SCPI Command Reference, Volume 1

Agilent Technologies
ESG Vector Signal Generator

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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

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” 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 alterative 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 "Command Parameters and Responses" on page 8 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 "Command Tree" on page 7 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`

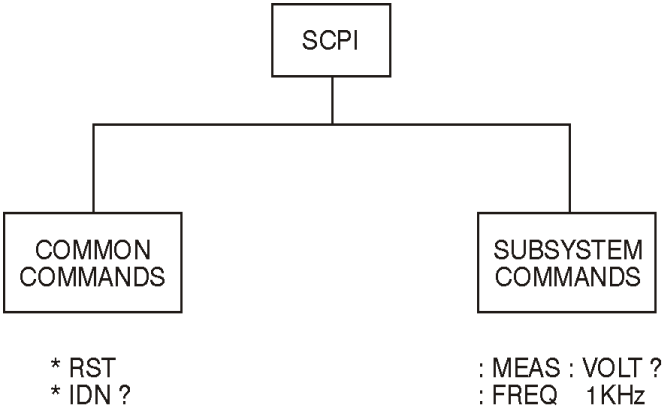
Command Types

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.

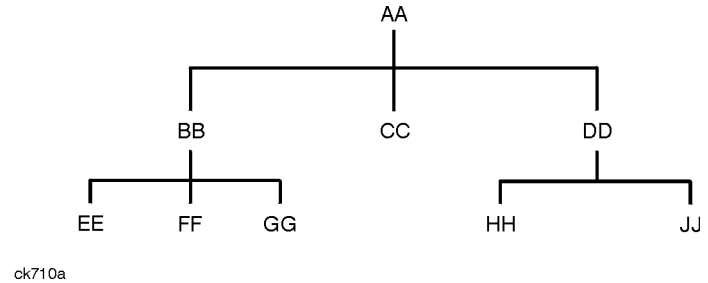
Figure 1-1 Command Types



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 Parameter and Response Types

Parameter Types	Response Data Types
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

+4.0000000000000E+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, such as "<file name>", represent three formats, "<file name>", "<file name@file type>", and "</user/file type/file name>". The following shows the file name syntax for the three formats, but uses "FLATCAL" as the file name in place of the variable "<file name>":

Format 1	"FLATCAL"
Format 2	"FLATCAL@USERFLAT"
Format 3	"/USER/USERFLAT/FLATCAL"

Format 2 uses the file type extension (@USERFLAT) as part of the file name syntax. Format 3 uses the directory path which includes the file name and file type. Use Formats 2 and 3 when the command does not specify the file type. This generally occurs in the Memory (:MEMory) or Mass Memory (:MMEMory) subsystems.

The following examples demonstrate a command where Format 1 applies:

Command Syntax with the file name variable

```
:MEMory:STORe:LIST "<file name>"
```

Command Syntax with the file name

```
:MEMory:STORe:LIST "SWEEP_1"
```

This command has :LIST in the command syntax. This denotes that "SWEEP_1" will be saved in the :List file type location as a list type file.

The following examples demonstrate a command where Format 2 applies:

Command Syntax with the file name variable

```
:MMEMory:COPY "<file name>","<file name>"
```

Command Syntax with the file name

```
:MMEMory:COPY "FLATCAL@USERFLAT","FLAT_2CAL@USERFLAT"
```

This command cannot distinguish which file type "FLATCAL" belongs to without the file type extension (@USERFLAT). If this command were executed without the extension, the command would assume the file type was Binary.

The following examples demonstrate a command where format 3 applies:

Command Syntax with the file name variable

```
:MMEMory:DATA "/USER/BBG1/WAVEFORM/<file name>",#ABC
```

Command Syntax with the file name

```
:MMEMory:DATA "/USER/BBG1/WAVEFORM/FLATCAL",#ABC
```

This command gives the directory path name where the file `"FLATCAL"` is stored.

`A`	the number of decimal digits to follow in B.
`B`	a decimal number specifying the number of data bytes in C.
`C`	the binary waveform data.

Refer to Table 3-1 on page 121 for a listing of the file systems and types. The entries under file type are used in the directory path.

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 14. 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 variable*s

```
: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 14:

```
: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@file system>") will work.

Refer to Table 1-1 on page 4 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 all ESG Vector Signal Generators. This chapter contains the following major sections:

Correction Subsystem ([:SOURce]:CORRection)

:FLATness:LOAD

Supported All

```
[:SOURce]:CORRection:FLATness:LOAD "<file name>"
```

This command loads a user-flatness correction file.

***RST** N/A

Range N/A

Key Entry **Load From Selected File**

Remarks N/A

:FLATness:PAIR

Supported All

```
[:SOURce]:CORRection:FLATness:PAIR <freq.>[<freq suffix>],
<corr.>[<corr suffix>]
```

This command sets a frequency and amplitude correction pair.

<corr.> This variable is the power correction.

***RST** N/A

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.

:FLATness:POINts

Supported All

`[:SOURce]:CORRection:FLATness:POINts?`

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

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

:FLATness:PRESet

Supported All

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.

***RST** N/A

Range N/A

Key Entry **Preset List**

Remarks N/A

:FLATness:STORe

Supported All

`[:SOURce]:CORRection:FLATness:STORe "<file name>"`

This command stores the current user-flatness correction data to a file.

***RST** N/A

Range N/A

Key Entry **Store To File**

Remarks For information on file name syntax, refer to "File Name Variables" on page 14.

[:STATe]

Supported All

```
[: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**

Remarks N/A

Digital Modulation Subsystem ([:SOURce])

:BURSt:SOURce

Supported All

```
[: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 INTernal[1] choice will not work unless an internal burst source is active.

:BURSt:STATe

Supported All

```
[: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**

Remarks N/A

:DM:EXTernal:ALC:BANDwidth|BWIDth

Supported All

```
[:SOURce]:DM:EXTernal:ALC:BANDwidth|BWIDth NORMal|NARRow
[:SOURce]:DM:EXTernal:ALC:BANDwidth|BWIDth?
```

This command sets the bandwidth of the automatic leveling control (ALC) loop.

NORMal This choice enables the signal generator to automatically select the ALC

bandwidth for the current test conditions.

NARRow — This choice sets the narrowest possible ALC bandwidth and is useful when an external I/Q source is connected.

***RST** NORM

Key Entry **ALC BW Normal Narrow**

Remarks N/A

:DM:EXTernal:HICRest[:STATe]

Supported All

```
[:SOURce]:DM:EXTernal:HICRest[:STATe] ON|OFF|1|0
[:SOURce]:DM:EXTernal:HICRest[: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**

Remarks N/A

:DM:EXTernal:FILTer

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DM:EXTernal:FILTer 40e6|THRough
[:SOURce]:RADio: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 25 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**

Remarks N/A

:DM:EXTernal:FILTer:AUTO

Supported All with Option 001 or 002

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

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 24 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:DM:EXTernal:POLarity

Supported All

```
[: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 All

```
[:SOURce]:DM:EXTernal:SOURce EXTernal|INTernal|BBG1|EXT600|OFF
[: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 or 002.
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.

***RST** EXT

Key Entry **Ext 50 Ohm** **BBG1** **Ext 600 Ohm** **Off**

Remarks The output is the analog component of the I and Q signals.

For selecting the I/Q source, refer to ":DM:SOURce" on page 38.

:DM:IQADjustment:EXTernal:COFFset

Supported All

```
[:SOURce]:DM:IQADjustment:EXTernal:COFFset <val>
[: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 All

```
[:SOURce]:DM:IQADjustment:EXTernal:DIOFfset <val>
[: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 All

```
[: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 All

```
[: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 All

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

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

Range –5 to 5

Key Entry **Ext In 600 Ohm 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:IQATten

Supported All

```
[: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 All

```
[: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 All

```
[: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 All

```
[: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 All

```
[:SOURce]:DM:IQADjustment:QOFFset <val>
[: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 All

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

This command adjusts the phase angle between the I and Q vectors.

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

***RST** +0.00000000E+000

Range –10.0 to 10.0

Key Entry **Quadrature Skew**

Remarks If the signal generator is operating at frequencies greater than 3.3 GHz, quadrature skew settings greater than ±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 is 90 degrees.

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:SKEW

Supported All

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

This command changes the input skew to the I and Q paths. Equal and opposite skew is applied to both paths (RF Output path 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 adjustment 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 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 units of pico seconds or nano seconds.

***RST** +0.00000000E+000

Range –5.0 to 5.0

Key Entry **I/Q Skew**

Remarks N/A

:DM:IQADjustment[:STATe]

Supported All

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

This command enables or disables the I/Q adjustments.

***RST** 0

Key Entry **I/Q Adjustments Off On**

Remarks N/A

:DM:MODulation:FILTer

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:FILTer 2.1e6|40e6|THRough
[:SOURce]:RADio: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 using this command will automatically set ":DM:MODulation:FILTer:AUTO" on page 33 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**

Remarks N/A

:DM:MODulation:FILTer:AUTO

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio: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 33 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:DM:MODulation:ATTen

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:ATTen <val>
[:SOURce]:RADio: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**

Remarks N/A

:DM:MODulation:ATTen:AUTO

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:ATTen:AUTO ON|OFF|1|0
[:SOURce]:RADio: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 34 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:DM:MODulation:ATTen:EXTernal

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:ATTen:EXTernal DEFault|MANual|MEASure
[:SOURce]:RADio:DM:MODulation:ATTen:EXTernal?
```

This command selects the method for setting the external I/Q input level for automatic

attenuation.

DEFault — This choice sets the external I/Q input level to the default value of 500.0 mV rms.

MANual — This choice is used to manually set the external I/Q input level. After selecting this parameter, refer to ":DM:MODulation:ATTen:EXTernal:LEVel" on page 35 to set the voltage level for automatic attenuation.

MEAsure — This choice is used to measure the voltage level at the external I/Q inputs. The measurement will be used as the input level setting. Refer to ":DM:MODulation:ATTen:EXTernal:LEVel:MEASurement" on page 35 to perform the measurement.

***RST** DEF

Key Entry **Ext Input Level 500 mV rms Default Man Meas**

Remarks This command is inactive until an external triggering source is selected.

:DM:MODulation:ATTen:EXTernal:LEVel

Supported All with Option 001 or 002

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

This command manually sets the external I/Q input level for automatic attenuation.

The variable <val> is expressed in units of volts root-mean-square (V rms).

***RST** +5.00000000E-001

Range 5E–1 to 1E0

Key Entry **Ext Input Level 500 mV rms Default Man Meas**

Remarks N/A

:DM:MODulation:ATTen:EXTernal:LEVel:MEASurement

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:ATTen:EXTernal:LEVel:MEASurement
```

This command measures the voltage level at the external I/Q inputs. The measurement will be used as the input level setting for automatic attenuation.

***RST** N/A

Key Entry **Ext Input Level 500 mV rms Default Man Meas**

Remarks N/A

:DM:MODulation:ATTen:OPTimize:BANDwidth

Supported All with Option 001 or 002

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

This command sets the expected bandwidth of the external I/Q signal. The I/Q modulator attenuator will use this bandwidth setting to optimize the attenuation level.

The variable <val> is expressed in units of samples per second (sps).

***RST** +1.00000000E+008

Range 1E–3 to 100E6

Key Entry **Optimize for 1.000000000Msps Bandwidth**

Remarks N/A

:DM:POLarity[:ALL]

Supported All

```
[: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**

Remarks N/A

:DM:SKEW:PATH

Supported All

```
[:SOURce]:DM:SKEW:PATH RF|BB|OFF
[: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 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 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.

OFF — When Off is selected, the factory I/Q skew correction is turned off. Using the signal generator in this mode does not add any latency symbols. This setting allows the instrument to operate in a mode prior to the installation of firmware C.03.10.

***RST** INT

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

Remarks N/A

:DM:SKEW[:STATe]

Supported All

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

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

***RST** 1

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

Remarks N/A

:DM:SOURce

Supported All

```
[:SOURce]:DM:SOURce 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.

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 or 002.

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

Key Entry **Ext 50 Ohm** **BBG1** **Ext 600 Ohm** **Off**

Remarks N/A

:DM:STATe

Supported All

```
[: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

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

Remarks The frequency channel state must be enabled for this command to work. Refer to ":FREQuency:CHANnels[:STATe]" on page 43.

:FREQuency:CHANnels:NUMBer

Supported All

```
[:SOURce]:FREQuency:CHANnels:NUMBer <number>
[: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

Range

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 43.

:FREQuency:CHANnels[:STATe]

Supported All

```
[: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 40.

:FREQuency:FIXed

Supported All

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

This command sets the signal generator output frequency.

***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

Key Entry N/A

Remarks A frequency change may affect the current output power. Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 65 for the correct specified frequency and amplitude settings. To set the frequency mode refer to ":FREQuency:MODE" on page 44.

:FREQuency:MODE

Supported All

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

This command sets the frequency mode of the signal generator.

CW and FIXed	These choices are synonymous with one another and they let the signal generator operate at a fixed frequency. Refer to ":FREQuency[:CW]" on page 48 for setting the frequency in the CW frequency mode. Refer to ":FREQuency:FIXed" on page 43 for setting the frequency in the fixed frequency mode.
LIST	This choice lets the currently selected sweep (LIST or STEP) frequency settings control the output frequency. Refer to ":LIST:TYPE" on page 56 for setting the sweep type.

***RST** CW

Key Entry N/A

Remarks N/A

:FREQuency:MULTiplier

Supported All

```
[: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

```
[: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** +0.0000000000000E+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

```
[: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

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

This command sets the output reference frequency.

***RST** +0.0000000000000E+00

Range *Option 501:* 0HZ–1GHZ
Option 502: 0HZ–2GHZ
Option 503: 0HZ–3GHZ
Option 504: 0HZ–4GHZ
Option 506: 0HZ–6GHZ

Key Entry **Freq Ref Set**

Remarks N/A

:FREQuency:REFerence:STATe

Supported All

```
[: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

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

This command sets the frequency start point for 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

Key Entry **Freq Start**

Remarks N/A

:FREQuency:STOP

Supported All

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

This command sets the frequency stop point for 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

Key Entry **Freq Stop**

Remarks N/A

:FREQuency:SYNThesis

Supported All except Option UNJ

```
[:SOURce]:FREQuency:SYNThesis 1|2
[:SOURce]:FREQuency:SYNThesis?
```

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 10 kHz.

***RST** +1

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

Remarks N/A

:FREQuency[:CW]

Supported All

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

This command sets the signal generator output frequency for the CW frequency mode.

***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

Key Entry **Frequency**

Remarks To set the frequency mode to CW, refer to ":FREQuency:MODE" on page 44.

:PHASe:REFerence

Supported All

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

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

***RST** N/A

Range N/A

Key Entry **Phase Ref Set**

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

:PHASe[:ADJust]

Supported All

```
[: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**

Remarks N/A

:ROSCillator:SOURce

Supported All

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

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

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

:ROSCillator:SOURce:AUTO

Supported All 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**

Remarks N/A

List/Sweep Subsystem ([:SOURce])

:LIST:DIRection

Supported All

```
[: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**

Remarks N/A

:LIST:DWELl

Supported All

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

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

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** N/A

Range 0.001–60

Key Entry N/A

Remarks Dwell time is used when IMMediate is the trigger source. Refer to ":LIST:TRIGger:SOURce" on page 55 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:DWELl:POINts

Supported All

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

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

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

:LIST:DWELl:TYPE

Supported All

```
[: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:DWELl" on page 51 for setting the list dwell points.

STEP This choice selects the dwell time from the step sweep. Refer to ":SWEep:DWELl" on page 57 for setting the step dwell.

***RST** LIST

Key Entry **Dwell Type List Step**

Remarks N/A

:LIST:FREQuency

Supported All

```
[: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.

***RST** N/A

Range *Option* 501: 100E3–1E9
Option 502: 100E3–2E9
Option 503: 100E3–3E9
Option 504: 100E3–4E9
Option 506: 100E3–6E9

Key Entry N/A

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

:LIST:FREQuency:POINts

Supported All

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

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

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

:LIST:MANual

Supported All

```
[: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.

***RST** N/A

Range 1–1601

Key Entry **Manual Point**

Remarks If list or step mode is controlling frequency and/or power, 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 54 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

```
[: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 sweep point which controls the frequency and/or amplitude according to the sweep type. Refer to ":LIST:MANual" on page 53 for selecting a sweep point

***RST** AUTO

Key Entry **Manual Mode Off On**

Remarks N/A

:LIST:POWer

Supported All

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

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

***RST** N/A

Range Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 65 for output power ranges.

Key Entry N/A

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 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.

:LIST:POWer:POINts

Supported All

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

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

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

:LIST:TRIGger:SOURce

Supported All

```
[:SOURce]:LIST:TRIGger:SOURce BUS|IMMediate|EXTernal|KEY
[:SOURce]:LIST:TRIGger:SOURce?
```

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

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 N/A

:LIST:TYPE

Supported All

```
[:SOURce]:LIST:TYPE LIST|STEP
[:SOURce]:LIST:TYPE?
```

This command toggles between the two types of sweep.

***RST** STEP

Key Entry **Sweep Type List Step**

Remarks N/A

:LIST:TYPE:LIST:INITialize:FSTep

Supported All

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 120 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.

***RST** N/A

Range N/A

Key Entry **Load List From Step Sweep**

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

:LIST:TYPE:LIST:INITialize:PRESet

Supported All

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 120 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.

***RST** N/A

Range N/A

Key Entry **Preset List**

Remarks N/A

:SWEep:DWELl

Supported All

```
[: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 55 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

```
[:SOURce]:SWEep:POINts <val>
[:SOURce]:SWEep:POINts?
```

This command enables you to define the number of points in a step sweep.

***RST** 2

Range 2–1601

Key Entry **# Points**

Remarks N/A

Power Subsystem ([:SOURce]:POWer)

:ALC:BANDwidth

Supported All

```
[:SOURce]:POWer:ALC:BANDwidth|BWIDth NORMal|NARRow
[:SOURce]:POWer:ALC:BANDwidth|BWIDth?
```

This command sets the bandwidth of the automatic leveling control (ALC) loop.

NORMal This choice enables the signal generator to automatically select the ALC bandwidth for the current test conditions.

NARRow This choice sets the narrowest possible ALC bandwidth and is useful when an external I/Q source is connected.

***RST** NORM

Key Entry **ALC BW Normal Narrow**

Remarks The bandwidth choices for this command are not effective if an internal I/Q source is being used.

:ALC:SEARch

Supported All

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

This command enables or disables the internal power search calibration.

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 60 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

```
[: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**

Remarks N/A

:ALC[:STATe]

Supported All

```
[: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 the desired level in spite of drift due to temperature and time.

:ALTernate:AMPLitude

Supported All 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

```
[:SOURce]:POWer:ALTernal:MANual MAIN|DELTa
[:SOURce]:POWer:ALTernal: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 trigger source. Refer to ":ALTernate:TRIGger[:SOURce]" on page 62 for more information.

:ALTernate:STATe

Supported All

```
[: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**

Remarks N/A

:ALTernate:TRIGger[:SOURce]

Supported All

```
[: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 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.

***RST** MAN

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

Remarks N/A

:ATTenuation:AUTO

Supported All

```
[:SOURce]:POWer:ATTenuation:AUTO ON|OFF|1|0
[:SOURce]:POWer:ATTenuation:AUTO?
```

This command sets the state of the attenuator hold function.

ON (1)	This choice enables the attenuator to operate normally.
OFF (0)	This choice holds the attenuator at its current setting or at a selected value that will not change during power adjustments.

***RST** 1

Key Entry **Atten Hold Off On**

Remarks The OFF (0) choice eliminates the power discontinuity normally associated with the attenuator switching during power adjustments.

During an amplitude sweep operation, signal generators with Option UNB 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.

:MODE

Supported All

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

This command sets the signal generator RF output power operating mode.

***RST** FIX

Key Entry **Amplitude**

Remarks N/A

:REFerence

Supported All

```
[: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

```
[: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 82 and ":POWer" on page 169 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

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

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

***RST** –1.35000000E+002

Range Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 65 for the output power ranges.

Key Entry **Ampl Start**

Remarks During an amplitude sweep operation, signal generators with Option UNB 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

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

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

***RST** –1.35000000E+002

Range Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 65 for the output power ranges.

Key Entry **Ampl Stop**

Remarks During an amplitude sweep operation, signal generators with Option UNB 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

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

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

This command sets the RF output power.

***RST** –1.35000000E+002

Range

Frequency	*Standard*	*Option UNB*	*Option 506*
250kHZ–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.

Pulse Subsystem ([:SOURce]:PULSe)

:FREQuency:STEP

Supported All

```
[:SOURce]:PULSe:FREQuency:STEP freq
[:SOURce]:PULSe:FREQuency:STEP?
```

This command sets the step increment for the pulse frequency.

***RST** +1.00000000E+005

Range 0–100

Key Entry N/A

Remarks N/A

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)

:DCFM

Supported All

`:CALibration:DCFM`

This command initiates a DCFM or DCΦM 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.

***RST** N/A

Range N/A

Key Entry **DCFM/DCΦM 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 All

`:CALibration:IQ`

This command initiates an I/Q calibration.

***RST** N/A

Range N/A

Key Entry **Execute Cal**

Remarks N/A

:IQ:DEFault

Supported All

```
:CALibration:IQ:DEFault
```

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

***RST** N/A

Range N/A

Key Entry **Revert to Default Cal Settings**

Remarks N/A

:IQ:FULL

Supported All

```
: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.

***RST** N/A

Range N/A

Key Entry **Execute Cal**

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

:IQ:DC

Supported All

```
: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 (±5 degrees)

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

- Power level changes
- I/Q Impairments

***RST** N/A

Key Entry **Execute Cal**

Remarks N/A

:IQ:STARt

Supported All

```
: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.

***RST** N/A

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 All

```
: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.

***RST** N/A

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:ADDRess

Supported All

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

This command sets the signal generator's GPIB address.

***RST** N/A

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`.

: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.

***RST** N/A

Range N/A

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.

***RST** N/A

Range N/A

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.

***RST** N/A

Range N/A

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.

***RST** N/A

Range N/A

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
:SYSTem:COMMunicate:PMETer:ADDRess?
```

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

***RST** N/A

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.

***RST** N/A

Key Entry **Meter Channel A B**

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

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.

***RST** N/A

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.

***RST** N/A

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.

***RST** N/A

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.

***RST** N/A

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.

***RST** N/A

Range N/A

Key Entry **Reset RS-232**

Remarks N/A

: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.

***RST** N/A

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.

***RST** N/A

Range N/A

Key Entry **Installed Board Info**

Remarks N/A

:CCOunt:ATTenuator

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:CCOunt:ATTenuator?
```

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

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks N/A

:CCOunt:PON

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:CCOunt:PON?
```

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

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks N/A

:CCOunt:PROTection

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:CCOunt:PROTection?
```

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

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks N/A

:DISPlay:OTIMe

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:DISPlay:OTIMe?
```

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

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks N/A

:OPTions

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:OPTions?
```

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

***RST** N/A

Range N/A

Key Entry **Options Info**

Remarks N/A

:OPTions:DETail

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:OPTions:DETail?
```

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

***RST** N/A

Range N/A

Key Entry **Options Info**

Remarks N/A

:OTIMe

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:OTIMe?
```

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

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks N/A

:REVision

Supported All

```
: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.

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks N/A

:SDATe

Supported All

```
:DIAGnostic[:CPU]:INFOrmation:SDATe?
```

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

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks N/A

Display Subsystem (:DISPlay)

:ANNotation:AMPLitude:UNIT

Supported All

```
:DISPlay:ANNotation:AMPLitude:UNIT DBM|DBUV|DBUVEMF|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 63 for more information.

***RST** DBM

Key Entry N/A

Remarks N/A

:ANNotation:CLOCk:DATE:FORMat

Supported All

```
: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.

***RST** N/A

Key Entry N/A

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

:ANNotation:CLOCk[:STATe]

Supported All

```
: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.

***RST** N/A

Key Entry N/A

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

:BRIGhtness

Supported All

```
:DISPlay:BRIGhtness <value>
: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).

***RST** N/A

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

```
:DISPlay:CAPTure
```

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

***RST** N/A

Range N/A

Key Entry N/A

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

```
:DISPlay:CONTrast <value>
: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).

***RST** N/A

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

```
:DISPlay:INVerse ON|OFF|1|0
:DISPlay:INVerse?
```

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

***RST** N/A

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

```
: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.

***RST** N/A

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

```
: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).

***RST** N/A

Key Entry N/A

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

```
*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.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

*ESE

Supported All

```
*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.

***RST** N/A

Range 0–255

Key Entry N/A

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 *Programming Guide* for more information.

*ESE?

Supported All

```
*ESE?
```

The Standard Event Status Enable (ESE) query returns the value of the Standard Event Status Enable Register.

***RST** N/A

Range N/A

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

*ESR?

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.

```
*ESR?
```

The Standard Event Status Register (ESR) query returns the value of the Standard Event Status Register.

***RST** N/A

Range N/A

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

*IDN?

Supported All

```
*IDN?
```

The Identification (IDN) query outputs an identifying string. The response will show the following information:

```
<company name>, <model number>, <serial number>, <firmware revision>
```

***RST** N/A

Range N/A

Key Entry **Diagnostic Info**

Remarks The identification information can be modified. Refer to ":IDN" on page 158 for more information.

*OPC

Supported All

```
*OPC
```

The Operation Complete (OPC) command sets bit 0 in the Standard Event Status Register when all pending operations have finished.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

*OPC?

Supported All

```
*OPC?
```

The Operation Complete (OPC) query returns the ASCII character 1 in the Standard Event Status Register when all pending operations have finished.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

*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.

***RST** N/A

Key Entry N/A

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

*PSC?

Supported All

`*PSC?`

The Power-On Status Clear (PSC) query returns the flag setting as enabled by the `*PSC` command.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

*RCL

Supported All

`*RCL <reg>,<seq>`

The Recall (RCL) command recalls the state from the specified memory register <reg> of the specified sequence <seq>.

***RST** N/A

Range *Registers*: 0–99 *Sequences*: 0–9

Key Entry **RECALL Reg** **Select Seq:**

Remarks N/A

*RST

Supported All

```
*RST
```

The Reset (RST) command resets most signal generator functions to factory-defined conditions.

***RST** N/A

Range N/A

Key Entry N/A

Remarks Each command shows the *RST value if the setting is affected.

*SAV

Supported All

```
*SAV <reg>,<seq>
```

The Save (SAV) command saves the state of the signal generator to the specified memory register <reg> of the specified sequence <seq>.

***RST** N/A

Range *Registers*: 0–99 *Sequences*: 0–9

Key Entry **Save Reg** **Save Seq[n] Reg[nn]**

Remarks N/A

*SRE

Supported All

```
*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.

***RST** N/A

Range 0–255

Key Entry N/A

Remarks Refer to chapter 3 of the *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

`*SRE?`

The Service Request Enable (SRE) query returns the value of the Service Request Enable Register.

***RST** N/A

Range 0–63 or 128–191

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

*STB?

Supported All

`*STB?`

The Read Status Bye (STB) query returns the value of the status byte including the master summary status (MSS) bit.

***RST** N/A

Range 0–255

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

*TRG

Supported All

`*TRG`

The Trigger (TRG) command triggers the device if BUS is the selected trigger source,

otherwise, *TRG is ignored.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

*TST?

Supported All

```
*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.

***RST** N/A

Range N/A

Key Entry **Run Complete Self Test**

Remarks N/A

*WAI

Supported All

```
*WAI
```

The Wait-to-Continue (WAI) command causes the signal generator to wait until all pending commands are completed, before executing any other commands.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

Memory Subsystem (:MEMory)

:CATalog:BINary

Supported All

```
: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>"
```

***RST** N/A

Range N/A

Key Entry Binary

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:BIT

Supported All

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **Bit**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:CDMa

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry **CDMA**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:DMOD

Supported All with Option 001 or 002

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **DMOD**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:DWCDma

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry **DWCDMA**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:FCDMa

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry **FCDMA**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:FIR

Supported All

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **FIR**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:FSK

Supported All with Option 402

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **FSK**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:IQ

Supported All

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **I/Q**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:LIST

Supported All

```
: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>"
```

***RST** N/A

Range N/A

Key Entry List

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:MCDMa

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry MCDMA

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:MDMod

Supported All with Option 001 or 002

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **MDMOD**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:MDWCdma

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry **MDWCDMA**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:MFCdma

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry **MFCDMA**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:MTONe

Supported All with Option 001 or 002

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **MTONE**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:RCDMa

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry **RCDMA**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:SEQ

Supported All with Option 001 or 002

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **SEQ**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:SHAPe

Supported All with Option 402

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **SHAPE**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:STATe

Supported All

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **State**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:UFLT

Supported All

```
: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>"
```

***RST** N/A

Range N/A

Key Entry **User Flatness**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog:UWCDma

Supported All 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>"
```

***RST** N/A

Range N/A

Key Entry **UWCDMA**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:CATalog[:ALL]

Supported All

```
: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 or 002 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>"
```

***RST** N/A

Range N/A

Key Entry All

Remarks Refer to Table 3-1 on page 121 for a listing of the file types and "File Name Variables" on page 14 for information on the "<file name>" syntax.

:COPY[:NAME]

Supported All

```
:MEMory:COPY[:NAME] "<file name>","<file name>"
```

This command makes a duplicate of the requested file.

***RST** N/A

Range N/A

Key Entry Copy File

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

When copying a waveform file from volatile to non-volatile memory, the marker and header files associated with the waveform file will automatically be copied at the same time.

:DATA

Supported All

```
:MEMory:DATA "<file name>",<datablock>
:MEMory:DATA? "<file name>"
```

This command creates a user data file and stores it in the signal generator non-volatile binary memory catalog.

<file name> This variable represents the user file stored in the signal generator non-volatile memory.

<datablock> This variable represents the block-formatted data.

Example:

```
:MEMory:DATA "userfile", #1912S407897
```

userfile This is the user file as it appears in the signal generator.

1 This variable defines the number of decimal digits to follow.

9 This variable defines how many bytes of data are to follow.

12S407897 This is the ASCII representation of the data that is downloaded to the signal generator.

***RST** N/A

Range N/A

Key Entry N/A

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:DATA:BIT

Supported All

```
:MEMory:DATA:BIT "<file name>",<bit_count>,<datablock>
:MEMory:DATA:BIT? "<file name>"
```

This command creates a bit file and stores it in the signal generator non-volatile memory.

"<file name>" This variable represents the user file name as it will appear in the signal generator memory.

<bit_count> This variable represents the number of significant bits in the data block.

<datablock> This variable represents the block-formatted data.

Example:

```
:MEMory:DATA:BIT "userfile1", 16, #12Qz
```

"userfile1" This is the name of the user file as it appears in the signal generator.

16 This variable defines the actual number of data bits contained in the datablock.

1 This variable defines the number of decimal digits to follow.

2 This variable defines how many bytes of data are to follow.

Qz This variable defines the ASCII representation of the 16 bits of data that are downloaded to the signal generator.

***RST** N/A

Range N/A

Key Entry N/A

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:DATA:FIR

Supported All

```
:MEMory:DATA:FIR "<file name>",osr,coefficient{,coefficient}
:MEMory:DATA:FIR? "<file name>"
```

This command creates a user-defined finite impulse response (FIR) file and stores it in the signal generator non-volatile memory.

osr The oversample ratio (osr) is the number of filter taps per symbol.

coefficient This variable is the FIR coefficient. The maximum total number of coefficients is 1024.

{,coefficient} This optional variable is used when you enter additional coefficients.

***RST** N/A

Range *osr:* 1–32

coefficient: –1000 to 1000

Key Entry **Oversample Ratio**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:DATA:FSK

Supported All with Option 001 or 002

```
: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 creates a custom FSK file and stores it in the signal generator non-volatile memory.

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.
<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.

The following example creates and stores a four-level FSK file named `4FSK` that has four states (frequencies): –2kHZ, –1kHZ, 2kHZ, 1kHZ; differential encoding is toggled ON, and there are two differential states 1 and 0.

```
:MEM:DATA:FSK "4FSK",4,–2kHZ,–1kHZ,2kHZ,1kHZ,ON,2,1,0
```

***RST** N/A

Range *num_diff_states*: 0–256
num_states: 2–16
f0–f(n): –20MHZ to 20MHZ
diff0–diff(n): –128 to 127

Key Entry N/A

Remarks N/A

:DATA:IQ

Supported All

```
: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 creates a custom I/Q file and stores it in the signal generator non-volatile memory.

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.
<offsetQ>	This variable enables or disables the Q output delay by 1/2 symbol from the I output.
<num_states>	This variable identifies the number of symbols.
<i0>...<i(n)>	This variable identifies the I value of the first and subsequent I symbols.
<q0>...<q(n)>	This variable identifies 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.

The following example creates and stores a two-symbol I/Q file named `testBPSK` that has the Q offset.

```
:MEM:DATA:IQ "testBPSK",1,2,1,0,0,0
```

***RST** N/A

Range *num_states*: 2–256
i0–i(n): –1 to 1
q0–q(n): –1 to 1
num_diff_states: 0–256
diff0–diff(n): -128 to 127

Key Entry N/A

Remarks N/A

:DATA:PRAM[1]|2|3|4

Supported All

```
:MEMory:DATA:PRAM[1]|2|3|4?
```

This query determines whether there is a user-defined pattern in the pattern RAM (PRAM).

***RST** 0

Range N/A

Key Entry N/A

Remarks N/A

:DATA:PRAM[1]|2|3|4:BLOCk

Supported All

```
:MEMory:DATA:PRAM[1]|2|3|4:BLOCk <datablock>
```

This command downloads the block-formatted data directly into pattern RAM.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

:DATA:PRAM[1]|2|3|4:LIST

Supported All

```
:MEMory:DATA:PRAM[1]|2|3|4:LIST <uint8>[,<uint8>,<...>]
```

This command downloads the list-formatted data directly into pattern RAM.

<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.

***RST** N/A

Range 0–255

Key Entry N/A

Remarks N/A

:DATA:SHAPe

Supported All with Option 402

```
: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.

"<file name>" 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.

***RST** N/A

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

Key Entry N/A

Remarks N/A

:DELete:ALL

Supported All

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 or 002 baseband generator. You cannot recover the files after executing this command.

```
:MEMory:DELete:ALL
```

This command clears the file system of all user files.

***RST** N/A

Range N/A

Key Entry **Delete All Files**

Remarks N/A

:DELete:BINary

Supported All

```
:MEMory:DELete:BINary
```

This command deletes all binary files.

***RST** N/A

Range N/A

Key Entry **Delete All Binary Files**

Remarks N/A

:DELete:BIT

Supported All

```
:MEMory:DELete:BIT
```

This command deletes all bit files.

***RST** N/A

Range N/A

Key Entry **Delete All Bit Files**

Remarks N/A

:DELete:CDMa

Supported All with Option 401

```
:MEMory:DELete:CDMa
```

This command deletes all arbitrary waveform IS-95 CDMA files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB CDMA Files**

Remarks N/A

:DELete:DMOD

Supported All with Option 001 or 002

```
:MEMory:DELete:DMOD
```

This command deletes all arbitrary waveform digital modulation files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB DMOD Files**

Remarks N/A

:DELete:DWCDma

Supported All with Option 400

```
:MEMory:DELete:DWCDma
```

This command deletes all arbitrary waveform downlink W-CDMA files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB DWCDMA Files**

Remarks N/A

:DELete:FCDMa

Supported All with Option 401

```
:MEMory:DELete:FCDMa
```

This command deletes all arbitrary waveform forward link W-CDMA files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB FCDMA Files**

Remarks N/A

:DELete:FIR

Supported All

```
:MEMory:DELete:FIR
```

This command deletes all finite impulse response filter files.

***RST** N/A

Range N/A

Key Entry **Delete All FIR Files**

Remarks N/A

:DELete:FSK

Supported All with Option 001 or 002

```
:MEMory:DELete:FSK
```

This command deletes all FSK files.

***RST** N/A

Range N/A

Key Entry **Delete All FSK Files**

Remarks N/A

:DELete:IQ

Supported All

```
:MEMory:DELete:IQ
```

This command deletes all I/Q files.

***RST** N/A

Range N/A

Key Entry **Delete All I/Q Files**

Remarks N/A

:DELete:LIST

Supported All

```
:MEMory:DELete:LIST
```

This command deletes all List files.

***RST** N/A

Range N/A

Key Entry **Delete All List Files**

Remarks N/A

:DELete:MCDMa

Supported All with Option 401

```
:MEMory:DELete:MCDMa
```

This command deletes all arbitrary waveform multicarrier IS-95 CDMA files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB MCDMA Files**

Remarks N/A

:DELete:MDMod

Supported All with Option 001 or 002

```
:MEMory:DELete:MDMod
```

This command deletes all arbitrary waveform multicarrier digital modulation files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB MDMOD Files**

Remarks N/A

:DELete:MDWCdma

Supported All with Option 400

```
:MEMory:DELete:MDWCdma
```

This command deletes all arbitrary waveform multicarrier downlink W-CDMA files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB MDWCDMA Files**

Remarks N/A

:DELete:MFCdma

Supported All with Option 401

```
:MEMory:DELete:MFCdma
```

This command deletes all arbitrary waveform multicarrier forward link cdma2000 files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB MFCDMA Files**

Remarks N/A

:DELete:MTONe

Supported All with Option 001 or 002

```
:MEMory:DELete:MTONe
```

This command deletes all arbitrary waveform multitone files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB MTONE Files**

Remarks N/A

:DELete:RCDMa

Supported All with Option 401

```
:MEMory:DELete:RCDMa
```

This command deletes all arbitrary waveform reverse link cdma2000 files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB RCDMA Files**

Remarks N/A

:DELete:SEQ

Supported All with Option 001 or 002

`:MEMory:DELete:SEQ`

This command deletes all sequence files.

***RST** N/A

Range N/A

Key Entry **Delete All Sequence Files**

Remarks N/A

:DELete:SHAPe

Supported All with Option 402

`:MEMory:DELete:SHAPe`

This command deletes all burst shape files.

***RST** N/A

Range N/A

Key Entry **Delete All Shape Files**

Remarks N/A

:DELete:STATe

Supported All

`:MEMory:DELete:STATe`

This command deletes all state files.

***RST** N/A

Range N/A

Key Entry **Delete All State Files**

Remarks N/A

:DELete:UFLT

Supported All

```
:MEMory:DELete:UFLT
```

This command deletes all user-flatness correction files.

***RST** N/A

Range N/A

Key Entry **Delete All UFLT Files**

Remarks N/A

:DELete:UWCDma

Supported All with Option 400

```
:MEMory:DELete:UWCDma
```

This command deletes all arbitrary waveform uplink W-CDMA files.

***RST** N/A

Range N/A

Key Entry **Delete All ARB UWCDMA Files**

Remarks N/A

:DELete[:NAME]

Supported All

```
:MEMory:DELete[:NAME] "<file name>"
```

This command clears the user file system of "<file name>".

***RST** N/A

Range N/A

Key Entry **Delete File**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

When deleting a waveform (WFM1) file from memory, the marker and headers file associated with the waveform file will also be deleted.

:FREE[:ALL]

Supported All

```
:MEMory:FREE[:ALL]?
```

This command returns the number of bytes left in the user file system.

***RST** N/A

Range N/A

Key Entry **All**

Remarks N/A

:LOAD:LIST

Supported All

```
:MEMory:LOAD:LIST "<file name>"
```

This command loads a list sweep file.

***RST** N/A

Range N/A

Key Entry **Load From Selected File**

Remarks N/A

:MOVE

Supported All

```
:MEMory:MOVE "<src_file>","<dest_file>"
```

This command renames the requested file in the memory catalog.

***RST** N/A

Range N/A

Key Entry **Rename File**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:STATe:COMMent

Supported All

```
: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.

***RST** N/A

Range N/A

Key Entry **Add Comment To Seq[n] Reg[nn]**

Remarks N/A

:STORe:LIST

Supported All

```
:MEMory:STORe:LIST "<file name>"
```

This command stores the current list sweep data to a file.

***RST** N/A

Range N/A

Key Entry **Store To File**

Remarks N/A

Mass Memory Subsystem (:MMEMory)

:CATalog

Supported All

```
: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 3-1.

Table 3-1

File System	File Type
BINARY	BIN
BIT	BIT
CDMA	CDMA
DMOD - ARB digital modulation file	DMOD
DWCDMA - ARB downlink W-CDMA file	DWCD
FCDMA - ARB forward link cdma2000 file	FCDM
FIR - finite impulse response filter file	FIR
FSK - frequency shift keying modulation file	FSK
I/Q - modulation file	IQ
LIST - sweep list file	LIST
MCDMA - ARB multicarrier CDMA file	MCDM
MDMOD - ARB multicarrier digital modulation file	MDM
MDWCDMA - ARB multicarrier downlink W-CDMA file	MDWC
MFCDMA - ARB multicarrier forward link cdma2000 file	MFCD
MTONE - ARB multitone file	MTON
NVMKR - non-volatile arbitrary waveform marker file	NVMKR

Table 3-1

File System	File Type
NVWFM - non-volatile arbitrary waveform file	NVWFM
RCDMA - ARB reverse link cdma2000 file	RCDM
SEQ - ARB sequence file	SEQ
SHAPE - burst shape file	SHAP
STATE	STAT
USERFLAT - user-flatness file	UFLT
UWCDMA - ARB uplink W-CDMA file	UWCD
WFM1 - waveform file	WFM1

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>"
```

***RST** N/A

Key Entry **Binary** **List** **State** **User Flatness** **FIR** **Shape** **Bit** **FSK** **IQ** **Seq** **DMOD** **MTONE** **MDMOD** **CDMA** **MCDMA** **FCDMA** **MFCDMA** **RCDMA** **WCDMA** **FWCDMA** **MFWCDMA** **RWCDMA** **DWCDMA** **MDWCDMA** **UWCDMA** **WFM1** **NVMKR** **NVWFM**

Remarks Refer to "MSUS (Mass Storage Unit Specifier) Variable" on page 15 for information on the use of the "<msus>" variable.

:COPY

Supported All

```
:MMEMory:COPY "<file name>","<file name>"
```

This command makes a duplicate of the requested file.

***RST** N/A

Key Entry **Copy File**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

When copying a waveform file from volatile to non-volatile memory, the marker and header files associated with the waveform file will automatically be copied at the same time.

:DATA

Supported All

```
: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>".

***RST** N/A

Key Entry N/A

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:DELete:NVWFm

Supported All with Option 001 or 002

```
:MMEMory:DELete:NVWFm
```

This command clears the user file system of all non-volatile arbitrary waveform files.

***RST** N/A

Key Entry **Delete All NVWFM Files**

Remarks N/A

:DELete:WFM

Supported All with Option 001 or 002

```
:MMEMory:DELete:WFM
```

This command clears the user file system of all arbitrary waveform files.

***RST** N/A

Key Entry **Delete All WFM1 Files**

Remarks N/A

:DELete:WFM1

Supported All with Option 001 or 002

```
:MMEMory:DELete:WFM1
```

This command clears the user file system of all arbitrary waveform files.

***RST** N/A

Key Entry **Delete All WFM1 Files**

Remarks N/A

: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 "<file system>:". For a list of the file systems refer to Table 3-1 on page 121.

***RST** N/A

Range N/A

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 14 and "MSUS (Mass Storage Unit Specifier) Variable" on page 15 for information on the use of the file variables.

When deleting a waveform file from memory, the marker and headers file associated with the waveform file will also be deleted.

:HEADer:CLEar

Supported All

```
:MMEMory:HEADer:CLEar "<file name>"
```

This command deletes the header file for the waveform file named.

***RST** N/A

Key Entry **Clear Header**

Remarks This command does not require a personality modulation to be on.

:HEADer:DESCription

Supported All

```
:MMEMory:HEADer:DESCription "<file name>","<description>"
:MMEMory:HEADer:DESCription? "<file name>"
```

This command inserts a description for the header file named.

***RST** N/A

Key Entry **Edit Description**

Remarks The header description is limited to 32 characters.

:LOAD:LIST

Supported All

```
:MMEMory:LOAD:LIST "<file name>"
```

This command loads a List sweep file.

***RST** N/A

Key Entry **Load From Selected File**

Remarks N/A

:MOVE

Supported All

```
:MMEMory:MOVE "<src_file>","<dest_file>"
```

This command renames the requested file in the memory catalog.

***RST** N/A

Key Entry **Rename File**

Remarks Refer to "File Name Variables" on page 14 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.

***RST** N/A

Key Entry **Store To File**

Remarks N/A

Output Subsystem (:OUTPut)

:BLANking:AUTO

Supported All

```
:OUTPut:BLANking:AUTO ON|OFF|1|0
:OUTPut:BLANKing:AUTO?
```

This command enables or disables the RF output blanking during frequency changes.

ON This choice causes the RF to always blank.

OFF This choice causes the RF to not blank.

***RST** 1

Key Entry **Output Blanking Off On Auto**

Remarks N/A

:BLANking:STATe

Supported All

```
:OUTPut:BLANking:STATe ON|OFF|1|0
:OUTPut:BLANKing:STATe?
```

This command enables or disables the RF output blanking state.

***RST** 1

Key Entry N/A

Remarks N/A

: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 Most modulation types can be simultaneously enabled except FM with ΦM.

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 All

```
: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 All

```
: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 131.

:INPut:DPOLarity

Supported All

```
: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 131.

:INPut:SPOLarity

Supported All

```
: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.

:INPut:TPOLarity

Supported All

```
:ROUTe:HARDware:DGENerator:INPut:TPOLarity POSitive|NEGative
:ROUTe:HARDware:DGENerator:INPut:TPOLarity?
```

This command configures the polarity of the of the input TTL signal at the PATT TRIG IN connector. POSitive refers to normal logic while NEGative refers to inverted logic.

***RST** POS

Key Entry **Pattern Trig In Polarity Neg Pos**

Remarks This command performs the same function as ":IPOLarity:TRIGger" on page 132.

:IPOLarity:BGATe

Supported All

```
: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 129.

:IPOLarity:CLOCk

Supported All

```
: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 129.

:IPOLarity:DATA

Supported All

```
: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 129.

:IPOLarity:SSYNc

Supported All

```
: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 130.

:IPOLarity:TRIGger

Supported All

```
:ROUTe:HARDware:DGENerator:IPOLarity:TRIGger POSitive|NEGative
:ROUTe:HARDware:DGENerator:IPOLarity:TRIGger?
```

This command configures the polarity of the TTL signal at the PATT TRIG IN connector that triggers an event. POSitive refers to normal logic, while NEGative refers to inverted logic.

***RST** POS

Key Entry **Pattern Trig In Polarity Neg Pos**

Remarks This command performs the same function as ":INPut:TPOLarity" on page 130.

:OPOLarity:CLOCk

Supported All

```
: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 All

```
: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:EVENt[1]|2|3|4

Supported All

```
:ROUTe:HARDware:DGENerator:OPOLarity:EVENt[1]|2|3|4 POSitive|NEGative
:ROUTe:HARDware:DGENerator:OPOLarity:EVENt[1]|2|3|4?
```

This command configures the polarity of the TTL output signal at the EVENT 1 or EVENT 2 connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

***RST** POS

Key Entry **Event 1 Polarity Neg Pos** **Event 2 Polarity Neg Pos**

Remarks This command performs the same function as ":OUTPut:EPOL[1]|2|3|4" on page 135.

:OPOLarity:SSYNc

Supported All

```
: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 136.

:OUTPut:CPOLarity

Supported All

```
: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 132.

:OUTPut:DCS[:STATe]

Supported All

```
: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**

Remarks N/A

:OUTPut:DPOLarity

Supported All

```
: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:EPOL[1]|2|3|4

Supported All

```
:ROUTe:HARDware:DGENerator:OUTPut:EPOL[1]|2|3|4 POSitive|NEGative
:ROUTe:HARDware:DGENerator:OUTPut:EPOL[1]|2|3|4?
```

This command configures the polarity of the TTL output signal at the EVENT1 or EVENT 2 connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

***RST** POS

Key Entry **Event 1 Polarity Neg Pos**

Event 2 Polarity Neg Pos

Remarks This command performs the same function as ":OPOLarity:EVENt[1]|2|3|4" on page 133.

:OUTPut:SPOLarity

Supported All

```
: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**

Remarks N/A

Status Subsystem (:STATus)

:OPERation:BASeband:CONDition

Supported All with Option 001 or 002

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects the current conditions.

Refer to chapter 3 of the *Programming Guide* for more information.

:OPERation:BASeband:ENABle

Supported All with Option 001 or 002

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

:OPERation:BASeband:NTRansition

Supported All with Option 001 or 002

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

:OPERation:BASeband:PTRansition

Supported All with Option 001 or 002

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

:OPERation:BASeband[:EVENt]

Supported All with Option 001 or 002

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects current conditions.

Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *Programming Guide* for more information.

:PRESet

Supported All

```
:STATus:PRESet
```

This command presets all transition filters, enable registers, and error/event queue enable registers.

***RST** N/A

Range N/A

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

:QUEStionable:BERT:CONDition

Supported All with Option UN7

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects the current conditions.

Refer to chapter 3 of the *Programming Guide* for more information.

:QUEStionable:BERT:ENABle

Supported All with Option UN7

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

:QUEStionable:BERT:NTRansition

Supported All with Option UN7

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects the current conditions.

Refer to chapter 3 of the *Programming Guide* for more information.

:QUEStionable:BERT:PTRansition

Supported All with Option UN7

```
: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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *Programming Guide* for more information.

:QUEStionable:BERT[:EVENt]

Supported All with Option UN7

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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects the current conditions.

Refer to chapter 3 of the *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.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects current conditions.

Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects current conditions.

Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects current conditions.

Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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 unleveled (bit 1), a value of 2 is returned.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks The data in this register is continuously updated and reflects current conditions.

Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *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.

***RST** N/A

Range 0–32767

Key Entry N/A

Remarks Refer to chapter 3 of the *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.

***RST** N/A

Range 0–32767

Key Entry N/A

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 *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 (a|b).

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

: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>

***RST** N/A

Range <*month*>: 1–12 <*day*>: 1–31

Key Entry **Time/Date**

Remarks N/A

: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.

***RST** N/A

Range N/A

Key Entry **Error Info** **View Next Error Message**

Remarks The error messages are erased after being queried.

: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.

***RST** 1

Key Entry N/A

Remarks N/A

: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.

***RST** N/A

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.

***RST** N/A

Key Entry N/A

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.
PDC	This choice provides compatibility for the 8657D PDC personality which is supported only through a GPIB interface.

PHS — This choice provides compatibility for the 8657J PHS personality which is supported only through a GPIB interface.

8648 — This choice provides compatibility for the 8648A/B/C/D signal generator which is supported only through a GPIB interface.

***RST** N/A

Key Entry **SCPI** **8656B,8657A/B** **8657D NADC** **8657D PDC** **8657J PHS** **8648A/B/C/D**

Remarks 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 *Programming Compatibility Guide*.

:PON:TYPE

Supported All

```
:SYSTem:PON:TYPE PRESet|LAST
:SYSTem:PON:TYPE?
```

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 162 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.

***RST** N/A

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.

***RST** N/A

Range N/A

Key Entry **Preset**

Remarks The defined conditions are either factory- or user-defined. Refer to ":PRESet:TYPE" on page 162 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`.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

: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.

PDC This choice provides compatibility for the 8657D PDC personality which is supported only through a GPIB interface.

PHS This choice provides compatibility for the 8657J PHS personality which is supported only through a GPIB interface.

8648 This choice provides compatibility for the 8648A/B/C/D signal generator which is supported only through a GPIB interface.

***RST** "SCPI"

Key Entry **SCPI** **8656B,8657A/B** **8657D NADC** **8657D PDC** **8657J PHS** **8648A/B/C/D**

Remarks N/A

: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.

***RST** N/A

Range N/A

Key Entry **Restore Sys Defaults**

Remarks N/A

:PRESet:PN9

Supported All

```
: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**

Remarks N/A

:PRESet:TYPE

Supported All

```
:SYSTem:PRESet:TYPE NORMal|USER
:SYSTem:PRESet:TYPE?
```

This command toggles the preset state between factory- and user-defined conditions.

***RST** N/A

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.

***RST** N/A

Range N/A

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.

: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.

***RST** N/A

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 163 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.

***RST** N/A

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.

***RST** N/A

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.

***RST** N/A

Range <hour>: 0–23 <minute>: 0–59 <second>: 0–59

Key Entry Time/Date

Remarks N/A

:VERSion

Supported All

```
:SYSTem:VERSion?
```

This command returns the SCPI version number with which the signal generator complies.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

Trigger Subsystem

:ABORt

Supported All

```
:ABORt
```

This command causes the list or step sweep in progress to abort.

***RST** N/A

Range N/A

Key Entry N/A

Remarks 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.

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 166 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 arms or arms 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

***RST** N/A

Range N/A

Key Entry **Single Sweep**

Remarks This command is ignored if a sweep is in progress.

Refer to ":INITiate:CONTinuous[:ALL]" on page 165 for setting continuous or single sweep.

Refer to ":TRIGger[:SEQuence]:SOURce" on page 167 to select the trigger source.

:TRIGger:OUTPut:POLarity

Supported All

```
:TRIGger:OUTPut:POLarity POSitive|NEGative
:TRIGger:OUTPut:POLarity?
```

This command sets the polarity of the TTL signal present at the TRIG OUT connector.

***RST** POS

Key Entry **Trigger Out Polarity Neg Pos**

Remarks 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 TRIG OUT at the beginning of each sweep.

: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**

Remarks N/A

: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

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

Remarks The wait for the BUS, EXTernal, or KEY trigger can be bypassed by sending the `:TRIGger[:SEQuence][:IMMediate]` command.

:TRIGger[:SEQuence][:IMMediate]

Supported All

```
:TRIGger[:SEQuence][:IMMediate]
```

This event command causes an armed list or step sweep to immediately start without the selected trigger occurring.

***RST** N/A

Range N/A

Key Entry N/A

Remarks N/A

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 63 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 for the ESG Vector Signal Generator. This chapter contains the following major sections:

Amplitude Modulation Subsystem ([:SOURce])

:AM[1]|2...

Supported All

```
[: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

```
[: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.

***RST** N/A

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

```
[: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 127 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:EXTernal[1]|2:COUPling

Supported All

```
[: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.

:AM[1]|2:INTernal[1]:FREQuency

Supported All

```
[: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**

Remarks N/A

:AM[1]|2:INTernal[1]:FREQuency:ALTernate

Supported All

```
[: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

```
[: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

```
[: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**

Remarks N/A

:AM[1]|2:INTernal[1]:SWEep:TIME

Supported All

```
[: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**

Remarks N/A

:AM[1]|2:INTernal[1]:SWEep:TRIGger

Supported All

`[: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

`[: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_p 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_p.

:AM[1]|2:STATe

Supported All

```
[: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 127 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

```
[:SOURce]:AM[1]|2[:DEPTh] <val><unit>|UP|DOWN
[:SOURce]:AM[1]|2[:DEPTh]?
```

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.

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

```
[:SOURce]:AM[1]|2[:DEPTh]:TRACk ON|OFF|1|0
[:SOURce]:AM[1]|2[:DEPTh]: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

```
[:SOURce]:AM[:DEPTh]:STEP[:INCRement] <val><unit>
[:SOURce]:AM[:DEPTh]:STEP[:INCRement]?
```

This command sets the AM depth step increment.

***RST** N/A

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

```
[: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

```
[:SOURce]:FM:INTernal:FREQuency:STEP[:INCRement] <num>
[: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

```
[: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

```
[: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**

Remarks N/A

:FM[1]|2:INTernal[1]:FREQuency:ALTernate

Supported All

```
[: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]:FUNCtion:SHAPe" on page 183 for the waveform selection.

:FM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent

Supported All

```
[: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

```
[: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

```
[: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 183 for the waveform selection.

:FM[1]|2:INTernal[1]:SWEep:TRIGger

Supported All

```
[: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 183 for the waveform selection.

:FM[1]|2:SOURce

Supported All

```
[: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 > ±3% of 1 V_p.

:FM[1]|2:STATe

Supported All

```
[: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 127 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 180 for more information.

:FM[1]|2[:DEViation]

Supported All

```
[:SOURce]:FM[1]|2[:DEViation] <val><unit>
[:SOURce]:FM[1]|2[:DEViation]?
```

This command sets the frequency modulation deviation.

***RST** +1.00000000E+003

Range

Frequency	*Deviation*	*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

```
[: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

```
[: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**

Remarks N/A

:FUNCtion[1]:FREQuency

Supported All

```
[: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 190 for selecting the waveform type.

:FUNCtion[1]:FREQuency:ALTernate

Supported All

```
[:SOURce]:LFOutput:FUNCtion[1]:FREQuency:ALTernate <val><unit>
[: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 190 for selecting the waveform type.

:FUNCtion[1]:FREQuency:ALTernate:AMPLitude:PERCent

Supported All

```
[:SOURce]:LFOutput:FUNCtion[1]:FREQuency:ALTernate:AMPLitude:
PERCent <val><unit>
[: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 190 for selecting the waveform type.

:FUNCtion[1]:PERiod

Supported All

```
[:SOURce]:LFOutput:FUNCtion[1]:PERiod <val><unit>
[: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**

Remarks N/A

:FUNCtion[1]:PWIDth

Supported All

```
[:SOURce]:LFOutput:FUNCtion[1]:PWIDth <val><unit>
[: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 µS, the pulse width is limited to a maximum range value of 16 µS.

***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 189.

:FUNCtion[1]:SHAPe

Supported All

```
[: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

Key Entry **Sine** **Dual-Sine** **Swept-Sine** **Triangle** **Square** **Ramp** **Pulse** **Noise** **DC**

Remarks Function Generator must be the source selection to support DUALsine or the SWEPtsine waveform. Refer to ":SOURce" on page 191.

:FUNCtion[1]:SWEep:TIME

Supported All

```
[:SOURce]:LFOutput:FUNCtion[1]:SWEep:TIME <val><unit>
[: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**

Remarks N/A

:FUNCtion[1]:SWEep:TRIGger

Supported All

```
[: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.

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 ":FUNCtion[1]:SHAPe" on page 190 for selecting the waveform type.

:SOURce

Supported All

```
[: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**

Remarks N/A

:STATe

Supported All

```
[: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**

Remarks N/A

Phase Modulation Subsystem ([:SOURce])

:PM[1]|2...

Supported All

`[:SOURce]:PM[1]|2...`

This prefix enables the selection of the ΦM path and is part of most SCPI commands associated with this subsystem. The two paths are equivalent to the **ΦM Path 1 2** softkey.

PM[1] **ΦM Path 1 2** with 1 selected

PM2 **ΦM 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]

:PM:INTernal:FREQuency:STEP[:INCRement]

Supported All

`[:SOURce]:PM:INTernal:FREQuency:STEP[:INCRement] <num>`
`[: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.

***RST** N/A

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 ΦM frequency command. Refer to ":PM[1]|2:INTernal[1]:FREQuency" on page 195for 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

```
[: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**

Remarks N/A

:PM[1]|2:EXTernal[1]:COUPling

Supported All

```
[: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

```
[: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 190 for selecting the waveform type.

:PM[1]|2:INTernal[1]:FREQuency:ALTernate

Supported All

```
[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALTernate <val><unit>
[: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 196 for the waveform selection.

:PM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent

Supported All

```
[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:
PERCent <val><unit>
[: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 196 for the waveform selection.

:PM[1]|2:INTernal[1]:FUNCtion:SHAPe

Supported All

```
[: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 INTernal1 source selection does not support the DUALsine and SWEPtsine waveform choices.

:PM[1]|2:INTernal[1]:SWEep:TIME

Supported All

```
[: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 **ΦM 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

```
[: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.

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 ":PM[1]|2:INTernal[1]:FUNCtion:SHAPe" on page 196 for the waveform selection.

:PM[1]|2:SOURce

Supported All

```
[:SOURce]:PM[1]|2:SOURce INT[1]|EXT1|EXT2
[:SOURce]:PM[1]|2:SOURce?
```

This command sets the source to generate the phase modulation.

INT — This choice selects internal source 1 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 1** **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 > ±3% of 1 V_p.

:PM[1]|2:STATe

Supported All

```
[: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.

***RST** 0

Key Entry **ΦM Off On**

Remarks The RF carrier is modulated when you set the signal generator's modulation state to ON, see ":MODulation[:STATe]" on page 127 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 193 for more information.

:PM[1]|2[:DEViation]

Supported All

```
[: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

Range

Frequency	*Normal Bandwidth*	*High Bandwidth*
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 199 for setting the value associated with the UP and DOWN choices.

:PM[1]|2[:DEViation]:TRACk

Supported All

```
[: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 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

```
[:SOURce]:PM[:DEViation]:STEP[:INCRement] <val><unit>
[:SOURce]:PM[:DEViation]:STEP[:INCRement]?
```

This command sets the phase modulation deviation step increment.

***RST** N/A

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 ΦM deviation command. Refer to ":PM[1]|2[:DEViation]" on page 198 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

```
[: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 203 for the pulse modulation type selection.

:INTernal[1]:FUNCtion:SHAPe

Supported All

```
[: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**

Remarks N/A

:INTernal[1]:PERiod

Supported All

```
[:SOURce]:PULM:INTernal[1]:PERiod <val><unit>|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 202 for setting the value associated with the UP and DOWN choices.

:INTernal[1]:PERiod:STEP[:INCRement]

Supported All

```
[:SOURce]:PULM:INTernal[1]:PERiod:STEP[:INCRement] <val><unit>|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 201 for more information.

:INTernal[1]:PWIDth

Supported All

```
[: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.

***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 203 for setting the value associated with the UP and DOWN choices.

:INTernal[1]:PWIDth:STEP

Supported All

```
[: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

Key Entry N/A

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 202 for more information.

:SOURce

Supported All

```
[: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**

Remarks N/A

:STATe

Supported All

```
[: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 subsystems dedicated to digital component testing for the ESG Vector Signal Generator. This chapter contains the following major sections:

All Subsystem–Option 001 or 002 ([:SOURce])

:RADio:ALL:OFF

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ALL:OFF
```

This command disables all digital modulation personalities on a particular baseband.

***RST** N/A

Range N/A

Key Entry N/A

Remarks This command does not affect analog modulation.

AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB)

:BWIDth

Supported All 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**

Remarks N/A

:IQ:EXTernal:FILTer

Supported All 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 208 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**

Remarks N/A

:IQ:EXTernal:FILTer:AUTO

Supported All 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 207 for selecting a filter or through path.

***RST** ON

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

Remarks N/A

:HEADer:CLEar

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

***RST** N/A

Key Entry **Clear Header**

Remarks The **AWGN Off On** softkey must be set to On for this command to function.

:HEADer:SAVE

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

***RST** N/A

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 All 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**

Remarks N/A

:IQ:MODulation:ATTen:AUTO

Supported All 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" on page 209 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:IQ:MODulation:FILTer

Supported All 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 209 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**

Remarks N/A

:IQ:MODulation:FILTer:AUTO

Supported All 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 294 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:MDEStination:PULSe

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:AWGN: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 functions.

***RST** NONE

Key Entry **None** **Marker 1** **Marker 2** **Marker 3** **Marker 4**

Remarks N/A

:MDEStination:AAMPlitude

Supported All 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**

Remarks N/A

:MDEStination:ALCHold

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:AWGN: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**

Remarks N/A

:MPOLarity:MARKer1

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

***RST** POS

Key Entry **Marker 1 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer2

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer2 NEGative|POSitive
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

***RST** POS

Key Entry **Marker 2 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer3

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer3 NEGative|POSitive
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

***RST** POS

Key Entry **Marker 3 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer4

Supported All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

***RST** POS

Key Entry **Marker 4 Polarity Neg Pos**

Remarks N/A

:LENgth

Supported All 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 All 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 278.

:REFerence[:SOURce]

Supported All 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 278 to enter the external reference frequency.

:SCLock:RATE

Supported All 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 215 to activate the modulation format.

:SEED

Supported All 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**

Remarks N/A

[:STATe]

Supported All 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**

Remarks N/A

CDMA ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA:ARB)

:CLIPping:I

Supported All 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 III To**

Remarks N/A

:CLIPping:POSition

Supported All 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**

Remarks N/A

:CLIPping:Q

Supported All 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

Range 10–100

Key Entry **Clip |Q| To**

Remarks N/A

:CLIPping:TYPE

Supported All 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|**

Remarks N/A.

:CLIPping[:IJQ]

Supported All 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

Remarks N/A

:CRATe

Supported All 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**

Remarks N/A

:IQ:EXTernal:FILTer

Supported All 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 219 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**

Remarks N/A

:IQ:EXTernal:FILTer:AUTO

Supported All 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 218 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:FILTer

Supported All 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 filter file that you have stored into memory.

***RST** GUAS

Key Entry **Root Nyquist** **Nyquist** **Gaussian** **Rectangle** **IS-95** **IS-95 w/EQ** **IS-95 Mod** **IS-95 Mod w/EQ** **WCDMA** **APCO 25 C4FM** **IS-2000 SR3 DS** **UN3/4 GSM Gaussian** **User FIR**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:FILTer:ALPHa

Supported All 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 219.

:FILTer:BBT

Supported All 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 219.

:FILTer:CHANnel

Supported All 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 219.

:HEADer:CLEar

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

***RST** N/A

Key Entry **Clear Header**

Remarks The **CDMA Off On** softkey must be set to On for this command to function.

:HEADer:SAVE

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

***RST** N/A

Key Entry **Save Setup To Header**

Remarks The **CDMA Off On** softkey must be set to On for this command to function.

:IQMap

Supported All 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 All 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**

Remarks N/A

:IQ:MODulation:ATTen:AUTO

Supported All 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 222 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:IQ:MODulation:FILTer

Supported All 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 223 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**

Remarks N/A

:IQ:MODulation:FILTer:AUTO

Supported All 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 294 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:MDEStination:PULSe

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:CDMA: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 functions.

***RST** NONE

Key Entry **None** **Marker 1** **Marker 2** **Marker 3** **Marker 4**

Remarks N/A

:MDEStination:AAMPlitude

Supported All 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.

***RST** NONE

Key Entry **None** **Marker 1** **Marker 2** **Marker 3** **Marker 4**

Remarks N/A

:MDEStination:ALCHold

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:CDMA: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**

Remarks N/A

:MPOLarity:MARKer1

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

***RST** POS

Key Entry **Marker 1 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer2

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer2 NEGative|POSitive
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

***RST** POS

Key Entry **Marker 2 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer3

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer3 NEGative|POSitive
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

***RST** POS

Key Entry **Marker 3 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer4

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

***RST** POS

Key Entry **Marker 4 Polarity Neg Pos**

Remarks N/A

:OSAMple

Supported All 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 All 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 228.

:REFerence[:SOURce]

Supported All 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 227 to enter the external reference frequency.

:RETRigger

Supported All 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**

Remarks N/A

:SCLock:RATE

Supported All 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 238 to activate the modulation format.

:SETup

Supported All 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.

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 activates Multicarrier mode (3 carrier setup) and deactivates any other mode that was previously selected. To change multicarrier setup, refer to “:SETup:MCARrier” on page 231.

***RST** FWD9

Key Entry **9 Ch Fwd** **32 Ch Fwd** **64 Ch Fwd** **Pilot** **Reverse** **Multicarrier Off On** **Multicarrier Off On** **Custom CDMA State**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:SETup:CHANnel

Supported All 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.

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	-7.00000000E+000	+0	+0

*RST	*Channel #*	*Channel Type*	*Walsh Code*	*Power*	*PN Offset*	*Data*
	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**

Remarks N/A

:SETup:MCARrier

Supported All 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 type of multicarrier CDMA setup required for your application.

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.

***RST** CAR3

Key Entry **3 Carriers** **4 Carriers** **Custom CDMA Multicarrier**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:SETup:MCARrier:STORe

Supported All 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.

***RST** N/A

Range N/A

Key Entry **Store Custom Multicarrier**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:SETup:MCARrier:TABLe

Supported All 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.

" " A null string, entered for any non-custom carrier.

***RST** *carrier type*: FWD9 <*freq_offset*>: +1.25000000E+006
<*power*>: +0.00000000E+000

Range <*freq_offset*>: –7.5E6 to 7.5E6 <*power*>: –40 to 0

Key Entry **9 Ch Fwd** **32 Ch Fwd** **64 Ch Fwd** **Pilot** **Custom CDMA State**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax. To store a multicarrier setup refer to ":SETup:MCARrier:STORe" on page 232

The file name specified must be a single carrier CDMA file.

:SETup:STORe

Supported All 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

***RST** N/A

Range N/A

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 14 for information on the file

name syntax.

:TRIGger:TYPE

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE?
```

This command sets the trigger type.

CONTinuous — The waveform repeats continuously; the waveform restarts every time the previous playback is completed. To customize continuous triggering, refer to ":TRIGger:TYPE:CONTinuous[:TYPE]" on page 234.

SINGle — The waveform segment or 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 high or low.

***RST** CONT

Key Entry **Continuous** **Single** **Gated**

Remarks To change the polarity of the gated trigger, refer to ":TRIGger:TYPE:GATE:ACTive" on page 235.

:TRIGger:TYPE:CONTinuous[:TYPE]

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE|TRIGger|
RESet
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
```

This command customizes the continuous trigger selection.

FREE — This choice immediately transmits a waveform that is continuously repeated.

TRIGger — This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.

RESet — This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

***RST** FREE

Key Entry **Free Run** **Trigger & Run** **Reset & Run**

Remarks To select CONTinuous as the trigger type, refer to ":TRIGger:TYPE" on page 234.

:TRIGger:TYPE:GATE:ACTive

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command toggles the polarity of the active state of the external gating input signal; GATE must be selected as the arb trigger type.

LOW The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.

HIGH The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.

***RST** HIGH

Key Entry **Gate Active Low High**

Remarks To select GATE as the ARB trigger type, refer to ":TRIGger:TYPE" on page 234.

:TRIGger[:SOURce]

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]?
```

This command sets the trigger source.

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 236.

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 **Trigger Key** **Ext** **Bus**

Remarks N/A

:TRIGger[:SOURce]:EXTernal[:SOURce]

Supported All 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 specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1 This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

EPT2 This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

EPTRIGGER1 This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

EPTRIGGER2 This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

***RST** EPT1

Key Entry **Patt Trig In 1** **Patt Trig In 2**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 235.

For more information about the rear panel AUX I/O connector pin configuration, refer to the *User's Guide*.

:TRIGger[:SOURce]:EXTernal:DELay

Supported All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command specifies the time (seconds) for the external trigger delay.

The variable <val> is expressed as seconds (µsec–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 235.

:TRIGger[:SOURce]:EXTernal:DELay:STATe

Supported All 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.

***RST** 0

Key Entry **Ext Delay Off On**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 235.

:TRIGger[:SOURce]:EXTernal:SLOPe

Supported All 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 of the external trigger.

***RST** NEG

Key Entry **Ext Polarity Neg Pos**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 235.

:WLENgth

Supported All 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 All 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 All 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 III To**

Remarks N/A

:CLIPping:POSition

Supported All 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**

Remarks N/A

:CLIPping:Q

Supported All 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**

Remarks N/A

:CLIPping:TYPE

Supported All 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|**

Remarks N/A

:CLIPping[:IJQ]

Supported All 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**

Remarks N/A

:IQ:EXTernal:FILTer

Supported All 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**

Remarks N/A

:IQ:EXTernal:FILTer:AUTO

Supported All 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 242 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:FILTer

Supported All 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 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 filter file that you have stored into memory.

***RST** IS95_MOD_EQ

Key Entry **Root Nyquist** **Nyquist** **Gaussian** **Rectangle** **IS-95** **IS-95 w/EQ** **IS-95 Mod** **IS-95 Mod w/EQ** **APCO 25 C4FM** **WCDMA**

UN3/4 GSM Gaussian **IS-2000 SR3 DS** **User FIR**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:FILTer:ALPHa

Supported All 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 243.

:FILTer:BBT

Supported All 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 243.

:FILTer:CHANnel

Supported All 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 243.

:HEADer:CLEar

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

***RST** N/A

Key Entry **Clear Header**

Remarks The **CDMA2000 Off On** softkey must be set to On for this command to function.

:HEADer:SAVE

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

***RST** N/A

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 All 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**

Remarks N/A

:IQ:MODulation:ATTen:AUTO

Supported All 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 246 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:IQ:MODulation:FILTer

Supported All 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 247 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**

Remarks N/A

:IQ:MODulation:FILTer:AUTO

Supported All 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 294 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:IQMap

Supported All 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 All 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**

Remarks N/A

:LINK:FORWard:SETup

Supported All 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?
```

This command selects a previously defined channel configuration for the CDMA2000 forward link.

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 enables the multicarrier mode. To set the CDMA2000 multicarrier type, refer to “:LINK:FORWard:SETup:MCARrier” on page 249.

***RST** S19C

Key Entry **Pilot** **9 Channel** **Spread Rate 1** **Spread Rate 3** **Multicarrier Off On** **Spreading Type Direct Mcarrier** **Custom CDMA2000 Carrier**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:FORWard:SETup:MCARrier

Supported All 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 This choice specifies the following standard 2-carrier setup:

Carrier 1: spread rate 3, direct spread, 9 channel; –2.5 MHz frequency offset; 0 dB power

Carrier 2: spread rate 3, direct spread, 9 channel; 2.5 MHz frequency offset; 0 dB power

CAR3 This choice specifies the following standard 3-carrier setup:

Carrier 1: spread rate 1, 9 channel; –1.25 MHz frequency offset; 0 dB power

Carrier 2: spread rate 1, 9 channel; 0 kHz frequency offset; 0 dB power

Carrier 3: spread rate 1, 9 channel; 1.25 MHz frequency offset; 0 dB power

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

Key Entry **2 SR3 Carriers** **3 Carriers** **4 Carriers** **Custom CDMA2000 Multicarrier**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:FORWard:SETup:MCARrier:STORe

Supported All 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.

***RST** N/A

Range N/A

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 14 for information on the file name syntax.

:LINK:FORWard:SETup:MCARrier:TABLe

Supported All 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.

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>`

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 25.
S1Pilot	This choice sets a single SR1 Pilot forward channel.
S3DPilot	This choice sets a single direct spread pilot forward channel.
S3MPilot	This choice sets a single SR3 multicarrier spread pilot forward channel.
S19Chan	This choice sets a SR1 9 forward channel.
S3D9chan	This choice sets a SR3 direct spread forward channel.
S3M9chan	This choice sets a SR3 multicarrier spread 9 forward channel.

***RST** *channel type*: S3D9CHAN <*freq_offset*>: -2.50000000E+006
<*power*>: +0.00000000E+000

Range <*freq_offset*>: –15E6 to 15E6 <*power*>: –40 to 0

Key Entry **Select File** **Insert Row** **SR1 Pilot** **SR3 Direct Pilot** **SR3 Mcarrier Pilot** **SR3 Mcarrier Pilot** **SR1 9 Channel** **SR3 Direct 9 Channel** **SR3 Mcarrier 9 Channel** **Custom CDMA2000 Carrier**

Field Entry `Freq Offset` `Power`

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:FORWard:SETup:MCARrier:TABLe:NCARriers

Supported All 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

Range N/A

Key Entry N/A

Remarks N/A

:LINK:FORWard:SETup:STORe

Supported All 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

***RST** N/A

Range N/A

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 14 for information on the file name syntax.

:LINK:FORWard:SETup:TABLe:APPLy

Supported All 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.

***RST** N/A

Range N/A

Key Entry Apply Channel Setup

Remarks N/A

:LINK:FORWard:SETup:TABLe:CHANnel

Supported All 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 All 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

Range N/A

Key Entry N/A

Remarks N/A

:LINK:FORWard:SETup:TABLe:PADJust

Supported All 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.

***RST** N/A

Key Entry **Equal Powers** **Scale To 0dB**

Remarks N/A

:LINK:REVerse:RCONfig

Supported All 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 All 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

Key Entry **Pilot** **5 Channel** **8 Channel** **Custom CDMA2000 State** **Spread Rate 1** **Spread Rate 3**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:REVerse:SETup:STORe

Supported All 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

***RST** N/A

Range N/A

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 14 for information on the file name syntax.

:LINK:REVerse:SETup:TABLe:APPLy

Supported All 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.

***RST** N/A

Range N/A

Key Entry **Apply Channel Setup**

Remarks N/A

:LINK:REVerse:SETup:TABLe:CHANnel

Supported All 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.
APPend	This choice adds rows to an existing table. The maximum number of channels in a table is eight.
RANDom	This choice selects a randomly generated data value.
<data_val>	This variable customizes a specific data value.

***RST** *channel type*: PIL <*data_rate*>: +3.84000000E+004
<*power*>: -7.00000000E+000 <*pn_offset*>: +0 <*data_val*>: 0

Range <*data_rate*>: 1500–9600 <*power*>: –40 to 0

<*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:REVerse:SETup:TABLe:NCHannels

Supported All 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.

***RST** +5

Range N/A

Key Entry N/A

Remarks N/A

:LINK:REVerse:SETup:TABLe:PADJust

Supported All 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).

EQUal This choice changes all channels to equal power, and the total power to 0 dB.

SCALe 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.

***RST** N/A

Key Entry **Equal Powers** **Scale To 0dB**

Remarks N/A

:MDEStination:PULSe

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:CDMA2000: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**

Remarks N/A

:MDEStination:AAMPlitude

Supported All 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**

Remarks N/A

:MDEStination:ALCHold

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:CDMA2000: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

Remarks N/A

:MPOLarity:MARKer1

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

***RST** POS

Key Entry **Marker 1 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer2

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer2 NEGative|POSitive
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

***RST** POS

Key Entry **Marker 2 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer3

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer3 NEGative|POSitive
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

***RST** POS

Key Entry **Marker 3 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer4

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

***RST** POS

Key Entry **Marker 4 Polarity Neg Pos**

Remarks N/A

:REFerence:EXTernal:FREQuency

Supported All 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 261.

:REFerence[:SOURce]

Supported All 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

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 261 to enter the external reference frequency.

:RETRigger

Supported All 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**

Remarks N/A

:REVision

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:REVision?
```

This command queries the revision number of the current CDMA2000 format.

***RST** 8

Range N/A

Key Entry N/A

Remarks N/A

:SCLock:RATE

Supported All 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 268 to activate the modulation format.

:SPReading:RATE

Supported All 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 All 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 All 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 All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

Execute this command to set the trigger type.

CONTinuous	The waveform repeats continuously; the waveform restarts every time the previous playback is completed. To customize continuous triggering, refer to ":TRIGger:TYPE:CONTinuous[:TYPE]" on page 265.
SINGle	The waveform segment or 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 high or low.

***RST** CONT

Key Entry **Continuous** **Single** **Gated**

Remarks To change the polarity of the gated trigger, refer to ":TRIGger:TYPE:GATE:ACTive" on page 265.

:TRIGger:TYPE:CONTinuous[:TYPE]

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE|
TRIGger|RESet
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
```

This command customizes the continuous trigger selection.

FREE This choice immediately transmits a waveform that is continuously repeated.

TRIGger This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.

RESet This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

***RST** FREE

Key Entry **Free Run** **Trigger & Run** **Reset & Run**

Remarks To select CONTinuous as the trigger type, refer to ":TRIGger:TYPE" on page 264.

:TRIGger:TYPE:GATE:ACTive

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command toggles the polarity of the active state of the external gating input signal; GATE must be selected as the arb trigger type.

LOW The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.

HIGH — The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.

***RST** HIGH

Key Entry **Gate Active Low High**

Remarks Refer to ":TRIGger:TYPE" on page 264 to select GATE as the trigger.

:TRIGger[:SOURce]

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
```

This command changes the characteristics of the trigger source.

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 266.

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

***RST** EXT

Key Entry **Trigger Key Ext Bus**

Remarks N/A

:TRIGger[:SOURce]:EXTernal[:SOURce]

Supported All 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 specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1 — This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

EPT2 This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

EPTRIGGER1 This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

EPTRIGGER2 This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

***RST** EPT1

Key Entry **Patt Trig In 1** **Patt Trig In 2**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 266.

For more information about the rear panel AUX I/O connector pin configuration, refer to the *User's Guide*.

:TRIGger[:SOURce]:EXTernal:DELay

Supported All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command specifies the time (seconds) for the external trigger delay.

The variable <val> is expressed as seconds (µsec–Msec).

***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 266.

:TRIGger[:SOURce]:EXTernal:DELay:STATe

Supported All 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.

***RST** 0

Key Entry **Ext Delay Off On**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 266.

:TRIGger[:SOURce]:EXTernal:SLOPe

Supported All 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 of the external trigger.

***RST** NEG

Key Entry **Ext Polarity Neg Pos**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 266.

[:STATe]

Supported All 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.

***RST** 0

Key Entry **CDMA2000 Off On**

Remarks N/A

Dmodulation Subsystem–Option 001 or 002 ([:SOURce]:RADio:DMODulation:ARB)

:IQ:EXTernal:FILTer

Supported All with Option 001 or 002

```
[: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 269 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**

Remarks N/A

:IQ:EXTernal:FILTer:AUTO

Supported All with Option 001 or 002

```
[: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 269 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:FILTer

Supported All with Option 001 or 002

```
[: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 filter file that you have stored into memory.

***RST** RNYQuist

Key Entry **Root Nyquist** **Nyquist** **Gaussian** **Rectangle** **IS-95** **IS-95 w/EQ** **IS-95 Mod** **IS-95 Mod w/EQ** **WCDMA** **IS-2000 SR3 DS** **APCO 25 C4FM** **UN3/4 GSM Gaussian** **User FIR**

Remarks Refer to "File Name Variables" on page 14 for information on the file

name syntax.

:FILTer:ALPHa

Supported All with Option 001 or 002

```
[: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 270.

:FILTer:BBT

Supported All with Option 001 or 002

```
[: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 270.

:FILTer:CHANnel

Supported All with Option 001 or 002

```
[: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 270.

:HEADer:CLEar

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

***RST** N/A

Key Entry **Clear Header**

Remarks The **Digital Modulation Off On** softkey must be set to On for this command to function.

:HEADer:SAVE

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

***RST** N/A

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 All with Option 001 or 002

```
[: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**

Remarks N/A

:IQ:MODulation:ATTen:AUTO

Supported All with Option 001 or 002

```
[: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 273 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:IQ:MODulation:FILTer

Supported All with Option 001 or 002

```
[: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 274 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**

Remarks N/A

:IQ:MODulation:FILTer:AUTO

Supported All with Option 001 or 002

```
[: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 294 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:MDEStination:PULSe

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:DMODulation: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**

Remarks N/A

:MDEStination:AAMPlitude

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:MDEStination:ALCHold

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:DMODulation: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**

Remarks N/A

:MODulation:FSK[:DEViation]

Supported All with Option 001 or 002

```
[: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 276.

Refer to ":SRATe" on page 283 for a list of the minimum and maximum symbol rate values.

To set an asymmetric FSK deviation value, refer to the *User's Guide for more information*.

:MODulation[:TYPE]

Supported All with Option 001 or 002

```
[: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|QAM256
[:SOURce]:RADio:DMODulation:ARB:MODulation[:TYPE]?
```

This command sets the modulation type for the digital modulation personality.

***RST** P4DQPSK

Key Entry **BPSK** **QPSK** **IS-95 QPSK** **Gray Coded QPSK** **OQPSK** **IS-95 OQPSK** **π/4 DQPSK** **8PSK** **16PSK** **D8PSK** **EDGE** **MSK** **2-Lvl FSK** **4-Lvl FSK** **8-Lvl FSK** **16-Lvl FSK** **C4FM** **4QAM** **16QAM** **32QAM** **64QAM** **256QAM** **User I/Q** **User FSK**

Remarks N/A

:MPOLarity:MARKer1

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

***RST** POS

Key Entry **Marker 1 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer2

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer2 NEGative|POSitive
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

***RST** POS

Key Entry **Marker 2 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer3

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer3 NEGative|POSitive
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

***RST** POS

Key Entry **Marker 3 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer4

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:DMODulation:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

***RST** POS

Key Entry **Marker 4 Polarity Neg Pos**

Remarks N/A

:REFerence:EXTernal:FREQuency

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:REFerence:EXTernal:FREQuency <val>
[: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 278.

:REFerence[:SOURce]

Supported All with Option 001 or 002

```
[: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 278 to enter the external reference frequency.

:RETRigger

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:SCLock:RATE

Supported All with Option 001 or 002

```
[: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 289 to activate the modulation format.

:SETup

Supported All with Option 001 or 002

```
[: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.

***RST** NADC

Key Entry **GSM NADC PDC PHS DECT APCO 25 w/C4FM APCO w/CQPSK CDPD PWT EDGE TETRA Multicarrier Off On Select File**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:SETup:MCARrier

Supported All with Option 001 or 002

```
[: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 14 for information on the file name syntax.

The file specified must be a single carrier CDMA file. To store a multicarrier setup refer to ":SETup:MCARrier:STORe" on page 232.

:SETup:MCARrier:PHASe

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:SETup:MCARrier:STORe

Supported All with Option 001 or 002

```
[: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.

***RST** N/A

Range N/A

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 14 for information on the file name syntax.

:SETup:MCARrier:TABLe

Supported All with Option 001 or 002

```
[: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.

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 14 for information on the file name syntax.

The file specified must be a single carrier CDMA file. To store a multicarrier setup refer to ":SETup:MCARrier:STORe" on page 232.

:SETup:MCARrier:TABLe:NCARriers

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:SETup:STORe

Supported All with Option 001 or 002

```
[: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.

***RST** N/A

Range N/A

Key Entry **Store Custom Dig Mod State**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:SRATe

Supported All with Option 001 or 002

```
[: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 bits per second (bps–Mbps) and the maximum range value is dependent upon the source of data (internal or external), the modulation type, and filter.

***RST** +2.43000000E+004

Range

Modulation Type	*Bits per Symbol*	*Internal Data*	*External Serial Data*
BPSK	1	1–50 Msps	1–50 Msps
FSK2			
MSK			
C4FM	2	1–50 Msps	1–25 Msps
FSK4			
OQPSK			
OQPSK195			
P4QPPSK			
QAM4			
QPSK			
QPSKIS95			
QPSKISAT			
D8PSK	3	1–33.33 Msps	1–16.67 Msps
EDGE			
FSK8			
PSK8			
FSK16	4	1–25 Msps	1–12.5 Msps
PSK16			
QAM16			
QAM32	5	1–20 Msps	1–10 Msps
QAM64	6	1–16.67 Msps	1–8.33 Msps
QAM256	7	1–12.50 Msps	1–6.25 Msps

Key Entry **Symbol Rate**

Remarks When user-defined filters are selected using the command in section ":FILTer" on page 270, 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.

To change the modulation type, refer to ":MODulation[:TYPE]" on page 276.

:TRIGger:TYPE

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE?
```

This command sets the trigger type.

CONTinuous	The waveform repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to ":TRIGger:TYPE:CONTinuous[:TYPE]" on page 285.
SINGle	The waveform segment or 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 high or low.

***RST** CONT

Key Entry **Continuous** **Single** **Gated**

Remarks To change the polarity of the gated trigger, refer to ":TYPE:GATE:ACTive" on page 286.

:TRIGger:TYPE:CONTinuous[:TYPE]

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE|
TRIGger|RESet
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
```

This command customizes the continuous trigger selection.

FREE	This choice immediately transmits a waveform that is continuously repeated.
TRIGger	This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.
RESet	This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

***RST** FREE

Key Entry **Free Run** **Trigger & Run** **Reset & Run**

Remarks To select CONTinuous as the trigger type, refer to ":TRIGger:TYPE" on page 285.

:TYPE:GATE:ACTive

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command sets the arb trigger gate polarity; GATE must first be selected as the trigger type.

LOW The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.

HIGH The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.

***RST** HIGH

Key Entry **Gate Active Low High**

Remarks To select a GATE as the trigger type, refer to ":TRIGger:TYPE" on page 285.

:TRIGger[:SOURce]

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]?
```

This command sets the trigger source.

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 288.

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

***RST** EXT

Key Entry **Trigger Key Ext Bus**

Remarks N/A

:TRIGger[:SOURce]:EXTernal:DELay

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command sets the time for the external trigger delay.

The variable <val> is expressed as seconds (µsec–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 286.

:TRIGger[:SOURce]:EXTernal:DELay:STATe

Supported All with Option 001 or 002

```
[: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.

***RST** 0

Key Entry **Ext Delay Off On**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 286.

:TRIGger[:SOURce]:EXTernal:SLOPe

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:
SLOPe POSitive|NEGative
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?
```

This command sets the polarity for the external trigger.

***RST** NEG

Key Entry **Ext Polarity Neg Pos**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 286.

:TRIGger[:SOURce]:EXTernal[:SOURce]

Supported All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:
EXTernal[:SOURce] EPT1|EPT2|EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]?
```

This command specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

***RST** EPT1

Key Entry **Patt Trig In 1** **Patt Trig In 2**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 286.

For more information about the rear panel AUX I/O connector pin

configuration, refer to the *User's Guide*.

[:STATe]

Supported All with Option 001 or 002

```
[: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 or 002 ([:SOURce]:RADio:ARB)

:CLIPping

Supported All with Option 001 or 002

```
[: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 14for information on the file name syntax.

:IQ:EXTernal:FILTer

Supported All with Option 001 or 002

```
[: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 293 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**

Remarks N/A

:GENerate:SINE

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:GENerate:SINE ["<filename>"][,<osr>][,<scale>]
[,I|Q|IQ]
```

This command creates a file (using a specific file name) and stores a generated sine wave.

<osr> This variable sets the oversample ratio, which must be a value that is ≥ 4. If the specified over sample ratio is < 60 (the minimum number of samples), multiple periods are generated to create a waveform with at least 60 samples. The number of periods that will be created is 60 ÷ <osr> (quotient will round off to a whole number). A waveform with an oversample ratio ≥ 60 has one period.

The maximum value for the range below is determined by the option and available baseband memory.

***RST** N/A

Range *<osr> Option 001*: 4–8Msamples

Option 002: 4–32Msamples

Key Entry N/A

Remarks Executing this command without the "<file name>" variable will generate a factory default `SINE_TEST_WFM` file.

When using the variable "<file name>" for this command, the “@” or “:” character is not allowed.

The file is always generated as "WFM#: <file name>", where “#” is replaced by the baseband generator number.

:HEADer:CLEar

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this

modulation format.

***RST** N/A

Key Entry **Clear Header**

Remarks The **ARB Off On** softkey must be set to On for this command to function.

:HEADer:SAVE

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

***RST** N/A

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 All with Option 001 or 002

```
[: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:AUTO

Supported All with Option 001 or 002

```
[: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 290 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:IQ:MODulation:ATTen

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:IQ:MODulation:ATTen:AUTO

Supported All with Option 001 or 002

```
[: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 294 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:IQ:MODulation:FILTer

Supported All with Option 001 or 002

```
[: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 295 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**

Remarks N/A

:IQ:MODulation:FILTer:AUTO

Supported All with Option 001 or 002

```
[: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 294 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:MARKer:CLEar

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MARKer:CLEar "<filename>",<mkr1|2|3|4>,
<first_Point>,<last_point>
```

This command clears markers from a waveform segment.

"<file name>"	This variable specifies the name of the waveform segment file.
<mkr1|2|3|4>	This variable designates which marker is to be cleared (1, 2, 3, or 4).

<first_point>	This variable defines the first point in a range of points (must be ≥ 1, and ≤ the total number of waveform points).
<last_point>	This variable defines the last point in a range of points (must be ≥ 1, and ≤ the total number of waveform points).
***RST**	N/A
Range	<*first_Point*>: 1–# of waveform points <*last_point*>: 1–# of waveform points
Key Entry	**Marker 1 2 3 4 First Mkr Point Last Mkr Point**
Remarks	Refer to "File Name Variables" on page 14 for information on the file name syntax.

:MARKer:CLEar:ALL

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MARKer:CLEar:ALL "<file name>",<mkr1|2|3|4>
```

This command clears all markers from a waveform segment simultaneously.

"<file name>"	This variable specifies the name of the waveform segment file.
<mkr1|2|3|4>	This variable designates which marker is to be cleared (1, 2, 3, or 4).
***RST**	N/A
Range	N/A
Key Entry	**Set Marker Off All Points**
Remarks	Refer to "File Name Variables" on page 14 for information on the file name syntax.

:MARKer:ROTate

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MARKer:ROTate "<file name>",<rotate_count>
```

This command shifts the marker bits in a waveform segment.

***RST**	N/A
Range	<*rotate_count*>: number of points in the waveform – 1
Key Entry	N/A

Remarks To define the maximum allowable points in a waveform, refer to ":MARKer:[SET]" on page 297.

Refer to "File Name Variables" on page 14 for information on the file name syntax.

:MARKer:[SET]

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MARKer:[SET] "<filename>",<mkr1|2|3|4>,
<first_point>,<last_point>,<skip_count>
```

This command defines a marker over a range of points on a waveform segment.

"<file name>" This choice specifies the name of the waveform segment file.

<mkr1|2|3|4> This variable designates which marker is to be set (1, 2, 3, or 4).

<first_point> This variable defines the first point in the range over which the marker will be placed. This number must greater than or equal to 1, 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 1, and less than or equal to the total number of waveform points.

<skip_count> This variable creates a repeating pattern of markers.

Defining a skip count causes the marker to appear on the first point in the defined range, disappear over the number of points defined as the skip count, then reappear for one point. The pattern repeats until the end of the defined range. This enables you to set repetitively spaced markers. For example, a skip of 2 produces two points between each marker across the defined range.

***RST** N/A

Range <*first_Point*>: 1–# of waveform points

<*last_point*>: 1–# of waveform points <*skip_count*>: 0–65535

Key Entry **Marker 1 2 3 4 First Mkr Point Last Mkr Point # Skipped Points**

Remarks Refer to "File Name Variables" on page 14 for information on the file

name syntax.

:MDEStination:PULSe

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio: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**

Remarks N/A

:MDEStination:AAMPlitude

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:MDEStination:ALCHold

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio: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**

Remarks N/A

:MPOLarity:MARKer1

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

***RST** POS

Key Entry **Marker 1 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer2

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLarity:MARKer2 NEGative|POSitive
[:SOURce]:RADio:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

***RST** POS

Key Entry **Marker 2 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer3

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLarity:MARKer3 NEGative|POSitive
[:SOURce]:RADio:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

***RST** POS

Key Entry **Marker 3 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer4

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

***RST** POS

Key Entry **Marker 4 Polarity Neg Pos**

Remarks N/A

:REFerence:EXTernal:FREQuency

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:REFerence:EXTernal:FREQuency <val>
[:SOURce]:RADio: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 300.

:REFerence[:SOURce]

Supported All with Option 001 or 002

```
[: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 300 to enter the external reference frequency.

:RETRigger

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:RETRigger ON|OFF|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**

Remarks N/A

:RSCAling

Supported All with Option 001 or 002

```
[: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 in units of percent.

***RST** +7.00000000E+001

Range 1–100

Key Entry **Waveform Runtime Scaling**

Remarks Runtime scaling does not alter the waveform data file.

:SCALing

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:SCALing "<file name>",<val>
```

This command sets the scaling value of the selected waveform segment.

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

***RST** N/A

Range <*val*>: 1–100

Key Entry **Scaling**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:SCLock:RATE

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:SEQuence

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:SEQuence "<file name>","<waveform>",<reps>,
<mkr1(1|0)>,<mkr2(1|0)>,{"<waveform>",<reps>,<mkr1(1|0)>,<mkr2(1|0)>}
[:SOURce]:RADio:ARB:SEQuence? "<file name>"
```

This command creates or defines a waveform sequence. The waveform file consists of the subsequent waveform segment files (combined in the same order in which the variables

are listed above).

"<file name>"	This variable specifies the name of the waveform sequence file.
"<waveform>"	This variable specifies the exact name of the waveform file.
<reps>	This variable edits the number times the waveform should repeat.
<mkr1(1|0)>	This variable toggles marker 1 on (1) or off (0).
<mk2(1|0)>	This variable toggles marker 2 on (1) or off (0).

***RST** N/A

Range <reps>: 1–65535

Key Entry **Build New Waveform Sequence** **Edit Selected Waveform Sequence** **Toggle Marker 1** **Toggle Marker 2** **Edit Repetitions**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax. compilations.

:TRIGger:TYPE

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE|SADVance
[:SOURce]:RADio:ARB:TRIGger:TYPE?
```

This command sets the trigger type.

CONTinuous	The waveform repeats continuously; the sequence restarts every time the previous playback is completed.
SINGle	The waveform segment or 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 high or low.
SADVance	The selected trigger controls the advance to the next segment in the sequence. To customize segment advance, refer to ":TRIGger:TYPE:SADVance[:TYPE]" on page 305.

***RST** CONT

Key Entry **Continuous** **Single** **Gate** **Segment Advance**

Remarks The SADvance choice can only be activated when a waveform sequence is active.

:TRIGger:TYPE:CONTinuous[:TYPE]

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE|TRIGger|RESet
[:SOURce]:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
```

This command customizes the continuous trigger selection.

FREE This choice immediately transmits a waveform that is continuously repeated.

TRIGger This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.

RESet This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

***RST** FREE

Key Entry **Free Run** **Trigger & Run** **Reset & Run**

Remarks To select CONTinuous as the trigger type, refer to ":TRIGger:TYPE" on page 303.

:TRIGger:TYPE:GATE:ACTive

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURce]:RADio:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command toggles the polarity of the active state of the external gating input signal; GATE must be selected as the arb trigger type.

LOW The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.

HIGH The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.

***RST** HIGH

Key Entry **Gate Active Low High**

Remarks To select GATE as the trigger type, refer to ":TRIGger:TYPE" on page 303.

:TRIGger:TYPE:SADVance[:TYPE]

Supported All with Option 001 or 002

```
[: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

Key Entry **Single** **Continuous**

Remarks 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 303.

:TRIGger[:SOURce]

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:ARB:TRIGger[:SOURce]?
```

This command sets the trigger source.

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 306.
BUS	This choice enables GPIB triggering using the `*TRG` or `GET` command or LAN and RS-232 triggering using the `*TRG` command.

***RST** EXT

Key Entry **Trigger Key** **Ext** **Bus**

Remarks N/A

:TRIGger[:SOURce]:EXTernal[:SOURce]

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal[:SOURce] EPT1|EPT2|
EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]?
```

This command specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

***RST** EPT1

Key Entry **Patt Trig In 1** **Patt Trig In 2**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 305.

For more information about the rear panel AUX I/O connector pin configuration, refer to the *User's Guide*.

:TRIGger[SOURce]:EXTernal:DELay

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command specifies the value for the external trigger delay.

The variable <val> is expressed as seconds (µsec–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 305.

:TRIGger[:SOURce]:EXTernal:DELay:STATe

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe ON|OFF|1|0
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

***RST** 0

Key Entry **Ext Delay Off On**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 305.

:TRIGger[:SOURce]:EXTernal:SLOPe

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|NEGative
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?
```

This command sets the polarity of the external trigger.

***RST** NEG

Key Entry **Ext Polarity Neg Pos**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 305.

:WAVeform

Supported All with Option 001 or 002

```
[:SOURce]:RADio:ARB:WAVeform "WFM1|SEQ:<file_name>"
[:SOURce]:RADio:ARB:WAVeform?
```

This command selects the waveform type and file to be played by the dual arbitrary waveform generator.

WFM1 This choice selects a single waveform segment.

SEQ — This choice selects a sequence of segments.

The appropriate file name of the sequence replaces the `<file name>` variable.

***RST** N/A

Key Entry **Select Waveform**

Remarks N/A

[:STATe]

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

Multitone Subsystem–Option 001 or 002 ([: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 320.
2. Assign the frequency spacing between the tones. Refer to ":SETup:TABLe:FSPacing" on page 319.
3. Define the number of tones within the waveform. Refer to ":SETup:TABLe:NTONes" on page 319.
4. Modify the power level, phase, and state of any individual tones. Refer to ":ROW" on page 316.

:IQ:EXTernal:FILTer

Supported All with Option 001 or 002

```
[: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 310 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**

Remarks N/A

:IQ:EXTernal:FILTer:AUTO

Supported All with Option 001 or 002

```
[: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 309 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:HEADer:CLEar

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

***RST** N/A

Key Entry **Clear Header**

Remarks The **Multitone Off On** softkey must be set to On for this command to function.

:HEADer:SAVE

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

***RST** N/A

Key Entry **Save Setup To Header**

Remarks The **Multitone Off On** softkey must be set to On for this command to function.

:IQ:MODulation:ATTen

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:IQ:MODulation:ATTen:AUTO

Supported All with Option 001 or 002

```
[: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 311 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:IQ:MODulation:FILTer

Supported All with Option 001 or 002

```
[: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 312 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**

Remarks N/A

:IQ:MODulation:FILTer:AUTO

Supported All with Option 001 or 002

```
[: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 294 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:MDEStination:PULSe

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:MTONe: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**

Remarks N/A

:MDEStination:AAMPlitude

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

:MDEStination:ALCHold

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:MTONe: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**

Remarks N/A

:MPOLarity:MARKer1

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

***RST** POS

Key Entry **Marker 1 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer2

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer2 NEGative|POSitive
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

***RST** POS

Key Entry **Marker 2 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer3

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer3 NEGative|POSitive
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

***RST** POS

Key Entry **Marker 3 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer4

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

***RST** POS

Key Entry **Marker 4 Polarity Neg Pos**

Remarks N/A

:REFerence:EXTernal:FREQuency

Supported All with Option 001 or 002

```
[: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 315.

:REFerence[:SOURce]

Supported All with Option 001 or 002

```
[: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.

***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 315 to enter the external reference frequency.

:ROW

Supported All with Option 001 or 002

```
[: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*: –3.50000000E+004 <*power*>: +0.00000000E+000 <*phase*>: +0.00000000E+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 318 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 309 for all four steps.

:SCLock:RATE

Supported All with Option 001 or 002

```
[: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 321 to activate the modulation format.

:SETup

Supported All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:SETup "<file name>"
[:SOURce]:RADio:MTONe:ARB:SETup?
```

This command retrieves a multitone waveform file.

***RST** N/A

Range N/A

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 14 for information on the file name syntax.

:SETup:STORe

Supported All with Option 001 or 002

```
[: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.

***RST** N/A

Range N/A

Key Entry **Store To File**

Remarks N/A

:SETup:TABLe

Supported All with Option 001 or 002

```
[: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
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 319.

:SETup:TABLe:FSPacing

Supported All with Option 001 or 002

```
[: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 318.

This command is the second step in creating a multitone waveform. Refer to "Creating a Multitone Waveform" on page 309 for all four steps.

:SETup:TABLe:NTONes

Supported All with Option 001 or 002

```
[: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.

***RST** +8

Range 2–64

Key Entry **Number Of Tones**

Remarks To specify the number of tones and additional parameters required to create or configure a multitone waveform, refer to ":SETup:TABLe" on page 318.

This command is the third step in creating a multitone waveform. Refer to "Creating a Multitone Waveform" on page 309 for all four steps.

:SETup:TABLe:PHASe:INITialize

Supported All with Option 001 or 002

```
[: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.

FIXed This choice sets the phase of all tones to the fixed value of 0 degrees.

RANDom This choice sets the phase of all tones to random values based on the setting on the random seed generator.

***RST** 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 320.

This command is the first step in creating a multitone waveform. Refer to "Creating a Multitone Waveform" on page 309 for all four steps.

:SETup:TABLe:PHASe:INITialize:SEED

Supported All with Option 001 or 002

```
[: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.

FIXed This choice sets the random number generator seed to a fixed value.

RANDom This choice sets the random number generator seed to a random value. This changes the phase value after each initialization of the phase.

***RST** FIX

Key Entry **Random Seed Fixed Random**

Remarks N/A

[:STATe]

Supported All with Option 001 or 002

```
[: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**

Remarks N/A

Wideband CDMA ARB Subsystem–Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)

:CLIPping:I

Supported All 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 III To**

Remarks N/A

:CLIPping:POSition

Supported All 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**

Remarks N/A

:CLIPping:Q

Supported All 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**

Remarks N/A

:CLIPping:TYPE

Supported All 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|**

Remarks N/A

:CLIPping[:IJQ]

Supported All 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**

Remarks N/A

:CRATe

Supported All 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**

Remarks N/A

:FILTer

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:FILTer RNYQuist|NYQuist|GAUSsian|
RECTangle|WCDMA|AC4Fm|IS2000SRDS|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 filter file that you have stored into memory.

***RST** WCDMA

Key Entry **Root Nyquist** **Nyquist** **Gaussian** **Rectangle** **WCDMA** **APCO 25 C4FM** **IS-95** **UN3/4 GSM Gaussian** **IS-2000 SR3 DS** **User FIR**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:FILTer:ALPHa

Supported All 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 324.

:FILTer:BBT

Supported All 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 324.

:FILTer:CHANnel

Supported All 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 324.

:HEADer:CLEar

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

***RST** N/A

Key Entry **Clear Header**

Remarks The **W-CDMA Off On** softkey must be set to On for this command to function.

:HEADer:SAVE

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

***RST** N/A

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 All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:IQ:EXTernal:FILTer 40e6|THRough
[:SOURce]:RADio:WCDMa:TGPP: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**

Remarks N/A

:IQ:EXTernal:FILTer:AUTO

Supported All 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 327 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:IQMap

Supported All 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**

Remarks N/A

:IQ:MODulation:ATTen

Supported All 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**

Remarks N/A

:IQ:MODulation:ATTen:AUTO

Supported All 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 328 for setting the attenuation value.

***RST** 1

Key Entry **Modulator Atten Manual Auto**

Remarks N/A

:IQ:MODulation:FILTer

Supported All 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 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**

Remarks N/A

:IQ:MODulation:FILTer:AUTO

Supported All 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 294 for selecting a filter or through path.

***RST** 1

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

Remarks N/A

:LINK

Supported All 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**

Remarks N/A

:LINK:DOWN:OACP

Supported All 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.

***RST** ADJ

Key Entry **Optimize ACP ADJ ALT**

Remarks 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 331.

:LINK:DOWN:SETup

Supported All 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 defines the multicarrier waveform.

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 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.

***RST** DPCH1

Key Entry **1 DPCH** **3 DPCH** **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/8HSPDSCH**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:DOWN:SETup:MCARrier

Supported All 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

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

***RST** CAR2

Key Entry **2 Carriers** **3 Carriers** **4 Carriers**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:DOWN:SETup:MCARrier:CLIPping:I

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:I <val>
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier: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 III To**

Remarks N/A

:LINK:DOWN:SETup:MCARrier:CLIPping:Q

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:Q <val>
[: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**

Remarks N/A

:LINK:DOWN:SETup:MCARrier:CLIPping:TYPE

Supported All 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|**

Remarks N/A

:LINK:DOWN:SETup:MCARrier:CLIPping[:IJQ]

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:
CLIPping[:IJQ] <val>
[: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

Range 10–100

Key Entry **Clip |I+jQ| To**

Remarks N/A

:LINK:DOWN:SETup:MCARrier:SCODe:AINCrement

Supported All 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.

***RST** N/A

Range N/A

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 All 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.

***RST** N/A

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 14 for information on the file name syntax.

:LINK:DOWN:SETup:MCARrier:TABLe

Supported All 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.
***RST**	*carrier type*: PPSCH <*freq_offset*>: +7.50000000E+006 <*power*>: +0.00000000E+000
Range	<*freq_offset*>: –37.5E6 to 37.5E6 <*power*>: –40 to 0 *scramble code*: 0–511 *timing offset*: 0–149 *initial phase*: 0–359 *clipping(in units of percent)*: 0.0–100.0 *or* 0.0 to –20.0 *(if units are dB)*
Key Entry	**1 DPCH 3 DPCH 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/8HSPDSCH**
Remarks	Refer to "File Name Variables" on page 14 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 339.

:LINK:DOWN:SETup:MCARrier:TABLe:NCARriers

Supported All 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

Choices N/A

Key Entry N/A

Remarks N/A

:LINK:DOWN:SETup:MCARrier:TOFFset:AINCrement

Supported All 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.

***RST** N/A

Range N/A

Key Entry **Increment Timing Offset**

Remarks N/A

:LINK:DOWN:SETup:STORe

Supported All 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
spread rate
ARB reference clock source (internal or external)
ARB reference clock frequency
clipping
multicarrier spacing
radio configuration

***RST** N/A

Range N/A

Key Entry **Store Custom W-CDMA State**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:DOWN:SETup:TABLe:APPLy

Supported All 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.

***RST** N/A

Choices N/A

Key Entry **Apply Channel Setup**

Remarks N/A

:LINK:DOWN:SETup:TABLe:CHANnel

Supported All 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>,
<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 1 Variables and Channel Types

	SSCH	CPICH	PCCPCH	SCCPCH	PICH	DPCH	OCNS	PSCH
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
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

Table 1 Variables and Channel Types

	SSCH	CPICH	PCCPCH	SCCPCH	PICH	DPCH	OCNS	PSCH
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 2 Variables and Channel Types

	HSPDSCH	HSSCCH
Channel number	X	X
Symbol rate	N/A (fixed to 30ksps)	N/A (fixed to 240ksps)
Spread code	X	X
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

Table 2 Variables and Channel Types

	HSPDSCH	HSSCCH
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

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
<TFCI_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 Spread Code TFCI Field Off On Scramble Code Scramble Offset Random PN9 Standard Left Alternate Right Alternate PCCPCH SCCPCH PSCH SSCH CPICH DPCH PICH OCNS HSPDSCH HSSCCH**

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 339.

:LINK:DOWN:SETup:TABLe:NCHannels?

Supported All 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

Key Entry N/A

Remarks N/A

:LINK:DOWN:SETup:TABLe:PADJust

Supported All with Option 400

`[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:TABLe:PADJust EQUal|SCALe`

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.

***RST** N/A

Key Entry **Equal Energy per Symbol** **Scale To 0dB**

Remarks This command is available in downlink only.

:LINK:DOWN:TFCI

Supported All 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**

Remarks N/A

:LINK:UP:OACP

Supported All 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 346.

:LINK:UP:SCRAMBLE

Supported All 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**

Remarks N/A

:LINK:UP:SDPDch

Supported All 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**

Remarks N/A

:LINK:UP:SETup

Supported All 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 **DPCCH** **DPCCH + 1 DPDCH** **DPCCH + 2 DPDCH** **DPCCH + 3 DPDCH** **DPCCH + 4 DPDCH** **DPCCH + 5 DPDCH** **Custom WCDMA State**

Remarks Refer to "File Name Variables" on page 14 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 348.

:LINK:UP:SETup:STORe

Supported All 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.

***RST** N/A

Range N/A

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 331.

For uplink, refer to ":LINK:UP:SETup" on page 346.

Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:UP:SETup:TABLe:APPLy

Supported All 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.

***RST** N/A

Range N/A

Key Entry **Apply Channel Setup**

Remarks Refer to "File Name Variables" on page 14 for information on the file name syntax.

:LINK:UP:SETup:TABLe:CHANnel

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLe:CHANnel
INIT|APPend|<chan_num>,<chan_type>,<symbol_rate>,<spread_code>,
<power>,<TFCI>,<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).

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

<symbol_rate>	*<spread_rate>*
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

Key Entry **Channel Type Symbol Rate First Spread Code Power Spread Code TFCI Field Off On Scramble Code Scramble Offset Random**

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 348.

:LINK:UP:SETup:TABLe:GUNit

Supported All 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 348.

:LINK:UP:SETup:TABLe:NCHannel

Supported All 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

Key Entry N/A

Remarks N/A

:LINK:UP:TFCI

Supported All 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 **TCFI Field Off On**

Remarks N/A

:MDEStination:PULSe

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:WCDMa:TGPP: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**

Remarks N/A

:MDEStination:AAMPlitude

Supported All 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

Key Entry **None** **Marker 1** **Marker 2** **Marker 3** **Marker 4**

Remarks N/A

:MDEStination:ALCHold

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:WCDMa:TGPP: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**

Remarks N/A

:MPOLarity:MARKer1

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

***RST** POS

Key Entry **Marker 1 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer2

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer2 NEGative|POSitive
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

***RST** POS

Key Entry **Marker 2 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer3

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer3 NEGative|POSitive
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

***RST** POS

Key Entry **Marker 3 Polarity Neg Pos**

Remarks N/A

:MPOLarity:MARKer4

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:WCDMa:TGPP:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

***RST** POS

Key Entry **Marker 4 Polarity Neg Pos**

Remarks N/A

:REFerence:EXTernal:FREQuency

Supported All 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

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 353.

:REFerence[:SOURce]

Supported All 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

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[:SOURce]" on page 353 to enter the external reference frequency.

:RETRigger

Supported All 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**

Remarks N/A

:REVision

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:REVision?
```

This command checks the version for the arbitrary waveform generator firmware.

***RST** 3GPP 06-2001

Key Entry N/A

Remarks N/A

:SCLock:RATE

Supported All 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 359 to activate the modulation format.

:TRIGger:TYPE:CONTinuous[:TYPE]

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger:CONTinuous[:TYPE] FREE|
TRIGger|RESet
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger:CONTinuous[:TYPE]?
```

This command sets the trigger type.

FREE This choice immediately transmits a waveform that is continuously repeated.

TRIGger This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.

RESet This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

***RST** FREE

Key Entry **Free Run** **Trigger & Run** **Reset & Run**

Remarks To select CONTinuous as the trigger type, refer to ":TRIGger:TYPE" on page 356.

:TRIGger:TYPE

Supported All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger:TYPE CONTinuous|SINGLE|GATE
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger:TYPE?
```

This command sets the arbitrary waveform trigger type.

CONTinuous	The waveform repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to ":TRIGger:TYPE:CONTinuous[:TYPE]" on page 355.
SINGle	The waveform segment or sequence plays once for every trigger received.
GATE	An external trigger signal interrupts a segment's playback. The active level can be set high or low when the external signal returns to the active state of the playback. To change the polarity of the gated trigger, refer to":TRIGger:TYPE:GATE:ACTive" on page 356.

***RST** CONT

Key Entry **Continuous** **Single** **Gated**

Remarks N/A

:TRIGger:TYPE:GATE:ACTive

Supported All 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 sets the arb trigger gate polarity; GATE must first be selected as the trigger type.

LOW	This choice outputs a trigger signal when the signal level at the PATT TRIG IN rear panel connector is in a low state.
HIGH	This choice outputs a trigger signal when the signal level at the PATT TRIG IN rear panel connector is in a high state.

***RST** HIGH

Key Entry **Gate Active Low High**

Remarks To select a GATE as the trigger type, refer to ":TRIGger:TYPE" on page 356.

:TRIGger[:SOURce]

Supported All 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.

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 358.

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** **Bus** **Ext**

Remarks N/A

:TRIGger[:SOURce]:EXTernal:DELay

Supported All 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 arbitrary waveform generator's external trigger delay.

The variable <val> is expressed in units of seconds (µsec–ksec).

***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 357.

:TRIGger[:SOURce]:EXTernal:DELay:STATe

Supported All 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.

***RST** 0

Key Entry **Ext Delay Off On**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 357.

:TRIGger[:SOURce]:EXTernal:SLOPe

Supported All 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 the external trigger.

***RST** NEG

Key Entry **Ext Polarity Neg Pos**

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 357.

:TRIGger[:SOURce]:EXTernal[:SOURce]

Supported All 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 specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1 This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

EPT2 This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

EPTRIGGER1 This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

EPTRIGGER2 This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

***RST** EPT1

Choices EPT1 EPT2 EPTRIGGER1 EPTRIGGER2

Remarks This command is effective only if an external trigger is selected as the trigger source. Refer to ":TRIGger[:SOURce]" on page 357.

For more information about the rear panel AUX I/O connector pin configuration, refer to the *User's Guide*.

[:STATe]

Supported All 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.

ON (1) This choice enables the W-CDMA modulation capability and sets up the internal hardware to generate the currently selected W-CDMA signal selection.

OFF (0) This choice disables the W-CDMA baseband signal capability.

***RST** 0

Key Entry **W-CDMA Off On**

Remarks This choice also activates the I/Q state and sets the I/Q source to internal.

Symbols

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