding scheme.

## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption:DLINK:MCS1:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCryption:DLINK:MCS1 :  
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCryption:DLINK:MCS1 :  
DATA?
```

This command selects the encryption field data for the selected GMSK timeslot that uses the downlink packet data block type 5 modulation and coding scheme.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption” on page 641 for selecting the coding scheme.

## **:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCryption:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCryption:FIX4 <val>  
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCryption:FIX4?
```

This command sets the encryption field with a 4-bit binary repeating data pattern for the selected GMSK timeslot.

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** #B0000

**Range** 0–15

**Key Entry** **FIX4**

**Remarks** Refer to “:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCrypTion” on page 641 for selecting the data type.

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCrypTion:TCH:FS:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCrypTion:TCH:FS:
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCrypTion:TCH:FS:DATA?
```

This command sets the encryption field data for the selected GMSK timeslot configured as the traffic channel with full speech (TCH/FS).

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCrypTion” on page 641 for selecting the TCH/FS.

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCrypTion:ULINK:MCS1:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCrypTion:ULINK:MCS1:
DATA { PN9 } | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :GMSK:ENCrypTion:ULINK:MCS1:
DATA?
```

This command selects the encryption field data for the selected GMSK timeslot that uses the uplink packet data block type 5 modulation and coding scheme.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “:SLOT0|[1]|2|3|4|5|6|7:GMSK:ENCrypTion” on page 641 for selecting the coding scheme.

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:STeal**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:STeal 0|1
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:STeal?
```

This command specifies the stealing bit (1-bit S field) for the selected GMSK timeslot. The single bit defines the value for both stealing (S) fields.

The stealing flag field accepts values in binary, hexadecimal, or decimal format, however the query returns only hexadecimal values.

**\*RST**                    #H0

**Key Entry**            **S**

**:SLOT0|[1]|2|3|4|5|6|7:GMSK:TSEquence**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:TSEquence TSC0|TSC1|
TSC2|TSC3|TSC4|TSC5|TSC6|TSC7|<26-bit pattern>
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:GMSK:TSEquence?
```

This command changes the 26-bit training sequence (TS) for the selected GMSK timeslot.

The query returns the current training sequence hexadecimal value. Use the following table to match the hexadecimal values to the training sequences of TSC0–TSC7.

<b>Training Sequence</b>	<b>Hexadecimal Value</b>
TSC0	0970897
TSC1	0B778B7
TSC2	10EE90E
TSC3	11ED11E
TSC4	06B906B
TSC5	13AC13A
TSC6	29F629F
TSC7	3BC4BBC

**\*RST**                    #H0970897

**EDGE Subsystem—Option 402 ([:SOURCE]:RADIO:EDGE)**

<b>Range</b>	<26-bit pattern>: #H0–#H3FFFFFF							
<b>Key Entry</b>	<b>TSC0</b>	<b>TSC1</b>	<b>TSC2</b>	<b>TSC3</b>	<b>TSC4</b>	<b>TSC5</b>	<b>TSC6</b>	<b>TSC7</b>
	<b>Custom TS</b>							

**:SLOT0|[1]|2|3|4|5|6|7:MULTIslot**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :MULTIslot ON | OFF | 1 | 0
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :MULTIslot?
```

This command turns bursting (ramping) on or off between the selected timeslot and the next higher numbered adjacent timeslot.

ON (1) This choice turns ramping off between timeslots.

OFF (0) This choice turns ramping on between timeslots.

\*RST 0

**Key Entry** **Multislot Off On**

**Remarks** Turning multislot on between an EDGE and GMSK timeslot may produce undesired spectral content. The undesired spectral content is a byproduct of the transition between two different modulation types without ramping.

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption**

**Supported** E4438C with Options 402 or 416

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption PN9 | PN11 |
PN15 | PN20 | PN23 | FIX4 | "<filename>" | EXT | P4 | P8 | P16 | P32 | P64 | DMCS9 | UMCS9 | DMCS5
| UMCS5 | ETCHF43 | UNCodeD | EBCH1 | EBCH2
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption?
```

This command selects the data pattern type or the multiframe channel (structure) for the selected normal timeslot.

There are two types of multiframe structures, a 26 and a 52 frame structure. The 26 frame structure has the following attributes:

- frame 12 contains the slow associated control channel (SACCH)
- frame 25 is idle and incorporates RF blanking

The 52 frame structure has the following attributes:

- frames 12 and 38 contain tail and control bits with the payload bits set to zero.

- Frames 25 and 51 are idle and incorporate RF blanking.
- |              |  |
|--------------|--|
| PN9–23       | These choices are standard PN sequences. For bursted data, the PN sequences continuously repeat from one timeslot in a frame to the matching timeslot in the next frame.   |
| FIX4         | This choice selects a repeating 4-bit binary pattern.  |
| "<filename>" | This choice selects a user-defined data file from signal generator memory. The file must supply enough bits to fill the desired number of timeslots. In timeslots where there are not enough bits to fill the encryption fields, the ESG ignores the data. |
| EXT          | This choice selects an external user signal as the modulating data stream. Connect the externally supplied serial data signal to the front panel DATA BNC connector.   |

---

<b>NOTE</b>	The EXT selection is not available when configuring both GMSK and EDGE normal timeslots for the same signal.
-------------	--

---

- |       |  |
|-------|--|
| P4    | This choice selects a data pattern with four ones followed by four zeros. The pattern repeats as needed to fill the encryption fields.   |
| P8    | This choice selects a data pattern with eight ones followed by eight zeros. The pattern repeats as needed to fill the encryption fields.   |
| P16   | This choice selects a data pattern with 16 ones followed by 16 zeros. The pattern repeats as needed to fill the encryption fields.   |
| P32   | This choice selects a data pattern with 32 ones followed by 32 zeros. The pattern repeats as needed to fill the encryption fields.   |
| P64   | This choice selects a data pattern with 64 ones followed by 64 zeros. The pattern repeats as needed to fill the encryption fields.   |
| DMCS9 | This multiframe choice selects the downlink packet data traffic channel that uses the packet data block type 13 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03. |
| UMCS9 | This multiframe choice selects the uplink packet data traffic channel that uses the packet data block type 13 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.   |
| DMCS5 | This multiframe choice selects the downlink packet data traffic channel that uses the packet data block type 9 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.  |
| UMCS5 | This multiframe choice selects the uplink packet data traffic channel that uses the packet data block type 9 modulation and coding scheme in accordance with the 3GPP standard GSM 05.03.    |

**EDGE Subsystem–Option 402 ([:SOURCE]:RADio:EDGE)**

ETCH43	This multiframe choice selects an enhanced circuit switched full rate traffic channel with a user data rate of 43.2k-bits per second																																
Uncoded	This choice selects an uncoded channel.																																
EBCH1	This multiframe choice selects a <i>non-combined</i> broadcast channel for timeslot zero. Use this selection when timeslot zero is the only multiframe timeslot within the frame (timeslots 0–7). Trying to use a multiframe choice for another timeslot (timeslots 1–7) when timeslot zero is configured as a BCH, will create a settings conflict error.																																
EBCH2	This multiframe choice selects a <i>combined</i> broadcast channel for timeslot zero. Use this selection when timeslot zero is the only multiframe timeslot within the frame (timeslots 0–7). Trying to use a multiframe choice for another timeslot (timeslots 1–7) when timeslot zero is configured as a BCH, will create a settings conflict error.																																
<b>*RST</b>	PN9																																
<b>Key Entry</b>	<table border="0"> <tr> <td><b>PN9</b></td> <td><b>PN11</b></td> <td><b>PN15</b></td> <td><b>PN20</b></td> <td><b>PN23</b></td> <td><b>FIX4</b></td> <td><b>User File</b></td> <td><b>EXT</b></td> </tr> <tr> <td><b>4 1's &amp; 4 0's</b></td> <td><b>8 1's &amp; 8 0's</b></td> <td><b>16 1's &amp; 16 0's</b></td> <td><b>32 1's &amp; 32 0's</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>64 1's &amp; 64 0's</b></td> <td><b>Downlink MCS-9</b></td> <td><b>Uplink MCS-9</b></td> <td><b>Downlink MCS-5</b></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Uplink MCS-5</b></td> <td><b>E-TCH/F43.2</b></td> <td><b>Uncoded</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>					<b>64 1's &amp; 64 0's</b>	<b>Downlink MCS-9</b>	<b>Uplink MCS-9</b>	<b>Downlink MCS-5</b>					<b>Uplink MCS-5</b>	<b>E-TCH/F43.2</b>	<b>Uncoded</b>					
<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>																										
<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>																														
<b>64 1's &amp; 64 0's</b>	<b>Downlink MCS-9</b>	<b>Uplink MCS-9</b>	<b>Downlink MCS-5</b>																														
<b>Uplink MCS-5</b>	<b>E-TCH/F43.2</b>	<b>Uncoded</b>																															
<b>Remarks</b>	<p>Refer to “<a href="#">File Name Variables</a>” on <a href="#">page 13</a> for information on the file name syntax.</p> <p>To change the current timeslot type, refer to “<a href="#">:SLOT0[1 2 3 4 5 6 7[:TYPE]]</a>” on <a href="#">page 656</a>.</p>																																

**:SLOT0:NORMAL:ENCRyption:BCH:BCC**

**Supported** E4438C with Option 416416

```
[:SOURCE]:RADio:EDGE:SLOT0:NORMAL:ENCRyption:BCH:BCC <val>
[:SOURCE]:RADio:EDGE:SLOT0:NORMAL:ENCRyption:BCH:BCC?
```

This command sets the broadcast control code (BCC) which is used to indicate what training sequence is being used by the basestation in the forward channels. This code will allow the mobile station to decode the other channels in the broadcast channel.

**\*RST** 0

**Range** 0–7



### **:SLOT0:NORMAL:ENCRyption:BCH:CELLid**

**Supported** E4438C with Option 416

```
[ :SOURCE ] :RADio:EDGE:SLOT0:NORMAl:ENCRyption:BCH:CELLid <val>  
[ :SOURCE ] :RADio:EDGE:SLOT0:NORMAl:ENCRyption:BCH:CELLid?
```

This command sets the cell identification. The purpose of the cell identity information element is to identify a cell within a location area.

**\*RST** 0

**Range** 0–65535

### **:SLOT0:NORMAL:ENCRyption:BCH:LAC**

**Supported** E4438C with Option 416

```
[ :SOURCE ] :RADio:EDGE:SLOT0:NORMAl:ENCRyption:BCH:LAC <val>  
[ :SOURCE ] :RADio:EDGE:SLOT0:NORMAl:ENCRyption:BCH:LAC?
```

This command sets the location area code (LAC). The location area code provides 16 bits to allow the administrator to define a location.

**\*RST** 0

**Range** 0–65535

### **:SLOT0:NORMAL:ENCRyption:BCH:MCC**

**Supported** E4438C with Option 416

```
[ :SOURCE ] :RADio:EDGE:SLOT0:NORMAl:ENCRyption:BCH:MCC <val>  
[ :SOURCE ] :RADio:EDGE:SLOT0:NORMAl:ENCRyption:BCH:MCC?
```

This command sets the mobile country code (MCC). The mobile country code is a 12 bit number used to represent the country where the basestation is located.

**\*RST** 0

**Range** 0–4095

**:SLOT0:NORMAL:ENCRyption:BCH:MNC****Supported** E4438C with Option 416

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:MNC &lt;val&gt;

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:MNC?

This command sets the mobile network code (MNC). The mobile network code is the individual number a network will be assigned.

**\*RST** 0**Range** 0–255

**Remarks** Federal regulation mandates that a 3-digit MNC will be used. For the ESG implementation the upper four bits are set to 1111.

**:SLOT0:NORMAL:ENCRyption:BCH:PLMN****Supported** E4438C with Option 416

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:PLMN &lt;val&gt;

[:SOURCE]:RADIO:EDGE:SLOT0:NORMAL:ENCRyption:BCH:PLMN?

This command is used to set the Public Land Mobile Network (PLMN) which is used to indicate the country the phone is in. PLMN is also referred to as the National Country Code (NCC).

**\*RST** 0**Range** 0–7**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS5:DATA****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS5:DATA PN9|PN15

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS5:DATA?

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 5 (MCS-5) downlink channel.

**\*RST** PN9**Key Entry** **PN9 PN15**

**Remarks** To select downlink MCS-5 as the multiframe channel type, refer to “:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.

## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS9:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:DLINK:MCS9 :  
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:DLINK:MCS9 :  
DATA?
```

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 9 (MCS-9) downlink channel.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select downlink MCS-9 as the multiframe channel type, refer to  
“:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.

## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ETCH:F43:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ETCH:F43 :  
DATA PN9 | PN15
```

```
[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ETCH:F43 :  
DATA?
```

This command sets the data type (pseudo-random number sequence) for the enhanced, circuit switched, full-rate traffic channel with 43.2k-bits per second of user data (E-TCH/F43.2).

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select E-TCH/F43.2 as the multiframe channel type, refer to  
“:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:FIX4****Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:FIX4 <val>
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for framed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the EDGE modulation format.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****Remarks** FIX4 must already be selected as the data type.

To select FIX4 as the data type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.](#)

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ULINK:MCS5:DATA****Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ULINK:MCS5:
DATA PN9|PN15
[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ULINK:MCS5:
DATA?
```

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 5 (MCS-5) uplink channel.

**\*RST** PN9**Key Entry** **PN9 PN15**

**Remarks** To select uplink MCS-5 as the multiframe channel type, refer to  
[“:SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.](#)

## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ULINK:MCS9:DATA**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ULINK:MCS9:DATA PN9 | PN15

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:ULINK:MCS9:DATA?

This command sets the data type (pseudo-random number sequence) for the enhanced general packet radio service (EGPRS) modulation and coding scheme 9 (MCS-9) uplink channel.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select uplink MCS-9 as the multiframe channel type, refer to “:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.

## **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:UNCoded**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:UNCoded PN9 | PN15

[ :SOURCE ] :RADIO:EDGE:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAL:ENCRyption:UNCoded?

This command sets the data type (pseudo-random number sequence) for an uncoded channel.

**\*RST** PN9

**Key Entry** PN9 PN15

**Remarks** To select uncoded as the multiframe channel type, refer to “:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption” on page 646.

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:GUARD****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:

GUARD &lt;24 or 27 bit\_pattern&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:GUARD?

This command sets the hexadecimal value for the guard time field in the selected normal timeslot.

**\*RST** Timeslots 0 & 4: #H7FFFFFF  
 Timeslots: 1, 2, 3, 5, 6, &7: #H0FFFFFF

**Range** Timeslots 0 & 4: #H0–#H7FFFFFF  
 Timeslots: 1, 2, 3, 5, 6, &7: #H0–#H0FFFFFF

**Key Entry** **G**

**Remarks** The guard time field is always modulated (but not bursted), even when the timeslot is off.

If the guard time and T2 symbols of the current timeslot and the T1 symbols of the next timeslot do not match, the burst shape may not be smooth (even if the current timeslot is turned off).

To change the current timeslot type, refer to “[:SLOT0|\[1\]|2|3|4|5|6|7\[:TYPE\]](#)” on [page 656](#).

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:T1****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:T1 &lt;9 bit\_pattern&gt;

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAL:T1?

This command sets the hexadecimal value for the leading 9-bit tail field in the selected normal timeslot.

**\*RST** #H1FF**Range** #H0–#H1FF**Key Entry** **T1**

**:SLOT0|[1]|2|3|4|5|6|7:NORMAl:T2**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAl:T2 <9 bit_pattern>
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAl:T2?
```

This command sets the hexadecimal value for the trailing 9-bit tail field in the selected normal timeslot.

**\*RST**                    #H1FF  
**Range**                   #H0–#H1FF  
**Key Entry**              T2

**:SLOT0|[1]|2|3|4|5|6|7:NORMAl:TSEQUence**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAl:TSEQUence TSC0|TSC1|
TSC2|TSC3|TSC4|TSC5|TSC6|TSC7|<78 bit_pattern>
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:NORMAl:TSEQUence?
```

This command sets the 78-bit training sequence code for a normal timeslot to one of eight values or to create a custom value.

**\*RST**                    #H3F3F9E49FFF3FF3F9E49  
**Range**                   <78 bit\_pattern>: #H0–#H3FFFFFFFFFFFFFFFFFFFFF  
**Key Entry**              TSC0    TSC1    TSC2    TSC3    TSC4    TSC5    TSC6    TSC7  
                            Custom TS

**:SLOT0|[1]|2|3|4|5|6|7:LCAPacity:POWer**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:POWer MAIN|DELTA
[:SOURCE]:RADio:EDGE:SLOT0|[1]|2|3|4|5|6|7:POWer?
```

This command toggles the RF output power level function for the selected timeslot.

**MAIN**                    This choice specifies RF output as the main power level.  
**DELTA**                   This choice specifies RF output as the alternative power level.  
**\*RST**                    MAIN  
**Key Entry**              Timeslot Ampl Main Delta

**:SLOT0|[1]|2|3|4|5|6|7:STATe****Supported** E4438C with Option 402

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:STATe ON|OFF|1|0

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7:STATe?

This command enables or disables the operating state of the selected timeslot.

**\*RST** Timeslot 0: 1 Timeslots 1–7: 0**Key Entry** Timeslot Off On**:SLOT0|[1]|2|3|4|5|6|7[:TYPE]****Supported** E4438C with Option 402[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7[:TYPE] CUSTOm|NORMAl|GMSK|  
NORMAL\_ALL

[:SOURCE]:RADIO:EDGE:SLOT0|[1]|2|3|4|5|6|7[:TYPE]?

This command sets the timeslot type for the selected timeslot.

**CUSTOm** This choice selects a generic, non-standard timeslot configuration that consists of a data field and a guard field.**NORMAl** This choice selects a normal timeslot configuration for an EDGE signal.**GMSK** This choice selects a normal GSM timeslot (GMSK modulation). Selecting a different EDGE modulation type does not change the GMSK modulation for a GMSK configured timeslot.**NORMAL\_ALL** This choice sets all timeslots to a normal timeslot configuration for an EDGE signal, regardless of the timeslot number selected.**\*RST** NORM**Key Entry** Custom Normal GMSK Normal All



**:SOUT:**

**Supported**            E4438C with Option 402

```
[:SOURce]:RADio:EDGE:SOUT FRAME | SLOT | ALL
[:SOURce]:RADio:EDGE:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME**                This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT**                 This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL**                  This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST**                 FRAME

**Key Entry**           **Begin Frame        Begin Timeslot #       All Timeslots**

**Remarks**            To change the synchronization output offset value, refer to “[:SOUT:OFFSet” on [page 657](#).

**:SOUT:OFFSet**

**Supported**            E4438C with Option 402

```
[:SOURce]:RADio:EDGE:SOUT:OFFSet <val>
[:SOURce]:RADio:EDGE:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed in bits.

**\*RST**                 +0

**Range**                -155 to 155

**Key Entry**           **Sync Out Offset**

**Remarks**            Negative values move the synchronization output signal earlier; positive values move it later.

To change the output of the EVENT1 rear panel connector to SLOT, refer to “[:SOUT:” on [page 657](#).

**:SOUT:SLOT**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:EDGE:SOUT:SLOT <val>

[ :SOURCE ] :RADio:EDGE:SOUT:SLOT?

This command selects the timeslot that will trigger a 1-bit output signal at the EVENT 1 rear panel connector.

**\*RST** +0

**Range** 0–7

**Key Entry** **Begin Timeslot #**

**Remarks** To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT:” on page 657.

**:SRATe**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:EDGE:SRATe <val>

[ :SOURCE ] :RADio:EDGE:SRATe?

This command sets the transmission symbol rate.

The variable <val> is expressed in units of symbols per second (sps–Msps) and the maximum range value depends on the modulation type, and filter.

---

**NOTE** When using EDGE and GMSK, or multiframe EDGE, limit the symbol rate to no more than 271 ksps. Although higher rates may work, they are not supported.

---

**\*RST** +2.70833333E+005

**Range**

Modulation Type	Bits per Symbol	Internal Data		
BPSK	1	1sps–50 Msps		
FSK2				
MSK				
C4FM	2	1sps–50 Msps		
FSK4				
OQPSK				
OQPSK195				
P4QPPSK				
QAM4				
QPSK				
QPSKIS95				
GRAYQPSK				
D8PSK			3	1sps–33.33 Msps
EDGE				
FSK8				
PSK8				
FSK16	4	1sps–25 Msps		
PSK16				
QAM16				
QAM32	5	1sps–20 Msps		
QAM64	6	1sps–16.67 Msps		
QAM256	8	1sps–12.50 Msps		

**Key Entry**

**Symbol Rate**

**Remarks**

When user-defined filters are selected using the command in section “:FILTer” on page 634, the upper bit rate will be restricted in line with the following symbol rate restriction:

- FIR filter length > 32 symbols: upper limit is 12.5 Msps
- FIR filter length > 16 symbols: upper limit is 25 Msps

When internal FIR filters are used, the limits of the above table always apply. For higher symbol rates, the FIR filter length will be truncated as follows:

- Above 12.5 Msps, the FIR length will be truncated to 32 symbols
- Above 25 Msps, the FIR length will be truncated to 16 symbols

This will impact the relative timing of the modulated data, as well as the actual filter response.

When the symbol rate is changed, the ESG will reconfigure the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 637.

---

<b>NOTE</b>	In the EDGE format with a GMSK modulated timeslot, the maximum symbol rate is 25 Msps for up to 16 symbol wide filters. For 32 symbol wide filters, the limit is 12.5 Msps.
-------------	---

---

## :TRIGger:TYPE

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:TRIGger:TYPE CONTinuous | SINGle | GATE
[ :SOURCE ] :RADio:EDGE:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTinuous** The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTinuous[:TYPE]” on page 660.

**SINGle** The framed data sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST** CONT

**Key Entry**      **Continuous**      **Single**      **Gated**

## :TRIGger:TYPE:CONTinuous[:TYPE]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:TRIGger:TYPE:CONTinuous [ :TYPE ] FREE | TRIGger | RESet
[ :SOURCE ] :RADio:EDGE:TRIGger:TYPE:CONTinuous [ :TYPE ] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 660.

The following list describes the waveform’s response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.
<b>*RST</b>	FREE
<b>Key Entry</b>	<b>Free Run      Trigger &amp; Run      Reset &amp; Run</b>

**:TRIGger:TYPE:GATE:ACTive**

**Supported**      E4438C with Option 402

```
[ :SOURce] :RADio:EDGE:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[ :SOURce] :RADio:EDGE:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 660.

The following list describes the ESG’s gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
<b>*RST</b>	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

**:TRIGger[:SOURCE]**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] KEY | EXT | BUS

[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] ?

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 660. The following list describes the command choices:

**KEY** This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

**EXT** An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTErnal[:SOURCE]” on page 665.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 661
  - continuous and single modes, see “:TRIGger[:SOURCE]:EXTErnal:SLOPe” on page 664
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURCE]:EXTErnal:DELAy” on page 663
  - turning the delay on, see “:TRIGger[:SOURCE]:EXTErnal:DELAy:STATe” on page 664

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

**Key Entry**      **Trigger Key**      **Ext**      **Bus**

## **:TRIGger[:SOURCE]:EXtErnal:DELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXtErnal:DELay <val>  
[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXtErnal:DELay?
```

This command sets the number of bits to delay the ESG's response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “[:TRIGger\[:SOURCE\]:EXtErnal:DELay:STATe](#)” on [page 664](#). You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURCE\]](#)” on [page 662](#).

### **Example**

```
:RAD:CUST:TRIG:EXT:DELay 200000
```

The preceding example sets the delay for an external trigger for 200K bits.

**\*RST** +0

**Range** 0–1048575

**Key Entry** **Ext Delay Bits**

**Remarks** For most TDMA formats, there is one bit per symbol. However, there are 3 bits per symbol for the EDGE format. If the selected number of delay bits is not a multiple of the number of bits per symbol, the entered value is rounded down to the next whole symbol value.

## **:TRIGger[:SOURCE]:EXtErnal:DELay:FINE**

**Supported** E4438C with Option 416

```
[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXtErnal:DELay:FINE <val>  
[ :SOURCE ] :RADio:EDGE:TRIGger [ :SOURCE ] :EXtErnal:DELay:FINE?
```

This command sets the fine trigger delay for synchronizing the ESG.

The fine delay value is added to the coarse delay setting (see “[:TRIGger\[:SOURCE\]:EXtErnal:DELay](#)” on [page 663](#)).

The variable <val> is expressed as a fraction of one symbol. For the EDGE format, there are 3 bits per symbol.

**EDGE Subsystem—Option 402 (:SOURce):RADio:EDGE)**

**\*RST** +0.00000000E+000

**Range** 0–1

**:TRIGger[:SOURce]:EXTErnal:DELAy:STATe**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTErnal:DELAy:STATe ON|OFF|1|0  
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTErnal:DELAy:STATe?

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURce]:EXTErnal:DELAy” on page 663, and for more information on configuring an external source, see “:TRIGger[:SOURce]” on page 662.

**\*RST** 0

**Key Entry** Ext Delay Off On

**:TRIGger[:SOURce]:EXTErnal:SLOPe**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTErnal:SLOPe POSitive|NEGative  
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTErnal:SLOPe?

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 661.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 662.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos



## **:TRIGger[:SOURce]:EXTeRnal[:SOURce]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTeRnal [ :SOURce ] EPT1 | EPT2 |
EPTRIGGER1 | EPTRIGGER2
[ :SOURce ] :RADio:EDGE:TRIGger [ :SOURce ] :EXTeRnal [ :SOURce ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 662. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

## **[:STATe]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:EDGE [ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :RADio:EDGE [ :STATe ] ?
```

This command enables or disables the EDGE modulation format.

**\*RST**                    0

**Key Entry**            **EDGE Off On**

**Remarks**            Although the EDGE modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.



---

## 9 Receiver Test Digital Commands (continued)

This chapter provides a continuation of SCPI descriptions for commands dedicated to digital real-time testing using the E4438C ESG Vector Signal Generator. This chapter contains the following sections:

- “3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])” on page 668
- “Real Time GPS Subsystem–Option 409 ([:SOURCE]:RADio[1]|2|3|4:GPS)” on page 763
- “Real Time MSGPS Subsystem–Option 409 ([:SOURCE]:RADio[1]|2|3|4:MSGPs)” on page 770
- “GSM Subsystem–Option 402 ([:SOURCE]:RADio:GSM)” on page 773
- “HSDPA over W-CDMA Subsystem–Option 418 ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])” on page 812
- “NADC Subsystem–Option 402 ([:SOURCE]:RADio[:NADC])” on page 874
- “PDC Subsystem–Option 402 ([:SOURCE]:RADio:PDC)” on page 908
- “PHS Subsystem–Option 402 ([:SOURCE]:RADio:PHS)” on page 941
- “TETRA Subsystem–Option 402 ([:SOURCE]:RADio:TETRa)” on page 977
- “Wideband CDMA Base Band Generator Subsystem–Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])” on page 1020

---

## **3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

The commands in this subsystem support the remote functionality of the Signal Studio for 3GPP W-CDMA HSPA software. For a complete description of terms and HSPA functionality, refer to the software online help. Commands used for configuring the carrier signal and performing general signal generator functions are located in different SCPI command subsystems found within the SCPI Command Reference volumes.

There are two methods to determine the SCPI commands for a setup. One method is to locate each individual command listed in this subsystem and others within the *SCPI Command Reference* volumes. The other method is to use the HSPA software UI. After downloading a UI setup to the ESG, the software lets you export a SCPI file that contains the commands used in the UI setup. Refer to the HSPA software online help for information on this feature.

### **File Overview**

The ESG's memory catalog (signal generator memory) uses several file types, each assigned with a unique syntax to recall the file. This section provides information on using files with SCPI commands.

This subsystem uses the following two command variables to represent two different file types stored in signal generator memory:

"<file name>"      Bit file  
"<user FIR>"      FIR file

For more information on managing and using files, refer to the resources in the following list:

- [“File Name Variables” on page 13](#) for information on the file name syntax
- [Table 1-4 on page 14](#) for a listing of the different file types
- ESG Signal Generator *Programming Guide* for information on downloading bit files
- ESG Signal Generator *User's Guide* for information on creating and editing bit and FIR files using the signal generator

The HSPA software interface downloads user files (bit and FIR file types) to the ESG when **USER** is the software data or filter type selection. You can see these files on the ESG by pressing **Utility > Memory Catalog > Catalog Type** and then selecting the file type, or by using the SCPI commands located in the Memory subsystem. User files are located on the ESG in the following directory path: /USER/<file type directory>/<file name>. Table 9-1 shows the software naming convention for the different files created by the HSPA software.

**Table 9-1 HSPA Software Downloaded File Names**

Link Direction	Data Source	File Name	ESG File Type
Downlink and Uplink	Filter	<project name>-FIR	FIR
Downlink	BCH	<project name>-BCH	Bit
	PICH	<project name>-PICH	
	DCH	<project name>-DCH	
	DPCH	<project name>-DPCH	
	DCH <sub>x</sub> <sup>a</sup>	<project name>-DCH <sub>x</sub> <sup>a</sup>	
	Inter-TTI	<project name>-ITTI <sub>x</sub> <sup>b</sup>	
	HARQ ACK/NACK Pattern	<project name>-DLCP	
	AMC CQI Pattern	<project name>-DLAPT	
	HS-DSCH	<project name>-DSCH1	
	HS-PDSCH	<project name>-HSPD <sub>x</sub> <sup>b</sup>	
	HS-SCCH	<project name>-HSSCC <sub>x</sub> <sup>b</sup>	
	E-AGCH Absolute Grant Scope	<project name>-EAGCH_AGS	
	E-AGCH Absolute Grant Value	<project name>-EAGCH_AGV	
	E-RGCH	<project name>-ERGCH	
E-HICH	<project name>-EHICH		

**Table 9-1 HSPA Software Downloaded File Names**

Link Direction	Data Source	File Name	ESG File Type
Uplink	DPCCH	<project name>-DPCCH	Bit
	FBI	<project name>-FBI	
	TPC	<project name>-TPC	
	DPDCH	<project name>-DPDCH	
	DCHx <sup>a</sup>	<project name>-DCHx <sup>a</sup>	
	ACK Pattern	<project name>-APAT	
	CQI Pattern	<project name>-CPAT	
	EDPCCH Pattern	<project name>-EDPCCH	
	EDPDCH Pattern	<project name>-EDPDCH	
	EDCH Pattern	<project name>-EDCH	
	EDPDCH (alternate) Pattern	<project name>-EDCHA	
	HARQ ACK Pattern	<project name>-UAPT	
	TFC E-TFCI User Pattern	<project name>-UETT	
	Happy Bit Pattern	<project name>-HBIT	
EXT Pattern	<project name>-EPAT		

a. x is the DCH number (1–6).

b. x is the channel number (1–4) for the HSDPA, the HS-PDSCH and the HS-SCCH.

## Managing ESG Setting Conflicts and Error Messages

The ESG reports setting conflicts as error messages. When a setting conflict occurs, an error number and a brief message appear at the bottom of the ESG display. You can view the full text of the error message in either of two ways: by using the front panel of the ESG, or by executing SCPI commands.

Front Panel      Press **Utility > Error Info**.

SCPI              Execute the SCPI error commands described in the “[System Subsystem \(:SYSTEM\)](#)” on page 154.

For more information on Error messages, refer to the signal generator *Programming Guide* for remote viewing or the signal generator *User's Guide* for front panel viewing.

## **:DLINK:APPLY**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:APPLY  
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:APPLY?
```

This command applies changes to the channel setup and data for active downlink physical and transport channels, immediately starting the channel coding generation process. A progress bar may appear on the ESG display indicating that the new signal parameters are being applied. Signal parameters are also applied when the modulation format is turned on.

Use the query to determine whether or not execution of this command is required. It returns the following responses:

0	Command execution is not required.
1	Command execution is required.

---

**NOTE** The apply query response is valid only when downlink HSPA format is active.

---

The apply function will not work if there is a conflict with range values and coupled parameters. For example, if all the physical channel codes are not orthogonal to each other, the new settings are not applied to the signal when this command is executed. Resolve any conflicts before reapplying the changes. The ESG reports an error when conflicts occur.

## **:DLINK:AWGN:CN**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:AWGN:CN <val>  
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:AWGN:CN?
```

This command sets the downlink in-band carrier to noise ratio (C/N) value using AWGN.

**\*RST** 0

**Range** -30 to 30

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])**:DLINK:AWGN[:STATe]****Supported** E4438C with Option 419[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:AWGN[:STATe] ON|OFF|0|1  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:AWGN[:STATe]?

This command turns the downlink AWGN on or off.

**\*RST** 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:BBCLock[:SOURCE]****Supported** E4438C with Option 419[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:BBCLock[:SOURCE]  
{INTernal}|EXTernal  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:BBCLock[:SOURCE]?

This command selects the downlink baseband generator chip clock source, which is either internal to the signal generator or applied externally.

**\*RST** INT**Remarks** When using an external chip clock source, connect the signal to the DATA CLOCK connector on the front panel of the ESG.**:DLINK:CPICH:CCODE****Supported** E4438C with Option 419

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:CPICH:CCODE?

This query returns the CPICH channelization code, which is always set to zero.



### **:DLINK:CPICH:POWER**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:CPICH:POWER <val>

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:CPICH:POWER?

This command sets the CPICH power level. The variable <val> is expressed in decibels (dB).

**\*RST** 3.30000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:CPICH[:STATE]**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:CPICH [ :STATE ] ON | OFF | 1 | 0

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:CPICH [ :STATE ] ?

This command turns the CPICH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:DPCH:CCODE**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:CCODE <val>

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:CCODE?

This command sets the downlink DPCH channel code number.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])

<b>*RST</b>	10
<b>Range</b>	0–511
<b>Remarks</b>	<p>Setting the command parameter while the signal is active also requires executing the apply command. Refer to “<a href="#">:DLINK:APPLY</a>” on page 671.</p> <p>The channel code is coupled with the slot format and all other physical channel codes. If the channel code exceeds the limits of the slot format or if it is not orthogonal with all other physical channel codes, the apply function (downlink apply command) will not work. If any channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.</p>

**:DLINK:DPCH:DATA**

<b>Supported</b>	E4438C with Option 419
	<pre>[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:DATA PN9   PN15   FIX4   DCH   "&lt;file name&gt;" [ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:DATA?</pre>
	This command configures the downlink DPCH data pattern.
DCH	This selects the transport channel as the data source. The DCH selection is not available for a DPCH slot format of 16.
"<file name>"	This represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “ <a href="#">File Overview</a> ” on page 668 for more information on files.
<b>*RST</b>	PN9
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “ <a href="#">:DLINK:APPLY</a> ” on page 671.

**:DLINK:DPCH:DATA:FIX4**

<b>Supported</b>	E4438C with Option 419
	<pre>[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:DATA:FIX4 &lt;val&gt; [ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:DATA:FIX4?</pre>
	This command sets the downlink DPCH repeating 4-bit binary data pattern.
	The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

<b>*RST</b>	0
<b>Range</b>	0–15
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:BSIZE**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6  
:BSIZE <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :BSIZE?
```

This command sets the block size for the selected downlink DCH.

<b>*RST</b>	20
<b>Range</b>	0–5000
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.  The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the ESG calculates the product of the block size and the number of blocks. If the product of these two parameters exceeds 200,000, the apply function (downlink apply command) will not work.

**:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:CRC**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CRC 0 | 8 |  
12 | 16 | 24  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CRC?
```

This command sets the number of CRC bits for the selected downlink DCH.

<b>*RST</b>	8
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:DPCH:DCH[1]|2|3|4|5|6:CTYPE****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [1] | 2 | 3 | 4 | 5 | 6 :CTYPE
HCONv | TCONv | TURBo | NONE
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [1] | 2 | 3 | 4 | 5 | 6 :CTYPE?
```

This command sets the coder type for the selected downlink DCH.

HCONv This choice selects the 1/2 rate convolutional encoder.

TCONv This choice selects the 1/3 rate convolutional encoder.

TURBo This choice selects the turbo coder.

NONE This choice selects no coding.

**\*RST** HCON

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:DPCH:DCH[1]|2|3|4|5|6:DATA****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [1] | 2 | 3 | 4 | 5 | 6 :DATA PN9 |
PN15 | FIX4 | "<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [1] | 2 | 3 | 4 | 5 | 6 :DATA?
```

This command configures the data for the selected downlink DCH.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “File Overview” on page 668 for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

## **:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:FIX4**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA:  
FIX4 <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA:FIX4?
```

This command sets the repeating 4-bit binary data pattern for the selected downlink DCH. The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

## **:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:NBLocks**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :  
NBLocks <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :NBLocks?
```

This command sets the number of data blocks for the selected downlink DCH.

**\*RST** 1

**Range** 0–512

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the ESG calculates the product of the block size and the number of blocks. If the product of these two parameters exceeds 200,000, the apply function (downlink apply command) will not work.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:RMATtribute****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:RMATtribute &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:RMATtribute?

This command sets the rate matching attribute for the selected downlink DCH.

**\*RST** 1**Range** 1–256**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:TTI****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:TTI 10 | 20 | 40 | 80

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:TTI?

This command sets the TTI for the selected downlink DCH.

The choices are expressed in millisecond (ms).

**\*RST** 10**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6[:STATe]****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6[:STATe] ON | OFF | 1 | 0

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6[:STATe] ?

This command turns the selected downlink DCH on or off; DCH1 is always on.

**\*RST**                    DCH 1: 1    DCH 2–6: 0

**Remarks**             Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

The apply command will not work and the ESG will report an error if you turn on a DCH where lower numbered DCHs are off. For example, turning on DCH5 requires turning on DCH2–4. The reverse is true when turning off the DCHs.

### **:DLINK:DPCH:POWer**

**Supported**            E4438C with Option 419

```
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:POWer <val>  
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:POWer?
```

This command sets the downlink DPCH power level.

**\*RST**                    –1.02000000E+001

**Range**                 –40 to 0

**Remarks**             Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:DPCH:SFORmat**

**Supported**            E4438C with Option 419

```
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:SFORmat <val>  
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:SFORmat?
```

This command configures the downlink DPCH slot format.

**\*RST**                    0

**Range**                 0–16

**Remarks**             Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

The slot format is coupled with the channel code, so a change in one value may require a change in the other. If the channel code exceeds the limits of the slot format or if it is not orthogonal with all other physical channel codes, the apply function (downlink apply command) will not work.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:DLINK:DPCH:SSCoffset****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:SSCoffset &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:SSCoffset?

This command sets the downlink DPCH secondary scrambling code offset.

**\*RST** +0**Range** 0–15**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:DPCH:TFCI****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:TFCI &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:DPCH:TFCI?

This command sets the TFCI 10-bit pattern for the downlink DPCH.

The variable &lt;val&gt; accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** +0**Range** 0–1023**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

Setting the TFCI bits is optional; they describe the type of service in use, for example voice or data.



### **:DLINK:DPCH:TOFFset**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:TOFFset <val>  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:TOFFset?
```

This command adjusts the downlink DPCH timing offset.

The variable <val> is expressed in chips.

**\*RST** +0

**Range** 0–149

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

### **:DLINK:DPCH:TPC:NSTeps**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:TPC:NSTeps <val>  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:TPC:NSTeps?
```

This command sets the number of steps for the down and up (DUP) or up and down (UDOWn) TPC pattern selections.

**\*RST** +1

**Range** 1–80

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

### **:DLINK:DPCH:TPC:PATtern**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:TPC:PATtern UDOWn | DUP | UALL |  
DALL | "<file name>"  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:DPCH:TPC:PATtern?
```

This command configures the downlink DPCH TPC pattern for increasing or decreasing, or increasing and decreasing the UE power level.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

UDOWN	The TPC pattern repetitively steps up and down.
DUP	The TPC pattern repetitively steps down and up.
UALL	The TPC pattern consecutively steps up.
DALL	The TPC pattern consecutively steps down.
"<file name>"	This variable represents a TPC pattern file stored in signal generator memory. The pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “ <a href="#">File Overview</a> ” on page 668 for more information on files.
<b>*RST</b>	UDOW
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “ <a href="#">:DLINK:APPLY</a> ” on page 671.  Each step in a TPC pattern signals an increase or decrease of 1 dB in the UE output power level.

**:DLINK:DPCH:TRPosition**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH:TRPosition?

This query returns the downlink DPCH transport channel position that is always set to FIX.

**:DLINK:DPCH[:STATe]**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH [ :STATe ] ON | OFF | 1 | 0

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:DPCH [ :STATe ] ?

This command turns the downlink DPCH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

## **:DLINK:EAGCh:AGScope**

**Supported**            E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:EAGCh:AGScope ALL_0|ALL_1|
"<file name>"
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:EAGCh:AGScope?
```

This command sets an absolute scope pattern.

ALL\_0, ALL\_1        These choices configure an absolute grant scope pattern.

"<file name>"        This variable represents an absolute scope pattern value. Create this file either by using the absolute grant scope pattern Data Type Entry window and downloading the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- absolute grant scope of 1, 0 using a 1-bit pattern, 1, 0. In the file, do not use delimiters between subframes; enter subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes, up to 1,280, which are numbered from 0 to 1,279. A subframe is active when it contains 1 bit.

**\*RST**                ALL\_0

**Remarks**            Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

## **:DLINK:EAGCh:AGValue**

**Supported**            E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:EAGCh:AGValue
ALL_0|ALL_1|ALL_2|ALL_3|ALL_4|ALL_5|ALL_6|ALL_7|ALL_8|ALL_9|ALL_10|ALL_11|
ALL_12|ALL_13|ALL_14|ALL_15|ALL_16|ALL_17|ALL_18|ALL_19|ALL_20|ALL_21|
ALL_22|ALL_23|ALL_24|ALL_25|ALL_26|ALL_27|ALL_28|ALL_29|ALL_30|ALL_31|
"<file name>"
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:DLINK:EAGCh:AGValue?
```

This command sets an absolute grant value pattern.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])

ALL\_1 to ALL\_31 These choices configure an absolute grant value pattern.

"<file name>" This variable represents an absolute grant pattern value. Create this file either by using the absolute grant value pattern Data Type Entry window and downloading the file to the ESG or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- absolute grant value of 0– 31 using an 8-bit pattern, 00000000 to 00011111  
In the file, do not use delimiters between subframes; enter subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes, up to 1,280, which are numbered from 0 to 1,279. A subframe is active when it contains 8 bits. If a subframe contains at least 1 bit, but less than 8 bits, the apply function (downlink apply command) will not work.

**\*RST** ALL\_0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:EAGCh:CCODE**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh:CCODE <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh:CCODE?
```

This command sets the downlink E-AGCH channel code number.

**\*RST** 14

**Range** 0–127

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

The channel code is coupled with the slot format and all other physical channel codes. Set the channel code so it does not exceed the limits of the slot format and ensure that all physical channel codes are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

### **:DLINK:EAGCh:ERNTI**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh:ERNTI <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh:ERNTI?
```

This command sets E-RNTI (E-DCH Radio Network Temporary Identifier).

**\*RST** 0

**Range** 0–255

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

### **:DLINK:EAGCh:Power**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh:POWER <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh:POWER?
```

This command sets the power level for the E-AGCH.

**\*RST** –20.00000000E+000

**Range** –40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

### **:DLINK:EAGCh[:STATe]**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh [ :STATe ] ON | OFF | 1 | 0  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:EAGCh [ :STATe ] ?
```

This command turns the downlink E-AGCH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:EHICH:CCODE****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:CCODE &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:CCODE?

This command sets the downlink E-HICH channel code number.

**\*RST** 5**Range** 0–127**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

The channel code is coupled with the slot format and all other physical channel codes. Set the channel code so it does not exceed the limits of the slot format and ensure that all physical channel codes are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

**:DLINK:EHICH:INDicator****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:INDicator

ALL\_1|ALL\_0|ALL\_M1|"&lt;file name&gt;"

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:INDicator?

This command sets a HARQ acknowledgement indicator pattern.

ALL\_&lt;val&gt; These choices configure an HARQ acknowledgement indicator pattern.

"<file name>" This variable represents an HARQ pattern file stored in signal generator memory. Create this file either by using the HARQ pattern Data Type Entry window and downloading the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

HARQ pattern of 1, 0, –1 using at 2-bit pattern: 01, 00, 10.

In the file, do not use delimiters between subframes; enter the subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes, from 1 to 1,280. The subframes are numbered 0 to 1,279. A subframe is active when it contains 1 bit.

**\*RST** ALL\_1  
**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:EHICH:POWER**

**Supported** E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:POWER <val>  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:POWER?

This command sets the power level for the E-HICH.

**\*RST** -20.00000000E+000  
**Range** -40 to 0  
**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:EHICH:SSINDEX**

**Supported** E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:SSINDEX <val>  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:SSINDEX?

This command sets the downlink E-HICH signature sequence index number.

**\*RST** 0  
**Range** 0–39  
**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:EHICH:TOFFSET**

**Supported** E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:TOFFSET <val>  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:EHICH:TOFFSET?

This command adjusts the downlink E-HICH timing offset (tE-HICH).

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])

<b>*RST</b>	–17920
<b>Range</b>	–17920, –10240, 5120, 12800, 20480, 28160, 43520, 51200
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:EHICH[:STATE]**

**Supported** E4438C with Option 419

```
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : EHICH [ : STATE ] ON | OFF | 1 | 0
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : EHICH [ : STATE ] ?
```

This command turns the downlink E-HICH on or off.

<b>*RST</b>	1
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:ERGCh:CCODE**

**Supported** E4438C with Option 419

```
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh : CCODE <val>
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh : CCODE ?
```

This command sets the downlink E-RGCH channel code number.

<b>*RST</b>	6
<b>Range</b>	0–127
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:ERGCh:POWER**

**Supported** E4438C with Option 419

```
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh : POWER <val>
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh : POWER ?
```

This command sets the power level for the E-ERGCH.



**3GPP W-CDMA HSPA Subsystem—Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

<b>*RST</b>	–20.00000000E+000
<b>Range</b>	–40 to 0
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:ERGCh:RGValue**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:ERGCh:RGValue
ALL_1|ALL_0|ALL_M1|"<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:ERGCh:RGValue?
```

This command sets a relative grant pattern.

ALL\_<val> These choices configure a relative grant value pattern

"<file name>" This variable represents a relative grant value pattern file stored in signal generator memory. Create this file either by using the relative grant value pattern Data Type Entry window and downloading the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- relative grant value pattern of 1, 0, –1 using at 2-bit pattern: 01, 00, 10. In the file, do not use delimiters between subframes; enter subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes, from 1 to 1,280. The subframes are numbered 0 to 1,279. A subframe is active when it contains 1 bit.

**\*RST** ALL\_1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:ERGCh:SSINDEX**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:ERGCh:SSINDEX <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:ERGCh:SSINDEX?
```

This command sets the downlink E-RGCH signature sequence index number.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

<b>*RST</b>	0
<b>Range</b>	0–39
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:ERGCh:TOFFset**

**Supported** E4438C with Option 419

```
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh : TOFFset <val>
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh : TOFFset ?
```

This command adjusts the downlink E-RGCH timing offset (tE-RGCH).

The variable <val> is expressed in chips.

<b>*RST</b>	–17920
<b>Range</b>	–17920, –10240, 5120, 12800, 20480, 28160, 43520, 51200
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:ERGCh[:STATe]**

**Supported** E4438C with Option 419

```
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh [ : STATE ] ON | OFF | 1 | 0
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : ERGCh [ : STATE ] ?
```

This command turns the downlink E-RGCH on or off.

<b>*RST</b>	0
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:FILTer**

**Supported** E4438C with Option 419

```
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : FILTer RNYQuist | NYQuist |
GAUSSian | RECTangle | IS95 | IS95_EQ | IS95_MOD | IS95_MOD_EQ | AC4Fm | UGaussian |
"<user FIR>"
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : DLINK : FILTer ?
```

This command selects the downlink filter type.

IS95	This filter meets the criteria of the IS-95 standard.
IS95_EQ	This filter is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard and is best suited for IS-95 baseband filtering.
IS95_MOD	This filter meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This filter is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
UGGaussian	This is a GSM Gaussian filter with a fixed BbT value of 0.300.
AC4Fm	This is a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
"<user FIR>"	This variable represents any FIR filter file stored in signal generator memory. Refer to <a href="#">“File Overview” on page 668</a> for more information on files.
<b>*RST</b>	RNYQ
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:DLINK:APPLY” on page 671</a> .

### **:DLINK:FILTer:ALPHa**

<b>Supported</b>	E4438C with Option 419
	[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:FILTer:ALPHa <val> [ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:FILTer:ALPHa?
	This command sets the downlink Nyquist or root Nyquist filter alpha value.
<b>*RST</b>	+2.20000000E-001
<b>Range</b>	0-1
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:DLINK:APPLY” on page 671</a> .  Executing this command while a filter other than Nyquist or root Nyquist is selected changes the parameter value, but it is not used by the signal generator until one of the Nyquist filters is selected.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:FILTer:BBT**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:FILTer:BBT <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:FILTer:BBT?
```

This command sets the downlink Gaussian filter BbT value.

**\*RST** +5.00000000E-001

**Range** 0–1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

Executing this command while a filter other than the Gaussian filter is selected changes the parameter value, but it is not used by the signal generator until the Gaussian filter is selected.

**:DLINK:FILTer:CHANnel**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:FILTer:CHANnel EVM|ACP
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:FILTer:CHANnel?
```

Execute this command to optimize a downlink filter for minimized EVM or for minimized ACP.

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection for the root Nyquist and Nyquist filters.

**\*RST** EVM

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

To change the filter selection, refer to “:DLINK:FILTer” on page 690.

**:DLINK:HSBurst**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSBurst ON|OFF|1|0
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSBurst?
```

This command sets the handling of the off slot periods for the downlink HSDPA channels.

ON 1	This choice turns off the ESG ALC feature and uses DTX during the off slots.
OFF 0	This choice continuously transmits the HSDPA channels filling the off slots with dummy bits.
<b>*RST</b>	0
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:HSDPa:AMC:CQIMapping:UECategory**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:AMC:CQIMapping:
UECategory <val>
```

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:AMC:CQIMapping:UECategory?
```

This command sets the UE category that determines the CQI mapping table per the 3GPP standards.

**\*RST** 5

**Range** 1–12

**Remarks** To use this command's parameter in a setup, you must also set AMC as the feedback selection. Refer to the “:DLINK:HSDPa:FCONtrol” on page 694 for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:HSDPa:AMC:CPATtern**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:AMC:CPATtern ALL_1 | ALL_2 |
ALL_3 | ALL_4 | ALL_5 | ALL_6 | ALL_7 | ALL_8 | ALL_9 | ALL_10 | ALL_11 | ALL_12 | ALL_13 |
ALL_14 | ALL_15 | ALL_16 | ALL_17 | ALL_18 | ALL_19 | ALL_20 | ALL_21 | ALL_22 | ALL_23 |
ALL_24 | ALL_25 | ALL_26 | ALL_27 | ALL_28 | ALL_29 | ALL_30 | "<file_name>"
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:AMC:CPATtern?
```

This command sets a simulated UE CQI pattern that determines HSDPA1's response including the modulation type (QPSK or 16QAM) and the constellation version for 16QAM per the set UE category.

ALL\_1 to ALL\_30 These choices configure a simulated UE ACK response with a single CQI value for 1,280 subframes.

"<file name>" This variable represents a CQI pattern file stored in signal generator memory.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])**

Create this file either by using the AMC CQI pattern Data Type Entry window and downloading the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- CQI value of 1–30 using an 8-bit pattern, 00000001 to 00011110
- DTX is represented by 11111111

In the file, do not use delimiters between subframes; enter subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes from 1 to 1,280. The subframes are numbered 0 to 1,279. A subframe is active when it contains 8-bits. If a subframe contains at least 1-bit but less than 8-bits, the apply function (downlink apply command) will not work.

**\*RST** ALL\_21

**Remarks** To use this command's parameter in a setup, you must also set AMC as the feedback selection. Refer to the “[:DLINK:HSDPa:FCONtrol](#)” on page 694 for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:HSDPa:FCONtrol**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:FCONtrol NONE | HARQ | AMC
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:FCONtrol ?
```

This command sets the HSDPA1 feedback control type.

**NONE** This choice turns off the feedback control.

**HARQ** This choice provides UE feedback using the HARQ process. This selection provides the capability of configuring a simulated UE ACK/NACK response, setting the maximum number of HARQ transmissions, and providing up to eight different RV parameters.

**AMC** This choice provides UE feedback using adaptive modulation coding. This selection provides the capability of configuring a simulated UE CQI response aligned with a UE category input.

**\*RST** NONE

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

## **:DLINK:HSDPa:HARQ:APATtern**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:HARQ:APATtern ACK_ALL |  
"<file name>"  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:HARQ:APATtern?
```

This command sets a simulated UE ACK/NACK pattern that determines HSDPA1's HARQ response.

**ACK\_ALL** This choice configures 1,280 subframes for a simulated ACK only response.

"<file name>" This variable represents an ACK pattern file stored in signal generator memory. Create this file either by using the HARQ ACK/NACK pattern Data Type Entry window and download the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- An ACK response is represented by 00.
- A NACK response is represented by 01.
- DTX is represented by 10.

In the file, do not use delimiters between subframes; enter subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes from 1 to 1,280. The subframes are numbered 0 to 1,279. A subframe is active when it contains 2-bits. If a subframe contains only 1-bit, the apply function (downlink apply command) will not work.

**\*RST** ACK\_ALL

**Remarks** To use this command's parameter in a setup, you must also set HARQ as the feedback selection. Refer to the “[:DLINK:HSDPa:FCONtrol](#)” on page 694 for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:HSDPa:HARQ:MNHTrans****Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa:HARQ:MNHTrans <val>
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa:HARQ:MNHTrans?
```

This command configures the HSDPA1 maximum number of HARQ transmissions for the HARQ function.

Use the command for UE performance testing or for specifying an arbitrary number of HARQ transmissions. When the software encounters a UE NACK response that is set by the HARQ ACK pattern command (see “[:DLINK:HSDPa:HARQ:APATern](#)” on page 695), the software re-sends the same packet payload until either the maximum number of HARQ transmissions is reached or a simulated ACK response is encountered. Whenever the software re-sends the same packet payload, it also transmits another RV parameter that is configured by the RV sequence command.

**\*RST** 1**Range** 1–8

**Remarks** To use this command's parameter in a setup, you must also set HARQ as the feedback selection. Refer to the “[:DLINK:HSDPa:FCONtrol](#)” on page 694 for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:HSDPa:HARQ:RVSequence[1]|2|3|4|5|6|7|8****Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa:HARQ:RVSequence [1] | 2 | 3 | 4 |
5 | 6 | 7 | 8 <val>
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa:HARQ:RVSequence [1] | 2 | 3 | 4 |
5 | 6 | 7 | 8?
```

This command sets the HSDPA1 RV parameter sequence used with the maximum number of HARQ transmission setting. You can set eight different RV parameters for the RV sequence.

During simulated ACK responses, the software uses the first RV parameter. When the software encounters a simulated NACK response, it sends data using the next RV parameter. The software keeps incrementing to the next RV parameter in the sequence until it receives a simulated ACK response. When the software encounters an ACK response, the RV sequence resets to the first RV parameter.



<b>*RST</b>	0
<b>Range</b>	0–7
<b>Remarks</b>	<p>To use this command's parameter in a setup, you must also set HARQ as the feedback selection. Refer to the “:DLINK:HSDPa:FCONtrol” on page 694 for selecting the feedback type.</p> <p>Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.</p>

### **:DLINK:HSDPa[1] | 2 | 3 | 4:BSINfo**

<b>Supported</b>	E4438C with Option 419
	<pre>[:SOURce]:RADio:WCDMa:HSPA[:BBG]:DLINK:HSDPa[1]   2   3   4:BSINfo &lt;val&gt; [:SOURce]:RADio:WCDMa:HSPA[:BBG]:DLINK:HSDPa[1]   2   3   4:BSINfo?</pre>
	<p>This command sets the HS-DSCH block size. HSDPA1 is the only HSDPA channel configuration that supports the HS-DSCH; however, the block size information parameter is also available for HSDPA2–4 for HS-SCCH coding purposes.</p>
<b>*RST</b>	36
<b>Range</b>	0–63
<b>Remarks</b>	<p>Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.</p>

### **:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDsch:COFFset**

<b>Supported</b>	E4438C with Option 419
	<pre>[:SOURce]:RADio:WCDMa:HSPA[:BBG]:DLINK:HSDPa[1]   2   3   4:HSPDsch: COFFset &lt;val&gt; [:SOURce]:RADio:WCDMa:HSPA[:BBG]:DLINK:HSDPa[1]   2   3   4:HSPDsch:COFFset?</pre>
	<p>This command sets the HS-PDSCH code offset. The code offset is used in determining the HS-PDSCH channel code.</p>
<b>*RST</b>	HSDPA1: 4    HSDPA2: 8    HSDPA3: 9    HSDPA4: 10
<b>Range</b>	1–16
<b>Remarks</b>	<p>Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.</p> <p>Set all physical channel codes orthogonal to each other. For any channel codes that fail this criteria, the apply function (downlink apply command) will not work.</p>

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:DATA**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [ 1 ] | 2 | 3 | 4 :HSPDSch:DATA
PN9 | FIX4 | "<file name>" | DSCH
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [ 1 ] | 2 | 3 | 4 :HSPDSch:DATA?
```

This command configures the HS-PDSCH data type.

**DSCH** This choice is the HS-DSCH selection that is supported on only HSDPA1. Selecting the DSCH choice for HSDPA2–4 will generate an error.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to [“File Overview” on page 668](#) for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 671](#).

**:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:DATA:FIX4**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [ 1 ] | 2 | 3 | 4 :HSPDSch:DATA:
FIX4 <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [ 1 ] | 2 | 3 | 4 :HSPDSch:DATA:
FIX4?
```

This command sets the HS-PDSCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 671](#).

### **:DLINK:HSDPa:HSPDSch:DSCH:DATA**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:DATA
PN9 | FIX4 | "<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:DATA?
```

This command defines the HS-DSCH data type for HSDPA1. The HS-DSCH is not supported on HSDPA2–4.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to [“File Overview” on page 668](#) for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 671](#).

### **:DLINK:HSDPa:HSPDSch:DSCH:DATA:FIX4**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:DATA:
FIX4 <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:DATA:FIX4?
```

This command defines the HS-DSCH repeating 4-bit binary data pattern for HSDPA1. The HS-DSCH is not supported on HSDPA2–4.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 671](#).

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:HSDPa:HSPDSch:DSCH:IRBSize****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:IRBSize <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:IRBSize?
```

This command sets the HS-DSCH IR buffer size per the HARQ process for HSDPA1. The HS-DSCH is not supported on HSDPA2–4.

**\*RST** 9600**Range** 960–28800

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:HSDPa:HSPDsch:NCODE****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDsch:NCODE <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa:HSPDsch:NCODE?
```

This command sets number of codes for the HS-PDSCH on HSDPA1. HSDPA2–4 do not support multicodes.

**\*RST** 1**Range** 1–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

**:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDsch:POWer****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [ 1 ] | 2 | 3 | 4 :HSPDsch:
POWer <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [ 1 ] | 2 | 3 | 4 :HSPDsch:POWer?
```

This command sets the HS-PDSCH power level.

The variable <val> is expressed in decibels (dB).

**\*RST**                    -1.02000000E+001  
**Range**                    -40 to 0  
**Remarks**                Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:HSDPa[1]|2|3|4:HSPDsch:SFORmat**

**Supported**                E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch:SFORmat  
0|1  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch:SFORmat?

This command sets the HS-PDSCH slot format.

0                            This sets the modulation type to QPSK.  
1                            This sets the modulation type to 16QAM.

**\*RST**                    1  
**Remarks**                Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:HSDPa[1]|2|3|4:HSPDsch[:STATe]**

**Supported**                E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch[:STATe]  
ON|OFF|1|0  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch[:STATe]?

This command turns the selected HS-PDSCH on or off.

**\*RST**                    HSDPA1: 1    HSDPA2–4: 0  
**Remarks**                Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

The HS-PDSCH turns on only when the HS-SCCH is on. Turning off the HS-SCCH also turns off the active HS-PDSCH. To turn the HS-SCCH on or off, see “:DLINK:HSDPa[1]|2|3|4[:STATe]” on page 706.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:DLINK:HSDPa[1]|2|3|4:HSSCch:CCODE****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:CCODE <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:CCODE?
```

This command sets the HS-SCCH channel code.

**\*RST** HSDPA1: 4 HSDPA2: 5 HSDPA3: 6 HSDPA4: 7**Range** 1–127**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

**:DLINK:HSDPa[1]|2|3|4:HSSCch:DATA****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:DATA
PN9|FIX4| "<file name>" |STD
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:DATA?
```

This command sets the data type for the selected downlink HS-SCCH.

**STD** This choice configures the bit field as defined by the 3GPP standards.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “[File Overview](#)” on page 668 for more information on files.

**\*RST** STD**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

### **:DLINK:HSDPa[1] | 2 | 3 | 4:HSSCch:DATA:FIX4**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:DATA:  
FIX4 <val>

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:DATA:FIX4?

This command sets the HS-SCCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:HSDPa[1] | 2 | 3 | 4:HSSCch:POWer**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:  
POWer <val>

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :HSSCch:POWer?

This command sets the HS-SCCH power level.

The variable <val> is expressed in decibels (dB).

**\*RST** -1.02000000E+001

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**3GPP W-CDMA HSPA Subsystem—Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:HSDPa[1]|2|3|4:ITTI****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :ITTI <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :ITTI?
```

This command sets the static inter-TTI pattern value for the selected HSDPA.

The variable <val> is expressed in subframes (one subframe = 2 ms).

**\*RST** 8**Range** 1–16

**Remarks** To use a static pattern, select FIX as the choice for the [:DLINK:HSDPa\[1\]|2|3|4:ITTI:PATTERN](#) command.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:HSDPa[1]|2|3|4:ITTI:PATTERN****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :ITTI:PATTERN
FIX | "<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4 :ITTI:PATTERN?
```

This command selects which method sets the inter-TTI pattern for the selected HSDPA.

**FIX** This choice enables a static pattern. To configure the pattern, see “[:DLINK:HSDPa\[1\]|2|3|4:ITTI](#)”.

"<file name>" This variable represents an inter-TTI pattern file stored in signal generator memory. Creating and using a file provides the option of having a flexible inter-TTI pattern where you can vary the distance between HS-PDSCH transmissions. To create a file, use one or a combination of the following methods:

- To create a file internal to the software, use the inter-TTI user pattern editor.
- To create a file external to the software, use a text editor.

For more information, see the Signal Studio for 3GPP W-CDMA HSPA software online help.

The file name follows the form <project name>-ITTIx, where 'x' is the HSDPA number from one to four. The inter-TTI pattern must contain at least one bit, or the apply function (downlink apply command) will not work.



**\*RST**                   FIX

**Remarks**             Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:HSDPa:NHPRocess**

**Supported**           E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:NHPRocess <val>  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa:NHPRocess?
```

This command sets the HS-DSCH number of HARQ processes for HSDPA1. For HSDPA2–4, this parameter is fixed at one and is used only for HS-SCCH coding purposes.

**\*RST**                   4

**Range**                1–8

**Remarks**             Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:HSDPa[1] | 2 | 3 | 4:RVParameter**

**Supported**           E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4:RVParameter <val>  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:HSDPa [1] | 2 | 3 | 4:RVParameter?
```

This command sets the HS-DSCH RV parameter. For HSDPA2–4, which do not support an HS-DSCH, this parameter is used only for HS-SCCH coding purposes.

**\*RST**                   0

**Range**                0–7

**Remarks**             Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:HSDPa[1]|2|3|4:UEID****Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4:UEID <val>
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4:UEID?
```

This command sets the UEID.

**\*RST** HSDPA1: 0 HSDPA2: 1 HSDPA3: 2 HSDPA4: 3**Range** 0–65535**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:HSDPa[1]|2|3|4[:STATE]****Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4[:STATE] ON|OFF|
1|0
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:HSDPa[1]|2|3|4[:STATE]?
```

This command turns the selected downlink HSDPA channel on or off.

- |         |   |
|---------|---|
| ON (1)  | <ul style="list-style-type: none"> <li>• Turns on the HS-SCCH for the selected HSDPA.</li> <li>• Enables turning on the HS-PDSCH for the selected HSDPA.</li> </ul> |
| OFF (0) | <ul style="list-style-type: none"> <li>• Turns off the HS-SCCH for the selected HSDPA.</li> <li>• Turns off the active HS-PDSCH for the selected HSDPA.</li> </ul>  |

**\*RST** HSDPA1: 1 HSDPA2–4: 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

Refer to “:DLINK:HSDPa[1]|2|3|4:HSPDSch[:STATE]” on page 701 for turning the HS-PDSCH on or off.

An HSDPA consists of a HS-SCCH and a HS-PDSCH; the HS-DSCH is supported on only HSDPA1.

**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:CCODE**

**Supported**            E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :CCODE <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :CCODE?
```

This command sets the channel code for the selected downlink OCNS.

<b>*RST</b>	OCNS1: 2	OCNS2: 3	OCNS3: 4	OCNS4: 5
	OCNS5: 6	OCNS6: 7	OCNS7: 8	OCNS8: 9
	OCNS9: 10	OCNS10: 11	OCNS11: 12	OCNS12: 13
	OCNS13: 14	OCNS14: 15	OCNS15: 16	OCNS16: 17

**Range**                1–127

**Remarks**            Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:DATA**

**Supported**            E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :DATA PN9 | PN15
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :DATA?
```

This command configures the data pattern for the selected downlink OCNS.

**\*RST**                    PN9

**Remarks**            Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:MODulation****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:MODulation&lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:MODulation?

This command sets the modulation for the selected downlink OCNS.

**\*RST** QPSK**Range** QPSK | QAM16**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:POWer****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:POWer &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:POWer?

This command sets the power level for the selected downlink OCNS.

The variable &lt;val&gt; is expressed in units of dB.

**\*RST** OCNS1: -6 OCNS2: -8 OCNS3: -8 OCNS4: -10  
OCNS5: -7 OCNS6: -9 OCNS7-16: -10**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:SF****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:SF&lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:SF?

This command sets the spreading factor for the selected downlink OCNS.

**\*RST** 128  
**Range** 16 | 128  
**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:OCNS[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16:SSCoffset**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16:SSCoffset <val>
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16:SSCoffset?
```

This command sets the secondary scrambling code offset for the selected downlink OCNS.

**\*RST** 0  
**Range** 0–15  
**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**:DLINK:OCNS[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16:TOFFset**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16:TOFFset <val>
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16:TOFFset?
```

This command adjusts the timing offset for the OCNS.

**\*RST** OCNS1: 1    OCNS2: 2    OCNS3: 3    OCNS4: 4  
OCNS5: 5    OCNS6: 6    OCNS7: 7    OCNS8: 8  
OCNS9: 9    OCNS10: 10    OCNS11: 11    OCNS12: 12  
OCNS13: 13    OCNS14: 14    OCNS15: 15    OCNS16: 16  
**Range** 0–149  
**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16[:STATE]****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16[:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16[:STATE]?

This command turns the selected OCNS on or off.

**\*RST** 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.**:DLINK:PCCPch:BCH:DATA****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PCCPch:BCH:DATA PN9|PN15|FIX4|"  
"<file name>"

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PCCPch:BCH:DATA?

This command sets the BCH data format that is transmitted on the P-CCPCH.

"  
"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “[File Overview](#)” on page 668 for more information on files.**\*RST** FIX4**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 671.**:DLINK:PCCPch:BCH:DATA:FIX4****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PCCPch:BCH:DATA:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PCCPch:BCH:DATA:FIX4?

This command sets the BCH repeating 4-bit binary data pattern.

The variable &lt;val&gt; accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

<b>*RST</b>	0
<b>Range</b>	0–15
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### :DLINK:PCCPch:CCODE

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:PCCPch:CCODE <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:PCCPch:CCODE?
```

This command sets the P-CCPCH channel code.

<b>*RST</b>	+1
<b>Range</b>	0–255
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.  Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

### :DLINK:PCCPch:POWer

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:PCCPch:POWer <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:PCCPch:POWer?
```

This command sets the P-CCPCH power level.

The variable <val> is expressed in decibels (dB).

<b>*RST</b>	–5.30000000E+000
<b>Range</b>	–40 to 0
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:PCCPch[:STATE]****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PCCPch[:STATE] ON|OFF|1|0  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PCCPch[:STATE] ?

This command turns the P-CCPCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:PICH:CCODE****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PICH:CCODE <val>  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PICH:CCODE?

This command sets the PICH channelization code.

**\*RST** +3**Range** 0–255**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the downlink apply command will not work.

**:DLINK:PICH:DATA****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PICH:DATA PN9|PN15|FIX4|  
"<file name>"  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PICH:DATA?

This command sets the PICH data type.

**"<file name>"** This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “File Overview” on page 668 for more information on files.



**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:PICH:DATA:FIX4**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:PICH:DATA:FIX4 <val>  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:PICH:DATA:FIX4?
```

This command sets the PICH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:PICH:POWer**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:PICH:POWer <val>  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :DLINK:PICH:POWer?
```

This command sets the PICH power level.

The variable <val> is expressed in decibels (dB).

**\*RST** -8.300000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:PICH[:STATE]****Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PICH[:STATE] ON|OFF|1|0
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PICH[:STATE]?
```

This command turns the PICH on or off.

**\*RST** 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:POLarity****Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:POLarity NORMAL|INVERTed|INVERT
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:POLarity?
```

This command selects the phase polarity of the downlink signal.

**NORMAL** This choice selects normal polarity.**INVERTed, INVERT** These choices perform the same function, inverting the internal Q signal.**\*RST** NORM**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to “:DLINK:APPLY” on page 671.**:DLINK:PSCH:POWer****Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PSCH:POWer <val>
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:PSCH:POWer?
```

This command sets the PSCH power level.

The variable &lt;val&gt; is expressed in decibels (dB).

**\*RST** -8.30000000E+000**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.

### **:DLINK:PSCH[:STATe]**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:PSCH [ :STATe ] ON | OFF | 1 | 0  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:PSCH [ :STATe ] ?
```

This command turns the PSCH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to “[:DLINK:APPLY](#)” on [page 671](#).

### **:DLINK:SCRamblecode**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:SCRamblecode <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:SCRamblecode ?
```

This command sets the downlink scramble code number.

**\*RST** +0

**Range** 0–511

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on [page 671](#).

### **:DLINK:SSCH:POWer**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:SSCH:POWer <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :DLINK:SSCH:POWer ?
```

This command sets the SSCH power level. The variable <val> is expressed in decibels (dB)

**\*RST** –8.30000000E+000

**Range** –40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on [page 671](#).

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:DLINK:SSCH[:STATE]****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:SSCH[:STATE] ON|OFF|1|0  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:SSCH[:STATE]?

This command turns the SSCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:DLINK:TXDiversity****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:TXDiversity NONE|OANT1|OANT2  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:DLINK:TXDiversity?

This command selects the downlink signal transmit diversity mode.

NONE This choice disables the transmit diversity mode.

OANT1 This choice selects the transmit diversity openloop antenna 1 mode.

OANT2 This choice selects the transmit diversity openloop antenna 2 mode.

**\*RST** NONE**Remarks** To configure both antennas (one and two) requires two ESGs.  
Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 671.**:LINK****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:LINK DOWN|UP  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:LINK?

This command sets the uplink or downlink mode.

**\*RST** UP

## :ULINK:APPLY

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:APPLY  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:APPLY?
```

This command applies changes to the channel setup and data for active physical and transport channels, immediately starting the channel coding generation process. A progress bar may appear on the ESG display indicating that the new signal parameters are being applied. Turning on the HSPA modulation format also applies the signal parameters.

The query response determines whether or not there is a need to execute the command. It returns the following responses:

0	Command execution is not required.
1	Command execution is required.

---

**NOTE** The query response is only valid while the HSPA format is active.

---

When there is a setting conflict (ESG reports an error) with the range values or coupled parameters, or both, executing the uplink apply command does not apply the new changes until the conflicts are resolved. After resolving the setting conflicts, execute the command to apply the new settings.

## :ULINK:AWGN:CN

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:AWGN:CN <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:AWGN:CN?
```

This command sets the uplink in-band carrier to noise ratio (C/N) value using AWGN.

**\*RST** 0 dB

**Range** -30 to 30 dB

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [:ULINK:APPLY](#)”.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURce]:RADio:WCDMa:HSPA[:BBG])**:ULINK:AWGN[:STATe]****Supported** E4438C with Option 419

[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:AWGN[:STATe] ON|OFF|0|1

[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:AWGN[:STATe]?

This command turns the uplink AWGN on or off.

**\*RST** 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.**:ULINK:BBReference:EXTeRnal:MRATe****Supported** E4438C with Option 419

[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:BBReference:EXTeRnal:MRATe

X1|X2|X4

[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:BBReference:EXTeRnal:MRATe?

This command configures the ESG, so it can accept an external baseband generator clock that is a multiple of the internal 3.84 MHz chip clock.

X1 This sets the ESG to accept an external clock rate identical to the chip clock.

X2 This sets the ESG to accept an external clock rate that is two times the rate of the chip clock.

X4 This sets the ESG to accept an external clock rate that is four times the rate of the chip clock.

**\*RST** X1**:ULINK:BBReference:EXTeRnal[:SOURce]****Supported** E4438C with Option 419

[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:BBReference[:SOURce]{INTeRnal}|

EXTeRnal

[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:BBReference?

This command selects the baseband generator reference source for the radio uplink channel.

**\*RST** INT**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:CRATe**

**Supported** E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:CRATe <val>  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:CRATe?

This command sets the chip rate (in units of samples).

**\*RST** 3.840000 Mcps  
**Range** .24000 - 4.224 Mcps

### **:ULINK:DPCCh:CCODE**

**Supported** E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:CCODE?

This query returns the channelization code for the uplink DPCCH. The slot format determines the channelization code in accordance with the 3GPP standards.

### **:ULINK:DPCCh:DATA**

**Supported** E4438C with Option 419  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:DATA PN9 | PN15 | FIX4 | STD |  
"<file name>"  
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:DATA?

This command configures the uplink DPCCH data pattern.

**STD** This sets the DPCCH bit fields according to the 3GPP standards.  
"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to [“File Overview” on page 668](#) for more information on files.  
**\*RST** STD  
**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

**:ULINK:DPCCh:DATA:FIX4****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:DATA:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:DATA:FIX4?

This command sets the uplink DPCCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:DPCCh:FBI:PATtern****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:FBI:PATtern PN9|PN15|FIX|  
"<file name>"

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:FBI:PATtern?

This command configures the uplink DPCCH FBI pattern.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to “File Overview” on page 668 for more information on files.

**\*RST** FIX

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:DPCCh:FBI:PATtern:FIX****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:FBI:PATtern:FIX &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPCCh:FBI:PATtern:FIX?

This command sets the 30-bit FBI pattern for the uplink DPCCH.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.



<b>*RST</b>	+0
<b>Range</b>	0–1073741823
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:DPCCh:POWer**

<b>Supported</b>	E4438C with Option 419
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:POWer <val>
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:POWer?

This command sets the uplink DPCCH power level.

The variable <val> is expressed in decibels (dB)

<b>*RST</b>	–2.69000000E+000
<b>Range</b>	–40 to 0
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:DPCCh:SFORmat**

<b>Supported</b>	E4438C with Option 419
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:SFORmat <val>
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:SFORmat?

This command sets the uplink DPCCH slot format.

<b>*RST</b>	+0
<b>Range</b>	0–5
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.  The slot format determines the settings for other parameters in accordance with 3GPP standards.

**:ULINK:DPCCh:TFCI**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:TFCI <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:TFCI?
```

This command sets the uplink DPCCH TFCI 10-bit data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only decimal values.

**\*RST** +0

**Range** 0–1023

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:DPCCh:TPC:NSteps**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:TPC:NSteps <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:TPC:NSteps?
```

This command sets the number of steps for the down and up (DUP) or up and down (UDOWn) TPC pattern selections.

The variable <val> is expressed in decibels (dB).

**\*RST** +1

**Range** 1–80

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:DPCCh:TPC:PATtern**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:TPC:PATtern
```

```
UDOWn|DUP|UALL|DALL| "<file name>"
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh:TPC:PATtern?
```

This command configures the uplink DPCCH TPC pattern for increasing or decreasing, or increasing and decreasing the BTS power level.

**3GPP W-CDMA HSPA Subsystem—Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

UDOWN	The TPC pattern repetitively steps up and down.
DUP	The TPC pattern repetitively steps down and up.
UALL	The TPC pattern consecutively steps up.
DALL	The TPC pattern consecutively steps down.
"<file name>"	This variable represents a power pattern file stored in signal generator memory. The pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to <a href="#">“File Overview” on page 668</a> for more information on files.
<b>*RST</b>	UDOW
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:ULINK:APPLY” on page 717</a> .  Each step in a TPC pattern signals an increase or decrease of 1 dB in the BTS output power level.

**:ULINK:DPCCh[:STATe]**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh [ :STATe ] ON | OFF | 1 | 0
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPCCh [ :STATe ] ?
```

This command turns the uplink DPCCH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

**:ULINK:DPDCh:CCODE**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:CCODE?
```

This query returns the uplink DPDCH channelization code.

The slot format determines the channelization code in accordance with the 3GPP standards. See [“:ULINK:DPDCh:SFORmat” on page 729](#) for setting the slot format.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:ULINK:DPDCh:DATA**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DATA PN9 | PN15 | FIX4 | DCH |
"<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DATA?
```

This command configures the uplink DPDCH data pattern.

**DCH** This choice selects the transport channel as the data source.

**"<file name>"** This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to [“File Overview” on page 668](#) for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

**:ULINK:DPDCh:DATA:FIX4**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DATA:FIX4 <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DATA:FIX4?
```

This command sets the uplink DPDCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

### **:ULINK:DPDCh:DCH[1]|2|3|4|5|6:BSIZE**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :  
BSIZE <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :BSIZE?
```

This command sets the block size for the selected uplink DCH.

**\*RST** 20

**Range** 0–5000

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:ULINK:APPLY](#)” on page 717.

The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the ESG calculates the product of the block size and the number of blocks. If the product of these two parameters exceeds 200,000, the apply function (uplink apply command) will not work.

### **:ULINK:DPDCh:DCH[1]|2|3|4|5|6:CRC**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CRC  
0 | 8 | 12 | 16 | 24
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CRC?
```

This command sets the number of CRC bits for the selected uplink DCH.

**\*RST** 8

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:ULINK:APPLY](#)” on page 717.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:ULINK:DPDCh:DCH[1] | 2 | 3 | 4 | 5 | 6:CTYPe****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CTYPe
HCONv | TCONv | TURBo | NONE
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CTYPe?
```

This command selects the encoder type for the selected uplink DCH.

HCONv This choice selects the 1/2 rate convolutional encoder.

TCONv This choice selects the 1/3 rate convolutional encoder.

TURBo This choice selects the turbo coder.

NONE This choice selects no coding.

**\*RST** HCON

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:DPDCh:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA****Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA PN9 |
PN15 | FIX4 | "<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA?
```

This command configures the data for the selected uplink DCH.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to “File Overview” on page 668 for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:DPDCh:DCH[1]|2|3|4|5|6:DATA:FIX4**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA  
:FIX4 <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA  
:FIX4?
```

This command sets the repeating 4-bit binary data pattern for the selected uplink DCH.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

### **:ULINK:DPDCh:DCH[1]|2|3|4|5|6:NBLocks**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :NBLocks  
<val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :NBLocks?
```

This command sets the number of blocks for the selected uplink DCH.

**\*RST** 1

**Range** 0–512

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the block size is multiplied by the number of blocks. If the product of these two parameters exceeds 200,000, the uplink apply command will not work.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:RMATtribute****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:RMATtribute &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:RMATtribute?

This command sets the rate matching attribute for the selected uplink DCH.

**\*RST** 1**Range** 1–256**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to “:ULINK:APPLY” on page 717.**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:TTI****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:TTI 10|20|40|80

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:TTI?

This command sets the TTI for the selected uplink DCH.

The choices are expressed in millisecond (ms).

**\*RST** 10**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to “:ULINK:APPLY” on page 717.**:ULINK:DPDCh:DCH2|3|4|5|6[:STATe]****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPDCh:DCH2|3|4|5|6[:STATe] ON|OFF|1|0

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:DPDCh:DCH2|3|4|5|6[:STATe]?

This command turns the selected uplink DCH on or off; DCH1 is always on.



**\*RST** DCH 1: 1 DCH 2– 6: 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

The apply command will not work and the ESG will report an error if you turn on a DCH where lower numbered DCHs are off. For example, turning on DCH5 requires turning on DCH2–4. The reverse is true when turning off the DCHs.

### **:ULINK:DPDCh:POWer**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:POWer <val>  
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:POWer?
```

This command sets the uplink DPDCH power level.

The variable <val> is expressed in decibels (dB).

**\*RST** +0.00000000E+00

**Range** –40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:DPDCh:SFORmat**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:SFORmat <val>  
[ :SOURCE ] :RADIo:WCDMA:HSPA [ :BBG ] :ULINK:DPDCh:SFORmat?
```

This command sets the uplink DPDCH slot format.

**\*RST** +2

**Range** 0– 6

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

The slot format determines the settings for other parameters in accordance with the 3GPP standards.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])**:ULink:DPDCh[:STATe]****Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULink:DPDCh[:STATe] ON|OFF|1|0
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULink:DPDCh[:STATe]?
```

This command turns the uplink DPDCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULink:APPLY” on page 717.**:ULink:FClock:INTERval****Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULink:FClock:INTERval 10|20|40|80|2560
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULink:FClock:INTERval?
```

This command selects the frame clock interval for the synchronization signal.

The frame clock interval is set in milliseconds (ms).

**\*RST** 80**Remarks** Ensure that the selected interval is equal to or longer than the longest transport channel TTI period.

This command is applicable only when FClock is the sync source selection. See “:ULink:SYNC[:SOURCE]” on page 755 for selecting the sync source.

**:ULink:FClock:POLarity****Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULink:FClock:POLarity POSitive|
NEGative
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULink:FClock:POLarity?
```

This command sets the frame clock polarity.

**POSitive** This choice sets the clock gate to trigger when the signal is high.**NEGative** This choice sets the clock gate to trigger when the signal is low.**\*RST** POS**Remarks** This command is applicable only when FClock is the sync source selection. See “:ULink:SYNC[:SOURCE]” on page 755 for selecting the sync source.

## **:ULINK:FILTer**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:FILTer RNYQuist|NYQuist|
GAUSSian|RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|
"<user FIR>"
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:FILTer?
```

This command selects the uplink filter type.

IS95	This filter meets the criteria of the IS-95 standard.
IS95_EQ	This filter is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard and is best suited for IS-95 baseband filtering.
IS95_MOD	This filter meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This filter is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
UGGaussian	This is a GSM Gaussian filter with a fixed BbT value of 0.300.
AC4Fm	This is a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
"<user FIR>"	This variable represents any FIR filter file stored in signal generator memory. Refer to <a href="#">“File Overview” on page 668</a> for more information on files.
<b>*RST</b>	RNYQ
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:ULINK:APPLY” on page 851</a> .

## **:ULINK:FILTer:ALPHa**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:FILTer:ALPHa <val>
[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:FILTer:ALPHa?
```

This command sets the uplink Nyquist or root Nyquist filter alpha value.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])

<b>*RST</b>	+2.20000000E–001
<b>Range</b>	0–1
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Executing this command while a filter other than Nyquist or root Nyquist is selected changes the parameter value, but it is not used by the signal generator until one of the Nyquist filters is selected. Refer to <a href="#">“:ULINK:APPLY” on page 717</a> .

**:ULINK:FILTer:BBT**

<b>Supported</b>	E4438C with Option 419
	[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:FILTer:BBT <val>
	[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:FILTer:BBT?

This command sets the uplink Gaussian filter BbT value.

<b>*RST</b>	+5.00000000E–001
<b>Range</b>	0–1
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:ULINK:APPLY” on page 717</a> .  Executing this command while a filter other than the Gaussian filter is selected changes the parameter value, but it is not used by the signal generator until the Gaussian filter is selected.

**:ULINK:FILTer:CHANnel**

<b>Supported</b>	E4438C with Option 419
	[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:FILTer:CHANnel EVM ACP
	[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:FILTer:CHANnel?

This command optimizes an uplink filter for minimized EVM or for minimized ACP.

<b>EVM</b>	This choice provides the most ideal passband.
<b>ACP</b>	This choice improves stopband rejection for the root Nyquist and Nyquist filters.
<b>*RST</b>	EVM
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:ULINK:APPLY” on page 717</a> .  To change the filter selection, refer to <a href="#">“:ULINK:FILTer” on page 731</a> .

### **:ULINK:FOFFset**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:FOFFset <val>  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:FOFFset?
```

This command sets the CFN starting frame within the SFN by setting a frame offset relative to SFN zero.

**\*RST** 0

**Range** 0–255

**Remarks** The command adds delays to the internal frame counter by specifying the starting frame number count. When the frame offset (FOFFset) is set to 0, the frame number starts at the system sync trigger. When the FOFFset is set to 2, the signal generator triggers two frames after the SFN RST. For additional information, refer to 3GPP TS25.402 for SFN and CFN relationship.

### **:ULINK:HCONfig**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HCONfig 0|1  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HCONfig?
```

This command sets HS-DSCH to be configured.

**\*RST** 1

### **:ULINK:HSDPcch:APATtern**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSDPcch:APATtern NONE|ACK_ALL|  
"<file name>"  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSDPcch:APATtern?
```

This command sets the HS-DPCCH ACK/NACK transmission pattern for each of the 1280 subframes that make up the pattern.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])

NONE	This choice sets all subframes to DTX.
"<file name>"	<p>This variable represents an ACK pattern file stored in signal generator memory. The file must contain 2,560-bits of data (2-bits per subframe) or the apply function (uplink apply command) will not work.</p> <ul style="list-style-type: none"> <li>• An ACK response is represented by 00.</li> <li>• A NACK response is represented by 01.</li> <li>• DTX is represented by 10.</li> </ul> <p>Enter the 2,560-bits into the file as a binary string.</p> <p>Refer to <a href="#">“File Overview” on page 668</a> for more information on files.</p>
*RST	ACK_ALL
Remarks	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:ULINK:APPLY” on page 717</a> .

**:ULINK:HSDPcch:APOWer**

Supported	E4438C with Option 419
	[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:APOWer <val> [:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:APOWer?
	This command sets the HS-DPCCH ACK part power level.
	The variable <val> is expressed in decibels (dB).
*RST	-2.69000000E+000
Range	-40 to 0
Remarks	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:ULINK:APPLY” on page 717</a> .

**:ULINK:HSDPcch:CCODE**

Supported	E4438C with Option 419
	[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:CCODE?
	This query returns the HS-DPCCH channelization code.

### **:ULINK:HSDPcch:CPATtern**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:CPATtern NONE |
"<file name>"
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:CPATtern?
```

This command sets the HS-DPCCH CQI transmission pattern for each of the 1280 subframes that make up the pattern.

**NONE** This choice sets all subframes to DTX.

"<file name>" This variable represents a bit file stored in signal generator memory. The file must contain 10,240-bits of data (8-bits per subframe) or the apply function (uplink apply command) will not work.

- A CQI response range is one to thirty using 8-bits, 00000001 to 00011110.
- DTX is represented by 11111111.

Enter the 10,240-bits into the file as a binary string.

Refer to [“File Overview” on page 668](#) for more information on files.

**\*RST** NONE

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

### **:ULINK:HSDPcch:CPOWer**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:CPOWer <val>
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:CPOWer?
```

This command sets the HS-DPCCH CQI part power level.

The variable <val> is expressed in decibels (dB).

**\*RST** -2.69000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])**:ULINK:HSDPcch:NPOWer****Supported** E4438C with Option 419

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:NPOWer &lt;val&gt;

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:NPOWer?

This command sets the HS-DPCCH NACK part power level. The variable <val> is expressed in decibels (dB).

**\*RST** -2.69000000E+000**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.**:ULINK:HSDPcch:SFDelay****Supported** E4438C with Option 419

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:SFDelay &lt;val&gt;

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch:SFDelay?

This command sets the HS-DPCCH subframe delay. The variable <val> is expressed in units of 256 chips.

**\*RST** 0**Range** 0–150**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.**:ULINK:HSDPcch[:STATe]****Supported** E4438C with Option 419

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch[:STATe] ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSDPcch[:STATe]?

This command turns the HS-DPCCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.



### **:ULINK:HSUPa:EDPCch:DATA**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch:DATA  
PN9 | FIX4 | STD | "<file name>"  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch:DATA?
```

This command sets the data type for the selected downlink E-DPCCH.

**STD** This choice configures the bit field as defined by the 3GPP standards.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function will not work.

**\*RST** STD

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:HSUPa:EDPCch:DATA:FIX4**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch:DATA:FIX4 <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch:DATA:FIX4?
```

This command sets the data type for E-DPCCH repeating 4-bit binary pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:HSUPa:EDPCch:POWer**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch:POWer <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch:POWer?
```

This command sets the E-DPCCH power level. The variable <val> is expressed in decibels (dB).

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])

<b>*RST</b>	–2.69000000E+000
<b>Range</b>	–40 to 0 dB
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:HSUPa:EDPCch[:STATE]**

<b>Supported</b>	E4438C with Option 419
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch [ :STATE ] ON   OFF   1   0
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPCch [ :STATE ] ?

This command turns the E-DPCCH on or off.

<b>*RST</b>	1
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:HSUPa:EDPDch:DATA**

<b>Supported</b>	E4438C with Option 419
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPDch:DATA:
	PN9   FIX4   STD   "<file name>"
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPDch:DATA?

This command sets the data type for the selected downlink E-DPDCH.

<b>STD</b>	This choice configures the bit field as defined by the 3GPP standards.
<b>"&lt;file name&gt;"</b>	This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function will not work.
<b>*RST</b>	STD

**:ULINK:HSUPa:EDPDch:DATA:FIX4**

<b>Supported</b>	E4438C with Option 419
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPDch:DATA:FIX4 <val>
	[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPDch:DATA?

This command sets the data type for E-DPDCH repeating 4-bit binary pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

<b>*RST</b>	0
<b>Range</b>	0–15
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:HSUPa:EDPDch:EDCH:DATA**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:DATA PN9|FIX4|STD|
"<file name>"
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:DATA?
```

This command defines the E-DCH data type.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function will not work.

<b>*RST</b>	PN9
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:HSUPa:EDPDch:EDCH:DATA:FIX4**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:EDCH:DATA:FIX4 <val>
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:EDCH:DATA:FIX4?
```

This command sets the E-DPDCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

<b>*RST</b>	0
<b>Range</b>	0–15
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:HSUPa:EDPDch:MCCodes**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPDch:MCCodes
SF256 | SF128 | SF64 | SF32 | SF16 | SF8 | SF4 | SF4SF4 | SF2SF2 | SF4SF4SF2SF2
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:EDPDch:MCCodes?
```

This command sets the maximum channelization codes for E-DPDCH.

SF256	Set the spreading factor to 256 and the number of E-DPDCH to 1
SF128	Set the spreading factor to 128 and the number of E-DPDCH to 1
SF64	Set the spreading factor to 64 and the number of E-DPDCH to 1
SF32	Set the spreading factor to 32 and the number of E-DPDCH to 1
SF16	Set the spreading factor to 16 and the number of E-DPDCH to 1
SF8	Set the spreading factor to 8 and the number of E-DPDCH to 1
SF4	Set the spreading factor to 4 and the number of E-DPDCH to 1
SF4SF4	Set the spreading factor to 4 and the number of E-DPDCH to 2
SF2SF2	Set the spreading factor to 2 and the number of E-DPDCH to 2
SF4SF4SF2SF2	Set the spreading factor to 4 for 2 E-DPDCHs and spreading factor to 2 for 2 E-DPDCHs
<b>*RST</b>	SF4SF4SF2SF2

**Remarks** The maximum channelization codes are used together with the E-DCH configuration, and PL-non-MAX to automatically calculate the physical channel codes according to TS 25.212 (4.8.4.1).

**:ULINK:HSUPa:EDPDch:PLNMax**

**Supported** E4438C with Option 419

```
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:PLNMax <val>
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:PLNMax?
```

This command sets the PL non-max value for the E-DPDCH used in the determination of SF and number of E-DPDCHs as defined in TS 25.212 (4.8.4.1) for compressed mode.

**\*RST** 0.44

**Resolution** 0.04

**Range** 0.44 to 1.0

**:ULINK:HSUPa:EDPDch:POWer**

**Supported** E4438C with Option 419

```
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:POWer <val>
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPCch:POWer?
```

This command sets the E-DPDCH power level. The variable <val> is expressed in decibels (dB).

**\*RST** +0.00000000E+001

**:ULINK:HSUPa:EDPDch:SNPHchs**

**Supported** E4438C with Option 419

```
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPDch:SNPHchs
SF256|SF128|SF64|SF32|SF16|SF8|SF4|SF4SF4|SF2SF2|SF4SF4SF2SF2|AUTO
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:EDPCch:SNPHchs?
```

This command sets the SF and number of E-DPDCHs to configure the physical channel manually. To configure the physical channel as defined in TS 25.212 (4.8.4.1), refer to [“:ULINK:HSUPa:EDPDch:MCCodes” on page 740](#).

SF256	Set the spreading factor to 256 and the number of E-DPDCH to 1
SF128	Set the spreading factor to 128 and the number of E-DPDCH to 1
SF64	Set the spreading factor to 64 and the number of E-DPDCH to 1
SF32	Set the spreading factor to 32 and the number of E-DPDCH to 1
SF16	Set the spreading factor to 16 and the number of E-DPDCH to 1
SF8	Set the spreading factor to 8 and the number of E-DPDCH to 1

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

SF4	Set the spreading factor to 4 and the number of E-DPDCH to 1
SF4SF4	Set the spreading factor to 4 and the number of E-DPDCH to 2
SF2SF2	Set the spreading factor to 2 and the number of E-DPDCH to 2
SF4SF4SF2SF2	Set the spreading factor to 4 for 2 E-DPDCHs and spreading factor to 2 for 2 E-DPDCHs
AUTO	Calculate the spreading factor and number of codes automatically from maximum channelization codes, PL non-max, E-TFCI table selection, and E-TFCI index as defined in TS 25.212 (4.8.4.1).
<b>*RST</b>	SF4
Remarks	ULINK:TGAP:PSI[1]:PS can be set ACTIVE only when the :ULINK:HSUPa:EDPDch:SNPHchs is AUTO.

**:ULINK:HSUPa:EDPDch[:STATE]**

**Supported** E4438C with Option 419

```
[ :SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : ULINK : HSUPa : EDPDch [ : STATE ]
[ : SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : ULINK : HSUPa : EDPCch [ : STATE ] ?
```

This command turns the E-DPDCH on or off.

**\*RST** 1

**:ULINK:HSUPa:ETABLE**

**Supported** E4438C with Option 419

```
[ : SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : ULINK : HSUPa : EDPDch : ETABLE 0 | 1
[ : SOURCE ] : RADIO : WCDMA : HSPA [ : BBG ] : ULINK : HSUPa : EDPCch : ETABLE ?
```

This command selects the E-TFCI tables as specified in E-TFCI Table Selection, TS 25.321 Annex B.

**\*RST** 1

**:ULINK:HSUPa:ETFCi**

**Supported** E4438C with Option 419  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:ETFCi <val>  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:ETFCi?

This command sets the E-TFC index 7-bit pattern.

**\*RST** 41  
**Range** 0–127 if E-TFCI Table = 0 and TTI = 2 ms  
0–125 if E-TFCI Table = 1 and TTI = 2 ms  
0–127 if E-TFCI Table = 0 and TTI = 10 ms  
0–120 if E-TFCI Table = 1 and TTI = 10 ms

**:ULINK:HSUPa:HARQ:APATtern**

**Supported** E4438C with Option 419  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern  
ACK\_ALL|EXtErnal|"<file name>"  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern?

This command sets a simulated Node B ACK/NACK pattern that determines HSUPA's HARQ response.

**ACK\_ALL** This choice configures 1,280 subframes (if TTI=2ms) or 1,280 frames (if TTI=10ms) for a simulated ACK only response. For a long transmission, up to 18000 (sub)frames can be configured.

“<file name>” This variable represents an ACK pattern file stored in signal generator memory. Create this file either by using the HARQ ACK/NACK pattern Data Type Entry window and download the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- An ACK response is represented by 0.
- A NACK response is represented by 1.

In the file, do not use delimiters between (sub)frames; enter (sub)frame bits as a binary string. When creating a pattern, you can determine the number of active (sub)frames from 1 to 1,280. The (sub)frames are numbered 0 to 1,279.

**External** This choice selects specifies an external ACK/NACK pattern.  
**\*RST** ACK\_ALL

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:ULINK:HSUPa:HARQ:APATtern[:EXternal]:DELay****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern[:EXternal]:DELay &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern[:EXternal]:DELay?

This command sets the amount of time between the head of a transmitted process and the sampling point of the external ACK/NACK signal corresponding with the process.

The variable <val> is expressed in chips with a resolution of 256.

**\*RST** 7680**:ULINK:HSUPa:HARQ:APATtern[:EXternal]:INPut****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern[:EXternal]:INPut ALTP|BGAT|PTR2

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern[:EXternal]:INPut?

This command sets the amount of time between the head of a transmitted process and the sampling point of the external ACK/NACK signal corresponding with the process.

The variable <val> is expressed in chips with a resolution of 256.

ALTP This choice sets the input port of the external signal to ALT PWR IN.

BGAT This choice sets the input port of the external signal to BURST GATE IN.

PTR2 This choice sets the input port of the external signal to PATT TRIG IN 2.

**\*RST** BGAT



### **:ULINK:HSUPa:HARQ:APATtern[:EXTErnal]:POLarity**

**Supported** E4438C with Option 419

```
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern[:EXTErnal]:  
POLarity POSitive|NEGative  
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ:APATtern[:EXTErnal]:  
POLarity?
```

This command sets the ACK/NACK signal polarity.

**POSitive** This choice sets the pattern signal to ACK when the external signal is low and NACK when the external signal is high.

**NEGative** This choice sets the pattern signal to ACK when the external signal is high and NACK when the external signal is low.

**\*RST** POS

### **:ULINK:HSUPa:HARQ:MNRTrans**

**Supported** E4438C with Option 419

```
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ:MNRTrans <val>  
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ:MNRTrans?
```

This command sets the maximum number of retransmissions.

**Range** 0–15

**\*RST** 15

### **:ULINK:HSUPa:HARQ[:MODE]**

**Supported** E4438C with Option 419

```
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ[:MODE] NONE |  
IREdundancy|CCOMbining  
[:SOURce]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:HARQ[:MODE] ?
```

This command sets the HARQ mode to use None, Incremental Redundancy, or Chase Combining for retransmission.

**Incr Redundancy** This choice sends different coded bits instead of the same coded packets, when a NACK is received.

**Chase Combining** This choice provides UE feedback by sending the same coded packet again upon reception of a NACK signal.

**\*RST** NONE

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**:ULINK:HSUPa:HARQ:HBIT**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:HARQ:HBIT
HAPPY|NHAPPY| "<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:HARQ:HBIT?
```

This command sets the HSUPA happy bit.

HAPPY This choice sets the happy bit to happy.

NHAPPY This choice sets the happy bit to not happy.

“<file name>” This variable represents a happy bit pattern file stored in signal generator memory. Create this file either by using the Happy Bit Pattern Data Type Entry window and download the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- A not happy response is represented by 0.
- A happy response is represented by 1.

**\*RST** HAPPY

**:ULINK:HSUPa:HPROcess**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:HPROcess [0] | 1 | 2 | 3 | 4 | 5 | 6 | 7
[ :STATE ] ON|OFF|1|0
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:HPROcess [0] 1 | 2 | 3 | 4 | 5 | 6 | 7
[ :STATE ] ?
```

This command turns the uplink HSUPA Hybrid ARQ Process on or off for the selected HARQ process.

1|ON TX the process #n

2|OFF DTX the process #n

**\*RST** 1

### **:ULINK:HSUPa:RSN**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:RSN 0 | 1 | 2 | 3

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:RSN?

This command sets the HSUPA retransmission sequence number (RSN) when HARQ mode is not selected.

**\*RST** 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:HSUPa:RVIndex**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:RVIndex 0 | 1 | 2 | 3

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:RVIndex?

This command sets the RV control when the HARQ mode is not selected.

**\*RST** 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:HSUPa:TFC:EPATtern[:EXternal]:DElay**

**Supported** E4438C with Option 419

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:TFC:EPATtern [ :EXternal ] :  
DElay <val>

[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:HSUPa:TFC:EPATtern [ :EXternal ] :  
DElay?

This command sets the amount of time between the head of a transmitted process and the sampling point of the external signal corresponding with the E-TFCI pattern control.

<val> The variable <val> is expressed in chips with a resolution of 256.

**\*RST** 7680

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURce]:RADio:WCDMa:HSPA[:BBG])

<b>Range</b>	0 to 153344 (for TTI = 10 ms) 0 to 61184 (for TTI = 2 ms)
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:HSUPa:TFC:EPATtern[:EXtErnal]:INPut**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSUPa:TFC:EPATtern [ :EXtErnal ] :
INPut ALTP|BGAT|PTR2
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSUPa:TFC:EPATtern [ :EXtErnal ] :
INPut?
```

This command selects the input port for the external TFC E-TFCI pattern signal.

ALTP	This choice sets the input port of the external signal to ALT PWR IN.
BGAT	This choice sets the input port of the external signal to BURST GATE IN.
PTR2	This choice sets the input port of the external signal to PATT TRIG IN 2.
<b>*RST</b>	BGAT
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:HSUPa:TFC:EPATtern[:EXtErnal]:POLarity**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSUPa:TFC:EPATtern [ :EXtErnal ] :
POLarity POSitive|NEGative
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSUPa:TFC:EPATtern [ :EXtErnal ] :
POLarity?
```

This command sets the external E-TFCI pattern control signal polarity.

POSitive	This choice sets the pattern signal to MAIN when the external signal is low and ALT when the external signal is high.
NEGative	This choice sets the pattern signal to MAIN when the external signal is high and ALT when the external signal is low.
<b>*RST</b>	POS
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

### **:ULINK:HSUPa:TFC:EPATtern**

**Supported** E4438C with Option 419

```
[ :SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC:EPATtern
MAIN|EXTernal | "<file name>"
[:SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC:EPATtern?
```

This command sets the MAIN and ALT TFC pattern to be used.

**MAIN\_ALL** This choice configures all subframes for a simulated MAIN only response.

**EXT** This choice selects an external signal to control the data pattern.

"<file name>" This variable represents a MAIN/ALT pattern file stored in signal generator memory. Create this file either by using the TFC pattern Data Type Entry window and download the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- A MAIN response is represented by 0.
- An ALT response is represented by 1

In the file, do not use delimiters between (sub)frames; enter (sub)frame bits as a binary string.

**\*RST** MAIN

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:ULINK:APPLY” on page 717](#).

### **:ULINK:HSUPa:TFC[:ALT]:EDPCch:POWer**

**Supported** E4438C with Option 419

```
[ :SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC [ :ALT] :EDPCch:
POWer <val>
[:SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC [ :ALT] :EDPCch:POWer?
```

This command sets the E-DPCCH power level of the alternate TFC setting.

The variable <val> is expressed in decibels (dB).

**\*RST** -2.69000000E+000

**Range** -40 to 0

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA  
PN9|FIX4|"<file name>"

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA?

This command defines the alternate E-DCH data type.

**EDCH** This choice selects E-DCH for data.

"&lt;file name&gt;" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function will not work.

**\*RST** PN9**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.**:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA:FIX4****Supported** E4438C with Option 419[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA:  
FIX4 <val>[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:EDPDch:EDCH:DATA:  
FIX4?

This command defines the E-DCH repeating 4-bit binary data pattern when the alternate TFC setting is used.

The variable &lt;val&gt; accepts values in binary, hexadecimal, or decimal format; however, the query returns only binary values.

**\*RST** 0**Range** 0–15**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:HSUPa:TFC[:ALT]:EDPDch:POWer**

**Supported** E4438C with Option 419

```
[ :SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC [ :ALT] :EDPDch:
POWer <val>
[ :SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC [ :ALT] :EDPDch:POWer?
```

This command sets the E-DPDCH power level of the alternate TFC setting.

The variable <val> is expressed in decibels (dB).

**\*RST** 0.00000000E+00

**Range** -40 to 0

**:ULINK:HSUPa:TFC[:ALT]EDPDch:SNPHchs**

**Supported** E4438C with Option 419

```
[ :SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC [ :ALT] :EDPDch:SNPHchs
SF256 | SF128 | SF64 | SF32 | SF16 | SF8 | SF4 | SF4SF4 | SF2SF2 | SF4SF4SF2SF2
[ :SOURce] :RADio:WCDMa:HSPA [ :BBG] :ULINK:HSUPa:TFC [ :ALT] :EDPDch:SNPHchs?
```

This command sets the SF and number of E-DPDCHs of the TFC alternate setting.

SF256	Set the spreading factor to 256 and the number of E-DPDCH to 1
SF128	Set the spreading factor to 128 and the number of E-DPDCH to 1
SF64	Set the spreading factor to 64 and the number of E-DPDCH to 1
SF16	Set the spreading factor to 16 and the number of E-DPDCH to 1
SF8	Set the spreading factor to 8 and the number of E-DPDCH to 1
SF4	Set the spreading factor to 4 and the number of E-DPDCH to 1
SF4SF4	Set the spreading factor to 4 and the number of E-DPDCH to 2
SF2SF2	Set the spreading factor to 2 and the number of E-DPDCH to 2
SF4SF4SF2SF2	Set the spreading factor to 4 for 2 E-DPDCHs and the spreading factor to 2 for 2 E-DPDCHs
<b>*RST</b>	SF4

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])**:ULINK:HSUPa:TFC[:ALT]:ETABle****Supported** E4438C with Option 419

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:ETABle 0|1

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:ETABle?

This command sets the E-TFCI table selection of the TFC alternate setting as shown in the E-TFCI Table Selection, TS 25.321 Annex B.

0 This choice selects Table 0.

1 This choice selects Table 1.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:HSUPa:TFC[:ALT]:ETFCI****Supported** E4438C with Option 419

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:ETFCI &lt;value&gt;

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TFC[:ALT]:ETFCI?

This command sets the E-TFC index 7-bit pattern for the TFC alternate setting. The TTI value controls the E-TFCI value as described in range field below. If a value exceeds its range, the value is clipped to the allowed maximum value for the current configuration.

**\*RST** 41

**Range** 0-127 if E-TFCI Table = 0  
 0-125 if E-TFCI Table = 1 and TTI = 2 ms  
 0-120 if E-TFCI Table = 1 and TTI = 10 ms

**:ULINK:HSUPa:TTI****Supported** E4438C with Option 419

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TTI 2|10

[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TTI?

This command sets the static TTI value for the HSUPA.

**\*RST** 10



### **:ULINK:HSUPa[:STATe]**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSUPa : [ :STATe ] ON | OFF | 1 | 0  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:HSUPa : [ :STATe ] ?
```

This command turns the uplink HSUPA state to ON | 1 or OFF | 0.

**\*RST** 1

### **:ULINK:NMDPdch**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:NMDPdch 0 | 1  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:NMDPdch?
```

This command sets the Nmax-dpdch (maximum number of simultaneous uplink DPDCH).

**\*RST** 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:ULINK:APPLY](#)” on page 717.

### **:ULINK:POLarity**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:POLarity NORMAL | INVerted | INVert  
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:POLarity?
```

This command selects the phase polarity of the uplink signal.

**NORMAL** This choice selects normal polarity.

**INVerted, INVert** These choices perform the same function, inverting the internal Q signal.

**\*RST** NORM

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:ULINK:APPLY](#)” on page 717.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])**:ULINK:SCRamblecode****Supported** E4438C with Option 419[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:SCRamblecode <val>  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:SCRamblecode?

This command sets the scramble code.

**\*RST** +0**Range** 0–16777215**:ULINK:SDElay****Supported** E4438C with Option 419[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:SDElay <val>  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:SDElay?

This command sets the uplink DPCH delay, measured in slots.

**\*RST** +0**Range** 0–119**Remarks** Calculate the delay between downlink and uplink DPCH, in slots, using the following formulas. Total Delay = (T0) + (TOFFset) + ((SDElay) \* 2560 chips)

- T0 = 1024 chips
- TOFFset is set by “:ULINK:TOFFset” on page 758

Slot Delay = (Total Delay - T0) / 2560

**:ULINK:SFNRst:POLarity****Supported** E4438C with Option 419[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:SFNRst:POLarity POSitive|  
NEGative  
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:SFNRst:POLarity?

This command sets the polarity of the system frame number reset signal for the uplink synchronization source.

POSitive	This choice sets the signal to trigger when the trigger signal is high.
NEGative	This choice sets the signal to trigger when the trigger signal is low.
<b>*RST</b>	POS
<b>Remarks</b>	This command is applicable only when SFN_RST is the sync source selection. See “:ULINK:SYNC[:SOURce]” on page 755 for selecting the sync source.

### **:ULINK:SYNC:MODE**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:SYNC:MODE SINGLE | CONTinuous
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:SYNC:MODE?
```

This command selects the uplink frame synchronization triggering mode.

SINGle	The signal generator, once triggered, generates frames based on the reference clock.
CONTinuous	The signal generator continuously aligns the frame timing with the frame sync trigger signal.
<b>*RST</b>	SING

### **:ULINK:SYNC[:SOURce]**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:SYNC [ :SOURce ] SFN_RST | FCLock
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:SYNC [ :SOURce ] ?
```

This command selects the uplink frame synchronization source type.

SFN_RST	The uplink signal triggers on the system frame number reset signal.
FCLock	The uplink signal triggers on the frame clock.
<b>*RST</b>	FCL

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])****:ULINK:TGAP:PSI[1]:CFN****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TGAP:PSI[1]:CFN &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TGAP:PSI[1]:CFN?

This command sets the connection frame number (CFN) for the first radio frame of the first pattern 1.

**\*RST** 0**Range** 0–255**Remarks** In the signal generator, CFN is counted internally, relative to the system sync signal.**:ULINK:TGAP:PSI[1]:D****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TGAP:PSI[1]:D &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TGAP:PSI[1]:D?

This command sets the transmission gap distance. It specifies the number of slots between the starting slots of two consecutive transmission gaps within a transmission gap pattern. A value of 0 indicates that there is only one transmission gap within the transmission gap pattern.

**\*RST** 0**Range** 0, 15–269**:ULINK:TGAP:PSI[1]:L1****Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TGAP:PSI[1]:L1 3|4|5|7|10|14

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TGAP:PSI[1]:L1?

This command specifies the length of the first transmission gap (TGL1). The length is expressed in number of slots.

**\*RST** +7

### **:ULINK:TGAP:PSI[1]:L2**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :L2 0 | 3 | 4 | 5 | 7 | 10 | 14  
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :L2?
```

This command specifies the length of the second transmission gap (TGL2). When the value is set to 0, TGL2=TGL1.

**\*RST** 0

### **:ULINK:TGAP:PSI[1]:PL1**

**Supported** E4438C with Option 419 and Option 400

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :PL1 <val>  
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :PL1?
```

This command specifies the duration of the transmission gap pattern length 1 (TGPL1). The pattern length is expressed in number of frames.

**\*RST** +2

**Range** 1–144

### **:ULINK:TGAP:PSI[1]:PRC**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :PRC <val>  
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :PRC?
```

This command sets the transmission gap pattern repetition count. The pattern repetition count (PRC) sets the number of transmission gap patterns within the transmission gap pattern sequence.

**\*RST** 0

**Range** 0–511

**Remarks** A value of 0 indicates that the PRC will continue indefinitely.

### **:ULINK:TGAP:PSI[1]:PS**

**Supported** E4438C with Option 419

```
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :PS ACTIVE | INACTIVE  
[ :SOURce ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK: TGAP: PSI [1] :PS?
```

This command sets the transmission gap pattern status.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

ACTive	This choice sets the compressed mode active.
INACTive	This choice sets the compressed mode inactive.
*RST	INAC

**:ULINK:TGAP:PSI[1]:SN**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TGAP:PSI [1] :SN <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TGAP:PSI [1] :SN?
```

This command specifies the timeslot number of the first transmission gap within the first radio frame.

\*RST +11

**Range** 0–14

**:ULINK:TOFFset**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TOFFset <val>
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TOFFset?
```

This command sets the uplink DPCH timing offset (delay), measured in chips.

\*RST 0

**Range** –512 to 2560

**Remarks** The downlink signal timing is provided by the synchronization signal.  
Calculate the delay between downlink and uplink DPCH, in chips, using the following formulas:

$$\text{Total Delay} = (T0) + (\text{TOFFset}) + ((\text{SDElay}) * 2560 \text{ chips})$$

- T0 = 1024 chips
- SDElay is set by “:ULINK:SDElay” on page 754

$$\text{Chip Delay} = (\text{Total Delay} - T0) \text{ mod } 2560$$

### **:ULINK:TPControl:PATtern**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:TPControl:PATtern
"<file name>"|EXTernal
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:TPControl:PATtern?
```

This command sets a user pattern that determines the power control response and controls the power of the user's equipment (UE). The increase/decrease direction for UE power level changes is determined by the transmit power control (TPC) pattern.

"<file name>" This choice specifies a user file. 0: DOWN, 1: UP

EXTernal This choice specifies an external TPC pattern.

**\*RST** EXTernal

### **:ULINK:TPControl:PATtern[:EXTernal]:INPut**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TFC:EPATtern[:EXTernal]:
INPut ALTP|BGAT|PTR2
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:HSUPa:TFC:EPATtern[:EXTernal]:
INPut?
```

This command sets the input port of the external Ack/Nack signal.

ALTP This choice sets the input port of the external signal to ALT PWR IN.

BGAT This choice sets the input port of the external signal to BURST GATE IN.

PTR2 This choice sets the input port of the external signal to PATT TRIG IN 2.

**\*RST** PTR2

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [":ULINK:APPLY" on page 717](#).

### **:ULINK:TPControl:PATtern[:EXTernal]:POLarity**

**Supported** E4438C with Option 419

```
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:TPControl[:EXTernal]:POLarity
POSitive|NEGative
[:SOURCE]:RADio:WCDMa:HSPA[:BBG]:ULINK:TPControl[:EXTernal]:POLarity?
```

This command sets the external TPC signal polarity.

**3GPP W-CDMA HSPA Subsystem–Option 419** ([:SOURCE]:RADio:WCDMa:HSPA[:BBG])

<b>POSitive</b>	This choice sets the pattern signal to DOWN when the external signal is low and sets the pattern signal to UP when the external signal is high.
<b>NEGative</b>	This choice sets the pattern signal to DOWN when the external signal is high and sets the pattern signal to UP when the external signal is low.
<b>*RST</b>	POS
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**:ULINK:TPControl:POWer:INITial**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:TPControl:POWer:INITial <val>
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:TPControl:POWer:INITial?
```

This command sets the initial power of the transmission power control, in dB (relative to Max Power: 0.00 dB).

**\*RST** +0.00000000E+000

**Range** 0 to –40 dB

**Remarks** If the parameter set by this command is changed while the signal is active, the “:ULINK:APPLY” on page 717 must be executed for the change to occur. The value must be larger than or equal to the minimum transmit power. The power difference between the initial power and the maximum power should be a multiple value of the power step. Initial power is relative to the maximum power (amplitude) set on the signal generator.

**:ULINK:TPControl:POWer:MAXimum**

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADio:WCDMa:HSPA [ :BBG ] :ULINK:TPControl:POWer:MAXimum?
```

This query returns the maximum power of the transmit power control, relative to Maximum Power, in dB. The value shown for this parameter will always be 0.00 dB, and is a relative value to the maximum amplitude set for the signal generator.

For example, if the signal generator amplitude is set to –20 dBm, the Minimum Power is set to –40 dB, and the Initial Power is set to –10 dB, then the absolute initial power level will be –30 dBm, which is 10 dBm below the signal generator amplitude, and the absolute minimum power will be –60 dBm, which is 40 dBm below the signal generator amplitude.

**\*RST** +0.00000000E+000



## :ULINK:TPControl:POWer:MINimum

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TPControl:POWer:MINimum <val>  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TPControl:POWer:MINimum?
```

This command sets the initial power of the transmission power control, in dB (relative to Max Power: 0.00 dB).

The minimum power value must be less than or equal to the value used for initial power. Minimum power is decreased in increments determined by the value set for the power step. The power difference between minimum and maximum power should be a multiple of the power step value.

Minimum power is limited by the amplitude set on the signal generator. The signal generator amplitude must be set to -96 dBm or lower for the minimum power to be set to -40 dB.

\*RST - 4.00000000E+001

**Range** - 40 to 0 dB

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

## :ULINK:TPControl:POWer:STEP

**Supported** E4438C with Option 419

```
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TPControl:POWer:STEP  
DB0_5 | DB1_0 | DB2_0 | DB3_0  
[ :SOURCE ] :RADIO:WCDMA:HSPA [ :BBG ] :ULINK:TPControl:POWer:STEP?
```

This command sets the power control step size. Initial power can only be increased in steps set by the power step command.

\*RST DB0\_5

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 717.

**3GPP W-CDMA HSPA Subsystem–Option 419 ([:SOURCE]:RADIO:WCDMA:HSPA[:BBG])**

**:ULINK:TPControl[:STATE]**

**Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TPControl[:STATE] 1|0|ON|OFF

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG]:ULINK:TPControl[:STATE]?

This command enables or disables the transmission power control.

**\*RST** 0

**[:STATE]**

**Supported** E4438C with Option 419

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG][:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:WCDMA:HSPA[:BBG][:STATE]?

This command turns the HSPA functionality on or off.

**\*RST** 0

**Remarks** This command only works when there is at least one active physical channel within the selected link.

---

## Real Time GPS Subsystem—Option 409 ([:SOURce]:RADio[1] | 2 | 3 | 4:GPS)

### :DATA

**Supported** E4438C with Option 409

```
[ :SOURce ] :RADio:GPS:DATA PN9 | PN15 | FIX4 | "<user file>"  
[ :SOURce ] :RADio:GPS:DATA?
```

This command sets the data type for the selected data mode.

**\*RST** PN9

**Key Entry** **PN9** **PN15** **FIX4** **User file**

**Remarks** This command is effective only when the data mode is RAW or ENCOded. To set the data mode, refer to “:DMODE”.

### :DMODE

**Supported** E4438C with Option 409

```
[ :SOURce ] :RADio:GPS:DMODE RAW | ENCOded | TLM  
[ :SOURce ] :RADio:GPS:DMODE?
```

This command sets the data mode.

**RAW** This choice modulates data onto the C/A (coarse acquisition) code at 50-bits per second. No parity bits are computed by the signal generator. Every 6 seconds, 300-bits from the source data are transmitted.

**ENCOded** This choice modulates data onto the C/A (coarse acquisition) code at 50-bits per second. The signal generator computes 6 parity bits for every 24 data bits from the selected data source. Every six seconds, 240-bits of the source data are transmitted along with 60 computed parity bits.

**TLM** This choice transmits a standard default navigation data transmission which includes a telemetry word (TLM), a handover word (HOW), and default navigation data. The signal generator transmits an incrementing time-of-week (TOW) as part of the HOW.

**Real Time GPS Subsystem—Option 409 ([:SOURce]:RADio[1] | 2 | 3 | 4:GPS)**

<b>*RST</b>	RAW
<b>Key Entry</b>	<b>Data Mode Raw Enc TLM</b>
<b>Remarks</b>	Since the TLM mode transmits default navigation data, there is no data selection for this mode.  For selecting the data type when RAW or ENCOded is the selection, refer to “:DATA” on page 763.

**:DSHift**

<b>Supported</b>	E4438C with Option 409
	<code>[:SOURce]:RADio:GPS:DSHift &lt;val&gt;</code> <code>[:SOURce]:RADio:GPS:DSHift?</code>
	This command sets the frequency and chip rate offsets to simulate a doppler shift. The variable <val> is expressed in units of hertz (Hz to kHz).
<b>*RST</b>	+0.00000000E+000
<b>Range</b>	–125kHz to 125kHz
<b>Key Entry</b>	<b>Doppler Shift</b>
<b>Remarks</b>	The lower bound of the doppler shift is limited by the frequency set on the signal generator. For example, if the signal generator frequency is set to 100 kHz, then the lower limit of the doppler shift would be 0.00 Hz. The doppler shift can not extend lower than the limitations of the signal generator

**:FILTer**

<b>Supported</b>	E4438C with Option 409
	<code>[:SOURce]:RADio:GPS:FILTer RNYQuist NYQuist GAUSSian RECTangle IS95 IS95_EQ IS95_MOD IS95_MOD_EQ AC4Fm UGGaussian  "&lt;user FIR&gt;"</code> <code>[:SOURce]:RADio:GPS:FILTer?</code>
	This command sets the pre-modulation filter type.
IS95	This choice selects a filter that meets the criteria of the IS-95 standard.
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.																		
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection.																		
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.																		
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.																		
"<user FIR>"	This variable is any filter file that you have stored into memory.																		
<b>*RST</b>	RECT																		
<b>Key Entry</b>	<table border="0" style="width: 100%;"> <tr> <td style="text-align: left;"><b>Root Nyquist</b></td> <td style="text-align: left;"><b>Nyquist</b></td> <td style="text-align: left;"><b>Gaussian</b></td> <td style="text-align: left;"><b>Rectangle</b></td> <td style="text-align: left;"><b>IS-95</b></td> <td style="text-align: left;"><b>IS-95 w/EQ</b></td> </tr> <tr> <td style="text-align: left;"><b>IS-95 Mod</b></td> <td style="text-align: left;"><b>IS-95 Mod w/EQ</b></td> <td style="text-align: left;"><b>APC025 C4FM</b></td> <td style="text-align: left;"><b>UN3/4 GSM Gaussian</b></td> <td></td> <td></td> </tr> <tr> <td colspan="6"><b>User FIR</b></td> </tr> </table>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APC025 C4FM</b>	<b>UN3/4 GSM Gaussian</b>			<b>User FIR</b>					
<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>														
<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APC025 C4FM</b>	<b>UN3/4 GSM Gaussian</b>																
<b>User FIR</b>																			

### **:FILTer:ALPHA**

**Supported**            E4438C with Option 409

```
[ :SOURce ] :RADio:GPS:FILTer:ALPHA <val>
[ :SOURce ] :RADio:GPS:FILTer:ALPHA?
```

This command sets the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to the minimum value (0), maximum value (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST**                    +2.20000000E-001

**Range**                    0.000–1.000

**Key Entry**                **Filter Alpha**

**Remarks**                To change the current filter type, refer to “:FILTer” on page 764.

**:FILTer:BBT**

**Supported** E4438C with Option 409

```
[ :SOURCE ] :RADio:GPS:FILTer:BBT <val>
```

```
[ :SOURCE ] :RADio:GPS:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameters.

The filter BbT value can be set to the minimum value (0), the maximum value (1), or in between by using fractional numeric values (0.001–0.999)

**\*RST** +5.00000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “[:FILTer](#)” on page 764.

**:FILTer:CHANnel**

**Supported** E4438C with Option 409

```
[ :SOURCE ] :RADio:GPS:FILTer:CHANnel EVM|ACP
```

```
[ :SOURCE ] :RADio:GPS:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “[:FILTer](#)” on page 764.

## :IQPHase

**Supported** E4438C with Option 409  
[:SOURce]:RADio:GPS:IQPHase NORMal|INVerted  
[:SOURce]:RADio:GPS:IQPHase?

This command sets the I/Q phase for the GPS signal.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **IQ Phase Normal Invert**

## :PCODE

**Supported** E4438C with Option 409  
[:SOURce]:RADio:GPS:PCODE <val>  
[:SOURce]:RADio:GPS:PCODE?

This command sets the P code power relative to the C/A code power.

**\*RST** -3.00000000E+000

**Range** -40 to 0

**Key Entry** **P Code Pwr**

**Remarks** This command is normally used when the CAP (C/A+P) ranging mode choice is selected. Refer to “:RCODE” for selecting the ranging mode.

## :RCODE

**Supported** E4438C with Option 409  
[:SOURce]:RADio:GPS:RCODE CA|P|CAP  
[:SOURce]:RADio:GPS:RCODE?

This command selects the ranging code for the GPS transmission.

**CA** This choice selects a 1023-bit pseudorandom C/A (coarse acquisition) code that is BPSK modulated onto the L1 (1575.42 MHz) carrier. The C/A code factory set chip rate is 1.023 Mcps using a 10.23 Mcps reference clock.

**Real Time GPS Subsystem—Option 409 ([:SOURCE]:RADio[1] | 2 | 3 | 4:GPS)**

<b>P</b>	This choice selects the precise (P) code which is a very long pseudorandom sequence that is BPSK modulated onto the L2 (1227.6 MHz) carrier. The P code factory set chip rate is 10.23 Mcps using a 10.23 Mcps reference clock.
<b>CAP</b>	This choice permits both the C/A (coarse acquisition) and P (precise) codes to modulate the L1 (1575.42 MHz) carrier simultaneously by providing the P code on the Q component and the C/A code in quadrature on the I component.
<b>*RST</b>	CA
<b>Key Entry</b>	<b>Ranging Code C/A P C/A+P</b>

**:REFClk**

<b>Supported</b>	E4438C with Option 409
	<code>[ :SOURCE ] :RADio:GPS:REFClk INT Ext</code>
	<code>[ :SOURCE ] :RADio:GPS:REFClk?</code>

This command sets the GPS reference clock to either internal or external.

<b>INT</b>	This selection sets the signal generator to use the internal chip clock.
<b>EXT</b>	This selection sets the signal generator to use an external chip clock which is supplied to the DATA CLOCK INPUT connector.
<b>*RST</b>	INT
<b>Key Entry</b>	<b>GPS Ref Clk</b>

**:REFFreq**

<b>Supported</b>	E4438C with Option 409
	<code>[ :SOURCE ] :RADio:GPS:REFFreq &lt;val&gt;&lt;unit&gt;</code>
	<code>[ :SOURCE ] :RADio:GPS:REFFreq?</code>

This command sets the GPS reference clock frequency. If an external source is being used, its frequency must match the value set with this command

<b>*RST</b>	+1.02300000E+007
<b>Range</b>	1kCPS–12.5MCPS
<b>Key Entry</b>	<b>GPS Ref (f0)</b>
<b>Remarks</b>	Changing the GPS reference frequency will change the P and C/A code chip rates.



## **:SATid**

**Supported** E4438C with Option 409

`[:SOURCE]:RADio:GPS:SATid <val>`

`[:SOURCE]:RADio:GPS:SATid?`

This command selects the pseudorandom number (PRN) code used for transmission.

Satellite identification numbers 1–32 are used for GPS satellites. Satellite identification numbers 33–37 are reserved for ground transmitter use in the real-world system.

**\*RST** +1

**Range** 1–37

**Key Entry** **Satellite ID**

## **[:STATE]**

**Supported** E4438C with Option 409

`[:SOURCE]:RADio:GPS[:STATE] ON|OFF|1|0`

`[:SOURCE]:RADio:GPS[:STATE]?`

This command enables or disables the real-time GPS signal.

**\*RST** 0

**Key Entry** **Real-time GPS Off On**

## **Real Time MSGPS Subsystem—Option 409** ([:SOURce]:RADio[1]|2|3|4:MSGPs)

### **:IQPHase**

**Supported** E4438C with Option 409

[ :SOURce ] :RADio:MSGPs:IQPHase NORMal | INVerted

[ :SOURce ] :RADio:MSGPs:IQPHase?

This command sets the I/Q phase for the MSGPS signal.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **IQ Phase Normal Invert**

### **:PMODE**

**Supported** E4438C with Option 409

[ :SOURce ] :RADio:MSGPs:PMODE RUN | PAUSE

[ :SOURce ] :RADio:MSGPs:PMODE?

This command pauses or plays the real-time MSGPS scenario.

**\*RST** RUN

**Key Entry** **Pause/Resume**

## :REFClk

**Supported** E4438C with Option 409

```
[ :SOURCE ] :RADio:MSGPs:REFClk INTernal | EXTernal  
[ :SOURCE ] :RADio:MSGPs:REFClk?
```

This command sets the MSGPS reference clock to either internal or external.

**INTernal** This selection sets the signal generator to use the internal chip clock.

**EXTernal** This selection sets the signal generator to use an external chip clock which is supplied to the DATA CLOCK INPUT connector.

**\*RST** INT

**Key Entry** **GPS Ref Clk**

## :REFFreq

**Supported** E4438C with Option 409

```
[ :SOURCE ] :RADio:MSGPs:REFFreq <val><unit>  
[ :SOURCE ] :RADio:MSGPs:REFFreq?
```

This command sets the MSGPS reference clock frequency. If an external reference clock is being used, its frequency must match the value set with this command

**\*RST** +1.02300000E+007

**Range** 1.023Mcps  $\pm$ 10%

**Key Entry** **GPS Ref (f0)**

**Remarks** Changing the GPS reference frequency will change the C/A code chip rate.

## :REStart

**Supported** E4438C with Option 409

```
[ :SOURCE ] :RADio:MSGPs:REStart
```

This command sets the real-time MSGPS scenario to the beginning.

**Key Entry** **Restart**

## **:SCENario**

**Supported** E4438C with Option 409

```
[:SOURCE]:RADIO:MSGPS:SCENario "<file_name>"  
[:SOURCE]:RADIO:MSGPS:SCENario?
```

This command selects the real-time MSGPS scenario to play.

**Key Entry**           **Select Scenario**

## **:SCENario:SATellites**

**Supported** E4438C with Option 409

```
[:SOURCE]:RADIO:MSGPS:SCENario:SATellites <val>  
[:SOURCE]:RADIO:MSGPS:SCENario:SATellites?
```

This command sets the number of satellites in view to include in the generated MSGPS signal.

**Key Entry**           **Number of Satellites**

## **:SCENario:STATus**

**Supported** E4438C with Option 409

```
[:SOURCE]:RADIO:MSGPS:SCENario:STATus?
```

This query returns the following information for the currently selected scenario as a comma-separated list:

Scenario date, scenario time, scenario position, scenario length, satellite IDs

**Key Entry**           **Scenario**

## **[:STATe]**

**Supported** E4438C with Option 409

```
[:SOURCE]:RADIO:MSGPS[:STATe] ON|OFF|1|0  
[:SOURCE]:RADIO:MSGPS[:STATe] ?
```

This command enables or disables the real-time MSGPS signal.

**\*RST**                0

**Key Entry**           **Real-time MSGPS Off On**

---

## GSM Subsystem–Option 402 ([:SOURce]:RADio:GSM)

### :ALPha

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:GSM:ALPha <val>  
[ :SOURce ] :RADio:GSM:ALPha?
```

This command changes the Nyquist or root Nyquist filter’s alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 786.

### :BBCLock

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:GSM:BBCLock INT [1] | EXT [1]  
[ :SOURce ] :RADio:GSM:BBCLock?
```

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**INT[1]** This choice selects the signal generator internal data clock.

**EXT[1]** This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **BBG Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

This will be ignored if the external reference is set to EXTERNAL. To change the external reference type, refer to “:EREFerence” on page 785.

## :BBT

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:GSM:BBT <val>

[ :SOURCE ] :RADIO:GSM:BBT?

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +3.00000000E–001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 786.

## :BRATe

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:GSM:BRATe <val>

[ :SOURCE ] :RADIO:GSM:BRATe?

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables.

---

**NOTE** When using multiframe, limit the symbol rate to no more than 271 ksps. Although higher rates may work, they are not supported. See “:SRATe” on page 804 for data stated as symbol rates.

---

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects a filter length.

For higher bit rates, the FIR filter length may be truncated (if the minimum filter size allows it) which will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 965). Refer to “:FILTer” on page 786 for information on filter symbol widths.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

**\*RST** +2.70833333E+005

Range	Modulation Type	Bit Rate Range		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps
	FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
	QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
	QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
	QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
	QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

**Key Entry**                      **Symbol Rate**

**:BURSt:PN9**

**Supported**                      E4438C with Option 402

[ :SOURce ] :RADio:GSM: BURSt : PN9 NORMal | QUICk  
 [ :SOURce ] :RADio:GSM: BURSt : PN9?

This command controls the software PN9 generation.

**NORMal**                      This choice produces a maximum length PN9 sequence.

**QUICk**                      This choice produces a truncated PN9 sequence.

**\*RST**                      NORM

**Key Entry**                      PN9 Mode Normal Quick

Receiver Test Digital Commands (continued)  
**GSM Subsystem—Option 402 ([:SOURCE]:RADIO:GSM)**

**Remarks** Use Normal mode for bit-error-rate tests where a maximum length PN9 sequence is required.

**:BURSt:SHAPe:FALL:DELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:BURSt:SHAPe:FALL:DELay <val>  
[ :SOURCE ] :RADio:GSM:BURSt:SHAPe:FALL:DELay?
```

This command sets the burst shape fall delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -11.0625 to 99

**Key Entry** **Fall Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 777 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:FALL:TIME**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:BURSt:SHAPe:FALL:TIME <val>  
[ :SOURCE ] :RADio:GSM:BURSt:SHAPe:FALL:TIME?
```

This command sets the burst shape fall time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.0625–127.9375



<b>Key Entry</b>	Fall Time
<b>Remarks</b>	<p>The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.</p> <p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 789. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPe:FTIME” on page 778 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

### **:BURSt:SHAPe:FDElay**

<b>Supported</b>	E4438C with Option 402
	<pre>[ :SOURce ] :RADio:GSM:BURSt:SHAPe:FDElay &lt;val&gt; [ :SOURce ] :RADio:GSM:BURSt:SHAPe:FDElay?</pre>
	<p>This command sets the burst shape fall delay.</p> <p>The variable &lt;val&gt; is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.</p>
<b>*RST</b>	+0.00000000E+000
<b>Range</b>	–11.0625 to 99
<b>Key Entry</b>	Fall Delay
<b>Remarks</b>	<p>The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.</p> <p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 789. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPe:FALL:DElay” on page 776 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

## :BURSt:SHAPe:FTIME

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:FTIME <val>

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:FTIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +3.00000000E+000

**Range** 0.0625–127.9375

**Key Entry** Fall Time

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:TIME” on page 776 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:RDElay

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:RDElay <val>

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:RDElay?

This command sets the burst shape rise delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate. For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**\*RST** +0.00000000E+000

**Range** –8.0625 to 99

**Key Entry** Rise Delay

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELay” on page 779 performs the same function; in compliance with the SCPI standard, both commands are listed.

### **:BURSt:SHAPe:RISE:DELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:BUrSt:SHAPe:RISE:DELay <val>  
[ :SOURCE ] :RADIo:GSM:BUrSt:SHAPe:RISE:DELay?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate. For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**\*RST** +0.00000000E+000

**Range** -8.0625 to 99

**Key Entry** Rise Delay

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELay” on page 778 performs the same function; in compliance with the SCPI standard, both commands are listed.

## :BURSt:SHAPe:RISE:TIME

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:RISE:TIME <val>

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:RISE:TIME?

This command sets the burst shape rise time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate. For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**\*RST** +3.00000000E+000

**Range** 0.0625–11.1875

**Key Entry** Rise Time

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789.

Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RTIME” on page 780 performs the same function; in compliance with the SCPI standard, both commands are listed.

## :BURSt:SHAPe:RTIME

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:RTIME <val>

[ :SOURCE ] :RADIo:GSM:BURSt:SHAPe:RTIME?

This command sets the burst shape rise time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate. For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User's Guide*.

**\*RST** +3.00000000E+000

**Range** 0.0625–11.1875

**Key Entry** Rise Time

**Remarks**                    The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 780 performs the same function; in compliance with the SCPI standard, both commands are listed.

### **:BURSt:SHAPe[:TYPE]**

**Supported**                    E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:BURSt:SHAPe[:TYPE] SINE| "<file name>"
[:SOURCE]:RADIO:GSM:BURSt:SHAPe[:TYPE] ?
```

This command specifies the burst shape as either SINE or a user-defined file ("<file name>").

**SINE**                            This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

"<file name>"                This choice selects a user designated file from signal generator memory (non-volatile).

**\*RST**                            SINE

**Key Entry**                    **Sine    User File**

### **:BURSt[:STATe]**

**Supported**                    E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:BURSt[:STATe] ON|OFF|1|0
[:SOURCE]:RADIO:GSM:BURSt[:STATe] ?
```

This command enables or disables the burst function.

**ON (1)**                        This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

**OFF (0)**                        This choice enables the transmission of unframed data.

**GSM Subsystem—Option 402 ([:SOURCE]:RADio:GSM)**

**\*RST** 0  
**Key Entry** Data Format Pattern Framed

**:CHANnel**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:CHANnel EVM|ACP
[ :SOURCE ] :RADio:GSM:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** ACP

**Key Entry** **Optimize FIR For Evm ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 786.

**:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:DATA PN9|PN11|PN15|PN20|PN23|FIX4|"<file name>"|
EXT|P4|P8|P16|P32|P64|PRAM
[ :SOURCE ] :RADio:GSM:DATA?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1’s and 0’s, data from an external source, or a user file) for unframed data transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1’s &amp; 4 0’s</b>	<b>8 1’s &amp; 8 0’s</b>	<b>16 1’s &amp; 16 0’s</b>	<b>32 1’s &amp; 32 0’s</b>				
	<b>64 1’s &amp; 64 0’s</b>	<b>PRAM File</b>						

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

## :DATA:PRAM

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:DATA:PRAM "<file_name>"
```

```
[ :SOURCE ] :RADIo:GSM:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the GSM (Global System for Mobile communication) format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

## :DATA:FIX4

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADIo:GSM:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the GSM modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

## :DEFault

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:DEFault
```

This command returns all of the GSM format parameters to their factory default conditions. It does not affect any other signal generator parameters.

Receiver Test Digital Commands (continued)  
**GSM Subsystem—Option 402 ([:SOURCE]:RADio:GSM)**

**Key Entry**            Restore GSM Factory Default

**:DENCode**

**Supported**            E4438C with Option 402

[ :SOURCE ] :RADio:GSM:DENCode ON|OFF|1|0  
[ :SOURCE ] :RADio:GSM:DENCode?

This command enables or disables the differential data encoding function. Once this function is enabled, data bits are encoded prior to modulation; each modulated bit is 1 if the data bit is different from the previous one, or 0 if the data bit is the same as the previous one.

**\*RST**                    1

**Key Entry**            **Diff Data Encode Off On**

**EDATa:DELaY**

**Supported**            E4438C with Option 402

[ :SOURCE ] :RADio:GSM:EDATa:DELaY?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks**            When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**:EDCLock**

**Supported**            E4438C with Option 402

[ :SOURCE ] :RADio:GSM:EDCLock SYMBol|NORMal  
[ :SOURCE ] :RADio:GSM:EDCLock?

This command sets the external data clock use.

**SYMBol**                This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal**                This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST**                    NORM

**Key Entry**            **Ext Data Clock Normal Symbol**



**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBCLock” on page 773 to select EXT as the data clock type.

## :EREFerence

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:GSM:EREFerence INT|EXT

[ :SOURCE ] :RADIo:GSM:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** **BBG Ref Ext Int**

**Remarks** If the EXT choice is selected, the external source’s frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

## :EREFerence:VALue

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIo:GSM:EREFerence:VALue <val>

[ :SOURCE ] :RADIo:GSM:EREFerence:VALue?

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence” on page 785 to select EXT (external source) as the reference for the bit-clock reference.

**:FILTER**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:GSM:FILTER RNYQuist | NYQuist | GAUSSian | RECTangle |
IS95 | IS95_EQ | IS95_MOD | IS95_MOD_EQ | AC4Fm | UGGaussian | "<user FIR>"
[ :SOURCE ] :RADIO:GSM:FILTER?
```

This command selects the pre-modulation filter type.

- IS95 This choice selects a filter that meets the criteria of the IS-95 standard.
- IS95\_EQ This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
- IS95\_MOD This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
- IS95\_MOD\_EQ This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
- AC4Fm This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
- UGGaussian This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
- "<user FIR>" This variable is any filter file that you have stored into memory.

**\*RST** GAUS

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM Gaussian</b>		
	<b>User FIR</b>					

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## **:IQ:SCALE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:IQ:SCALE <val>
```

```
[ :SOURCE ] :RADIo:GSM:IQ:SCALE?
```

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST** +100

**Range** 1–200

**Key Entry** **I/Q Scaling**

**Remarks** This command has no effect with MSK or FSK modulation.

## **:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:MODulation:FSK[:DEVIation] <val>
```

```
[ :SOURCE ] :RADIo:GSM:MODulation:FSK[:DEVIation]?
```

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 789.

Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

### **:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:MODulation:MSK[:PHASe] <val>  
[ :SOURCE ] :RADio:GSM:MODulation:MSK[:PHASe] ?
```

This command sets the MSK phase deviation value. The variable <val> is in units of degrees

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** Phase Dev

### **:MODulation:UFSK**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:MODulation:UFSK "<file name>"  
[ :SOURCE ] :RADio:GSM:MODulation:UFSK?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. See “[:MODulation\[:TYPE\]](#)” on page 789 to change the current modulation type.

See “[File Name Variables](#)” on page 13 for information on the file name syntax.

### **:MODulation:UIQ**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:MODulation:UIQ "<file name>"  
[ :SOURCE ] :RADio:GSM:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “[:MODulation\[:TYPE\]](#)” on page 789 to change the current modulation type.

See “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:GSM:MODulation [ :TYPE ] BPSK | QPSK | IS95QPSK |
GRAYQPSK | OQPSK | IS95OQPSK | P4DQPSK | PSK8 | PSK16 | D8PSK | MSK | FSK2 | FSK4 | FSK8 |
FSK16 | C4FM | QAM4 | QAM16 | QAM32 | QAM64 | QAM128 | QAM256 | UIQ | UFSK
[ :SOURce ] :RADio:GSM:MODulation [ :TYPE ] ?
```

This command sets the modulation type for the GSM personality.

**\*RST** MSK

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>	<b>OQPSK</b>			
	<b>IS-95 OQPSK</b>	<b><math>\pi/4</math> DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

**:POLarity[:ALL]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:GSM:POLarity [ :ALL ] NORMal | INVerted
[ :SOURce ] :RADio:GSM:POLarity [ :ALL ] ?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **Phase Polarity Normal Invert**

**Remarks** This command is useful for lower sideband mixing applications.

## :SECondary:RECall

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:GSM:SECondary:RECall

This command recalls the secondary frame configuration, overwriting the current state.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “:SECondary:SAVE” on page 790.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “:SECondary[:STATE]” on page 791.

## :SECondary:SAVE

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:GSM:SECondary:SAVE

This command saves the current frame configuration as the secondary frame with the filename GSM\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame state (saved in non-volatile signal generator memory), refer to “:SECondary:RECall” on page 790.

## :SECondary:TRIGger[:SOURCE]

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:GSM:SECondary:TRIGger [ :SOURCE ] KEY | EXT | BUS

[ :SOURCE ] :RADio:GSM:SECondary:TRIGger [ :SOURCE ] ?

This command selects the type of triggering for the secondary frame.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 810.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry** **Trigger Key Ext Bus**

### **:SECondary[:STATe]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SECondary[:STATe] ON|OFF|1|0
[:SOURCE]:RADIO:GSM:SECondary[:STATe] ?
```

This command enables or disables the ability to switch to the secondary frame.

**\*RST** 0

**Key Entry** **Secondary Frame Off On**

**Remarks** A frame must already be saved as the secondary frame in order to turn the secondary state function on. To save a frame as the secondary frame, refer to [“:SECondary:SAVE” on page 790](#).

### **:SLOT0|[1]|2|3|4|5|6|7:ACCess:ENCRyption**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:ENCRyption
PN9|PN15|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:ENCRyption?
```

This command creates and configures an access encrypted data field.

**\*RST** PN9

**Key Entry** **PN9 PN15 FIX4 User File Ext 4 1's & 4 0's 8 1's & 8 0's**  
**16 1's & 16 0's 32 1's & 32 0's 64 1's & 64 0's**

**Remarks** See [“File Name Variables” on page 13](#) for information on the file name syntax.

### **:SLOT0|[1]|2|3|4|5|6|7:ACCess:ENCRyption:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:ENCRyption:FIX4 <val>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:ENCRyption:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected access timeslot encryption field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:SLOT0|[1]|2|3|4|5|6|7:ACCess:ETAIl**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:ETAIl <bit_pattern>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:ETAIl?
```

This command specifies the extended tail bits (8 bits) field for the selected access timeslot.

**\*RST** #H3A

**Range** #H00–#HFF

**Key Entry** ET

**:SLOT0|[1]|2|3|4|5|6|7:ACCess:SSEQuence**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:SSEQuence <bit_pattern>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:ACCess:SSEQuence?
```

This command specifies the synchronization sequence bits (41 bits) for the selected access timeslot.

**\*RST** #H096FF335478

**Range** #H0–#H1FFFFFFFF

**Key Entry** SS

**:SLOT0|[1]|2|3|4|5|6|7:ACCess:CUSTom**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:CUSTom PN9|PN15|FIX4|
"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:CUSTom?
```

This command configures the data field for the selected custom timeslot.

**\*RST** PN9

**Key Entry** **PN9** **PN15** **FIX4** **User File** **Ext** **4 1's & 4 0's** **8 1's & 8 0's**  
**16 1's & 16 0's** **32 1's & 32 0's** **64 1's & 64 0's**

**Remarks** See “File Name Variables” on page 13 for information on the file name syntax.



### **:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4 <val>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:CUSTom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

### **:SLOT0|[1]|2|3|4|5|6|7:DUMMy:TSEQuence**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:DUMMy:TSEQuence TSC0|
TSC1|TSC2|TSC3|TSC4|TSC5|TSC6|TSC7|<bit_pattern>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:DUMMy:TSEQuence?
```

This command changes the 26-bit dummy training sequence (TS) for the selected dummy timeslot.

**\*RST** #H0000000

**Range** <bit\_pattern>: #H0–#H3FFFFFF

**Key Entry** **TSC0 TSC1 TSC2 TSC3 TSC4 TSC5 TSC6 TSC7**  
**Custom TS**

**Remarks** When normal preset is selected, the preset hexadecimal value for TS reflects the GSM protocol, however you may use this command to enter a new value.

### **:SLOT0|[1]|2|3|4|5|6|7:MULTIslot**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:MULTIslot ON|OFF|1|0
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:MULTIslot?
```

This command turns bursting (ramping) on or off between the selected timeslot and the next higher numbered adjacent timeslot.

ON (1) This choice turns ramping off between timeslots.

OFF (0) This choice turns ramping on between timeslots.

\*RST 0

Key Entry Multislot Off On

## SLOT0|[1]|2|3|4|5|6|7:NORMAl:ENCRyption

Supported E4438C with Option 402

```
[:SOURCE]:RADio:GSM:SLOT0|[1]|2|3|4|5|6|7:NORMAl:ENCRyption
PN9|PN15|FIX4|"<filename>"|EXT|P4|P8|P16|P32|P64|TCHFS|TCHHS|CS1|CS4|
DMCS1|UMCS1|BCH1|BCH2
[:SOURCE]:RADio:GSM:SLOT0|[1]|2|3|4|5|6|7:NORMAl:ENCRyption?
```

This command creates and configures an encrypted data field for a normal timeslot.

PN9	This choice uses a standard PN9 bit pattern. In the case of TDMA bursted data, a PN9 repeats continuously, running from one timeslot to the matching timeslot in the next frame.
PN15	This choice uses a standard PN15 bit pattern. In the case of TDMA bursted data, a PN15 repeats continuously, running from one timeslot to the matching timeslot in the next frame.
FIX4	This choice uses a fixed 4-bit pattern. The selected 4-bit pattern will be repeated as necessary to fill the selected data to set the desired pattern.
User File	This choice selects a user-supplied file to be used as the bit pattern. In the case of TDMA bursted data, enough bits must be supplied to fill the desired number of timeslots (left over bit are ignored). User files contain 8 data bits per byte.
EXT	This choice uses an external user signal as the modulating data stream. Serial data is supplied via the front panel DATA BNC connector.
P4	This choice selects a data pattern with 4 1's followed by 4 0's. The selected pattern will be repeated as necessary to fill the selected data area.
P8	This choice selects a data pattern with 8 1's followed by 8 0's. The selected pattern will be repeated as necessary to fill the selected data area.
P16	This choice selects a data pattern with 16 1's followed by 16 0's. The selected pattern will be repeated as necessary to fill the selected data area.
P32	This choice selects a data pattern with 32 1's followed by 32 0's. The selected pattern will be repeated as necessary to fill the selected data area.
P64	This choice selects a data pattern with 64 1's followed by 64 0's. The selected pattern will be repeated as necessary to fill the selected data area.
TCHFS	This choice selects traffic channel with full rate speech (TCH/FS). This channel would be represented by a 26 frame multiframe with an SACCH and IDLE frame.

TCHHS	This choice selects traffic channel with half rate speech (TCH/HS). This is when a complex coding scheme is used that can allow two mobile stations to share the same timeslot. On an ESG this is represented by having one timeslot with a normal burst and user definable training sequence and the same timeslot on an alternate frame using a dummy burst. This represents the situation where TCH/HS is being used in one timeslot and the other timeslot is not being used.
CS-1	This choice selects the CS-1 channel, a packet data traffic channel with block type 1 as per 3GPP standard GSM 05.03.
CS4	This choice selects the CS-4 channel, a packet data traffic channel with block type 4 as per 3GPP standard GSM 05.03.
DMCS1	This choice selects the downlink MCS-1 channel, a packet data traffic channel with block type 5 as per 3GPP standard GSM 05.03.
UMCS1	This choice selects the uplink MCS-1 channel, a packet data traffic channel with block type 5 as per 3GPP standard GSM 05.03.
BCH1	This choice selects a non-combined broadcast channel. BCH1 can only be set in timeslot zero and can be the only multiframe type in a frame. This means that BCH1 will conflict with the following parameters: TCH/FS, TCH/HS, CS-1, CS-4, DMCS-1 and UMCS-1.
BCH2	This choice selects a combined broadcast channel. BCH2 can only be set in timeslot zero and can be the only multiframe type in a frame. This means that BCH2 will conflict with the following parameters: TCH/FS, TCH/HS, CS-1, CS-4, DMCS-1, and UMCS-1.
*RST	PN9
<b>Range</b>	BCH1: 0–65535 BCH2: 0–65535
<b>Key Entry</b>	<b>PN9    PN15    FIX4    User File    Ext    4 1's &amp; 4 0's    8 1's &amp; 8 0's</b> <b>16 1's &amp; 16 0's    32 1's &amp; 32 0's    64 1's &amp; 64 0's    TCH/FS    TCH/HS</b> <b>CS-1    CS-4    Downlink MCS-1    Uplink MCS-1</b>
<b>Remarks</b>	See <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

**GSM Subsystem—Option 402 ([:SOURCE]:RADIO:GSM)****:SLOT0:NORMAL:ENCRyption:BCH1:BCC****Supported** E4438C with Option 416

[:SOURCE]:RADIO:GSM:SLOT0:NORMAL:ENCRyption:BCH1:BCC &lt;val&gt;

[:SOURCE]:RADIO:GSM:SLOT0:NORMAL:ENCRyption:BCH1:BCC?

This command sets the broadcast control code (BCC) which is used to indicate what training sequence is being used by the basestation in the forward channels. This code will allow the mobile station to decode the other channels in the broadcast channel.

**\*RST** 0**Range** 0–7**:SLOT0:NORMAL:ENCRyption:BCH1:CELLid****Supported** E4438C with Option 416

[:SOURCE]:RADIO:GSM:SLOT0:NORMAL:ENCRyption:BCH1:CELLid &lt;val&gt;

[:SOURCE]:RADIO:GSM:SLOT0:NORMAL:ENCRyption:BCH1:CELLid?

This command sets the cell identification. This will identify a cell within a location area.

**\*RST** 0**Range** 0–65535**:SLOT0:NORMAL:ENCRyption:BCH1:LAC****Supported** E4438C with Option 416

[:SOURCE]:RADIO:GSM:SLOT0:NORMAL:ENCRyption:BCH1:LAC &lt;val&gt;

[:SOURCE]:RADIO:GSM:SLOT0:NORMAL:ENCRyption:BCH1:LAC?

This command sets the location area code (LAC). The location area code provides 16 bits to allow the administrator to define a location.

**\*RST** 0**Range** 0–65535

### **:SLOT0:NORMAL:ENCRyption:BCH1:MCC**

**Supported** E4438C with Option 416

[ :SOURCE ] :RADIo:GSM:SLOT0:NORMAl:ENCRyption:BCH1:MCC <val>

[ :SOURCE ] :RADIo:GSM:SLOT0:NORMAl:ENCRyption:BCH1:MCC?

This command sets the mobile country code (MCC). The mobile country code is a 12 bit number used to represent the country where the basestation is located.

**\*RST** 0

**Range** 0–4095

### **:SLOT0:NORMAL:ENCRyption:BCH1:MNC**

**Supported** E4438C with Option 416

[ :SOURCE ] :RADIo:GSM:SLOT0:NORMAl:ENCRyption:BCH1:MNC <val>

[ :SOURCE ] :RADIo:GSM:SLOT0:NORMAl:ENCRyption:BCH1:MNC?

This command sets the mobile network code (MNC). The mobile network code is the individual number a network will be assigned.

**\*RST** 0

**Range** 0–255

**Remarks** Federal regulation mandates that a 3-digit MNC will be used. For the ESG implementation the upper four bits are set to 1111.

### **:SLOT0:NORMAL:ENCRyption:BCH1:PLMN**

**Supported** E4438C with Option 416

[ :SOURCE ] :RADIo:GSM:SLOT0:NORMAl:ENCRyption:BCH1:PLMN <val>

[ :SOURCE ] :RADIo:GSM:SLOT0:NORMAl:ENCRyption:BCH1:PLMN?

This command is used to set the Public Land Mobile Network (PLMN) which is used to indicate the country the phone is in. PLMN is also referred to as the National Country Code (NCC).

**\*RST** 0

**Range** 0–7

### **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:CS1:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:CS1:DATA  
PN9 | PN15  
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:CS1:DATA?
```

This command sets the bit pattern for the CS1 packet data traffic channel.

**\*RST** PN9

**Key Entry** **PN9 PN15**

### **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:CS4:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo [1] | 2 | 3 | 4 :GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:CS4  
:DATA PN9 | PN15  
[ :SOURCE ] :RADIo [1] | 2 | 3 | 4 :GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:CS4  
:DATA?
```

This command selects the encryption field data, if the selected timeslot uses the packet data block type 4 coding scheme.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**Remarks** Refer to “[SLOT0|\[1\]|2|3|4|5|6|7:NORMAL:ENCRyption](#)” on page 794 for selecting the coding scheme.

### **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:DLINK:MCS1:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:DLINK:MCS1:  
DATA PN9 | PN15  
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:DLINK:MCS1:  
DATA?
```

This command sets the bit pattern for the downlink MCS1 packet data traffic channel.

**\*RST** PN9

**Key Entry** **PN9 PN15**

### **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:FIX4 <val>  
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected normal timeslot encryption field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

### **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:TCH:FS:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:TCH:FS:DATA  
PN9 | PN15  
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:TCH:FS:DATA?
```

This command sets the bit pattern for the TCH/FS channel.

**\*RST** PN9

**Key Entry** **PN9 PN15**

### **:SLOT0|[1]|2|3|4|5|6|7:NORMAL:ENCRyption:ULINK:MCS1:DATA**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:ULINK:MCS1:  
DATA PN9 | PN15  
[ :SOURCE ] :RADIo:GSM:SLOT0 | [1] | 2 | 3 | 4 | 5 | 6 | 7 :NORMAl:ENCRyption:ULINK:MCS1:  
DATA?
```

This command sets the bit pattern for the uplink MCS1 packet data traffic channel.

**\*RST** PN9

**Key Entry** **PN9 PN15**

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:STeal**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:NORMAL:STeal <val>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:NORMAL:STeal?
```

This command specifies the normal stealing bits for the selected timeslot. The single bit defines the value for both 1-bit fields.

**\*RST** #H0

**Range** #H0–#H1

**Key Entry** **S**

**:SLOT0|[1]|2|3|4|5|6|7:NORMAL:TSEQUence**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:NORMAL:TSEQUence
TSC0|TSC1|TSC2|TSC3|TSC4|TSC5|TSC6|TSC7|<bit_pattern>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:NORMAL:TSEQUence?
```

This command changes the 26-bit training sequence (TS) for a normal timeslot. The preset hexadecimal value (when normal preset is selected) for TS reflects the GSM protocol, however you can enter a new value by using this command. The hexadecimal values for the 8 training sequence codes are listed below:

**\*RST** #H0000000

**Range** <bit\_pattern>: #H0–#H3FFFFFF

**Key Entry** **TSC0 TSC1 TSC2 TSC3 TSC4 TSC5 TSC6 TSC7**

**Custom TS**

**Remarks** The preset hexadecimal value (when normal preset is selected) for TS reflects the GSM protocol, however you can enter a new value by using this command.



**:SLOT0|[1]|2|3|4|5|6|7:POWer**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:POWer MAIN|DELTA
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:POWer?
```

This command defines the RF output power level for the selected timeslot.

**MAIN**                    This choice specifies RF output as the main power level.

**DELTA**                   This choice specifies RF output as the alternative power level.

**\*RST**                    MAIN

**Key Entry**             **Timeslot Ampl Main Delta**

**:SLOT0|[1]|2|3|4|5|6|7:STATe**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:STATe ON|OFF|1|0
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:STATe?
```

This command enables or disables the operating state of the selected timeslot.

**\*RST**                    Timeslot 0: 1      Timeslot 1–7: 0

**Key Entry**             **Timeslot Off On**

**:SLOT0|[1]|2|3|4|5|6|7:SYNC:ENCRyption**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:SYNC:ENCRyption PN9|PN11|PN15|
PN20|PN23|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:SYNC:ENCRyption?
```

This command creates and configures an encrypted data field for a synchronization timeslot.

**\*RST**                    PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>				
	<b>64 1's &amp; 64 0's</b>							

**Remarks**             Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:SLOT0|[1]|2|3|4|5|6|7:SYNC:ENCRyption:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:SYNC:ENCRyption:FIX4 <val>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:SYNC:ENCRyption:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected synchronization timeslot encryption field.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:SLOT0|[1]|2|3|4|5|6|7:SYNC:TSEQUence**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:SYNC:TSEQUence <bit_pattern>
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7:SYNC:TSEQUence?
```

This command customizes the training sequence (TS) for the selected synchronization timeslot. The preset hexadecimal value (when normal preset is selected) for TS reflects the GSM protocol, however you can enter a new value by using this command.

**\*RST** #HB962040F2D45761B

**Range** #H0–#HFFFFFFFFFFFFFFFF

**Key Entry** **TS**

**:SLOT0|[1]|2|3|4|5|6|7[:TYPE]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7[:TYPE] CUSTom|NORMaL|
FCORrection|SYNC|DUMMy|ACCess|NORMAL_ALL
[:SOURCE]:RADIO:GSM:SLOT0|[1]|2|3|4|5|6|7[:TYPE]?
```

This command sets the timeslot type for the selected timeslot.

**\*RST** NORMAL

**Key Entry** **Custom Normal FCorr Sync Dummy Access Normal All**

## **:SOUT**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SOUT FRAME|SLOT|ALL
[:SOURCE]:RADIO:GSM:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

<b>Key Entry</b>	<b>Begin Frame</b>	<b>Begin Timeslot #</b>	<b>All Timeslots</b>
------------------	--------------------	-------------------------	----------------------

## **:SOUT:OFFSet**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:GSM:SOUT:OFFSet <val>
[:SOURCE]:RADIO:GSM:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed as a number of bits.

**\*RST** +0

**Range** -155 to 155

**Key Entry** **Sync Out Offset**

**Remarks** Negative values move the synchronization output signal earlier; positive values move it later.

To change the output of the EVENT1 rear panel connector to SLOT, refer to [“:SOUT” on page 803](#).

## :SOUT:SLOT

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:GSM:SOUT:SLOT <val>

[ :SOURCE ] :RADio:GSM:SOUT:SLOT?

This command selects the timeslot that will trigger a 1-bit output signal at the EVENT 1 rear panel connector.

**\*RST** +0

**Range** 0–7

**Key Entry** **Begin Timeslot #**

**Remarks** To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 803.

## :SRATe

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:GSM:SRATe <val>

[ :SOURCE ] :RADio:GSM:SRATE?

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to “:BRATe” on page 774 for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–MSPS) and the maximum symbol rate depends on the filter. Refer to “:FILTer” on page 786 for minimum filter symbol width.

---

**NOTE** When using multiframe, limit the symbol rate to no more than 271 kSPS. Although higher rates may work, they are not supported.

---

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 789.

**\*RST** +2.70833333E+006

Range	Modulation Type	Symbol Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1sps–50MspS	1sps–25MspS	1sps–12.5MspS
	C4FM, OQPSK, FSK4	2sps–25MspS	2sps–12.5MspS	2sps–6.25MspS
	OQPSKI95, QPSK			
	P4QPPSK, QPSKI95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 MspS	3sps–8.333333333 MspS	3sps–4.166666666MspS
	FSK16, PSK16, QAM16	4sps–12.5MspS	4sps–6.25MspS	4sps–3.125MspS
	QAM32	5sps–10MspS	5sps–5MspS	5sps–2.5MspS
	QAM64	6sps–8.333333333 MspS	6sps–4.166666666 MspS	6sps–2.083333333 MspS
	QAM128	7sps–7.142857142 MspS	7sps–3.571428572 MspS	7sps–1.785714285 MspS
	QAM256	8sps–6.25MspS	8sps–3.125 MspS	8sps–1.5625 MspS

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**                      **Symbol Rate**

**:TRIGger:EXTernal:DELay**

**Supported**                      E4438C with Option 416

```
[:SOURce]:RADio:GSM:TRIGger:EXTernal:DELay <val>
[:SOURce]:RADio:GSM:TRIGger:EXTernal:DELay?
```

This command sets the trigger delay for synchronizing the ESG. The variable <val> is expressed in number of symbols.

**\*RST**                                +0

**Range**                              0–1048575

## **:TRIGger:TYPE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:GSM:TRIGger:TYPE CONTInuous | SINGle | GATE
[ :SOURCE ] :RADIO:GSM:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTInuous** The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “[:TRIGger:TYPE:CONTInuous\[:TYPE\]](#)” on page 806.

**SINGle** The framed data sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST** CONT

**Key Entry** **Continuous**      **Single**      **Gated**

## **:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:GSM:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet
[ :SOURCE ] :RADIO:GSM:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode. See “[:TRIGger:TYPE](#)” on page 806 for more information on triggering modes.

The following list describes the waveform’s response to each of the command choices:

**FREE** Turning the ARB format on immediately triggers the waveform. The waveform repeats until the format is turned off or another trigger or waveform is selected.

**TRIGger** The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

**RESet** The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

**\*RST** FREE

**Key Entry** **Free Run**      **Trigger & Run**      **Reset & Run**

## :TRIGger:TYPE:GATE:ACTive

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:TRIGger:TYPE:GATE:ACTive LOW|HIGH  
[ :SOURCE ] :RADIo:GSM:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 806.

The following list describes the signal generator’s gating behavior for the external trigger signal polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
*RST	HIGH

**Key Entry** Gate Active Low High

## :TRIGger[:SOURCE]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo:GSM:TRIGger [ :SOURCE ] KEY|EXT|BUS  
[ :SOURCE ] :RADIo:GSM:TRIGger [ :SOURCE ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 806. The following list describes the command choices:

KEY	This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.
EXT	An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger: <ul style="list-style-type: none"><li>• The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 810.</li></ul>

**GSM Subsystem—Option 402 ([:SOURCE]:RADio:GSM)**

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User's Guide*.

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 807
  - continuous and single modes, see “:TRIGger[:SOURCE]:EXTernal:SLOPe” on page 809
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURCE]:EXTernal:DELay” on page 808
  - turning the delay on, see “:TRIGger[:SOURCE]:EXTernal:DELay:STATe” on page 809

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

**Key Entry**      **Trigger Key**      **Ext**      **Bus**

**:TRIGger[:SOURCE]:EXTernal:DELay**

**Supported**      E4438C with Option 402

This command sets the number of bits to delay the signal generator's response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “:TRIGger[:SOURCE]:EXTernal:DELay:STATe” on page 809. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 807.

**\*RST**      +0

**Range**      0–1048575

**Key Entry**      **Ext Delay Bits**



### **:TRIGger[:SOURCE]:EXTErnal:DELay:FINE**

**Supported** E4438C with Option 416

```
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTErnal:DELay:FINE <val>  
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTErnal:DELay:FINE?
```

This command sets the fine trigger delay for synchronizing the ESG.

The fine delay value is added to the coarse delay setting (see “:TRIGger[:SOURCE]:EXTErnal:DELay” on page 808).

The variable <val> is expressed as a fraction of one symbol.

**\*RST** +0.00000000E+000

**Range** 0–1

### **:TRIGger[:SOURCE]:EXTErnal:DELay:STATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTErnal:DELay:STATe ON|OFF|1|0  
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTErnal:DELay:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURCE]:EXTErnal:DELay” on page 808, and for more information on configuring an external source, see “:TRIGger[:SOURCE]” on page 807.

**\*RST** 0

**Key Entry** Ext Delay Off On

### **:TRIGger[:SOURCE]:EXTErnal:SLOPe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTErnal:SLOPe POSitive|NEGative  
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 807.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

Receiver Test Digital Commands (continued)  
**GSM Subsystem—Option 402 ([:SOURCE]:RADio:GSM)**

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 807.

**\*RST**                    NEG  
**Key Entry**            **Ext Polarity Neg Pos**

**:TRIGger[:SOURCE]:EXTernal[:SOURCE]**

**Supported**            E4438C with Option 402

```
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTernal [ :SOURCE ] EPT1 |  
EPT2 | EPTRIGGER1 | EPTRIGGER2  
[ :SOURCE ] :RADio:GSM:TRIGger [ :SOURCE ] :EXTernal [ :SOURCE ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 807. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

**[ :STATe]**

**Supported** E4438C with Option 402

[ :SOURce] :RADio:GSM [ :STATe] ON|OFF|1|0

[ :SOURce] :RADio:GSM [ :STATe] ?

This command enables or disables the GSM modulation format.

**\*RST** 0

**Key Entry** **GSM Off On**

**Remarks** Although the GSM modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.

---

## HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])

The commands in this subsystem support the remote functionality of the Signal Studio for HSDPA over W-CDMA software. For a complete description of terms and HSDPA functionality, refer to the software online help. Commands used for configuring the carrier signal and performing general signal generator functions are located in different SCPI command subsystems found within the SCPI Command Reference volumes.

There are two methods to determine the SCPI commands for a setup. One method is to locate each individual command listed in this subsystem and others within the *SCPI Command Reference* volumes. The other method is to use the HSDPA software UI. After downloading a UI setup to the ESG, the software lets you export a SCPI file that contains the commands used in the UI setup. Refer to the HSDPA software online help for information on this feature.

### File Overview

The ESG's memory catalog (signal generator memory) uses several file types, each assigned with a unique syntax to recall the file. This section provides information on using files with SCPI commands.

This subsystem uses the following two command variables to represent two different file types stored in signal generator memory:

"<file name>" Bit file

"<user FIR>" FIR file

For more information on managing and using files, refer to the resources in the following list:

- [“File Name Variables” on page 13](#) for information on the file name syntax
- [Table 1-4 on page 14](#) for a listing of the different file types
- *E4428C/38C ESG Signal Generators Programming Guide* for information on downloading bit files
- *E4428C/38C ESG Signal Generators User's Guide* for information on creating and editing bit and FIR files using the signal generator

---

**NOTE** To create or edit HSDPA files with the ESG, use the table editors located in the Real Time W-CDMA modulation format. Access the bit table editor through the Data field and then select **User File** as the data source. Access the FIR filter table editor through the Filter field and then select **Define User FIR** as the filter type.

---

**HSDPA over W-CDMA Subsystem—Option 418** [:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]

The HSDPA software interface downloads user files (bit and FIR file types) to the ESG when **USER** is the software data or filter type selection. You can see these files on the ESG by pressing **Utility > Memory Catalog > Catalog Type** and then selecting the file type, or by using the SCPI commands located in the Memory subsystem. User files are located on the ESG in the following directory path: /USER/<file type directory>/<file name>. **Table 9-2** shows the software naming convention for the different files created by the HSDPA software.

**Table 9-2 HSDPA Software Downloaded File Names**

Link Direction	Data Source	File Name	ESG File Type
Downlink and Uplink	Filter	<project name>–FIR	FIR
Downlink	BCH	<project name>–BCH	Bit
	PICH	<project name>–PICH	
	DPCH	<project name>–DPCH	
	DCH <sub>x</sub> <sup>a</sup>	<project name>–DCH <sub>x</sub> <sup>a</sup>	
	Inter-TTI	<project name>–ITTI <sub>x</sub> <sup>b</sup>	
	HARQ ACK/NACK Pattern	<project name>–DLCPT	
	AMC CQI Pattern	<project name>–DLAPT	
	HS-DSCH	<project name>–DSCH1	
	HS-PDSCH	<project name>–HSPD <sub>x</sub> <sup>b</sup>	
	HS-SCCH	<project name>–HSSCC <sub>x</sub> <sup>b</sup>	
Uplink	DPCCH	<project name>–DPCCH	
	FBI	<project name>–FBI	
	TPC	<project name>–TPC	
	DPDCH	<project name>–DPDCH	
	DCH <sub>x</sub> <sup>a</sup>	<project name>–DCH <sub>x</sub> <sup>a</sup>	
	ACK Pattern	<project name>–APAT	
	CQI Pattern	<project name>–CPAT	

a. x is the DCH number (1–6).

b. x is the channel number (1–4) for the HSDPA, the HS-PDSCH and the HS-SCCH.

## Managing ESG Setting Conflicts and Error Messages

The ESG reports setting conflicts as error messages. When a setting conflict occurs, an error number and a brief message appear at the bottom of the ESG display. You can view the full text of the error message in either of two ways: by using the front panel of the ESG, or by executing SCPI commands.

Front Panel            Press **Utility > Error Info**.

SCPI                    Execute the SCPI error commands described in the “[System Subsystem \(:SYSTem\)](#)” on page 154.

For more information on Error messages, refer to the *E4428C/38C ESG Signal Generators Programming Guide* for remote viewing or the *E4428C/38C ESG Signal Generators User’s Guide* for front panel viewing.

### :DLINK:APPLY

**Supported**            E4438C with Option 418

```
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:APPLY
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:APPLY?
```

This command applies changes to the channel setup and data for active downlink physical and transport channels, immediately starting the channel coding generation process. A progress bar may appear on the ESG display indicating that the new signal parameters are being applied. Signal parameters are also applied when the HSDPA modulation format is turned on.

Use the query to determine whether or not execution of this command is required. It returns the following responses:

```
0                        Command execution is not required.
1                        Command execution is required.
```

---

**NOTE**                The apply query response is valid only when downlink HSDPA format is active.

---

The apply function will not work if there is a conflict with range values and coupled parameters. For example, if all the physical channel codes are not orthogonal to each other, the new settings are not applied to the signal when this command is executed. Resolve any conflicts before reapplying the changes. The ESG reports an error when conflicts occur.

## :DLINK:AWGN:CN

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:AWGN:CN <val>  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:AWGN:CN?
```

This command sets the downlink in-band carrier to noise ratio (C/N) value using AWGN.

**\*RST** 0

**Range** -30 to 30

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

## :DLINK:AWGN[:STATE]

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:AWGN [ :STATE ] ON | OFF | 0 | 1  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:AWGN [ :STATE ] ?
```

This command turns the downlink AWGN on or off.

**\*RST** 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

## :DLINK:BBCLOCK[:SOURCE]

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:BBCLOCK [ :SOURCE ] INT | EXT  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:BBCLOCK [ :SOURCE ] ?
```

This command selects the downlink baseband generator chip clock source, which is either internal to the signal generator or applied externally.

**\*RST** INT

**Remarks** When using an external chip clock source, connect the signal to the DATA CLOCK connector on the front panel of the ESG.

**:DLINK:CPICH:CCODE****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:CPICH:CCODE?

This query returns the CPICH channelization code, which is always set to zero.

**:DLINK:CPICH:POWER****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:CPICH:POWER &lt;val&gt;

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:CPICH:POWER?

This command sets the CPICH power level. The variable &lt;val&gt; is expressed in decibels (dB).

**\*RST** 3.30000000E+000**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.**:DLINK:CPICH[:STATe]****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:CPICH[:STATe] ON|OFF|1|0

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:CPICH[:STATe] ?

This command turns the CPICH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.**:DLINK:DPCH:CCODE****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH:CCODE &lt;val&gt;

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH:CCODE?

This command sets the downlink DPCH channel code number.

**\*RST** 10**Range** 0–511



**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

The channel code is coupled with the slot format and all other physical channel codes. Set the channel code to not exceed limits of the slot format and ensure that all physical channel codes are orthogonal to each other. If any channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

**:DLINK:DPCH:DATA**

**Supported**                    E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :DLINK:DPCH:DATA PN9 | PN15 | FIX4 | DCH |
"<file name>"
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :DLINK:DPCH:DATA?
```

This command configures the downlink DPCH data pattern.

**DCH**                            This selects the transport channel as the data source. The DCH selection is not available for a DPCH slot format of 16.

"<file name>"                This represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “File Overview” on page 812 for more information on files.

**\*RST**                            PN9

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:DPCH:DATA:FIX4**

**Supported**                    E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :DLINK:DPCH:DATA:FIX4 <val>
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :DLINK:DPCH:DATA:FIX4?
```

This command sets the downlink DPCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST**                            0

**Range**                            0–15

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**:DLINK:DPCH:DCH[1]|2|3|4|5|6:BSIZE****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH:DCH[1]|2|3|4|5|6

:BSIZE &lt;val&gt;

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH:DCH[1]|2|3|4|5|6:BSIZE?

This command sets the block size for the selected downlink DCH.

**\*RST** 20**Range** 0–5000**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the ESG calculates the product of the block size and the number of blocks. If the product of these two parameters exceeds 200,000, the apply function (downlink apply command) will not work.

**:DLINK:DPCH:DCH[1]|2|3|4|5|6:CTYPE****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH:DCH[1]|2|3|4|5|6

:CTYPE HCONv|TCONv|TURBo|NONE

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH:DCH[1]|2|3|4|5|6:CTYPE?

This command sets the coder type for the selected downlink DCH.

**HCONv** This choice selects the 1/2 rate convolutional encoder.**TCONv** This choice selects the 1/3 rate convolutional encoder.**TURBo** This choice selects the turbo coder.**NONE** This choice selects no coding.**\*RST** HCON**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

### **:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6 :CRC**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CRC 0 | 8 |  
12 | 16 | 24  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :CRC?
```

This command sets the number of CRC bits for the selected downlink DCH.

**\*RST** 8

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[DLINK:APPLY](#)” on page 814.

### **:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6 :DATA**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA PN9 |  
PN15 | FIX4 | "<file name>"  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA?
```

This command configures the data for the selected downlink DCH.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “[File Overview](#)” on page 812 for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[DLINK:APPLY](#)” on page 814.

### **:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6 :DATA:FIX4**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA:  
FIX4 <val>  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :DATA:FIX4?
```

This command sets the repeating 4-bit binary data pattern for the selected downlink DCH.

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

<b>*RST</b>	0
<b>Range</b>	0–15
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:NBLocks**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :
NBLocks <val>
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :NBLocks?
```

This command sets the number of data blocks for the selected downlink DCH.

<b>*RST</b>	1
<b>Range</b>	0–512
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.  The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the ESG calculates the product of the block size and the number of blocks. If the product of these two parameters exceeds 200,000, the apply function (downlink apply command) will not work.

**:DLINK:DPCH:DCH[1] | 2 | 3 | 4 | 5 | 6:RMATtribute**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :
RMATtribute <val>
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :
RMATtribute?
```

This command sets the rate matching attribute for the selected downlink DCH.

<b>*RST</b>	1
<b>Range</b>	1–256
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

### **:DLINK:DPCH:DCH[1]|2|3|4|5|6:TTI**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :TTI 10 | 20 |  
40 | 80
```

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :TTI?
```

This command sets the TTI for the selected downlink DCH.

The choices are expressed in millisecond (ms).

**\*RST** 10

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

### **:DLINK:DPCH:DCH2|3|4|5|6[:STATE]**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH2 | 3 | 4 | 5 | 6 [ :STATE ] ON |  
OFF | 1 | 0
```

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:DCH2 | 3 | 4 | 5 | 6 [ :STATE ] ?
```

This command turns the selected downlink DCH on or off; DCH1 is always on.

**\*RST** DCH 1: 1 DCH 2–6: 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

The apply command will not work and the ESG will report an error if you turn on a DCH where lower numbered DCHs are off. For example, turning on DCH5 requires turning on DCH2–4. The reverse is true when turning off the DCHs.

### **:DLINK:DPCH:POWER**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:POWER <val>  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:POWER?
```

This command sets the downlink DPCH power level.

**\*RST** -1.02000000E+001

**Range** -40 to 0

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:DPCH:SFORmat**

**Supported**                    E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:SFORmat <val>
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:SFORmat?
```

This command configures the downlink DPCH slot format.

**\*RST**                            0

**Range**                         0–16

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

The slot format is coupled with the channel code, so a change in one value may require a change in the other. If the channel code exceeds the limits of the slot format or if it is not orthogonal with all other physical channel codes, the apply function (downlink apply command) will not work.

**:DLINK:DPCH:SSCOffset**

**Supported**                    E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:SSCOffset <val>
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:SSCOffset?
```

This command sets the downlink DPCH secondary scrambling code offset.

**\*RST**                            +0

**Range**                         0–15

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:DLINK:DPCH:TFCI**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:TFCI <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:TFCI?
```

This command sets the TFCI 10-bit pattern for the downlink DPCH.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** +0

**Range** 0–1023

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

Setting the TFCI bits is optional; they describe the type of service in use, for example voice or data.

**:DLINK:DPCH:TOFFset**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:TOFFset <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:DPCH:TOFFset?
```

This command adjusts the downlink DPCH timing offset.

The variable <val> is expressed in chips.

**\*RST** +0

**Range** 0–149

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

**:DLINK:DPCH:TPC:NSTeps**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:DPCH:TPC:NSTeps <val>
```

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:DPCH:TPC:NSTeps?
```

This command sets the number of steps for the down and up (DUP) or up and down (UDOWn) TPC pattern selections.

**\*RST** +1

**Range** 1–80

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:DPCH:TPC:PATtern**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:DPCH:TPC:PATtern UDOWn | DUP | UALL | DALL | "<file name>"
```

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:DPCH:TPC:PATtern?
```

This command configures the downlink DPCH TPC pattern for increasing or decreasing, or increasing and decreasing the UE power level.

UDOWn The TPC pattern repetitively steps up and down.

DUP The TPC pattern repetitively steps down and up.

UALL The TPC pattern consecutively steps up.

DALL The TPC pattern consecutively steps down.

"<file name>" This variable represents a TPC pattern file stored in signal generator memory. The pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “File Overview” on page 812 for more information on files.

**\*RST** UDOW

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

Each step in a TPC pattern signals an increase or decrease of 1 dB in the UE output power level.



**HSDPA over W-CDMA Subsystem—Option 418** [:SOURce]:RADio:WCDMa:HSDPa[:BBG]**:DLINK:DPCH:TRPosition****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH:TRPosition?

This query returns the downlink DPCH transport channel position that is always set to FIX.

**:DLINK:DPCH[:STATe]****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH[:STATe] ON|OFF|1|0

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:DPCH[:STATe]?

This command turns the downlink DPCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:FILTer****Supported** E4438C with Option 418[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|IS95|IS95\_EQ|IS95\_MOD|IS95\_MOD\_EQ|AC4Fm|UGGaussian|"  
" <user FIR > "

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:FILTer?

This command selects the downlink filter type.

IS95 This filter meets the criteria of the IS-95 standard.

IS95\_EQ This filter is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard and is best suited for IS-95 baseband filtering.

IS95\_MOD This filter meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

IS95\_MOD\_EQ This filter is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

UGGaussian This is a GSM Gaussian filter with a fixed BbT value of 0.300.

AC4Fm This is a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])

"<user FIR>" This variable represents any FIR filter file stored in signal generator memory. Refer to [“File Overview” on page 812](#) for more information on files.

**\*RST** RNYQ

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 814](#).

**:DLINK:FILTer:ALPHA**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:FILTer:ALPHA <val>
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:FILTer:ALPHA?
```

This command sets the downlink Nyquist or root Nyquist filter alpha value.

**\*RST** +2.20000000E-001

**Range** 0–1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 814](#).

Executing this command while a filter other than Nyquist or root Nyquist is selected changes the parameter value, but it is not used by the signal generator until one of the Nyquist filters is selected.

**:DLINK:FILTer:BBT**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:FILTer:BBT <val>
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:FILTer:BBT?
```

This command sets the downlink Gaussian filter BbT value.

**\*RST** +5.00000000E-001

**Range** 0–1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 814](#).

Executing this command while a filter other than the Gaussian filter is selected changes the parameter value, but it is not used by the signal generator until the Gaussian filter is selected.

### **:DLINK:FILTer:CHANnel**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMa:HSDPa [ :BBG ] :DLINK:FILTer:CHANnel EVM|ACP  
[ :SOURCE ] :RADIo:WCDMa:HSDPa [ :BBG ] :DLINK:FILTer:CHANnel?
```

Execute this command to optimize a downlink filter for minimized EVM or for minimized ACP.

**EVM** This choice provides the most ideal passband

**ACP** This choice improves stopband rejection for the root Nyquist and Nyquist filters.

**\*RST** EVM

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

To change the filter selection, refer to “[:DLINK:FILTer](#)” on page 825.

### **:DLINK:HSBurst**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMa:HSDPa [ :BBG ] :DLINK:HSBurst ON|OFF|1|0  
[ :SOURCE ] :RADIo:WCDMa:HSDPa [ :BBG ] :DLINK:HSBurst?
```

This command sets the handling of the off slot periods for the downlink HSDPA channels.

**ON|1** This choice turns off the ESG ALC feature and uses DTX during the off slots.

**OFF|0** This choice continuously transmits the HSDPA channels filling the off slots with dummy bits.

**\*RST** 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**:DLINK:HSDPa:AMC:CQIMapping:UECategory****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:AMC:CQIMapping:UECategory &lt;val&gt;

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:AMC:CQIMapping:UECategory?

This command sets the UE category that determines the CQI mapping table per the 3GPP standards.

**\*RST** 5**Range** 1–12**Remarks** To use this command's parameter in a setup, you must also set AMC as the feedback selection. Refer to the “:DLINK:HSDPa:FCONtrol” on page 829 for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:HSDPa:AMC:CPATtern****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:AMC:CPATtern ALL\_1|ALL\_2|ALL\_3|ALL\_4|ALL\_5|ALL\_6|ALL\_7|ALL\_8|ALL\_9|ALL\_10|ALL\_11|ALL\_12|ALL\_13|ALL\_14|ALL\_15|ALL\_16|ALL\_17|ALL\_18|ALL\_19|ALL\_20|ALL\_21|ALL\_22|ALL\_23|ALL\_24|ALL\_25|ALL\_26|ALL\_27|ALL\_28|ALL\_29|ALL\_30|"&lt;file\_name&gt;"

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:AMC:CPATtern?

This command sets a simulated UE CQI pattern that determines HSDPA1's response including the modulation type (QPSK or 16QAM) and the constellation version for 16QAM per the set UE category.

ALL\_&lt;val&gt; These choices configure a simulated UE ACK response with a single CQI value for 1,280 subframes.

"&lt;file name&gt;" This variable represents a CQI pattern file stored in signal generator memory. Create this file either by using the AMC CQI pattern Data Type Entry window and downloading the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- CQI value of 1–30 using an 8-bit pattern, 00000001 to 00011110
- DTX is represented by 11111111

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**

In the file, do not use delimiters between subframes; enter subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes from 1 to 1,280. The subframes are numbered 0 to 1,279. A subframe is active when it contains 8-bits. If a subframe contains at least 1-bit but less than 8-bits, the apply function (downlink apply command) will not work.

**\*RST**

ALL\_21

**Remarks**

To use this command's parameter in a setup, you must also set AMC as the feedback selection. Refer to the “:DLINK:HSDPA:FCONTROL” for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:HSDPA:FCONTROL****Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA:FCONTROL NONE | HARQ | AMC
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA:FCONTROL ?
```

This command sets the HSDPA1 feedback control type.

**NONE** This choice turns off the feedback control.

**HARQ** This choice provides UE feedback using the HARQ process. This selection provides the capability of configuring a simulated UE ACK/NACK response, setting the maximum number of HARQ transmissions, and providing up to eight different RV parameters.

**AMC** This choice provides UE feedback using adaptive modulation coding. This selection provides the capability of configuring a simulated UE CQI response aligned with a UE category input.

**\*RST**

NONE

**Remarks**

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814

**:DLINK:HSDPa:HARQ:APATtern**

**Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:HARQ:APATtern ACK_ALL |
"<file name>"
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:HARQ:APATtern?
```

This command sets a simulated UE ACK/NACK pattern that determines HSDPA1's HARQ response.

**ACK\_ALL** This choice configures 1,280 subframes for a simulated ACK only response.

"<file name>" This variable represents an ACK pattern file stored in signal generator memory. Create this file either by using the HARQ ACK/NACK pattern Data Type Entry window and download the file to the ESG, or by using the ESG Real Time W-CDMA table editor to create a bit file with the following bit patterns:

- An ACK response is represented by 00.
- A NACK response is represented by 01.
- DTX is represented by 10.

In the file, do not use delimiters between subframes; enter subframe bits as a binary string.

When creating a pattern, you can determine the number of active subframes from 1 to 1,280. The subframes are numbered 0 to 1,279. A subframe is active when it contains 2-bits. If a subframe contains only 1-bit, the apply function (downlink apply command) will not work.

**\*RST** ACK\_ALL

**Remarks** To use this command's parameter in a setup, you must also set HARQ as the feedback selection. Refer to the “[:DLINK:HSDPa:FCONtrol](#)” for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

**:DLINK:HSDPa:HARQ:MNHTrans**

**Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:HARQ:MNHTrans <val>
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:HARQ:MNHTrans?
```

This command configures the HSDPA1 maximum number of HARQ transmissions for the HARQ function.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURce]:RADio:WCDMa:HSDPa[:BBG])

Use the command for UE performance testing or for specifying an arbitrary number of HARQ transmissions. When the software encounters a UE NACK response that is set by the HARQ ACK pattern command (see “:DLINK:HSDPa:HARQ:APATtern”), the software re-sends the same packet payload until either the maximum number of HARQ transmissions is reached or a simulated ACK response is encountered. Whenever the software re-sends the same packet payload, it also transmits another RV parameter that is configured by the RV sequence command.

**\*RST** 1

**Range** 1–8

**Remarks** To use this command's parameter in a setup, you must also set HARQ as the feedback selection. Refer to the “:DLINK:HSDPa:FCONtrol” on page 829 for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:HSDPa:HARQ:RVSequence[1]|2|3|4|5|6|7|8**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:HSDPa:HARQ:RVSequence [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 <val>
```

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:HSDPa:HARQ:RVSequence [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8?
```

This command sets the HSDPA1 RV parameter sequence used with the maximum number of HARQ transmission setting. You can set eight different RV parameters for the RV sequence.

During simulated ACK responses, the software uses the first RV parameter. When the software encounters a simulated NACK response, it sends data using the next RV parameter. The software keeps incrementing to the next RV parameter in the sequence until it receives a simulated ACK response. When the software encounters an ACK response, the RV sequence resets to the first RV parameter.

**\*RST** 0

**Range** 0–7

**Remarks** To use this command's parameter in a setup, you must also set HARQ as the feedback selection. Refer to the “:DLINK:HSDPa:FCONtrol” on page 829 for selecting the feedback type.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**:DLINK:HSDPa[1] | 2 | 3 | 4:BSInfo****Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:BSInfo <val>
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:BSInfo?
```

This command sets the HS-DSCH block size. HSDPA1 is the only HSDPA channel configuration that supports the HS-DSCH, however the block size information parameter is also available for HSDPA2–4 for HS-SCCH coding purposes.

**\*RST** 36**Range** 0–63**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:COFFset****Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:
COFFset <val>
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:COFFset?
```

This command sets the HS-PDSCH code offset. The code offset is used in determining the HS-PDSCH channel code.

**\*RST** HSDPA1: 4 HSDPA2: 8 HSDPA3: 9 HSDPA4: 10**Range** 1–15**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

Set all physical channel codes orthogonal to each other. For any channel codes that fail this criteria, the apply function (downlink apply command) will not work.

**:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:DATA****Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:DATA PN9 |
FIX4 | "<file name>" | DSCH
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:HSPDSch:DATA?
```

This command configures the HS-PDSCH data type.



**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])

<b>DSCH</b>	This choice is the HS-DSCH selection that is supported on only HSDPA1. Selecting the DSCH choice for HSDPA2–4 will generate an error.
"<file name>"	This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “ <a href="#">File Overview</a> ” on page 812 for more information on files.
<b>*RST</b>	PN9
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “ <a href="#">DLINK:APPLY</a> ” on page 814.

**:DLINK:HSDPA[1] | 2 | 3 | 4:HSPDSch:DATA:FIX4**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA [ 1 ] | 2 | 3 | 4 :HSPDSch:DATA:
FIX4 <val>
```

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA [ 1 ] | 2 | 3 | 4 :HSPDSch:DATA:
FIX4?
```

This command sets the HS-PDSCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[DLINK:APPLY](#)” on page 814.

**:DLINK:HSDPA:HSPDSch:DSCH:DATA**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA:HSPDSch:DSCH:DATA PN9 |
FIX4 | "<file name>"
```

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA:HSPDSch:DSCH:DATA?
```

This command defines the HS-DSCH data type for HSDPA1. The HS-DSCH is not supported on HSDPA2–4.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “[File Overview](#)” on page 812 for more

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**

information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

**:DLINK:HSDPa:HSPDSch:DSCH:DATA:FIX4**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:DATA:
FIX4 <val>
```

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:DATA:FIX4?
```

This command defines the HS-DSCH repeating 4-bit binary data pattern for HSDPA1. The HS-DSCH is not supported on HSDPA2–4.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

**:DLINK:HSDPa:HSPDSch:DSCH:IRBSize**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:IRBSize <val>
```

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:HSDPa:HSPDSch:DSCH:IRBSize?
```

This command sets the HS-DSCH IR buffer size per the HARQ process for HSDPA1. The HS-DSCH is not supported on HSDPA2–4.

**\*RST** 9600

**Range** 960–28800

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

### **:DLINK:HSDPA:HSPDSch:NCODE**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA:HSPDSch:NCODE <val>  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA:HSPDSch:NCODE?
```

This command sets number of codes for the HS-PDSCH on HSDPA1. HSDPA2–4 do not support multicodes.

**\*RST** 1

**Range** 1–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

### **:DLINK:HSDPA[1] | 2 | 3 | 4:HSPDSch:POWER**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA [ 1 ] | 2 | 3 | 4 :HSPDSch:  
POWER <val>  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:HSDPA [ 1 ] | 2 | 3 | 4 :HSPDSch:POWER?
```

This command sets the HS-PDSCH power level.

The variable <val> is expressed in decibels (dB).

**\*RST** –1.02000000E+001

**Range** –40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**:DLINK:HSDPa[1]|2|3|4:HSPDsch:SFORmat****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch:SFORmat 0|1

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch:SFORmat?

This command sets the HS-PDSCH slot format.

0 This sets the modulation type to QPSK.

1 This sets the modulation type to 16QAM.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:HSDPa[1]|2|3|4:HSPDsch[:STATe]****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch[:STATe] ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1]|2|3|4:HSPDsch[:STATe]?

This command turns the selected HS-PDSCH on or off.

**\*RST** HSDPA1: 1 HSDPA2–4: 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

The HS-SCCH must be on for the HS-PDSCH to turn on. Turning off the HS-SCCH also turns off the active HS-PDSCH. See “:DLINK:HSDPa[1]|2|3|4[:STATe]” on page 841 for turning the HS-SCCH on or off.

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])****:DLINK:HSDPA[1] | 2 | 3 | 4:HSSCch:CCODE****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1] | 2 | 3 | 4:HSSCch:CCODE &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1] | 2 | 3 | 4:HSSCch:CCODE?

This command sets the HS-SCCH channel code.

**\*RST** HSDPA1: 4 HSDPA2: 5 HSDPA3: 6 HSDPA4: 7**Range** 1–127**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

**:DLINK:HSDPA[1] | 2 | 3 | 4:HSSCch:DATA****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1] | 2 | 3 | 4:HSSCch:DATA PN9 | FIX4 | "&lt;file name&gt;" | STD

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1] | 2 | 3 | 4:HSSCch:DATA?

This command sets the data type for the selected downlink HS-SCCH.

**STD** This choice configures the bit field as defined by the 3GPP standards."<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “[File Overview](#)” on page 812 for more information on files.**\*RST** STD**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:DLINK:HSDPA[1]|2|3|4:HSSCch:DATA:FIX4****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:HSSCch:DATA:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:HSSCch:DATA:FIX4?

This command sets the HS-SCCH repeating 4-bit binary data pattern.

The variable &lt;val&gt; accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0**Range** 0–15**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:HSDPA[1]|2|3|4:HSSCch:POWER****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:HSSCch:POWER &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:HSSCch:POWER?

This command sets the HS-SCCH power level.

The variable &lt;val&gt; is expressed in decibels (dB).

**\*RST** -1.02000000E+001**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:DLINK:HSDPA[1]|2|3|4:ITTI****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:ITTI <val>
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:ITTI?
```

This command sets the static inter-TTI pattern value for the selected HSDPA.

The variable <val> is expressed in subframes (one subframe = 2 ms).

**\*RST** 8**Range** 1–16

**Remarks** To use a static pattern, select FIX as the choice for the [:DLINK:HSDPA\[1\]|2|3|4:ITTI:PATTERN](#) command.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:DLINK:APPLY](#)” on page 814.

**:DLINK:HSDPA[1]|2|3|4:ITTI:PATTERN****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:ITTI:
PATTERN FIX|"<file name>"
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:ITTI:PATTERN?
```

This command selects which method sets the inter-TTI pattern for the selected HSDPA.

**FIX** This choice enables a static pattern. To configure the pattern, see “[:DLINK:HSDPA\[1\]|2|3|4:ITTI](#)”.

"<file name>" This variable represents an inter-TTI pattern file stored in signal generator memory. Creating and using a file provides the option of having a flexible inter-TTI pattern where you can vary the distance between HS-PDSCH transmissions. To create a file, use one or a combination of the following methods:

- To create a file internal to the software, use the inter-TTI user pattern editor.
- To create a file external to the software, use a text editor.

For more information, see the Signal Studio for HSDPA over W-CDMA software online help.

The file name follows the form <project name>–ITTIx, where 'x' is the HSDPA number from one to four. The inter-TTI pattern must contain at least one bit, or the apply function (downlink apply command) will not work.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**\*RST**                   FIX**Remarks**               Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:HSDPa:NHPRocess****Supported**             E4438C with Option 418[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:NHPRocess <val>  
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa:NHPRocess?

This command sets the HS-DSCH number of HARQ processes for HSDPA1. For HSDPA2–4, this parameter is fixed at one and is used only for HS-SCCH coding purposes.

**\*RST**                   4**Range**                 1–8**Remarks**               Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:HSDPa[1] | 2 | 3 | 4:RVParameter****Supported**             E4438C with Option 418[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:RVParameter <val>  
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:HSDPa[1] | 2 | 3 | 4:RVParameter?

This command sets the HS-DSCH RV parameter. For HSDPA2–4, which do not support an HS-DSCH, this parameter is used only for HS-SCCH coding purposes.

**\*RST**                   0**Range**                 0–7**Remarks**               Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.



**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:DLINK:HSDPA[1]|2|3|4:UEID****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:UEID <val>
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4:UEID?
```

This command sets the UEID.

**\*RST** HSDPA1: 0 HSDPA2: 1 HSDPA3: 2 HSDPA4: 3**Range** 0–65535**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:HSDPA[1]|2|3|4[:STATE]****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4[:STATE] ON|OFF|
1|0
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:HSDPA[1]|2|3|4[:STATE]?
```

This command turns the selected downlink HSDPA channel on or off.

- |         |   |
|---------|---|
| ON (1)  | <ul style="list-style-type: none"> <li>• Turns on the HS-SCCH for the selected HSDPA.</li> <li>• Enables turning on the HS-PDSCH for the selected HSDPA.</li> </ul> |
| OFF (0) | <ul style="list-style-type: none"> <li>• Turns off the HS-SCCH for the selected HSDPA.</li> <li>• Turns off the active HS-PDSCH for the selected HSDPA.</li> </ul>  |

**\*RST** HSDPA1: 1 HSDPA2–4: 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

Refer to “:DLINK:HSDPA[1]|2|3|4:HSPDSch[:STATE]” on page 836 for turning the HS-PDSCH on or off.

An HSDPA consists of a HS-SCCH and a HS-PDSCH, however the HS-DSCH is supported on only HSDPA1.

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])****:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:CCODE****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:CCODE &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:CCODE?

This command sets the channel code for the selected downlink OCNS.

<b>*RST</b>	OCNS1: 2	OCNS2: 3	OCNS3: 4	OCNS4: 5
	OCNS5: 6	OCNS6: 7	OCNS7: 8	OCNS8: 9
	OCNS9: 10	OCNS10: 11	OCNS11: 12	OCNS12: 13
	OCNS13: 14	OCNS14: 15	OCNS15: 16	OCNS16: 17

**Range** 1–127**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:DATA****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:DATA PN9|PN15

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:DATA?

This command configures the data pattern for the selected downlink OCNS.

**\*RST** PN9**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:POWer**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :POWer <val>
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :POWer?
```

This command sets the power level for the selected downlink OCNS.

The variable <val> is expressed in units of dB.

**\*RST** OCNS1: -6 OCNS2: -8 OCNS3: -8 OCNS4: -10  
OCNS5: -7 OCNS6: -9 OCNS7-16: -10

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:SSCOffset**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :SSCOffset <val>
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
12 | 13 | 14 | 15 | 16 :SSCOffset?
```

This command sets the secondary scrambling code offset for the selected downlink OCNS.

**\*RST** 0

**Range** 0-15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])****:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:TOFFset****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:TOFFset &lt;val&gt;

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:TOFFset?

This command adjusts the timing offset for the OCNS.

<b>*RST</b>	OCNS1: 1	OCNS2: 2	OCNS3: 3	OCNS4: 4
	OCNS5: 5	OCNS6: 6	OCNS7: 7	OCNS8: 8
	OCNS9: 9	OCNS10: 10	OCNS11: 11	OCNS12: 12
	OCNS13: 13	OCNS14: 14	OCNS15: 15	OCNS16: 16

**Range** 0–149**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16[:STATE]****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16[:STATE] ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16[:STATE]?

This command turns the selected OCNS on or off.

**\*RST** 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:PCCPch:BCH:DATA****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PCCPch:BCH:DATA PN9|PN15|FIX4|&lt;file name&gt;"

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PCCPch:BCH:DATA?

This command sets the BCH data format that is transmitted on the P-CCPCH.

**HSDPA over W-CDMA Subsystem—Option 418** [:SOURce]:RADio:WCDMa:HSDPa[:BBG]

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “File Overview” on page 812 for more information on files.

**\*RST** FIX4

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:PCCPch:BCH:DATA:FIX4**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PCCPch:BCH:DATA:FIX4 <val>
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PCCPch:BCH:DATA:FIX4?
```

This command sets the BCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**:DLINK:PCCPch:CCODE**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PCCPch:CCODE <val>
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PCCPch:CCODE?
```

This command sets the P-CCPCH channel code.

**\*RST** +1

**Range** 0–255

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

**:DLINK:PCCPch:POWer****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PCCPch:POWer &lt;val&gt;

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PCCPch:POWer?

This command sets the P-CCPCH power level.

The variable &lt;val&gt; is expressed in decibels (dB).

**\*RST** -5.30000000E+000**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:PCCPch[:STATe]****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PCCPch[:STATe] ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PCCPch[:STATe]?

This command turns the P-CCPCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:PICH:CCODE****Supported** E4438C with Option 418

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PICH:CCODE &lt;val&gt;

[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PICH:CCODE?

This command sets the PICH channelization code.

**\*RST** +3**Range** 0–255**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

Set all physical channel codes so they are orthogonal to each other. If any of the channel codes fail to meet this criteria, the apply function (downlink apply command) will not work.

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])****:DLINK:PICH:DATA**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:PICH:DATA PN9 | PN15 | FIX4 |
"<file name>"
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:PICH:DATA?
```

This command sets the PICH data type.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to [“File Overview” on page 812](#) for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 814](#).

**:DLINK:PICH:DATA:FIX4**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:PICH:DATA:FIX4 <val>
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :DLINK:PICH:DATA:FIX4?
```

This command sets the PICH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 814](#).

**:DLINK:PICH:POWer****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PICH:POWer &lt;val&gt;

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PICH:POWer?

This command sets the PICH power level.

The variable &lt;val&gt; is expressed in decibels (dB).

**\*RST** -8.300000000E+000**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:PICH[:STATe]****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PICH[:STATe] ON|OFF|1|0

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:PICH[:STATe] ?

This command turns the PICH on or off.

**\*RST** 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:POLarity****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:POLarity NORMal|INVerted|INVert

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:POLarity?

This command selects the phase polarity of the downlink signal.

**NORMal** This choice selects normal polarity.**INVerted, INVert** These choices perform the same function, inverting the internal Q signal.**\*RST** NORM**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to “:DLINK:APPLY” on page 814.



### **:DLINK:PSCH:POWer**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PSCH:POWer <val>  
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PSCH:POWer?
```

This command sets the PSCH power level.

The variable <val> is expressed in decibels (dB).

**\*RST** -8.30000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 814](#).

### **:DLINK:PSCH[:STATe]**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PSCH [ :STATe ] ON | OFF | 1 | 0  
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:PSCH [ :STATe ] ?
```

This command turns the PSCH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to [“:DLINK:APPLY” on page 814](#).

### **:DLINK:SCRamblecode**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:SCRamblecode <val>  
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :DLINK:SCRamblecode?
```

This command sets the downlink scramble code number.

**\*RST** +0

**Range** 0–511

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to [“:DLINK:APPLY” on page 814](#).

**:DLINK:SSCH:POWer****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:SSCH:POWer &lt;val&gt;

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:SSCH:POWer?

This command sets the SSCH power level. The variable &lt;val&gt; is expressed in decibels (dB)

**\*RST** -8.3000000E+000**Range** -40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:SSCH[:STATe]****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:SSCH[:STATe] ON|OFF|1|0

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:SSCH[:STATe]?

This command turns the SSCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.**:DLINK:TXDiversity****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:TXDiversity NONE|OANT1|OANT2

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:DLINK:TXDiversity?

This command selects the downlink signal transmit diversity mode.

**NONE** This choice disables the transmit diversity mode.**OANT1** This choice selects the transmit diversity openloop antenna 1 mode.**OANT2** This choice selects the transmit diversity openloop antenna 2 mode.**\*RST** NONE**Remarks** To configure both antennas (one and two) requires two ESGs.

Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:DLINK:APPLY” on page 814.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:LINK****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:LINK DOWN|UP
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:LINK?
```

This command sets the uplink or downlink mode.

**\*RST** DOWN**:ULINK:APPLY****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:APPLY
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:APPLY?
```

This command applies changes to the channel setup and data for active physical and transport channels, immediately starting the channel coding generation process. A progress bar may appear on the ESG display indicating that the new signal parameters are being applied. Turning on the HSDPA modulation format also applies the signal parameters.

The query response determines whether or not there is a need to execute the command. It returns the following responses:

```
0 Command execution is not required.
1 Command execution is required.
```

---

**NOTE** The query response is only valid while the HSDPA format is active.

---

When there is a setting conflict (ESG reports an error) with the range values or coupled parameters, or both, executing the uplink apply command does not apply the new changes until the conflicts are resolved. After resolving the setting conflicts, execute the command to apply the new settings.

**:ULINK:AWGN:CN****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:AWGN:CN <val>
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:AWGN:CN?
```

This command sets the uplink in-band carrier to noise ratio (C/N) value using AWGN.

**\*RST** 0**Range** -30 to 30

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to **:ULINK:APPLY**”.

**:ULINK:AWGN[:STATe]**

**Supported**                    E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:AWGN [ :STATe ] ON | OFF | 0 | 1
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:AWGN [ :STATe ] ?
```

This command turns the uplink AWGN on or off.

**\*RST**                         0

**Remarks**                    Setting the command parameter while the signal is active also requires executing the apply command. Refer to **“:ULINK:APPLY” on page 851**.

**:ULINK:BBReference:EXTeRnal:MRATe**

**Supported**                    E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:BBReference:EXTeRnal:MRATe X1 |
X2 | X4
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:BBReference:EXTeRnal:MRATe ?
```

This command configures the ESG, so it can accept an external baseband generator clock that is a multiple of the internal 3.84 MHz chip clock.

X1                              This sets the ESG to accept an external clock rate identical to the chip clock.

X2                              This sets the ESG to accept an external clock rate that is two times the rate of the chip clock.

X4                              This sets the ESG to accept an external clock rate that is four times the rate of the chip clock.

**\*RST**                         X1

**:ULINK:BBReference[:SOURce]**

**Supported**                    E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:BBReference [ :SOURce ] INT [1] |
EXT [1]
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:BBReference [ :SOURce ] ?
```

This command selects the baseband generator reference source for the radio uplink channel.

**\*RST**                         INT

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:ULINK:DPCCh:CCODE**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPCCh:CCODE?
```

This query returns the channelization code for the uplink DPCCH.

The slot format determines the channelization code in accordance with the 3GPP standards. See “:ULINK:DPCCh:SFORmat” on page 856 for setting the slot format.

**:ULINK:DPCCh:DATA**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPCCh:DATA PN9 | PN15 | FIX4 |
"<file name>" | STD
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPCCh:DATA?
```

This command configures the uplink DPCCH data pattern.

**STD** This sets the DPCCH bit fields according to the 3GPP standards.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to “File Overview” on page 812 for more information on files.

**\*RST** STD

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPCCh:DATA:FIX4**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPCCh:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPCCh:DATA:FIX4?
```

This command sets the uplink DPCCH repeating 4-bit binary data pattern.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:ULINK:APPLY](#)” on page 851.

**:ULINK:DPCCh:FBI:PATtern**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPCCh:FBI:PATtern PN9 | PN15 | FIX |  
"<file name>"
```

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPCCh:FBI:PATtern?
```

This command configures the uplink DPCCH FBI pattern.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to “[File Overview](#)” on page 812 for more information on files.

**\*RST** FIX

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “[:ULINK:APPLY](#)” on page 851.

**HSDPA over W-CDMA Subsystem—Option 418** [:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]**:ULINK:DPCCh:FBI:PATtern:FIX****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:FBI:PATtern:FIX &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:FBI:PATtern:FIX?

This command sets the 30-bit FBI pattern for the uplink DPCCH.

The variable &lt;val&gt; accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** +0**Range** 0–1073741823**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.**:ULINK:DPCCh:POWer****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:POWer &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:POWer?

This command sets the uplink DPCCH power level.

The variable &lt;val&gt; is expressed in decibels (dB)

**\*RST** –2.69000000E+000**Range** –40 to 0**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPCCh:SFORmat****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:SFORmat &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:SFORmat?

This command sets the uplink DPCCH slot format.

**\*RST** +0**Range** 0–5**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

The slot format determines the settings for other parameters in accordance with 3GPP standards.

**:ULINK:DPCCh[:STATe]****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh[:STATe] ON|OFF|1|0

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh[:STATe]?

This command turns the uplink DPCCH on or off.

**\*RST** 1**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.**:ULINK:DPCCh:TFCI****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:TFCI &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:TFCI?

This command sets the uplink DPCCH TFCI 10-bit data pattern.

The variable &lt;val&gt; accepts values in binary, hexadecimal, or decimal format, however the query returns only decimal values.

**\*RST** +0**Range** 0–1023**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.



**HSDPA over W-CDMA Subsystem—Option 418** [:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]**:ULINK:DPCCh:TPC:NSTeps****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:TPC:NSTeps &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:TPC:NSTeps?

This command sets the number of steps for the down and up (DUP) or up and down (UDOWn) TPC pattern selections.

The variable <val> is expressed in decibels (dB).

**\*RST** +1**Range** 1–80

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPCCh:TPC:PATtern****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:TPC:PATtern

UDOWn|DUP|UALL|DALL|"&lt;file name&gt;"

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPCCh:TPC:PATtern?

This command configures the uplink DPCCH TPC pattern for increasing or decreasing, or increasing and decreasing the BTS power level.

UDOWn The TPC pattern repetitively steps up and down.

DUP The TPC pattern repetitively steps down and up.

UALL The TPC pattern consecutively steps up.

DALL The TPC pattern consecutively steps down.

"<file name>" This variable represents a power pattern file stored in signal generator memory. The pattern must contain at least one bit or the apply function (downlink apply command) will not work. Refer to “File Overview” on page 812 for more information on files.

**\*RST** UDOW

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

Each step in a TPC pattern signals an increase or decrease of 1 dB in the BTS output power level.

**:ULINK:DPDCh:CCODE****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:CCODE?

This query returns the uplink DPDCH channelization code.

The slot format determines the channelization code in accordance with the 3GPP standards. See “:ULINK:DPDCh:SFORmat” on page 863 for setting the slot format.

**:ULINK:DPDCh:DATA****Supported** E4438C with Option 418[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DATA PN9|PN15|FIX4|DCH|"  
"<file name>"

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DATA?

This command configures the uplink DPDCH data pattern.

**DCH** This choice selects the transport channel as the data source."  
"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to “File Overview” on page 812 for more information on files.**\*RST** PN9**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.**:ULINK:DPDCh:DATA:FIX4****Supported** E4438C with Option 418

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DATA:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DATA:FIX4?

This command sets the uplink DPDCH repeating 4-bit binary data pattern.

The variable &lt;val&gt; accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0**Range** 0–15

**HSDPA over W-CDMA Subsystem—Option 418** [:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:BSIZE**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [1] | 2 | 3 | 4 | 5 | 6 :
BSIZE <val>
```

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [1] | 2 | 3 | 4 | 5 | 6 :BSIZE?
```

This command sets the block size for the selected uplink DCH.

**\*RST** 20

**Range** 0–5000

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the ESG calculates the product of the block size and the number of blocks. If the product of these two parameters exceeds 200,000, the apply function (uplink apply command) will not work.

**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:CRC**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [1] | 2 | 3 | 4 | 5 | 6 :
CRC 0 | 8 | 12 | 16 | 24
```

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [1] | 2 | 3 | 4 | 5 | 6 :CRC?
```

This command sets the number of CRC bits for the selected uplink DCH.

**\*RST** 8

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:CTYPe**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [1] | 2 | 3 | 4 | 5 | 6 :
CTYPe HCONv | TCONv | TURBo | NONE
```

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [1] | 2 | 3 | 4 | 5 | 6 :CTYPe?
```

This command selects the encoder type for the selected uplink DCH.

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**

HCONv	This choice selects the 1/2 rate convolutional encoder.
TCONv	This choice selects the 1/3 rate convolutional encoder.
TURBo	This choice selects the turbo coder.
NONE	This choice selects no coding.
<b>*RST</b>	HCON
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:DATA**

**Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:DATA PN9|
PN15|FIX4|"<file name>"
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:DATA?
```

This command configures the data for the selected uplink DCH.

"<file name>" This variable represents a data pattern file stored in signal generator memory. The data pattern must contain at least one bit or the apply function (uplink apply command) will not work. Refer to “File Overview” on page 812 for more information on files.

**\*RST** PN9

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:DATA:FIX4**

**Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:DATA:
FIX4 <val>
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:DATA:
FIX4?
```

This command sets the repeating 4-bit binary data pattern for the selected uplink DCH.

The variable <val> accepts values in binary, hexadecimal, or decimal format, however the query returns only binary values.

**\*RST** 0

**Range** 0–15

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURce]:RADio:WCDMa:HSDPa[:BBG])

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPDCh:DCH[1] | 2 | 3 | 4 | 5 | 6:NBLocks**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :
NBLocks <val>
```

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :NBLocks?
```

This command sets the number of blocks for the selected uplink DCH.

**\*RST** 1

**Range** 0–512

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

The number of data bits per DCH cannot exceed 200,000. To maintain this data bit limit, the block size is multiplied by the number of blocks. If the product of these two parameters exceeds 200,000, the apply function (uplink apply command) will not work.

**:ULINK:DPDCh:DCH[1] | 2 | 3 | 4 | 5 | 6:RMATtribute**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :
RMATtribute <val>
```

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:DPDCh:DCH [ 1 ] | 2 | 3 | 4 | 5 | 6 :
RMATtribute?
```

This command sets the rate matching attribute for the selected uplink DCH.

**\*RST** 1

**Range** 1–256

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to “:ULINK:APPLY” on page 851.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURce]:RADio:WCDMa:HSDPa[:BBG])**:ULINK:DPDCh:DCH[1]|2|3|4|5|6:TTI****Supported** E4438C with Option 418

```
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:
TTI 10|20|40|80
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:DPDCh:DCH[1]|2|3|4|5|6:TTI?
```

This command sets the TTI for the selected uplink DCH.

The choices are expressed in millisecond (ms).

**\*RST** 10

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. For more information, refer to “:ULINK:APPLY” on page 851.

**:ULINK:DPDCh:DCH2|3|4|5|6[:STATe]****Supported** E4438C with Option 418

```
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:DPDCh:
DCH2|3|4|5|6[:STATe] ON|OFF|1|0
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:DPDCh:DCH2|3|4|5|6[:STATe]?
```

This command turns the selected uplink DCH on or off; DCH1 is always on.

**\*RST** *DCH 1: 1 DCH 2–6: 0*

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

The apply command will not work and the ESG will report an error if you turn on a DCH where lower numbered DCHs are off. For example, turning on DCH5 requires turning on DCH2–4. The reverse is true when turning off the DCHs.

## :ULINK:DPDCh:POWer

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPDCh:POWer <val>  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPDCh:POWer?
```

This command sets the uplink DPDCH power level.

The variable <val> is expressed in decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

## :ULINK:DPDCh:SFORmat

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPDCh:SFORmat <val>  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPDCh:SFORmat?
```

This command sets the uplink DPDCH slot format.

**\*RST** +2

**Range** 0– 6

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

The slot format determines the settings for other parameters in accordance with the 3GPP standards.

## :ULINK:DPDCh[:STATe]

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPDCh [ :STATe ] ON | OFF | 1 | 0  
[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:DPDCh [ :STATe ] ?
```

This command turns the uplink DPDCH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURce]:RADio:WCDMa:HSDPa[:BBG])**:ULINK:FCLock:INTerval**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FCLock:INTerval 10 | 20 | 40 | 80 | 2560
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FCLock:INTerval?
```

This command selects the frame clock interval for the synchronization signal.

The frame clock interval is set in milliseconds (ms).

**\*RST** 80

**Remarks** Ensure that the selected interval is equal to or longer than the longest transport channel TTI period.

This command is applicable only when FCLock is the sync source selection. See “:ULINK:SYNC[:SOURce]” on page 872 for selecting the sync source.

**:ULINK:FCLock:POLarity**

**Supported** E4438C with Option 418

```
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FCLock:POLarity POSitive |
NEGative
[ :SOURce ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FCLock:POLarity?
```

This command sets the frame clock polarity.

**POSitive** This choice sets the clock gate to trigger when the signal is high.

**NEGative** This choice sets the clock gate to trigger when the signal is low.

**\*RST** POS

**Remarks** This command is applicable only when FCLock is the sync source selection. See “:ULINK:SYNC[:SOURce]” on page 872 for selecting the sync source.



**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:ULINK:FILTer**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:FILTer RNYQuist | NYQuist |
GAUSSian | RECTangle | IS95 | IS95_EQ | IS95_MOD | IS95_MOD_EQ | AC4Fm | UGGaussian |
" <user FIR > "
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:FILTer?
```

This command selects the uplink filter type.

IS95	This filter meets the criteria of the IS-95 standard.
IS95_EQ	This filter is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard and is best suited for IS-95 baseband filtering.
IS95_MOD	This filter meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This filter is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
UGGaussian	This is a GSM Gaussian filter with a fixed BbT value of 0.300.
AC4Fm	This is a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
" <user FIR > "	This variable represents any FIR filter file stored in signal generator memory. Refer to <a href="#">“File Overview” on page 812</a> for more information on files.
<b>*RST</b>	RNYQ
<b>Remarks</b>	Setting the command parameter while the signal is active also requires executing the apply command. Refer to <a href="#">“:ULINK:APPLY” on page 851</a> .

**:ULINK:FILTer:ALPHa**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:FILTer:ALPHa <val>
[ :SOURCE ] :RADIo:WCDMA:HSDPa [ :BBG ] :ULINK:FILTer:ALPHa?
```

This command sets the uplink Nyquist or root Nyquist filter alpha value.

**\*RST** +2.20000000E-001

**Range** 0–1

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])**

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Executing this command while a filter other than Nyquist or root Nyquist is selected changes the parameter value, but it is not used by the signal generator until one of the Nyquist filters is selected. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:FILTer:BBT**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FILTer:BBT <val>
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FILTer:BBT?
```

This command sets the uplink Gaussian filter BbT value.

**\*RST** +5.00000000E-001

**Range** 0–1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

Executing this command while a filter other than the Gaussian filter is selected changes the parameter value, but it is not used by the signal generator until the Gaussian filter is selected.

**:ULINK:FILTer:CHANnel**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FILTer:CHANnel EVM|ACP
[ :SOURCE ] :RADio:WCDMa:HSDPa [ :BBG ] :ULINK:FILTer:CHANnel?
```

This command optimizes an uplink filter for minimized EVM or for minimized ACP.

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection for the root Nyquist and Nyquist filters.

**\*RST** EVM

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

To change the filter selection, refer to “:ULINK:FILTer” on page 865.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])**:ULINK:FOFFset****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:FOFFset <val>
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:FOFFset?
```

This command sets the CFN starting frame within the SFN by setting a frame offset relative to SFN zero.

**\*RST** 0**Range** 0–255

**Remarks** The command adds delays to the internal frame counter by specifying the starting frame number count. When the frame offset (FOFFset) is set to 0, the frame number starts at the system sync trigger. When the FOFFset is set to 2, the signal generator triggers two frames after the SFN RST. For additional information, refer to 3GPP TS25.402 for SFN and CFN relationship.

**:ULINK:HSDPcch:APATtern****Supported** E4438C with Option 418

```
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:HSDPcch:APATtern NONE|ACK_ALL|
"<file name>"
[:SOURCE]:RADIO:WCDMA:HSDPA[:BBG]:ULINK:HSDPcch:APATtern?
```

This command sets the HS-DPCCH ACK/NACK transmission pattern for each of the 1280 subframes that make up the pattern.

NONE This choice sets all subframes to DTX.

"<file name>" This variable represents an ACK pattern file stored in signal generator memory. The file must contain 2,560-bits of data (2-bits per subframe) or the apply function (uplink apply command) will not work.

- An ACK response is represented by 00.
- A NACK response is represented by 01.
- DTX is represented by 10.

Enter the 2,560-bits into the file as a binary string.

Refer to [“File Overview” on page 812](#) for more information on files.

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURce]:RADio:WCDMa:HSDPa[:BBG])

**\*RST** ACK\_ALL

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:HSDPcch:APOWer**

**Supported** E4438C with Option 418

```
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch:APOWer <val>
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch:APOWer?
```

This command sets the HS-DPCCH ACK part power level.

The variable <val> is expressed in decibels (dB).

**\*RST** -2.69000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:HSDPcch:CCODE**

**Supported** E4438C with Option 418

```
[:SOURce]RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch:CCODE?
```

This query returns the HS-DPCCH channelization code.

**:ULINK:HSDPcch:CPATtern**

**Supported** E4438C with Option 418

```
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch:CPATtern NONE |
"<file name>"
[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch:CPATtern?
```

This command sets the HS-DPCCH CQI transmission pattern for each of the 1280 subframes that make up the pattern.

NONE This choice sets all subframes to DTX.

"<file name>" This variable represents a bit file stored in signal generator memory. The file must contain 10,240-bits of data (8-bits per subframe) or the apply function (uplink apply command) will not work.

- A CQI response range is one to thirty using 8-bits, 00000001 to 00011110.

**HSDPA over W-CDMA Subsystem—Option 418** [:SOURCE]:RADIO:WCDMA:HSDPa[:BBG]

- DTX is represented by 11111111.

Enter the 10,240-bits into the file as a binary string.

Refer to “File Overview” on page 812 for more information on files.

**\*RST** NONE

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:HSDPcch:CPOWer**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPa [ :BBG ] :ULINK:HSDPcch:CPOWer <val>
[ :SOURCE ] :RADIO:WCDMA:HSDPa [ :BBG ] :ULINK:HSDPcch:CPOWer?
```

This command sets the HS-DPCCH CQI part power level.

The variable <val> is expressed in decibels (dB).

**\*RST** -2.69000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:HSDPcch:NPOWer**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPa [ :BBG ] :ULINK:HSDPcch:NPOWer <val>
[ :SOURCE ] :RADIO:WCDMA:HSDPa [ :BBG ] :ULINK:HSDPcch:NPOWer?
```

This command sets the HS-DPCCH NACK part power level. The variable <val> is expressed in decibels (dB).

**\*RST** -2.69000000E+000

**Range** -40 to 0

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:HSDPcch:SFDelay**

**Supported** E4438C with Option 418

```
[ :SOURCE ] :RADIO:WCDMA:HSDPa [ :BBG ] :ULINK:HSDPcch:SFDelay <val>
```

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURce]:RADio:WCDMa:HSDPa[:BBG])

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch:SFDeLay?

This command sets the HS-DPCCH subframe delay. The variable <val> is expressed in units of 256 chips.

**\*RST** 0**Range** 0–150

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:HSDPcch[:STATe]****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch[:STATe] ON|OFF|1|0

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:HSDPcch[:STATe]?

This command turns the HS-DPCCH on or off.

**\*RST** 1

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:POLarity****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:POLarity NORMAl|INVerted|INVert

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:POLarity?

This command selects the phase polarity of the uplink signal.

**NORMAl** This choice selects normal polarity.

**INVerted, INVert** These choices perform the same function, inverting the internal Q signal.

**\*RST** NORM

**Remarks** Setting the command parameter while the signal is active also requires executing the apply command. Refer to “:ULINK:APPLY” on page 851.

**:ULINK:SCRamblecode****Supported** E4438C with Option 418

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:SCRamblecode &lt;val&gt;

[:SOURce]:RADio:WCDMa:HSDPa[:BBG]:ULINK:SCRamblecode?

**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])

This command sets the scramble code.

**\*RST** +0  
**Range** 0–16777215

**:ULINK:SDElay**

**Supported** E4438C with Option 418

[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:SDElay <val>  
 [ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:SDElay?

This command sets the uplink DPCH delay, measured in slots.

**\*RST** +0  
**Range** 0–119  
**Remarks** Calculate the delay between downlink and uplink DPCH, in slots, using the following formulas. Total Delay = (T0) + (TOFFset) + ((SDElay) \* 2560 chips)

- T0 = 1024 chips
- TOFFset is set by “:ULINK:TOFFset” on page 872

Slot Delay = (Total Delay – T0) / 2560

**:ULINK:SFNRst:POLarity**

**Supported** E4438C with Option 418

[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:SFNRst:POLarity POSitive|  
 NEGative  
 [ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] :ULINK:SFNRst:POLarity?

This command sets the polarity of the system frame number reset signal for the uplink synchronization source.

POSitive This choice sets the signal to trigger when the trigger signal is high.

NEGative This choice sets the signal to trigger when the trigger signal is low.

**\*RST** POS

**Remarks** This command is applicable only when SFN\_RST is the sync source selection. See “:ULINK:SYNC[:SOURCE]” on page 872 for selecting the sync source.

**HSDPA over W-CDMA Subsystem—Option 418 ([:SOURCE]:RADio:WCDMa:HSDPa[:BBG])****:ULINK:SYNC:MODE****Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:ULINK:SYNC:MODE SINGLE|CONTInuous
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:ULINK:SYNC:MODE?
```

This command selects the uplink frame synchronization triggering mode.

**SINGLE** The signal generator, once triggered, generates frames based on the reference clock.

**CONTInuous** The signal generator continuously aligns the frame timing with the frame sync trigger signal.

**\*RST** SING

**:ULINK:SYNC[:SOURCE]****Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:ULINK:SYNC[:SOURCE] SFN_RST|FCLock
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:ULINK:SYNC[:SOURCE]?
```

This command selects the uplink frame synchronization source type.

**SFN\_RST** The uplink signal triggers on the system frame number reset signal.

**FCLock** The uplink signal triggers on the frame clock.

**\*RST** FCL

**:ULINK:TOFFset****Supported** E4438C with Option 418

```
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:ULINK:TOFFset <val>
[:SOURCE]:RADio:WCDMa:HSDPa[:BBG]:ULINK:TOFFset?
```

This command sets the uplink DPCH timing offset (delay), measured in chips.

**\*RST** +0

**Range** -512 to 2560



**HSDPA over W-CDMA Subsystem—Option 418** ([:SOURCE]:RADIO:WCDMA:HSDPA[:BBG])

- Remarks** The downlink signal timing is provided by the synchronization signal.
- Calculate the delay between downlink and uplink DPCH, in chips, using the following formulas:
- Total Delay = (T0) + (TOFFset) + ((SDElay) \* 2560 chips)
- T0 = 1024 chips
  - SDElay is set by “:ULINK:SDElay” on page 871
- Chip Delay = (Total Delay - T0) mod 2560

**[ :STATe ]**

**Supported** E4438C with Option 418

[ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] [ :STATe ] ON | OFF | 1 | 0  
 [ :SOURCE ] :RADIO:WCDMA:HSDPA [ :BBG ] [ :STATe ] ?

This command turns the HSDPA functionality on or off.

**\*RST** 0

**Remarks** This command only works when there is at least one active physical channel within the selected link.

## NADC Subsystem—Option 402 ([:SOURce]:RADio[:NADC])

### :ALPha

**Supported** E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:ALPha <val>  
[:SOURce]:RADio[:NADC]:ALPha?
```

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to a minimum level (0), a maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +3.50000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** This command is effective only after choosing a root Nyquist or Nyquist filter; it does not effect other types of filters. To change the current filter type, refer to [“:FILTer” on page 887](#).

### :BBCLock

**Supported** E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:BBCLock INT[1] | EXT[1]  
[:SOURce]:RADio[:NADC]:BBCLock?
```

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**INT[1]** This choice selects the signal generator internal data clock.

**EXT[1]** This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **BBG Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

## :BBT

**Supported** E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:BBT <val>  
[:SOURce]:RADio[:NADC]:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E–001

**Range** 0.100–1.000

**Key Entry** Filter BbT

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters. To change the current filter type, refer to [“:FILTer” on page 887](#).

## :BRATe

**Supported** E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:BRATe <val>  
[:SOURce]:RADio[:NADC]:BRATe?
```

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects a filter length.

For higher bit rates, the FIR filter length may be truncated (if the minimum filter size allows it) which will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command [“:SRATe” on page 965](#)). Refer to [“:FILTer” on page 887](#) for information on filter symbol widths.

To change the modulation type, refer to [“:MODulation\[:TYPE\]” on page 890](#).

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

Receiver Test Digital Commands (continued)  
**NADC Subsystem—Option 402 ([:SOURCE]:RADio[:NADC])**

**\*RST** +4.86000000E+004

Range	Modulation Type	Bit Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps
	FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
	QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
	QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
	QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
	QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

**Key Entry**      **Symbol Rate**

**:BURSt:PN9**

**Supported**      E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :BURSt :PN9 NORMal | QUICk  
 [ :SOURCE ] :RADio [ :NADC ] :BURSt :PN9?

This command controls the software PN9 generation.

**NORMal**      This choice produces a maximum length PN9 sequence.

**QUICk**      This choice produces a truncated PN9 sequence.

**\*RST**      NORM

**Key Entry**      **PN9 Mode Normal Quick**

**Remarks**      Use Normal mode for bit-error-rate tests where a maximum length PN9 sequence is required.

### **:BURSt:SHAPe[:TYPE]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe [ :TYPE ] SINE | "<file name>"
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe [ :TYPE ] ?
```

This command specifies the burst shape as either SINE or a user-defined file ("*<file name>*").

**SINE**                    This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

"*<file name>*"        This choice selects a user designated file from signal generator memory (non-volatile).

**\*RST**                    SINE

**Key Entry**            **Sine    User File**

### **:BURSt:SHAPe:FALL:DELay**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe :FALL :DELay <val>
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe :FALL :DELay?
```

This command sets the burst shape fall delay.

The variable *<val>* is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST**                    +0.00000000E+000

**Range**                    -22.3750 to 99

**Key Entry**            **Fall Delay**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890. Refer to “:SRate” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 878 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:FALL:TIME

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :BURSt :SHAPe :FALL :TIME <val>

[ :SOURCE ] :RADio [ :NADC ] :BURSt :SHAPe :FALL :TIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +5.00000000E+000

**Range** 0.1250–255.8750

**Key Entry** **Fall Time**

**Remarks** The setting enabled by this command is not affected by signal

generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890.

Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 879 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPe:FDElay

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :BURSt :SHAPe :FDElay <val>

[ :SOURCE ] :RADio [ :NADC ] :BURSt :SHAPe :FDElay?

This command sets the burst shape fall delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** –22.3750 to 99

**Key Entry** **Fall Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DELay” on page 877 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:FTIME**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:BURSt:SHAPe:FTIME <val>  
[:SOURCE]:RADIO[:NADC]:BURSt:SHAPe:FTIME?
```

This command sets the burst shape fall time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** 0.1250–255.8750

**Key Entry** **Fall Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:TIME” on page 878 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:RDElay**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe :RDElay <val>  
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe :RDElay?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -17.3750 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890.  
Refer to “:SRATE” on page 965 for minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELay” on page 880 performs the same function; in compliance with the SCPI standard, both commands are listed.

Refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

### **:BURSt:SHAPe:RISE:DELay**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe :RISE :DELay <val>  
[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPe :RISE :DELay?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -17.3750 to 99

**Key Entry** **Rise Delay**



**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPE:RDElay” on page 880 performs the same function; in compliance with the SCPI standard, both commands are listed.

Refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

### **:BURSt:SHAPE:RISE:TIME**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:BURSt:SHAPE:RISE:TIME <val>  
[:SOURce]:RADio[:NADC]:BURSt:SHAPE:RISE:TIME?
```

This command sets the burst shape rise time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +5.00000000E+000

**Range** 0.1250–22.5000

**Key Entry** Rise Time

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPE:RTIME” on page 882 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt:SHAPE:RTIME

**Supported** E4438C with Option 402

[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPE :RTIME <val>

[ :SOURce ] :RADio [ :NADC ] :BURSt :SHAPE :RTIME ?

This command sets the burst shape rise time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +5.00000000E+000

**Range** 0.1250–22.5000

**Key Entry** **Rise Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 890. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPE:RISE:TIME” on page 881 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## :BURSt[:STATe]

**Supported** E4438C with Option 402

[ :SOURce ] :RADio [ :NADC ] :BURSt [ :STATe ] ON | OFF | 1 | 0

[ :SOURce ] :RADio [ :NADC ] :BURSt [ :STATe ] ?

This command enables or disables the burst function.

**ON (1)** This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

**OFF (0)** This choice enables the transmission of unframed data.

**\*RST**                    0  
**Key Entry**            **Data Format Pattern Framed**

**:BURSt:SHAPE[:TYPE]**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:BURSt:SHAPE[:TYPE] SINE | "<file name>"
[:SOURCE]:RADIO[:NADC]:BURSt:SHAPE[:TYPE] ?
```

This command specifies the burst shape as either SINE or a user-defined file ("<file name>").

**SINE**                    This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

"<file name>"        This choice selects a user designated file from signal generator memory (non-volatile).

**\*RST**                    SINE

**Key Entry**            **Sine    User File**

**:CHANnel**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:CHANnel EVM|ACP
[:SOURCE]:RADIO[:NADC]:CHANnel ?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM**                    This choice provides the most ideal passband.

**ACP**                    This choice improves stopband rejection.

**\*RST**                    ACP

**Key Entry**            **Optimize FIR For EVM ACP**

**Remarks**            To change the current filter type, refer to [“:FILTer” on page 887](#).

**:DATA**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:DATA PN9|PN11|PN15|PN20|PN23|FIX4|"<file_name>"|
EXT|P4|P8|P16|P32|P64|PRAM
[:SOURCE]:RADio[:NADC]:DATA?
```

This command sets a pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file as the data pattern for unframed transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>			
	<b>64 1's &amp; 64 0's</b>	<b>PRAM File</b>						

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:DATA:PRAM**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:DATA:PRAM "<file_name>"
[:SOURCE]:RADio[:NADC]:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the NADC (North American Digital Cellular) format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTernal to allow framing control. The PRAM file must reside in the signal generator's volatile memory (WFM1) in order to be accessed by this command. For more information refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#)

## **:DATA:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADIO [ :NADC ] :DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the NADC (North American Digital Cellular) modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

## **:DEFAULT**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :DEFAULT
```

This command returns all of the NADC (North American Digital Cellular) modulation format parameters to factory settings. It does not affect any other signal generator parameters.

**Key Entry** **Restore NADC Factory Default**

## **:EDATa:DELaY**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :EDATa:DELaY?
```

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks** When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

## **:EDCLock**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :EDCLock SYMBOL | NORMAl

[ :SOURCE ] :RADio [ :NADC ] :EDCLock?

This command sets the external data clock use.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMAl** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** Ext Data Clock Normal Symbol

**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBCLock” on [page 874](#) to select EXT as the data clock type.

## **:EREFerence**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :EREFerence INT | EXT

[ :SOURCE ] :RADio [ :NADC ] :EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT

**Key Entry** BBG Ref Ext Int

**Remarks** If the EXT choice is selected, the external source’s frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

Refer to, “:EREFerence:VALue” on [page 887](#) to enter the external reference frequency setting.

## **:EREFerence:VALue**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo [ :NADC ] :EREFerence:VALue <val>
[ :SOURCE ] :RADIo [ :NADC ] :EREFerence:VALue?
```

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence” on page 886 to select EXT (external source) as the reference for the bit-clock.

## **:FILTer**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIo [ :NADC ] :FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|IS95|
IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|"<user FIR>"
[ :SOURCE ] :RADIo [ :NADC ] :FILTer?
```

This command selects the pre-modulation filter type.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ** This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**AC4Fm** This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**NADC Subsystem—Option 402 ([:SOURCE]:RADio[:NADC])**

<b>UGGaussian</b>	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory.
<b>*RST</b>	RNYQ
<b>Key Entry</b>	<b>Root Nyquist      Nyquist      Gaussian      Rectangle      IS-95      IS-95 w/EQ</b> <b>IS-95 Mod      IS-95 Mod w/EQ      APCO 25 C4FM      UN3/4 GSM Gaussian</b> <b>User FIR</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

**:FRATe**

<b>Supported</b>	E4438C with Option 402
	[ :SOURCE ] :RADio [ :NADC ] :FRATe FULL   HALF
	[ :SOURCE ] :RADio [ :NADC ] :FRATe?

This command toggles between a full- or half-rate traffic channel.

<b>FULL</b>	Selects two equally spaced timeslots of the frame. Since there are six timeslots per frame, timeslots 1, 2, and 3 are paired with timeslots 4, 5, and 6, respectively.
<b>HALF</b>	Selects one timeslot of the frame (6 individual timeslots per frame).
<b>*RST</b>	FULL
<b>Key Entry</b>	<b>Rate Full Half</b>

**:IQ:SCALE**

<b>Supported</b>	E4438C with Option 402
	[ :SOURCE ] :RADio [ :NADC ] :IQ:SCALE <val>
	[ :SOURCE ] :RADio [ :NADC ] :IQ:SCALE?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

<b>*RST</b>	+100
<b>Range</b>	1–200
<b>Key Entry</b>	<b>I/Q Scaling</b>
<b>Remarks</b>	This command has no effect with MSK or FSK modulation.



### **:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :MODulation:FSK [ :DEVIation ] <val>  
[ :SOURCE ] :RADio [ :NADC ] :MODulation:FSK [ :DEVIation ] ?
```

This command sets the symmetric FSK frequency deviation value. The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 890.

Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide for more information.*

### **:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :MODulation:MSK [ :PHASe ] <val>  
[ :SOURCE ] :RADio [ :NADC ] :MODulation:MSK [ :PHASe ] ?
```

This command sets the MSK phase deviation value. The variable <val> is expressed in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

### **:MODulation:UFSK**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :MODulation:UFSK "<file name>"  
[ :SOURCE ] :RADio [ :NADC ] :MODulation:UFSK ?
```

This command selects a user-defined FSK file from the signal generator memory.

Receiver Test Digital Commands (continued)  
**NADC Subsystem—Option 402 ([:SOURce]:RADio[:NADC])**

**Key Entry**            **User FSK**

**Remarks**            The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to “:MODulation[:TYPE]” on page 890 to change the current modulation type.

Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:MODulation:UIQ**

**Supported**            E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:MODulation:UIQ "<file name>"
[:SOURce]:RADio[:NADC]:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry**            **User I/Q**

**Remarks**            The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “:MODulation[:TYPE]” on page 890 to change the current modulation type.

Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported**            E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|GRAYQPSK|
OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|FSK8|FSK16|C4FM|
QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|UIQ|UFSK
[:SOURce]:RADio[:NADC]:MODulation[:TYPE]?
```

This command sets the modulation type for the NADC personality.

**\*RST**                    P4DQPSK

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>	<b>OQPSK</b>			
	<b>IS-95 OQPSK</b>	<b><math>\pi/4</math> DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

## **:REPeat**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:REPeat SINGLE|CONTInuous  
[:SOURCE]:RADio[:NADC]:REPeat?
```

This command sets the rotation direction of the phase modulation vector.

**SINGLE** This choice outputs one occurrence of the selected frame.

**CONTInuous** This choice outputs a continuous stream of the selected frame.

**\*RST** SING

**Key Entry** **Frame Repeat Single Cont**

## **:POLarity[:ALL]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:POLarity[:ALL] NORMal|INVerted  
[:SOURCE]:RADio[:NADC]:POLarity[:ALL]?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **Polarity Normal Invert**

## **:SECOndary:RECall**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:SECOndary:RECall
```

This command recalls the secondary frame configuration, overwriting the current state.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “[:SECOndary:SAVE]” on page 892.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “[:SECOndary[:STATe]]” on page 892.

## :SECondary:SAVE

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :SECondary :SAVE

This command saves the current frame configuration as the secondary frame with the filename NADC\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “:SECondary:RECall” on page 891.

## :SECondary:TRIGger[:SOURCE]

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :SECondary :TRIGger [ :SOURCE ] KEY | EXT | BUS

[ :SOURCE ] :RADio [ :NADC ] :SECondary :TRIGger [ :SOURCE ] ?

This command selects the type of triggering for the secondary frame.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 906.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry** **Trigger Key      Ext      Bus**

## :SECondary[:STATE]

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio [ :NADC ] :SECondary [ :STATE ] ON | OFF | 1 | 0

[ :SOURCE ] :RADio [ :NADC ] :SECondary [ :STATE ] ?

This command enables or disables the ability to switch to the secondary frame.

**\*RST** 0

**Key Entry** **Secondary Frame Off On**

**Remarks**                    A frame must already be saved as the secondary frame in order to turn the secondary state function on.

                                  To save a frame as the secondary frame, refer to “:SECONdary:SAVE” on page 892.

**:SLOT[1] | 2 | 3 | 4 | 5 | 6:DCUStom**

**Supported**                    E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1] | 2 | 3 | 4 | 5 | 6:DCUStom
PN9 | PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[:SOURCE]:RADIO[:NADC]:SLOT[1] | 2 | 3 | 4 | 5 | 6:DCUStom?
```

This command configures the data field for the selected downlink custom timeslot.

**\*RST**                            PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>			

**Remarks**                    Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:SLOT[1] | 2 | 3 | 4 | 5 | 6:DCUStom:FIX4**

**Supported**                    E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1] | 2 | 3 | 4 | 5 | 6:DCUStom:FIX4 <val>
[:SOURCE]:RADIO[:NADC]:SLOT[1] | 2 | 3 | 4 | 5 | 6:DCUStom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink custom timeslot.

**\*RST**                            #B0000

**Range**                            #B0000–#B1111 or 0–15

**Key Entry**                    **FIX4**

**Remarks**                    FIX4 must already be defined as the data type.

### **:SLOT[1]|2|3|4|5|6:DTCHannel:CDLocator**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :SLOT [ 1 ] | 2 | 3 | 4 | 5 | 6 :DTCHannel :  
CDLocator <bit_pattern>  
[ :SOURCE ] :RADIO [ :NADC ] :SLOT [ 1 ] | 2 | 3 | 4 | 5 | 6 :DTCHannel :CDLocator?
```

This command changes the 11-bit coded digital control channel locator (CDL) field.

**\*RST** #H000

**Range** #H0–#H7FF

**Key Entry** **CDL**

**Remarks** The preset hexadecimal value (when normal preset is selected) for CDL reflects the NADC protocol; however, you can enter a new value by using this command.

### **:SLOT[1]|2|3|4|5|6:DTCHannel:CDVCCode**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :SLOT [ 1 ] | 2 | 3 | 4 | 5 | 6 :DTCHannel :  
CDVCCode <bit_pattern>  
[ :SOURCE ] :RADIO [ :NADC ] :SLOT [ 1 ] | 2 | 3 | 4 | 5 | 6 :DTCHannel :CDVCCode?
```

This command changes the 12-bit coded digital verification color code (CDVCC).

**\*RST** #H000

**Range** #H0–#HFFF

**Key Entry** **CDVCC**

**Remarks** The preset hexadecimal value (when normal preset is selected) for CDVCC reflects the NADC protocol; however, you can enter a new value by using this command.

### **:SLOT[1]|2|3|4|5|6:DTCHannel:SACChannel**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :SLOT [ 1 ] | 2 | 3 | 4 | 5 | 6 :DTCHannel :  
SACChannel <bit_pattern>  
[ :SOURCE ] :RADIO [ :NADC ] :SLOT [ 1 ] | 2 | 3 | 4 | 5 | 6 :DTCHannel :SACChannel?
```

This command changes the 15-bit slow associated control channel.

**\*RST** #H000

<b>Range</b>	#H0–#HFFF
<b>Key Entry</b>	<b>SACCH</b>
<b>Remarks</b>	The preset hexadecimal value (when normal preset is selected) for SACCH reflects the value specified by the standard.

**:SLOT[1]|2|3|4|5|6:DTCHannel:SWORd**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 :DTCHannel :SWORd <bit_pattern>
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 :DTCHannel :SWORd?
```

This command sets the 28-bit synchronization word as the active function. This is used for slot synchronization, equalizer training, and timeslot identification.

<b>*RST</b>	#HA91DE4A
<b>Range</b>	#H0–#HFFFFFFF
<b>Key Entry</b>	SYNC

**:SLOT[1]|2|3|4|5|6:DTCHannel[:DATA]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 :DTCHannel [ :DATA ] PN9 |
PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 :DTCHannel [ :DATA ] ?
```

This command sets a pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file as the data pattern for the selected downlink traffic channel timeslot during framed transmission.

<b>*RST</b>	PN9
<b>Key Entry</b>	<b>PN9    PN11    PN15    PN20    PN23    FIX4    User File    EXT</b>
	<b>4 1's &amp; 4 0's    8 1's &amp; 8 0's    16 1's &amp; 16 0's    32 1's &amp; 32 0's</b>
	<b>64 1's &amp; 64 0's</b>

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:SLOT[1]|2|3|4|5|6:DTCHannel[:DATA]FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:DTCHannel[:DATA]:FIX4 <val>  
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:DTCHannel[:DATA]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink traffic channel timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:SLOT[1]|2|3|4|5|6:POWER**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:POWER MAIN|DELTA  
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:POWER?
```

This command toggles the RF output power level function for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.

**DELTA** This choice specifies RF output as the alternative power level.

**\*RST** MAIN

**Key Entry** **Timeslot Ampl Main Delta**

**:SLOT[1]|2|3|4|5|6:STATE**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:STATE ON|OFF|1|0  
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:STATE?
```

This command enables or disables the operating state of the selected timeslot.

**\*RST** Timeslot 1: 1 Timeslots 2–6: 0

**Key Entry** **Timeslot Off On**



### **:SLOT[1]|2|3|4|5|6:UCUStom**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:UCUStom PN9|PN11|PN15|
PN20|PN23|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:UCUStom?
```

This command configures the data field for the selected uplink custom timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>				
	<b>64 1's &amp; 64 0's</b>							

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### **:SLOT[1]|2|3|4|5|6:UCUStom:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:UCUStom:FIX4 <val>
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:UCUStom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected uplink custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

### **:SLOT[1]|2|3|4|5|6:UTCHannel:CDVCcode**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel:
CDVCcode <bit_pattern>
[:SOURCE]:RADIO[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel:CDVCcode?
```

This command changes the 12-bit coded digital verification color code (CDVCC).

**\*RST** #H000

**Range** #H0–#HFFF

**NADC Subsystem—Option 402 ([:SOURCE]:RADio[:NADC])****Key Entry**            **CDVCC**

**Remarks**            The preset hexadecimal value (when normal preset is selected) for CDVCC reflects the NADC protocol, however you can enter a new value by using this command.

**:SLOT[1]|2|3|4|5|6:UTCHannel:SACChannel****Supported**            E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel:SACChannel
<bit_pattern>
[:SOURCE]:RADio[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel:SACChannel?
```

This command changes the 15-bit slow associated control channel.

**\*RST**                #H000**Range**                #H0–#HFFF**Key Entry**            **SACCH**

**Remarks**            The preset hexadecimal value (when normal preset is selected) for SACCH reflects the value specified by the standard.

**:SLOT[1]|2|3|4|5|6:UTCHannel:SWORd****Supported**            E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel:SWORd <bit_pattern>
[:SOURCE]:RADio[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel:SWORd?
```

This command sets the 28-bit synchronization word as the active function. This is used for slot synchronization, equalizer training, and timeslot identification.

**\*RST**                #HA91DE4A**Range**                #H0–#HFFFFFFF**Key Entry**            **SYNC****:SLOT[1]|2|3|4|5|6:UTCHannel[:DATA]****Supported**            E4438C with Option 402

```
[:SOURCE]:RADio[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel[:DATA] PN9|PN15|
FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADio[:NADC]:SLOT[1]|2|3|4|5|6:UTCHannel[:DATA]?
```

This command sets a pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file as the data pattern for the selected uplink traffic channel timeslot during framed transmission.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>			

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:SLOT[1] | 2 | 3 | 4 | 5 | 6:UTCHannel[:DATA]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 :UTCHannel [ :DATA ] :FIX4 <val>
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 :UTCHannel [ :DATA ] :FIX4 ?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected uplink traffic channel timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:SLOT[1] | 2 | 3 | 4 | 5 | 6[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 [ :TYPE ] UCUSom | DCUSom | UTCH |
UTCH_ALL | DTCH | DTCH_ALL
[ :SOURce ] :RADio [ :NADC ] :SLOT [ 1 | 2 | 3 | 4 | 5 | 6 [ :TYPE ] ?
```

This command sets the timeslot type for the selected timeslot.

**\*RST** Timeslot 1: UTCH Timeslots 2–6: UCUS

<b>Key Entry</b>	<b>Up Custom</b>	<b>Down Custom</b>	<b>Up TCH</b>	<b>Up TCH All</b>	<b>Down TCH</b>
	<b>Down TCH All</b>				

**:SOUT**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SOUT FRAME|SLOT|ALL
[:SOURCE]:RADIO[:NADC]:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

<b>Key Entry</b>	<b>Begin Frame</b>	<b>Begin Timeslot #</b>	<b>All Timeslots</b>
------------------	--------------------	-------------------------	----------------------

**:SOUT:OFFSet**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO[:NADC]:SOUT:OFFSet <val>
[:SOURCE]:RADIO[:NADC]:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed as a number of bits.

**\*RST** +0

**Range** -323 to 323

**Key Entry** **Sync Out Offset**

**Remarks** Negative values move the synchronization output signal earlier; positive values move it later.

To change the output of the EVENT1 rear panel connector to SLOT, refer to [“:SOUT” on page 900](#).

## :SOUT: SLOT

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :SOUT :SLOT <val>
```

```
[ :SOURCE ] :RADIO [ :NADC ] :SOUT :SLOT?
```

This command selects the timeslot that will trigger a 1-bit output signal at the EVENT 1 rear panel connector.

**\*RST** +1

**Range** 1–3

**Key Entry** **Begin Timeslot #**

**Remarks** To change the output of the EVENT1 rear panel connector to SLOT, refer to [“:SOUT” on page 900](#).

## :SRATe

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO [ :NADC ] :SRATe <val>
```

```
[ :SOURCE ] :RADIO [ :NADC ] :SRATe?
```

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to [“:BRATe” on page 774](#) for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–MSPS) and the maximum symbol rate depends on the filter. Refer to [“:FILTer” on page 887](#) for minimum filter symbol width.

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to [“:MODulation\[:TYPE\]” on page 890](#).

**\*RST** +2.43000000E+004

Receiver Test Digital Commands (continued)  
**NADC Subsystem—Option 402 ([:SOURce]:RADio[:NADC])**

Range	Modulation Type	Symbol Rate Range		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 Msps	3sps–8.333333333 Msps	3sps–4.166666666Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.333333333 Msps	6sps–4.166666666 Msps	6sps–2.083333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**            **Symbol Rate**

**:TRIGger:TYPE**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio [ :NADC ] :TRIGger:TYPE CONTInuous | SINGle | GATE  
 [ :SOURce ] :RADio [ :NADC ] :TRIGger:TYPE?

This command sets the trigger type.

CONTInuous	The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 903.		
SINGle	The framed data sequence plays once for every trigger received.		
GATE	An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.		
<b>*RST</b>	CONT		
<b>Key Entry</b>	<b>Continuous</b>	<b>Single</b>	<b>Gated</b>

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURce] :RADio [:NADC] :TRIGger:TYPE:CONTInuous [:TYPE] FREE | TRIGger | RESet
[:SOURce] :RADio [:NADC] :TRIGger:TYPE:CONTInuous [:TYPE] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 902.

The following list describes the waveform’s response to each of the command choices:

FREE	Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.		
TRIGger	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.		
RESet	The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.		
<b>*RST</b>	FREE		
<b>Key Entry</b>	<b>Free Run</b>	<b>Trigger &amp; Run</b>	<b>Reset &amp; Run</b>

## :TRIGger:TYPE:GATE:ACTive

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :TRIGger :TYPE:GATE:ACTive LOW|HIGH  
[ :SOURCE ] :RADio [ :NADC ] :TRIGger :TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 902.

The following list describes the signal generator’s external trigger signal gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
*RST	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

## :TRIGger[:SOURCE]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] KEY|EXT|BUS  
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 902. The following list describes the command choices:

KEY	This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.
EXT	An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger: <ul style="list-style-type: none"><li>• The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 906.</li></ul>



For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User's Guide*.

- The trigger signal polarity:
  - gating mode, see “[:TRIGger:TYPE:GATE:ACTive” on page 904
  - continuous and single modes, see “[:TRIGger[:SOURce]:EXTernal:SLOPe” on page 906
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “[:TRIGger[:SOURce]:EXTernal:DELay” on page 905
  - turning the delay on, see “[:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 906

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

<b>Key Entry</b>	<b>Trigger Key</b>	<b>Ext</b>	<b>Bus</b>
------------------	--------------------	------------	------------

## **:TRIGger[:SOURce]:EXTernal:DELay**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio[:NADC]:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio[:NADC]:TRIGger[:SOURce]:EXTernal:DELay?
```

This command sets the number of bits to delay the ESG's response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “[:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 906. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger[:SOURce]” on page 904.

**\*RST** +0

**Range** 0–1048575

**Key Entry** Ext Delay Bits

### **:TRIGger[:SOURCE]:EXternal:DELay:STATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] :EXternal :DELay :STATe ON | OFF | 1 | 0  
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] :EXternal :DELay :STATe ?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURCE]:EXternal:DELay” on page 905, and for more information on configuring an external source, see “:TRIGger[:SOURCE]” on page 904.

**\*RST** 0

**Key Entry** Ext Delay Off On

### **:TRIGger[:SOURCE]:EXternal:SLOPe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] :EXternal :SLOPe POSitive | NEGative  
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] :EXternal :SLOPe ?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 904.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 904.

**\*RST** POS

**Key Entry** Ext Polarity Neg Pos

### **:TRIGger[:SOURCE]:EXternal[:SOURCE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] :EXternal [ :SOURCE ] EPT1 | EJPT2 |  
EPTRIGGER1 | EPTRIGGER2  
[ :SOURCE ] :RADio [ :NADC ] :TRIGger [ :SOURCE ] :EXternal [ :SOURCE ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 904. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

**[ :STATe ]**

**Supported**      E4438C with Option 402

[ :SOURce ] :RADio [ :NADC ] [ :STATe ] ON | OFF | 1 | 0  
 [ :SOURce ] :RADio [ :NADC ] [ :STATe ] ?

This command enables or disables the NADC modulation format.

**\*RST**      OFF

**Key Entry**      **NADC Off On**

**Remarks**      Although the NADC modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.

---

## PDC Subsystem–Option 402 ([:SOURce]:RADio:PDC)

### :ALPha

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:ALPha <val>  
[ :SOURce ] :RADio:PDC:ALPha?
```

This command changes the Nyquist or root Nyquist filter’s alpha value.

The filter alpha value can be set to a minimum level (0), a maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 920.

### :BBCLock

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:BBCLock INT [1] | EXT [1]  
[ :SOURce ] :RADio:PDC:BBCLock?
```

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**INT[1]** This choice selects the signal generator internal data clock.

**EXT[1]** This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **Ext Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

## :BBT

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:PDC:BBT <val>

[ :SOURCE ] :RADio:PDC:BBT?

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E–001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 920.

## :BRATe

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:PDC:BRATe <val>

[ :SOURCE ] :RADio:PDC:BRATe?

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects a filter length.

For higher bit rates, the FIR filter length may be truncated (if the minimum filter size allows it) which will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 965). Refer to “:FILTer” on page 920 for information on filter symbol widths.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

Receiver Test Digital Commands (continued)  
**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

**\*RST** +4.20000000E+004

Range	Modulation Type	Bit Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps
	FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
	QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
	QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
	QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
	QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

**Key Entry**                      **Symbol Rate**

**:BURSt:PN9**

**Supported**                      E4438C with Option 402

[ :SOURce ] :RADio:PDC: BURSt: PN9 NORMAl | QUICk  
 [ :SOURce ] :RADio:PDC: BURSt: PN9?

This command controls the software PN9 generation.

NORMAl                      This choice produces a maximum length PN9 sequence.

QUICk                      This choice produces a truncated PN9 sequence.

**\*RST**                      NORM

**Key Entry**                      **PN9 Mode Normal Quick**

**Remarks**                      Use Normal mode for bit-error-rate tests where a maximum length PN9 sequence is required.

## **:BURSt:SHAPe:FALL:DELay**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FALL:DELay <val>

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FALL:DELay?

This command sets the period of time that the start of the burst fall is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -22.3750 to 99

**Key Entry** **Fall Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATe” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 912 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:FALL:TIME**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FALL:TIME <val>

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FALL:TIME?

This command sets the period of time where the burst decreases from full power to minimum power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.1250–255.8750

**Key Entry** Fall Time

Receiver Test Digital Commands (continued)  
**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATE” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 913 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:FDElay**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FDElay <val>  
[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FDElay?

This command sets the period of time that the start of the burst fall is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST**                    +0.00000000E+000

**Range**                    –22.3750 to 99

**Key Entry**            **Fall Delay**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATE” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DElay” on page 911 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.



## **:BURSt:SHAPe:FTIME**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FTIME <val>

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:FTIME?

This command sets the period of time where the burst decreases from full power to minimum power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** 0.1250–255.8750

**Key Entry** **Fall Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATE” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:TIME” on page 911 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:RDELay**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RDELay <val>

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RDELay?

This command sets the period of time that the start of the burst rise is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** –18.3750 to 99

**Key Entry** **Rise Delay**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATe” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELay” on page 914 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:RISE:DELay**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RISE:DELay <val>  
[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RISE:DELay?

This command sets the period of time that the start of the burst rise is delayed.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST**                    +0.00000000E+000

**Range**                    –18.3750 to 99

**Key Entry**            **Rise Delay**

**Remarks**            The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATe” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RDELay” on page 913 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:RISE:TIME**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RISE:TIME <val>

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RISE:TIME?

This command sets the period of time where the burst increases from a minimum power to full power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.1250–22.5000

**Key Entry** **Rise Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATE” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RTIME” on page 915 performs the same function. In compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:RTIME**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RTIME <val>

[ :SOURce ] :RADio:PDC:BURSt:SHAPe:RTIME?

This command sets the period of time where the burst increases from a minimum power to full power.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +1.00000000E+001

**Range** 0.1250–22.5000

**Key Entry** **Rise Time**

**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923. Refer to “:SRATE” on page 965 for a list of minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 915 performs the same function. In compliance with the SCPI standard, both commands are listed.

Refer to the *E4428C/38C ESG Signal Generators User’s Guide* for concept information.

**:BURSt:SHAPe[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:BURSt:SHAPe[:TYPE] SINE | "<file name>"
[ :SOURce ] :RADio:PDC:BURSt:SHAPe[:TYPE] ?
```

This command specifies the burst shape as either SINE or a user-defined file ("<file name>").

**SINE** This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

"<file name>" This choice selects a user designated file from signal generator memory.

**\*RST** SINE

**Key Entry** **Sine** **User File**

**:BURSt[:STATe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:BURSt[:STATe] ON | OFF | 1 | 0
[ :SOURce ] :RADio:PDC:BURSt[:STATe] ?
```

This command enables or disables the burst function.

**ON (1)** This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

OFF (0) This choice enables the transmission of unframed data.

\*RST 0

**Key Entry** Data Format Pattern Framed

## :CHANnel

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:CHANnel EVM|ACP
[ :SOURce ] :RADio:PDC:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

EVM This choice provides the most ideal passband.

ACP This choice improves stopband rejection.

\*RST EVM

**Key Entry** Optimize FIR For EVM ACP

**Remarks** To change the current filter type, refer to “:FILTer” on page 920.

## :DATA

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:DATA PN9|PN11|PN15|PN20|PN23|FIX4 | "<file name>" |
EXT|P4|P8|P16|P32|P64|PRAM
[ :SOURce ] :RADio:PDC:DATA?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1’s and 0’s, data from an external source, or a user file) for unframed data transmission.

\*RST PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1’s &amp; 4 0’s</b>	<b>8 1’s &amp; 8 0’s</b>	<b>16 1’s &amp; 16 0’s</b>	<b>16 1’s &amp; 16 0’s</b>	<b>32 1’s &amp; 32 0’s</b>		<b>32 1’s &amp; 32 0’s</b>	
	<b>64 1’s &amp; 64 0’s</b>	<b>PRAM File</b>						

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

## **:DATA:PRAM**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:DATA:PRAM "<file_name>"
```

```
[ :SOURCE ] :RADIO:PDC:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the PDC (Personal Digital Cellular) format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the ESG’s volatile memory (WFM1) in order to be accessed by this command. See [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

## **:DATA:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADIO:PDC:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the protocols (modulation type, symbol rate, filter, and burst shape) selected for the PDC format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

## **:DEFault**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:DEFault
```

This command returns all of the PDC modulation format parameters to factory settings. It does not affect any other signal generator parameters.

**Key Entry** **Restore PDC Factory Default**

### **:EDATa:DELay**

**Supported**            E4438C with Option 402

[:SOURce]:RADio:PDC:EDATa:DELay?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks**            When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

### **:EDCLock**

**Supported**            E4438C with Option 402

[:SOURce]:RADio:PDC:EDCLock SYMBol | NORMal

[:SOURce]:RADio:PDC:EDCLock?

This command sets the external data clock use.

**SYMBol**                This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal**                This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST**                    NORM

**Key Entry**            **Ext Data Clock Normal Symbol**

**Remarks**            Both choices have no effect in internal clock mode. Refer to “:BBCLock” on [page 908](#) to select EXT as the data clock type.

### **:EREFerence**

**Supported**            E4438C with Option 402

[:SOURce]:RADio:PDC:EREFerence INT | EXT

[:SOURce]:RADio:PDC:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST**                    INT

**Key Entry**            **BBG Ref Ext Int**

**PDC Subsystem—Option 402 ([:SOURCE]:RADio:PDC)**

**Remarks** If the EXT choice is selected, the external source's frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

Refer to "[:EREFerence:VALue](#)" on page 920 to enter the external reference frequency setting.

**:EREFerence:VALue**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PDC:EREFerence:VALue <val>
[:SOURCE]:RADio:PDC:EREFerence:VALue?
```

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.30000000E+007

**Range** 2.5E5–1E8

**Key Entry** **Ext BBG Ref Freq**

**Remarks** The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to "[:EREFerence](#)" on page 919 to select EXT (external source) as the reference for the bit-clock.

**:FILTer**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PDC:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|
IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|"<user FIR>"
[:SOURCE]:RADio:PDC:FILTer?
```

This command selects the pre-modulation filter type.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the



	filter specified in the IS-95 standard.
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
AC4Fm	Selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory.
<b>*RST</b>	<b>RYNQ</b>
<b>Key Entry</b>	<b>Root Nyquist      Nyquist      Gaussian      Rectangle      IS-95      IS-95 w/EQ</b> <b>IS-95 Mod      IS-95 Mod w/EQ      APCO 25 C4FM      UN3/4 GSM Gaussian</b> <b>User FIR</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

## **:FRATe**

**Supported**      E4438C with Option 402  
[:SOURCE]:RADio:PDC:FRATe FULL|HALF  
[:SOURCE]:RADio:PDC:FRATe?

This command toggles between a full- or half-rate traffic channel.

**FULL**      Selects two equally spaced timeslots of the frame. Since there are six timeslots per frame, timeslots 1, 2, and 3 are paired with timeslots 4, 5, and 6, respectively.

**HALF**      Selects one timeslot of the frame (6 individual timeslots per frame).

**\*RST**      **FULL**

**Key Entry**      **Rate Full Half**

## **:IQ:SCALE**

**Supported**      E4438C with Option 402  
[:SOURCE]:RADio:PDC:IQ:SCALE <val>  
[:SOURCE]:RADio:PDC:IQ:SCALE?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

The variable <val> is expressed in units of percent.

<b>*RST</b>	+100
<b>Range</b>	1–200
<b>Key Entry</b>	<b>I/Q Scaling</b>
<b>Remarks</b>	This command has no effect with MSK or FSK modulation.

**:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:MODulation:FSK[:DEVIation] <val>
```

```
[ :SOURce ] :RADio:PDC:MODulation:FSK[:DEVIation] ?
```

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 923.  
 Refer to “:SRATe” on page 965 for minimum and maximum symbol rate values.  
 To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

**:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:MODulation:MSK[:PHASe] <val>
```

```
[ :SOURce ] :RADio:PDC:MODulation:MSK[:PHASe] ?
```

This command sets the MSK phase deviation value.

The variable <val> is expressed in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

## :MODulation:UFSK

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PDC:MODulation:UFSK "<file name>"
```

```
[ :SOURCE ] :RADio:PDC:MODulation:UFSK?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 923](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :MODulation:UIQ

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PDC:MODulation:UIQ "<file name>"
```

```
[ :SOURCE ] :RADio:PDC:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 923](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :MODulation[:TYPE]

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PDC:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|  
GRAYQPSK|OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|  
FSK2|FSK4|FSK8|FSK16|C4FM|QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|UIQ|UFSK  
[ :SOURCE ] :RADio:PDC:MODulation[:TYPE] ?
```

This command sets the modulation type for the PDC personality.

Receiver Test Digital Commands (continued)  
**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

<b>*RST</b>	P4DQPSK							
<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>		<b>OQPSK</b>		
	<b>IS-95 OQPSK</b>	$\pi/4$ <b>DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

**:POLarity[:ALL]**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:POLarity[:ALL] NORMal | INVerted  
 [ :SOURce ] :RADio:PDC:POLarity[:ALL] ?

This command sets the rotation direction for of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **Phase Polarity Normal Invert**

**:SECondary:RECall**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:SECondary:RECall

This command recalls the secondary frame configuration, overwriting the current state.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “:SECondary:SAVE” on page 924.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “:SECondary[:STATE]” on page 925.

**:SECondary:SAVE**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:SECondary:SAVE

This command saves the current frame configuration as the secondary frame with the filename PDC\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “:SECOndary:SAVE” on page 924.

### **:SECOndary:TRIGger[:SOURce]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:SECOndary:TRIGger [ :SOURce ] KEY | EXT | BUS
[ :SOURce ] :RADio:PDC:SECOndary:TRIGger [ :SOURce ] ?
```

This command selects the type of triggering for the secondary frame.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURce]:EXTErnal[:SOURce]” on page 940.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry**      **Trigger Key      Ext      Bus**

### **:SECOndary[:STATe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:SECOndary [ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :RADio:PDC:SECOndary [ :STATe ] ?
```

This command enables or disables the ability to switch to the secondary frame.

**\*RST**            0

**Key Entry**      **Secondary Frame Off On**

**Remarks** A frame must already be saved as the secondary frame in order to turn the secondary state function on.

To save a frame as the secondary frame, refer to “:SECOndary[:STATe]” on page 925.

**:SLOT0|[1]|2|3|4|5:DCUStom**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:DCUStom PN9|PN11|PN15|
PN20|PN23|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:DCUStom?
```

This command configures the data field for the selected downlink custom timeslot.

**\*RST** PN9

**Key Entry** **PN9 PN11 PN15 PN20 PN23 FIX4 User File EXT**  
**4 1's & 4 0's 8 1's & 8 0's 16 1's & 16 0's 32 1's & 32 0's**  
**64 1's & 64 0's**

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:SLOT0|[1]|2|3|4|5:DCUSTom:FIX4**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:DCUSTom:FIX4 <val>
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:DCUSTom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to “:SLOT0|[1]|2|3|4|5:DCUStom” on page 926.

**:SLOT0|[1]|2|3|4|5:DTCHannel:CCODE**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:DTCHannel:CCODE <bit_pattern>
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:DTCHannel:CCODE?
```

This command changes the 8-bit color code (CC). The preset hexadecimal value (when normal preset is selected) for CC reflects the PDC protocol, however you can enter a new value using this command.

**\*RST** #H00

**Range** #H00–#HFF

**Key Entry** CC

### **:SLOT0|[1]|2|3|4|5:DTCHannel:SACChannel**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel:SACChannel <bit_pattern>  
[ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel:SACChannel?
```

This command changes the 15-bit slow associated control channel (SACCH). The preset hexadecimal value (when normal preset is selected) for SACCH reflects the PDC protocol, however you can enter a new value by executing this command.

**\*RST** #H00000

**Range** #H0–#HFFFFFF

**Key Entry** SACCH

### **:SLOT0|[1]|2|3|4|5:DTCHannel:SWORd**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel:SWORd <bit_pattern>  
[ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel:SWORd?
```

This command sets the 20-bit synchronization word as the active function. This is used for the control and traffic physical channels.

**\*RST** #H87A4B

**Range** #H0–#HFFFFFF

**Key Entry** SW

### **:SLOT0|[1]|2|3|4|5:DTCHannel[:TCHannel]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel[:TCHannel] PN9 |  
PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64  
[ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel[:TCHannel] ?
```

This command configures the data field for the selected downlink traffic channel field.

Receiver Test Digital Commands (continued)  
**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

**\*RST** PN9  
**Key Entry** PN9 PN11 PN15 PN20 PN23 FIX4 User File EXT  
 4 1's & 4 0's 8 1's & 8 0's 16 1's & 16 0's 32 1's & 32 0's  
 64 1's & 64 0's

**Remarks** See “File Name Variables” on page 13 for information on the file name syntax.

**:SLOT0|[1]|2|3|4|5:DTCHannel[:TCHannel]:FIX4**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel [ :TCHannel ] :FIX4 <val>  
 [ :SOURce ] :RADio:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :DTCHannel [ :TCHannel ] :FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink traffic channel timeslot.

**\*RST** #B0000  
**Range** #B0000–#B1111 or 0–15  
**Key Entry** FIX4  
**Remarks** FIX4 must already be defined as the data type.

**:SLOT0|[1]|2|3|4:POWer**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PDC:DLINK:SLOT0 | [1] | 2 | 3 | 4 :POWer MAIN|DELTA  
 [ :SOURce ] :RADio:PDC:DLINK:SLOT0 | [1] | 2 | 3 | 4 :POWer?

This command toggles the RF output power level function for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.  
**DELTA** This choice specifies RF output as the alternative power level.  
**\*RST** MAIN  
**Key Entry** Timeslot Ampl Main Delta



**:SLOT0|[1]|2|3|4|5:STATE**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0 [1] | 2 | 3 | 4 | 5 :STATe ON|OFF|1|0
[:SOURce]:RADio:PDC:SLOT0 [1] | 2 | 3 | 4 | 5 :STATe?
```

This command enables or disables the operating state of the selected timeslot.

**\*RST** Timeslot 0: 1 Timeslots 1–5: 0

**Key Entry** Timeslot Off On

**:SLOT0|[1]|2|3|4|5:UCUStom**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0 [1] | 2 | 3 | 4 | 5 :UCUStom PN9|PN11|PN15 |
PN20|PN23|FIX4 | "<file name>" |EXT|P4|P8|P16|P32|P64
[:SOURce]:RADio:PDC:SLOT0 [1] | 2 | 3 | 4 | 5 :UCUStom?
```

This command configures the data field for the selected uplink custom timeslot.

**\*RST** PN9

**Key Entry**

<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
<b>64 1's &amp; 64 0's</b>							

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:SLOT0|[1]|2|3|4|5:UCUStom:FIX4**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0 [1] | 2 | 3 | 4 | 5 :UCUStom:FIX4 <val>
[:SOURce]:RADio:PDC:SLOT0 [1] | 2 | 3 | 4 | 5 :UCUStom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected uplink custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

### **:SLOT0|[1]|2|3|4|5:UTCHannel:CCODE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UTCHannel:CCODE <bit_pattern>  
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UTCHannel:CCODE?
```

This command changes the 8-bit color code (CC). The preset hexadecimal value (when normal preset is selected) for CC reflects the PDC protocol, however you can enter a new value using this command.

**\*RST** #H00

**Range** #H00–#HFF

**Key Entry** **CC**

### **:SLOT0|[1]|2|3|4|5:UTCHannel:SACChannel**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UTCHannel:SACChannel <bit_pattern>  
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UTCHannel:SACChannel?
```

This command changes the 15-bit slow associated control channel (SACCH). The preset hexadecimal value (when normal preset is selected) for SACCH reflects the PDC protocol, however you can enter a new value by executing this command.

**\*RST** #H0000

**Range** #H0–#H7FFF

**Key Entry** **SACCH**

### **:SLOT0|[1]|2|3|4|5:UTCHannel:SWORd**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UTCHannel:SWORd <bit_pattern>  
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UTCHannel:SWORd?
```

This command sets the 20-bit synchronization word as the active function. This is used for the control and traffic physical channels.

**\*RST** #H785B4

**Range** #H0–#HFFFFFF

**Key Entry** **SW**

**:SLOT0|[1]|2|3|4|5:UTCHannel[:TCHannel]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:UTCHannel[:TCHannel] PN9|
PN11|PN15|PN20|PN23|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:UTCHannel[:TCHannel]?
```

This command sets a pseudo-random number sequence, 4-bit pattern, sequence of 1's and 0's, data from an external source, or a user file as the data pattern type for the uplink traffic channel field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>			

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:SLOT0|[1]|2|3|4|5:UTCHannel[:TCHannel]:FIX4**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:UTCHannel[:TCHannel]:FIX4 <val>
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5:UTCHannel[:TCHannel]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected uplink traffic channel timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

### **:SLOT0|[1]|2|3|4|5:UVOX:CCODE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UVOX:CCODE <bit_pattern>  
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UVOX:CCODE?
```

This command changes the 8-bit color code (CC). The preset hexadecimal value (when normal preset is selected) for CC reflects the PDC protocol, however you can enter a new value using this command.

**\*RST** #H00

**Range** #H00–#HFF

**Key Entry** **CC**

### **:SLOT0|[1]|2|3|4|5:UVOX:SACChannel**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UVOX:SACChannel <bit_pattern>  
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UVOX:SACChannel?
```

This command changes the 15-bit slow associated control channel (SACCH). The preset hexadecimal value (when normal preset is selected) for SACCH reflects the PDC protocol, however you can enter a new value by executing this command.

**\*RST** #H0000

**Range** #H0–#H7FFF

**Key Entry** **SACCH**

### **:SLOT0|[1]|2|3|4|5:UVOX:SWORD**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UVOX:SWORD <bit_pattern>  
[ :SOURCE ] :RADIO:PDC:SLOT0 | [1] | 2 | 3 | 4 | 5 :UVOX:SWORD?
```

This command changes the synchronization word, which is used for slot synchronization, equalizer training, and timeslot identification.

**\*RST** UTCH & UVOX: 785B4 DTCH: 87A4B

**Range** #H0–#HFFFFFF

**Key Entry** **SW**

**Remarks** The \*RST hexadecimal value reflects the value specified by the indicated standard.

## **:SLOT0|[1]|2|3|4|5[:TYPE]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5[:TYPE] UCUStom|DCUStom|
UTCH|UTCH_ALL|UVOX|DTCH|DTCH_ALL
[:SOURce]:RADio:PDC:SLOT0|[1]|2|3|4|5[:TYPE]?
```

This command sets the timeslot type for the selected timeslot.

**\*RST** UTCH

<b>Key Entry</b>	<b>Up Custom</b>	<b>Down Custom</b>	<b>Up TCH</b>	<b>UP TCH All</b>	<b>Up VOX</b>
	<b>Down TCH</b>	<b>Down TCH All</b>			

## **:SOUT**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SOUT FRAME|SLOT|ALL
[:SOURce]:RADio:PDC:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

<b>Key Entry</b>	<b>Begin Frame</b>	<b>Begin Timeslot #</b>	<b>All Timeslots</b>
------------------	--------------------	-------------------------	----------------------

## **:SOUT:OFFSet**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PDC:SOUT:OFFSet <val>
[:SOURce]:RADio:PDC:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed as a number bits.

**\*RST** +0

Receiver Test Digital Commands (continued)  
**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

<b>Range</b>	–279 to 279
<b>Key Entry</b>	<b>Sync Out Offset</b>
<b>Remarks</b>	Negative values move the synchronization output signal earlier; positive values move it later.  To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 933.

**:SOUT:SLOT**

<b>Supported</b>	E4438C with Option 402
	[ :SOURce ] :RADio:PDC:SOUT:SLOT <val>
	[ :SOURce ] :RADio:PDC:SOUT:SLOT?

This command selects the timeslot that will trigger a 1-bit signal at the EVENT 1 rear panel connector.

<b>*RST</b>	+0
<b>Range</b>	0–5
<b>Key Entry</b>	<b>Begin Timeslot #</b>
<b>Remarks</b>	To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 933.

**:SRATe**

<b>Supported</b>	E4438C with Option 402
	[ :SOURce ] :RADio:PDC:SRATe <val>
	[ :SOURce ] :RADio:PDC:SRATe?

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to “:BRATe” on page 774 for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–MSPS) and the maximum symbol rate depends on the filter. Refer to “:FILTer” on page 920 for minimum filter symbol width.

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 923.

**\*RST**                    +2.1000000E+004

Range	Modulation Type	Symbol Rate Range		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 Msps	3sps–8.333333333 Msps	3sps–4.166666666Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.333333333 Msps	6sps–4.166666666 Msps	6sps–2.083333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

---

**NOTE**                    Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**                    **Symbol Rate**

## **:TRIGger:TYPE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PDC:TRIGger:TYPE CONTInuous | SINGle | GATE
[ :SOURCE ] :RADio:PDC:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTInuous** The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “[:TRIGger:TYPE:CONTInuous\[:TYPE\]](#)” on page 936.

**SINGle** The framed data sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST** CONT

<b>Key Entry</b>	<b>Continuous</b>	<b>Single</b>	<b>Gated</b>
------------------	-------------------	---------------	--------------

## **:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PDC:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet
[ :SOURCE ] :RADio:PDC:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “[:TRIGger:TYPE](#)” on page 936.

The following list describes the waveform’s response to each of the command choices:

**FREE** Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.

**TRIGger** The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

**RESet** The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.



<b>*RST</b>	FREE		
<b>Key Entry</b>	<b>Free Run</b>	<b>Trigger &amp; Run</b>	<b>Reset &amp; Run</b>

**:TRIGger:TYPE:GATE:ACTive**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PDC:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[ :SOURCE ] :RADio:PDC:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 936.

The following list describes the ESG’s gating behavior for the polarity selections:

LOW	The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).
HIGH	The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
<b>*RST</b>	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>

**:TRIGger[:SOURCE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PDC:TRIGger [ :SOURCE ] KEY|EXT|BUS
[ :SOURCE ] :RADio:PDC:TRIGger [ :SOURCE ] ?
```

This command sets the trigger source.

For more information on triggering, see “:TRIGger:TYPE” on page 936. The following list describes the command choices:

KEY	This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.
-----	---

**PDC Subsystem—Option 402 ([:SOURce]:RADio:PDC)**

- EXT** An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:
- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “[:TRIGger[:SOURce]:EXTErnal[:SOURce]]” on page 940.  
For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.
  - The trigger signal polarity:
    - gating mode, see “[:TRIGger:TYPE:GATE:ACTive]” on page 937
    - continuous and single modes, see “[:TRIGger[:SOURce]:EXTErnal:SLOPe]” on page 939
  - The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
    - setting the amount of delay, see “[:TRIGger[:SOURce]:EXTErnal:DELay]” on page 938
    - turning the delay on, see “[:TRIGger[:SOURce]:EXTErnal:DELay:STATe]” on page 939
- BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

Key Entry	Trigger Key	Ext	Bus
-----------	-------------	-----	-----

**:TRIGger[:SOURce]:EXTErnal:DELay**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:TRIGger [ :SOURce ] :EXTErnal:DELay <val>
[ :SOURce ] :RADio:PDC:TRIGger [ :SOURce ] :EXTErnal:DELay?
```

This command sets the number of bits to delay the ESG’s response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “[:TRIGger[:SOURce]:EXTErnal:DELay:STATe]” on page 939. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 937.

**\*RST**                    +0  
**Range**                    0–1048575  
**Key Entry**                **Ext Delay Bits**

### **:TRIGger[:SOURce]:EXTErnal:DELAy:STATe**

**Supported**                E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:TRIGger [ :SOURce ] :EXTErnal:DELAy:STATe ON|OFF|1|0  
[ :SOURce ] :RADio:PDC:TRIGger [ :SOURce ] :EXTErnal:DELAy:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURce]:EXTErnal:DELAy” on page 938, and for more information on configuring an external source, see “:TRIGger[:SOURce]” on page 937.

**\*RST**                    0  
**Key Entry**                **Ext Delay Off On**

### **:TRIGger[:SOURce]:EXTErnal:SLOPe**

**Supported**                E4438C with Option 402

```
[ :SOURce ] :RADio:PDC:TRIGger [ :SOURce ] :EXTErnal:SLOPe POSitive|NEGative  
[ :SOURce ] :RADio:PDC:TRIGger [ :SOURce ] :EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 937.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 937.

**\*RST**                    NEG  
**Key Entry**                **Ext Polarity Neg Pos**

**:TRIGger[:SOURCE]:EXTernal[:SOURCE]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PDC:TRIGger[:SOURCE]:EXTernal[:SOURCE] EPT1|EPT2|
EPTRIGGER1|EPTRIGGER2
[:SOURCE]:RADio:PDC:TRIGger[:SOURCE]:EXTernal[:SOURCE]?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 937. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

- EPT1 This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
- EPT2 This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
- EPTRIGGER1 This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
- EPTRIGGER2 This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

**\*RST** EPT1

**Key Entry** **Patt Trig In 1** **Patt Trig In 2**

**[:STATe]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PDC[:STATe] ON|OFF|1|0[:SOURCE]:RADio:PDC[:STATe]?
```

This command enables or disables the PDC modulation format.

**\*RST** OFF

**Key Entry** **PDC Off On**

**Remarks** Although the PDC modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.

---

## **PHS Subsystem–Option 402 ([:SOURce]:RADio:PHS)**

### **:ALPha**

**Supported** E4438C with Option 402

`[:SOURce]:RADio:PHS:ALPha <val>`

`[:SOURce]:RADio:PHS:ALPha?`

This command changes the Nyquist or root Nyquist filter’s alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “[:FILTer](#)” on page 959.

### **:BBCLock**

**Supported** E4438C with Option 402

`[:SOURce]:RADio:PHS:BBCLock INT[1] |EXT[1]`

`[:SOURce]:RADio:PHS:BBCLock?`

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**INT[1]** This choice selects the signal generator internal data clock.

**EXT[1]** This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **BBG Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

## :BBT

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:BBT <val>  
[ :SOURce ] :RADio:PHS:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E–001

**Range** 0.100–1.000

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 959.

## :BRATe

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:BRATe <val>  
[ :SOURce ] :RADio:PHS:BRATe?
```

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects a filter length.

For higher bit rates, the FIR filter length may be truncated (if the minimum filter size allows it) which will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 965). Refer to “:FILTer” on page 959 for information on filter symbol widths.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

**\*RST** +3.8400000E+005

Range	Modulation Type	Bit Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps
	FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
	QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
	QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
	QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
	QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

**Key Entry**            **Symbol Rate**

**:BURSt:PN9**

**Supported**            E4438C with Option 402

[ :SOURCE ] :RADio:PHS: BURSt:PN9 NORMal | QUICk  
 [ :SOURCE ] :RADio:PHS: BURSt:PN9?

This command controls the software PN9 generation.

**NORMal**                This choice produces a maximum length PN9 sequence.

**QUICk**                 This choice produces a truncated PN9 sequence.

**\*RST**                  NORM

**Key Entry**            **PN9 Mode Normal Quick**

**Remarks**            Use Normal mode for bit-error-rate tests where a maximum length PN9 sequence is required.

### **:BURSt:SCRamble:SEED**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:BURSt:SCRamble:SEED <16-bit val>  
[ :SOURce ] :RADio:PHS:BURSt:SCRamble:SEED?
```

This command select a 16-bit scramble seed value for scrambling.

**\*RST** #H3FF

**Range** #H0–#H3FF

**Key Entry** **Scramble Seed**

**Remarks** Although values may be set using this command, it does not active that scramble function.

To enable the scrambling function, refer to “:BURSt:SCRamble[:STATe]” on [page 944](#).

### **:BURSt:SCRamble[:STATe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:BURSt:SCRamble [ :STATe ] ON | OFF | 1 | 0  
[ :SOURce ] :RADio:PHS:BURSt:SCRamble [ :STATe ] ?
```

This command enables or disables the operating state of the scramble function.

ON (1) This choice scrambles data on the related fields, using the seed setting.

OFF (0) This choice disables the scramble function.

**\*RST** 0

**Key Entry** **Scramble Off On**

**Remarks** To set the seed setting, refer to “:BURSt:SCRamble:SEED” on [page 944](#).



## **:BURSt:SHAPe:FALL:DELay**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PHS:BURSt:SHAPe:FALL:DELay <val>

[ :SOURce ] :RADio:PHS:BURSt:SHAPe:FALL:DELay?

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -22.1250 to 99

**Key Entry** **Fall Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FDELay” on page 946 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:FALL:TIME**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PHS:BURSt:SHAPe:FALL:TIME <val>

[ :SOURce ] :RADio:PHS:BURSt:SHAPe:FALL:TIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +4.00000000E+001

**Range** 0.1250–255.8750

**Key Entry** **Fall Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FTIME” on page 947 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:FDElay**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:BURSt:SHAPe:FDElay <val>  
[ :SOURce ] :RADio:PHS:BURSt:SHAPe:FDElay?
```

This command sets the burst shape fall delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** -22.1250 to 99

**Key Entry** **Fall Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DElay” on page 945 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:FTIME**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:PHS:BURSt:SHAPe:FTIME <val>

[ :SOURCE ] :RADio:PHS:BURSt:SHAPe:FTIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits.

**\*RST** +4.00000000E+001

**Range** 0.1250–255.8750

**Key Entry** **Fall Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:TIME” on page 945 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

## **:BURSt:SHAPe:RDElay**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:PHS:BURSt:SHAPe:RDElay <val>

[ :SOURCE ] :RADio:PHS:BURSt:SHAPe:RDElay?

This command sets the burst shape rise delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** –18.1250 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELay” on page 948 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:RISE:DELay**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:BURSt:SHAPe:RISE:DELay <val>  
[ :SOURce ] :RADio:PHS:BURSt:SHAPe:RISE:DELay?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits.

**\*RST** +0.00000000E+000

**Range** –18.1250 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATE” on page 965 for minimum and maximum symbol rate values.

“:BURSt:SHAPe:RDELay” on page 947 performs the same function; in compliance with the SCPI standard, both commands are listed.

See the *E4428C/38C ESG Signal Generators User’s Guide* for concept information.

## **:BURSt:SHAPe:RISE:TIME**

**Supported** E4438C with Option 402

[[:SOURce]:RADio:PHS: BURSt:SHAPe:RISE:TIME <val>

[[:SOURce]:RADio:PHS: BURSt:SHAPe:RISE:TIME?

This command sets the burst shape rise time. The variable <val> is expressed in bits.

**\*RST** +4.00000000E+001

**Range** 0.1250–22.500

**Key Entry** **Rise Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values. The command “:BURSt:SHAPe:RTIME” on page 949 performs the same function. See the *E4428C/38C ESG Signal Generators User’s Guide* for more information.

## **:BURSt:SHAPe:RTIME**

**Supported** E4438C with Option 402

[[:SOURce]:RADio:PHS: BURSt:SHAPe:RTIME <val>

[[:SOURce]:RADio:PHS: BURSt:SHAPe:RTIME?

This command sets the burst shape rise time. The variable <val> is expressed in bits.

**\*RST** +4.00000000E+001

**Range** 0.1250–22.500

**Key Entry** **Rise Time**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 949 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal*

*Generators User's Guide.*

### **:BURSt:SHAPe[:TYPE]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PHS:BURSt:SHAPe[:TYPE] SINE| "<file name>"  
[:SOURce]:RADio:PHS:BURSt:SHAPe[:TYPE] ?
```

This command specifies the burst shape as either SINE or a user-defined file ("<file name>").

**SINE** This choice selects a state that is defined by the burst rise and fall \*RST values, as the default burst shape type.

"<file name>" This choice selects a user designated file from signal generator memory (non-volatile).

**\*RST** SINE

**Key Entry** **Sine User File**

### **:BURSt[:STATe]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PHS:BURSt[:STATe] ON|OFF|1|0  
[:SOURce]:RADio:PHS:BURSt[:STATe] ?
```

This command enables or disables the burst function.

**ON (1)** This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

**OFF (0)** This choice enables the transmission of unframed data.

**\*RST** 0

**Key Entry** **Data Format Pattern Framed**

## **:CHANnel**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PHS:CHANnel EVM|ACP
[:SOURCE]:RADio:PHS:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “[:FILTer](#)” on page 959.

## **:DATA**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PHS:DATA PN9|PN11|PN15|PN20|PN23|FIX4|
"<file name>"|EXT|P4|P8|P16|P32|P64|PRAM
[:SOURCE]:RADio:PHS:DATA?
```

This command sets the data pattern type (pseudo-random number sequence, 4-bit pattern, sequence of 1’s and 0’s, data from an external source, or a user file) for unframed data transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1’s &amp; 4 0’s</b>		<b>8 1’s &amp; 8 0’s</b>		<b>16 1’s &amp; 16 0’s</b>		<b>32 1’s &amp; 32 0’s</b>	
	<b>64 1’s &amp; 64 0’s</b>	<b>PRAM File</b>						

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

## :DATA:PRAM

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DATA:PRAM "<file_name>"
```

```
[ :SOURce ] :RADio:PHS:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the PHS (Personal Handy-phone System) format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

## :DATA:FIX4

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DATA:FIX4 <val>
```

```
[ :SOURce ] :RADio:PHS:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the protocols (modulation type, symbol rate, filter, and burst shape) selected for the PHS format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

## :DEFault

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DEFault
```

This command returns all of the PHS modulation format parameters to factory settings. It does not affect any other signal generator parameters.



**Key Entry**                    **Restore PHS Factory Default**

**:DLINK:SLOT[1] | 2 | 3 | 4:CUSTom**

**Supported**                    E4438C with Option 402

```
[:SOURce]:RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:CUSTom PN9 | PN11 | PN15 |
PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[:SOURce]:RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:CUSTom?
```

This command configures the data field for the selected downlink custom timeslot.

**\*RST**                         PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>				
	<b>64 1's &amp; 64 0's</b>							

**Remarks**                    Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:DLINK:SLOT[1] | 2 | 3 | 4:CUSTom:FIX4**

**Supported**                    E4438C with Option 402

```
[:SOURce]:RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:CUSTom:FIX4 <val>
[:SOURce]:RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:CUSTom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink custom timeslot.

**\*RST**                         #B0000

**Range**                        #B0000–#B1111 or 0–15

**Key Entry**                    **FIX4**

**Remarks**                    FIX4 must already be defined as the data type.

**:DLINK:SLOT[1] | 2 | 3 | 4:POWer**

**Supported**                    E4438C with Option 402

```
[:SOURce]:RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:POWer MAIN | DELTA
[:SOURce]:RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:POWer?
```

This command toggles the RF output power level function for the selected timeslot.

**MAIN**                         This choice specifies RF output as the main power level.

Receiver Test Digital Commands (continued)  
**PHS Subsystem—Option 402 ([:SOURCE]:RADio:PHS)**

**DELTA** This choice specifies RF output as the alternative power level.  
**\*RST** MAIN  
**Key Entry** **Timeslot Ampl Main Delta**

**:DLINK:SLOT[1] | 2 | 3 | 4:SCHannel:CSID**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:CSID <bit_pattern>  
[ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:CSID?
```

This command changes the 42-bit cell station identification code (CSID) field of the selected downlink timeslot. The preset hexadecimal value (when normal preset is selected) for CSID reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H20200020001  
**Range** #H0–#H3FFFFFFFFF  
**Key Entry** **CSID**

**:DLINK:SLOT[1] | 2 | 3 | 4:SCHannel:IDLE**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:IDLE <bit_pattern>  
[ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:IDLE?
```

This command changes the 34-bit idle (IDLE) field of the selected downlink timeslot. The preset hexadecimal value (when normal preset is selected) for IDLE reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H000000000  
**Range** #H0–#H3FFFFFFFFF  
**Key Entry** **IDLE**

**:DLINK:SLOT[1] | 2 | 3 | 4:SCHannel:PSID**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:PSID <bit_pattern>  
[ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:PSID?
```

This command changes the 28-bit personal station identification code (PSID) field in the synchronization channel of the selected downlink timeslot. The normal preset hexadecimal value for PSID reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H0000001  
**Range** #H0–#H3FFFFFFF  
**Key Entry** **PSID**

### **:DLINK:SLOT[1] | 2 | 3 | 4:SCHannel:UWORD**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:UWORD <bit_pattern>
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :SCHannel:UWORD?
```

This command changes the unique word (UW) field of the selected downlink timeslot. The preset hexadecimal value (when normal preset is selected) for UW reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H50EF2993  
**Range** #H0–#HFFFFFFF  
**Key Entry** **UW**

### **:DLINK:SLOT[1] | 2 | 3 | 4:STATe**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :STATe ON|OFF|1|0
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :STATe?
```

This command enables or disables the operating state of the selected downlink timeslot.

**\*RST** Timeslot 1: 1 *Timeslots 2–4: 0*  
**Key Entry** **Timeslot Off On**

### **:DLINK:SLOT[1] | 2 | 3 | 4:TCHannel:SACChannel**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :TCHannel:SACChannel
<bit_pattern>
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 :TCHannel:SACChannel?
```

This command changes the 15-bit slow associated control channel of the selected downlink timeslot. The preset hexadecimal value (when normal preset is selected) for SACCH reflects the value specified by the standard.

**\*RST** #H8000  
**Range** #H0–#HFFFF

**Key Entry SA**

**:DLINK:SLOT[1] | 2 | 3 | 4:TCHannel:UWORD**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:TCHannel:UWORD <bit_pattern>
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:TCHannel:UWORD?
```

This command changes the unique word (UW) field of the selected downlink timeslot. The preset hexadecimal value (when normal preset is selected) for UW reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H3D4C

Range #H0–#HFFFF

**Key Entry UW**

**:DLINK:SLOT[1] | 2 | 3 | 4:TCHannel[:TCHannel]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:TCHannel
[:TCHannel] PN9 | PN11 | PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 |
P64
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:TCHannel [:TCHannel] ?
```

This command customizes the selected downlink traffic channel timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>				
	<b>64 1's &amp; 64 0's</b>							

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:DLINK:SLOT[1] | 2 | 3 | 4:TCHannel[:TCHannel]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:TCHannel [:TCHannel] :FIX4 <val>
[ :SOURce ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4:TCHannel [:TCHannel] :FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink traffic channel timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to “**:DLINK:SLOT[1]|2|3|4:TCHannel[:TCHannel]**” on page 956.

**:DLINK:SLOT[1]|2|3|4[:TYPE]**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 [ :TYPE ] CUSTom | TCH | TCH\_ALL | SYNC  
 [ :SOURCE ] :RADio:PHS:DLINK:SLOT [1] | 2 | 3 | 4 [ :TYPE ] ?

This command sets the downlink timeslot type for the selected timeslot.

**\*RST** Timeslot 1: TCH Timeslots 2–4: CUST

**Key Entry** **Custom TCH TCH All SYNC**

**:EDATa:DElay**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:PHS:EDATa:DElay?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks** When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

**:EDCLock**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:PHS:EDCLock SYMBol | NORMal  
 [ :SOURCE ] :RADio:PHS:EDCLock?

This command sets the external data clock use.

**SYMBol** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

Receiver Test Digital Commands (continued)  
**PHS Subsystem—Option 402 ([:SOURce]:RADio:PHS)**

<b>*RST</b>	NORM
<b>Key Entry</b>	<b>Ext Data Clock Normal Symbol</b>
<b>Remarks</b>	Both choices have no effect in internal clock mode. Refer to “:BBCLock” on page 941 to select EXT as the data clock type.

**:EREFerence**

<b>Supported</b>	E4438C with Option 402
	<code>[:SOURce]:RADio:PHS:EREFerence INT EXT</code>
	<code>[:SOURce]:RADio:PHS:EREFerence?</code>

This command selects either an internal or external bit-clock reference for the data generator.

<b>*RST</b>	INT
<b>Key Entry</b>	<b>BBG Ref Ext Int</b>
<b>Remarks</b>	If the EXT choice is selected, the external source’s frequency value must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.  Refer to, “:EREFerence:VALue” on page 958 to enter the external reference frequency setting.

**:EREFerence:VALue**

<b>Supported</b>	E4438C with Option 402
	<code>[:SOURce]:RADio:PHS:EREFerence:VALue &lt;val&gt;</code>
	<code>[:SOURce]:RADio:PHS:EREFerence:VALue?</code>

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

<b>*RST</b>	+1.30000000E+007
<b>Range</b>	2.5E5–1E8

**Key Entry**            **Ext BBG Ref Freq**

**Remarks**            The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “[EREFerence](#)” on page 958 to select EXT (external source) as the reference for the bit-clock.

**:FILTer**

**Supported**            E4438C with Option 402

```
[:SOURce]:RADio:PHS:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|
IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|"<user FIR>"
[:SOURce]:RADio:PHS:FILTer?
```

This command selects the pre-modulation filter type.

- IS95                    This choice selects a filter that meets the criteria of the IS-95 standard.
- IS95\_EQ                This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
- IS95\_MOD              This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
- IS95\_MOD\_EQ          This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
- AC4Fm                 This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
- UGGaussian            This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
- "<user FIR>"          This variable is any filter file that you have stored into memory.

**\*RST**                    RNYQ

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM Gaussian</b>		
	<b>User FIR</b>					

**Remarks**            Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

## **:IQ:SCALe**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PHS:IQ:SCALe <val>

[ :SOURce ] :RADio:PHS:IQ:SCALe?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST** +100

**Range** 1–200

**Key Entry** **I/Q Scaling**

**Remarks** This command has no effect with MSK or FSK modulation.

## **:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:PHS:MODulation:FSK[:DEVIation] <val>

[ :SOURce ] :RADio:PHS:MODulation:FSK[:DEVIation]?

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 962.

Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.



## :MODulation:MSK[:PHASe]

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:MODulation:MSK[:PHASe] <val>  
[ :SOURce ] :RADio:PHS:MODulation:MSK[:PHASe] ?
```

This command sets the MSK phase deviation value. The variable <val> is in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

## :MODulation:UFSK

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:MODulation:UFSK "<file name>"  
[ :SOURce ] :RADio:PHS:MODulation:UFSK?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 962](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

## :MODulation:UIQ

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:MODulation:UIQ "<file name>"  
[ :SOURce ] :RADio:PHS:MODulation:UIQ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 962](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PHS:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|
GRAYQPSK|OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|
FSK8|FSK16|C4FM|QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|UIQ|UFSK
[:SOURCE]:RADio:PHS:MODulation[:TYPE] ?
```

This command sets the modulation type for the PHS personality.

**\*RST** P4DQPSK

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>	<b>OQPSK</b>			
	<b>IS-95 OQPSK</b>	<b><math>\pi/4</math> DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

**:POLarity[:ALL]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PHS:POLarity[:ALL] NORMal|INVerted
[:SOURCE]:RADio:PHS:POLarity[:ALL] ?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **Phase Polarity Normal Invert**

**:SECondary:RECall**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:PHS:SECondary:RECall
```

This command recalls the secondary frame configuration, overwriting the current state.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “:SECondary:SAVE” on page 963.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “:SECondary[:STATE]” on page 963.

## **:SECondary:SAVE**

**Supported** E4438C with Option 402

`[ :SOURCE ] :RADio:PHS:SECondary:SAVE`

This command saves the current frame configuration as the secondary frame with the filename `PHS_SECONDARY_FRAME`.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “[:SECondary:RECall](#)” on page 962.

## **:SECondary:TRIGger[:SOURCE]**

**Supported** E4438C with Option 402

`[ :SOURCE ] :RADio:PHS:SECondary:TRIGger [ :SOURCE ] KEY | EXT | BUS`

`[ :SOURCE ] :RADio:PHS:SECondary:TRIGger [ :SOURCE ] ?`

This command selects the type of triggering for the secondary frame.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “[:TRIGger\[:SOURCE\]:EXTernal\[:SOURCE\]](#)” on page 969.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry** **Trigger Key Ext Bus**

## **:SECondary[:STATE]**

**Supported** E4438C with Option 402

`[ :SOURCE ] :RADio:PHS:SECondary [ :STATE ] ON | OFF | 1 | 0`

`[ :SOURCE ] :RADio:PHS:SECondary [ :STATE ] ?`

This command enables or disables the ability to switch to the secondary frame.

**\*RST** 0

**Key Entry** **Secondary Frame Off On**

Receiver Test Digital Commands (continued)  
**PHS Subsystem—Option 402 ([:SOURce]:RADio:PHS)**

**Remarks** A frame must already be saved as the secondary frame in order to turn the secondary state function on.  
To save a frame as the secondary frame, refer to “:SECOndary:SAVE” on page 963.

**:SOUT**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:SOUT FRAME | SLOT | ALL  
[ :SOURce ] :RADio:PHS:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

**Choices** FRAME SLOT ALL

**:SOUT:OFFSet**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:SOUT:OFFSet <val>  
[ :SOURce ] :RADio:PHS:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed as a number of bits.

**\*RST** +0

**Range** -239 to 239

**Key Entry** **Sync Out Offset**

**Remarks** Negative values move the synchronization output signal earlier; positive values move it later.

To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 964.

## :SOUT:SLOT

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:SOUT:SLOT <val>  
[ :SOURce ] :RADio:PHS:SOUT:SLOT?
```

This command selects the timeslot that will trigger a 1-bit output signal at the EVENT 1 rear panel connector.

**\*RST** +0

**Range** 1–4

**Key Entry** **Begin Timeslot #**

**Remarks** To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 964.

## :SRATe

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:SRATe <val>  
[ :SOURce ] :RADio:PHS:SRATe?
```

This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to “:BRATe” on page 875 for information on bit rate.

The variable <val> is expressed in units of symbols per second (sps–Mps) and the maximum symbol rate depends on the filter. Refer to “:FILTer” on page 959 for minimum filter symbol width.

The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 962.

Receiver Test Digital Commands (continued)  
**PHS Subsystem—Option 402 ([:SOURce]:RADio:PHS)**

\*RST +1.92000000E+004

Range	Modulation Type	Symbol Rate Range		
		16 Symbol Wide Filter	32 Symbol Wide Filter	64 Symbol Wide Filter
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKI95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.6666666666 Msps	3sps–8.3333333333 Msps	3sps–4.1666666666 Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.3333333333 Msps	6sps–4.1666666666 Msps	6sps–2.0833333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**            **Symbol Rate**

**:TRIGger:TYPE**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:PHS:TRIGger:TYPE CONTInuous | SINGle | GATE  
 [ :SOURce ] :RADio:PHS:TRIGger:TYPE?

This command sets the trigger type.

**CONTInuous**            The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 967.

**SINGle**                    The framed data sequence plays once for every trigger received.

**GATE**                    An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST**                    **CONT**

**Key Entry**            **Continuous**      **Single**      **Gated**

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported**            E4438C with Option 402

[ :SOURce ] :RADio:PHS:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE | TRIGger | RESet  
 [ :SOURce ] :RADio:PHS:TRIGger:TYPE:CONTInuous [ :TYPE ] ?

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 966.

The following list describes the waveform’s response to each of the command choices:

**FREE**                    Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.

**TRIGger**                The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

**RESet**                    The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

**\*RST**                    **FREE**

**Key Entry**            **Free Run**      **Trigger & Run**      **Reset & Run**

## :TRIGger:TYPE:GATE:ACTive

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:TRIGger:TYPE:GATE:ACTive LOW|HIGH  
[ :SOURCE ] :RADio:PHS:TRIGger:TYPE:GATE:ACTive?
```

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 966.

The following list describes the ESG’s gating behavior for the polarity selections:

LOW The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).

HIGH The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).

\*RST HIGH

**Key Entry** Gate Active Low High

## :TRIGger[:SOURCE]:EXTErnal:DELAy

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:TRIGger[:SOURCE]:EXTErnal:DELAy <val>  
[ :SOURCE ] :RADio:PHS:TRIGger[:SOURCE]:EXTErnal:DELAy?
```

This command sets the number of bits to delay the ESG’s response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “:TRIGger[:SOURCE]:EXTErnal:DELAy:STATE” on page 969. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 970.

\*RST +0

**Range** 0–1048575

**Key Entry** Ext Delay Bits



### **:TRIGger[:SOURce]:EXTErnal:DELay:STATe**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] :EXTErnal:DELay:STATe ON|OFF|1|0
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] :EXTErnal:DELay:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “:TRIGger[:SOURce]:EXTErnal:DELay” on page 968, and for more information on configuring an external source, see “:TRIGger[:SOURce]” on page 970.

**\*RST**                    0

**Key Entry**            **Ext Delay Off On**

### **:TRIGger[:SOURce]:EXTErnal:SLOPe**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] :EXTErnal:SLOPe POSitive|NEGative
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] :EXTErnal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 968.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 970.

**\*RST**                    NEG

**Key Entry**            **Ext Polarity Neg Pos**

### **:TRIGger[:SOURce]:EXTErnal[:SOURce]**

**Supported**            E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] :EXTErnal [ :SOURce ] EPT1|
EPT2|EPTRIGGER1|EPTRIGGER2
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] :EXTErnal [ :SOURce ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger[:SOURce]]” on page 970. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
*RST	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1      Patt Trig In 2</b>

### **:TRIGger[:SOURce]**

**Supported**      E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] KEY | EXT | BUS
[ :SOURce ] :RADio:PHS:TRIGger [ :SOURce ] ?
```

This command sets the trigger source.

For more information on triggering, see “[:TRIGger:TYPE]” on page 966. The following list describes the command choices:

KEY	This choice enables manual triggering by pressing the front-panel <b>Trigger</b> hardkey.
EXT	An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger: <ul style="list-style-type: none"> <li>The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “[:TRIGger[:SOURce]:EXTernal[:SOURce]]” on page 969.</li> </ul> <p>For more information on the connectors and on connecting the cables, see the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

- The trigger signal polarity:
  - gating mode, see “:TRIGger:TYPE:GATE:ACTive” on page 968
  - continuous and single modes, see “:TRIGger[:SOURce]:EXTernal[:SOURce]” on page 969
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “:TRIGger[:SOURce]:EXTernal:DELay” on page 968
  - turning the delay on, see “:TRIGger[:SOURce]:EXTernal:DELay:STATe” on page 969

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

<b>Key Entry</b>	<b>Trigger Key</b>	<b>Ext</b>	<b>Bus</b>
------------------	--------------------	------------	------------

### **:ULINK:SLOT[1] | 2 | 3 | 4:CUSTom**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4:CUSTom PN9 | PN11 | PN15 |
PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4:CUSTom?
```

This command configures the data field for the selected uplink custom timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
	<b>64 1's &amp; 64 0's</b>							

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

### **:ULINK:SLOT[1]|2|3|4:CUSTom:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :CUSTom:FIX4 <val>  
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :CUSTom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected uplink custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

### **:ULINK:SLOT[1]|2|3|4:POWer**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :POWer MAIN|DELTA  
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :POWer?
```

This command toggles the RF output power level function for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.

**DELTA** This choice specifies RF output as the alternative power level.

**\*RST** MAIN

**Key Entry** **Timeslot Ampl Main Delta**

### **:ULINK:SLOT[1]|2|3|4:SCHannel:CSID**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:CSID <bit_pattern>  
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:CSID?
```

This command changes the 42-bit cell station identification code (CSID) field of the selected uplink timeslot. The preset hexadecimal value (when normal preset is selected) for CSID reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H20200020001

**Range** #H0–#H3FFFFFFFFF

**Key Entry** **CSID**

### **:ULINK:SLOT[1]|2|3|4:SCHannel:IDLE**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:IDLE <bit_pattern>  
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:IDLE?
```

This command changes the 34-bit idle (IDLE) field of the selected uplink timeslot. The preset hexadecimal value (when normal preset is selected) for IDLE reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H00000000

**Range** #H0–#H3FFFFFFFF

**Key Entry** **IDLE**

### **:ULINK:SLOT[1]|2|3|4:SCHannel:PSID**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:PSID <bit_pattern>  
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:PSID?
```

This command changes the 28-bit personal station identification code (PSID) field in the synchronization channel of the selected uplink timeslot. The preset (normal) hexadecimal value for PSID reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H0000001

**Range** #H0–#H3FFFFFFFF

**Key Entry** **PSID**

### **:ULINK:SLOT[1]|2|3|4:SCHannel:UWORD**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:UWORD <bit_pattern>  
[ :SOURce ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :SCHannel:UWORD?
```

This command changes the unique word (UW) field of the selected uplink timeslot. The preset hexadecimal value (when normal preset is selected) for UW reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H050EF2993

**Range** #H0–#H0FFFFFFFF

**Key Entry** **UW**

### **:ULINK:SLOT[1] | 2 | 3 | 4:STATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :STATe ON | OFF | 1 | 0  
[ :SOURCE ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :STATe?
```

This command enables or disables the operating state of the selected uplink timeslot.

**\*RST** Timeslot 1: 1 Timeslots 2–4: 0

**Key Entry** Timeslot Off On

### **:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel:SACChannel**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :TCHannel:SACChannel  
<bit_pattern>  
[ :SOURCE ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :TCHannel:SACChannel?
```

This command changes the 15-bit slow associated control channel of the selected uplink timeslot. The preset hexadecimal value (when normal preset is selected) for SACCH reflects the value specified by the standard.

**\*RST** #H8000

**Range** #H0–#HFFFF

**Key Entry** SA

### **:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel:UWORD**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :TCHannel:UWORD <bit_pattern>  
[ :SOURCE ] :RADio:PHS:ULINK:SLOT [1] | 2 | 3 | 4 :TCHannel:UWORD?
```

This command changes the unique word (UW) field of the selected uplink timeslot. The preset hexadecimal value (when normal preset is selected) for UW reflects the PHS protocol, however you can enter a new value with this command.

**\*RST** #H3D4C

**Range** #H0–#HFFFF

**Key Entry** UW

**:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel[:TCHannel]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel
[:TCHannel] PN9|PN11|PN15|PN20|PN23|FIX4| "<file name>" | EXT| P4|P8|P16|P32|
P64
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel[:TCHannel] ?
```

This command selects the data pattern for the selected uplink traffic channel timeslot.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>			

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel[:TCHannel:FIX4]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel[:TCHannel]:FIX4 <val>
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4:TCHannel[:TCHannel]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected uplink traffic channel timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**:ULINK:SLOT[1] | 2 | 3 | 4[:TYPE]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4[:TYPE] CUSTom|TCH|TCH_ALL|SYNC
[:SOURce]:RADio:PHS:ULINK:SLOT[1] | 2 | 3 | 4[:TYPE] ?
```

This command sets the uplink timeslot type for the selected uplink timeslot.

**\*RST** Timeslot 1: TCH Timeslots 2–4: CUST

**Key Entry** **Timeslot Type**

**PHS Subsystem—Option 402 ([:SOURce]:RADio:PHS)**

**[ :STATe]**

**Supported** E4438C with Option 402

[ :SOURce] :RADio:PHS [ :STATe] ON|OFF|1|0

[ :SOURce] :RADio:PHS [ :STATe] ?

This command enables or disables the PHS modulation format.

**\*RST** 0

**Key Entry** **PHS Off On**

**Remarks** Although the PHS modulation is enabled with this command, the RF carrier is not modulated unless you also activate the front panel **Mod On/Off** hardkey.



## TETRA Subsystem—Option 402 ([:SOURce]:RADio:TETRa)

### :ALPha

**Supported** E4438C with Option 402

[:SOURce]:RADio:TETRa:ALPha <val>

[:SOURce]:RADio:TETRa:ALPha?

This command changes the Nyquist or root Nyquist filter's alpha value.

The filter alpha value can be set to a minimum level (0), a maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +3.50000000E-001

**Range** 0.000–1.000

**Key Entry** **Filter Alpha**

**Remarks** To change the current filter type, refer to “:FILTer” on page 991.

### :BBCLock

**Supported** E4438C with Option 402

[:SOURce]:RADio:TETRa:BBCLock INT [1] | EXT [1]

[:SOURce]:RADio:TETRa:BBCLock?

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

INT[1] This choice selects the signal generator internal data clock.

EXT[1] This choice selects an external data clock input.

**\*RST** INT

**Key Entry** **BBG Data Clock Ext Int**

**Remarks** A data clock or continuous symbol sync input must be supplied when external mode is used.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:BBT**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:TETRA:BBT <val>
```

```
[ :SOURCE ] :RADIO:TETRA:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999).

**\*RST** +5.00000000E–001

**Range** 0.100–1.000

**Key Entry** Filter BbT

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTER” on page 991.

**:BRATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:TETRA:BRATe <val>
```

```
[ :SOURCE ] :RADIO:TETRA:BRATe?
```

This command sets the bit rate in bits per second (bps–Mbps). The maximum bit rate is dependent on the modulation type and filter as shown in the following tables

The IQ digital data stream is shaped by a FIR filter. The filter length and associated latency and frequency response are dependent on the bit rate as shown in the following tables. The signal generator selects a filter length.

For higher bit rates, the FIR filter length may be truncated (if the minimum filter size allows it) which will impact the relative timing of the modulated data, as well as the actual filter response (see the symbol rate command “:SRATe” on page 965). Refer to “:FILTER” on page 991 for information on filter symbol widths. To change the modulation type, refer to “:MODulation[:TYPE]” on page 994.

When the bit rate is changed, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the bit rate: lower bit rates require more time.

**\*RST** +3.60000000E+004

Range	Modulation Type	Bit Rate Range		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1bps–50Mbps	1bps–25Mbps	1bps–12.5Mbps
	C4FM, OQPSK, FSK4	2bps–50Mbps	2bps–25Mbps	2bps–12.5Mbps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3bps–50Mbps	3bps–25Mbps	3bps–12.5Mbps
	FSK16, PSK16, QAM16	4bps–50Mbps	4bps–25Mbps	4bps–12.5Mbps
	QAM32	5bps–50Mbps	5bps–25Mbps	5bps–12.5Mbps
	QAM64	6bps–50Mbps	6bps–25Mbps	6bps–12.5Mbps
	QAM128	7bps–50Mbps	7bps–25Mbps	7bps–12.5Mbps
	QAM256	8bps–50Mbps	8bps–25Mbps	8bps–12.5Mbps

**Key Entry**                      **Symbol Rate**

### **:BURSt:PN9**

**Supported**                      E4438C with Option 402

[ :SOURCE ] :RADio:TETRa: BURSt :PN9 NORMal | QUICk  
 [ :SOURCE ] :RADio:TETRa: BURSt :PN9?

This command controls the software PN9 generation.

NORMal                      This choice produces a maximum length PN9 sequence.

QUICk                      This choice produces a truncated PN9 sequence.

\*RST                      NORM

**Key Entry**                      **PN9 Mode Normal Quick**

**Remarks**                      Use Normal mode for bit-error-rate tests where a maximum length PN9 sequence is required.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:BURSt:SCRamble:SEED**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:BURSt:SCRamble:SEED <32-bit val>
```

```
[:SOURCE]:RADIO:TETRA:BURSt:SCRamble:SEED?
```

This command sets the 32-bit scramble seed value.

**\*RST** #HFFFFFFF

**Range** #H0–#HFFFFFFF

**Key Entry** **Scramble Seed**

**Remarks** Although values may be set using this command, it does not active that scramble function.

Refer to “[:BURSt:SCRamble\[:STATe\]](#)” on page 980 to enable the scrambling function.

**:BURSt:SCRamble[:STATe]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:BURSt:SCRamble[:STATe] ON|OFF|1|0
```

```
[:SOURCE]:RADIO:TETRA:BURSt:SCRamble[:STATe]?
```

This command enables or disables the scramble function.

ON (1) This choice scrambles data on the related fields, using the seed setting.

OFF (0) This choice disables the scramble function.

**\*RST** 0

**Key Entry** **Scramble Off On**

**Remarks** To set the seed value, refer to “[:BURSt:SCRamble:SEED](#)” on page 980.

**:BURSt:SHAPE:FALL:DELAy**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:BURSt:SHAPE:FALL:DELAy <val>
```

```
[:SOURCE]:RADIO:TETRA:BURSt:SHAPE:FALL:DELAy?
```

This command sets the burst shape fall delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

<b>*RST</b>	+0.00000000E+000
<b>Range</b>	–22.3750 to 99
<b>Key Entry</b>	<b>Fall Delay</b>
<b>Remarks</b>	<p>The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.</p> <p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 994. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPe:FDELay” on page 982 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**:BURSt:SHAPe:FALL:TIME**

<b>Supported</b>	E4438C with Option 402
	[:SOURCE]:RADio:TETRa:BURSt:SHAPe:FALL:TIME <val> [:SOURCE]:RADio:TETRa:BURSt:SHAPe:FALL:TIME?
	This command sets the burst shape fall time.
	The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.
<b>*RST</b>	+8.00000000E+000
<b>Range</b>	0.1250–50
<b>Key Entry</b>	<b>Fall Time</b>
<b>Remarks</b>	<p>The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.</p> <p>To change the modulation type, refer to “:MODulation[:TYPE]” on page 994. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.</p> <p>“:BURSt:SHAPe:FTIME” on page 982 performs the same function; in compliance with the SCPI standard, both commands are listed.</p> <p>For concept information on burst shaping, refer to the <i>E4428C/38C ESG Signal Generators User’s Guide</i>.</p>

**TETRA Subsystem—Option 402 ([:SOURCE]:RADio:TETRa)****:BURSt:SHAPe:FDELaY**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:FDELaY <val>

[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:FDELaY?

This command sets the burst shape fall delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -22.3750 to 99

**Key Entry** **Fall Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 994.

Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:DELaY” on page 980 performs the same

function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:FTIME**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:FTIME <val>

[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:FTIME?

This command sets the burst shape fall time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +8.00000000E+000

**Range** 0.1250–50

**Key Entry** **Fall Time**

**Remarks**                    The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 994. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:FALL:TIME” on page 981 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

### **:BURSt:SHAPe:RDELay**

**Supported**                    E4438C with Option 402

[ :SOURce ] :RADio:TETRa: BURSt :SHAPe: RDELay <val>

[ :SOURce ] :RADio:TETRa: BURSt :SHAPe: RDELay?

This command sets the burst shape rise delay. The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST**                            +0.00000000E+000

**Range**                            –14.3750 to 99

**Key Entry**                    **Rise Delay**

**Remarks**                    The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 994. Refer to “:SRATE” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:DELay” on page 984 performs the same function; in compliance with the SCPI standard, both commands are listed.

See the *E4428C/38C ESG Signal Generators User’s Guide* for concept information.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADio:TETRa)****:BURSt:SHAPe:RISE:DELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:RISE:DELay <val>
```

```
[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:RISE:DELay?
```

This command sets the burst shape rise delay.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +0.00000000E+000

**Range** -14.3750 to 99

**Key Entry** **Rise Delay**

**Remarks** The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 994. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RDELay” on page 983 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:RISE:TIME**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:RISE:TIME <val>
```

```
[ :SOURCE ] :RADio:TETRa:BURSt:SHAPe:RISE:TIME?
```

This command sets the burst shape rise time.

The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST** +8.00000000E+000

**Range** 0.1250–22.5000

**Key Entry** **Rise Time**



**Remarks**                    The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 994. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RTIME” on page 985 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**:BURSt:SHAPe:RTIME**

**Supported**                    E4438C with Option 402

[ :SOURce ] :RADio:TETRa: BURSt :SHAPe: RTIME <val>  
 [ :SOURce ] :RADio:TETRa: BURSt :SHAPe: RTIME?

This command sets the burst shape rise time. The variable <val> is expressed in bits. The minimum and maximum values depend upon modulation type and symbol rate.

**\*RST**                            +8.00000000E+000

**Range**                            0.1250–22.5000

**Key Entry**                    **Rise Time**

**Remarks**                    The setting enabled by this command is not affected by signal generator power-on, preset, or \*RST.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 994. Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHAPe:RISE:TIME” on page 984 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E4428C/38C ESG Signal Generators User’s Guide*.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:BURSt:SHAPE[:TYPE]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:BURSt:SHAPE[:TYPE] SINE | "<file name>"
[:SOURCE]:RADIO:TETRA:BURSt:SHAPE[:TYPE] ?
```

This command specifies the burst shape as either SINE or a user-defined file ("<file name>").

**SINE** This choice selects a state that is defined by the burst rise and fall \*RST values as the default burst shape type.

"<file name>" This choice selects a user designated file from signal generator memory (non-volatile).

**\*RST** SINE

**Key Entry** **Sine User File**

**:BURSt[:STATe]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:BURSt[:STATe] ON | OFF | 1 | 0
[:SOURCE]:RADIO:TETRA:BURSt[:STATe] ?
```

This command enables or disables the burst function.

**ON (1)** This choice enables the transmission of framed data. If all timeslots which are switched on are up traffic channels or custom, you will be bursting the timeslots that are on; there will be no RF carrier during the off timeslots.

If you have switched on any timeslot that you have configured as a down traffic channel, the RF carrier is not switched off between any of the timeslots. The off timeslots are transmitted as a continuous series of ones for the time period of the off timeslots.

**OFF (0)** This choice enables the transmission of unframed data.

**\*RST** 0

**Key Entry** **Data Format Pattern Framed**

## :CHANnel

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:CHANnel EVM|ACP
[ :SOURCE ] :RADio:TETRa:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 991.

## :DATA

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:DATA PN9|PN11|PN15|PN20|PN23|FIX4|
"<file name>"|EXT|P4|P8|P16|P32|P64|PRAM
[ :SOURCE ] :RADio:TETRa:DATA?
```

This command sets the data pattern for unframed transmission.

**\*RST** PN23

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>Ext</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>				
	<b>64 1's &amp; 64 0's</b>	<b>PRAM File</b>						

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:DATA:PRAM**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:TETRA:DATA:PRAM "<file_name>"
```

```
[ :SOURCE ] :RADIO:TETRA:DATA:PRAM?
```

This command selects a pattern RAM (PRAM) file as the pattern data type for the TETRA (Trans-European Trunked Radio) format.

"<file\_name>" This variable designates the PRAM file in WFM1. Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**Key Entry** **PRAM File**

**Remarks** Selecting this data source forces the burst source to INTERNAL to allow framing control.

The PRAM file must reside in the signal generator’s volatile memory (WFM1) in order to be accessed by this command. For more information on PRAM files, refer to [“:DATA:PRAM:FILE:BLOCK” on page 112](#).

**:DATA:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:TETRA:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADIO:TETRA:DATA:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the TETRA modulation format.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to [“:DATA” on page 987](#).

## :DEFault

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:TETRA:DEFault

This command returns all of the TETRA modulation format parameters to factory settings. It does not affect any other signal generator parameters.

**Key Entry** Restore TETRA Factory Default

## :EDATa:DELay

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:TETRA:EDATa:DELay?

This query returns the amount of delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear panel connectors and the front panel RF OUTPUT connector.

**Remarks** When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

## :EDCLock

**Supported** E4438C with Option 402

[ :SOURCE ] :RADIO:TETRA:EDCLock SYMBOL |NORMal

[ :SOURCE ] :RADIO:TETRA:EDCLock?

This command sets the external data clock use.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**\*RST** NORM

**Key Entry** Ext Data Clock Normal Symbol

**Remarks** Both choices have no effect in internal clock mode. Refer to “:BBCLock” on [page 977](#) to select EXT as the data clock type.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADio:TETRa)****:EREFerence****Supported** E4438C with Option 402

[:SOURCE]:RADio:TETRa:EREFerence INT|EXT

[:SOURCE]:RADio:TETRa:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator.

**\*RST** INT**Key Entry** **BBG Ref Ext Int****Remarks** If the EXT choice is selected, the external source's frequency value

must be applied to the BASEBAND GEN REF IN rear panel connector. The external reference and external data clock are not applicable at the same time. If both are selected, then the external reference takes precedence.

Refer to, “:EREFerence:VALue” on page 990 to enter the external reference frequency setting.

**:EREFerence:VALue****Supported** E4438C with Option 402

[:SOURCE]:RADio:TETRa:EREFerence:VALue &lt;val&gt;

[:SOURCE]:RADio:TETRa:EREFerence:VALue?

This command sets the expected bit-clock reference frequency value for an externally applied reference signal.

The variable <val> is expressed in units of hertz (Hz–MHz).

**\*RST** +1.30000000E+007**Range** 2.5E5–1E8**Key Entry** **Ext BBG Ref Freq****Remarks** The value specified by this command is effective only when you are using an external reference applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:EREFerence” on page 990 to select EXT (external source) as the reference for the bit-clock.

**:FILTer**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|
IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|"<user FIR>"
[:SOURCE]:RADio:TETRa:FILTer?
```

This command selects the pre-modulation filter type.

- IS95 This choice selects a filter that meets the criteria of the IS-95 standard.
- IS95\_EQ This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
- IS95\_MOD This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
- IS95\_MOD\_EQ This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
- AC4Fm This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
- UGGaussian This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
- "<user FIR>" This variable is any filter file that you have stored into memory.

**\*RST** RNYQ

<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM Gaussian</b>		
	<b>User FIR</b>					

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**TETRA Subsystem—Option 402 ([:SOURce]:RADio:TETRa)****:IQ:SCALe**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:TETRa:IQ:SCALe <val>

[ :SOURce ] :RADio:TETRa:IQ:SCALe?

This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.

The variable <val> is expressed in units of percent.

**\*RST** +65

**Range** 1–200

**Key Entry** **I/Q Scaling**

**Remarks** This command has no effect with MSK or FSK modulation.

**:MODulation:FSK[:DEVIation]**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:TETRa:MODulation:FSK[:DEVIation] <val>

[ :SOURce ] :RADio:TETRa:MODulation:FSK[:DEVIation]?

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by four, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

**Key Entry** **Freq Dev**

**Remarks** To change the modulation type, refer to “:MODulation[:TYPE]” on page 994.

Refer to “:SRATe” on page 965 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *E4428C/38C ESG Signal Generators User’s Guide* for more information.



### **:MODulation:MSK[:PHASe]**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:TETRa:MODulation:MSK[:PHASe] <val>  
[ :SOURce ] :RADio:TETRa:MODulation:MSK[:PHASe] ?
```

This command sets the MSK phase deviation value.

The variable <val> is expressed in units of degrees.

**\*RST** +9.00000000E+001

**Range** 0–100

**Key Entry** **Phase Dev**

### **:MODulation:UFSK**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:TETRa:MODulation:UFSK "<file name>"  
[ :SOURce ] :RADio:TETRa:MODulation:UFSK ?
```

This command selects a user-defined FSK file from the signal generator memory.

**Key Entry** **User FSK**

**Remarks** The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to [“:MODulation\[:TYPE\]” on page 994](#) to change the current modulation type.

Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### **:MODulation:UIQ**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:TETRa:MODulation:UIQ "<file name>"  
[ :SOURce ] :RADio:TETRa:MODulation:UIQ ?
```

This command selects a user-defined I/Q file from the signal generator memory.

**Key Entry** **User I/Q**

**TETRA Subsystem—Option 402** ([:SOURce]:RADio:TETRa)

**Remarks** The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “:MODulation[:TYPE]” on page 994 to change the current modulation type.

Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:MODulation[:TYPE]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:TETRa:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|
GRAYQPSK|OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|
FSK8|FSK16|C4FM|QAM4|QAM16|QAM32|QAM64|QAM128|QAM256|UIQ|UFSK
[:SOURce]:RADio:TETRa:MODulation[:TYPE]?
```

This command sets the modulation type for the TETRA personality.

**\*RST** P4DQPSK

<b>Key Entry</b>	<b>BPSK</b>	<b>QPSK</b>	<b>IS-95 QPSK</b>	<b>Gray Coded QPSK</b>	<b>OQPSK</b>			
	<b>IS-95 OQPSK</b>	<b><math>\pi/4</math> DQPSK</b>	<b>8PSK</b>	<b>16PSK</b>	<b>D8PSK</b>	<b>MSK</b>	<b>2-Lvl FSK</b>	
	<b>4-Lvl FSK</b>	<b>8-Lvl FSK</b>	<b>16-Lvl FSK</b>	<b>C4FM</b>	<b>4QAM</b>	<b>16QAM</b>	<b>32QAM</b>	
	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>	<b>User I/Q</b>	<b>User FSK</b>			

**:POLarity[:ALL]**

**Supported** E4438C with Option 402

```
[:SOURce]:RADio:TETRa:POLarity[:ALL] NORMal|INVerted
[:SOURce]:RADio:TETRa:POLarity[:ALL]?
```

This command sets the rotation direction of the phase modulation vector.

**NORMal** This choice selects normal phase polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** **Phase Polarity Normal Invert**

## **:SECondary:RECall**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:TETRa:SECondary:RECall

This command recalls the secondary frame configuration, overwriting the current state.

**Key Entry** **Recall Secondary Frame State**

**Remarks** To save a secondary frame state, refer to “:SECondary:SAVE” on page 995.

A secondary frame is not active until the secondary state is enabled. To activate a secondary frame, refer to “:SECondary[:STATe]” on page 996.

## **:SECondary:SAVE**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:TETRa:SECondary:SAVE

This command saves the current frame configuration as the secondary frame with the file name TETRa\_SECONDARY\_FRAME.

**Key Entry** **Save Secondary Frame State**

**Remarks** To recall the secondary frame (saved in non-volatile signal generator memory), refer to “:SECondary:RECall” on page 995.

## **:SECondary:TRIGger[:SOURCE]**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:TETRa:SECondary:TRIGger [ :SOURCE ] KEY | EXT | BUS  
 [ :SOURCE ] :RADio:TETRa:SECondary:TRIGger [ :SOURCE ] ?

This command selects the type of triggering for the secondary frame.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 1018.

**BUS** This choice enables GPIB triggering using the \*TRG or GET command or LAN and RS-232 triggering using the \*TRG command.

**Key Entry** **Trigger Key    Ext    Bus**

**TETRA Subsystem—Option 402 ([:SOURCE]:RADio:TETRa)****:SECondary[:STATe]****Supported** E4438C with Option 402

[:SOURCE]:RADio:TETRa:SECondary[:STATe] ON|OFF|1|0

[:SOURCE]:RADio:TETRa:SECondary[:STATe] ?

This command enables or disables the ability to switch to the secondary frame.

**\*RST** 0**Key Entry** **Secondary Frame Off On****Remarks** A frame must already be saved as the secondary frame in order to turn the secondary state function on.To save a frame as the secondary frame, refer to “[:SECondary:SAVE” on [page 995](#).**:SLOT[1]|2|3|4:DCCustom****Supported** E4438C with Option 402

[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DCCustom PN9|PN11|PN15|

PN20|PN23|FIX4|"&lt;file name&gt;"|EXT|P4|P8|P16|P32|P64

[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DCCustom?

This command configures the downlink continuous custom timeslot data field.

**\*RST** PN9**Key Entry** **PN9 PN11 PN15 PN20 PN23 FIX4 User File EXT****4 1's & 4 0's 8 1's & 8 0's 16 1's & 16 0's 32 1's & 32 0's****64 1's & 64 0's****Remarks** Refer to “[File Name Variables](#)” on [page 13](#) for information on the file name syntax.**:SLOT[1]|2|3|4:DCCustom:FIX4****Supported** E4438C with Option 402

[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DCCustom:FIX4 &lt;val&gt;

[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DCCustom:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink continuous custom timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15  
**Key Entry** **FIX4**  
**Remarks** FIX4 must already be defined as the data type.

### **:DCNormal:B1**

**Supported** E4438C with Option 402  
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DCNormal:B1 <val>  
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DCNormal:B1?

This command sets the first 14 broadcast bits for the selected downlink continuous normal timeslot.

**\*RST** #H0000  
**Range** #H0–#H3FFF  
**Key Entry** **B1**

### **:DCNormal:B2**

**Supported** E4438C with Option 402  
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DCNormal:B2 <val>  
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DCNormal:B2?

This command sets the last 16 broadcast bits for the selected downlink continuous normal timeslot.

**\*RST** #H0000  
**Range** #H0–#HFFFF  
**Key Entry** **B2**

### **:SLOT[1] | 2 | 3 | 4:DCNormal:TSEquence**

**Supported** E4438C with Option 402  
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DCNormal:  
TSEquence <val>  
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DCNormal:TSEquence?

This command sets the normal training sequence bits (30-bit mid-amble) for the selected downlink continuous normal timeslot.

**\*RST** #H343A74  
**Range** #H0–#H3FFFFFF  
**Key Entry** **TS**

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)**

**Remarks** When 1E90DE is selected, the data fields are scrambled as separate logical channels.

**:SLOT[1] | 2 | 3 | 4:DCNormal[:DATA]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:TETRA:SLOT [1] | 2 | 3 | 4 :DCNormal [ :DATA ] PN9 | PN11 |
PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[ :SOURCE ] :RADIO:TETRA:SLOT [1] | 2 | 3 | 4 :DCNormal [ :DATA ] ?
```

This command configures the selected downlink continuous normal timeslot data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>			

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:SLOT[1] | 2 | 3 | 4:DCNormal[:DATA]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADIO:TETRA:SLOT [1] | 2 | 3 | 4 :DCNormal [ :DATA ] :FIX4 <val>
[ :SOURCE ] :RADIO:TETRA:SLOT [1] | 2 | 3 | 4 :DCNormal [ :DATA ] :FIX4 ?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink continuous normal timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

### **:SLOT[1]|2|3|4:DCSync:B**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DCSync:B <val>  
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DCSync:B?
```

This command sets the broadcast bits for the selected downlink continuous synchronization timeslot.

**\*RST** #H00000000

**Range** #H0–#H3FFFFFFF

**Key Entry** **B**

### **:SLOT[1]|2|3|4:DCSync:FCOR**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DCSync:FCOR <val>  
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DCSync:FCOR?
```

This command sets the frequency correction bits for the selected downlink continuous synchronization timeslot.

**\*RST** #HFF0000000000000000FF

**Range** #H0–#HFFFFFFFFFFFFFFFFFFFF

**Key Entry** **FCOR**

### **:SLOT[1]|2|3|4:DCSync:SSB**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DCSync:SSB <val>  
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DCSync:SSB?
```

This command sets the synchronization block bits for the selected downlink synchronization continuous timeslot.

**\*RST** #H00000000000000000000000000000000

**Range** #H0–#HFFFFFFFFFFFFFFFFFFFFFFFF

**Key Entry** **SSB**

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:SLOT[1]|2|3|4:DCSync:STS****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DCSync:STS &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DCSync:STS?

This command sets the synchronization training sequence for the selected downlink continuous synchronization timeslot.

**\*RST** #H30673A7067**Range** #H0–#H3FFFFFFFF**Key Entry** **STS****:SLOT[1]|2|3|4:DCSync[:DATA]****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DCSync[:DATA] PN9|PN11|

PN15|PN20|PN23FIX4|"&lt;file name&gt;"|EXT|P4|P8|P16|P32|P64

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DCSync[:DATA]?

This command configures the selected downlink continuous synchronization timeslot data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
	<b>64 1's &amp; 64 0's</b>							

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

**:SLOT[1]|2|3|4:DCSync[:DATA]:FIX4****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DCSync[:DATA]:FIX4 &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DCSync[:DATA]:FIX4?

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink continuous synchronization timeslot.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15



**Key Entry**            **FIX4**

**Remarks**            FIX4 must already be defined as the data type.

**:SLOT[1] | 2 | 3 | 4:DDCustom**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DDCustom PN9 | PN11 | PN15 |
PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DDCustom?
```

This command configures the downlink discontinuous custom timeslot data field.

**\*RST**                 PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
			<b>64 1's &amp; 64 0's</b>					

**Remarks**            Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

**:SLOT[1] | 2 | 3 | 4:DDCustom:FIX4**

**Supported**            E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DDCustom:FIX4 <val>
[:SOURCE]:RADio:TETRa:SLOT[1] | 2 | 3 | 4:DDCustom:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink discontinuous custom timeslot.

**\*RST**                 #B0000

**Range**                #B0000–#B1111 or 0–15

**Key Entry**            **FIX4**

**Remarks**            FIX4 must already be defined as the data type.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:SLOT[1]|2|3|4:DDNormal:B1****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDNormal:B1 &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDNormal:B1?

This command sets the first 14 broadcast bits for the selected downlink discontinuous normal timeslot.

**\*RST** #H0000**Range** #H0–#H3FFF**Key Entry** **B1****:SLOT[1]|2|3|4:DDNormal:B2****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDNormal:B2 &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDNormal:B2?

This command sets the last 16 broadcast bits for the selected downlink continuous normal timeslot.

**\*RST** #H0000**Range** #H0–#HFFFF**Key Entry** **B2****:SLOT[1]|2|3|4:DDNormal:TSEquence****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDNormal:TSEquence &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDNormal:TSEquence?

This command specifies the normal training sequence bits (30-bit mid-amble) for the selected downlink discontinuous normal timeslot.

**\*RST** #H343A74**Range** #H0–#H3FFFFFFF**Key Entry** **TS****Remarks** When 1E90DE is selected, the data fields are scrambled as separate logical channels.

### **:SLOT[1] | 2 | 3 | 4:DDNormal[:DATA]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DDNormal [ :DATA ] PN9 | PN11 |
PN15 | PN20 | PN23 FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DDNormal [ :DATA ] ?
```

This command configures the selected downlink discontinuous normal timeslot data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>			

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

### **:SLOT[1] | 2 | 3 | 4:DDNormal[:DATA]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DDNormal [ :DATA ] :FIX4 <val>
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :DDNormal [ :DATA ] :FIX4 ?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink discontinuous normal timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**Remarks** FIX4 must already be defined as the data type.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:SLOT[1]|2|3|4:DDSync:B****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDSync:B &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDSync:B?

This command sets the broadcast bits for the selected downlink discontinuous synchronization timeslot.

**\*RST** #H00000000**Range** #H0–#H3FFFFFFF**Key Entry** **B****:SLOT[1]|2|3|4:DDSync:FCOR****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDSync:FCOR &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDSync:FCOR?

This command sets the frequency correction bits for the selected downlink discontinuous synchronization timeslot.

**\*RST** #HFF0000000000000000FF**Range** #H0–#HFFFFFFFFFFFFFFFFFFFF**Key Entry** **FCOR****:SLOT[1]|2|3|4:DDSync:SSB****Supported** E4438C with Option 402

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDSync:SSB &lt;val&gt;

[:SOURCE]:RADIO:TETRA:SLOT[1]|2|3|4:DDSync:SSB?

This command sets the synchronization block bits for the selected downlink synchronization discontinuous timeslot.

**\*RST** #H000000000000000000000000**Range** #H0–#HFFFFFFFFFFFFFFFFFFFFFFFF**Key Entry** **SSB**

### **:SLOT[1]|2|3|4:DDSync:STS**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DDSync:STS <val>
[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DDSync:STS?
```

This command sets the synchronization training sequence for the selected downlink discontinuous synchronization timeslot.

**\*RST** #H30673A7067

**Range** #H0–#H3FFFFFFFF

**Key Entry** STS

### **:SLOT[1]|2|3|4:DDSync[:DATA]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DDSync[:DATA] PN9|PN11|
PN15|PN20|PN23|FIX4|"<file name>"|EXT|P4|P8|P16|P32|P64
[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DDSync[:DATA]?
```

This command configures the selected downlink discontinuous synchronization timeslot data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
	<b>64 1's &amp; 64 0's</b>							

**Remarks** Refer to [“File Name Variables” on page 13](#) for information on the file name syntax.

### **:SLOT[1]|2|3|4:DDSync[:DATA]:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DDSync[:DATA]:FIX4 <val>
[:SOURCE]:RADio:TETRa:SLOT[1]|2|3|4:DDSync[:DATA]:FIX4?
```

This command sets the binary, 4-bit repeating sequence data pattern that is used in the selected downlink discontinuous synchronization timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** FIX4

**TETRA Subsystem—Option 402 ([:SOURce]:RADio:TETRa)**

**Remarks** FIX4 must already be defined as the data type. To change the data type, refer to “:SLOT[1]|2|3|4:DCNormal[:DATA]” on page 998.

**:SLOT[1]|2|3|4:POWer**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :POWer MAIN|DELTA
[ :SOURce ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :POWer?
```

This command toggles the RF output power level function for the selected timeslot.

**MAIN** This choice specifies RF output as the main power level.

**DELTA** This choice specifies RF output as the alternative power level.

**\*RST** MAIN

**Key Entry** Timeslot Ampl Main Delta

**:SLOT[1]|2|3|4:STATe**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :STATe ON|OFF|1|0
[ :SOURce ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :STATe?
```

This command enables or disables the selected timeslot.

**\*RST** Timeslot 1: 1 Timeslot 2-4:

**Key Entry** Timeslot Off On

**Remarks** Continuous timeslots cannot be disabled.

**:SLOT[1]|2|3|4:UC1:TSEQuence**

**Supported** E4438C with Option 402

```
[ :SOURce ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC1:TSEQuence <val>
[ :SOURce ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC1:TSEQuence?
```

This command specifies the extended training sequence bits (30-bit mid-amble) for the selected uplink control 1 timeslot.

**\*RST** #H2743A743

**Range** #H0–#H3FFFFFFF

**Key Entry** TS

### **:SLOT[1]|2|3|4:UC1[:DATA]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC1 [ :DATA] PN9 | PN11 | PN15 |
PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC1 [ :DATA] ?
```

This command configures the selected uplink control 1 data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>64 1's &amp; 64 0's</b>			

**Remarks** Refer to “[File Name Variables](#)” on page 13 for information on the file name syntax.

### **:SLOT[1]|2|3|4:UC1[:DATA]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC1 [ :DATA] :FIX4 <val>
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC1 [ :DATA] :FIX4 ?
```

This command configures the uplink control 1 data field FIX4 value for the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

### **:SLOT[1]|2|3|4:UC2:TSEquence**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC2:TSEquence <val>
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UC2:TSEquence ?
```

This command specifies the extended training sequence bits (30-bit mid-amble) for the selected uplink control 2 timeslot.

**\*RST** #H2743A743

**Range** #H0–#H3FFFFFF

**Key Entry** **TS**

**TETRA Subsystem—Option 402 ([:SOURCE]:RADIO:TETRA)****:SLOT[1] | 2 | 3 | 4:UC2[:DATA]****Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:SLOT[1] | 2 | 3 | 4:UC2[:DATA] PN9 | PN11 | PN15 |
PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[:SOURCE]:RADIO:TETRA:SLOT[1] | 2 | 3 | 4:UC2[:DATA] ?
```

This command configures the selected uplink control 2 data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>32 1's &amp; 32 0's</b>
	<b>64 1's &amp; 64 0's</b>							

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:SLOT[1] | 2 | 3 | 4:UC2[:DATA]:FIX4****Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:SLOT[1] | 2 | 3 | 4:UC2[:DATA]:FIX4 <val>
[:SOURCE]:RADIO:TETRA:SLOT[1] | 2 | 3 | 4:UC2[:DATA]:FIX4?
```

This command configures the uplink control 2 data field FIX4 value for the selected timeslot.

**\*RST** #B0000**Range** #B0000–#B1111 or 0–15**Key Entry** **FIX4****:SLOT[1] | 2 | 3 | 4:UCUStom****Supported** E4438C with Option 402

```
[:SOURCE]:RADIO:TETRA:SLOT[1] | 2 | 3 | 4:UCUStom PN9 | PN11 | PN15 |
PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[:SOURCE]:RADIO:TETRA:SLOT[1] | 2 | 3 | 4:UCUStom?
```

This command configures the uplink custom data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>	<b>8 1's &amp; 8 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>16 1's &amp; 16 0's</b>	<b>32 1's &amp; 32 0's</b>	<b>32 1's &amp; 32 0's</b>
	<b>64 1's &amp; 64 0's</b>							



**Remarks** See “File Name Variables” on page 13 for information on the file name syntax.

### **:SLOT[1] | 2 | 3 | 4:UCUStom:FIX4**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT [1] | 2 | 3 | 4:UCUStom:FIX4 <val>
[:SOURCE]:RADio:TETRa:SLOT [1] | 2 | 3 | 4:UCUStom:FIX4?
```

This command configures the uplink custom data field to FIX4 (4-bit repeating sequence data pattern).

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

### **:SLOT[1] | 2 | 3 | 4:UNORmal:TSEquence**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT [1] | 2 | 3 | 4:UNORmal:TSEquence <val>
[:SOURCE]:RADio:TETRa:SLOT [1] | 2 | 3 | 4:UNORmal:TSEquence?
```

This command specifies the extended training sequence bits (22-bit mid-amble) for the selected uplink normal timeslot.

**\*RST** #H343A74

**Range** #H0–#H3FFFFFF

**Key Entry** **TS**

**Remarks** When 1E90DE is selected, data fields are scrambled as separate logical channels.

### **:SLOT[1] | 2 | 3 | 4:UNORmal[:DATA]**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SLOT [1] | 2 | 3 | 4:UNORmal[:DATA] PN9 | PN11 |
PN15 | PN20 | PN23 | FIX4 | "<file name>" | EXT | P4 | P8 | P16 | P32 | P64
[:SOURCE]:RADio:TETRa:SLOT [1] | 2 | 3 | 4:UNORmal[:DATA] ?
```

This command configures the selected uplink normal data field.

**\*RST** PN9

<b>Key Entry</b>	<b>PN9</b>	<b>PN11</b>	<b>PN15</b>	<b>PN20</b>	<b>PN23</b>	<b>FIX4</b>	<b>User File</b>	<b>EXT</b>
	<b>4 1's &amp; 4 0's</b>		<b>8 1's &amp; 8 0's</b>		<b>16 1's &amp; 16 0's</b>		<b>32 1's &amp; 32 0's</b>	
			<b>64 1's &amp; 64 0's</b>					

**TETRA Subsystem—Option 402 ([:SOURCE]:RADio:TETRa)**

**Remarks** Refer to “File Name Variables” on page 13 for information on the file name syntax.

**:SLOT[1]|2|3|4:UNORmal[:DATA]:FIX4**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UNORmal [ :DATA ] :FIX4 <val>
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 :UNORmal [ :DATA ] :FIX4?
```

This command configures the uplink normal data field FIX4 value for the selected timeslot.

**\*RST** #B0000

**Range** #B0000–#B1111 or 0–15

**Key Entry** **FIX4**

**:SLOT[1]|2|3|4[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 [ :TYPE ] UCUSTom|UC1|UC2 |
UNORmal | DDNormal | DDSync | DCNormal | DCSync | DCCustom | DDCustom
[ :SOURCE ] :RADio:TETRa:SLOT [1] | 2 | 3 | 4 [ :TYPE ] ?
```

This command sets the timeslot type for the selected timeslot.

**\*RST** *Timeslot 1:* UCUS *Timeslot 2-4:* UNOR

**Key Entry** **Up Custom      Up Control 1      Up Control 2      Up Normal      Dn Normal Disc**  
**Dn Sync Disc      Dn Normal Cont      Dn Sync Cont      Dn Custom Cont**  
**Dn Custom Disc**

**Remarks** When downlink is selected and the frame is uplink, the following mapping is made to convert the uplink protocols to downlink; an error will be generated.

From	To (Continuous Downlink)	To (Discontinuous Downlink)
UC1	DCCustom	DDCustom
UC2	DCCustom	DDCustom
UCUSTom	DCCustom	DDCustom
UNORmal	DCNormal	DDNormal

When uplink is selected and the frame is downlink, the following mapping is made to convert the downlink protocols to uplink; an error will be generated.

From	To
DCCustom/ DDCustom	UCUSTom
DCNormal/ DDNormal	UNORmal
DCSync/ DDSync	UCUSTom

When continuous downlink protocols are selected, all timeslots must be on, and they cannot be turned off. Any attempts to do so will generate an error.

## **:SOUT**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SOUT FRAME|SLOT|ALL
[:SOURCE]:RADio:TETRa:SOUT?
```

This command sets the synchronization location (within the pattern of data) and the type of output at the EVENT 1 rear panel connector.

**FRAME** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a framed data pattern.

**SLOT** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for a selected timeslot.

**ALL** This choice outputs a 1-bit signal, synchronized to the bit selected by the synchronization output offset command, for all active timeslots.

**\*RST** FRAME

**Key Entry** **Begin Frame**      **Begin Timeslot #**      **All Timeslots**

**Remarks** See “:SOUT:OFFSet” on page 1011 to change the synchronization output offset.

## **:SOUT:OFFSet**

**Supported** E4438C with Option 402

```
[:SOURCE]:RADio:TETRa:SOUT:OFFSet <val>
[:SOURCE]:RADio:TETRa:SOUT:OFFSet?
```

This command sets the offset value for the location of the output synchronization signal on the EVENT1 rear panel connector relative to the beginning of the framed data pattern or timeslot.

The variable <val> is expressed as a number of bits.

**TETRA Subsystem—Option 402 ([:SOURCE]:RADio:TETRa)**

<b>*RST</b>	+0
<b>Range</b>	–509 to 509
<b>Key Entry</b>	<b>Sync Out Offset</b>
<b>Remarks</b>	Negative values move the synchronization output signal earlier; positive values move it later.  To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 1011.

**:SOUT:SLOT**

<b>Supported</b>	E4438C with Option 402
	[ :SOURCE ] :RADio:TETRa:SOUT:SLOT <val> [ :SOURCE ] :RADio:TETRa:SOUT:SLOT?
	This command selects the timeslot that will trigger a 1-bit output signal at the EVENT 1 rear panel connector.
<b>*RST</b>	+1
<b>Range</b>	1–4
<b>Key Entry</b>	<b>Begin Timeslot #</b>
<b>Remarks</b>	SLOT must be selected as the output signal type for the EVENT 1 rear panel connector.  To change the output of the EVENT1 rear panel connector to SLOT, refer to “:SOUT” on page 1011.

**:SRATe**

<b>Supported</b>	E4438C with Option 001/601 or 002/602
	[ :SOURCE ] :RADio:TETRa:SRATe <val> [ :SOURCE ] :RADio:TETRa:SRATe?
	This command sets the transmission symbol rate. Symbol rate is the bit rate divided by the bits per symbol. A change in the symbol rate affects the bit rate. Refer to “:BRATe” on page 978 for information on bit rate.
	The variable <val> is expressed in units of symbols per second (sps–MSPS) and the maximum symbol rate depends on the filter. Refer to “:FILTer” on page 991 for minimum filter symbol width.
	The filter may have to be truncated down to 32 or 16 symbols wide to achieve the highest symbol rate. The signal generator’s internal filters are not truncated below their minimum filter length and user-defined FIR filters are not truncated. If the filter cannot be truncated then the symbol rate is

limited to the maximum rate of the narrowest filter size possible.

The relative timing of the modulated data, as well as the actual filter response is affected when the filter is truncated.

When the symbol rate changes, the ESG reconfigures the baseband generator. The time required to reconfigure the baseband generator is inversely proportional to the symbol rate: lower symbol rates require more time.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 994.

\*RST +1.80000000E+004

Range	Modulation Type	Symbol Rate Range		
		<i>16 Symbol Wide Filter</i>	<i>32 Symbol Wide Filter</i>	<i>64 Symbol Wide Filter</i>
	BPSK, FSK2, MSK	1sps–50Msps	1sps–25Msps	1sps–12.5Msps
	C4FM, OQPSK, FSK4	2sps–25Msps	2sps–12.5Msps	2sps–6.25Msps
	OQPSKI95, QPSK			
	P4QPPSK, QPSKIS95			
	GRAYQPSK, QAM4			
	D8PSK, EDGE, FSK8, PSK8	3sps–16.666666666 Msps	3sps–8.333333333 Msps	3sps–4.166666666Msps
	FSK16, PSK16, QAM16	4sps–12.5Msps	4sps–6.25Msps	4sps–3.125Msps
	QAM32	5sps–10Msps	5sps–5Msps	5sps–2.5Msps
	QAM64	6sps–8.333333333 Msps	6sps–4.166666666 Msps	6sps–2.083333333 Msps
	QAM128	7sps–7.142857142 Msps	7sps–3.571428572 Msps	7sps–1.785714285 Msps
	QAM256	8sps–6.25Msps	8sps–3.125 Msps	8sps–1.5625 Msps

---

**NOTE** Using I/Q skew will half the minimum number of symbols for the selected filter.

---

**Key Entry**                      **Symbol Rate**

**TETRA Subsystem—Option 402 ([:SOURce]:RADio:TETRa)****:TRIGger:TYPE**

**Supported** E4438C with Option 402

```
[ :SOURce] :RADio:TETRa:TRIGger:TYPE CONTInuous | SINGle | GATE
[:SOURce] :RADio:TETRa:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTInuous** The framed data sequence repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to [“:TRIGger:TYPE:CONTInuous\[:TYPE\]” on page 1014](#).

**SINGle** The framed data sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set to high or low.

**\*RST** CONT

**Key Entry**      **Continuous**      **Single**      **Gated**

**:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** E4438C with Option 402

```
[ :SOURce] :RADio:TETRa:TRIGger:TYPE:CONTInuous [:TYPE] FREE |
TRIGger | RESet
[:SOURce] :RADio:TETRa:TRIGger:TYPE:CONTInuous [:TYPE] ?
```

This commands selects the waveform’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see [“:TRIGger:TYPE” on page 1014](#).

The following list describes the waveform’s response to each of the command choices:

**FREE** Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.

**TRIGger** The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

**RESet**                    The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

**\*RST**                    FREE

**Key Entry**            **Free Run      Trigger & Run      Reset & Run**

**:TRIGger:TYPE:GATE:ACTive**

**Supported**            E4438C with Option 402

[ :SOURce] :RADIo:TETRa:TRIGger:TYPE:GATE:ACTive LOW|HIGH  
[:SOURce] :RADIo:TETRa:TRIGger:TYPE:GATE:ACTive?

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the ESG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 1014.

The following list describes the ESG’s gating behavior for the polarity selections:

**LOW**                    The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).

**HIGH**                   The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).

**\*RST**                    HIGH

**Key Entry**            **Gate Active Low High**

**TETRA Subsystem—Option 402 (:SOURce):RADio:TETRa)****:TRIGger[:SOURce]**

**Supported** E4438C with Option 402

[ :SOURce ] :RADio:TETRa:TRIGger [ :SOURce ] KEY | EXT | BUS

[ :SOURce ] :RADio:TETRa:TRIGger [ :SOURce ] ?

This command sets the trigger source.

For more information on triggering, see “[:TRIGger:TYPE](#)” on page 1014. The following list describes the command choices:

**KEY** This choice enables manual triggering by pressing the front-panel **Trigger** hardkey.

**EXT** An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “[:TRIGger\[:SOURce\]:EXTErnal\[:SOURce\]](#)” on page 1018.

For more information on the connectors and on connecting the cables, see the *E4428C/38C ESG Signal Generators User’s Guide*.

- The trigger signal polarity:
  - gating mode, see “[:TRIGger:TYPE:GATE:ACTive](#)” on page 1015
  - continuous and single modes, see “[:TRIGger\[:SOURce\]:EXTErnal:SLOPe](#)” on page 1018
- The time delay between when the ESG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “[:TRIGger\[:SOURce\]:EXTErnal:DELay](#)” on page 1017
  - turning the delay on, see “[:TRIGger\[:SOURce\]:EXTErnal:DELay:STATe](#)” on page 1017

**BUS** This choice enables triggering over the GPIB or LAN using the \*TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the \*TRG command.

**\*RST** KEY

**Key Entry**      **Trigger Key**      **Ext**      **Bus**



## **:TRIGger[:SOURCE]:EXtErnal:DELay**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXtErnal:DELay <val>  
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXtErnal:DELay?
```

This command sets the number of bits to delay the ESG’s response to an external trigger.

The bit delay is a delay between when the ESG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the ESG receives the trigger and the set number of delay bits (clocks) occurs, the ESG transmits the data pattern.

The delay occurs after you enable the state. See “[:TRIGger\[:SOURCE\]:EXtErnal:DELay:STATe](#)” on [page 1017](#). You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see “[:TRIGger\[:SOURCE\]](#)” on [page 1016](#).

**\*RST** +0  
**Range** 0–1048575  
**Key Entry** **Ext Delay Bits**

## **:TRIGger[:SOURCE]:EXtErnal:DELay:STATe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXtErnal:DELay:STATe  
ON|OFF|1|0  
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXtErnal:DELay:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

For setting the delay time, see “[:TRIGger\[:SOURCE\]:EXtErnal:DELay](#)” on [page 1017](#), and for more information on configuring an external source, see “[:TRIGger\[:SOURCE\]](#)” on [page 1016](#).

**\*RST** 0  
**Key Entry** **Ext Delay Off On**

**TETRA Subsystem—Option 402 ([:SOURCE]:RADio:TETRa)****:TRIGger[:SOURCE]:EXternal:SLOPe**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXternal:SLOPe POSitive|NEGative
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXternal:SLOPe?
```

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “**:TRIGger:TYPE:GATE:ACTive**” on page 1015.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the ESG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “**:TRIGger[:SOURCE]**” on page 1016.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**:TRIGger[:SOURCE]:EXternal[:SOURCE]**

**Supported** E4438C with Option 402

```
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXternal [ :SOURCE ] EPT1 |
EPT2 | EPTRIGGER1 | EPTRIGGER2
[ :SOURCE ] :RADio:TETRa:TRIGger [ :SOURCE ] :EXternal [ :SOURCE ] ?
```

This command selects which PATTERN TRIG IN connection the ESG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “**:TRIGger[:SOURCE]**” on page 1016. For more information on the rear-panel connectors, see the *E4428C/38C ESG Signal Generators User’s Guide*.

The following list describes the command choices:

- |            |   |
|------------|---|
| EPT1       | This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.                         |
| EPT2       | This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. |
| EPTRIGGER1 | This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.                               |
| EPTRIGGER2 | This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.       |

**\*RST** EPT1  
**Key Entry** **Patt Trig In 1** **Patt Trig In 2**

**[ :STATe ]**

**Supported** E4438C with Option 402

[ :SOURCE ] :RADio:TETRa [ :STATe ] ON | OFF | 1 | 0

[ :SOURCE ] :RADio:TETRa [ :STATe ] ?

This command enables or disables the TETRA modulation format.

**\*RST** OFF

**Key Entry** TETRA Off On

**Remarks** Although the TETRA modulation is enabled with this command, the  
RF carrier is not modulated unless you also activate the front panel  
**Mod On/Off** hardkey.

---

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP[:BBG])

### :BBClock

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:BBClock INT[1]|EXT[1]
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:BBClock?
```

This command selects the baseband generator chip clock source for the radio uplink channel.

**\*RST** INT

**Key Entry** **BBG Chip Clock Ext Int**

**Remarks** Refer to “:BBClock:EXT:RATE” on page 1020 for the EXT clock rate selections.

### :BBClock:EXT:RATE

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:BBClock:EXT:RATE X1|X2|X4
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:BBClock:EXT:RATE?
```

This command sets the external clock rate for the baseband generator.

X1 This choice sets an external clock rate that is identical to the chip clock (3.84 MHz).

X2 This choice sets an external clock rate that is two times the rate of the chip clock.

X4 This choice sets an external clock rate that is four times the rate of the chip clock.

**\*RST** X1

**Key Entry** **Ext Clock Rate x1 x2 x4**

**Remarks** This command only applies to uplink.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:DLINK:APPLY****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:APPLY

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:APPLY?

This command immediately starts the channel coding generation process according to the channel setup and data entered for the downlink physical and transport channels.

**Key Entry** **Apply Channel Setup****Remarks** If pre-computing is required, then a progress bar will appear on the signal generator's display.**:DLINK:AWGN:CN****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:AWGN:CN &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:AWGN:CN?

This command sets the in band carrier to noise ratio (C/N) value in the AWGN carrier to noise.

**\*RST** -10.2**Range** -20 to 20**Field Entry** C/N value**:DLINK:AWGN:CPOWer****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:AWGN:CPOWer?

This query returns the carrier power of the RF signal.

**\*RST** 0**Field Entry** C Power

**:DLINK:AWGN:ECNO**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:AWGN:ECNO <val>

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:AWGN:ECNO?

This command sets the Ec/No value of the Ec Ref channel.

The variable <val> is expressed in decibels (dB).

**\*RST** 0

**Range** -30 to 30

**Field Entry** Ec/No value

**:DLINK:AWGN:ECRPower**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:AWGN:ECRPower?

This query returns the carrier noise power in the Ec Ref channel.

**\*RST** 0

**Field Entry** Ec Ref Power

**:DLINK:AWGN:ECRef**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:AWGN:ECRef DPCH1 | DPCH2 | PCCPCH | PICH | CPICH

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:AWGN:ECRef?

This command selects the reference used for the Ec/No value.

DPCH1 This choice selects 1 dedicated physical channel.

DPCH2 This choice selects 2 dedicated physical channel.

PCCPCH This choice selects a primary command control physical channel.

PICH This choice selects a paging indicator channel.

CPICH This choice selects a common pilot channel.

**\*RST** DPCH1

**Key Entry** DPCH + 1 DPCH + 2 PCCPCH PICH CPICH

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**Remarks** White noise is a frequency spectrum that is uniform over a specific frequency band. White noise has equal power per hertz over the specific frequency band.

**:DLINK:AWGN:FNBW**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:AWGN:FNBW?

This query returns the flat noise bandwidth value.

**\*RST** +6.1440000E+006

**:DLINK:AWGN:NPOWER**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:AWGN:NPOWER?

This query returns the in-band noise power portion of the total RF power.

**\*RST** +0

**:DLINK:AWGN:TICPower**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:AWGN:TICPower?

This query returns the total in-channel power (carrier with noise) as defined by the 3GPP standard.

**\*RST** +0

**Field Entry** Total Pwr

**Remarks** The total in-channel power is a sum of carrier power and in-channel noise power. Changing the noise related parameters such as C/N, Eb/No, and Eb Ref will cause a recalculation of the total in-channel power.

The maximum value returned by this query depends on the power option that is installed in the signal generator.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:DLINK:AWGN[:STATe]**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:AWGN:STATe ON | OFF | 1 | 0

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:AWGN:STATe?

This command enables or disables the additive white gaussian noise (AWGN) physical channel.

**\*RST** 0

**Key Entry** Channel State Off On

**:DLINK:BBClock**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:BBClock INT [1] | EXT [1]

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:BBClock?

This command selects the baseband generator chip clock source for the channel.

**\*RST** INT

**Key Entry** BBG Data Clock Ext Int

**:DLINK:CARB:CMODE:CCODE**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:CCODE <val>

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:CCODE?

This command sets the channel code for the chip ARB based dedicated physical channel (DPCH) in compressed mode.

**\*RST** 6

**Range** 0–511

**Field Entry** Channel Code



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])**:DLINK:CARB:CMODE:DATA****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:DATA PN9 | PN15

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:DATA?

This command sets the dedicated physical channel (DPCH) data pattern in compressed mode (CM).

**\*RST** PN9**Key Entry** **PN9 PN15**

**Remarks** The data pattern contains one frame of each normal DPCH frame with a chosen slot structure. CM is enabled via spread factor reduction using a single frame method.

**:DLINK:CARB:CMODE:FOFFset****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:FOFFset &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:FOFFset?

This command sets the frame offset for the dedicated physical channel (DPCH) in compressed mode.

**\*RST** 0**Range** 0–149**Field Entry** Frame Offset**:DLINK:CARB:CMODE:FSTRuct****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:FSTRuct A | B

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:FSTRuct?

This command selects the frame structure for the downlink compressed mode.

A This choice maximizes the transmission gap length in a compressed frame.

B This choice optimized for power control during a compressed frame.

**\*RST** A**Key Entry** **A B**

**:DLINK:CARB:CMODE:POWER**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:POWER <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:POWER?
```

This command sets the power for the downlink compressed mode.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -40 to 0

**Field Entry** Power

**:DLINK:CARB:CMODE:PRATio**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:PRATio <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:PRATio?
```

This command sets the playback ratio for the downlink compressed mode.

**\*RST** 2

**Range** 0–4096

**Field Entry** Playback Ratio

**Remarks** The value that is set represents the number of normal frames played between each compressed frame.

For example: 1:30

30 represents the un-compressed (normal) DPCH frames. The 30 frames will be played and then 1 compressed DPCH frame. The sequence then repeats.

**:DLINK:CARB:CMODE:SCTYpe**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:SCTYpe NORMal | RIGHT |
LEFT
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:CARB:CMODE:SCTYpe?
```

This command sets the scramble type for the downlink compressed mode.

**NORMal** This choice selects scramble codes 0–8191 (16 x 511 + 15 = 8191).

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

<b>RIGHT</b>	This choice selects scramble codes 8192–16383 (Normal + 8192).		
<b>LEFT</b>	This choice selects scramble codes 16384–24575 (Normal + 16384).		
<b>*RST</b>	NORM		
<b>Key Entry</b>	<b>Normal</b>	<b>Right</b>	<b>Left</b>

**:DLINK:CARB:CMODE:SFORmat**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:CARB:CMODE:SFORmat <val>
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:CARB:CMODE:SFORmat?
```

This command sets the slot format value for the dedicated physical channel (DPCH) in compressed mode. This value is used for both compressed and uncompressed frames.

<b>*RST</b>	+11
<b>Range</b>	1–15
<b>Field Entry</b>	Slot Format

**:DLINK:CARB:CMODE:SSCodeos**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:CARB:CMODE:SSCodeos <val>
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:CARB:CMODE:SSCodeos?
```

This command sets the secondary scramble code offset for the dedicated physical channel (DPCH) in compressed mode.

<b>*RST</b>	+0
<b>Range</b>	0–15
<b>Field Entry</b>	SecScr Code OS

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])****:DLINK:CARB:CMODE:TFIRST****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:TFIRST &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:TFIRST?

This command sets the first slot at which a gap appears.

**\*RST** 7**Range** 0–7**Field Entry** Tfirst**:DLINK:CARB:CMODE:TGL****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:TGL &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE:TGL?

This command sets the number of slots in the gap.

**\*RST** 7**Range** 1–7**Field Entry** Tgl**:DLINK:CARB:CMODE[:STATE]****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE[:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:CARB:CMODE[:STATE]?

This command enables or disables the downlink dedicated physical channel (DPCH) in compressed mode.

**\*RST** 0**Key Entry** Channel State Off On

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:DLINK:CPICH:CCODE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:CPICH:CCODE?

This query returns the common paging indicator channel (CPICH) channel code value.

**\*RST** +0**Remarks** The channelization code is always expected to be 0.**:DLINK:CPICH:POWer****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:CPICH:POWer &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:CPICH:POWer?

This command sets the power level for the common paging indicator channel (CPICH). The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** -3.30000000E+000**Range** -40 to 0**Field Entry** Power**:DLINK:CPICH[:STATE]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:CPICH[:STATE]

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:CPICH[:STATE]?

This command enables or disables the common paging indicator channel (CPICH).

**\*RST** 1**Key Entry** Channel State Off On

**:DLINK:CRATe**

**Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:CRATe <val>

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:CRATe?

This command adjusts the chip rate.

The variable <val> is expressed in units of cycle per second (cps).

**\*RST** +3.84000000E+006

**Range** 1000∠4250000

**Field Entry** Chip Rate

**Remarks** The chip rate is equivalent to the spreading rate.

**:DLINK:DPCH[1]:BALance**

**Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1]:BALance <val>

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1]:BALance?

This command sets DPCH1 power while scaling the power of all available OCNS channels in order to maintain a total power of 0 dB.

The variable <val> is expressed in units of decibels (dB).

**Key Entry** **DPCH Channel Balance**

**Remarks** At least one DPCH and one OCNS channel must be on prior to channel balancing. Refer to “[:DLINK:DPCH\[1\]2\[:STATe\]](#)” on page 1037 and “[:DLINK:OCNS\[1\]2|3|4|5|6|7|8|9|10|11|12|13|14|15|16\[:STATe\]](#)” on page 1042.

The command [:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1]:BINitalize must be initiated prior to channel balancing.

**:DLINK:DPCH[1]:BINitalize**

**Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1]:BINitalize

This command initializes the DPCH1 or DPCH2 power of the OCNS channel balancing.

**Remarks** To insure proper balancing, this command must be called before the channel balancing.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])**:DLINK:DPCH[1] | 2:ALL[:STATE]****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:ALL[:STATE] ON|OFF | 1 | 0

This command enables or disables both of the downlink dedicated physical channels.

**Key Entry** **Channel State Off On****Remarks** If the parameter is changed, the apply command must be executed after the change. Refer to “:DLINK:APPLY” on page 1021.

To query the state of the individual channel, refer to “:DLINK:DPCH[1]|2[:STATE]” on page 1037

**:DLINK:DPCH[1] | 2:CCODE****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:CCODE <val>  
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:CCODE?

This command sets the downlink dedicated physical channel (DPCH) code number.

**\*RST** DPCH 1: 10 DPCH 2: 11**Range** 0–511**Field Entry** Chan Code**Remarks** The channel code is coupled with the slot format and symbol rate. Refer to “:DLINK:DPCH[1]|2:SLOTformat” on page 1034 and “:DLINK:DPCH[1]|2:SRATE” on page 1034.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:DPCH[1] | 2:DATA****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:DATA PN9 | PN15 | FIX4 |  
"<file name>" | TGRA | TGRB  
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:DATA?

This command configures the data pattern for the downlink dedicated physical channel (DPCH).

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

<b>TGRA</b>	This choice selects transport channel A.
<b>TGRB</b>	This choice selects transport channel B.
<b>"&lt;file name&gt;"</b>	This variable specifies a data pattern that has been stored in memory.
<b>*RST</b>	PN9
<b>Key Entry</b>	<b>PN9    PN15    FIX4    "User File"    Transp Chan A    Transp Chan B</b>
<b>Remarks</b>	The data is now independent, on each of the DPCH channels. The data is limited to PN9 and PN15 when the DPCH is in slot format 16.  If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to <a href="#">“:DLINK:APPLY” on page 1021</a> .

**:DLINK:DPCH[1] | 2:DATA:FIX4**

**Supported**            E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:DPCH [1] | 2:DATA:FIX4 <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:DPCH [1] | 2:DATA:FIX4?
```

This command sets the data type to a FIX4 pattern for the downlink dedicated physical channel (DPCH). While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST**                    #B0000

**Range:**                0–15

**Key Entry**            **FIX4**

**Remarks**            If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:DLINK:APPLY” on page 1021](#).

**:DLINK:DPCH[1] | 2:POWer**

**Supported**            E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:DPCH [1] | 2:DATA:POWer <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:DPCH [1] | 2:DATA:POWer?
```

This command sets the power level for the downlink dedicated physical channel (DPCH). The variable <val> is expressed in units of decibels (dB).

**\*RST**                    -1.02000000E+001



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**Range:** –40 to 0**Field Entry** Power**:DLINK:DPCH[1] | 2:RCSetup****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:RCSetup REF122 | REF64 | REF144 | REF384 | AMR122 | ISDN

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:RCSetup?

This command selects the downlink DCPH reference measurement setup for the transport channel.

REF122	This choice configures the transport channel per the 3GPP TS 34.121 specification for a downlink reference measurement channel with a 12.2 kbps rate.	
REF64	This choice configures the transport channel per the 3GPP TS 34.121 specification for a downlink reference measurement channel with a 64 kbps rate.	
REF144	This choice configures the transport channel per the 3GPP TS 34.121 specification for a downlink reference measurement channel with a 144 kbps rate.	
REF384	This choice configures the transport channel per the 3GPP TS 34.121 specification for a downlink reference measurement channel with a 384 kbps rate.	
AMR122	This choice configures the transport channel per the 3GPP TS 25.944 specification for a downlink reference measurement channel AMR with 12.2 kbps rate.	
ISDN	This choice configures the transport channel as follows: 64 kbps rate, channel 1 with 4 blocks of 640 and channel 2 with 1 block of 148 as per the 3GPP TS 25.944 specification.	

<b>Key Entry</b>	<b>12.2 kbps (34.121)</b>	<b>64 kbps (34.121)</b>
	<b>144 kbps (34.121)</b>	<b>384 kbps (34.121)</b>
	<b>AMR 12.2 (25.944)</b>	<b>UDI ISDN (25.944)</b>

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:DPCH[1] | 2:SLOTformat****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:DATA:SLOTformat <val>  
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:DATA:SLOTformat?

This command configures the slot format for the dedicated physical channel (DPCH).

**\*RST** 0**Range:** 0–16**Field Entry** Slot Format**Remarks** The slot format is coupled with the channel code and symbol rate. The transmit power control (TPC), the transport format combination indicator (TFCI), and the Pilot bits are also set as per specification and not displayed.

For a description of slot formats, see the 3GPP Technical Specifications (TS 25.211 v3.10).

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:DPCH[1] | 2:SRATE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:SRATE?

This query returns the symbol rate for the downlink dedicated physical channel.

**\*RST** +7.50000000E+003**:DLINK:DPCH[1] | 2:SSCodeos****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:SSCodeos <val>  
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:SSCodeos?

This command sets the secondary scrambling code offset for the downlink dedicated physical channel (DPCH).

**\*RST** +0**Range:** 0–15

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**Field Entry**            2nd Scr Offset

**Remarks**            If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:DPCH[1] | 2:TFCI:PATtern**

**Supported**            E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:TFCI:PATtern <val>
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:TFCI:PATtern?
```

This command sets a 10-bit pattern for the transport format combination indicator (TFCI) for the dedicated physical channel (DPCH).

While the variable <val> is expressed in binary or decimal formats, the query returns only decimal values.

**\*RST**                    +0

**Range:**                0–1023

**Field Entry**            TFCI Pat

**Remarks**            The TFCI is optional and describes the services in use (for example, voice or data). If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:DPCH[1] | 2:TOFFset**

**Supported**            E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:TOFFset <val>
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:DPCH[1] | 2:TOFFset?
```

This command adjusts the timing offset for the dedicated physical channel (DPCH). The variable <val> is expressed in chips.

**\*RST**                    +0

**Range:**                0–149

**Field Entry**            tDPCH Offset

**Remarks**            If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:DLINK:DPCH[1] | 2:TPC:NUMSteps****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:TPC:NUMSteps &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:TPC:NUMSteps?

This command sets the number of steps for increasing/decreasing the user's equipment (UE) power.

**\*RST** +1**Range:** 1–80**Field Entry** TPC Steps**Remarks** The command is used with the transmit power control (TPC) patterns up/down (UDOWN), down/up (DUP), all down(DALL), all up (UALL), external (EXT), or user file ("<<file name>"). Refer to **“:DLINK:DPCH[1]2:TPC:PATtern”**If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to **“:DLINK:APPLY”** on page 1021.**:DLINK:DPCH[1] | 2:TPC:PATtern****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:TPC:PATtern UDOWN | DUP |

UALL | DALL | EXT | "&lt;file name&gt;"

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1] | 2:TPC:PATtern?

This command controls the power of the user's equipment (UE). The increase/decrease direction for UE power level changes is determined by the transmit power control (TPC) pattern.

UDOWN This choice repetitively steps up and down the TPC pattern.

DUP This choice repetitively steps down and up the TPC pattern.

UALL This choice consecutively steps up the TPC pattern.

DALL This choice consecutively steps down the TPC pattern.

EXT This choice specifies an external TPC pattern.

"&lt;file name&gt;" This choice specifies a user file.

**\*RST** UDOW**Key Entry** All Down All Up Down/Up Up/Down Ext User File

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURce]:RADio:WCDMa:TGPP[:BBG])

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:DPCH[1]|2[:STATe]**

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1]|2:ALL[:STATe] ON|OFF|1|0
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:DLINK:DPCH[1]|2:ALL[:STATe]?
```

This command enables or disables the dedicated physical channels (DPCH1 or DPCH2).

**\*RST** DPCH1: 1 DPCH2: 0

**Key Entry** **Channel State Off On**

**Remarks** If the parameter is changed, the apply command must be executed after the change. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:FILTer**

**Supported** E4438C with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:DLINK:FILTer RNYQuist|NYQuist|GAUSSian|
RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|UGGaussian|
"<user FIR>"
[:SOURce]:RADio:WCDMa:TGPP[:BBG]:DLINK:FILTer?
```

This command selects the filter type for the downlink configuration.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ** This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**UGGaussian** This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

<b>AC4Fm</b>	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.					
"<user FIR>"	This variable is any filter file that you have stored into memory.					
<b>*RST</b>	RNYQ					
<b>Key Entry</b>	<b>Root Nyquist</b>	<b>Nyquist</b>	<b>Gaussian</b>	<b>Rectangle</b>	<b>IS-95</b>	<b>IS-95 w/EQ</b>
	<b>IS-95 Mod</b>	<b>IS-95 Mod w/EQ</b>	<b>APCO 25 C4FM</b>	<b>UN3/4 GSM Gaussian</b>		
	<b>User FIR</b>					
<b>Remarks</b>	See <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.					

**:DLINK:FILTER:ALPHA**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:FILTER:ALPHA <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:FILTER:ALPHA?
```

Execute this command to change the alpha value for a Nyquist or root Nyquist filter.

**\*RST** +2.20000000E-001

**Range** 0-1

**Key Entry** **Filter Alpha**

**Remarks** This command is effective only after selection of a root Nyquist or Nyquist filter; it does not affect other types of filters. To change the current filter type, refer to [“:DLINK:FILTER” on page 1037](#).

**:DLINK:FILTER:BBT**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:FILTER:BBT <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:FILTER:BBT?
```

Execute this command to change the bandwidth-multiplied-by-bit-time filter parameter value.

**\*RST** +5.00000000E-001

**Range** 0.0000-1.0

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after selecting a Gaussian filter; it does not affect other types of filters. See [“:DLINK:FILTER” on page 1037](#) to change the filter type.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])**:DLINK:FILTer:CHANnel****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:FILTer:CHANnel EVM|ACP  
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:FILTer:CHANnel?

Execute this command to optimize a filter for minimized error vector magnitude (EVM) or for minimized adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.**ACP** This choice improves stopband rejection. This feature only applies to root Nyquist and Nyquist filters.**\*RST** EVM**Key Entry** **Optimize FIR For EVM ACP****Remarks** To change the current filter type, refer to “:DLINK:FILTer” on page 1037.**:DLINK:MSYNc****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:MSYNc

This command generates a one shot trigger pulse to synchronize multiple ESGs. This is a command only; there is no query.

**Key Entry** **Multi ESG Sync Trigger****Remarks** The trigger pulse will be generated when the user assigns the DRPS42 signal to any output port.**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:ALL[:STATE]****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:ALL[:STATE] ON|OFF|1|0

This command enables or disables all of the orthogonal channel noise simulator (OCNS) channels.

**\*RST** +0**Key Entry** **Channel State Off On****Remarks** To query the state of the individual channel, refer to “:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16[:STATE]” on page 1042.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:CCODE****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16:CCODE <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16:CCODE?
```

This command sets the channel code number for the downlink orthogonal channel noise simulator (OCNS).

**\*RST** +24**Range** 0–255**Field Entry** Chan Code

**Remarks** The channel code is coupled with the symbol rate. Refer to  
“:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:SRATE” on page 1041.

**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:DATA****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16:DATA PN9|PN15
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16:DATA?
```

This command configures the data pattern for the downlink orthogonal channel noise simulator (OCNS).

**\*RST** PN9**Key Entry** **PN9** **PN15****:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:POWer****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16:POWer <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16:POWer?
```

This command sets the power level for the orthogonal channel noise simulator (OCNS).



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURce]:RADio:WCDMa:TGPP[:BBG])

The variable <val> is expressed in units of decibels (dB).

**\*RST**                    -1.200000000E+001  
**Range**                    -40 to 0  
**Field Entry**            Power

**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:SRATe**

**Supported**            E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
13 | 14 | 15 | 16 :SRATe <val>
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
13 | 14 | 15 | 16 :SRATe?
```

This command selects the symbol rate for the orthogonal channel noise simulator (OCNS).

The choices are expressed in units of kilo symbols per second (ksps).

**\*RST**                    +1.50000000E+004  
**Key Entry**            **7.5 ksps      15 ksps      30 ksps      60 ksps      120 ksps      240 ksps**  
**480 ksps      960 ksps**  
**Remarks**            The symbol rate is coupled with the channel code. Refer to  
“:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:CCODE” on page 1040.

**:DLINK:OCNS[1]|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16:SSCodeos**

**Supported**            E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
13 | 14 | 15 | 16 :SSCodeos <val>
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:OCNS [1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
13 | 14 | 15 | 16 :SSCodeos?
```

This command sets the secondary scrambling code offset for the orthogonal channel noise simulator (OCNS).

**\*RST**                    +0  
**Range**                    0–15  
**Field Entry**            2nd Scr Offset

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:TOFFset****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16]:TOFFset <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16]:TOFFset?
```

This command adjusts the timing offset for the orthogonal channel noise simulator (OCNS) channel.

**\*RST** +0**Range:** 0–149**Field Entry** tOCNS Offset**:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16]:STATE****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16]:STATE ON|OFF|1|0
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OCNS[1|2|3|4|5|6|7|8|9|10|11|12|
13|14|15|16]:STATE?
```

This command enables or disables the orthogonal channel noise simulator (OCNS) channel.

**\*RST** +0**Field Entry** On/Off**:DLINK:OOSTest[:STATE]****Supported** E4438C with Option 400 and 403

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OOSTest[:STATE] ON|OFF|1|0
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:OOSTest[:STATE]?
```

This command enables or disables the Out-of-Sync-Test mode.

**\*RST** 0**Key Entry** **Out-of-Sync Test Off On**

**Remarks** When **Compressed Mode Off On** is set to On, Out-of-Sync Test mode cannot be enabled.

When **Out-of-Sync Test Off On** is set to On, ALC is automatically disabled; when **Out-of-Sync Test Off On** is set to Off, **ALC Off On** is automatically enabled.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])**:DLINK:OOSTest:DTXGate:POLarity**

**Supported** E4438C with Option 400 and 403

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK:OOSTest:DTXGate:
POLarity POSitive|NEGative
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK:OOSTest:DTXGate:POLarity?
```

This command sets the multiple ESG synchronization trigger signal polarity.

**\*RST** POS

**Key Entry** **DPCH1 DTX-Gate Trigger Polarity Neg Pos**

**:DLINK:PADJust**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK:PADJust EQUal|SCALE
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK:PADJust?
```

This command adjusts the code domain power levels of all downlink channels.

**EQUal** This choice will adjust all channel powers to equal power settings.

**SCALE** This choice will scale the channel power levels so that the sum of the powers are equal to 0 dB.

**\*RST** EQU

**Key Entry** **Equal Powers Scale To 0dB**

**:DLINK:PCCPch:BCHData**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK:PCCPch:BCHData PN9|PN15|FIX4|
"<file name>"|TRANspch
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK:PCCPch:BCHData?
```

This command sets the broadcast channel (BCH) data format that will be transmitted on the physical common control physical channel (PCCPCH).

**TRANspch** This choice selects a dedicated transport channel data pattern.

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** FIX4

**Key Entry** **PN9 PN15 FIX4 User File Transport CH**

**:DLINK:PCCPch:BCHData:FIX4****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch:BCHData:FIX4 &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch:BCHData:FIX4?

This command sets a fixed 4-bit binary data pattern for the primary common control physical channel (PCCPCH).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000**Range** 0–15**Key Entry** **FIX4****:DLINK:PCCPch:CCODE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch:CCODE &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch:CCODE?

This command sets the primary common control physical channel (PCCPCH) code to the desired code number.

**\*RST** +1**Range** 0–255**Field Entry** Channel Code**:DLINK:PCCPch:POWER****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch:POWER &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch:POWER?

This command sets the power level for the primary common control physical channel (PCCPCH). The variable <val> is expressed in units of decibels (dB).

**\*RST** -5.30000000E+000**Range** -40 to 0**Field Entry** Power

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:DLINK:PCCPch[:STATE]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch[:STATE] ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PCCPch[:STATE] ?

This command enables or disables the primary common control physical channel (PCCPCH).

**\*RST** 1**Key Entry** Channel State Off On**:DLINK:PICH:CCODE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH:CCODE &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH:CCODE?

This command sets the paging indicator channel (PICH) code to the desired code number.

**\*RST** +3**Range** 0–255**Field Entry** Channel Code**:DLINK:PICH:DATA****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH:DATA PN9|PN15|FIX4|

&lt;file name&gt;"

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH:DATA?

This command configures the data pattern for the downlink paging indicator channel (PICH).

&lt;file name&gt;" This variable specifies a data pattern that has been stored in memory.

**\*RST** PN9**Key Entry** **PN9** **PN15** **FIX4** **User File**

### **:DLINK:PICH:DATA:FIX4**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:PICH:DATA:FIX4 <val>

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:PICH:DATA:FIX4?

This command sets a fixed 4-bit data pattern to be transmitted on a paging indicator channel (PICH).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000

**Range** 0–15

**Key Entry** **FIX4**

### **:DLINK:PICH:PIBits**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:PICH:PIBits?

This query returns the number of bits in the paging indicator field.

**\*RST** +288

**Field Entry** PI Bits

### **:DLINK:PICH:PINDicator**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:PICH:PINDicator?

This query returns the number of paging indicator fields per frame.

**\*RST** +144

**Field Entry** Paging Indicator

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:DLINK:PICH:POWer****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH:POWer &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH:POWer?

This command sets the power level of the paging indicator channel (PICH). The variable <val> is expressed in units of decibels (dB)

**\*RST** -8.300000000E+000**Range** -40 to 0**Field Entry** Power**:DLINK:PICH[:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH[:STATe] ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PICH[:STATe]?

This command enables or disables the paging indicator channel (PICH).

**\*RST** 0**Key Entry** Channel State Off On**:DLINK:POLarity****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:POLarity NORMAL|INVverted

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:POLarity?

This command selects the phase polarity of the downlink signal.

NORMAL This choice selects normal polarity.

INVverted This choice inverts the internal Q signal.

**\*RST** NORM**Key Entry** Phase Polarity Normal Invert

**:DLINK:PSCH:POWer**

**Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PSCH:POWer <val>

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PSCH:POWer?

This command sets the power level for the primary synchronization physical channel (PSCH).

The variable <val> is expressed in units of decibels (dB).

**\*RST** -8.30000000E+000

**Range** -40 to 0

**Field Entry** Power

**:DLINK:PSCH[:STATe]**

**Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PSCH[:STATe] ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:PSCH[:STATe]?

This command enables or disables the primary synchronization physical channel (PSCH).

**\*RST** 1

**Field Entry** PSCH State

**:DLINK:RPANel:INPut:ALTPower**

**Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:INPut:ALTPower?

This query returns the type of signal at the alternate power input (Alt power in AUX I/O connector pin#16) for the dedicated physical channel (DPCH) mode.

**\*RST** NONE

**Remarks** When **Compressed Mode Off On** is set to On, Compressed-mode stop-trigger Compressed-mode stop-trigger signal is assigned to pin 16 of the rear panel AUX I/O connector. For more information about the rear panel AUX I/O connector configuration, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.



## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:DLINK:RPANEL:INPUT:BBGRef****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:RPANEL:INPUT:BBGRef?

This query returns the type of signal at the baseband generator reference input (BASEBAND GEN REF IN, rear panel connector) for the dedicated physical channel (DPCH) mode.

**\*RST** CCL

**Remarks** The signal name is baseband generator chip clock (CCL). For more information about the rear panel connector configuration, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:DLINK:RPANEL:INPUT:BGATE****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:RPANEL:INPUT:BGATE?

This query returns the type of signal at the gate burst (BURST GATE IN, rear panel connector) for the dedicated physical channel (DPCH) mode.

**\*RST** SFNR

**Remarks** System Frame Number Reset (SFNR) is used for synchronization in a two ESG setup. This signal is used to tell where the frame starts.

**:DLINK:RPANEL:INPUT:PTRigger1****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:RPANEL:INPUT:PTRigger1?

This query returns the type of signal at the pattern trigger input 1 (PATT TRIG IN, rear panel connector) for the dedicated physical channel (DPCH) mode.

**\*RST** MSTI

**Remarks** When **Compressed Mode Off On** is set to On, Compressed-mode start-trigger (CSTT) signal is assigned to the rear panel PATT TRIG IN connector; when **Out-of-Sync Test Off On** is set to On, DPCH1 DTX-Gate (DDTX) signal is assigned to the rear panel PATT TRIG IN connector.

Multiple ESG Synchronization Trigger In (MSTI) signal is used to synchronize signals from two ESGs that have different coding to simulate transmit diversity.

**:DLINK:RPANel:INPut:PTRigger2****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:INPut:PTRigger2?

This query returns the type of signal at the pattern trigger input 2 (PATT TRIG IN 2, AUX I/O connector pin#17) for the dedicated physical channel (DPCH) mode.

**\*RST** TPCB**Remarks** Transmit Power Control Bit (TPCB) signal is used to control the DPCH TPC bit.**:DLINK:RPANel:OUTPut:DCLock****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:DCLock
DRPS0|DRPS4|DRPS5|DRPS6|DRPS10|DRPS11|DRPS13|DRPS20|DRPS21|DRPS22|
DRPS23|DRPS24|DRPS25|DRPS26|DRPS28|DRPS30|DRPS32|DRPS33|DRPS34|DRPS35|
DRPS36|DRPS37|DRPS38|DRPS39|DRPS40|DRPS41|DRPS42
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:DCLock?
```

This command assigns a signal to the data clock output at the selected rear panel AUX I/O connector pin#6. Refer to [Table 9-3 on page 1050](#) for command parameters for the variable and output signal names.

**Table 9-3 Downlink Rear Panel Signal (DRPS) Output Type**

Command Parameter	Signal Out
DRPS0	NONE
DRPS4	3.84 MHz chip clock
DRPS5	SFN reset signal
DRPS6	SFN sync pulse
DRPS10	SCH slot pulse
DRPS11	10ms Frame pulse
DRPS13	80ms Frame pulse
DRPS20	DPCH data clock with DTX
DRPS21	DPCCH TPC data clock

**Table 9-3 Downlink Rear Panel Signal (DRPS) Output Type**

<b>Command Parameter</b>	<b>Signal Out</b>
DRPS22	DPCCH TFCI data clock
DRPS23	DPCCH Pilot data clock
DRPS24	DPCH data stream
DRPS25	DPCH TimeSlot pulse
DRPS26	DPCH 10ms Frame Pulse
DRPS28	DPCH data clock
DRPS30	DPDCH data clock w/oDTX
DRPS32	DPCH comp Frm Indicator
DRPS33	DPCH Gap Indicator
DRPS34	PICH data clock
DRPS35	PICH data
DRPS36	PICH TimeSlot pulse
DRPS37	PICH 10ms FramePulse
DRPS38	P-CCPCH data clock
DRPS39	P-CCPCH data
DRPS40	DPCH Chip-ARB-frame-pulse
DRPS41	DPCH TPC-bits-out
DRPS42	Multi-ESG Sync Trigger Out

\*RST

RPS0

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

<b>Key Entry</b>	<b>NONE</b>	<b>3.84MHz chip-clk (DRPS4)</b>	<b>SFN reset-signal (DRPS5)</b>
	<b>SFN sync-pulse (DRPS6)</b>	<b>SCH slot-pulse (DRPS10)</b>	
	<b>10ms Frame Pulse (DRPS11)</b>	<b>80ms Frame Pulse (DRPS13)</b>	
	<b>DPDCH data-clk with DTX (DRPS20)</b>	<b>DPCCH TPC data-clk (DRPS21)</b>	
	<b>DPCCH TFC I data-clk (DRPS22)</b>	<b>DPCCH Pilot data-clk (DRPS23)</b>	
	<b>DPCH data stream (DRPS24)</b>	<b>DPCH TimeSlot pulse (DRPS25)</b>	
	<b>DPCH 10ms Frame-Pulse (DRPS26)</b>	<b>DPCH data-clk (0) (DRPS28)</b>	
	<b>DPDCH data-clk withoutDTX (DRPS30)</b>		
	<b>DPCH Compressed Frame Indicator (DRPS32)</b>		
	<b>DPCH Gap Indicator (DRPS33)</b>	<b>PICH data-clk (DRPS34)</b>	
	<b>PICH data (DRPS35)</b>	<b>PICH TimeSlot Pulse (DRPS36)</b>	
	<b>PICH 10ms FramePulse (DRPS37)</b>	<b>P-CCPCH data-clk (DRPS38)</b>	
	<b>P-CCPCH data (DRPS39)</b>	<b>DPCH ChipARB FramePulse (DRPS40)</b>	
	<b>DPCH TPC-Bit Out (DRPS41)</b>	<b>Mlt-ESG-Sync Trigger-Out (DRPS42)</b>	
<b>Remarks</b>	For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .		

## :DLINK:RPANel:OUTPut:DOUT

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:DOUT
DRPS0|DRPS4|DRPS5|DRPS6|DRPS10|DRPS11|DRPS13|DRPS20|DRPS21|DRPS22|
DRPS23|DRPS24|DRPS25|DRPS26|DRPS28|DRPS30|DRPS32|DRPS33|DRPS34|DRPS35|
DRPS36|DRPS37|DRPS38|DRPS39|DRPS40|DRPS41|DRPS42
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:DOUT?
```

This command assigns a signal to the data output at the selected rear panel AUX I/O connector pin#7. Refer to [Table 9-3 on page 1050](#) for command parameters and output signal names.

**\*RST** RPS0

**Key Entry** Refer to **Key Entry** on [page 1052](#).

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:DLINK:RPANel:OUTPut:EVENT1**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:RPANel :OUTPut :EVENT1
DRPS0 | DRPS4 | DRPS5 | DRPS6 | DRPS10 | DRPS11 | DRPS13 | DRPS20 | DRPS21 | DRPS22 |
DRPS23 | DRPS24 | DRPS25 | DRPS26 | DRPS28 | DRPS30 | DRPS32 | DRPS33 | DRPS34 | DRPS35 |
DRPS36 | DRPS37 | DRPS38 | DRPS39 | DRPS40 | DRPS41 | DRPS42
```

```
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:RPANel :OUTPut :EVENT1?
```

This command assigns a signal to the EVENT 1 rear panel output connector. Refer to [Table 9-3 on page 1050](#) for command parameters and output signal names.

**\*RST** RPS0

**Key Entry** Refer to **Key Entry** on [page 1052](#).

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:DLINK:RPANel:OUTPut:EVENT2**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:RPANel :OUTPut :EVENT2
DRPS0 | DRPS4 | DRPS5 | DRPS6 | DRPS10 | DRPS11 | DRPS13 | DRPS20 | DRPS21 | DRPS22 |
DRPS23 | DRPS24 | DRPS25 | DRPS26 | DRPS28 | DRPS30 | DRPS32 | DRPS33 | DRPS34 | DRPS35 |
DRPS36 | DRPS37 | DRPS38 | DRPS39 | DRPS40 | DRPS41 | DRPS42
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:RPANel :OUTPut :EVENT2?
```

This command assigns a signal to the EVENT 2 rear panel output connector. Refer to [Table 9-3 on page 1050](#) for command parameters and output signal names.

**\*RST** RPS0

**Key Entry** Refer to **Key Entry** on [page 1052](#).

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:DLINK:RPANel:OUTPut:EVENT3****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:EVENT3
DRPS0|DRPS4DRPS5|DRPS6|DRPS10|DRPS11|DRPS13|DRPS20|DRPS21|DRPS22|
DRPS23|DRPS24|DRPS25|DRPS26|DRPS28|DRPS30|DRPS32|DRPS33|DRPS34|DRPS35|
DRPS36|DRPS37|DRPS38|DRPS39|DRPS40|DRPS41|DRPS42
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:EVENT3?
```

This command assigns a signal to the EVENT 3 at the selected rear panel AUX I/O connector pin#19. Refer to [Table 9-3 on page 1050](#) for command parameters and output signal names.

**\*RST** RPS0**Key Entry** Refer to **Key Entry** on [page 1052](#).**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.**:DLINK:RPANel:OUTPut:EVENT4****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:EVENT4
DRPS0|DRPS4|DRPS5|DRPS6|DRPS10|DRPS11|DRPS13|DRPS20|DRPS21|DRPS22|
DRPS23|DRPS24|DRPS25|DRPS26|DRPS28|DRPS30|DRPS32|DRPS33|DRPS34|DRPS35
DRPS36|DRPS37|DRPS38|DRPS39|DRPS40|DRPS41|DRPS42
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:RPANel:OUTPut:EVENT4?
```

This command assigns a signal to the EVENT 4 at the selected rear panel AUX I/O connector pin#18. Refer to [Table 9-3 on page 1050](#) for command parameters and output signal names.

**\*RST** RPS0**Key Entry** Refer to **Key Entry** on [page 1052](#).**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:DLINK:RPANel:OUTPut:SSYNc****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:RPANel:OUTPut:SSYNc
DRPS0|DRPS4|DRPS5|DRPS6|DRPS10|DRPS11|DRPS13|DRPS20|DRPS21|DRPS22|
DRPS23|DRPS24|DRPS25|DRPS26|DRPS28|DRPS30|DRPS32|DRPS33|DRPS34|DRPS35|
DRPS36|DRPS37|DRPS38|DRPS39|DRPS40|DRPS41|DRPS42
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:RPANel:OUTPut:SSYNc?
```

This command assigns a signal to the SYM SYNC OUT at the selected rear panel AUX I/O connector pin#5. Refer to [Table 9-3 on page 1050](#) for command parameters and output signal names.

**\*RST** RPS0**Key Entry** Refer to **Key Entry** on [page 1052](#).**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.**:DLINK:SCH[:STATe]****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:SCH[:STATe] ON|OFF|1|0
```

This command enables or disables the primary and secondary synchronization channel (SSCH).

**\*RST** 1**Key Entry** **Channel State Off On****Remarks** To query the state of the individual channel, refer to “:DLINK:PSCH[:STATe]” on [page 1048](#) and “:DLINK:SSCH[:STATe]” on [page 1057](#).**:DLINK:SCRamblecode****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:SCRamblecode <val>
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:SCRamblecode?
```

This command selects the scramble code number.

**\*RST** +0**Range** 0–511**Field Entry** Scrambling Code

**:DLINK:SDElay****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:SDElay &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:SDElay?

This command sets the delay of the system frame number (SFN) synchronization when a Multi-ESG-Sync Trigger-In signal is received. The variable <val> is expressed in unit of chips.

**\*RST** +0.00000000E+000**Range** 0–38399**Field Entry** Sync Delay

**Remarks** This function provides the capability of Inter-Cell Soft Handover test as described in TS.34.121 7.7.1 of the 3GPP standard. The test requires two base stations that generate the same signal but have a 10 chip timing offset. The two base stations are simulated by two ESGs and Sync Delay is the synchronization delay between the ESGs.

**:DLINK:SSCH:POWer****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:SSCH:POWer &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:SSCH:POWer?

This command sets the power level for the secondary synchronization channel (SSCH). The variable <val> is expressed in units of decibels (dB).

**\*RST** –8.30000000E+000**Range** –40 to 0**Field Entry** SSCH Power**:DLINK:SSCH:SSGRoup****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:SSCH:SSGRoup?

This command query returns the secondary scramble code group for the secondary synchronization channel (SSCH).

**\*RST** +0**Field Entry** SSCH 2nd Scramble Group



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:DLINK:SSCH[:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:SSCH[:STATe] ON|OFF|1|0

This command enables or disables the secondary synchronization channel (SSCH).

**\*RST** 1**Field Entry** SSCH State**:DLINK:TGAP:FSTRUCT****Supported** E4438C with Option 400

[:SOURCE]:RADio[1]|2|3|4:WCDMa:TGPP[:BBG]:DLINK:TGAP:FSTRUCT A|B

[:SOURCE]:RADio[1]|2|3|4:WCDMa:TGPP[:BBG]:DLINK:TGAP:FSTRUCT?

This command selects the compressed frame structure for the transmission gaps.

**A** The pilot field of the last slot in the transmission gap is transmitted and transmission is turned off during the rest of the transmission gap.**B** The TPC field of the first slot and the pilot field of the last slot in the transmission gap are transmitted and transmission is turned off during the rest of the transmission gap.**\*RST** A**Field Entry** Frame Struct**:DLINK:TGAP:POFFset****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:POFFset &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:POFFset?

This command specifies the amount of power to be increased when the data is being compressed for the transmission gap power offset.

The variable &lt;val&gt; is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** 0–6**Field Entry** PwrOffs

**:DLINK:TGAP:PSI[1]:CFN**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [1] :CFN <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [1] :CFN?
```

This command sets the connection frame number (CFN) for the first radio of the first pattern 1.

**\*RST** 0

**Range** 1–255

**Field Entry** TGCFN

**Remarks** The connection frame number (CFN) is counted internally relative to the system sync signal.

**:DLINK:TGAP:PSI[1]:CMMethod**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [1] :CMMehtod SF2 | PUNcture
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [1] :CMMethod?
```

This command selects the compressed mode (CM) method.

**SF2** This choice selects a compressed mode method that reduces the spread factor (SF) by 2. This is done by reducing the spreading factor in half. When the dedicated physical data channel's (DPDCH) symbol rate is 960 kbps, the frame is not compressed because it uses the lowest SF value and cannot be reduced.

**PUNcture** This choice selects a compressed mode method that punctures the convolutional encoder to a lower rate which reduces the number of symbols to be transmitted.

**\*RST** SF2

**Key Entry** **SF2** **Puncture**

**Remarks** To edit the parameters for this command using the ESG front panel keys, highlight the **CM Method** field and select either **SF2** or **Puncture** softkeys.

If the parameter is changed, the apply command must be executed after the change. Refer to “:DLINK:APPLY” on page 1021.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:DLINK:TGAP:PSI[1]:D****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:TGAP:PSI[1]:D <val>
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:TGAP:PSI[1]:D?
```

This command sets the transmission gap distance.

**\*RST** +0**Range** 0, 15–269**Field Entry** TGD**Remarks** This command specifies the number of slots between the starting slot of two consecutive transmission gaps within a gap pattern.**:DLINK:TGAP:PSI[1]:L1****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:TGAP:PSI[1]:L1 3|4|5|7|10|14
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:TGAP:PSI[1]:L1?
```

This command specifies the length of the first transmission gap (TGL1).

The length is expressed in number of slots.

**\*RST** 7**Field Entry** TGL1**:DLINK:TGAP:PSI[1]:L2****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:TGAP:PSI[1]:L2 3|4|5|7|10|
14|OMITted
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK:TGAP:PSI[1]:L2?
```

This command specifies the length of the second transmission gap (TGL2).

The length is expressed in number of slots.

**\*RST** OMIT**Field Entry** TGL2**Key Entry** **Omitted****Remarks** When OMITted is selected, TGL2 = TGL1.

**:DLINK:TGAP:PSI[1]:PL1**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [ 1 ] :PL1 <val>

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [ 1 ] :PL1?

This command specifies the duration of the transmission gap pattern length 1 (TGPL1).

The variable <val> is expressed in number of frames.

**\*RST** +2

**Range** 1–144

**Field Entry** TGPL1

**:DLINK:TGAP:PSI[1]:PL2**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [ 1 ] :PL2 <val> | OMITted

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [ 1 ] :PL2?

This command specifies the duration of the transmission gap pattern length 2 (TGPL2).

The variable is expressed in number of frames.

**\*RST** OMIT

**Range** 1–144

**Key Entry** **Omitted**

**Remarks** When OMITted is selected, TGPL2 = TGPL1.

**:DLINK:TGAP:PSI[1]:PRC**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [ 1 ] :PRC <val> | INFINity

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TGAP:PSI [ 1 ] :PRC?

This command sets the transmission gap pattern repetition count.

**\*RST** 1

**Range** 1–511

**Key Entry** **Infinity**

**Field Entry** TGPRC

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**Remarks** The pattern repetition count (PRC) sets the number of transmission gap patterns within the transmission gap pattern sequence. When *INFINITY* is selected, the PRC will continue indefinitely.

**:DLINK:TGAP:PSI[1]:PS**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:PSI[1]:PS ACTIVE|INACTIVE
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:PSI[1]:PS?
```

This command sets the transmission gap pattern status.

**ACTIVE** This choice activates the compressed mode.

**INACTIVE** This choice sets the compressed mode to inactive.

**\*RST** INAC

**Key Entry** **Active** **Inactive**

**:DLINK:TGAP:PSI[1]:SN**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:PSI[1]:SN <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:PSI[1]:SN?
```

This command specifies the timeslot number of the first transmission gap within the first radio frame.

**\*RST** +11

**Range** 0–14

**Field Entry** TGSN

**:DLINK:TGAP:RPARAMeter**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:RPARAMeter DREF11|DREF12|
DREF21|DREF22
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:RPARAMeter?
```

This command sets the downlink reference compressed mode parameters as defined in 3GPP standard.

**DREF11** This choice sets the reference parameter to 1.1.

**DREF12** This choice sets the reference parameter to 1.2.

**DREF21** This choice sets the reference parameter to 2.1.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

DREF22	This choice sets the reference parameter to 2.2.			
*RST	CUST			
<b>Key Entry</b>	<b>DL Reference 1.1</b>	<b>DL Reference 1.2</b>	<b>DL Reference 2.1</b>	<b>DL Reference 2.2</b>
<b>Remarks</b>	The query returns CUSTom when the parameters are set individually.			

**:DLINK:TGAP:SCFN**

<b>Supported</b>	E4438C with Option 400			
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:SCFN <val>			
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:SCFN?			
	This command sets the stop connection frame number (CFN) when the stop trigger is used.			
	When the stop trigger is received at the signal generator, the compressed mode will finish even if the transmission gap pattern repetition count (TGPRC) is still remaining.			
*RST	+0			
<b>Range</b>	0–255			
<b>Field Entry</b>	SCFN			
<b>Remarks</b>	The compressed mode stop trigger must be executed for this command to work. Refer to, “:DLINK:TGAP:STOP:TRIGger” on page 1063.			

**:DLINK:TGAP:START:TRIGger**

<b>Supported</b>	E4438C with Option 400			
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:START:TRIGger			
	This command starts the signal generator compressed pattern transmission. Compressed pattern transmission begins with the specified transmission gap connection frame number (TGCFN).			
<b>Key Entry</b>	<b>Compressed Mode Start Trigger</b>			

**:DLINK:TGAP:START:TRIGger:POLarity**

<b>Supported</b>	E4438C with Option 400			
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:START:TRIGger:POLarity			
	POSitive NEGative			
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TGAP:START:TRIGger:POLarity?			
	This command sets the compressed mode start trigger polarity. The compressed pattern transmission begins when this trigger is received.			

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

POSitive	This choice sets the trigger to start when the trigger signal is high.
NEGative	This choice sets the trigger to start when the trigger signal is low.
<b>*RST</b>	POS
<b>Key Entry</b>	<b>Comp Mode Start Trigger Polarity Pos Neg</b>

**:DLINK:TGAP:STOP:TRIGger**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:TGAP:STOP:TRIGger

This command stops the signal generator compressed pattern transmission. Compressed pattern transmission begins with the specified transmission gap connection frame number (TGCFN).

**Key Entry** **Compressed Mode Stop Trigger**

**:DLINK:TGAP:STOP:TRIGger:POLarity**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:TGAP:STOP:TRIGger:POLarity  
POSitive | NEGative

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:TGAP:STOP:TRIGger:POLarity?

This command sets the compressed mode stop trigger polarity. The compressed pattern transmission stops when this trigger is received.

POSitive	This choice sets the trigger to stop when the trigger signal is high.
NEGative	This choice sets the trigger to stop when the trigger signal is low.
<b>*RST</b>	POS
<b>Key Entry</b>	<b>Comp Mode Stop Trigger Polarity Pos Neg</b>

**:DLINK:TGAP[:STATe]**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:TGAP [ :STATe ] 1 | 0 | ON | OFF  
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :DLINK:TGAP [ :STATe ] ?

This command enables or disables the transmission gap compressed mode.

<b>*RST</b>	0
<b>Key Entry</b>	<b>Compressed Mode On Off</b>

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

**Remarks** When compressed mode is enabled, DPCH2 is automatically disabled and can't be enabled.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK:TSETup**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :DLINK:TSETup REFSensitivity | MAXinput | ACS | BLOcking | SPURious | INTermod | PERFreq

This command configures the test setup for the downlink channels.

**REFSensitivity** This choice selects reference sensitivity. This is the minimum receiver input power measured at the antenna connector.

**MAXinput** This choice selects maximum input interference. The receiver is stressed with high-levels of interference from unwanted signals.

**ACS** This choice selects adjacent channel selectivity (ACS). This is the receiver ability to receive a wanted signal at the assigned channel frequency with the presence of adjacent signals.

ACS is the ratio of the receiver filter attenuation (on the assigned channel) to the receive filter attenuation on the adjacent channel(s).

**BLOcking** This choice selects the blocking characteristics. This is a measure of the receiver ability to receive a wanted signal at the assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels.

**SPURious** This choice selects spurious emission power. The emissions are generated or amplified by a receiver.

**INTermod** This choice selects intermodulation. Third order intermodulation (TIO) or higher mixing of the two interfering RF signals signal in the band of the desired channel.

**PERFreq** This choice selects the performance requirement of the dedicated channel. This is a static propagation conditions that is determined by the maximum block error rate (BLER) allowed when the receiver input signal is at a specified Eb/No limit.

<b>Key Entry</b>	<b>Ref Sensitivity</b>	<b>Max Input</b>	<b>ACS</b>	<b>Blocking</b>
	<b>Spurious Response</b>	<b>Intermod</b>	<b>Performance Req</b>	



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:DLINK:TXDV****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TXDV NONE|OANT1|OANT2|OANTO1|OANTO2  
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK:TXDV?

This command selects the transmit diversity mode of the downlink signal.

NONE This choice disables the transmit diversity mode.

OANT1 This choice selects a Transmit Diversity Openloop Antenna 1 mode.

OANT2 This choice selects a Transmit Diversity Openloop Antenna 2 mode.

OANTO1 This choice selects a Transmit Diversity Openloop Antenna 1 mode with the SCH TSTD (Synchronization Channel Transmit Switched Time Diversity) off.

OANTO2 This choice selects a Transmit Diversity Openloop Antenna 2 mode with the SCH TSTD (Synchronization Channel Transmit Switched Time Diversity) off.

**\*RST** NONE**Field Entry** TX Diversity**Key Entry****None    OpenLoop Ant1    OpenLoop Ant2****OpenLoop Ant1 SCH TSTD OFF            OpenLoop Ant2 SCH TSTD OFF**

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:BLKSize****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:BLKSize &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:BLKSize?

This command sets the block size (BLKSize) for the selected dedicated transport channel (DCH). The transport channel position affects the behavior of this command as described below.

Transport Channel Mode	Signal Generator Behavior
FLEXible	Changing the block size causes the signal generator to recalculate the block set size. The block size, number of blocks and the block set size values are interdependent as shown in the following formula:  $\text{block size} = \text{block set size} \div \text{number of blocks}$
FIXed	There are two signal generator behaviors in this mode: <ul style="list-style-type: none"> <li>change the block size to zero, and it remains zero regardless of the block set size and number of blocks values</li> <li>change the block size to a value other than zero, and the signal generator recalculates the block size as a quotient of the block set size and the number of blocks (block set size <math>\div</math> number of blocks), ignoring the value entered by the command</li> </ul>

**\*RST** 20**Range** 0–5000**Field Entry** Blk Size

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

For information on the number of blocks and block set size commands, see “:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:NBLocks” on page 1071, and “:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:BSSize” on page 1067.

Refer to the “:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:POSITION” command on page 1072 for information on setting the transport channel position.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:BPFRame****Supported** E4438C with Option 400[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6 :  
BPFRame?

This query returns the number of bits per frame for the selected dedicated transport channel (DCH).

**\*RST** 60**Field Entry** Bits/Frame**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:BRATe****Supported** E4438C with Option 400[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6 :  
BRATe?

This query returns the block rate for the selected dedicated transport channel (DCH).

**\*RST** 20**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:BSSize****Supported** E4438C with Option 400[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6 :  
BSSize <val>  
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6 :  
BSSize?This command sets the block set size (BSSize) for the selected dedicated transport channel (DCH).  
The transport channel position affects the behavior of this command as described below.**Transport  
Channel Mode****Signal Generator Behavior**

FLEXible This command has no effect on the block size value. The block size value changes only when there is a value change in the number of blocks or the block size according to the following formula:

$$\text{block set size} \geq \text{block size} \times \text{number of blocks}$$

<b>Transport Channel Mode</b>	<b>Signal Generator Behavior</b>
FIXed	<p>Changing the block set size value automatically changes the block size, so that the block set size approximates or is the product of the block size and number of blocks values:</p> $\text{block set size} \geq \text{block size} \times \text{number of blocks}$ <p>The change in the block set size value generates a settings conflict error, which the signal generator corrects when it recalculates the block size value.</p>
*RST	20
Range	0–200000
Field Entry	Blk Set Size
Remarks	<p>Refer to the “:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:POSition” command on <a href="#">page 1072</a> for information on setting the transport channel position.</p> <p>For information on the number of blocks and block size commands, see “:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:NBLocks” on <a href="#">page 1071</a>, and “:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:BLKSize” on <a href="#">page 1066</a>.</p> <p>If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on <a href="#">page 1021</a>.</p>

### **:DLINK[:TGRoup [A]|B]:DCH[1]|2|3|4|5|6:CODE**

<b>Supported</b>	E4438C with Option 400
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:CODE HCONv TCONv TURBo NONE
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:CODE?
	This command selects the encoder type.
HCONv	This choice selects coding with the 1/2 rate convolutional encoder.
TCONv	This choice selects coding with the 1/3 rate convolutional encoder.
TURBo	This choice selects coding with the turbo coder.
NONE	This choice selects no coding.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

<b>*RST</b>	HCON
<b>Key Entry</b>	<b>1/2 Conv    1/3 Conv    Turbo    None</b>
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:CRC**

**Supported**            E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:
CRC <val>
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:
CRC?
```

This command sets the number of cyclic redundancy check (CRC) bits for the dedicated transport channel (DCH).

<b>*RST</b>	8
<b>Field Entry</b>	CRC Size
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA**

**Supported**            E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:
DATA PN9 | FIX4 | "<file name>"
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:
DATA?
```

This command configures the data for the downlink dedicated transport channel (DCH) selected.

"<file name>" This variable specifies a data pattern that has been stored in memory.

<b>*RST</b>	PN9
<b>Key Entry</b>	<b>PN9    FIX4    "&lt;User File&gt;"</b>
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:EINSErt****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:EINSErt BLER|BER|NONE

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:EINSErt?

This command selects the error insertion mode.

**BLER** This choice selects a block error rate (BLER) mode.**BER** This choice selects a bit error rate (BER) mode.**NONE** This choice selects no BLER or BER mode (no error blocks or bit are inserted)**\*RST** NONE**Key Entry** **BLER** **BER** **None****:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:FIX4****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:FIX4 &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:FIX4?

This command sets a fixed data type to be transmitted on the selected downlink dedicated transport channel (DCH).

While the variable &lt;val&gt; can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000**Range** 0–15**Key Entry** **FIX4****Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:NBLocks****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:
NBLocks <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:
NBLocks?
```

This command sets the number of blocks (NBLocks) transmitted by the selected downlink dedicated transport channel (DCH). The transport channel position affects the behavior of this command as described below.

Transport Channel Mode	Signal Generator Behavior
FLEXible	Changing the number of blocks causes the signal generator to recalculate the block set size; <i>block size</i> remains constant. The equation is as follows: $\text{number of blocks} \leq \text{block set size} \div \text{block size}$
FIXed	Changing the number of blocks causes the signal generator to recalculate the block size; <i>block set size</i> remains constant. Changing the number of blocks also causes the ESG to generate a settings conflict error that is corrected when the signal generator recalculates the block size. The equation is as follows: $\text{number of blocks} \leq \text{block set size} \div \text{block size}$
<b>*RST</b>	1
<b>Range</b>	1–64
<b>Field Entry</b>	# of Blocks
<b>Remarks</b>	Refer to the “:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:POSITION” command on <a href="#">page 1072</a> for information on setting the transport channel position.  For information on the block size (BLKSize) and block set size (BSSize) commands, see “:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:BLKSize” on <a href="#">page 1066</a> and “:DLINK[:TGRoup [A] B]:DCH[1] 2 3 4 5 6:BSSize” on <a href="#">page 1067</a> .  If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on <a href="#">page 1021</a> .

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:POSITION**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A]|B]:DCH[1]|2|3|4|5|6:
POSITION FLEXible|FIXed
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A]|B]:DCH[1]|2|3|4|5|6:
POSITION?
```

This command selects a position for the data transmitted by the downlink dedicated transport channel (DCH).

The transport position selection, flexible or fixed, determines how the three block settings, block set size, block size, and number of blocks, for the transport channel are determined.

**FLEXible** This choice allows the signal generator to automatically set the block set size. The relationship between block set size, block size, and number of blocks is as follows:  
 $\text{block set size} = \text{number of blocks} \times \text{block size}$

**FIXed** This choice allows a user-defined block set size. The relationship between block set size, block size, and number of blocks is as follows:  
 $\text{block set size} \geq \text{number of blocks} \times \text{block size}$

**\*RST** FLEX

**Key Entry** **Transp Position Flexible Fixed**

**Remarks** For more information on the block parameters, refer to the “:DLINK[:TGRoup [A]|B]:DCH[1]|2|3|4|5|6:NBLocks” command on [page 1072](#), the “:DLINK[:TGRoup [A]|B]:DCH[1]|2|3|4|5|6:BSSize” command on [page 1067](#) and the “:DLINK[:TGRoup [A]|B]:DCH[1]|2|3|4|5|6:BLKSize” command on [page 1066](#).

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:PPERcentage**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A]|B]:DCH[1]|2|3|4|5|6:
PPERcentage?
```

This query returns the percentage of the total bits removed from or added to the fully coded channel.



## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:RMAth****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6:  
RMAth <val>[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6:  
RMAth?

This command sets the rate matching attribute.

**\*RST** 1**Range** 1–256**Field Entry** Rate Match Attr**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6:TTI****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6:  
TTI 10000 | 20000 | 40000 | 80000[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:DLINK[:TGRoup [A] | B]:DCH [1] | 2 | 3 | 4 | 5 | 6:  
TTI?

This command sets the transmission time interval (TTI) allowed for the dedicated channel (DCH) to transmit.

The choices are expressed in units of milliseconds (msec) where 20000=20 msec.

**\*RST** 10000**Field Entry** TTI**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:DLINK:APPLY” on page 1021.

**:DLINK[:TGRoup [A] | B]:DCH[1] | 2 | 3 | 4 | 5 | 6[:STATe]****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 |
6[:STATe] ON|OFF|1|0
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:DLINK[:TGRoup[A] | B]:DCH[1] | 2 | 3 | 4 | 5 |
6[:STATe] ?
```

This command enables or disables the selected dedicated transport channel (DCH).

**\*RST** DCH 1: 1 DCH 2–6: 0**Key Entry** **TrCH State Off On**

**Remarks** DCH1 reset value cannot be turned off. The channels must be turned on sequentially. If one channel is turned off then all higher numbered channels will automatically be turned off.

If the parameter is changed, the apply command must be executed after the change. Refer to “[:DLINK:APPLY](#)” on page 1021.

**:LINK****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:LINK DOWN|UP
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:LINK?
```

This command sets the uplink or downlink mode.

**\*RST** DOWN**Key Entry** **Link Down Up****:POLarity[:ALL]****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:POLarity[:ALL] NORMal | INVert
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:POLarity[:ALL] ?
```

This command selects the polarity for the Q channel.

**NORMal** This choice selects normal phase polarity.

**INVert** This choice inverts the internal Q signal.

**\*RST** NORM**Key Entry** **Phase Polarity Normal Invert**

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])**:ULINK:APPLY****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:APPLY

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:APPLY?

This command immediately starts the channel coding generation process according to the channel setup and data for the uplink physical and transport channels.

The query returns a response that determines whether or not the execution of the command is necessary. The response from the query is as follows:

1 This response is returned if the execution of the command is required.

0 This response is returned if the execution of the command is not required.

**\*RST** +0

**Key Entry** **Apply Channel Setup**

**:ULINK:AWGN:CN****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:AWGN:CN &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:AWGN:CN?

This command sets the in band carrier to noise ratio. The noise is the total noise level of the in-channel.

The variable <val> is expressed in units of decibels (dB).

**\*RST** -1.80000000E+001

**Range** -30 to 30

**Field Entry** C/N value

**Remarks** In compressed mode, carrier power means normal frame power. A change in the C/N value will change the Eb/No value and vice versa.

**:ULINK:AWGN:CPOWer**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:AWGN:CPOWer?

This query returns the carrier power level when the additive white gaussian noise (AWGN) is on.

The power value is expressed in units of decibels (dBm/3.84 MHz).

**\*RST** -1.56957537E+002

**Field Entry** C Power

**Remarks** In compressed mode, carrier power means normal frame power.

**:ULINK:AWGN:DRATe**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:AWGN:DRATe?

This query returns the data rate of the Eb reference channel.

**\*RST** +1.22000000E+004

**Field Entry** Ref Data Rate

**:ULINK:AWGN:EBNO**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:AWGN:EBNO <val>

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:AWGN:EBNO?

This command sets the Eb/No ratio. The Eb is defined as the carrier power divided by the bit rate. No is noise power divided by the bandwidth (3.84MHz).

The variable <val> setting is affected by the carrier to noise ratio (C/N) and the data rate. A change to either of these values will affect your Eb/No setting. Use the formula in the range field to determine a correct Eb/No value.

**\*RST** +6.97971394E+000

**Range** Eb/No = C/N x 3.84MHz/Data Rate

**Field Entry** Eb/No value (dB)

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:AWGN:EBRef**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:AWGN:EBRef DPCCh | DPDCh | DCH1 |  
DCH2 | DCH3 | DCH4 | DCH5 | DCH6

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:AWGN:EBRef?

This command selects the Eb reference and it is used in the Eb/No value.

**DPCCh** This choice selects a dedicated physical control channel.

**DPDCh** This choice selects a dedicated physical data channel.

**DCH1** This choice select dedicated transport channel 1.

**DCH2** This choice select dedicated transport channel 2.

**DCH3** This choice select dedicated transport channel 3.

**DCH4** This choice select dedicated transport channel 4.

**DCH5** This choice select dedicated transport channel 5.

**DCH6** This choice select dedicated transport channel 6.

**\*RST** DCH1

**Key Entry** **DPCCH** **DPDCH** **DCH1** **DCH2**  
**DCH3** **DCH4** **DCH5** **DCH6**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:AWGN:FNBW**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:AWGN:FNBW?

This query returns the flat noise bandwidth (BW). Flat noise bandwidth is calculated by  $BW=(1.6) \times$  (Chip rate) and the result is close to the 0 dB roll-off point.

**\*RST** +6.14400000E+006

**Field Entry** Flat Noise BW

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:ULINK:AWGN:NPOWer****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:AWGN:NPOWer?

This query returns the in-channel noise level when the additive white gaussian noise (AWGN) is on.

The power value is expressed in units of decibels (dBm/3.84 MHz).

**\*RST** -1.38957537E+002**Field Entry** N Power**:ULINK:AWGN:TICPower****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:AWGN:TICPower?

This query returns the total in-channel power (carrier with noise) as defined by the 3GPP standard.

**Field Entry** TotalPwr**Remarks** The total in-channel power is a sum of carrier power and in-channel noise power. Changing the noise related parameters such as C/N, Eb/No, and Eb Ref will cause a recalculation of the total in-channel power.

The maximum value returned by this query depends on the power option that is installed in the signal generator.

**:ULINK:AWGN[:STATe]****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:AWGN:STATe ON|OFF|1|0

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:AWGN:STATe?

This command enables or disables the additive white gaussian noise (AWGN). AWGN can only be turned on when DPCCH is selected as the physical channel. Refer to “:ULINK:PHYSical[1]:TYPE” on page 1100.

**\*RST** 0**Key Entry** Channel State Off On**Remarks** If the parameter is changed, the apply command must be executed after the change. Refer to “:ULINK:APPLY” on page 1075.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])**:ULINK:CRATE****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:CRATE &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:CRATE?

This command sets the chip rate for the uplink configuration. The variable <val> is expressed in cycles per second (cps).

**\*RST** +3.8400000E+006**Range** 1E3–4.25E6**Field Entry** Chip Rate**Remarks** The chip rate is equivalent to the spreading rate of the channel.**:ULINK:DPCCh:BETA****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:DPCCh:BETA &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:DPCCh:BETA?

This command sets the beta value for the uplink dedicated physical control channel (DPCCH). The beta value and the power ratio are coupled. When the power ratio is updated, the beta value is converted to the beta ratio (amplitude ratio).

**\*RST** +11**Range** 0–15**Field Entry** Beta**Remarks** After this command is sent, the channel power level for the DPCCH is re-calculated. If the channel power is set directly, the beta value of this command becomes invalid and is reset to –1.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPCCh:CCODE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:CCODE &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:CCODE?

This command sets the channelization code for the uplink dedicated physical control channel (DPCCH).

**\*RST** 0**Range** 0–255**Field Entry** Channel Code

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:DPCCh:DATA****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:DATA PN9 | PN15 | FIX4 |

"&lt;file name&gt;" | STD

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:DATA?

This command configures the data pattern for the uplink dedicated physical control channel (DPCCH).

**STD** This choice sets the DPCCH to use the bits field as defined by the slot format.

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** STD**Key Entry** **PN9** **PN15** **FIX4** **User File** **3GPP STD**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:DPCCh:DATA:FIX4**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:DATA:FIX4 <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:DATA:FIX4?
```

This command sets the 4-bit data pattern of the uplink dedicated physical control channel (DPCCH).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000

**Range** 0–15

**Key Entry** **FIX4**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:DPCCh:FBI:PATtern**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:FBI:PATtern PN9 | PN15 | FIX |  
"<file name>"
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:FBI:PATtern?
```

This command configures the pattern of the feedback information (FBI) for the uplink dedicated physical control channel (DPCCH).

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** FIX

**Key Entry** **PN9 PN15 FIX User File**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:ULINK:DPCCh:FBI:PATtern:FIX**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:FBI:PATtern:FIX <val>

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:FBI:PATtern:FIX?

This command sets the 30-bit feedback information (FBI) pattern for the uplink dedicated physical control channel (DPCCH).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only decimal values.

**\*RST** +0

**Range** 0–10737418235

**Key Entry** **FIX**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPCCh:FBI[:STATe]**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:FBI [ :STATe ] ?

This query returns whether or not the feedback information (FBI) bits are included in the uplink dedicated physical control channel (DPCCH). The FBI is included when a status of one is returned. A zero indicates no FBI.

**\*RST** 0

**Range** N/A

**Field Entry** FBI State

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:DPCCh:POWer**

**Supported** E4438C with Option 400

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:POWer <val>

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:POWer?

This command sets the power level for the uplink dedicated physical control channel (DPCCH).

The variable <val> is expressed in units of decibels (dB).

**\*RST** -2.69000000E+000

**Range** -40 to 0

**Field Entry** DPCCH Power

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:DPCCh:RATE**

**Supported** E4438C with Option 400

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:RATE?

This query returns the symbol rate for the uplink dedicated physical control channel (DPCCH).

**\*RST** +1.50000000E+004

**Field Entry** Symbol Rate

**:ULINK:DPCCh:SLOTformat**

**Supported** E4438C with Option 400

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:SLOTformat <val>

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:SLOTformat?

This command sets the slot format for the uplink dedicated physical control channel (DPCCH). The variable <val> is expressed in unit of bits.

**\*RST** +0

**Range** 0–5

**Field Entry** Slot Format

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPCCh:TFCI:PATtern**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:TFCI:PATtern PN9 | PN15 | FIX
"<file name>"
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:TFCI:PATtern?
```

This command configures the transport format combination indicator (TFCI) bit pattern for the uplink dedicated physical control channel (DPCCH).

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** FIX

**Key Entry** **PN9 PN15 FIX User File**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPCCh:TFCI:PATtern:FIX**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:TFCI:PATtern:FIX <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:TFCI:PATtern:FIX?
```

This command sets the transport format combination indicator (TFCI) 10-bit data pattern for the uplink dedicated physical control channel (DPCCH).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only decimal values.

**\*RST** +0

**Range** 0–1023

**Field Entry** TFCI Pattern

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:DPCCh:TFCI[:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TFCI[:STATe]?

This query returns the status of the transport format combination indicator (TFCI) for the uplink dedicated physical control channel (DPCCH).

**\*RST** 1**Range** N/A**Field Entry** TFCI State**:ULINK:DPCCh:TPC:NSTeps****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:NSTeps &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:NSTeps?

This command sets the number of steps to increase or decrease the transmit power control (TPC) for the uplink dedicated physical control channel (DPCCH).

The variable <val> is expressed in units of decibels (dB).

**\*RST** +1**Range** 1–80**Field Entry** TPC Pat Steps**Remarks** Refer to “:ULINK:DPCCh:TPC:PATtern” on page 1086.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPCCh:TPC:PATtern**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:PATtern PN9 | PN15 | FIX4 |
"<file name>" | UDOW | DUP | UALL | DALL
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:PATtern?
```

This command configures the transmit power control (TPC) pattern for the uplink dedicated physical control channel (DPCCH).

"<file name>" This variable specifies a data pattern that has been stored in memory.

UDOW This choice repetitively steps up and down the TPC pattern.

DUP This choice repetitively steps down and up the TPC pattern.

UALL This choice consecutively steps up the TPC pattern.

DALL This choice consecutively steps down the TPC pattern.

**\*RST** PN9

**Key Entry** **PN9 PN15 FIX4 "<file name>" Up/Down Down/Up All Up**

**All Down**

**Remarks** Refer to [“:ULINK:DPCCh:TPC:NSTeps” on page 1085](#).

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:DPCCh:TPC:PATtern:FIX4****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:PATtern:FIX4 &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:PATtern:FIX4?

This command sets the transmit power control (TPC) 4 bit data pattern for the uplink dedicated physical control channel (DPCCH).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000**Range** 0–15**Field Entry** TPC Pattern

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:DPCCh:TPC:PATtern:TRIGger:POLarity****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:PATtern:TRIGger:POLarity POSitive|NEGative

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPCCh:TPC:PATtern:TRIGger:POLarity?

This command sets the transmit power control (TPC) pattern trigger polarity for the uplink dedicated physical control channel (DPCCH).

**POSitive** This choice sets the pattern signal to trigger when the signal is high.**NEGative** This choice sets the pattern signal to trigger when the signal is low.**\*RST** POS**Key Entry** **TPC Pat Trig Polarity Neg Pos**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:DPCCh:TPC:PATtern:TRIGger[:STATe]**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:TPC:PATtern:
TRIGger[:STATe] ON|OFF|1|0
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:TPC:PATtern:
TRIGger [ :STATe ] ?
```

This command enables or disables the transmit power control (TPC) pattern trigger state for the uplink dedicated physical control channel (DPCCH).

**\*RST** 0

**Field Entry** TPC UserFile Trig

**Remarks** The TPC pattern trigger input is located on the AUX I/O connector (ALT PWR IN, pin#16). For more information about the rear panel AUX I/O connector, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*. If the parameter is changed, the apply command must be executed after the change. Refer to "[:ULINK:APPLY](#)" on page 1075.

**:ULINK:DPCCh:TPOWer**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPCCh:TPOWer?
```

This query returns the "Total Power" value displayed on the user interface (UI). The power value is the relative power difference between the total in-channel signal power and the active channel reference power (0dB).

**\*RST** +0.00000000E+000

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to "[:ULINK:APPLY](#)" on page 1075.



## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:ULINK:DPCCh[:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:DPCCh[:STATe] ON|OFF|1|0

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:DPCCh[:STATe] ?

This command enables or disables the operating state for the uplink dedicated physical control channel (DPCCH).

**\*RST** 1**Field Entry** Channel State

**Remarks** If the parameter is changed, the apply command must be executed after the change. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPDCh:BETA****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:DPDCh:BETA &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:DPDCh:BETA?

This command sets the beta value for uplink dedicated physical data channel (DPDCH).

**\*RST** +15**Range** 0–15**Field Entry** Beta

**Remarks** The beta value and power ratio are coupled. After this command is sent, the value of the channel power level of the DPDCH is re-calculated.

If the channel power is set directly, the value of this command becomes invalid and is set to –1.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPDCh:CCODE**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:DPDCh:CCODE <val>
```

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:DPDCh:CCODE?
```

This command sets the channelization code for the uplink dedicated physical data channel (DPDCH). There are commands that are associated with the channelization code and they are the slot format and the symbol rate.

If the slot format is changed, so will the symbol rate. If the symbol rate is changed, so will the slot format. In addition, the channelization code will change. If current channelization code exceed the new maximum value for the specified slot format or symbol rate, a setting conflict error is generated and the value is clipped to the maximum value. Refer to [Table 9-4 on page 1090](#).

**Table 9-4 Channelization Code Maximum Value**

Channelization Code	Slot Format	Symbol Rate
255	0	15
127	1	30
63	2	60
31	3	120
15	4	240
7	5	780
3	6	960

**\*RST** +16

**Range** 0–255

**Field Entry** Channel Code

**Remarks** Refer to “:ULINK:DPDCh:SLOTformat” on page 1094 and “:ULINK:DPDCh:RATE” on page 1092. If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**:ULINK:DPDCh:DATA**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:DATA PN9 | PN15 | FIX4 |
"<file name>" | TRANspch
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:DATA?
```

This command configures the data pattern of the uplink dedicated physical data channel (DPDCH).

**TRANspch** This choice sets the data that is generated from the transport channel setup.

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** TRAN

**Key Entry** **PN9 PN15 FIX4 User File Transport CH**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:DPDCh:DATA:FIX4**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:DATA:FIX4 <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:DATA:FIX4?
```

This command sets the fixed 4-bit binary data for the uplink dedicated physical data channel (DPDCH).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000

**Range** 0–15

**Field Entry** Data

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:DPDCh:POWer****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:POWer &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:POWer?

This command sets the power level for the uplink dedicated physical data channel (DPDCH).

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** -40 to 0**Field Entry** DPDCH Power

**Remarks** The power ratio and the beta value are coupled. After the beta value is specified and sent, the value of the channel power level of the DPDCH is re-calculated.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPDCh:RATE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:RATE &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:RATE?

This command sets the symbol rate for the uplink dedicated physical data channel (DPDCH). There are commands that are associated with the symbol rate and they are the channelization code and the slot format.

If the slot format is changed, so will the symbol rate. If the symbol rate is changed, so will the slot format. In addition, the channelization code will change. If current channelization code exceed the new maximum value for the specified slot format or symbol rate, a setting conflict error is generated and the value is clipped to the maximum value. Refer to [Table 9-5](#).

**Table 9-5 Channelization Code Maximum Value**

Channelization Code	Slot Format	Symbol Rate
255	0	15
127	1	30

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**Table 9-5 Channelization Code Maximum Value**

Channelization Code	Slot Format	Symbol Rate
63	2	60
31	3	120
15	4	240
7	5	780
3	6	960

The variable <val> is expressed in units of kilo symbols per second (ksps).

**\*RST** +6.00000000E+004

**Range** 15000–960000

**Field Entry** Symbol Rate

**Remarks** Refer to “:ULINK:DPDCh:CCODE” on page 1090 and “:ULINK:DPDCh:RATE” on page 1092. If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:DPDCh:RBER**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPDCh:RBER?

This query returns inserted error bit rate which is specified by the transport channel cycle length and transport channel error length commands.

Inserted error bit rate is calculated by the following formula:  $\text{TrCH BER ErrLen} / \text{TrCH BER Cycle}$ . Refer to “:ULINK:DPDCh:TBER[:CLENgth]” on page 1095 and “:ULINK:DPDCh:TBER:ELENgth” on page 1095.

**\*RST** 0.0

**Field Entry** TrCH BER

**:ULINK:DPDCh:SLOTformat**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPDCh:SLOTformat <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:DPDCh:SLOTformat?
```

This command sets the slot format for the uplink dedicated physical data channel (DPDCH).

There are commands that are associated with the slot format and they are the channelization code and the symbol rate.

If the slot format is changed, so will the symbol rate. If the symbol rate is changed, so will the slot format. In addition, the channelization code will change. If current channelization code exceed the new maximum value for the specified slot format or symbol rate, a setting conflict error is generated and the value is clipped to the maximum value. Refer to [Table 9-6 on page 1094](#).

**Table 9-6 Channelization Code Maximum Value**

Channelization Code	Slot Format	Symbol Rate
255	0	15
127	1	30
63	2	60
31	3	120
15	4	240
7	5	780
3	6	960

**\*RST** +2

**Range** 0–6

**Field Entry** Slot Format

**Remarks** Refer to “:ULINK:DPDCh:CCODE” on page 1090 and “:ULINK:DPDCh:RATE” on page 1092. If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:DPDCh:TBER[:CLENgth]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:TBER[:CLENgth] &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:TBER[:CLENgth] ?

This command sets the cycle length of the Transport Channel BER insertion of dedicated physical channel (DPCH).

**\*RST** 0**Range** 0–65535**Field Entry** TrCH BER Cycle

**Remarks** A zero in the TrCH BER Cycle field, disables the error insertion function (error rate equals 0%).

**:ULINK:DPDCh:TBER:ELENgth****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:TBER:ELENgth &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:TBER:ELENgth?

This command sets the error length of the Transport Channel BER.

**\*RST** 0**Range** 0–4095**Field Entry** TrCH BER ErrLen

**Remarks** The Transport Channel BER error length must be smaller than or equal to the Transport Channel BER cycle length.

The TrCH ELEN (transport channel error length) is truncated by the TrCH CLEN (transport channel cycle length) when the TrCH BER cycle length is smaller than TrCH BER length.

**Wideband CDMA Base Band Generator Subsystem—Option 400 (:SOURce:RADio:WCDMa:TGPP[:BBG])****:ULINK:DPDCh:TPOWer****Supported** E4438C with Option 400

[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh:TPOWer?

This query returns the “Total Power” value displayed on the user interface (UI). The power value is the relative power difference between the total in-channel signal power and the active channel reference power (0dB).

**\*RST** +0**:ULINK:DPDCh[:STATe]****Supported** E4438C with Option 400

[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh[:STATe] ON|OFF|1|0

[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:DPDCh[:STATe] ?

This command enables or disables the operating state for the uplink dedicated physical data channel (DPDCH).

**\*RST** 1**Field Entry** Channel State

**Remarks** If the parameter is changed, the apply command must be executed after the change. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:FCLock:INTerval****Supported** E4438C with Option 400

[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:FCLock:INTerval FCL10|FCL20|FCL40|FCL80|FCL2560

[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:FCLock:INTerval ?

This command selects the frame clock interval supplied to the source.

The frame clock interval is set in units of milliseconds (msec).

**\*RST** FCL80**Key Entry** 10 msec 20 msec 40 msec 80 msec 2560 msec

**Remarks** This command is not used when the sync source is set to ESG. Refer to “:ULINK:SYNC[:SOURce]” on page 1152.



## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])

**:ULINK:FCLOCK:POLarity****Supported** E4438C with Option 400

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:FCLOCK:POLarity POSitive|NEGative
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:FCLOCK:POLarity?
```

This command sets the polarity of the frame clock for the uplink synchronization source.

**POSitive** This choice sets the clock gate to trigger when the signal is high.

**NEGative** This choice sets the clock gate to trigger when the signal is low.

**\*RST** POS

**Key Entry** **Frame Clock Polarity Neg Pos**

**Remarks** This command is not used when the sync source is set to ESG. Refer to “:ULINK:SYNC[:SOURCE]” on page 1152.

**:ULINK:FILTer****Supported** E4438C with Option 400

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:FILTer RNYQuist|NUQuist|GAUSSian|
RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm| UGGaussian|
"<user FIR>"
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:FILTer?
```

This command selects the filter type for the uplink configuration.

**IS95** This choice selects a filter that meets the criteria of the IS-95 standard.

**IS95\_EQ** This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

**IS95\_MOD** This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

**IS95\_MOD\_EQ** This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**AC4Fm** This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

<b>UGGaussian</b>	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory.
<b>*RST</b>	RNYQ
<b>Key Entry</b>	<b>Root Nyquist      Nyquist      Gaussian      Rectangle      IS-95      IS-95 w/EQ</b> <b>IS-95 Mod      IS-95 Mod w/EQ      APCO 25 C4FM      UN3/4 GSM Gaussian</b> User FIR
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 13</a> for information on the file name syntax.

**:ULINK:FILTer:ALPHa**

**Supported**      E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:FILTer:ALPHa <val>

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:FILTer:ALPHa?

This command changes the alpha value for the Nyquist or root Nyquist filter.

**\*RST**      +2.20000000E-001

**Range**      0.000–1.000

**Key Entry**      **Filter Alpha**

**Remarks**      This command is effective only after a root Nyquist or Nyquist filter is selected; it does not affect other types of filters.

To change the current filter type, refer to [“:ULINK:FILTer” on page 1097](#).

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:FILTer:BBT**

**Supported** E4438C with Option 400

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:FILTer:BBT <value>

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:FILTer:BBT?

This command changes the bandwidth-multiplied-by-bit-time filter parameter value for the Gaussian filter.

**\*RST** +5.00000000E-001

**Range** **0.000–1.000**

**Key Entry** **Filter BbT**

**Remarks** This command is effective only after a Gaussian filter is selected; it does not affect other types of filters.

To change the current filter type, refer to “[:ULINK:FILTer]” on page 1097.

**:ULINK:FILTer:CHANnel**

**Supported** E4438C with Option 400

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:FILTer:CHANnel EVM|ACP

[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:FILTer:CHANnel?

This command optimizes a filter for minimized error vector magnitude (EVM) or for minimized adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection. This feature only applies to root Nyquist and Nyquist filters.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “[:ULINK:FILTer]” on page 1097.

**:ULINK:FOFFset**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:FOFFset <val>
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:FOFFset?
```

This command sets the SFN-CFN frame number offset. The command adds in delays of the internal frame counter by specifying the starting frame number count.

When the FOFFset is set to “0,” the frame number starts at the system sync trigger.

An example of specifying a frame number count: Set the FOFFset to 2. This makes the signal generator to trigger 2 frames after the SFN RST.

**\*RST** 0

**Range** 0–255

**Key Entry** SFN-CFN Frame Offset

**Remarks** For additional information, refer to 3GPP TS25.402 for SFN and CFN relationship.

**:ULINK:PADJust**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PADJust EQUal|SCALE
```

This command adjusts the code domain power levels of all uplink channels.

**EQUal** This choice will adjust all channel powers to equal power settings.

**SCALE** This choice will scale the channel power levels so that the sum of the powers are equal to 0 dB.

**Key Entry** Equal Powers Scale To 0dB

**:ULINK:PHYSical[1]:TYPE**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PHYSical[1]:TYPE PRACH|DPCCCh
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PHYSical[1]:TYPE?
```

This command sets the physical channel type.

**PRACH** This choice selects a physical random access channel type.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**DPCCh** This choice selects a dedicated physical control channel type.

**\*RST** DPCC

**Key Entry** **PRACH** **DPCC**

**:ULINK:PMODE:TPControl:HOLD**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:HOLD 1|0|ON|OFF
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:HOLD?
```

This command sets the transmission power control of the dedicated physical channel (DPCH).

**ON** This choice enables the power hold mode.

**OFF** This choice disables the power hold mode and enables the dynamic power control

**\*RST** 1

**Key Entry** **Power Hold** **Off** **On**

**Remarks** The power hold mode is automatically enabled when the dedicated physical channel (DPCH) **Power Mode Norm TPC** is set to **TPC** (refer to “:ULINK:PMODE[:SElect]” on page 1104).

**:ULINK:PMODE:TPControl:POWer:INITial**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWer:
```

```
INITial <val>
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWer:INITial?
```

This command sets the initial power (in dB; relative to Max Power: 0.00 dB) of the DPCH power control.

**\*RST** +0.00000000E+000

**Range** 0 to -40

**Field Entry** Init Power

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

<b>Remarks</b>	<p>If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.</p> <p>The value of &lt;val&gt; must be smaller or equal to the value use for the command: “:ULINK:PMODE:TPControl:POWER:MINimum” on page 1102. Init Power is relative to Max Power (the amplitude set on the signal generator). For more information refer to “:ULINK:PMODE:TPControl:POWER:MAXimum” on page 1102.</p>
----------------	--

**:ULINK:PMODE:TPControl:POWER:MAXimum**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWER:MAXimum?
```

This query returns the maximum power (in dB; relative to Max Power) of the dedicated physical channel (DPCH).

Max Power is a grayed out field that will always be 0.00 dB. The value of this field is a relative value to the maximum amplitude set for the signal generator. For example, if the signal generator amplitude is set to -20 dBm, the Min Power set to -40 dB, and the Init Power is set to -10 dB, then the absolute initial power level will be -30 dBm (10 dBm below the signal generator amplitude) and the absolute minimum power will be -60 dBm (40 dBm below the signal generator amplitude).

**\*RST** +0.00000000E+000

**Field Entry** Max Power

**Remarks** The value of this query will always be zero. The maximum power is mapped to the actual RF output power.

**:ULINK:PMODE:TPControl:POWER:MINimum**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWER:MINimum <val>
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWER:MINimum?
```

This command sets the minimum power of the dedicated physical channel (DPCH). The variable <val> is expressed in units of dB.

**\*RST** -4.00000000E+001

**Range** -40 to 0

**Field Entry** Min Power

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])

<b>Remarks</b>	<p>If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.</p> <p>The minimum power is decreased in increments determined by the value set for the Power Step. Refer to “:ULINK:PMODE:TPControl:POWer:STEP” on page 1103. Minimum power is limited by the amplitude set on the signal generator. The signal generator amplitude must be set to -96 dBm or lower for the minimum power to be set to -40 dB. For more information, refer to “:ULINK:PMODE:TPControl:POWer:MAXimum” on page 1102.</p>
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**:ULINK:PMODE:TPControl:POWer:RESet**

<b>Supported</b>	E4438C with Option 400
	[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWer:RESet
	[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWer:MINimum?

This command resets the transmit power of the dedicated physical channel (DPCH) to the initial power.

**Key Entry**            **Reset to Initial Power**

<b>Remarks</b>	When the DPCH power mode is changed to TPControl, this command is performed. Refer to “:ULINK:PMODE[:SElect]” on page 1104 to select the power mode. Any time the power mode is changed, the start power is always set to the initial power.
----------------	--

**:ULINK:PMODE:TPControl:POWer:STEP**

<b>Supported</b>	E4438C with Option 400
	[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWer:STEP DB0_5 DB1_0 DB2_0 DB3_0
	[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:POWer:STEP?

This command set the power step of the dedicated physical channel (DPCH) power control. Initial power can only be increased in steps set by the power step.

**\*RST**                    DB0\_5

**Key Entry**            Power Step

<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.
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**:ULINK:PMODE:TPControl:TRIGger:POLarity****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:TRIGger:  
POLarity POSitive|NEGative

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE:TPControl:TRIGger:POLarity?

This command sets the uplink dedicated physical channel (DCPH) transmit power control signal polarity.

**\*RST** POS**Key Entry** **Power Control Signal Polarity Neg Pos****:ULINK:PMODE[:SElect]****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE[:SElect] NORMal|TPControl  
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PMODE[:SElect]?

This command sets the dedicated physical channel (DPCH) power control mode.

**NORMal** This choice selects the normal power mode. Compressed frames are available.

**TPC** This choice selects the TPC power mode. Compressed gaps are not available.

**\*RST** NORM**Key Entry** **Power Mode Norm TPC****:ULINK:PRACH:AICH:NUMBER****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:AICH:NUMBER?

This query returns the number of received acquisition indication channel (AICH) trigger during one configured physical random access channel (PRACH) signal generation.

The result value can be queried after the PRACH signal generation is completed and until the next PRACH generation trigger is received.

The signal begins when the PRACH start trigger and ends when the specified number of signals are generated.

To specify a number of PRACHs, refer to “:ULINK:PRACH[:SINGLE]:PREamble:NUMBER” on [page 1134](#).

**\*RST** -1



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**Field Entry**        Number of AICH  
**Remarks**         A -1 status represents a PRACH generation is on going.

**:ULINK:PRACH:AICH:POLarity**

**Supported**        E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:AICH:
POLarity POSition|NEGative
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:AICH:POLarity?
```

This command sets the trigger signal polarity for the acquisition indication channel (AICH).

**POSitive**         This choice sets the signal polarity to trigger when the signal goes high.

**NEGative**         This choice sets the signal polarity to trigger when the signal goes low.

**\*RST**             POS

**Key Entry**        **AICH Trigger Polarity Pos Neg**

**Remarks**        If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#)

**:ULINK:PRACH:AWGN:CN**

**Supported**        E4438C with Option 400 and 403

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:AWGN:CN <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:AWGN:CN?
```

This command sets the in band carrier to noise ratio.

The variable <val> is expressed in units of decibels (dB).

**\*RST**             -2.25005194E+001

**Range**            -30 to 30

**Field Entry**     C/N value

**Remarks**        A change in the C/N value will change the Eb/No value and vice versa.

**:ULINK:PRACH:AWGN:CPOWer****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH:AWGN:CPOWer?

This query returns the carrier power level when the physical random access channel's (PRACH) additive white gaussian noise (AWGN) is on.

**\*RST** -1.61435521E+002**Field Entry** C Power**:ULINK:PRACH:AWGN:DRATe****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH:AWGN:DRATe?

This query returns the data rate of the Eb reference channel.

**\*RST** +1.22000000E+004**Field Entry** Ref Data Rate**:ULINK:PRACH:AWGN:EBNO****Supported** E4438C with Option 400 and 403

[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH:AWGN:EBNO &lt;val&gt;

[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH:AWGN:EBNO?

This command sets the Eb/No value. The Eb is defined as carrier divided by the bit rate. No is noise power divided by the bandwidth (3.84 MHz). This ratio is only referred when EREF is CONTrol or DATA.

The variable <val> setting is affected by the carrier to noise ratio (C/N) and the data rate. A change to either of these values will affect your Eb/No setting. Use the formula in the range field to determine a correct Eb/No value.

**\*RST** +4.10000000E+000**Range** Eb/No = C/N x 3.84MHz/DataRate**Field Entry** Eb/No

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:PRACH:AWGN:ECNO**

**Supported** E4438C with Option 400 and 403

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN:ECNO <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN:ECNO?
```

This command sets the  $E_c/N_o$  value. The  $E_c$  is defined as carrier divided by the chip rate.  $N_o$  is the noise power divided by the bandwidth (3.84 MHz). This ratio is only referred when EREF is PREAMBLE.

**\*RST** -2.05000000E+001

**Range** -30 to 30

**Field Entry**  $E_c/N_o$  value

**:ULINK:PRACH:AWGN:EREF**

**Supported** E4438C with Option 400 and 403

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN:EREF PREAMBLE |  
CONTrol | DATA | RACH
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN:EREF?
```

This command selects the  $E_b$  ( $E_c$ ) reference. It is used for specifying the bit (chip) rate of physical/transport channel.

**PREAMBLE** This choice selects a preamble part as the  $E_c/N_o$  reference.

**CONTrol** This choice selects a message control part as the  $E_b/N_o$  reference.

**DATA** This choice selects a message data part as the  $E_b/N_o$  reference.

**RACH** This choice selects a random access channel as the  $E_b/N_o$  reference.

**\*RST** RACH

**Key Entry** **Preamble** Msg Ctrl Msg Data **RACH TrCH**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:AWGN:NPOWER**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN:NPOWER?

This query returns the in-channel noise level when the additive white gaussian noise (AWGN) is on.

**\*RST** -1.38935002E+002

**Field Entry** N Power

**:ULINK:PRACH:AWGN:TICPower**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN:TICPOWER?

This query returns the in-channel power within the 3.84 MHz bandwidth.

**\*RST**           **DPCH:**   -1.38924800E+002  
                   **Single PRACH:**   -1.38924800E+002  
                   **Multiple PRACH:**   -1.56970651E+002

**Field Entry** TotalPwr

**:ULINK:PRACH:AWGN[:STATE]**

**Supported** E4438C with Option 400 and 403

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN [ :STATE ] ON | OFF | 1 | 0  
 [ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:AWGN [ :STATE ] ?

This command enables or disables the additive white gaussian noise (AWGN) for the physical random access channel (PRACH). The AWGN can only be turned on when PRACH is selected as the physical channel.

**\*RST** 0

**Key Entry** Channel State Off On

**Remarks** Refer to “:ULINK:PHYSical[1]:TYPE” on page 1100.

If the parameter is changed, the apply command must be executed after the change. Refer to “:ULINK:APPLY” on page 1075.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:ULINK:PRACH:MESSAge:CPARt:BETA**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt :BETA <val>
```

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt :BETA?
```

This command sets the beta ratio (amplitude ratio) for the physical random access channel (PRACH) message control part. The variable <val> is an integer value.

Changing the control power value (see “:ULINK:PRACH:MESSAge:CPARt:POWer” on page 1110 for information on setting PRACH control power) changes the beta to power ratio, and the ESG may not be able to compute a proper control beta value. If this occurs, the query will return a minus one (-1).

**\*RST** +11

**Range** 0–15

**Field Entry** Ctrl Beta

**Remarks** A change to the beta value will also cause a change to the control power setting.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:MESSAge:CPARt:DATA**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt :DATA PN9 |
PN15 | FIX4 | "<file name>" | STD
```

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt :DATA?
```

This command selects the data type to be inserted into the physical random access channel (PRACH) message control part.

**STD** This choice selects a slot format defined in the 3GPP standard.

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** STD

**Key Entry** **PN9** **PN15** **FIX4** **User File** **3GPP STD**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:MESSAge:CPARt:DATA:FIX4**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt:DATA:
FIX4 <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt:DATA:FIX4?
```

This command sets a fixed 4 bit pattern for use as physical random access channel (PRACH) message part data.

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000

**Range** 0–15

**Key Entry** **Fix4**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:PRACH:MESSAge:CPARt:POWer**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt:POWer <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:MESSAge:CPARt:POWer?
```

This command sets the power level for the physical random access channel (PRACH) message control part.

The variable <val> is expressed in units of decibels (dB).

**\*RST** -2.69000000E+000

**Range** -40 to 0

**Field Entry** Ctrl Pwr

**Remarks** Changing the control power changes the beta to power ratio. Refer to [“:ULINK:PRACH:MESSAge:CPARt:BETA” on page 1109](#) for more information.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#)

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:PRACH:MESSAge:CPARt:RATE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:CPARt:RATE?

This query returns the message data part symbol rate for the physical random access channel (PRACH).

**\*RST** +1.50000000E+004**Key Entry** **Symbol Rate**

**Remarks** The symbol rate of 15 kbps is the only supported rate per the 3GPP standards, TS 25.211 v3.10 (2002-03).

**:ULINK:PRACH:MESSAge:CPARt:SLOTformat****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:CPARt:SLOTformat?

This query returns the message control part slot format for the physical random access channel (PRACH).

**\*RST** 0**Range** 0–3**Field Entry** Slot Format

**Remarks** The slot format is a static value set to zero in accordance with the 3GPP standards, TS 25.211 v3.10 (2002-03).

**:ULINK:PRACH:MESSAge:CPARt:TFCI:PATtern****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:CPARt:TFCI:PATtern PN9|PN15|FIX|"&lt;file name&gt;"

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:CPARt:TFCI:PATtern?

This command selects data type to be inserted into the transport format combination indicator (TFCI) of the message control part located in the physical random access channel (PRACH).

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** FIX**Key Entry** **PN9** **PN15** **FIX** **User File**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:PRACH:MESSAge:CPARt:TFCI:PATtern:FIX****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:CPARt:TFCI:PATtern:FIX &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:CPARt:TFCI:PATtern:FIX?

This command sets a fixed bit pattern to be inserted into the transport format combination indicator (TFCI).

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only decimal values.

**\*RST** +0**Range** 0–1023**Field Entry** TFCI Pattern

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).



## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**:ULINK:PRACH:MESSAge:CPARt:TFCI[:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:CPARt:TFCI[:STATe]?

This query returns the transport format combination indicator (TFCI) bits to determine if they exist or not in the currently specified slot format. A query returned with a “1” determines a TFCI exists and a “0,” no bits exist.

**\*RST** 1**Field Entry** TFCI State**:ULINK:PRACH:MESSAge:DPARt:BETA****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:DPARt:BETA &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MESSAge:DPARt:BETA?

This command sets the beta ratio (amplitude ratio) for the message data part of the physical random access channel (PRACH).

The variable <val> is an integer value. Changing the data power value (refer to, “:ULINK:PRACH:MESSAge:DPARt:POWer” on page 1115 for more information on setting PRACH data power) changes the beta to power ratio, and the signal generator may not be able to compute a proper data beta value. If this occurs, the query will return a minus one (-1).

**\*RST** +15**Range** 0–15**Field Entry** Data Beta**Remarks** A change to the beta value will also cause a change to the data power setting.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:MESSAge:DPART:DATA**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: PRACH:MESSAge:DPART :DATA PN9 |
PN15 |FIX4 | "<file name>" | TRANSpch
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: PRACH:MESSAge:DPART :DATA?
```

This command sets the data type to be inserted into physical random access channel (PRACH) message data part.

**TRANSpch** This choice sets the data that is generated from the transport channel setup.

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** TRAN

**Key Entry** **PN9 PN15 FIX4 User File Transport CH**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:PRACH:MESSAge:DPART:DATA:FIX4**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: PRACH:MESSAge:DPART :DATA:
FIX4 <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: PRACH:MESSAge:DPART :DATA:FIX4?
```

This command sets a pseudo-random pattern as output data type in the message data part of the physical random access channel (PRACH).

While the variable <val> is expressed in binary or decimal formats, the query returns only binary values.

**\*RST** #B0000

**Range** 0∠15

**Key Entry** **FIX4**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:ULINK:PRACH:MESSAge:DPART:POWer****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:PRACH:MESSAge:DPART:POWer &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:PRACH:MESSAge:DPART:POWer?

This command sets the power level for the physical random access channel (PRACH) message data part.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** -40 to 0**Field Entry** Data Pwr

**Remarks** Changing the data power changes the beta to power ratio. Refer to [“:ULINK:PRACH:MESSAge:DPART:BETA” on page 1113](#) for more information.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#)

**:ULINK:PRACH:MESSAge:DPART:RATE****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:PRACH:MESSAge:DPART:RATE &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:PRACH:MESSAge:DPART:RATE?

This command sets the symbol rate for the message data part of the physical random access channel (PRACH).

There are commands that are associated with the symbol rate and they are the channelization code and the slot format.

If the slot format is changed, so will the symbol rate. If the symbol rate is changed, so will the slot format. In addition, the channelization code will change. If current channelization code exceed the new maximum value for the specified slot format or symbol rate, a setting conflict error is generated and the value is clipped to the maximum value. Refer to [Table 9-7](#).

**Table 9-7 Channelization Code Maximum Value**

Channelization Code	Slot Format	Symbol Rate
255	0	15
127	1	30
63	2	60
31	3	120

The variable <val> is expressed in units of kilo symbols per second (ksps).

**\*RST** 60

**Range** 15–120

**Field Entry** Symbol Rate

**Remarks** Channel code value is determined by slot format choice. Refer to “:ULINK:PRACH:MESSAge:DPART:SLOTformat” on page 1116 and “:ULINK:PRACH[:SINGLE]:MESSAge:DPART:CCODE” on page 1132.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

### :ULINK:PRACH:MESSAge:DPART:SLOTformat

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: PRACH:MESSAge:DPART :
SLOTformat <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: PRACH:MESSAge:DPART :SLOTformat?
```

This command sets the slot format value for the message data part of the physical random access channel (PRACH).

There are commands that are associated with the slot format and they are the channelization code and the symbol rate.

If the slot format is changed, so will the symbol rate. If the symbol rate is changed, so will the slot format. In addition, the channelization code will change. If current channelization code exceed the new maximum value for the specified slot format or symbol rate, a setting conflict error is generated and the value is clipped to the maximum value. Refer to [Table 9-8](#).

**Table 9-8 Channelization Code Maximum Value**

Channelization Code	Slot Format	Symbol Rate
255	0	15
127	1	30
63	2	60
31	3	120

The variable <val> is expressed in units of kilo symbols per second (ksps).

**\*RST** 2

**Range** 0–3

**Field Entry** Slot Format

**Remarks** Refer to “[:ULINK:PRACH:MESSAge:DPARt:RATE]” on page 1115 and “[:ULINK:PRACH[:SINGLE]:MESSAge:DPARt:CCODE]” on page 1132.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “[:ULINK:APPLY]” on page 1075.

### **[:ULINK:PRACH:MODE[:SElect]]**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH:MODE[:SElect] SINGLE|MULTI
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH:MODE[:SElect]?
```

This command sets the channel mode of the physical random access channel (PRACH).

**SINGLE** This choice generates a single PRACH.

**MULTI** This choice generates up to eight PRACHes.

**\*RST** SING

**Key Entry** **PRACH Mode**    **Single**    **Multi**

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:PRACH:MULTi:MESSAge:TPOWer****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:MESSAge:TPOWer &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:MESSAge:TPOWer?

This command sets the message total power value in the physical random access channel (PRACH). The total power indicates a power of one PRACH.

**\*RST** -1.54060000E+002**Range** -1.00 to 1.94**Field Entry** Msg Pwr

**Remarks** This value is used only when POWER:MODE is set to TOTAL. Refer to “:ULINK:PRACH:PREAmble:POWer:MODE” on page 1124.

The maximum power for this command is limited by the power of the signal generator (ESG maximum power – 18.06 dBm). If the signal generator power is set to +20 dBm, the maximum value of this command is +1.94 dBm.

**:ULINK:PRACH:MULTi:MESSAge[:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:MESSAge[:STATe]

ON|OFF

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:MESSAge[:STATe]?

This command enables or disables the message part of the physical random access channel (PRACH) for the multiple PRACH mode.

**\*RST** ON**Field Entry** Message Part**:ULINK:PRACH:MULTi:NUMBer****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:NUMBer &lt;val&gt;|INFINITY

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:NUMBer?

This command specifies the number of the physical random access channel (PRACH) 80 ms configuration patterns to be transmitted after the PRACH start trigger has been received.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

<b>INFINITY</b>	This choice means the repeating number will continue while the PRACH mode is selected and the start trigger is ignored.
<b>*RST</b>	1
<b>Range</b>	1–2147447836
<b>Field Entry</b>	Number of 80ms
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:MULTi:PREamble:NUMBER**

<b>Supported</b>	E4438C with Option 400
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:PREamble:NUMBER?	

This query returns the number of Preambles on the multiple physical random access channel (PRACH) mode. This number is fixed to 1 in the current version.

<b>*RST</b>	1
<b>Field Entry</b>	Num of Pre

**:ULINK:PRACH:MULTi:PREamble:POWER:INITIAL**

<b>Supported</b>	E4438C with Option 400
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:PREamble:POWER:INITIAL?	

This query returns the initial power of PRACH preambles on the multiple physical random access channel (PRACH) mode.

<b>*RST</b>	–1.54060000E+002
<b>Range</b>	–154.06 to 10
<b>Field Entry</b>	Init Pwr
<b>Remarks</b>	For the multiple PRACH mode, the initial power is the same as the maximum power for the PRACH preamble.

**:ULINK:PRACH:MULTi:PREamble:POWer:MAX****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:PREamble:POWer:Max<val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:PREamble:POWer:Max?
```

This command sets the power of the preamble on the multiple physical random access channel (PRACH) mode.

**\*RST** -1.54060000E+002**Range** -1.0 to 1.94**Field Entry** Max Pwr

**Remarks** The maximum power for this command is limited by the power of the signal generator (ESG maximum power – 18.06 dBm). If the signal generator power is set to +20 dBm, the maximum value of this command is +1.94 dBm.

**:ULINK:PRACH:MULTi:PREamble:POWer:RSTep****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:PREamble:POWer:RSTep?
```

This query, for the multiple physical random access channel (PRACH) mode, always returns zero, because power ramping is not supported for the multiple PRACH mode.

**\*RST** +0**Field Entry** Ramp Step**:ULINK:PRACH:MULTi:PREamble:PPM****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:PREamble:PPM <val>
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:PREamble:PPM?
```

This command sets the difference between the preamble and the message control part in the physical random access channel (PRACH).

**\*RST** -4.56000000E+000**Range** -20 to 10**Field Entry** Pp-m



## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8:MESSAge:CPARt:CCODE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8:MESSAge:CPARt:CCODE?

This query returns the channel code of the message control part of physical random access channel (PRACH) on the multiple PRACH mode.

**\*RST** 255**Range** 0–255**Field Entry** CHCode Ctl**Remarks** This command affects the PRACH setting on the multiple PRACH mode only.**:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8:MESSAge:DPARt:CCODE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8:MESSAge:DPARt:CCODE?

This query returns the channel code of the message data part of physical random access channel (PRACH) on the multiple PRACH mode.

**\*RST** 245**Range** 0–255**Field Entry** ChCode Dat**Remarks** This command affects the PRACH setting on the multiple PRACH mode only.**:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8:PREAmble:SIGNature****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8:PREAmble:SIGNature &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8:PREAmble:SIGNature?

This command sets the signature encoded in the multiple physical random access channel's (PRACH) preamble.

**\*RST**

	Signature
--	-----------

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

UE	1	0
	2	1
	3	2
	4	3
	5	4
	6	5
	7	6
	8	7

**Field Entry** Pre Sig**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.**:ULINK:PRACH:MULTi:UE[1]|2|3|4|5|6|7|8:SPOsition[1]|2|3|4|5|6|7|8[:ASLot]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1]|2|3|4|5|6|7|8:SPOsition[1]|2|3|4|5|6|7|8[:ASLot] &lt;val&gt;|OFF

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1]|2|3|4|5|6|7|8:SPOsition[1]|2|3|4|5|6|7|8[:ASLot]?

This command sets each physical random access channel (PRACH) start access slot position within 80ms.

**\*RST**

		Start Access Slot Pos							
		1	2	3	4	5	6	7	8
UE	1	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	2	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	3	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	4	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
UE	5	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	6	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	7	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	8	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF

**Range** 0–59**Field Entry** Start Access Slot Position in 80ms Period**Remarks** This command can only be executed while in the PRACH Mode is set to Multi. Refer to “:ULINK:PRACH:MODE[:SElect]” on page 1117.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8[:STATe]****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8
[:STATe] 0 | 1 | ON | OFF
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:MULTi:UE[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8
[:STATe] ?
```

This command enables or disables each physical random access channel (PRACH) individually on the multiple PRACH mode.

**\*RST**

		State
UE	1	ON
	2	OFF
	3	OFF
	4	OFF
	5	OFF
	6	OFF
	7	OFF
	8	OFF

**Field Entry** On/Off

**Remarks** This command will not run if the power of all assigned physical random access channels exceed the power of the signal generator.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:PREamble:POWer:AVERage****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:PREamble:POWer:AVERage?
```

This query returns the average power of preambles that were sent before the acquisition indication channel (AICH) trigger was received.

**\*RST** -999**Field Entry** Preamble power average

**Remarks** The average power value can be queried after the physical random access channel's (PRACH) signal generation is completed. Refer to “:ULINK:PRACH[:SINGLE]:PREamble:NUMBER” on page 1134.

**:ULINK:PRACH:PREamble:POWer:MODE****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:PREamble:POWer:MODE PPM | TOTAl

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:PREamble:POWer:MODE?

This command sets the message power calculation mode for the physical random access channel (PRACH).

**PPM** This choice calculates the message power based on the power differences between the preamble and the message control part. The difference is specified by the PPM command. This is based on 3GPP standards.

**TOTAl** This choice calculates message power based on power differences between preamble and message total part. The message total power is specified by the MESSage:TPOWer command. Refer to [“:ULINK:PRACH\[:SINGLE\]:MESSAge:TPOWer”](#) on page 1133.

**\*RST** PPM**Key Entry** **PRACH Power Setup Mode Pp-m Total**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY”](#) on page 1075.

**:ULINK:PRACH:RPARAmeter****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:RPARAmeter TB168 | TB360

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:RPARAmeter?

This command sets a set of parameters as defined in 3GPP Standard (TS25.104) Reference Measurement Channel for the uplink (UL) physical random access channel (PRACH).

**TB168** This choice sets the parameters for the transport block size = 168.

**TB360** This choice sets the parameters for the transport block size = 360.

**\*RST** TB168**Key Entry** **TrCh BlkSize 168** **TrCh BlkSize 360**

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**Remarks** When parameters are sets individually, CUSTom is returned for the query.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:SCRamblecode**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :ULINK:PRACH:SCRamblecode <val>
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :ULINK:PRACH:SCRamblecode?
```

This command sets the physical random access channel’s (PRACH) scrambling code.

**\*RST** +0

**Range** 0–8191

**Field Entry** PRACH Scrambling Code

**Remarks** The signature data is scrambled against a 4096 chip segment of the 225 complex gold code generator.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:SDElay**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :ULINK:PRACH:SDElay <val>
[ :SOURCE ] :RADIO:WCDMA:TGPP [ :BBG ] :ULINK:PRACH:SDElay?
```

This command sets the number of timeslots to be delayed from the uplink synchronization source. One timeslot is equivalent to 2560 chips.

The variable <val> range is dependent on the Tp-a setting.

**\*RST** +0

<b>Range</b>	Tp-a Setting	<val>
	0	-14 to 119
	7680	-11 to 119
	12800	-9 to 119

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****Key Entry**            **Timeslot Offset**

**Remarks**            The actual amount of timing difference is  
(TOFFset + SDELay \* 2560) – (Tp–a).

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

To set the Tp-a value, refer to “:ULINK:PRACH:TPA” on page 1127.

**:ULINK:PRACH:SUBChannel**

**Supported**            E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:SUBChannel <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:SUBChannel?
```

This command sets the sub-channel number to send the first preamble of the physical random access channel’s (PRACH).

**\*RST**                    +0

**Range**                    0–11

**Field Entry**            Start Sub-Channel#

**Remarks**            If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:TOFFset**

**Supported**            E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TOFFset <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TOFFset?
```

This command sets additional timing offset for the physical random access channel (PRACH).

The timing offset is to adjust the time distance from the uplink PRACH frame timing which is the downlink’s AICH framing timing minus the Tp–a to the actual uplink PRACH signal frame timing from the signal generator.

The downlink’s AICH frame timing is provided by the synchronization signal. The

The variable <val> is expressed in chips.

**\*RST**                    +0

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

<b>Range</b>	–512 to 2560
<b>Key Entry</b>	<b>Timing Offset</b>
<b>Remarks</b>	<p>The actual timing offset is the timing difference from the synchronization signal from the signal generator’s RF signal (TOFFset + SDElay * 2560) – (Tp–a).</p> <p>If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.</p>

**:ULINK:PRACH:TPA**

<b>Supported</b>	E4438C with Option 400
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:TPA 0   7680   12800
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:TPA?
	This command sets the time period (distance) between the physical random access channel’s (PRACH) preamble to the acquisition indication channel’s (AICH) frame.
	The variable <val> is expressed in units of “chip”.
<b>*RST</b>	7680
<b>Key Entry</b>	<b>Base Delay Tp–a</b>
<b>Remarks</b>	<p>The actual timing offset is (TOFFset + SDElay * 2560) – (Tp–a).</p> <p>If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.</p> <p>This command is not used when the sync source is set to ESG. Refer to “:ULINK:SYNC[:SOURCE]” on page 1152.</p>

**:ULINK:PRACH:TPM**

<b>Supported</b>	E4438C with Option 400
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:TPM <val>
	[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:TPM?
	This command sets the time period between the preamble and the message part.
	The variable <val> is expressed in access slot units.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

<b>*RST</b>	+3
<b>Range</b>	1–15
<b>Field Entry</b>	Tp-m
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to <a href="#">“:ULINK:APPLY” on page 1075</a> .  This command is used for single and multiple physical random access channel (PRACH) modes.

**:ULINK:PRACH:TPOWer**

<b>Supported</b>	E4438C with Option 400
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:TPOWer?	
This query returns the total power value of the physical random access channels (PRACH).	
The value is the relative power difference between the total in-channel signal power of the PRACH message part and the active channel reference power (0dB) in the message part.	
<b>*RST</b>	+0
<b>Remarks</b>	This command is used for single and multiple physical random access channel (PRACH) modes.

**:ULINK:PRACH:TPP**

<b>Supported</b>	E4438C with Option 400
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:TPP <val>	
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:PRACH:TPP?	
This command sets the time period between the preamble and another preamble before the message part.	
The variable <val> is expressed in access slot units.	
<b>*RST</b>	+3
<b>Range</b>	1–60
<b>Field Entry</b>	Tp-p



**Wideband CDMA Base Band Generator Subsystem—Option 400** [:SOURCE]:RADio:WCDMa:TGPP[:BBG]

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

This command is used for single and multiple physical random access channel (PRACH) modes.

**:ULINK:PRACH:TRIGger**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TRIGger
```

This command specifies the start of the physical random access channel’s (PRACH) pattern.

**Key Entry** **PRACH Trigger**

**Remarks** The PRACH trigger source must be set to “Trigger” before executing this command. Refer to [“:ULINK:PRACH:TRIGger:SOURce” on page 1129](#).

**:ULINK:PRACH:TRIGger:POLarity**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TRIGger:
POLarity POSitive|NEGative
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TRIGger:POLarity?
```

This command sets the trigger polarity of the physical random access channel type (PRACH).

**POSitive** This choice sets the signal to trigger when the trigger signal is high.

**NEGative** This choice sets the signal to trigger when the trigger signal is low.

**\*RST** POS

**Key Entry** **PRACH Trigger Polarity Neg Pos**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:PRACH:TRIGger:SOURce**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TRIGger:
SOURce IMMEDIATE|TRIGger
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TRIGger:SOURce?
```

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

This command sets the trigger source of the physical random access channel (PRACH).

**IMMediate** This choice resets the waveform and immediately replays it from the start.

**TRIGger** This choice plays the waveform after receiving the trigger command.

**\*RST** IMMediate

**Key Entry** **PRACH Trigger Source Immedi Trigger**

**Remarks** Refer to “:ULINK:PRACH:TRIGger:POLarity” on page 1129 and “:ULINK:PRACH:TRIGger” on page 1129 for additional information.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH:TTI**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TTI 10000 | 20000
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH:TTI ?
```

This command sets the transmission time interval (TTI) period of the message part.

The choices are expressed in units of milliseconds (msec) where 20000=20 msec.

**\*RST** +20000

**Field Entry** TTI

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH[:SINGLE]:MESSAge[:STATe]**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :MESSAge [ :STATe ]  
ON | OFF | AICH
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :MESSAge [ :STATe ] ?
```

This command enables or disables the message part of the physical random access channel (PRACH).

**ON** This choice enables the message part to be generated after the number of preambles are generated. The “Number of Preamble” must be specified.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

<b>OFF</b>	This choice does not allow the message part to be generated. Only the preambles are transmitted.
<b>AICH</b>	This choice enables the acquisition indication channel preamble power ramping mode.
<b>*RST</b>	ON
<b>Key Entry</b>	<b>On Off AICH</b>
<b>Remarks</b>	For more information about the rear panel AUX I/O connector, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .  If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to " <a href="#">:ULINK:APPLY</a> " on page 1075.

**:ULINK:PRACH[:SINGLE]:NUMBER**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :NUMBER <val> |
INFinity
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :NUMBER?
```

This command specifies the number of the physical random access channel (PRACH) patterns to repeat after the PRACH start trigger has been received.

**INFinity** This choice means the repeating number will continue while the PRACH mode is selected and the start trigger is ignored.

**\*RST** 1

**Range** 1–2147483647

**Field Entry** Number of PRACH

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to "[:ULINK:APPLY](#)" on page 1075.

**:ULINK:PRACH[:SINGLE]:MESSAGE:CPART:CCODE**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :MESSAGE:CPART :
CCODE <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :MESSAGE:CPART :
```

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

CCODE?

This command sets the channelization code for the physical random access channel (PRACH) message control part.

**\*RST** +15

**Range** 0–255

**Field Entry** Channel Code

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH[:SINGLE]:MESSAGE:DPART:CCODE**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :MESSAGE:DPART :CCODE <val>

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :MESSAGE:DPART :CCODE?

This command sets the channelization code for the physical random access channel (PRACH) message data part.

There are commands that are associated with the channelization code and they are the slot format and the symbol rate.

If the slot format is changed, so will the symbol rate. If the symbol rate is changed, so will the slot format. In addition, the channelization code will change. If current channelization code exceeded the new maximum value for the specified slot format or symbol rate, a setting conflict error is generated and the value is clipped to the maximum value. Refer to [Table 9-9](#).

**Table 9-9 Channelization Code Maximum value**

Channelization Code	Slot Format	Symbol Rate
255	0	15
127	1	30
63	2	60
31	3	120

**\*RST** +0

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

<b>Range</b>	0–255
<b>Field Entry</b>	Channel Code
<b>Remarks</b>	Channel code value is determined by slot format choice. Refer to <a href="#">“:ULINK:PRACH:MESSAGE:DPART:SLOTformat”</a> on page 1116 and <a href="#">“:ULINK:PRACH:MESSAGE:DPART:RATE”</a> on page 1115. If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to <a href="#">“:ULINK:APPLY”</a> on page 1075.

**:ULINK:PRACH[:SINGLE]:MESSAGE:TPOWer**

**Supported** E4438C with Option 400

```
[ :SOURCE ] : RADio : WCDMa : TGPP [ : BBG ] : ULINK : PRACH [ : SINGLE ] : MESSAGE :
TPOWer <val>
```

```
[ :SOURCE ] : RADio : WCDMa : TGPP [ : BBG ] : ULINK : PRACH [ : SINGLE ] : MESSAGE : TPOWer?
```

This command sets the message total power value for the single physical random access channel (PRACH) and multiple PRACH modes. The variable <val> is expressed in units of decibels (dB). The RF output power is limited to the signal generator’s specifications

**\*RST** –1.36000000E+002

**Range** –136 to 20

**Field Entry** Msg Pwr

**Remarks** This value is used only when POWER:MODE is set to TOTAL. Refer to [“:ULINK:PRACH:PREamble:POWER:MODE”](#) on page 1124.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY”](#) on page 1075.

**:ULINK:PRACH[:SINGLE]:NUMBer**

**Supported** E4438C with Option 400

```
[ :SOURCE ] : RADio : WCDMa : TGPP [ : BBG ] : ULINK : PRACH [ : SINGLE ] :
NUMBer <val> | INFINity
```

```
[ :SOURCE ] : RADio : WCDMa : TGPP [ : BBG ] : ULINK : PRACH [ : SINGLE ] : NUMBer?
```

This command specifies the number of the physical random access channel (PRACH) patterns to repeat after the PRACH start trigger has been received.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

<b>INFINITY</b>	This choice means the repeating number will continue while the PRACH mode is selected and the start trigger is ignored.
<b>*RST</b>	1
<b>Range</b>	1–2147447836
<b>Field Entry</b>	Number of PRACH
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH[:SINGLE]:PREAmble:NUMBER**

**Supported** E4438C with Option 400

```
[ :SOURCE ] : RADio : WCDMa : TGPP [ : BBG ] : ULINK : PRACH [ : SINGLE ] : PREAmble :  
NUMBER <val> | INFINITY
```

```
[ :SOURCE ] : RADio : WCDMa : TGPP [ : BBG ] : ULINK : PRACH [ : SINGLE ] : PREAmble : NUMBER ?
```

This command specifies the number of preambles to repeat in one physical random access channel (PRACH) pattern.

<b>INFINITY</b>	This choice means the repeating preamble will play continuously while the PRACH mode is selected.
-----------------	---

<b>*RST</b>	1
-------------	---

<b>Range</b>	1–8388607
--------------	-----------

<b>Field Entry</b>	PRACH Timing Setup: Number of Preamble PRACH Power Setup: Num of Pre
--------------------	---

**:ULINK:PRACH[:SINGLE]:PREAmble:POWER:INITIAL**

**Supported** E4438C with Option 400

```
[ :SOURCE ] : RADio : WCDMa : TGPP [ : BBG ] : ULINK : PRACH [ : SINGLE ] : PREAmble :  
POWER : INITIAL ?
```

This query returns the initial preamble power from POWER:Max value, RSTeP (ramp step) and PREAmble:NUMBER commands.

<b>*RST</b>	–1.36000000E+002
-------------	------------------

<b>Field Entry</b>	Init Pwr
--------------------	----------

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])

**:ULINK:PRACH[:SINGLE]:PREamble:POWer:MAX****Supported** E4438C with Option 400[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH[:SINGLE]:PREamble:  
POWer:MAX <val>[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH[:SINGLE]:PREamble:  
POWer:MAX?

This command sets the maximum preamble power for the physical random access channel (PRACH).

In power ramping mode (RSTep is a non-zero value), the preamble power can go up until the acquisition indication channel's (AICH) signal is not received (maximum power).

The variable <val> is expressed in units of decibels (dB).

**\*RST** -1.36000000E+002**Range** -136 to 20**Field Entry** Max Pwr**Remarks** The actual RF output is limited to the signal generator's specifications although the value can be entered up to 20 dBm.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:PRACH[:SINGLE]:PREamble:POWer:RSTep****Supported** E4438C with Option 400[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH[:SINGLE]:PREamble:POWer:  
RSTep <val>[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:PRACH[:SINGLE]:PREamble:POWer:  
RSTep?

This command sets the power ramping steps for the single physical random access channel (PRACH) preamble.

The variable <val> is expressed in units of decibels (dB).

**\*RST** 0**Range** 0–10**Field Entry** Ramp Step

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

This command is used for single and multiple physical random access channel (PRACH) modes.

**:ULINK:PRACH[:SINGLE]:PREamble:PPM**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :PREamble:PPM <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :PREamble:PPM?
```

This command sets the power difference between the preamble and the message control part in the single physical random access channel (PRACH).

The variable <val> is expressed in units of decibels (dB).

**\*RST** -4.56032509E+000

**Range** -20 to 10

**Field Entry** Pp-m

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:PRACH[:SINGLE]:PREamble:SIGNature**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :PREamble:
SIGNature <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:PRACH [ :SINGLE ] :PREamble:
SIGNature?
```

This command sets the signature encoded in the single physical random access channel’s (PRACH) preamble.

**\*RST** +0

**Range** 0–15

**Field Entry** Signature



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:RMCHannel**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:RMCHannel RMC122 | RMC64 | RMC144 |
RMC384 | UDI64 | AMR122
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:RMCHannel?
```

This command configures the uplink reference measurement (RMC) channel by providing a one command access to a typical RMC configuration.

**RMC122** This choice selects a reference measurement channel with a 12.2 kbps rate as per 3GPP TS 25.141.

**RMC64** This choice selects a reference measurement channel with a 64.0 kbps rate as per 3GPP TS 25.141.

**RMC144** This choice selects a reference measurement channel with a 144.0 kbps rate as per 3GPP TS 25.141.

**RMC384** This choice selects a reference measurement channel with a 384.0 kbps rate as per 3GPP TS 25.141.

**UDI64** This choice selects an ISDN unrestricted digital information 1B with a 64.0 kbps rate as per 3GPP TS 25.944.

**ARM122** This choice selects an adaptive multiple rate of 12.2 kbps as per 3GPP TS 25.944.

**\*RST** RMC122

<b>Key Entry</b>	<b>RMC122 kbps (25.141)</b>	<b>RMC64 kbps (25.141)</b>
	<b>RMC144 kbps (25.141)</b>	<b>RMC384 kbps (25.141)</b>
	<b>AMR 122 kbps</b>	<b>UDI 64 kbps</b>

**:ULINK:RPANel:DPCH:INPut:ALTPower**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:RPANel:DPCH:INPut:ALTPower?
```

This query returns the type of signal at the alternate power input (ALT PWR IN, AUX I/O connector pin#16) for the dedicated physical channel (DPCH) mode.

**\*RST** USER

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

**Remarks** The signal name is TPC user file trigger (USER). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:DPCH:INPut:BBGRef**

**Supported** E4438C with Option 400

[ :SOURCE ] : RADio : WCDMa : TGPP [ :BBG ] : ULINK : RPANel : DPCH : INPut : BBGRef ?

This query returns the type of signal at the baseband generator reference input (BASEBAND GEN REF IN, rear panel connector) for the dedicated physical channel (DPCH) mode.

**\*RST** CCL

**Remarks** The signal name is baseband generator chip clock (CCL). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:DPCH:INPut:BGATe**

**Supported** E4438C with Option 400

[ :SOURCE ] : RADio : WCDMa : TGPP [ :BBG ] : ULINK : RPANel : DPCH : INPut : BGATe ?

This query returns the type of signal at the gate burst (BURST GATE IN, rear panel connector) for the dedicated physical channel (DPCH) mode.

**\*RST** CSTT

**Remarks** In compressed mode the signal name is compressed mode start trigger (CSST). In power control mode, the signal name is DPCH power control signal (DPCS). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*

**:ULINK:RPANel:DPCH:INPut:PTRigger1**

**Supported** E4438C with Option 400

[ :SOURCE ] : RADio : WCDMa : TGPP [ :BBG ] : ULINK : RPANel : DPCH : INPut : PTRigger1 ?

This query returns the type of signal at the pattern trigger input 1 (PATT TRIG IN 1, rear panel) for the dedicated physical channel (DPCH) mode.

**\*RST** FSYN

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**Remarks** The signal name is frame synchronization (FSYN). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:DPCH:INPut:PTRigger2**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:INPut:PTRigger2?
```

This query returns the type of signal at the pattern trigger input 2 (PATT TRIG IN 2, AUX I/O connector pin#17) for the dedicated physical channel (DPCH) mode.

**\*RST** CSPT

**Remarks** The signal name is compress mode stop trigger (CSPT). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:DPCH:OUTPut:DCLock**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:DCLock RPS0 |
RPS1 | RPS2 | RPS3 | RPS4 | RPS5 | RPS6 | RPS7 | RPS8 | RPS9 | RPS10
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:DCLock?
```

This command assigns a signal to the data clock output at the selected rear panel AUX I/O connector pin#6. Refer to [Table 9-10 on page 1139](#) for command parameters and output signal type.

**Table 9-10 Rear Panel Signal (RPS) Output Type**

Command Parameter	Signal Out
RPS0	None
RPS1	Chip Clock
RPS2	DPDCH raw data
RPS3	DPDCH raw data clock
RPS4	DPCCH raw data
RPS5	DPCCH raw data clock

**Table 9-10 Rear Panel Signal (RPS) Output Type**

Command Parameter	Signal Out
RPS6	10ms frame pulse
RPS7	Trigger sync reply
RPS8	Compressed frame
RPS9	TTI frame pulse
RPS10	CFN #0 frame pulse

**\*RST** RPS1

**Key Entry** NONE (RPS0) Chip Clock (RPS1) DPDCH Raw Data (RPS2)  
 DPDCH Data Raw Clock (RPS3) DPCCH Raw Data (RPS4)  
 DPCCH Raw Data Clock (RPS5) 10 ms Frame Pulse (RPS6)  
 Trigger Sync Reply (RPS7) Compressed Frame (RPS8)  
 TTI Frame Clock (RPS9) CFN #0 Frame Pulse (RPS10)

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

## :ULINK:RPANel:DPCH:OUTPut:DOUT

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:DOUT RPS0 |
RPS1 | RPS2 | RPS3 | RPS4 | RPS5 | RPS6 | RPS7 | RPS8 | RPS9 | RPS10
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:DOUT?
```

This command assigns a signal to the data output at the selected rear panel AUX I/O connector pin#7. Refer to [Table 9-10 on page 1139](#) for command parameters and output signal type.

**\*RST** RPS4

**Key Entry** NONE (RPS0) Chip Clock (RPS1) DPDCH Raw Data (RPS2)  
 DPDCH Data Raw Clock (RPS3) DPCCH Raw Data (RPS4)  
 DPCCH Raw Data Clock (RPS5) 10 ms Frame Pulse (RPS6)  
 Trigger Sync Reply (RPS7) Compressed Frame (RPS8)  
 TTI Frame Clock (RPS9) CFN #0 Frame Pulse (RPS10)

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:DPCH:OUTPut:EVENT1**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:
EVENT1 RPS0|RPS1|RPS2|RPS3|RPS4|RPS5|RPS6|RPS7|RPS8|RPS9|RPS10
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:EVENT1?
```

This command assigns a signal to the EVENT 1 at the rear panel output connector. Refer to [Table 9-10 on page 1139](#) for command parameters and output signal type.

**\*RST** RPS2

<b>Key Entry</b>	<b>NONE (RPS0)</b>	<b>Chip Clock (RPS1)</b>	<b>DPDCH Raw Data (RPS2)</b>
	<b>DPDCH Data Raw Clock (RPS3)</b>		<b>DPCCH Raw Data (RPS4)</b>
	<b>DPCCH Raw Data Clock (RPS5)</b>		<b>10 ms Frame Pulse (RPS6)</b>
	<b>Trigger Sync Reply (RPS7)</b>		<b>Compressed Frame (RPS8)</b>
	<b>Frame Clock (RPS9)</b>		<b>CFN #0 Frame Pulse (RPS10)</b>

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:DPCH:OUTPut:EVENT2**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:
EVENT2 RPS0|RPS1|RPS2|RPS3|RPS4|RPS5|RPS6|RPS7|RPS8|RPS9|RPS10
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:EVENT2?
```

This command assigns a signal to the EVENT 2 at the rear panel output connector. Refer to [Table 9-10 on page 1139](#) for command parameters and output signal types.

**\*RST** RPS3

<b>Key Entry</b>	<b>NONE (RPS0)</b>	<b>Chip Clock (RPS1)</b>	<b>DPDCH Raw Data (RPS2)</b>
	<b>DPDCH Data Raw Clock (RPS3)</b>		<b>DPCCH Raw Data (RPS4)</b>
	<b>DPCCH Raw Data Clock (RPS5)</b>		<b>10 ms Frame Pulse (RPS6)</b>
	<b>Trigger Sync Reply (RPS7)</b>		<b>Compressed Frame (RPS8)</b>

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

	<b>TTI Frame Clock (RPS9)</b>	<b>CFN #0 Frame Pulse (RPS10)</b>
<b>Remarks</b>	For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .	

**:ULINK:RPANel:DPCH:OUTPut:EVENT3**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:
EVENT3 RPS0|RPS1|RPS2|RPS3|RPS4|RPS5|RPS6|RPS7|RPS8|RPS9|RPS10
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:EVENT3?
```

This command assigns a signal to the EVENT 3 output at the selected rear panel AUX I/O connector pin#19. Refer to [Table 9-10 on page 1139](#) for command parameters and output signal type.

**\*RST** RPS0

<b>Key Entry</b>	<b>NONE (RPS0)</b>	<b>Chip Clock (RPS1)</b>	<b>DPDCH Raw Data (RPS2)</b>
	<b>DPDCH Data Raw Clock (RPS3)</b>	<b>DPCCH Raw Data (RPS4)</b>	
	<b>DPCCH Raw Data Clock (RPS5)</b>	<b>10 ms Frame Pulse (RPS6)</b>	
	<b>Trigger Sync Reply (RPS7)</b>	<b>Compressed Frame (RPS8)</b>	
	<b>TTI Frame Clock (RPS9)</b>	<b>CFN #0 Frame Pulse (RPS10)</b>	

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:DPCH:OUTPut:EVENT4**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:
EVENT4 RPS0|RPS1|RPS2|RPS3|RPS4|RPS5|RPS6|RPS7|RPS8|RPS9|RPS10
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:EVENT4?
```

This command assigns a signal to the EVENT 4 output at the selected rear panel AUX I/O connector pin#18. Refer to [Table 9-10 on page 1139](#) for command parameters and output signal type.

**\*RST** RPS0

<b>Key Entry</b>	<b>NONE (RPS0)</b>	<b>Chip Clock (RPS1)</b>	<b>DPDCH Raw Data (RPS2)</b>
	<b>DPDCH Data Raw Clock (RPS3)</b>	<b>DPCCH Raw Data (RPS4)</b>	
	<b>DPCCH Raw Data Clock (RPS5)</b>	<b>10 ms Frame Pulse (RPS6)</b>	

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

	<b>Trigger Sync Reply (RPS7)</b>	<b>Compressed Frame (RPS8)</b>
	<b>TTI Frame Clock (RPS9)</b>	<b>CFN #0 Frame Pulse (RPS10)</b>
<b>Remarks</b>	For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .	

**:ULINK:RPANel:DPCH:OUTPut:SSYNc**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:SSYNc RPS0 |
RPS1 | RPS2 | RPS3 | RPS4 | RPS5 | RPS6 | RPS7 | RPS8 | RPS9 | RPS10
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:DPCH:OUTPut:SSYNc?
```

This command assigns a signal to SYM SYNC OUT at the selected rear panel AUX I/O connector pin#5. Refer to [Table 9-10 on page 1139](#) for command parameters and output signal type.

**\*RST** RPS6

<b>Key Entry</b>	<b>NONE (RPS0)</b>	<b>Chip Clock (RPS1)</b>	<b>DPDCH Raw Data (RPS2)</b>
	<b>DPDCH Data Raw Clock (RPS3)</b>	<b>DPCCH Raw Data (RPS4)</b>	
	<b>DPCCH Raw Data Clock (RPS5)</b>	<b>10 ms Frame Pulse (RPS6)</b>	
	<b>Trigger Sync Reply (RPS7)</b>	<b>Compressed Frame (RPS8)</b>	
	<b>TTI Frame Clock (RPS9)</b>	<b>CFN #0 Frame Pulse (RPS10)</b>	

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:INPut:ALTPower**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:PRACH:INPut:ALTPower?
```

This query returns the signal type at the ALT PWR IN (alternate power in) connector pin for the physical random access channel (PRACH) mode.

**\*RST** NONE

**Field Entry** Alt power in

**Remarks** For more information about the rear panel AUX I/O connector pin configuration, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:INPut:BBGRef****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:INPut:BBGRef?

This query returns the type of signal at the baseband generator reference input (BASEBAND GEN REF IN, rear panel connector) for the physical random access channel (PRACH) mode.

**\*RST** CCL

**Remarks** The signal name is baseband generator chip clock (CCL). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:INPut:BGATe****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:INPut:BGATe?

This query returns the signal type at the BURST GATE IN connector for the physical random access channel (PRACH) mode.

**\*RST** PSTR**Field Entry** Burst gate in

**Remarks** The signal name is PRACH start trigger (PSTR). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:INPut:PTRigger1****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:INPut:PTRigger1?

This query returns the signal type at the pattern trigger in 1 (PATT TRIG IN) connector for the physical random access channel (PRACH) mode.

**\*RST** FSYN**Field Entry** Pattern trigger in 1

**Remarks** The signal name is frame synchronization (FSYN). For more information about the rear panel I/O connectors' configuration, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.



**:ULINK:RPANel:PRACH:INPut:PTRigger2****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:PRACH:INPut:PTRigger2?

This query returns the signal type at the pattern trigger input 2 (PATT TRIG IN 2 AUX I/O connector pin#17) for the physical random access channel (PRACH) mode.

**\*RST** AITR**Field Entry** Pattern trigger in 2

**Remarks** The signal name is AICH trigger (AITR). For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:OUTPut:DCLock****Supported** E4438C with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:PRACH:OUTPut:DCLock RPS0 |
RPS1 | RPS6 | RPS7 | RPS11 | RPS12 | RPS13 | RPS14 | RPS15 | RPS16 |
RPS17 | RPS19 | RPS20 | RPS21 | RPS22 | RPS23 | RPS24 | RPS25
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK:RPANel:PRACH:OUTPut:DCLock?
```

This command assigns a signal at the data clock output for the selected rear panel AUX I/O connector pin#6.

RPS0 none

RPS1 This choice assigns the chip clock signal.

RPS6 This choice assigns the 10ms frame pulse signal.

RPS7 This choice assigns the trigger sync reply signal.

RPS11 This choice assigns the message-data raw data signal. In the multiple PRACH mode, RPS11 outputs the message-data raw data signal of PRACH#1. If the PRACH#1 is not "on", no signal output is output.

RPS12 This choice assigns the message-data raw clock signal. In the multiple PRACH mode, RPS12 outputs the message-data raw clock signal of PRACH#1. If the PRACH#1 is not "on", no signal output is output.

RPS14 This choice assigns the message-ctrl raw data clock signal. In the multiple PRACH mode, RPS14 outputs the message-control raw data clock signal of PRACH#1. If the PRACH#1 is not "on", no signal output is output.

RPS15 This choice assigns the preamble raw data signal. In the multiple PRACH mode,

	RPS15 outputs the preamble raw data signal of PRACH#1. If the PRACH#1 is not “on”, no signal output is output.
RPS16	This choice assigns the preamble raw data clock signal. In the multiple PRACH mode, RPS16 outputs the preamble raw data clock signal of PRACH#1. If the PRACH#1 is not “on”, no signal output is output.
RPS17	This choice assigns the sub channel timing signal. Sub channel timing is used on the single PRACH mode.
RPS19	This choice assigns the PRACH processing signal. This signal indicates the PRACH is generating.
RPS20	This choice assigns the 80ms frame pulse signal.
RPS21	This choice assigns the preamble pulse signal. This signal indicates the preamble timing of all configured PRACHes. One pulse for one preamble. In the multiple PRACH mode, this output relates to PRACH#1. If the PRACH#1 in not “on”, no signal is output.
RPS22	This choice assigns the message pulse signal. This signal indicates the message part timing of all configured PRACHes. In the multiple PRACH mode, this output relates to PRACH#1. If the PRACH#1 in not “on”, no signal is output.
RPS23	This choice assigns the PRACH pulse signal. This signal indicates the start timing of all configured PRACHes. In the multiple PRACH mode, this output relates to PRACH#1. If the PRACH#1 in not “on”, no signal is output.
RPS24	This choice assigns the ESG synchronization signal. This signal is used for the multiple EAG synchronization on the multiple PRACH mode.
RPS25	This choice assigns the PRACH start trigger echo back signal. The PRACH start trigger echo back signal is used for the multiple ESG connection on the multiple PRACH mode.
*RST	RPS0
Key Entry	<b>NONE (RPS0)      Chip Clock (RPS1)      Message-Data Raw Data (RPS11)</b> <b>10ms Frame Pulse (RPS6)      Trigger Sync Reply (RPS7)</b> <b>Message-Data Raw Clock (RPS12)      Message-Control Raw Data (RPS13)</b> <b>Message-Control Raw Data Clock(RPS14)</b> <b>Preamble Raw Data(RPS15)      Preamble Raw Data Clock(RPS16)</b> <b>Sub Channel Timing(RPS17)      PRACH Processing(RPS19)</b> <b>80ms Frame Pulse(RPS20)      Preamble Pulse(RPS21)</b> <b>Message Pulse(RPS22)      PRACH Pulse(RPS23)</b>

**Wideband CDMA Base Band Generator Subsystem—Option 400** [:SOURCE]:RADIo:WCDMa:TGPP[:BBG]

	<b>ESG-Sync Sig(RPS24)</b>	<b>Start-Trigger EchoBack(RPS25)</b>
<b>Remarks</b>	For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .	

**:ULINK:RPANel:PRACH:OUTPut:DOUT**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:RPANel:PRACH:OUTPut:DOUT RPS0 |
RPS1 | RPS6 | RPS7 | RPS11 | RPS12 | RPS13 | RPS14 | RPS14 | RPS15 | RPS16 | RPS17 | RPS19 |
RPS20 | RPS21 | RPS22 | RPS23 | RPS24 | RPS25
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:RPANel:PRACH:OUTPut:DOUT?
```

This command assigns a signal to the data output at the selected rear panel AUX I/O connector pin#7.

For parameter descriptions refer to “:ULINK:RPANel:PRACH:OUTPut:DCLock” on page 1145.

**\*RST** RPS0

<b>Key Entry</b>	<b>NONE (RPS0)</b>	<b>Chip Clock (RPS1)</b>	<b>Message-Data Raw Data (RPS11)</b>
	<b>10ms Frame Pulse (RPS6)</b>	<b>Trigger Sync Reply (RPS7)</b>	
	<b>Message-Data Raw Clock (RPS12)</b>	<b>Message-Control Raw Data (RPS13)</b>	
	<b>Message-Control Raw Data Clock(RPS14)</b>		
	<b>Preamble Raw Data(RPS15)</b>	<b>Preamble Raw Data Clock(RPS16)</b>	
	<b>Sub Channel Timing(RPS17)</b>	<b>PRACH Processing(RPS19)</b>	
	<b>80ms Frame Pulse(RPS20)</b>	<b>Preamble Pulse(RPS21)</b>	
	<b>Message Pulse(RPS22)</b>	<b>PRACH Pulse(RPS23)</b>	
	<b>ESG-Sync Sig(RPS24)</b>	<b>Start-Trigger EchoBack(RPS25)</b>	

<b>Remarks</b>	For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .		
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**:ULINK:RPANel:PRACH:OUTPut:EVENT1**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:RPANel:PRACH:OUTPut:EVENT1 RPS0 |
RPS1 | RPS6 | RPS7 | RPS11 | RPS12 | RPS13 | RPS14 | RPS14 | RPS15 | RPS16 | RPS17 | RPS19 |
RPS20 | RPS21 | RPS22 | RPS23 | RPS24 | RPS25
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK:RPANel:PRACH:OUTPut:EVENT1?
```

This command assigns a signal to the EVENT 1 at the selected rear panel connector.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

For parameter descriptions refer to “:ULINK:RPANel:PRACH:OUTPut:DCLock” on page 1145.

<b>*RST</b>	RPS0
<b>Key Entry</b>	<b>NONE (RPS0)      Chip Clock (RPS1)      Message-Data Raw Data (RPS11)</b> <b>10ms Frame Pulse (RPS6)      Trigger Sync Reply (RPS7)</b> <b>Message-Data Raw Clock (RPS12)      Message-Control Raw Data (RPS13)</b> <b>Message-Control Raw Data Clock(RPS14)</b> <b>Preamble Raw Data(RPS15)      Preamble Raw Data Clock(RPS16)</b> <b>Sub Channel Timing(RPS17)      PRACH Processing(RPS19)</b> <b>80ms Frame Pulse(RPS20)      Preamble Pulse(RPS21)</b> <b>Message Pulse(RPS22)      PRACH Pulse(RPS23)</b> <b>ESG-Sync Sig(RPS24)      Start-Trigger EchoBack(RPS25)</b>

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:OUTPut:EVENT2**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:RPANel :PRACH:OUTPut :EVENT2 RPS0  
 RPS1|RPS6|RPS7|RPS11|RPS12|RPS13|RPS14|RPS14|RPS15|RPS16|RPS17|RPS19|RPS20|RPS21  
 RPS22|RPS23|RPS24|RPS25

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:RPANel :PRACH:OUTPut :EVENT2?

This command assigns a signal to the EVENT 2 at the rear panel connector.

For parameter descriptions refer to “:ULINK:RPANel:PRACH:OUTPut:DCLock” on page 1145.

<b>*RST</b>	RPS0
<b>Key Entry</b>	<b>NONE (RPS0)      Chip Clock (RPS1)      Message-Data Raw Data (RPS11)</b> <b>10ms Frame Pulse (RPS6)      Trigger Sync Reply (RPS7)</b> <b>Message-Data Raw Clock (RPS12)      Message-Control Raw Data (RPS13)</b> <b>Message-Control Raw Data Clock(RPS14)</b> <b>Preamble Raw Data(RPS15)      Preamble Raw Data Clock(RPS16)</b> <b>Sub Channel Timing(RPS17)      PRACH Processing(RPS19)</b> <b>80ms Frame Pulse(RPS20)      Preamble Pulse(RPS21)</b> <b>Message Pulse(RPS22)      PRACH Pulse(RPS23)</b>

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])

	<b>ESG-Sync Sig(RPS24)</b>	<b>Start-Trigger EchoBack(RPS25)</b>
<b>Remarks</b>	For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .	

**:ULINK:RPANel:PRACH:OUTPut:EVENT3**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:OUTPut:EVENT3 RPS0 |
RPS1 | RPS6 | RPS7 | RPS11 | RPS12 | RPS13 | RPS14 | RPS14 | RPS15 | RPS16 | RPS17 | RPS19 |
RPS20 | RPS21 | RPS22 | RPS23 | RPS24 | RPS25
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:OUTPut:EVENT3?
```

This command assigns a signal to the EVENT 3 output at the selected rear panel AUX I/O connector pin#19.

For parameter descriptions refer to “:ULINK:RPANel:PRACH:OUTPut:DCLock” on page 1145.

**\*RST** RPS0

<b>Key Entry</b>	<b>NONE (RPS0)</b>	<b>Chip Clock (RPS1)</b>	<b>Message-Data Raw Data (RPS11)</b>
	<b>10ms Frame Pulse (RPS6)</b>	<b>Trigger Sync Reply (RPS7)</b>	
	<b>Message-Data Raw Clock (RPS12)</b>	<b>Message-Control Raw Data (RPS13)</b>	
	<b>Message-Control Raw Data Clock(RPS14)</b>		
	<b>Preamble Raw Data(RPS15)</b>	<b>Preamble Raw Data Clock(RPS16)</b>	
	<b>Sub Channel Timing(RPS17)</b>	<b>PRACH Processing(RPS19)</b>	
	<b>80ms Frame Pulse(RPS20)</b>	<b>Preamble Pulse(RPS21)</b>	
	<b>Message Pulse(RPS22)</b>	<b>PRACH Pulse(RPS23)</b>	
	<b>ESG-Sync Sig(RPS24)</b>	<b>Start-Trigger EchoBack(RPS25)</b>	

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:OUTPut:EVENT4**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:OUTPut:EVENT4 4RPS0 |
RPS1 | RPS6 | RPS7 | RPS11 | RPS12 | RPS13 | RPS14 | RPS14 | RPS15 | RPS16 | RPS17 | RPS19 |
RPS20 | RPS21 | RPS22 | RPS23 | RPS24 | RPS25
[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:OUTPut:EVENT4?
```

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

This command assigns a signal to the EVENT 4 output at the selected rear panel AUX I/O connector pin#18.

For parameter descriptions refer to “:ULINK:RPANel:PRACH:OUTPut:DCLock” on page 1145.

**\*RST** RPS0

**Key Entry** **NONE (RPS0)** **Chip Clock (RPS1)** **Message-Data Raw Data (RPS11)**  
**10ms Frame Pulse (RPS6)** **Trigger Sync Reply (RPS7)**  
**Message-Data Raw Clock (RPS12)** **Message-Control Raw Data (RPS13)**  
**Message-Control Raw Data Clock(RPS14)**  
**Preamble Raw Data(RPS15)** **Preamble Raw Data Clock(RPS16)**  
**Sub Channel Timing(RPS17)** **PRACH Processing(RPS19)**  
**80ms Frame Pulse(RPS20)** **Preamble Pulse(RPS21)**  
**Message Pulse(RPS22)** **PRACH Pulse(RPS23)**  
**ESG-Sync Sig(RPS24)** **Start-Trigger EchoBack(RPS25)**

**Remarks** For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the *E4428C/38C ESG Signal Generators User's Guide*.

**:ULINK:RPANel:PRACH:OUTPut:SSYNc**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:RPANel:PRACH:OUTPut:SSYNc RPS0 | RPS1 | RPS6 | RPS7 | RPS11 | RPS12 | RPS13 | RPS14 | RPS14 | RPS15 | RPS16 | RPS17 | RPS19 | RPS20 | RPS21 | RPS22 | RPS23 | RPS24 | RPS25  
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RPANel:PRACH:OUTPut:SSYNc?

This command assigns a signal to SYM SYNC OUT at the selected rear panel AUX I/O connector pin#5.

For parameter descriptions refer to “:ULINK:RPANel:PRACH:OUTPut:DCLock” on page 1145.

**\*RST** RPS0

**Key Entry** **NONE (RPS0)** **Chip Clock (RPS1)** **Message-Data Raw Data (RPS11)**  
**10ms Frame Pulse (RPS6)** **Trigger Sync Reply (RPS7)**  
**Message-Data Raw Clock (RPS12)** **Message-Control Raw Data (RPS13)**  
**Message-Control Raw Data Clock(RPS14)**  
**Preamble Raw Data(RPS15)** **Preamble Raw Data Clock(RPS16)**  
**Sub Channel Timing(RPS17)** **PRACH Processing(RPS19)**

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURce]:RADio:WCDMa:TGPP[:BBG])

	<b>80ms Frame Pulse(RPS20)</b>	<b>Preamble Pulse(RPS21)</b>
	<b>Message Pulse(RPS22)</b>	<b>PRACH Pulse(RPS23)</b>
	<b>ESG-Sync Sig(RPS24)</b>	<b>Start-Trigger EchoBack(RPS25)</b>
<b>Remarks</b>	For more information about the rear panel connector configurations, refer to "Signal Generator Overview" in the <i>E4428C/38C ESG Signal Generators User's Guide</i> .	

**:ULINK:SCRamblecode**

<b>Supported</b>	E4438C with Option 400
	<code>[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:SCRamblecode &lt;val&gt;</code> <code>[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:SCRamblecode?</code>
	This command sets the uplink scramble code.
<b>*RST</b>	+0
<b>Range</b>	0–16777215
<b>Field Entry</b>	Scrambling Code

**:ULINK:SDElay**

<b>Supported</b>	E4438C with Option 400
	<code>[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:SDElay &lt;val&gt;</code> <code>[:SOURce]:RADio:WCDMa:TGPP[:BBG]:ULINK:SDElay?</code>
	This command sets the number of timeslots to be delayed for the dedicated physical channel (DPCH).
<b>*RST</b>	+0
<b>Range</b>	0–119
<b>Key Entry</b>	<b>Timeslot Offset</b>
<b>Remarks</b>	The actual amount of timing offset is $(T0) + (TOFFset) + (SDElay) * 2560$ chips, where $T0 = 1024$ chips.  This command is not used when the sync source is set to ESG. Refer to <a href="#">“:ULINK:SYNC[:SOURce]” on page 1152</a> .

**:ULINK:SFNRst:POLarity**

<b>Supported</b>	E4438C with Option 400
------------------	------------------------

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:SFNRst:POLarity POSitive|NEGative
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:SFNRst:POLarity?
```

This command sets the polarity of the system frame number reset signal for the uplink synchronization source.

**POSitive** This choice sets the signal to trigger when the trigger signal is high.

**NEGative** This choice sets the signal to trigger when the trigger signal is low.

**\*RST** POS

**Key Entry** **SFN RST Polarity Neg Pos**

**Remarks** This command is not used when the sync source is set to ESG. Refer to “:ULINK:SYNC[:SOURCE]” on page 1152.

**:ULINK:SYNC:MODE**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:SYNC:MODE SINGLE|CONTinuous
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:SYNC:MODE?
```

This command selects the uplink frame synchronization triggering mode.

**SINGLE** This choice sets the signal generator, once triggered, to generate frames based on the reference clock.

**CONTinuous** This choice sets the signal generator to continuously align the frame sync trigger signal and the frame timing.

**\*RST** SING

**Key Entry** **Frame Sync Trigger Mode Single Cont**

**:ULINK:SYNC[:SOURCE]**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:SYNC[:SOURCE] SFN_RST|FCLock|ESG
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:SYNC[:SOURCE] ?
```

This command selects the uplink frame synchronization source type.

**SFN\_RST** This choice sets the signal to trigger on the system frame number reset signal.

**FCLock** This choice sets the signal to trigger on the frame clock.

**ESG** This choice sets the signal to trigger on the synchronization signal of a primary ESG.



**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])**

<b>*RST</b>	<b>FCL</b>				
<b>Key Entry</b>	<b>Sync Source</b>	<b>SFN</b>	<b>FCIk</b>	<b>ESG</b>	

**:ULINK:TGAP:POFFset**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP:POFFset <val> | AUTO
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP:POFFset?
```

This command specifies the amount of power to be increased when the data is being compressed for the transmission gap power offset.

**AUTO** This choice sets the power to increase using the gap pattern parameters calculation based on 3GPP standard. When AUTO is selected, the query returns “AUTO” as the value.

The variable <val> is expressed in units of decibels (dB).

**\*RST** AUTO

**Range** 0–6

**Field Entry** PwrOffs

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK:TGAP:PSI[1] | 2 | 3 | 4 | 5 | 6:CFN**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP:PSI [ 1 ] | 2 | 3 | 4 | 5 | 6 :CFN <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP:PSI [ 1 ] | 2 | 3 | 4 | 5 | 6 :CFN?
```

This command sets the connection frame number (CFN) for the first radio frame of the first pattern 1.

**\*RST** 0

**Range** 1–255

**Field Entry** TGCFN

**Remarks** In the signal generator, CFN is counted internally relative to the system sync signal.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**:ULINK:TGAP:PSI[1]:CMMethod****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]:CMMethod SF2|HIGHer
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]:CMMethod?
```

This command selects the compressed mode (CM) method.

**SF2** This choice selects a compressed mode method that reduced the spread factor (SF) by 2. This is done by increasing the data rate by reducing the spreading factor in half. When the dedicated physical data channel's (DPDCH) symbol rate is 960 kbps, the frame is not compressed because it uses the lowest SF value and it cannot be reduced.

**HIGHer** This choice selects a higher layer scheduling method. The emulated higher layer scheduling method mode keeps the same physical layer data rate even when a transmission gap is created.

**\*RST** SF2**Key Entry** **SF/2 Higher Layer**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

The ULINK:APPLY command will fail if the CM method is higher layer and DPDCH data is TrCH. CM method should be SF/2 if the DPDCH data is TrCH.

**:ULINK:TGAP:PSI[1]|2|3|4|5|6:D****Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:D
<val>|UNDEfined
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:D?
```

This command sets the transmission gap distance. The command specifies the number of slots between the starting slots of two consecutive transmission gaps within a transmission gap pattern.

**UNDEfined** This choice sets one transmission gap. When UNDEfined is selected, then there is only one transmission gap within the transmission gap pattern.

**\*RST** UND**Range** 15–269**Field Entry** TGD

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:ULINK:TGAP:PSI[1]|2|3|4|5|6:L1****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6  
:L1 3|4|5|7|10|14

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:L1?

This command specifies the length of the first transmission gap (TGL1). The length is expressed in number of slots.

**\*RST** +7**Field Entry** TGL1**:ULINK:TGAP:PSI[1]|2|3|4|5|6:L2****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6  
:L2 3|4|5|7|10|14|OMITted

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:L2?

This command specifies the length of the second transmission gap (TGL2). When OMITted is selected, TGL2=TGL1.

**\*RST** OMIT**Field Entry** TGL2**:ULINK:TGAP:PSI[1]|2|3|4|5|6:PL1****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:PL1 <val>  
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:PL1?

This command specifies the duration of the transmission gap pattern length 1 (TGPL1). The pattern length is expressed in number of frames.

**\*RST** +2**Range** 1–144**Field Entry** TGPL1

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])**:ULINK:TGAP:PSI[1]|2|3|4|5|6:PL2****Supported** E4438C with Option 400[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:PL2 <val> |  
OMITted

[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:PL2?

This command specifies the duration of the transmission gap pattern length 2 (TGPL2).

The variable &lt;val&gt; is expressed in number of frames. When OMITted is selected, TGPL2=TGPL1.

**\*RST** OMIT**Range** 1–144**Field Entry** TGPL2**Key Entry** **Omitted****:ULINK:TGAP:PSI[1]|2|3|4|5|6:POWer****Supported** E4438C with Option 400

[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:POWer?

This query returns each power level for a compressed slot.

The return string has five real numbers followed by dBm (for normal power) or dB (for before/after gap power) separated by a single space character. When a value does not exist because of a specified compressed pattern (Example: Gap2 does not exist when TGD is “UNDeFined”), it returns “–dB.”

Normal power value represents an actual power level in dBm and relative power is represented in dB.

**:ULINK:TGAP:PSI[1]|2|3|4|5|6:PRC****Supported** E4438C with Option 400[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:PRC <val> |  
INFIinity

[:SOURCE]:RADIo:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1]|2|3|4|5|6:PRC?

This command sets the transmission gap pattern repetition count. The pattern repetition count (PRC) sets the number of transmission gap patterns within the transmission gap pattern sequence.

**\*RST** INF**Range** 1–511**Field Entry** TGPRC

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

<b>Key Entry</b>	<b>Infinity</b>
<b>Remarks</b>	When INFINITY is selected, the PRC will continue indefinitely.

**:ULINK:TGAP:PSI[1] | 2 | 3 | 4 | 5 | 6:PS**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1] | 2 | 3 | 4 | 5 | 6:PS ACTIVE |
INACTIVE
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1] | 2 | 3 | 4 | 5 | 6:PS?
```

This command sets the transmission gap pattern status.

ACTIVE This choice sets the compressed mode active.

INACTIVE This choice sets the compressed mode inactive.

**\*RST** INAC

**Key Entry** **TGPS Active Inactive**

**:ULINK:TGAP:PSI[1] | 2 | 3 | 4 | 5 | 6:SN**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1] | 2 | 3 | 4 | 5 | 6:SN <val>
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:PSI[1] | 2 | 3 | 4 | 5 | 6:SN?
```

This command specifies the timeslot number of the first transmission gap within the first radio frame.

**\*RST** +11

**Range** 0–14

**Field Entry** TGSN

**:ULINK:TGAP:RPARAMeter**

**Supported** E4438C with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:RPARAMeter DREF11 | DREF12 |
DREF21 | DREF22
```

```
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:RPARAMeter?
```

This command sets the downlink reference compressed mode parameters as defined in 3GPP Standard TS25.101.

DREF11 This choice sets the reference parameter to 1.1.

DREF12 This choice sets the reference parameter to 1.2.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

DREF21	This choice sets the reference parameter to 2.1.		
DREF22	This choice sets the reference parameter to 2.2.		
*RST	CUST		
<b>Key Entry</b>	<b>DL Reference 1.1</b>	<b>DL Reference 1.2</b>	<b>DL Reference 2.1</b>
	<b>DL Reference 2.2</b>		
<b>Remarks</b>	The query returns CUSTom when the parameters are set individually.		

**:ULINK:TGAP:SCFN**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP:SCFN <val>
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP:SCFN?
```

This command sets the stop connection frame number (CFN) when the stop trigger is used.

When the stop trigger is received at the signal generator, the next stop CFN, the compressed mode will finish even if the transmission gap pattern repetition count (TGPRC) is still remaining.

\*RST +0

**Range** 0–255

**Field Entry** SCFN

**Remarks** The compressed mode stop trigger must be used for this command to executed. Refer to “:ULINK:TGAP:STOP:TRIGger” on page 1160.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

This command is not used when the sync source is set to ESG. Refer to “:ULINK:SYNC[:SOURCE]” on page 1152.

**:ULINK:TGAP[:STATe]**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP [ :STATe ] ON|OFF|1|0
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TGAP [ :STATe ] ?
```

This command enables or disables the uplink transmission gap pattern.

\*RST 1

**Key Entry**                    **Compress Mode Off On**

**:ULINK:TGAP:START:TRIGger**

**Supported**                    E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:START:TRIGger

This command starts the compressed mode trigger.

**Key Entry**                    **Compressed Mode Start Trigger**

**:ULINK:TGAP:START:TRIGger:POLarity**

**Supported**                    E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:START:TRIGger:  
POLarity POSitive|NEGative

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:START:TRIGger:POLarity?

This command sets the compressed mode start trigger signal polarity.

POSitive                    This choice sets the trigger to start when the trigger signal is high.

NEGative                    This choice sets the trigger to start when the trigger signal is low.

**\*RST**                        POS

**Key Entry**                    **Comp Mode Start Trigger Polarity Neg Pos**

**:ULINK:TGAP:STOP:TRIGger**

**Supported**                    E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:STOP:TRIGger

This command stops the compressed mode trigger.

**Key Entry**                    **Compressed Mode Stop Trigger**

**:ULINK:TGAP:STOP:TRIGger:POLarity**

**Supported**                    E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:STOP:TRIGger:  
POLarity POSitive|NEGative

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TGAP:STOP:TRIGger:POLarity?

This command sets the compressed mode stop trigger signal polarity.



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURce]:RADio:WCDMa:TGPP[:BBG])

POSitive	This choice sets the trigger to stop when the trigger signal is high.
NEGative	This choice sets the trigger to stop when the trigger signal is low.
*RST	POS
<b>Key Entry</b>	<b>Comp Mode Stop Trigger Polarity Neg Pos</b>

**:ULINK:TOffset**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TOffset <val>
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TOffset?
```

This command sets additional timing offset for the dedicated physical channel (DPCH). Timing offset is the time delay between the downlink signal and the uplink signal. The downlink signal timing is provided by the synchronization signal.

*RST	+0
<b>Range</b>	–512 to 2560
<b>Key Entry</b>	<b>Timing Offset</b>

**Remarks** The actual amount of timing offset is (T0) + (TOFFset) + (SDElay) where T0 = 1024 chips.

**:ULINK:TStatus:COMPRESSED**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TStatus:COMPRESSED?
```

This query returns the status of compressed pattern generation. A “0” response indicates the compressed mode pattern signal is not generating. A “1” response indicates that the compressed mode pattern signal is generating.

*RST	0
------	---

**:ULINK:TStatus:RACH**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK:TStatus:RACH?
```

This query returns the status of the physical random access channel (PRACH). A “0” response indicates the PRACH signal is not generating. A “1” response indicates that the PRACH signal is generating.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**\*RST**                    0

**:ULINK:TStatus:RECeive**

**Supported**            E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TStatus:RECeive?

This query returns the frame synchronization signal reception status.

When the frame synchronization signal is received after synchronization configuration, the received value becomes “1.” If the signal is not received, the value is “0.”

**\*RST**                    0

**:ULINK:TStatus:SYNC**

**Supported**            E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:TStatus:SYNC?

This query returns the frame synchronization status. A “0” status indicates frame synchronization is fine or no frame synchronization signal is received). A “1” indicates frame synchronization is out sync and the synchronization signal does not match with the signal generator’s timing. The signal generator will generate incorrect data

**\*RST**                    0

**:ULINK:[TGRoup[1]]:DCH[1]|2|3|3|5|6:BLKSize**

**Supported**            E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:[TGRoup[1]]:DCH[1]|  
2|3|4|5|6:BLKSize <val>

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:[TGRoup[1]]:DCH[1]|  
2|3|4|5|6:BLKSize?

This command sets the block size for the selected uplink dedicated channel (DCH).

**\*RST**                    DCH1: 244    DCH2: 100    DCH3,4,5,6: 20

**Range**                    0–5000

**Key Entry**              Blk Size

**Remarks**              If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])

**:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:BPFRame****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:BPFRame?

This query returns the number of bits per frame for the selected dedicated transport channel (DCH).

**\*RST** DCH1: 490 DCH2: 110 DCH3–6: 60**Field Entry** Bits/Frame**:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:BRATe****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:BRATe?

This query returns the bit rate for the selected dedicated transport channel (DCH)

**\*RST** DCH1: 12200 DCH2: 2500 DCH3–6: 2000**Range** 0–5000**:ULINK[:TGRoup[1]]:DCH[1]|2|3|3|5|6:CODE****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:CODE HCONv|TCONv|TURBo|NONE  
[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:CODE?

This command sets the encoder type for the uplink dedicated channel (DCH) selected.

**HCONv** This choice selects a coding with the 1/2 rate convolutional encoder.**TCONv** This choice selects a coding with the 1/3 rate convolutional encoder.**TURBo** This choice selects a coding with the turbo coder.**NONE** This choice selects no coding type.**\*RST** DCH1,2: TCONv DCH3,4,5,6: HCONv**Key Entry** 1/2 Conv 1/3 Conv Turbo NONE**Remarks** If the choice, set by this command, is changed while the signal is active, the apply command must be sent to set the change. See “:ULINK:APPLY” on page 1075.

**:ULINK:[TGRoup[1]]:DCH[1]|2|3|3|5|6:CRc****Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: [ TGRoup [ 1 ] ] :DCH [ 1 ] |
2 | 3 | 4 | 5 | 6 :CRc 0 | 8 | 12 | 16 | 24
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: [ TGRoup [ 1 ] ] :DCH [ 1 ] |
2 | 3 | 4 | 5 | 6 :CRc?
```

This command specifies the number of cyclic redundancy code (CRC) bits to be added to each transport channel block.

**\*RST** DCH1: 16 DCH2: 12 DCH3,4,5,6: 8**Field Entry** CRC Size

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK:[TGRoup[1]]:DCH[1]|2|3|3|5|6:DATA****Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: [ TGRoup [ 1 ] ] :DCH [ 1 ] |
2 | 3 | 4 | 5 | 6 :DATA PN9 | FIX4 | "<file name>"
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK: [ TGRoup [ 1 ] ] :DCH [ 1 ] |
2 | 3 | 4 | 5 | 6 :DATA?
```

This command configures the data type to be inserted into the selected uplink dedicated channel (DCH).

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** PN9**Key Entry** **PN9** **FIX4** **User File**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])****:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BER:ACTual****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1] |  
2 | 3 | 4 | 5 | 6:DATA:BER:ACTual?

This query returns the actual inserted error ratio in the uplink dedicated channel (DCH) selected.

**\*RST** +0.0000000E+000**Remarks** The actual bit error rate can be different from the specified bit error rate due to the internal bit generation.**:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BER:ERRor:BIT****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:  
DATA:BER:ERRor:BIT?

This query returns the actual error bits inserted in total number of bits.

**\*RST** +0**Field Entry** Error Bits**:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BER:TOTal:BIT****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:  
DATA:BER:TOTal:BIT?

This query returns the total number of bits inserted for the bit error ratio calculation.

**\*RST** 0**Field Entry** Total Bits

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BER[:VALue]**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :DCH [1] | 2 | 3 | 4 | 5 | 6 :
DATA:BER [ :VALue ] <val>
```

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :DCH [1] | 2 | 3 | 4 | 5 | 6 :
DATA:BER [ :VALue ] ?
```

This command specifies the bit error rate (BER) value to be inserted into the selected uplink dedicated channel (DCH). The variable <val> is expressed in decimal form as a percent ratio (1.0=100%).

**\*RST** 0.0000000+000

**Range** 0.0001–1.0

**Field Entry** BER

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to [“:ULINK:APPLY” on page 1075](#).

**:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BLER:ACTual**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :DCH [1] |
2 | 3 | 4 | 5 | 6 :DATA:BLER:ACTual?
```

This query returns the actual block error ratio inserted.

**\*RST** 0.0000000E+000

**Remarks** The actual block error rate can be different from the specified block error rate due to the internal bit generation.

**:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BLER:ERRor:BLOCK**

**Supported** E4438C with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] | 2 :DCH [1] | 2 | 3 | 4 | 5 | 6 :
DATA:BLER:ERRor:BLOCK?
```

This query returns the number of error blocks inserted.

**\*RST** +0

**Field Entry** Error Blocks

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK[:TGRoup[1] | 2:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BLER:TOTal:BLOCK****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1] | 2:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BLER:TOTal:BLOCK?

This query returns the error blocks actually inserted in total number of blocks.

**\*RST** +0**Field Entry** Total Blocks**:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BLER[:VALue]****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BLER[:VALue] &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1] | 2 | 3 | 4 | 5 | 6:DATA:BLER[:VALue]?

This command specifies the block error rate (BLER) value to be inserted into the selected uplink dedicated channel (DCH).

The variable &lt;val&gt; is expressed in decimal form as a percent ratio (1.0=100%).

**\*RST** +0.00000000E+000**Range** 0.0–1.00**Field Entry** BLER**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:DATA:EINSert****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:DATA:EINSert BLER|BER|NONE

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:DATA:EINSert?

This command selects the error insertion mode.

**BLER** This choice selects a block error rate (BLER) mode.**BER** This choice selects a bit error rate (BER) mode.**NONE** This choice selects no BLER or BER mode (no error blocks or bits inserted).**\*RST** NONE**Key Entry** **BLER** **BER** **None****:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:DATA:FIX4****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:DATA:FIX4 &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:DATA:FIX4?

This command sets the 4 bit data pattern for the selected uplink dedicated channel (DCH).

While the variable &lt;val&gt; can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000**Range** 0–15**Key Entry** **FIX4**



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:NBLock****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:NBLock &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:NBLock?

This command specifies the number of transport blocks coded on to the selected dedicated channel (DCH).

**\*RST** +1**Range** 0–4095**Field Entry** Num of Blk**:ULINK[:TGRoup [1]]:DCH[1]|2|3|4|5|6:PPERcentage****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:PPERcentage?

This query returns the percentage of the total bits removed from or added to the fully coded channel.

The value is returned in the unit of percent and a negative value means repetition.

**Field Entry** Puncture**:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:RMATch****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:RMATch &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:RMATch?

This command specifies the rate matching parameters of each dedicated channel (DCH) selected.

**\*RST** DCH1: 2 DCH2: 12 DCH3,4,5,6: 1**Range** 1–256**Field Entry** Rate Match Attr

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])****:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:TTI****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:  
TTI 10000|20000|40000|80000

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6:TTI?

This command sets the transmission time interval (TTI) period for the dedicated channel (DCH) selected. TTI is the time interval of the amount of data to be transmitted.

The choices are expressed in units of milliseconds (msec) where 20000 = 20 msec.

**\*RST** DCH1: 20000 DCH2: 40000 DCH3,4,5,6: 10000**Field Entry** TTI**Remarks** The data amount equals the block size (BLKsize) times the number of transport blocks (NBlock).**:ULINK[:TGRoup[1]]:DCH[1]|2|3|4|5|6[:STATe]****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|  
2|3|4|5|6[:STATe] ON|OFF|1|0[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:DCH[1]|  
2|3|4|5|6[:STATe]?

This command enables or disables the operating state of the dedicated channel (DCH) selected.

**\*RST** DCH1,2: 1 DCH3,4,5,6: 0**Key Entry** TrCH State Off On**:ULINK[:TGRoup[1]]:RACH[1]:BLKSize****Supported** E4438C with Option 400[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1]:BLKSize <val>  
[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1]:BLKSize?

This command sets the transport block size for the random access channel (RACH) coding where the input data is carried.

**\*RST** +168**Range** 0–5000**Field Entry** Blk Size

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK[:TGRoup [1]]:RACH[1]:BPFRame**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :RACH [1] :BPFRame?

This query returns the bits per frame for the selected random access channel (RACH).

**\*RST** +600

**:ULINK[:TGRoup [1]]:RACH[1]:BRATe**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :RACH [1] :BRATe?

This query returns the bit rate for the random access transport channel (RACH).

**\*RST** +8400

**:ULINK[:TGRoup[1]]:RACH[1]:CODE**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :RACH [1] :CODE?

This query returns the type of channel coding for error protection.

**\*RST** HCON

**:ULINK[:TGRoup[1]]:RACH[1]:CRC**

**Supported** E4438C with Option 400

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :RACH [1] :  
CRC 0 | 8 | 12 | 16 | 24

[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [1] ] :RACH [1] :CRC?

This command specifies the number of cyclic redundancy code (CRC) bits that are to be added to each transport channel block.

**\*RST** +16

**Field Entry** CRC Size

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA PN9 |
FIX4 | "<file name>"
```

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA?
```

This command sets the type of data to be inserted into the random access channel (RACH).

"<file name>" This variable specifies a data pattern that has been stored in memory.

**\*RST** PN9

**Key Entry** **PN9** **FIX4** **User File**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER:ACTual**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:BER :
ACTual?
```

This query returns the actual error ratio inserted.

**\*RST** +0

**Range** 0–5000

**Key Entry** **Actual BER**

**Remarks** The specified error ratio and actual ratio will not match when the internal bit generation goes into “pre-computing” mode.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER:ERRor:BIT**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:BER :
ERRor:BIT?
```

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])

This query returns the actual error bits inserted for the total number of bits.

**\*RST** 0

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER:TOTal:BIT**

**Supported** E4438C with Option 400

[ :SOURce ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:BER:TOTal:BIT?

This query returns the total number of bits inserted for the bit error ratio calculation.

**\*RST** 0

**Remarks** The specified error ratio and actual ratio will not match when the internal bit generation goes into “pre-computing” mode.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BER[:VALue]**

**Supported** E4438C with Option 400

[ :SOURce ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:BER [ :VALue ] <val>

[ :SOURce ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:BER [ :VALue ] ?

This command sets the bit error rate value for the random access channel (RACH).

**\*RST** +0.00000000E+000

**Range** 0.0000–1.0

**Field Entry** BER

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER:ACTual**

**Supported** E4438C with Option 400

[ :SOURce ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:BLER:ACTual?

This query returns the actual error ratio inserted.

**\*RST** 0.0000000E+000

**Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**

**Remarks** The specified error ratio and actual error ratio will not match when the internal bit generation goes into “pre-computing” mode.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER:ERROR:BLOCK**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:
BLER:ERROR:BLOCK?
```

This query returns the actual block errors inserted in the total number of blocks.

**\*RST** +0

**Remarks** The specified error ratio and actual error ratio will not match when the internal bit generation goes into “pre-computing” mode.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER:TOTAL:BLOCK**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:
BLER:TOTAL:BLOCK?
```

This query returns the total blocks inserted for the block error ratio calculation.

**\*RST** +0

**Remarks** The specified error ratio and actual error ratio will not match when the internal bit generation goes into “pre-computing” mode.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:BLER[:VALue]**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:
BLER [ :VALue ] <val>
[ :SOURCE ] :RADio:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:
BLER [ :VALue ] ?
```

This command sets the inserted block error rate value. The variable <val> is expressed in decimal form, but it is a percent ratio (1.0=100%).

**\*RST** 0

**Range** 0.0001–1.0

**Field Entry** BLER

## Wideband CDMA Base Band Generator Subsystem—Option 400 ([:SOURCE]:RADIo:WCDMa:TGPP[:BBG])

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:EINSErt**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:
EINSErt BLER|BER|NONE
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:EINSErt?
```

This command selects an error mode or no error insertion.

**BLER** This choice selects block error rate (BLER) mode.

**BER** This choice selects a bit error rate (BER) mode.

**NONE** This choice selects no BLER or BER mode (no error blocks or bits inserted).

**\*RST** NONE

**Key Entry** **BLER** **BER** **None**

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK[:TGRoup[1]]:RACH[1]:DATA:FIX4**

**Supported** E4438C with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:
FIX4 <val>
[ :SOURCE ] :RADIo:WCDMa:TGPP [ :BBG ] :ULINK [ :TGRoup [ 1 ] ] :RACH [ 1 ] :DATA:FIX4?
```

This command sets a fixed 4 bit pattern for use as a data pattern.

While the variable <val> can be entered in binary, hexadecimal, or decimal formats, the query returns only binary values.

**\*RST** #B0000

**Range** 0–15

**Field Entry** Data

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADio:WCDMa:TGPP[:BBG])**:ULINK[:TGRoup[1]]:RACH[1]:NBLOCK****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1]:NBLOCK &lt;val&gt;

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1]:NBLOCK?

This command sets the number of transport blocks coded into one random access channel (RACH).

**\*RST** +1**Range** 0–4095**Field Entry** Num of Blk**Remarks** The total input data into one RACH is the block size (BLKsize) multiplied by the number of transport blocks (NBLOCK).

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075

**:ULINK[:TGRoup [1]]:RACH[1]:PPERcentage****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1]:PPERcentage?

This query returns the percentage of the total bits removed from or added to the fully coded channel.

**\*RST** –2.12500000E+002**Field Entry** Puncture**:ULINK[:TGRoup[1]]:RACH[1]:RMArch****Supported** E4438C with Option 400

[:SOURCE]:RADio:WCDMa:TGPP[:BBG]:ULINK:RACH[1]:RMArch?

This query returns the rate match parameters of each random access channel (RACH).

**\*RST** +1



**Wideband CDMA Base Band Generator Subsystem—Option 400** ([:SOURCE]:RADIO:WCDMA:TGPP[:BBG])**:ULINK[:TGRoup[1]]:RACH[1]:TTI****Supported** E4438C with Option 400[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1]:  
TTI 10000|20000

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1]:TTI?

This command sets the transmission time interval (TTI) period for the random access channel (RACH).

The choices are expressed in units of milliseconds (msec) where 20000=20 msec.

**\*RST** 20000**Field Entry** TTI

**Remarks** If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:ULINK:APPLY” on page 1075.

**:ULINK[:TGRoup[1]]:RACH[1][:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG]:ULINK[:TGRoup[1]]:RACH[1][:STATe]?

This query returns the state of the random access channel (RACH).

**\*RST** 1**[:STATe]****Supported** E4438C with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG][:STATe] ON|OFF|1|0

[:SOURCE]:RADIO:WCDMA:TGPP[:BBG][:STATe]?

This command enables or disables W-CDMA functionality.

**\*RST** 0**Key Entry** **W-CDMA Off On**



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