1xEV-DO Rev. A/Rev. B Digital Standard for R&S®Signal Generators

Operating Manual

1171.5631.12 ─ 15

Test & Measurement

Operating Manual

ROHDE&SCHWARZ

This document describes the following software options:

- R&S®SMBV-K47/-K87
  1415.8090.xx, 1415.8719.02
- R&S®SMU-K47/-K87
  1408.7410.02, 1408.8675.02
- R&S®AMU-K47/-K87
  1402.6602.02, 1403.0999.02
- R&S®SMATE-K47/-K87
  1404.7900.02, 1404.8887.02
- R&S®SMJ-K47/-K87
  1409.2306.02, 1409.3548.02

This manual version corresponds to firmware version:
FW 3.20.281.xx and later of the R&S®SMBV100A
FW 3.20.286.xx and later of the R&S®SMU200A, R&S®SMATE200A, R&S®SMJ100A and R&S®AMU200A

Mühldorfstr. 15, 81671 München, Germany
Phone: +49 89 41 29 - 0
Fax: +49 89 41 29 12 164
Email: info@rohde-schwarz.com
Internet: www.rohde-schwarz.com

The following abbreviations are used throughout this manual: R&S®SMBV100A is abbreviated as R&S SMBV, R&S®SMU200A is abbreviated as R&S SMU, R&S®AMU200A is abbreviated as R&S AMU, R&S®SMATE200A is abbreviated as R&S SMATE, R&S®SMJ100A is abbreviated as R&S SMJ,R&S®WinIQSIM2™ is abbreviated as R&S WinIQSIM2; the license types 02/03/07/11/13/16/12 are abbreviated as xx.

Contents

1 Preface

1.1 Documentation Overview

The user documentation for the R&S Signal Generator consists of the following parts:

- Quick start guide, printed manual
- Online help system on the instrument
- Operating manuals and online manual for base unit and options provided on the product page
- Service manual provided for registered users, or on the product page
- Instrument security procedures provided on the product page
- Release notes provided on the product page
- Data sheet and brochures provided on the product page
- Application notes provided on the Rohde & Schwarz website

You find the user documentation on the mainly on the R&S Signal Generator product page.

Additional download paths are stated directly in the following abstracts of the documentation types.

Quick Start Guide

Introduces the R&S Signal Generator and describes how to set up and start working with the product. Includes basic operations, typical measurement examples, and general information, e.g. safety instructions, etc.

Online Help

Offers quick, context-sensitive access to the information needed for operation and programming. It contains the description for the base unit and the software options.

Operating Manuals and Online Manual

Separate manuals are provided for the base unit and the software options:

- **Base unit** manual
  Contains the description of the graphical user interface, an introduction to remote control, the description of all SCPI remote control commands, programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the Quick Start Guide manual.
- **Software option** manuals
  Describe the specific functions of this option. Basic information on operating the base unit is not included.

The **online manual** provides the contents of the operating manual for immediate display on the internet.

Service Manual

Describes the performance test for checking the rated specifications, module replacement and repair, firmware update, troubleshooting and fault elimination, and contains mechanical drawings and spare part lists.

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS).

Instrument Security Procedures

Deals with security issues when working with the R&S Signal Generator in secure areas.

Data Sheet and Brochures

The data sheet contains the technical specifications of the software options, see "Digital Standards for Signal Generators - Data sheet" on the web site.

Release Notes

Describes the firmware installation, new and modified features and fixed issues according to the current firmware version. You find the latest version at the product page of the corresponding instrument > "Download" > "Firmware".

Application Notes, Application Cards, White Papers, etc.

These documents deal with special applications or background information on particular topics, see http://www.rohde-schwarz.com/appnotes.

1.2 Conventions Used in the Documentation

1.2.1 Typographical Conventions

The following text markers are used throughout this documentation:

Convention	Description
"Graphical user interface elements"	All names of graphical user interface elements on the screen, such as dialog boxes, menus, options, buttons, and softkeys are enclosed by quotation marks.
KEYS	Key names are written in capital letters.
`File names, commands, program code`	File names, commands, coding samples and screen output are distinguished by their font.
Input	Input to be entered by the user is displayed in italics.

Convention	Description
Links	Links that you can click are displayed in blue font.
"References"	References to other parts of the documentation are enclosed by quotation marks.

1.2.2 Notes on Screenshots

When describing the functions of the product, we use sample screenshots. These screenshots are meant to illustrate as much as possible of the provided functions and possible interdependencies between parameters. The shown values may not represent realistic test situations.

The screenshots usually show a fully equipped product, that is: with all options installed. Thus, some functions shown in the screenshots may not be available in your particular product configuration.

1.2.3 Naming of Software Options

In this operating manual, we explicitly refer to options required for specific functions of the digital standard.

The name of software options for signal generators vary in the name of the instrument, but the option name is identical. Therefore we use in this manual the placeholder R&S SMx/AMU.

Example:

Naming for an option of the vector signal generator R&S SMBV100A, e.g:

- R&S SMx/AMU-K99, stands for R&S SMBV-K99

The particular software options available for the corresponding instruments are listed on the back of the title page.

2 About the 1xEV-DO Options

The R&S Signal Generator (options R&S SMx/AMU-K47/-K87) provides you with the ability to generate signals in accordance with the standard CDMA2000 1xEV-DO (Evolution-Data Optimized), Rev. B. CDMA2000 1xEV-DO is the North American standard for the third mobile radio generation (3G). CDMA2000 1xEV-DO is a high-speed packet-switched transmission technique with forward peak data rates of 4.9152 Mbps per carrier, designed and optimized for a data-centric broadband network.

The R&S Signal Generator simulates 1xEV-DO signal at the physical layer. In forward link (downlink) mode the signal is generated in realtime. Parameter changes during active signal output take effect immediately without signal interruption. In reverse link (uplink) mode the signal is precalculated and played from the ARB memory. Parameter changes result in a recalculation of the signal.

To playback a signal from a waveform file created by the simulation software R&S WinIQSIM2, the corresponding R&S WinIQSIM2 digital standard option must be installed.

The following list gives an overview of the main options provided by the R&S Signal Generator for generating an 1xEV-DO signal in accordance with 3GGP2 C.S0024-B.v3.0.

- Generation of 1xEV-DO signals with a chip rate of 1.2288 Mcps
- Independent configuration of up to 4 traffic channels or 4 access terminals
- Support of physical layer subtypes 0, 1, 2 and 3
- Support of multi-carrier operation with up to 16 simultaneous carriers
- Operating modes "Traffic" and "Access" on the uplink
- Simulation of up to 360 additional MAC users
- Generation of standard compliant forward/downlink and reverse/uplink channel types
- Supports configuration of public data as defined in the standard, such as Long Code Masks for I and Q channel, PreambleLength, DRCLength etc.
- Filling the data files for data channels from all possible sources of the R&S Signal Generator: pattern (all1, all0, user-defined up to 64 bits), PN data or data lists
- Clipping for reducing the crest factor

The following table gives an overview of parameters of the modulation system 1xEV-DO.

Table 2-1: Parameters of the modulation system 1xEV-DO

Parameter	Value
Chip rate	1.2288 Mcps
Channel types	Forward link: • Pilot Channel • Forward Traffic Channel (Rev. A) • Reverse Activity • DRCLock • Reverse Power Control • ARQ (Rev. A) • Control Channel Reverse link, access mode: • Pilot Channel • Data Channel Reverse link, traffic mode: • Pilot Channel • Auxiliary Pilot Channel (Rev. A) • Reverse Rate Indicator • Data Rate Control • Data Source Control (Rev. A) • ACK Channel • Data Channel
Generation mode	Forward link: • Realtime mode Reverse link: • Arbitrary waveform mode • Multicarrier operation up to 16 concurrent carriers supported requires option R&S SMx/AMU-K87
Data rates	Forward link: • 38.4 .. 2457.6 kbps (Rev. 0) • 4.8 .. 3072 kbps (Rev. A) • 4.8 .. 4915 kbps (Rev. B) requires option R&S SMx/AMU-K87 Reverse link: • 9.6 .. 153.6 kbps (Rev. 0) • 4.8 .. 1843.2 kbps (Rev. A)
Frame length	26.67 ms (1 frame = 16 slots)
Slot duration	1.67 ms (1 slot = 2048 PN chips)
PN offset	0 .. 511
Channel coding	All channel coding modes defined in the standard (channel encoding, block interleaving, repetition, modulation, orthogonal spreading by Walsh function)
Modulation	BPSK, QPSK, 8PSK, 16QAM, 64QAM requires option R&S SMx/AMU-K87
Multi-code modulation	B4, Q2, Q4, Q4Q2, E4E2
Long Code Mask	Separate Long Code Masks for I and Q channel. The Long Code Generator is reloaded at every PN rollover with 0x24B91BFD3A8.
Walsh covers	Different Walsh functions for the different channels

2.1 Traffic Scheduling Process

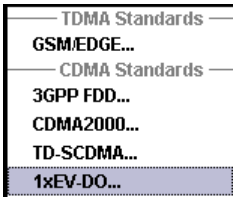
In the 1xEV-DO system, the Forward Link is govern by a time division multiple access technique; access to Forward Link bandwidth by a user channel is governed by a scheduling process. The schedule process determines who gets access to Forward Link slots to carry user data.

The traffic scheduling process in this instrument follows a number of rules to schedule which user's data is sent for each slot.

The rules are listed in order of priority, with the highest priority rules being listed first. In the event that two rules contradict each other, the circumstances invoking the lower priority rule must be altered to resolve the contradiction.

- A channel with "State = Off" is never transmitted.
- The first slot of the control channel packet is always transmitted at its specified offset at the start of the control channel cycle.
- Once the first slot of a multiple slot packet is sent, the remaining slots are always transmitted with the proper interlace (3 slots skipped after 1 slot sent).
- Packets for a user can be transmitted on 1-4 interlaces (there are a total of 4 interlaces in the 1xEV-DO system). Packets on the different interlaces will be duplicates of those sent on the other interlaces for a given user. The interleave factor user interface parameter is used to control the number of interlaces used for each user.
- Immediately after the transmission of the last slot of a multiple slot packet, a lockout period of three slots is created. No additional packets from the same source may be scheduled before the three slot period expires.
- A control channel packet has priority over all other traffic channels. This may exclude transmission of user channels in advance of the control channel packet, if the other channel would require a slot that the control channel packet would require.
- User1 traffic has priority over User2, User3, and User4 traffic.
- User2 traffic has priority over User3 and User4 traffic.
- User3 traffic has priority over User4 traffic.
- If no traffic is scheduled for a slot, an idle slot will be transmitted.

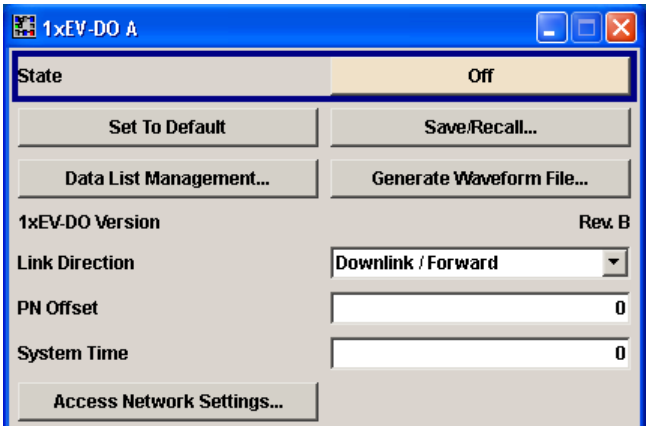
3 1xEV-DO User Interface



To access the 1xEV-DO settings, select "Baseband block > 1xEV-DO".

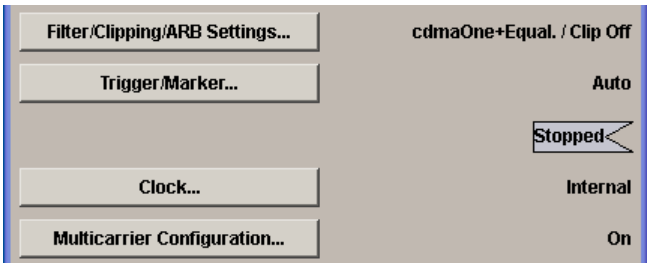
The menu is split into three sections. The choice of link direction determines which displays and parameters are made available in the middle section.

In the upper menusection the 1xEV-DO digital standard is enabled, the default settings are called and the link direction is selected. Also there the valid 1xEV-DO version is displayed.

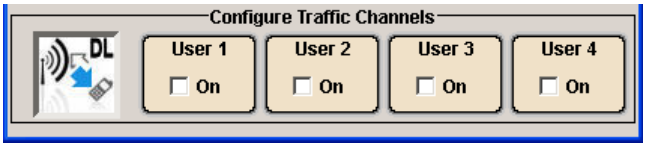


Further buttons lead to submenus for loading and saving the 1xEV-DO configuration and for setting the filter, trigger, and clock parameters.

In the "Multicarrier Configuration" menu you can define and activate / deactivate multiple carriers. See detailed description under Chapter 3.3, "Multi Carrier Configuration Settings", on page 18.



In the lower menu section either the traffic channels per user or the access terminals are configured, depending on the link direction selected.



3.1 General Settings

With this dialog the 1xEV-DO digital standard is enabled and reset, and all the settings valid for the signal in both link directions are made.

State
Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Remote command:
`[:SOURce<hw>]:BB:EVDO:STATe` on page 64

Set to Default
Calls the default settings. The values of the main parameters are listed in the following table.

Parameter	Value
State	Not affected by "Set to default"
Link Direction	Downlink/ Forward
PN Offset	0
System Time	0
Predefined Settings	User Defined
Multicarrier State	off
Filter	CdmaOne + Equalizer
Clipping	Off
Trigger	Auto
Clock	Internal

Remote command:
`[:SOURce<hw>]:BB:EVDO:PRESet` on page 62

Save/Recall ...
Calls the "Save/Recall" menu.

From the Save/Recall menu the "Save/Recall Settings" windows for saving and recalling 1xEV-DO configurations and the "File Manager" can be called.

1xEV-DO configurations are stored as files with the predefined file extension `*.1xevdo`. The file name and the directory they are stored in are user-definable.

The complete settings in the "1xEV-DO" menu are saved and recalled.

"Recall 1xEV-DO Setting" Opens the "Recall Settings" window for loading a saved 1xEV-DO configuration.
The configuration of the selected (highlighted) file is loaded by pressing the "Select" button.

"Save 1xEV-DO Setting"	Opens the "Save Settings" window for saving the current 1xEV-DO signal configuration. The name of the file is specified in the File name entry field, the directory selected in the save into field. The file is saved by pressing the "Save" button.
"File Manager"	Calls the "File Manager". The "File Manager" is used to copy, delete and rename files and to create new directories.

Remote command:
`[:SOURce<hw>]:BB:EVDO:SETTing:CATalog?` on page 63
`[:SOURce<hw>]:BB:EVDO:SETTing:LOAD` on page 63
`[:SOURce<hw>]:BB:EVDO:SETTing:STORe` on page 63
`[:SOURce<hw>]:BB:EVDO:SETTing:DELete` on page 63

Data List Management
Calls the "Data List Management" dialog. This menu is used to create and edit a data list.

All data lists are stored as files with the predefined file extension `*.dm_iqd`. The file name and the directory they are stored in are user-definable.

The data lists must be selected as a data source from the submenus under the individual function.

Note: All data lists are generated and edited by means of the `SOURce:BB:DM` subsystem commands. Files containing data lists usually end with `*.dm_iqd`. The data lists are selected as a data source for a specific function in the individual subsystems of the digital standard.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA` on page 102
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:DSELection` on page 103
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA` on page 105
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:DSELection` on page 106

Generate Waveform File
With enabled signal generation, triggers the instrument to store the current settings as an ARB signal in a waveform file. Waveform files can be further processed by the ARB and/or as a multi-carrier or a multi-segment signal.

The file name and the directory it is stored in are user-definable; the predefined file extension for waveform files is `*.wv`.

Remote command:
`[:SOURce<hw>]:BB:EVDO:WAVeform:CREate` on page 65

1xEV-DO Version
Displays the current version of the 1xEV-DO standard.

The default settings and parameters provided are oriented towards the specifications of the version displayed.

Remote command:
[:SOURce<hw>]:BB:EVDO:VERSion? on page 65

Link Direction
Selects the link direction.

The settings of the traffic channels per user and the access terminals are provided in the following menu section in accordance with the selection.

"Downlink/Forward"
The link direction selected is base station to access terminal. The signal corresponds to that of a base station.

"Uplink/Reverse"
The link direction selected is access terminal to base station. The signal corresponds to that of an access terminal.

Remote command:
[:SOURce<hw>]:BB:EVDO:LINK on page 62

PN Offset
Sets the PN Offset of the 1xEV-DO signal.

Remote command:
[:SOURce<hw>]:BB:EVDO:PNOFfset on page 62

System Time
Sets the System Time value of the 1xEV-DO signal and the base station. The System Time value is expressed in units of 1.67 ms intervals (80 ms/ 48).

Note: In uplink, the value selected for system time must be multiple of 16.

Remote command:
[:SOURce<hw>]:BB:EVDO:STIMe on page 65

Predefined Settings
Uplink only

Enables selection of UL predefined settings for Terminal 1 for faster configuration.

The predefined settings are made according to 3GPP2 C.S0032-A to allow easy receiver testing.

Remote command:
[:SOURce<hw>]:BB:EVDO:PREDefined on page 97

Multicarrier Configuration
Access the "Multicarrier Configuration" dialog, see Chapter 3.3, "Multi Carrier Configuration Settings", on page 18.

Access Network Settings
In Downlink direktion, provides an access to the "Access Network Settings" dialog (see Chapter 3.2, "Access Network Settings", on page 15).

Configure Traffic Channels
appears at downlink only

Activates/deactivates the selected terminal and access the corresponding "Configure Traffic User 1 .. 4" dialog (see Chapter 3.4, "Traffic Channel Settings", on page 20).

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:STATe` on page 96

Configure Access Terminals
appears at uplink only

Activates/deactivates the selected terminal and access the corresponding "Configure Access Terminal 1 .. 4" dialog (see Chapter 3.5, "Access Terminal Settings", on page 31).

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:STATe` on page 117

Filter / Clipping / ARB Settings
Access to the dialog for setting baseband filtering, clipping and the sequence length of the arbitrary waveform component (see Chapter 3.6, "Filter / Clipping / ARB Settings", on page 45).

Trigger/Marker
Calls the menu for selecting the trigger source, for configuring the marker signals and for setting the time delay of an external trigger signal (see Chapter 3.7, "Trigger/Marker/Clock Settings", on page 48).

The currently selected trigger source is displayed to the right of the button.

Execute Trigger
For internal trigger source, executes trigger manually.

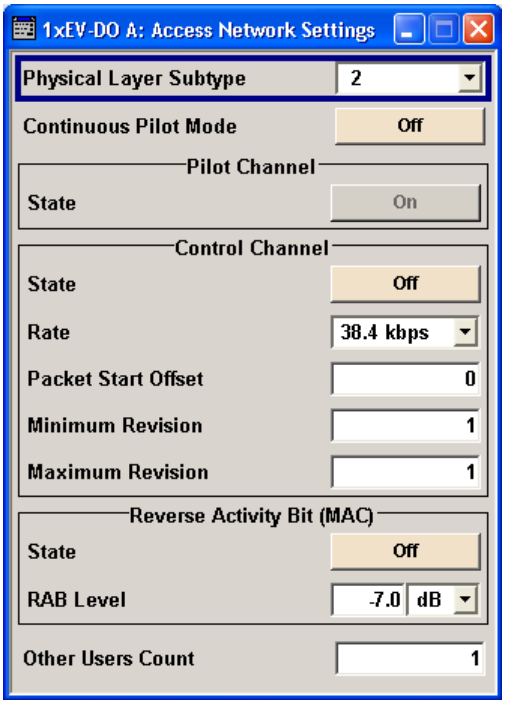
Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:EXECute` on page 71

Clock
Calls the dialog for selecting the clock source and for setting a delay (see Chapter 3.7, "Trigger/Marker/Clock Settings", on page 48).

3.2 Access Network Settings

The "Access Network Settings" dialog is available at Downlink only and allows configuration of physical layer subtype, the pilot and control channels and reverse activity bit.

"Access Network Settings" consists of three main sections, "Pilot Channel", "Control Channel" and "Reverse Activity Bit (MAC)".



Physical Layer Subtype (Access Network Settings)
Defines the physical layer subtype for the forward link direction.

Physical layer subtype 0 is the original (release "0").

Physical layer subtype 1 and 2 are the revision "A" physical layers.

Physical layer subtype 3 is the revision "B" physical layer.

Remote command:
`[:SOURce<hw>]:BB:EVDO:ANETwork:SUBType` on page 83

Continuous Pilot Mode
Enables or disables a special mode within the 1xEV-DO generator. When the state is off, normal operation is selected. When the state is on, a special mode is selected.

In this special mode, the 1xEV-DO generator generates a pilot signal only.

Note: During the special mode, all other parameters do not affect the signal output.

Remote command:
`[:SOURce<hw>]:BB:EVDO:ANETwork:CPMode` on page 81

State (Pilot Channel)
Displays the state of the pilot channel. Pilot channel is transmitted by sector on each active forward channel. It is present always and transmitted at the full sector power.

Remote command:
`[:SOURce<hw>]:BB:EVDO:ANETwork:PCHannel:STATe?` on page 82

State (Control Channel)
Enables or disables the control channel messages.

The only control channel message that is ever sent is the Sync Message.When this is enabled, the control channel messages will have the highest priority for placement within the slots. The Sync Message will be updated constantly, even when the control channel is not enabled.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:STATe on page 81

Rate (Control Channel)
Sets the rate that the control channel messages are transmitted at.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:RATE on page 80

Packet Start Offset
Sets the offset (in slots) from the start of control channel cycle to the start of the synchronous message capsule that contains the Sync Message.

SeeChapter 2.1, "Traffic Scheduling Process", on page 10 for an explanation on how the control and traffic channels are transmitted over time.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:PSOFfset on page 80

Minimum Revision
Sets the value of the minimum revision field within the control channel message.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MINimum
on page 80

Maximum Revision
Sets the value of the maximum revision field within the control channel message.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MAXimum
on page 80

State (Reverse Activity Bit)
Activates or deactivates the reverse activity bit (RAB).

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:STATe on page 83

RAB Level
Sets the power within the MAC block for the Reverse Activity Channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LEVel on page 82

RAB Length
for physical layer subtype 0&1 only

Sets the duration (in slots) of a Reverse Activity bit.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LENGth on page 82

RAB Offset
for physical layer subtype 0&1 only

Sets the starting time offset of the Reverse Activity (RA) bit in slots. The command is specified in Reverse Activity Length/8 units.

The RA bit starts when the following equation is satisfied:

- System Time mod RABlenght = RABOffset,
  where System Time is expressed in slots.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:OFFSet on page 83

RAB MAC Index
For physical layer subtype 3 only sets the RAB MAC Index.

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:MAC:INDex on page 82

Other Users Count
Sets the number of additional users (beyond the four defined users) that appear in the MAC Channel.

These additional users will never have a packet addressed to them, but are used to fill in the MAC channel code domain.

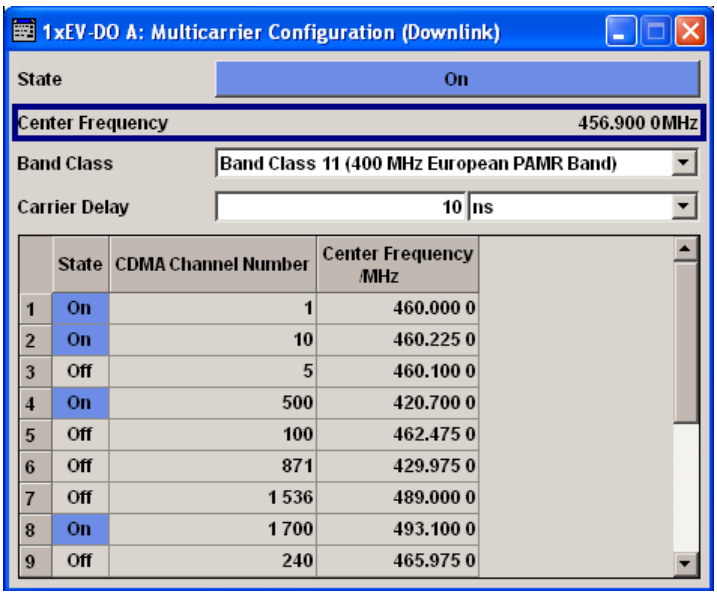
These Other Users are used to evenly distribute the excess power (beyond what is required by the "User 1..4" and RAB channels).

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:OUCount on page 81

3.3 Multi Carrier Configuration Settings

Multi Carrier Configuration requires option R&S SMx/AMU-K87

In multi carrier mode, up to 16 modulated carriers can be generated with one base-band. Each carrier’s center frequency is input via it’s "CDMA Channel Number" or by directly entering the RF "Center Frequency / MHz". The carriers can be activated or deactivated separately.



State
Enables or disables multi carrier operation.

Remote command:
`[:SOURce<hw>]:BB:EVDO:UP:MC:CARRier<ch>:STATe` on page 85
`[:SOURce<hw>]:BB:EVDO:DOWN:MC:CARRier<ch>:STATe` on page 85

Center Frequency (band)
Shows the center frequency of the band resulting from the set active carriers.

Remote command:
`[:SOURce<hw>]:BB:EVDO:DOWN:MC:CFRequency?` on page 84
`[:SOURce<hw>]:BB:EVDO:UP:MC:CFRequency?` on page 84

Band Class
Selects the band class for operation, as defined in 3GPP2 C.S0057-E.

Remote command:
`[:SOURce<hw>]:BB:EVDO:UP:MC:BCLass` on page 84
`[:SOURce<hw>]:BB:EVDO:DOWN:MC:BCLass` on page 84

Carrier Delay
Applies a delay to each carrier in order to reduce the crest factor of the sum signal.

The delay increases by the given value on each active carrier. Inactive carriers are not taken into account.

Example:

"Carrier Delay = 1000 ns"

The first active carrier is delayed by 0 ns, the second by 1000 ns, the third by 2000 ns, etc.

Remote command:
`[:SOURce<hw>]:BB:EVDO:UP:MC:CDELay` on page 85
`[:SOURce<hw>]:BB:EVDO:DOWN:MC:CDELay` on page 85

State
Switches the selected carrier on or off.

Remote command:
`[:SOURce<hw>]:BB:EVDO:UP:MC:CARRier<ch>:STATe` on page 85
`[:SOURce<hw>]:BB:EVDO:DOWN:MC:CARRier<ch>:STATe` on page 85

CDMA Channel Number
Selects the carrier's channel number.

The selected channel numbers are directly translated into center frequencies, according to the used band class. In some cases not all channel numbers in the range indicated by the tool tip are allowed. In case a non-existing channel is selected, the software selects the next available channel.

Remote command:
`[:SOURce<hw>]:BB:EVDO:UP:MC:CARRier<ch>:CHANnel` on page 85
`[:SOURce<hw>]:BB:EVDO:DOWN:MC:CARRier<ch>:CHANnel` on page 85

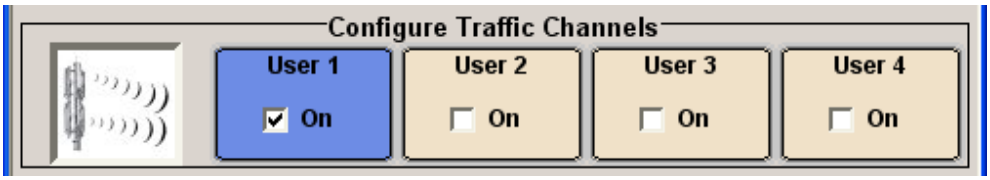
Center Frequency
Sets the the center frequency of the carrier.

In some cases not all center frequencies in the range indicated by the tool tip are defined by the selected band class. In case a non-existing frequency is selected, the software selects the next available frequency.

Remote command:
`[:SOURce<hw>]:BB:EVDO:UP:MC:CARRier<ch>:FREQuency` on page 86
`[:SOURce<hw>]:BB:EVDO:DOWN:MC:CARRier<ch>:FREQuency` on page 86

3.4 Traffic Channel Settings

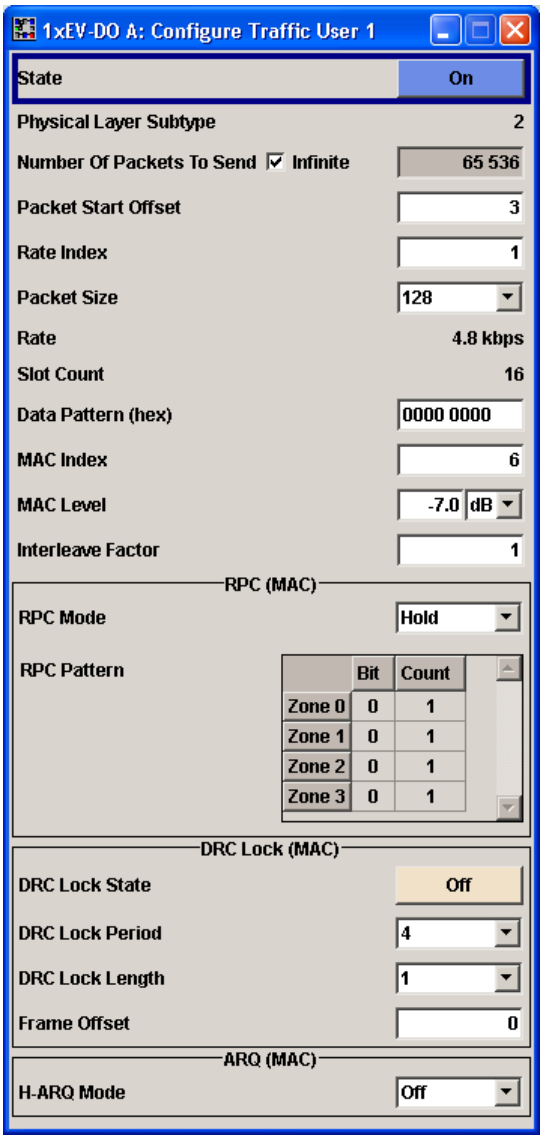
1. To access this dialog, select "Baseband > 1xEV-DO > Link Direction > Downlink"
2. Select "Traffic Channels".



Four users are available.

3. To activate a user, set its state to "On", e.g. "User 1 > On".
4. To access the settings of a user, select the corresponding field, e.g. "User 1".

   The corresponding "Configure Traffic User 1 .. 4" dialog opens. The user number is indicated in the panel headline.



The dialog comprises the settings of the traffic channel and of the forward MAC channel settings, such as Reverse Power Control (RPC) and DRCLock.

State (User)
Enables or disables the selected user.

If the user is enabled, the proper MAC Index will be placed within the MAC channel and packets may be sent to the user. If disabled, the MAC Index will not be present within the MAC channel and packets may not be sent to the user.

Note: Disabling the state of a user during a transfer aborts all transfers to the user.

Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:STATe on page 96

Physical Layer Subtype (User)
Displays the physical layer subtype selected in the menu "Access Network Settings".

Remote command:
[:SOURce<hw>]:BB:EVDO:ANETwork:SUBType on page 83

Number of Packets to Send
Sets the number of packets to send to the selected user.

The number of packets to be sent depends on whether the parameter "Infinite" is enabled or disabled. If "Infinite" is enabled, there is no limit to the number of packets sent to the user.

If "Infinite" is disabled and a value is specified while packets are being sent, the new count value will be used at the end of transmission of the current packet. If a value of zero is specified, the transmission to the user will be stopped at the end of the current packet.

Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:INFinite on page 91
[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:COUNt on page 90

Infinite
Enables or disables sending an unlimited number of packets to the selected user.

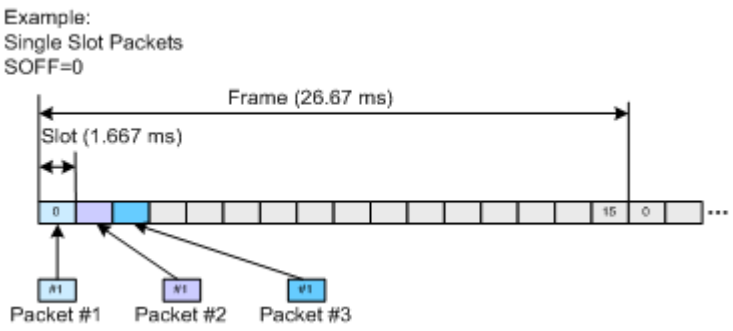
If "Infinite" is enabled, there is no limit to the number of packets sent to the user.

If "Infinite" is disabled, the number of packets to be sent to the selected user can be specified.

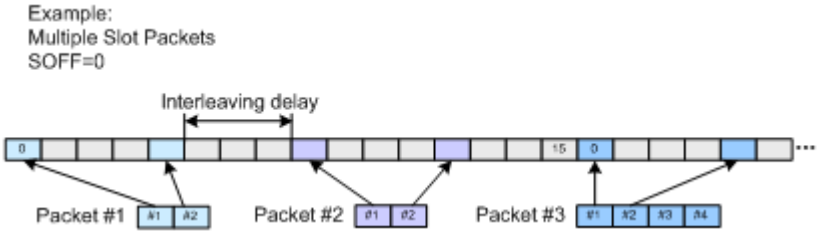
Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:INFinite on page 91

Packet Start Offset
Sets the minimum number of slots between the end of one packet and the beginning of the next.

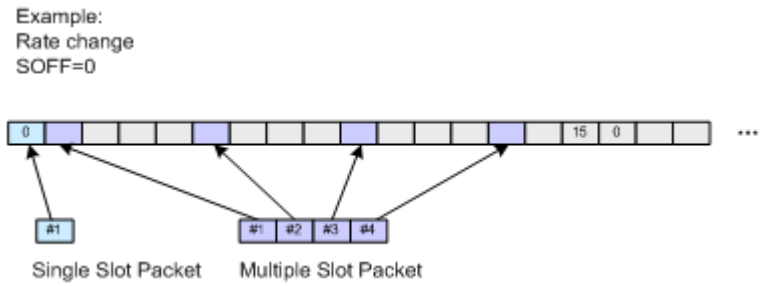
For single slot packets, a value of zero will cause the next packet to be sent in the immediate next slot (subject to scheduling).



For multiple slot packets, a value of zero will cause the next packet transmission to start three slots after the end of the previous packet. The three slot delay is identical to the interleaving delay between slots for multiple slot packets. The offset value is attached to the end of the preceding packet.



Note: An offset value of zero with a rate change from a single slot packet to multiple slot packets will cause the first slot of the multiple slot packets to be transmitted in the slot immediately following the single slot packet.



See Chapter 2.1, "Traffic Scheduling Process", on page 10 for an explanation on how the control and traffic channels are transmitted over time.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:SOFFset` on page 91

Rate Index
Sets an index into the table of rates and slot counts.

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

For physical layer 0&1, the parameter "Rate Index" alone automatically set the packet size, data rate and the slot count for the packets sent to the selected user. Parameters "Packet Size", "Data Rate" and "Slot Count" are read-only.

Table 3-1: Rate Index for Physical Layer Subtype 0&1

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
1	0	1024	38.4	16
2	0	1024	76.8	8
3	0	1024	153.6	4
4	0	1024	307.2	2
5	0	2048	307.2	4
6	0	1024	614.4	1

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
7	0	2048	614.4	2
8	0	3072	921.6	2
9	0	2048	1228.8	1
10	0	4096	1228.8	2
11	0	3072	1843.2	1
12	0	4096	2457.6	1

For physical layer subtype 2 however, a combination of the parameters Rate Index and the parameter Packet Size sets the data rate and the slot count for the packets sent to the selected user.

Table 3-2: Rate Index for Physical Layer Subtype 2

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
1	3	128	4.8	16
1	2	256	9.6	16
1	1	512	19.2	16
1	0	1024	38.4	16
2	3	128	9.6	8
2	2	256	19.2	8
2	1	512	38.4	8
2	0	1024	76.8	8
3	3	128	19.2	4
3	2	256	38.4	4
3	1	512	76.8	4
3	0	1024	153.6	4
4	3	128	38.4	2
4	2	256	76.8	2
4	1	512	153.6	2
4	0	1024	307.2	2
5	2	512	76.8	4
5	1	1024	153.6	4
5	0	2048	307.2	4
6	3	128	76.8	1
6	2	256	153.6	1
6	1	512	307.2	1
6	0	1024	614.4	1

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
7	2	512	153.6	2
7	1	1024	307.2	2
7	0	2048	614.4	2
8	1	1024	307.2	2
8	0	3072	921.6	2
9	2	512	307.2	1
9	1	1024	614.4	1
9	0	2048	1228.8	1
10	0	4096	1228.8	2
11	1	1024	614.4	1
11	0	3072	1843.2	1
12	0	4096	2457.6	1
13	0	5120	1536	2
14	0	5120	3072	1

Table 3-3: Rate Index for Physical Layer Subtype 3 (requires the appropriate Rev. B option)

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
1	3	128	4.8	16
1	2	256	9.6	16
1	1	512	19.2	16
1	0	1024	38.4	16
2	3	128	9.6	8
2	2	256	19.2	8
2	1	512	38.4	8
2	0	1024	76.8	8
3	3	128	19.2	4
3	2	256	38.4	4
3	1	512	76.8	4
3	0	1024	153.6	4
4	3	128	38.4	2
4	2	256	76.8	2
4	1	512	153.6	2
4	0	1024	307.2	2
5	2	512	76.8	4

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
5	1	1024	153.6	4
5	0	2048	307.2	4
6	3	128	76.8	1
6	2	256	153.6	1
6	1	512	307.2	1
6	0	1024	614.4	1
7	2	512	153.6	2
7	1	1024	307.2	2
7	0	2048	614.4	2
8	1	1024	307.2	2
8	0	3072	921.6	2
9	2	512	307.2	1
9	1	1024	614.4	1
9	0	2048	1228.8	1
10	0	4096	1228.8	2
11	1	1024	614.4	1
11	0	3072	1843.2	1
12	0	4096	2457.6	1
13	0	5120	1536	2
14	0	5120	3072	1
15	0	1024	153.6	4
16	0	2048	307.2	4
17	0	3072	460.8	4
18	0	4096	614.4	4
19	0	5120	768	4
20	0	6144	921.6	4
21	0	6144	1843.2	2
22	0	6144	3686.4	1
23	0	7168	1075.2	4
24	0	7168	2150.4	2
25	0	7168	4300.8	1
26	0	8192	1228.8	4

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
27	0	8192	2457.6	2
28	0	8192	4915.2	1

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RATE:INDex` on page 93

Packet Size
Sets the packet size for the packets sent to the selected user.

For physical layer 0&1, the parameter "Packet Size" is read-only. The value is automatically set depending on the selection for the parameter "Rate Index". (see Table 3-1)

For physical layer subtype 2 and 3, a combination of the parameter "Packet Size" and the parameter "Rate Index" sets the data rate and the slot count for the packets sent to the selected user. (see Table 3-2)

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:PSIZe` on page 92

Data Rate
Displays the data rate of the packets sent to the selected user. This parameter is read-only. The value is set automatically, depending on the selected "Rate Index "and "Packet Size" (see Table 3-1 and Table 3-2).

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RATE?` on page 92

Slot Count
Displays the slot count of the packets sent to the selected user.

This parameter is read-only. The value is set automatically, depending on the selected Rate Index and Packet Size. (see Table 3-1 and Table 3-2)

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:SCOunt?` on page 95

Data Pattern (hex)
Sets the data pattern for the data portion of the packets sent to the user.

The most significant bit (MSB) of this value is the MSB of the packet and the word is repeated to fill all space within the packet. This parameter is in a hexadecimal format.

Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:DATA:PATTern on page 87

MAC Index
Sets the MAC Index used for the selected user.

MAC Index should be different for the different users. However, in case that two users are using the same value for MAC Index, the lower priority user will be disabled, or be unable to enable.

The values for the MAC Indexes for the 'OtherUsers' (see parameter Other Users Count) will be assigned from a pool of valid MAC Indexes, that exclude the MAC Indexes specified for each of the four configurable users.

Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:INDex on page 89

MAC Level
Sets the power within the MAC channel that is dedicated to the selected user.

Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:LEVel on page 90

Interleave Factor
Controls the number of interleave slots used for the selected user on the forward link.

Four interleave slots are defined in the 1xEV-DO system.By default, only 1 Interleave slot (Interleave Factor = 1) for an access terminal is configured and transmission to that access terminal every 4th slot is selected. For an interleave factor > 1, packets on multiple interleave slots will be sent, increasing the data throughput to the access terminal.

Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:IFACtor on page 89

RPC Mode
Sets the operation mode for the Reverse Power Control (RPC) Channel within the MAC channel for the selected user.

"Hold"	An alternating series of Up and Down power control bits are transmitted. The intent is to hold the access terminal at a constant power level. This mode always starts with an Up bit, and ends with the following Down bit. This mode is two bits long.
"All up"	A continuous stream of Up (0) power control bits are transmitted. The intent is to force the access terminal to the highest transmit power level. This mode is a single bit long.
"All down"	A continuous stream of Down (1) power control bits are transmitted. The intent is to force the access terminal to the lowest transmit power level. This mode is a single bit long.

"Range" A sequence of Up power control bits are sent followed by an equal number of Down power control bits. The intent is to force the access terminal to ramp its power from one extreme to another. The number of power control bits in each direction is specified by the "RPC Range Count" parameter. (see RPC Range Count). Each time that the Range mode is specified, the sequence will be restarted.
The Range mode starts with the first Up bit and ends with the last Down bit.
The length of the mode is two times the RPC Range Count.

"Pattern" A user-defined sequence of RPC bits is sent. The mode starts with the bit defined in the first (0) zone, and ends with the last bit of the last (3) zone. The length of the pattern is the sum of the Count values for each RPC Zone.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:MODE` on page 94

RPC Range Count
Sets the number of Reverse Power Control (RPC) bits sent in each direction when the "RPC Mode" is set to Range. The specified value is used immediately.

Note: This parameter is displayed in RPC Mode "Range" only.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:RANGe` on page 94

RPC Pattern
Defines the Reverse Power Control (RPC) pattern in form of table with four zones (zone 0 .. 3).

For each zone, a bit and a count can be defined.

"Bit" Defines the RPC bits sent within the specific zone of the RPC Pattern.

"Count" Defines the number of RPC bits sent within the specific zone of the RPC Pattern.

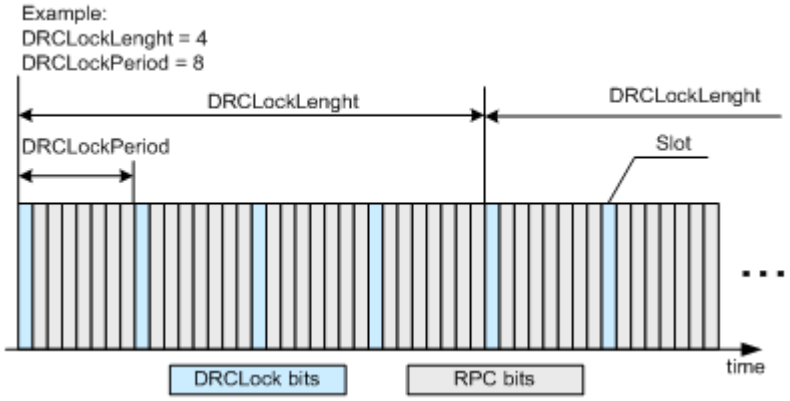
Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:BIT` on page 94
`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:COUNt` on page 95

DRC Lock State
Sets the state of the DRC (Data Rate Control) Lock bit for the selected user.

Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:STATe` on page 88

DRC Lock Period
Sets the period (measured in slots) of time between successive transmissions of the DRC (Data Rate Control) Lock bit for the selected user.



Note: A value of zero will disable the DRC Lock subchannel and the MAC RPC channel of the selected user will not be punctured with the DRC Lock subchannel.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:PERiod` on page 88

DRC Lock Length
Sets the number of DRC (Data Rate Control) Lock Periods that the state of the DRC Lock for the selected user will be held constant.

Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

A value of one allows updating of the DRC Lock bit at anytime.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:LENGth` on page 87

Frame Offset
Sets the reverse link frame offset for the reverse link.

The frame offset is used to properly position the DRC Lock bit within the MAC channel.

Remote command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:OFFSet` on page 88

H-ARQ Mode
Enables or disables the H-ARQ Channel.

The H-ARQ channel is used by the access network to transmit positive acknowledgement (ACK) or a negative acknowledgement (NAK) in response to a physical layer packet.

Note: This parameter is enabled for Physical Layer Subtype 2 only.

"Off"	Disables transmission of the H-ARQ channel.
"ACK"	The channel will be transmitted with all bits set to ACK.
"NAK"	The channel will be transmitted with all bits set to NAK.

Remote command:
[:SOURce<hw>]:BB:EVDO:USER<st>:HARQ:MODE on page 88

3.5 Access Terminal Settings

1. To access this dialog, select "Baseband > 1xEV-DO > Link Direction > Uplink"
2. Select "Access Terminals".

   Four terminals are available.
3. To enable a subset of predefined settings for faster configuration, select "Predefined Settings".
4. To activate a terminal, set its state to "On", e.g. "Terminal 1 > On".
5. To access the settings of a terminal, select the corresponding field, e.g. "Terminal 1".

   The corresponding "Configure Access Terminal 1 .. 4" dialog opens. The access terminaö number is indicated in the panel headline.

The dialog comprises the settings of the access terminal mode, of the data channel and configuration of the different channels, such as Pilot Channel, Auxiliary Pilot Channel, Reverse Rate Indicator (RRI) Channel, Data Source Control (DSC) Channel, Data Rate Control (DRC) Channel and ACK channel.

The available channels depend on the selected "Physical Layer Subtype" and the selected "Access Terminal Mode", see Table 3-4.

Table 3-4: Overview on available channels, depending on physical layer subtype and access terminal mode

Physical Layer Subtype	Access Terminal Mode	Pilot Channel	Auxiliary Pilot Channel	RRI Channel	DSC Channel	DRC Channel	ACK Channel	Data Channel
0&1	Traffic	X	-	X	-	X	X	Packet 1
	Access	X	-	-	-	-	-	Packet 1
2	Traffic	X	X	X	X	X	X	Packet 1..3
	Access	X	-	-	-	-	-	Packet 1

Predefined Settings
Uplink only

Enables selection of UL predefined settings for Terminal 1 for faster configuration.

The predefined settings are made according to 3GPP2 C.S0032-A to allow easy receiver testing.

Remote command:
`[:SOURce<hw>]:BB:EVDO:PREDefined` on page 97

State (Access Terminal)
Enables or disables the selected access terminal.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:STATe` on page 117

Mode (Access Terminal)
Sets the mode (Traffic or Access) of the selected access terminal.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:MODE` on page 115

Physical Layer Subtype (Access Terminal)
Selects the physical layer subtype for the selected access terminal.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:SUBType` on page 117

Disable Quadrature Spreading
Disables the quadrature spreading (complex multiply) with PN sequences and long code.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DQSPreading` on page 111

Long Code Mask I (hex)
Sets the long code mask of the I channel.

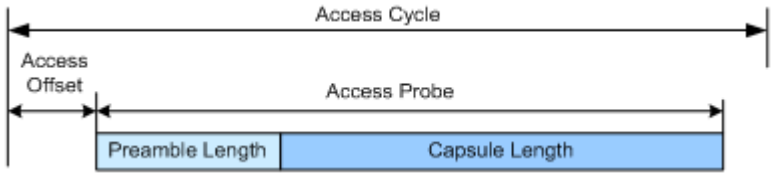
Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:IMASk on page 114

Long Code Mask Q (hex)
Sets the long code mask of the Q channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:QMASk on page 116

Preamble Length
(enabled for access terminal working in access mode only)

Specifies the length of the preamble in frames (16 slots each) of the access probe (see figure below).



Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PLENgth on page 116

Access Cycle Duration
(enabled for access terminal working in access mode only)

Sets the access cycle duration in slots. Access probes are repeated with a period of access cycle duration slots.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:DURation on page 100

Access Cycle Offset
(enabled for access terminal working in access mode only)

The access channel transmission starts with this number of slots relative to the beginning of each access cycle duration.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:OFFSet on page 100

State (Pilot Channel)
Displays the state of the pilot channel.

Note: The pilot channel is always switched on.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:STATe? on page 115

Gain (Pilot Channel)
Sets the gain of the pilot channel.

Gains of other channels are relative to the pilot channel power. This setting is used to distinguish the power between access terminals, when more than one access terminal is active.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:GAIN on page 115

State (Auxiliary Pilot Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Enables or disables the state of the auxiliary pilot channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:STATe on page 102

Relative Gain (Auxiliary Pilot Channel)
Sets the gain of the auxiliary pilot channel relative to the data channel power.

Note: All other channel gains are specified relative to the pilot channel power, but the auxiliary pilot gain is specified relative to the data channel power. This parameter is only enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:GAIN on page 101

Minimum Payload (Auxiliary Pilot Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Sets the minimum payload size in bits of the data channel that activates the transmission of the auxiliary pilot channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:PAYLoad:MINimum on page 101

State (RRI Channel)
(enabled for access terminal working in traffic mode only)

Enables or disables the state of the reverse rate indicator (RRI) channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:STATe on page 116

Relative Gain (RRI Channel)
(enabled for access terminal working in traffic mode only)

Sets the gain of the reverse rate indicator (RRI) channel relative to the pilot channel power.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:GAIN on page 116

State (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Enables or disables the state of the data source control (DSC) channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:STATe on page 114

Relative Gain (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Sets the gain of the data source control (DSC) channel relative to the pilot channel power.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:GAIN on page 113

Length (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Specifies the transmission duration of the data source control (DSC) channel in slots.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:LENGth on page 113

Values (oct) (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Specifies the pattern transmitted on the data source control (DSC) Channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is transmitted for DSC length slots.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:VALues on page 114

State (DRC Channel)
(enabled for access terminal working in traffic mode only)

Enables or disables the state of the data rate control (DRC) channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:STATe on page 112

Relative Gain (DRC Channel)
(enabled for access terminal working in traffic mode only)

Sets the gain of the data rate control (DRC) channel relative to the pilot channel power.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GAIN on page 111

Length (DRC Channel)
(enabled for access terminal working in traffic mode only)

Specifies the transmission duration of the data rate control (DRC) channel in slots.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:LENGth on page 112

Values (hex) (DRC Channel)
(enabled for access terminal working in traffic mode only)

Specifies the pattern transmitted on the data rate control (DRC) channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is used for DRC length slots.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:VALues on page 113

Cover (DRC Channel)
(enabled for access terminal working in traffic mode only)

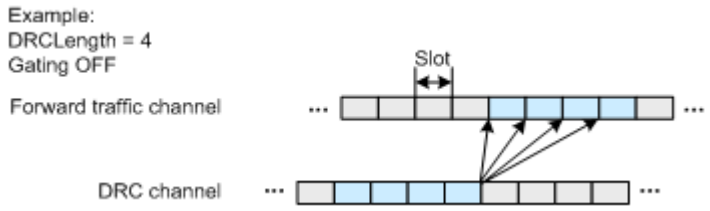
Selects the data rate control (DRC) channel Walsh cover.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:COVer on page 111

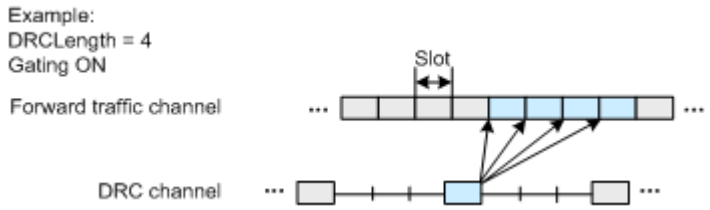
Gating Active (DRC Channel)
(enabled for access terminal working in traffic mode only)

Activates or deactivates the data rate control (DRC) Channel gating.

With deactivated gating, each DRC value is repeated for DRC length slots.



If gating is active, each value of the DRC channel is transmitted for one slot followed by DRCLenght-1 empty slots.



Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GATing[:STATe] on page 112

State (ACK Channel)
(enabled for access terminal working in traffic mode only)

Enables or disables the ACK channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:STATe on page 99

Relative Gain (ACK Channel)
(enabled for access terminal working in traffic mode only)

Sets the gain of the ACK channel relative to the pilot channel power.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GAIN on page 98

Mode (ACK Channel)
(enabled for access terminal working in traffic mode only)

Specifies the modulation mode of the ACK channel.

"BPSK" Sets the modulation to BPSK (Binary Phase Shift Keying).
With BPSK modulation, a 0 (ACK) is mapped to +1 and a 1 (NAK) to -1 respectively.

"OOK" Sets the modulation to OOK (On-Off Keying).With OOK modulation, a 0 (ACK) is mapped to ON and a 1 (NAK) to OFF.

Note: OKK modulation is only enabled for physical layer subtype 2.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:MODE on page 99

Gating (bin) (ACK Channel)
(enabled for access terminal working in traffic mode only)

Sets the active and inactive slots of the ACK channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern.

A 0 gates the ACK channel off for the corresponding slot, a 1 activates the channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GATing on page 98

Values (ACK Channel)
(enabled for access terminal working in traffic mode only)

Specifies the data pattern transmitted on the ACK Channel.

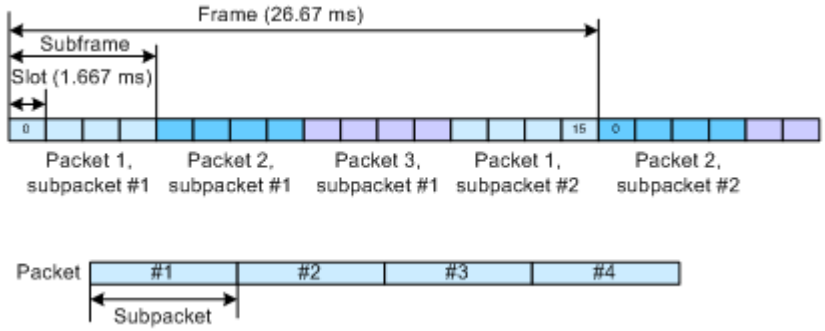
The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. A 0 specifies an ACK, a 1 specifies a NAK. This pattern is only read for slots that are gated on.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:VALues on page 100

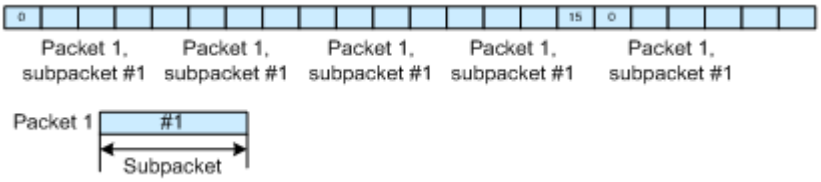
State (Packet)
(enabled for access terminal working in traffic mode only)

Enables or disables the state of the packet(s).

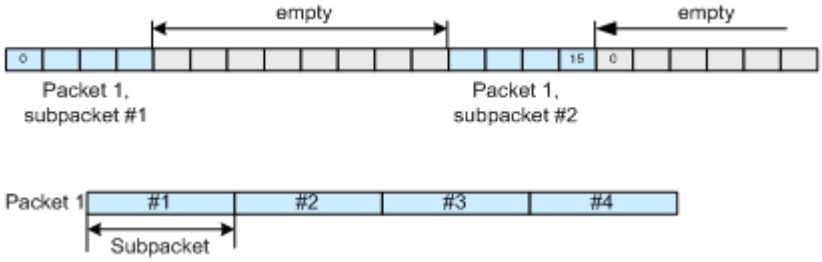
There are three configurable packets (Packet 1… 3) for physical layer subtype 2. When more then one packet is active, packet 1 is sent on the first subframe (first 4 slots), packets 2 and 3 are sent respectively on the second and the third subframe (see figure below).



When only one packet is active and Number of Sub-packets is set to 1, no interleaving will be performed between the packets. In this case, the data channel is active continuously (see figure below).



When only one packet is active but the number of subpackets is larger than one, subframe interleaving has to be performed. In this case 2 subframes will be left empty inbetween every two subpackets (see figure below).



Only one configurable packet is available for physical layer subtype 0&1, the data channel is continuously active for the number of packets to send.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:STATe`
on page 110

Relative Gain (Packet)
(enabled for access terminal working in traffic mode only)

Sets the gain in dB of the selected packet relative to the pilot channel power.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:GAIN
on page 108

Infinite Packets (Packet)
(enabled for access terminal working in traffic mode only)

Enables or disables sending an unlimited number of packets.

If "Infinite Packets" is disabled, the number of packets to send can be specified with the parameter "Number of Packets to Send".

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:INFinite
on page 108

Number of Packets to Send (Packet)
(enabled for access terminal working in traffic mode only)

Sets the number of packets to be sent.

The number of packets to send depends on whether the parameter "Infinite Packets "is enabled or disabled. If "Infinite Packets" is enabled, there is no limit to the number of packets sent.

If "Infinite Packets" is disabled, the number of packets can be specified. The data channel will be switched off after the specified "Number of Packets" have been sent.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:COUNt
on page 105

Number of Sub-packets (Packet)
(enabled for physical layer subtype 2 and an access terminal working in traffic mode only)

Sets the number of sub-packets to be sent.

Example:

If number of sub-packets is 4, then subpacket 0, 1, 2 and 3 of a packet will be sent in a subframe each (with 2 subframes interleaving between) before the next packet is started. This is to simulate a situation where 3 times NAK has been received from the base station with an ACK after the 4th subpacket.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:
SUBPackets[:COUNt] on page 110

Payload Size (Packet)
(enabled for access terminal working in traffic mode only)

Sets the payload size in bits for the selected packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:PSIZe`
on page 109

Modulation (Packet)
(enabled for physical layer subtype 2 and an access terminal working in traffic mode only)

Displays the modulation type per packet.

The modulation type is set automatically according to the selected payload size. The value is read-only.

Remote-control command: SOUR:BB:EVDO:TERM2:DCH:PACK3:MOD?

"B4"	The modulation type is set to BPSK modulation with 4-ary Walsh cover.
"Q4"	The modulation type is set to QPSK modulation with 4-ary Walsh cover.
"Q2"	The modulation type is set to QPSK modulation with 2-ary Walsh cover.
"Q4Q2"	Sum of Q4 and Q2 modulated symbols.
"E4E2"	Sum of E4 (8-PSK modulated with 4-ary Walsh cover) and E2 (8-PSK modulated with 2-ary Walsh cover) modulated symbols.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:MODulation?`
on page 109

Data Rate (Packet)
(enabled for access terminal working in traffic mode only)

Displays the resulting data rate for the selected Packet.

This is the effective data rate achieved for the specific packet. Sum up the data rates of all 3 packets to obtain the total effective data rate for the uplink data channel.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DRATe?`
on page 107

Channel Coding (Packet)
(enabled for access terminal working in traffic mode only)

Activates or deactivates channel coding, including scrambling, turbo encoding and channel interleaving.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:CCODing
on page 104

Data Source (Packet)
(enabled for access terminal working in traffic mode only)

Selects the data source.

The number of bits read from the data source for each packet depends on the payload size, channel coding state and FCS state. The following table gives an overview on the number of bits read.

	FCS ON	**FCS OFF**
Channel Coding ON	PayloadSize - FCSSize - 6	PayloadSize - 6
Channel Coding OFF	(PayloadSize/CodeRate) - FCSSize	(PayloadSize/CodeRate)

FCSSize and code rate depend on the physical layer subtype (see table bellow).

	Physical layer subtype 0&1	**Physical layer subtype 2**
FCSSize	16	24
Code rate	1/4 or 1/2	1/5 or 1/3

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

The following standard data sources are available:

- "All 0, All 1"
  An internally generated sequence containing 0 data or 1 data.
- "PNxx"
  An internally generated pseudo-random noise sequence.
- "Pattern"
  An internally generated sequence according to a bit pattern.
  Use the "Pattern" box to define the bit pattern.
- "Data List/Select DList"
  A binary data from a data list, internally or externally generated.
  Select "Select DList" to access the standard "Select List" dialog.
  – Select the "Select Data List > navigate to the list file *.dm_iqd > Select" to select an existing data list.
  – Use the "New" and "Edit" functions to create internally new data list or to edit an existing one.
  – Use the standard "File Manager" function to transfer external data lists to the instrument.

  See also "Main Dialog > Data List Management".

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA on page 105
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:DSELection on page 106
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:PATTern on page 106

FCS (Packet)
(enabled for access terminal working in traffic mode only)

Enables or disables appending a standard Frame Check Sequence (FCS) to the MAC layer packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:FCS[:STATe] on page 107

State (Data Channel)
(enabled for access terminal working in access mode only)

Enables or disables the state of the Data Channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:STATe on page 111

Relative Gain (Data Channel)
(enabled for access terminal working in access mode only)

Sets the gain in dB of the data channel relative to the pilot channel power.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:GAIN on page 104

Capsule Length (Data Channel)
(enabled for access terminal working in access mode only)

Sets the number of frames (16 slots each) to be transmitted after the preamble. Each frame contains one data packet.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:CLENgth on page 102

Data Rate (Data Channel)
(enabled for access terminal working in access mode only)

Selects the data rate for the data channel.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DRATe on page 103

Data Source (Data Channel)
(enabled for access terminal working in access mode only)

Selects the data source.

The following standard data sources are available:

- "All 0, All 1"
  An internally generated sequence containing 0 data or 1 data.
- "PNxx"
  An internally generated pseudo-random noise sequence.
- "Pattern"
  An internally generated sequence according to a bit pattern.
  Use the "Pattern" box to define the bit pattern.
- "Data List/Select DList"
  A binary data from a data list, internally or externally generated.
  Select "Select DList" to access the standard "Select List" dialog.
  – Select the "Select Data List > navigate to the list file *.dm_iqd > Select" to select an existing data list.
  – Use the "New" and "Edit" functions to create internally new data list or to edit an existing one.
  – Use the standard "File Manager" function to transfer external data lists to the instrument.

  See also "Main Dialog > Data List Management".

Remote command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA` on page 102
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:PATTern` on page 103

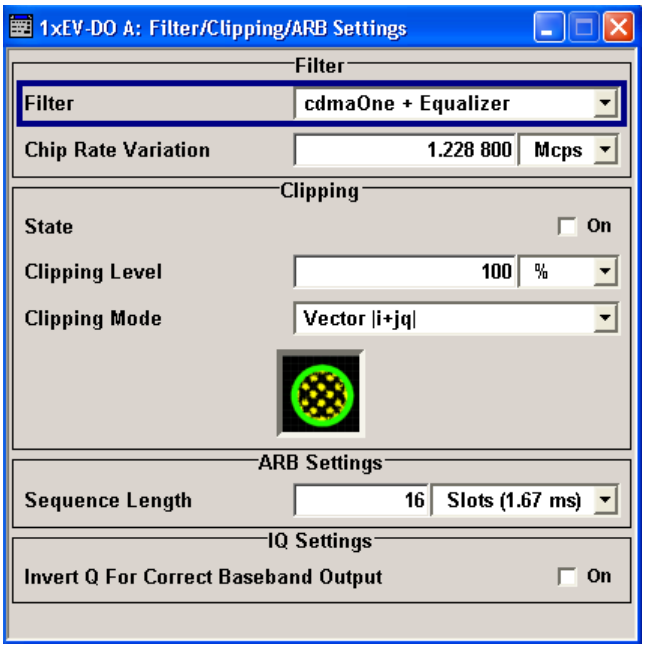
Append FCS (Data Channel)
(enabled for access terminal working in access mode only)

Enables or disables appending a standard Frame Check Sequence (FCS) to the MAC layer packet.

Remote command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:FCS[:STATe]
on page 104

3.6 Filter / Clipping / ARB Settings

► To access this dialog, select "Main dialog > Filter/Clipping/ARB/IQ Settings".



The dialog comprises the settings, necessary to configure the baseband filter, sample rate variation and clipping.
Generation of baseband signals according to 1xEV-DO standard by inverting the Q-part of the signal is enabled in the I/Q Settings section.

3.6.1 Filter Settings

Provided are the following settings for configuring the baseband filter:

Filter
Selects the baseband filter.

Remote command:
[:SOURce<hw>]:BB:EVDO:FILTer:TYPE on page 70

Roll Off Factor or BxT
Sets the filter parameter.

The filter parameter offered ("Roll Off Factor" or "BxT") depends on the currently selected filter type. This parameter is preset to the default for each of the predefined filters.

Remote command:
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:APCO25 on page 67
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:COSine on page 68
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:GAUSs on page 68
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:PGAuss on page 69
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:RCOSine on page 69
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:SPHase on page 70

Cut Off Frequency Factor
Sets the value for the cut off frequency factor. The cut off frequency of the filter can be adjusted to reach spectrum mask requirements.

Remote command:
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:LPASs on page 68
[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:LPASSEVM on page 69

Chip Rate Variation
Enters the chip rate.

The chip rate entry changes the output clock and the modulation bandwidth.

Remote command:
[:SOURce<hw>]:BB:EVDO:CRATe:VARiation on page 67

3.6.2 Clipping Settings

Provided are the following settings for configuring the clipping settings:

Clipping State
(For reverse link mode only)

Switches baseband clipping on and off.

Baseband clipping is a very simple and effective way of reducing the crest factor of the signal. Since clipping is done prior to filtering, the procedure does not influence the spectrum. The EVM however increases.

1xEV-DO signals may have very high crest factors particularly with many channels and long sequences.

Remote command:
[:SOURce<hw>]:BB:EVDO:CLIPping:STATe on page 67

Clipping Level
(For reverse link mode only)

Sets the limit for clipping.

This value indicates at what point the signal is clipped. It is specified as a percentage, relative to the highest level. 100% indicates that clipping does not take place.

Remote command:
[:SOURce<hw>]:BB:EVDO:CLIPping:LEVel on page 66

Clipping Mode
(For reverse link mode only)

Selects the clipping method. A graphic illustration of the way in which these two methods work is given in the dialog.

- "Vector | i + jq |"
  The limit is related to the amplitude | i + q |. The I and Q components are mapped together, the angle is retained.
- "Scalar | i | , | q |"
  The limit is related to the absolute maximum of all the I and Q values | i | + | q |. The I and Q components are mapped separately, the angle changes.

Remote command:
[:SOURce<hw>]:BB:EVDO:CLIPping:MODE on page 66

3.6.3 ARB Settings

Provided are the following settings for configuring the ARB settings:

Sequence Length ARB
(For reverse link mode only)

Changes the sequence length of the arbitrary waveform component of the 1xEV-DO signal. This component is calculated in advance and output in the arbitrary waveform generator. It is added to the realtime signal components.

The number of chips is determined from this sequence length. One slot of 1.67ms duration equals 2048 chips.

Remote command:
[:SOURce<hw>]:BB:EVDO:SLENgth on page 64

3.6.4 I/Q Setting

Provided are the following settings for configuring the IQ settings:

Invert Q for Correct Baseband Output
With its default 1xEV-DO settings, the R&S Signal Generator generates a standard compliant *RF* signal.

If a standard compliant *baseband* signal is required, enable this parameter to invert the Q-part of the baseband signal.

If both, the RF signal and baseband signal have to be compliant with the 1xEV-DO standard:

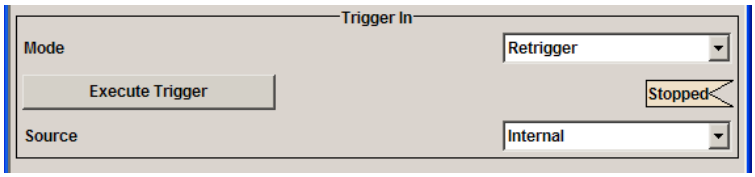
- Set "Invert Q for Correct Baseband Output > On"
- Set "I/Q Mod > I/Q Settings > I/Q Swap > On"

Remote command:
[:SOURce<hw>]:BB:EVDO:IQSWap:STATe on page 70

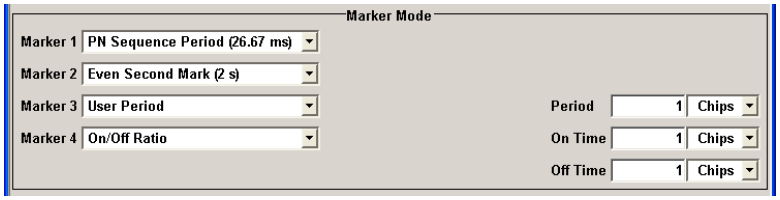
3.7 Trigger/Marker/Clock Settings

► To access this dialog, select "Main Menu > Trigger/Marker".

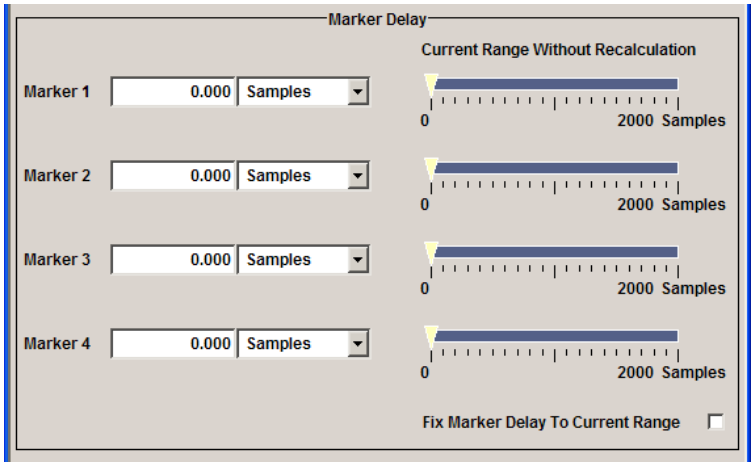
- The "Trigger In" section allows setting of the trigger for the signal. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation ("Running" or "Stopped") is indicated for all trigger modes.



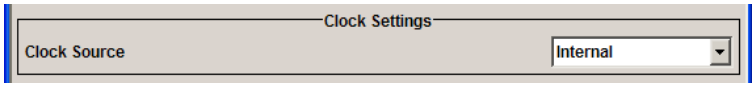
- The "Marker Mode" section is where the marker signals at the MARKER output connectors are configured.



- In the "Marker Delay" section you can define the marker signal delay, either without restriction or restricted to the dynamic section, i.e., the section in which it is possible to make settings without restarting signal and marker generation.



- In the "Clock Settings" section you can select the clock source and - in case of an external source - the clock type.



- The buttons in the last section lead to submenu for general trigger, clock and mapping settings.

3.7.1 Trigger Settings

In the "Trigger in" dialog the trigger for the signal is set. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation ("Running" or "Stopped") is indicated for all trigger modes.

Trigger Mode
Selects trigger mode, i.e. determines the effect of a trigger event on the signal generation.

- "Auto"
  The signal is generated continuously.
- "Retrigger"
  The signal is generated continuously. A trigger event (internal or external) causes a restart.
- "Armed_Auto"
  The signal is generated only when a trigger event occurs. Then the signal is generated continuously.
  An "Arm" stops the signal generation. A subsequent trigger event (internal with or external) causes a restart.
- "Armed_Retrigger"
  The signal is generated only when a trigger event occurs. Then the signal is generated continuously. Every subsequent trigger event causes a restart.
  An "Arm" stops signal generation. A subsequent trigger event (internal with or external) causes a restart.
- "Single"
  The signal is generated only when a trigger event occurs. Then the signal is generated once to the length specified at "Signal Duration".
  Every subsequent trigger event (internal or external) causes a restart.

Remote command:
`[:SOURce<hw>]:BB:EVDO[:TRIGger]:SEQuence` on page 71

Signal Duration Unit
Available in Single Trigger Mode. Defines the unit for describing the length of the signal sequence to be output.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:SLUNit` on page 73

Signal Duration
Defines the length of the signal sequence to be output in the "Single" trigger mode.

It is possible to output deliberately just part of the signal, an exact sequence of the signal, or a defined number of repetitions of the signal.

Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger:SLENgth on page 73

Running/Stopped
Displays the status of signal generation for all trigger modes. This display appears only when signal generation is enabled ("State" On).

- "Running"
  The modulation signal is generated; a trigger was (internally or externally) initiated in triggered mode.
  If "Armed_Auto" and "Armed_Retrigger" have been selected, generation of signals can be stopped with the "Arm" button. A new trigger (internally with "Execute Trigger" or externally) causes a restart.
- "Stopped"
  The signal is not generated, and the instrument waits for a trigger event (internal or external).

Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger:RMODe? on page 72

Arm
For trigger modes "Armed Auto" and "Armed Retrigger", stops the signal generation until subsequent trigger event occurs.

Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger:ARM:EXECute on page 71

Execute Trigger
For internal trigger source, executes trigger manually.

Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger:EXECute on page 71

Trigger Source
Selects trigger source. This setting is effective when a trigger mode other than "Auto" has been selected.

- "Internal"
  The trigger event is executed by "Execute Trigger".
- "Internal (Baseband A/B)"
  (two-path instruments)
  The trigger event is the trigger signal from the second path
- "External (Trigger 1/2)"
  The trigger event is the active edge of an external trigger signal, supplied at the TRIGGER 1/2 connector.
  Use the "Global Trigger/Clock Settings" dialog to define the polarity, the trigger threshold and the input impedance of the trigger signal.

Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger:SOURce on page 73

Sync. Output to External Trigger
(enabled for Trigger Source External)

Enables/disables output of the signal synchronous to the external trigger event.

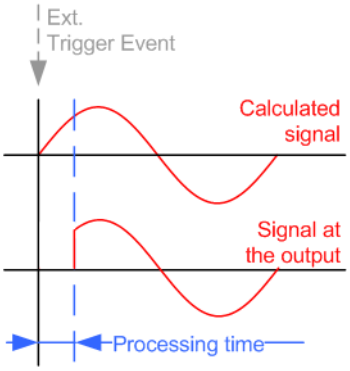
For R&S SMBV instruments:

For two or more R&S SMBVs configured to work in a master-slave mode for synchronous signal generation, configure this parameter depending on the provided system trigger event and the properties of the output signal. See below for an overview of the required settings.

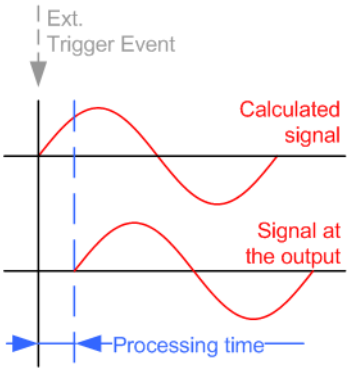
Typical Applications

- All instruments are synchronous to the external trigger event
  - System Trigger = common External Trigger event for the master and the slave instruments
  - "Sync. Output to External Trigger" = ON
- All instruments are synchronous among themselves but starting the signal from first symbol is more important than synchronicity with external trigger event
  - System Trigger = common External Trigger event for the master and the slave instruments
  - "Sync. Output to External Trigger" = OFF
- All instruments are synchronous among themselves
  - System Trigger = internal trigger signal of the master R&S SMBV for the slave instruments
  - "Sync. Output to External Trigger" = OFF

"On" Corresponds to the default state of this parameter.
The signal calculation starts simultaneously with the external trigger event but because of the instrument's processing time the first samples are cut off and no signal is output. After elapsing of the internal processing time, the output signal is synchronous to the trigger event.



"Off" The signal output begins after elapsing of the processing time and starts with sample 0, i.e. the complete signal is output.
This mode is recommended for triggering of short signal sequences with signal duration comparable with the processing time of the instrument.



Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger:EXTernal:SYNChronize:OUTPut
on page 71

Trigger Delay
Sets the trigger signal delay in samples on external triggering or on internal triggering via the second path.

This enables the R&S Signal Generator to be synchronized with the device under test or other external devices.

For two-path instruments, the delay can be set separately for each of the two paths.

Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger[:EXTernal<ch>]:DELay on page 74
[:SOURce<hw>]:BB:EVDO:TRIGger:OBASeband:DELay on page 72

Trigger Inhibit
Sets the duration for inhibiting a new trigger event subsequent to triggering. The input is to be expressed in samples.

In the "Retrigger" mode, every trigger signal causes signal generation to restart. This restart is inhibited for the specified number of samples.

This parameter is only available on external triggering or on internal triggering via the second path.

For two-path instruments, the trigger inhibit can be set separately for each of the two paths.

Remote command:
[:SOURce<hw>]:BB:EVDO:TRIGger[:EXTernal<ch>]:INHibit on page 74
[:SOURce<hw>]:BB:EVDO:TRIGger:OBASeband:INHibit on page 72

3.7.2 Marker Settings

The marker output signal for synchronizing external instruments is configured in the marker settings section "Marker Mode".

The R&S SMBV supports only two markers.

Marker Mode
Selects a marker signal for the associated "MARKER" output.

"Slot (1.67 ms)" A marker signal is generated at the start of each slot (every 1.67 ms).

"PN Sequence Period (26,67 ms)" A marker signal is generated every 26.67 ms (PN Sequence Period).

"Even Second Mark (2 s)" A marker signal is generated every 2 seconds.

"Chip Sequence Period (ARB)" (For reverse link mode only)
A marker signal is generated at the beginning of every Arbitrary Waveform sequence (depending on the set sequence length). The marker signal is generated regardless of whether or not an ARB component is actually used.

"ON/OFF Period" A regular marker signal that is defined by an ON/OFF ratio is generated. A period lasts one ON and OFF cycle.
The "ON Time" and "OFF Time" are each expressed as a number of samples and are set in an input field which opens when ON/OFF ratio is selected.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:ONTime` on page 76
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:OFFTime` on page 76

"User Period" A marker signal is generated at the beginning of every user-defined period. The period is defined in "Period."

Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:PERiod` on page 77

Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:MODE` on page 76

3.7.3 Marker Delay Settings

The delay of the signals on the marker outputs is set in the "Marker Delay" section.

The R&S SMBV supports two markers.

Marker x Delay
Enters the delay between the marker signal at the marker outputs and the start of the signal.

If the setting "Fix marker delay to dynamic range" is enabled, the setting range is restricted to the dynamic range. In this range the delay of the marker signals can be set without restarting the marker and signal.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:DELay` on page 75

Current Range without Calculation
Displays the dynamic range within which the delay of the marker signals can be set without restarting the marker and signal.

The delay can be defined by moving the setting mark.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:DELay:MINimum?`
on page 75
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:DELay:MAXimum?`
on page 75

Fix Marker to Current Range
Restricts the marker delay setting range to the dynamic range. In this range the delay can be set without restarting the marker and signal.

Remote command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut:DELay:FIXed` on page 75

3.7.4 Clock Settings

The clock settings are used to set the clock source.

Sync. Mode
(for R&S SMBV only)

Selects the synchronization mode.

This parameter is used to enable generation of very precise synchronous signals of several connected R&S SMBVs.

Note: If several instruments are connected, the connecting cables from the master instrument to the slave one and between each two consecutive slave instruments must have the same length and type. Avoid unnecessary cable length and branching points.

- "None"
  The instrument is working in stand-alone mode.
- "Sync. Master"
  The instrument provides all connected instruments with its synchronisation (including the trigger signal) and reference clock signal.
- "Sync. Slave"
  The instrument receives the synchronisation and reference clock signal from another instrument working in a master mode.

Remote command:
[:SOURce<hw>]:BB:EVDO:CLOCk:SYNChronization:MODE on page 79

Set Synchronization Settings
(for R&S SMBV only)

Performs an automatic adjustment of the instrument's settings required for the synchronization mode, selected with the parameter "Synchronization Mode".

Remote command:
[:SOURce<hw>]:BB:EVDO:CLOCk:SYNChronization:EXECute on page 78

Clock Source
Selects the clock source.

- "Internal"
  The internal clock reference is used to generate the symbol clock.
- "External"
  The external clock reference is fed in as the symbol clock or multiple thereof via the CLOCK connector.
  The symbol rate must be correctly set to an accuracy of +/-2 % (see data sheet).
  The polarity of the clock input can be changed with the aid of "Global Trigger/Clock Settings".
  In the case of two-path instruments this selection applies to path A.

Remote command:
[:SOURce<hw>]:BB:EVDO:CLOCk:SOURce on page 78

Clock Mode
Enters the type of externally supplied clock.

- "Chip"
  A chip clock is supplied via the CLOCK connector.
- "Multiple"
  A multiple of the chip clock is supplied via the CLOCK connector; the symbol clock is derived internally from this.

Remote command:
[:SOURce<hw>]:BB:EVDO:CLOCk:MODE on page 77

Chip Clock Multiplier
Enters the multiplication factor for clock type Multiple.

Remote command:
[:SOURce<hw>]:BB:EVDO:CLOCk:MULTiplier on page 77

Measured External Clock
Provided for permanent monitoring of the enabled and externally supplied clock signal.

Remote command:
`CLOCk:INPut:FREQuency?`

3.7.5 Global Settings

The buttons in this section lead to dialogs for general trigger, clock and mapping settings.

Global Trigger/Clock Settings
Calls the "Global Trigger/Clock/Input Settings" dialog.

This dialog is used among other things for setting the trigger threshold, the input impedance and the polarity of the clock and trigger inputs.

The parameters in this dialog affect all digital modulations and standards, and are described in chapter "Global Trigger/Clock/Input Settings" in the Operating Manual.

User Marker / AUX I/O Settings
Calls the "User Marker AUX I/O Settings" dialog, used to map the connector on the rear of the instruments.

See also "User Marker / AUX I/O Settings" in the Operating Manual.

4 Remote-Control Commands

The following commands are required to perform signal generation with the 1xEV-DO options in a remote environment. We assume that the R&S Signal Generator has already been set up for remote operation in a network as described in the R&S Signal Generator documentation. A knowledge about the remote control operation and the SCPI command syntax are assumed.

Conventions used in SCPI command descriptions

For a description of the conventions used in the remote command descriptions, see section "Remote Control Commands" in the R&S Signal Generator operating manual.

Common Suffixes

The following common suffixes are used in remote commands:

Suffix	Value range	Description
SOURce<ch>	[1]|2	available baseband signals
OUTPut<ch>	1 .. 4	available markers R&S SMBV supports two markers
EXTernal<ch>	1|2	external trigger connector
CARRier<Ch>	0 .. 21	band class
USER<ST>	1 .. 4	user
TERMinal<ST>	1 .. 4	terminal

Placeholder <root>

For commands that read out or save files in the default directory, the default directory is set using command `MMEM:CDIRectory`. The examples in this description use the place holder `<root>` in the syntax of the command.

- `D:\` - for selecting the internal hard disk of a Windows instrument
- `E:\` - for selecting the memory stick which is inserted at the USB interface of a Windows instrument
- `/var/user/` - for selecting the internal flash card of a Linux instrument
- `/usb/` - for selecting the memory stick which is inserted at the USB interface of a Linux instrument.

Tasks (in manual or remote operation) that are also performed in the base unit in the same way are not described here.

In particular, this includes:

- Managing settings and data lists, i.e. storing and loading settings, creating and accessing data lists, accessing files in a particular directory, etc.
- Information on regular trigger, marker and clock signals as well as filter settings, if appropriate.
- General instrument configuration, such as configuring networks and remote operation
- Using the common status registers

For a description of such tasks, see the R&S Signal Generator operating manual.

The following commands specific to the 1xEV-DO are described here:

4.1 Programming Examples

Example: Performing general tasks

This example shows how to enable the option with predefined settings as basis for further customization (e.g. defining the transmission direction, etc.); results and configuration are stored with the save/recall function.

```
// ********************************************************************
// Reset instrument first
// ********************************************************************
*RST; *CLS

SOURce1:BB:EVDO:PRESet
SOURce1:BB:EVDO:STATe ON
// ********************************************************************
// Save and Recall settings
// ********************************************************************

SOURce1:BB:EVDO:SETTing:STORe "<root>1xEVDO_def"
MMEM:CDIR "<root>"
```

```
SOURce1:BB:EVDO:SETTing:STORe "/var/user/temp/1xEVDO_def"
MMEM:CDIR "/var/user/temp/"

SOURce1:BB:EVDO:SETTing:CATalog?
// 1xEVDO_def,1xEVDO_dl,1xEVDO_test
SOURce1:BB:EVDO:SETTing:DELete "1xEVDO_test"
SOURce1:BB:EVDO:SETTing:LOAD "1xEVDO_dl"

// *********************************************************************
// Change the data transmission direction
// queries PN offset, sets the system time
// queries version and ARB sequence length
// generates and stores an waveform file in the current directory
// *********************************************************************
SOURce1:BB:EVDO:LINK?
// DOWN
SOURce1:BB:EVDO:LINK UP
SOURce1:BB:EVDO:PNOFfset?
// 0
SOURce1:BB:EVDO:STIMe 32
SOURce1:BB:EVDO:SLENgth?
// 48
SOURce1:BB:EVDO:VERSion?
// Release B
SOURce1:BB:EVDO:WAVeform:CREate "wv1xEVDO_ul"
```

Example: Adjusting clock, marker and trigger settings

The following example lists the provided commands:

```
// *********************************************************************
// Clock settings
// *********************************************************************
SOURce1:BB:EVDO:CLOCk:SOURce INTernal

// *********************************************************************
// Configure and enable standard marker signal
// *********************************************************************
SOURce1:BB:EVDO:TRIGger:OUTPut1:MODE RATio
SOURce1:BB:EVDO:TRIGger:OUTPut1:ONTime 40
SOURce1:BB:EVDO:TRIGger:OUTPut1:OFFTime 20

// *********************************************************************
// Configure and enable signal generation
// *********************************************************************
SOURce1:BB:EVDO:TRIGger:SOURce INTernal
SOURce1:BB:EVDO:TRIGger:SEQuence ARETrigger
SOURce1:BB:EVDO:STAT ON
SOURce1:BB:EVDO:TRIGger:EXECute
SOURce1:BB:EVDO:TRIGger:ARM:EXECute
SOURce1:BB:EVDO:TRIGger:RMODe?
// Stopped
```

```
SOURce1:BB:EVDO:TRIGger:EXECute
SOURce1:BB:EVDO:TRIGger:RMODe?
// Run
```

Example: Generating a downlink multi carrier signal

This example shows how to enable the multi carrier configuration and generate a signal composed of four carriers within a selected band class.

```
// ********************************************************************
// Reset instrument first
// ********************************************************************
*RST; *CLS

SOURce1:BB:EVDO:LINK?
// DOWN

:SOURce1:BB:EVDO:DOWN:MC:BCLass BC11

:SOURce1:BB:EVDO:DOWN:MC:CARRier1:STATe 1
:SOURce1:BB:EVDO:DOWN:MC:CARRier2:CHANnel 10
:SOURce1:BB:EVDO:DOWN:MC:CARRier2:STATe 1
:SOURce1:BB:EVDO:DOWN:MC:CARRier3:CHANnel 5
:SOURce1:BB:EVDO:DOWN:MC:CARRier4:CHANnel 500
:SOURce1:BB:EVDO:DOWN:MC:CARRier4:STATe 1
:SOURce1:BB:EVDO:DOWN:MC:CARRier5:CHANnel 100
:SOURce1:BB:EVDO:DOWN:MC:CARRier6:CHANnel 1200
:SOURce1:BB:EVDO:DOWN:MC:CARRier6:CHANnel?
// 871 (channel 1200 is not allowed; the software selects the next available channel)
:SOURce1:BB:EVDO:DOWN:MC:CARRier7:CHANnel 1536
:SOURce1:BB:EVDO:DOWN:MC:CARRier8:CHANnel 1700
:SOURce1:BB:EVDO:DOWN:MC:CARRier8:STATe 1
:SOURce1:BB:EVDO:DOWN:MC:CARRier9:CHANnel 240
:SOURce1:BB:EVDO:DOWN:MC:STATe 1

:SOURce1:BB:EVDO:STATe 1

:SOURce1:BB:EVDO:DOWN:MC:CFRequency?
// 456900000
:SOURce1:BB:EVDO:DOWN:MC:CARRier1:FREQuency?
// 460000000
:SOURce1:BB:EVDO:DOWN:MC:CARRier2:FREQuency?
// 460225000
:SOURce1:BB:EVDO:DOWN:MC:CARRier4:FREQuency?
// 420700000
:SOURce1:BB:EVDO:DOWN:MC:CARRier8:FREQuency?
//493100000

// apply a carrier delay to reduce the crest factor
:SOURce1:BB:EVDO:DOWN:MC:CDELay 0.000001
// Carrier#1 is delayed by 0 ns, carrier#2 by 1000 ns,
// carrier#4 by 2000 ns, carrie#8 by 3000 ns
```

4.2 General Commands

This section contains commands for the primary and general settings of the 1XEV-DO standard. These settings concern activation and deactivation of the standard, setting the transmission direction, defining the chip rate and the sequence length, as well as the preset and power adjust setting.

[:SOURce<hw>]:BB:EVDO:LINK <Link>

Defines the transmission direction.

Parameters:

<Link> FORWard/DOWN | REVerse/UP
*RST: DOWN

Example: see Example "Performing general tasks" on page 58

Manual operation: See "Link Direction" on page 14

[:SOURce<hw>]:BB:EVDO:PNOFfset <PnOffset>

Sets the PN Offset of the 1xEV-DO signal.

Parameters:

<PnOffset> integer
Range: 0 to 511
*RST: 0

Example: see Example "Performing general tasks" on page 58

Manual operation: See "PN Offset" on page 14

[:SOURce<hw>]:BB:EVDO:PRESet

Sets the parameters of the digital standard to their default values (`*RST` values specified for the commands).

Not affected is the state set with the command `SOURce<hw>:BB:EVDO:STATe`

Example: see Example "Performing general tasks" on page 58

Usage: Event

Manual operation: See "Set to Default" on page 12

[:SOURce<hw>]:BB:EVDO:SETTing:CATalog?

Queries the files with 1xEV-DO settings (file extension `*.1xevdo`) in the default or the specified directory.

Return values:

<Catalog> "<filename1>,<filename2>,..."
Returns a string of file names separated by commas.

Example: see Example "Performing general tasks" on page 58

Usage: Query only

Manual operation: See "Save/Recall ..." on page 12

[:SOURce<hw>]:BB:EVDO:SETTing:DELete <Filename>

Deletes the selected file from the default or specified directory. Deleted are files with the file extension `*.1xevdo`.

Setting parameters:

<Filename> string

Example: see Example "Performing general tasks" on page 58

Usage: Setting only

Manual operation: See "Save/Recall ..." on page 12

[:SOURce<hw>]:BB:EVDO:SETTing:LOAD <Filename>

Loads the selected file from the default or the sepcified directory. Load are files with extension `*.1xevdo`.

Setting parameters:

<Filename> string

Example: see Example "Performing general tasks" on page 58

Usage: Setting only

Manual operation: See "Save/Recall ..." on page 12

[:SOURce<hw>]:BB:EVDO:SETTing:STORe <Filename>

Stores the current settings into the selected file; the file extension `*.1xevdo` is assined automatically.

Setting parameters:
<Filename> string

Example: see Example "Performing general tasks" on page 58

Usage: Setting only

Manual operation: See "Save/Recall ..." on page 12

[:SOURce<hw>]:BB:EVDO:SETTing:STORe:FAST <Fast>

Determines whether the instrument performs an absolute or a differential storing of the settings.

Enable this function to accelerate the saving process by saving only the settings with values different to the default ones.

Note: This function is not affected by the "Preset" function.

Parameters:
<Fast> 0 | 1 | OFF | ON
*RST: 1

[:SOURce<hw>]:BB:EVDO:SLENgth <SLength>

(For reverse link mode only)

Sets the sequence length of the arbitrary waveform component of the 1XEV-DO signal in number of frames. This component is calculated in advance and output in the arbitrary waveform generator. It is added to the real-time signal components.The number of chips is determined from this sequence length. One slot of 1.67ms duration equals 2048 chips.

Parameters:
<SLength> integer
Range: 4 to dynamic
Increment: 4
*RST: 48

Example: see Example "Performing general tasks" on page 58

Manual operation: See "Sequence Length ARB" on page 47

[:SOURce<hw>]:BB:EVDO:STATe <State>

Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Parameters:
<State> 0 | 1 | OFF | ON
*RST: 0

Example: see Example "Performing general tasks" on page 58

Manual operation: See "State" on page 12

[:SOURce<hw>]:BB:EVDO:STIMe <STime>

Sets the System Time value of the 1xEV-DO signal and the base station. The System Time value is expressed in units of 1.67 ms intervals (80 ms/ 48).

Note: In uplink, the value selected for system time must be multiple of 16.

Parameters:

<STime> integer

Range: 0 to 2199023255551
*RST: 0

Example: see Example "Performing general tasks" on page 58

Manual operation: See "System Time" on page 14

[:SOURce<hw>]:BB:EVDO:VERSion?

Queries the version of the 1xEV-DO standard underlying the definitions

Return values:

<Version> string

Example: see Example "Performing general tasks" on page 58

Usage: Query only

Manual operation: See "1xEV-DO Version" on page 13

[:SOURce<hw>]:BB:EVDO:WAVeform:CREate <Filename>

Creates a waveform using the current settings. The file is stored with the predefined file extension `*.wv`. The file name and the directory it is stored in are user-definable.

Setting parameters:

<Filename> string

Example: see Example "Performing general tasks" on page 58

Usage: Setting only

Manual operation: See "Generate Waveform File" on page 13

4.3 Filter/Clipping/ARB Commands

[:SOURce<hw>]:BB:EVDO:CLIPping:LEVel <Level>

(For reverse link mode only)

The command sets the limit for level clipping (Clipping). This value indicates at what point the signal is clipped. It is specified as a percentage, relative to the highest level. 100% indicates that clipping does not take place.

Level clipping is activated with the command `SOUR:BB:EVDO:CLIP:STAT ON`

Parameters:

<Level> integer

Range: 0 PCT to 100 PCT
Increment: 1 PCT
*RST: 100 PCT

Example: `BB:EVDO:CLIP:LEV 80PCT`
sets the limit for level clipping to 80% of the maximum level.
`BB:EVDO:CLIP:STAT ON`
activates level clipping.

Manual operation: See "Clipping Level" on page 46

[:SOURce<hw>]:BB:EVDO:CLIPping:MODE <Mode>

(For reverse link mode only)

The command sets the method for level clipping (Clipping).

Parameters:

<Mode> VECTor | SCALar

VECTor
The reference level is the amplitude | i+jq |

SCALar
The reference level is the absolute maximum of the I and Q values.

*RST: VECTor

Example: `BB:EVDO:CLIP:MODE SCAL`
selects the absolute maximum of all the I and Q values as the reference level.
`BB:EVDO:CLIP:LEV 80PCT`
sets the limit for level clipping to 80% of this maximum level.
`BB:EVDO:CLIP:STAT ON`
activates level clipping.

Manual operation: See "Clipping Mode" on page 47

[:SOURce<hw>]:BB:EVDO:CLIPping:STATe <State>

(For reverse link mode only)

The command activates level clipping (Clipping). The value is defined with the command`BB:EVDO:CLIPping:LEVel`, the mode of calculation with the command `BB:EVDO:CLIPping:MODE`.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: OFF

Example: `BB:EVDO:CLIP:STAT ON`
activates level clipping.

Manual operation: See "Clipping State" on page 46

[:SOURce<hw>]:BB:EVDO:CRATe:VARiation <Variation>

Enters the output chip rate.

The output chip rate changes the output clock and the modulation bandwidth, as well as the synchronization signals that are output. It does not affect the calculated chip sequence.

Parameters:

<Variation> float
Range: 1 Mcps to 5 Mcps
Increment: 1E-6 Mcps (1cps)
*RST: 1.2288 Mcps

Example: `BB:EVDO:CRAT:VAR 4086001`
sets the chip rate to 4.08 Mcps.

Manual operation: See "Chip Rate Variation" on page 46

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:APCO25 <Apco25>

Sets the roll-off factor for filter type APCO25.

Parameters:

<Apco25> float

Range: 0.05 to 0.99
Increment: 0.01
*RST: 0.2

Example: `BB:EVDO:FILT:PAR:APCO25 0.2`
sets the roll-off factor to 0.2 for filter type APCO25.

Manual operation: See "Roll Off Factor or BxT" on page 45

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:COSine <Cosine>

Sets the roll-off factor for the Cosine filter type.

Parameters:

<Cosine> float

Range: 0.05 to 1
Increment: 0.01
*RST: 0.1

Example: `BB:EVDO:FILT:PAR:COS 0.35`
sets the roll-off factor to 0.35 for filter type Cosine.

Manual operation: See "Roll Off Factor or BxT" on page 45

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:GAUSs <Gauss>

Sets the roll-off factor for the Gauss filter type.

Parameters:

<Gauss> float

Range: 0.15 to 2.5
Increment: 0.01
*RST: 0.5

Example: `BB:EVDO:FILT:PAR:GAUS 0.5`
sets B x T to 0.5 for the Gauss filter type.

Manual operation: See "Roll Off Factor or BxT" on page 45

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:LPASs <LPass>

Sets the cut off frequency factor for the Lowpass filter (ACP Opt.) type.

Parameters:

<LPass> float

Range: 0.05 to 2
Increment: 0.01
*RST: 0.5

Example: `BB:EVDO:FILT:PAR:LPAS 0.5`
the cut of frequency factor is set to 0.5.

Manual operation: See "Cut Off Frequency Factor" on page 46

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:LPASSEVM <LPassEvm>

Sets the cut off frequency factor for the Lowpass filter (EVM Opt.) type.

Parameters:

<LPassEvm> float

Range: 0.05 to 2
Increment: 0.01
*RST: 0.5

Example: `BB:EVDO:FILT:PAR:LPASSEVM 0.5`
the cut of frequency factor is set to 0.5.

Manual operation: See "Cut Off Frequency Factor" on page 46

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:PGAuss <PGauss>

Sets the roll-off factor for the Pure Gauss filter type.

Parameters:

<PGauss> float

Range: 0.15 to 2.5
Increment: 0.01
*RST: 0.5

Example: `BB:EVDO:FILT:PAR:GAUS 0.5`
sets B x T to 0.5 for the Pure Gauss filter type.

Manual operation: See "Roll Off Factor or BxT" on page 45

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:RCOSine <RCosine>

Sets the roll-off factor for the Root Cosine filter type.

Parameters:

<RCosine> float

Range: 0.05 to 1
Increment: 0.01
*RST: 0.15

Example: `BB:EVDO:FILT:PAR:RCOS 0.22`
sets the roll-off factor to 0. 22 for filter type Root Cosine.

Manual operation: See "Roll Off Factor or BxT" on page 45

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:SPHase <SPhase>

Sets B x T for the Split Phase filter type.

Parameters:

<SPhase> float

Range: 0.15 to 2.5
Increment: 0.01
*RST: 2

Example: `BB:EVDO:FILT:PAR:SPH 0.5`
sets B x T to 0.5 for the Split Phase filter type.

Manual operation: See "Roll Off Factor or BxT" on page 45

[:SOURce<hw>]:BB:EVDO:FILTer:TYPE <Type>

The command selects the filter type.

Parameters:

<Type> RCOSine | COSine | GAUSs | LGAuss | CONE | COF705 | COEQualizer | COFequalizer | C2K3x | APCO25 | SPHase | RECTangle | PGAuss | LPASs | DIRac | ENPShape | EWPShape | LPASSEVM

*RST: Downlink:COEQ; Uplink: CONE

Example: `BB:EVDO:FILT:TYPE CONE`
sets the filter type CdmaOne. This filter type is defined by the standard for the uplink.

Manual operation: See "Filter" on page 45

[:SOURce<hw>]:BB:EVDO:IQSWap:STATe <State>

Inverts the Q-part of the baseband signal

Parameters:

<State> 0 | 1 | OFF | ON

*RST: 0

Example: `SOURce1:BB:EVDO:IQSWap:STATe ON`
inverts the Q-part of the baseband signal
`SOURce:IQ:SWAP:STATe ON`
swaps the I and Q signals

Manual operation: See "Invert Q for Correct Baseband Output" on page 47

4.4 Trigger Commands

The following commands are described here:

[:SOURce<hw>]:BB:EVDO[:TRIGger]:SEQuence <Sequence>

Selects a requlr trigger mode.

Parameters:

<Sequence> AUTO | RETRigger | AAUTo | ARETrigger | SINGle

*RST: AUTO

Example: see Example "Adjusting clock, marker and trigger settings" on page 59

Manual operation: See "Trigger Mode" on page 49

[:SOURce<hw>]:BB:EVDO:TRIGger:ARM:EXECute

Stops signal generation; a subsequent internal or external trigger event restart signal generation.

Example: see Example "Adjusting clock, marker and trigger settings" on page 59

Usage: Event

Manual operation: See "Arm" on page 50

[:SOURce<hw>]:BB:EVDO:TRIGger:EXECute

Executes a trigger.

Example: see Example "Adjusting clock, marker and trigger settings" on page 59

Usage: Event

Manual operation: See "Execute Trigger" on page 15

[:SOURce<hw>]:BB:EVDO:TRIGger:EXTernal:SYNChronize:OUTPut <Output>

For an external trigger signal, enables/disables the output of a signal synchronous to the external trigger event.

Parameters:

<Output> 0 | 1 | OFF | ON

*RST: 1

Example: `BB:EVDO:TRIG:SOUR EXT`
sets external triggering.
`BB:EVDO:TRIG:EXT:SYNC:OUTP ON`
enables synchrounous output to external trigger

Manual operation: See "Sync. Output to External Trigger" on page 50

[:SOURce<hw>]:BB:EVDO:TRIGger:OBASeband:DELay <Delay>

Specifies the trigger delay (expressed as a number of chips) for triggering from the other path.

Parameters:

<Delay> float

Range: 0 to 65535
Increment: 0.01
*RST: 0

Example: see `[:SOURce<hw>]:BB:EVDO:TRIGger:OBASeband:INHibit` on page 72

Manual operation: See "Trigger Delay" on page 52

[:SOURce<hw>]:BB:EVDO:TRIGger:OBASeband:INHibit <Inhibit>

Specifies the number of chips by which a restart is to be inhibited following a trigger event. This command applies only for triggering by the second path.

Parameters:

<Inhibit> integer

Range: 0 to 67108863
*RST: 0

Example: `BB:EVDO:TRIG:SOUR OBAS`
sets triggering by the other path
`BB:EVDO:TRIG:INH 200`
sets a restart inhibit for 200 chips following a trigger event.
`BB:EVDO:TRIG:OBAS:DEL 50`
sets a delay of 50 symbols for the trigger.

Manual operation: See "Trigger Inhibit" on page 52

[:SOURce<hw>]:BB:EVDO:TRIGger:RMODe?

Queries the status of signal generation.

Return values:

<RMode> STOP | RUN

Example: see Example "Adjusting clock, marker and trigger settings" on page 59

Usage: Query only

Manual operation: See "Running/Stopped" on page 50

[:SOURce<hw>]:BB:EVDO:TRIGger:SLENgth <SLength>

Defines the length of the signal sequence to be output in the `SINGle` trigger mode.

Parameters:

<SLength> integer

Range: 1 to 4294967295
*RST: 1

Example:
```
SOURce:BB:EVDO:TRIGger:SEQuence SINGle
SOURce:BB:EVDO:TRIGger:SLUNit CHIP
```
sets unit chips for the entry of sequence length.
```
SOURce:BB:EVDO:TRIGger:SLENgth 200
```
sets a sequence length of 200 chips. The first 200 chips of the current frame will be output after the next trigger event.

Manual operation: See "Signal Duration" on page 49

[:SOURce<hw>]:BB:EVDO:TRIGger:SLUNit <SLunit>

Defines the unit for the entry of the length of the signal sequence.

Parameters:

<SLunit> SLOT | CHIP | SEQuence

*RST: SEQuence

Example: see `[:SOURce<hw>]:BB:EVDO:TRIGger:SLENgth` on page 73

Manual operation: See "Signal Duration Unit" on page 49

[:SOURce<hw>]:BB:EVDO:TRIGger:SOURce <Source>

Selects the trigger source.

Parameters:

<Source> INTernal|OBASeband|BEXTernal|EXTernal

`INTernal`
manual trigger or `*TRG`.
`EXTernal|BEXTernal`
trigger signal on the TRIGGER 1 connector.
`OBASeband`
trigger signal from the other path

*RST: INTernal

Example: see Example "Adjusting clock, marker and trigger settings" on page 59

Manual operation: See "Trigger Source" on page 50

[:SOURce<hw>]:BB:EVDO:TRIGger[:EXTernal<ch>]:DELay <Delay>

Specifies the trigger delay (expressed as a number of chips) for external triggering.

Parameters:

<Delay> float

Range: 0 to 65535
Increment: 0.01
*RST: 0

Example: see `[:SOURce<hw>]:BB:EVDO:TRIGger[:EXTernal<ch>]:INHibit` on page 74

Manual operation: See "Trigger Delay" on page 52

[:SOURce<hw>]:BB:EVDO:TRIGger[:EXTernal<ch>]:INHibit <Inhibit>

Specifies the number of chips by which a restart is to be inhibited following a trigger event. This command applies only in the case of external triggering.

Parameters:

<Inhibit> integer

Range: 0 to 67108863
*RST: 0

Example: `BB:EVDO:TRIG:SOUR EXT`
selects an external trigger
`BB:EVDO:TRIG:INH 200`
sets a restart inhibit for 200 chips following a trigger event.
`BB:EVDO:TRIG:DEL 50`
sets a delay of 50 symbols for the trigger.

Manual operation: See "Trigger Inhibit" on page 52

4.5 Marker Commands

The following commands are described here:

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut:DELay:FIXed <Fixed>

Restricts the marker delay setting range to current range.

Parameters:

<Fixed> 0 | 1 | OFF | ON

*RST: 0

Example: `SOURce2:BB:EVDO:TRIGger:OUTPut:DELay:FIXed ON`

Manual operation: See "Fix Marker to Current Range" on page 54

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:DELay <Delay>

Defines the delay between the signal on the marker outputs and the start of the signal, expressed in terms of the signal units.

Parameters:

<Delay> float

Range: 0 to max
Increment: 0.001
*RST: 0

Example: `SOURce2:BB:EVDO:TRIGger:OUTPut2:DELay 16000`

Manual operation: See "Marker x Delay" on page 54

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:DELay:MINimum?
[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:DELay:MAXimum?

Queries the minimum/maximum marker delay for fixed marker delay setting.

Return values:

<Maximum> float

Range: 0 to max

Example: `SOURce:BB:EVDO:TRIGger:OUTPut1:DELay:FIXed ON`
restricts the marker signal delay setting range to the dynamic range.
`SOURce:BB:EVDO:TRIGger:OUTPut1:DELay:MINimum?`
`SOURce:BB:EVDO:TRIGger:OUTPut1:DELay:MAXimum?`
queries the maximum of the dynamic range.

Usage: Query only

Manual operation: See "Current Range without Calculation" on page 54

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:MODE <Mode>

Defines the signal for the selected marker output.

Parameters:

<Mode> SLOT | PNSPeriod | ESM | CSPeriod | USER | RATio | TRIGger

SLOT
Each slot (every 1.67 ms)

PNSPeriod
Every 26.67 ms (PN Sequence Period)

ESM
Every 2 s (even second mark).

CSPeriod
Each arbitrary waveform sequence

RATio
Regular marker signal

USER
Every user-defined period.

TRIGger
A received internal or external trigger signal is output at the marker connector.

*RST: SLOT

Example: `SOURce:BB:EVDO:TRIGger:OUTPut2:MODE ESM`
selects the even second mark clock (every 2 seconds) on the output for marker signal 2

Manual operation: See "Marker Mode" on page 53

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:ONTime <OnTime>
[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:OFFTime <OffTime>

Sets the number of symbols in a period (ON time + OFF time) for marker `RATio`

Parameters:

<OffTime> integer

Range: 1 to 16777215
*RST: 1

Example: `SOURce:BB:EVDO:TRIGger:OUTPut2:MODE RATio`
`SOURce:BB:EVDO:TRIGger:OUTPut2:OFFTime 2000`
sets an OFF time of 2000 chips for marker signal 2.
`SOURce:BB:EVDO:TRIGger:OUTPut2:ONTime 200`
sets an ON time of 200 chips for marker signal 2.

Manual operation: See "Marker Mode" on page 53

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:PERiod <Period>

Sets the repetition rate for the signal at the marker outputs, expressed in terms of chips.

Parameters:

<Period> integer

Range: 2 to 16777215
*RST: 2

Example: `SOURce:BB:EVDO:TRIGger:OUTPut2:MODE USER`
selects the user marker
`SOURce:BB:EVDO:TRIGger:OUTPut2:PERiod 1600`
sets a period of 1600 chips, i.e. the marker signal is repeated every 1600th chip.

Manual operation: See "Marker Mode" on page 53

4.6 Clock Commands

The following commands are described here:

[:SOURce<hw>]:BB:EVDO:CLOCk:MODE <Mode>

Sets the type of externally supplied clock.

For two-path instruments, the only numerical suffix allowed for SOURce is 1, since the external clock source is permanently allocated to path A.

Parameters:

<Mode> CHIP | MCHip

*RST: CHIP

Example: see `[:SOURce<hw>]:BB:EVDO:CLOCk:SOURce` on page 78

Manual operation: See "Clock Mode" on page 55

[:SOURce<hw>]:BB:EVDO:CLOCk:MULTiplier <Multiplier>

Sets the multiplier for clock type Multiplied.

For two-path instruments, the only numerical suffix allowed for `SOURce` is 1, since the external clock source is permanently allocated to path A.

Parameters:

<Multiplier> integer

Range: 1 to 64
*RST: 4

Example: see `[:SOURce<hw>]:BB:EVDO:CLOCk:SOURce` on page 78

Manual operation: See "Chip Clock Multiplier" on page 55

[:SOURce<hw>]:BB:EVDO:CLOCk:SOURce <Source>

The command selects the clock source.

For two-path instruments, selecting `EXTernal` is only possible for path A, since the external clock source is permanently allocated to path A. Selection `AINternal` is only possible for path B.

Parameters:

<Source> INTernal | EXTernal | AINTernal

INTernal
The internal clock reference is used.

EXTernal
The external clock reference is supplied to the CLOCK connector. Commands `:BB:EVDO:CLOCk:MODE` and `:MULTiplier` are used to enter the type of the external clock.

AINTernal
The clock source of path A is used for path B.

*RST: INTernal

Example:
```
BB:EVDO:CLOC:SOUR EXT
BB:EVDO:CLOC:MODE MCH
BB:EVDO:CLOC:MULT 12
```

Manual operation: See "Clock Source" on page 55

[:SOURce<hw>]:BB:EVDO:CLOCk:SYNChronization:EXECute

Performs automatically adjustment of the instrument's settings required for the synchronization mode, set with the command `BB:EVDO:CLOC:SYNC:MODE`.

Example:
```
BB:EVDO:CLOC:SYNC:MODE MAST
```
the instrument is configured to work as a master one.
```
BB:EVDO:CLOC:SYNC:EXEC
```
all synchronizations settings are adjusted accordingly.

Usage: Event

Manual operation: See "Set Synchronization Settings" on page 55

[:SOURce<hw>]:BB:EVDO:CLOCk:SYNChronization:MODE <Mode>

Selects the synchronization mode.

This parameter is used to enable generation of very precise synchronous signal of several connected R&S SMBVs.

Note: If several instruments are connected, the connecting cables from the master instrument to the slave one and between each two consecutive slave instruments must have the same length and type. Avoid unnecessary cable length and branching points.

Parameters:

<Mode> NONE | MASTer | SLAVe

NONE
The instrument is working in stand-alone mode.

MASTer
The instrument provides all connected instrument with its synchronisation (including the trigger signal) and reference clock signal.

SLAVe
The instrument receives the synchronisation and reference clock signal from another instrument working in a master mode.

*RST: NONE

Example: `BB:EVDO:CLOC:SYNC:MODE MAST`
the instrument is configured to work as a master one.

Manual operation: See "Sync. Mode" on page 54

4.7 Access Network Commands

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:PSOFfset <PSoffset>

Sets the offset (in slots) from the start of control channel cycle to the start of the synchronous message capsule that contains the Sync Message.

Parameters:

<PSoffset> integer

Range: 0 to 3
*RST: 0

Example: `BB:EVDO:ANET:CCH:PSOF 2`
sets the packet start offset for the control channel to 2.

Manual operation: See "Packet Start Offset" on page 17

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:RATE <Rate>

Sets the rate that the control channel messages are transmitted at.

Parameters:

<Rate> DR4K8 | DR9K6 | DR19K2 | DR38K4 | DR76K8 | DR153K6 | DR307K2 | DR614K4 | DR921K6 | DR1228K8 | DR1536K | DR1843K2 | DR2457K6 | DR3072K | DR460K8 | DR768K | DR1075K2 | DR2150K4 | DR3686K4 | DR4300K8 | DR4915K2

*RST: 38.4 kbps

Example: `BB:EVDO:ANET:CCH:RATE DR76K8`
sets the control channel rate to 76.8 kbps.

Manual operation: See "Rate (Control Channel)" on page 17

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MAXimum <Maximum>

Sets the value of the maximum revision field within the control channel message.

Parameters:

<Maximum> integer

Range: 0 to 255
*RST: 1

Example: `BB:EVDO:ANET:CCH:REV:MAX 10`
sets the value of the maximum revision field to 10.

Manual operation: See "Maximum Revision" on page 17

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MINimum <Minimum>

Sets the value of the minimum revision field within the control channel message.

Parameters:

<Minimum> integer

Range: 0 to 255
*RST: 1

Example: `BB:EVDO:ANET:CCH:REV:MIN 1`
sets the value of the minimum revision field to 1.

Manual operation: See "Minimum Revision" on page 17

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:STATe <State>

Enables or disables the control channel messages.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: 0

Example: `BB:EVDO:ANET:CCH:STAT ON`
enables the control channel message.

Manual operation: See "State (Control Channel)" on page 16

[:SOURce<hw>]:BB:EVDO:ANETwork:CPMode <CpMode>

Enables or disables a special mode within the 1xEV-DO generator.

Note: During the special mode, all other parameters do not affect the signal output.

Parameters:

<CpMode> 0 | 1 | OFF | ON

*RST: 0

Example: `BB:EVDO:ANET:CPM ON`
enables the special mode.

Manual operation: See "Continuous Pilot Mode" on page 16

[:SOURce<hw>]:BB:EVDO:ANETwork:OUCount <OuCount>

Sets the number of additional users (beyond the four defined users) that appear in the MAC Channel.

Parameters:

<OuCount> integer

Range: 0 to 55 for physical layer subtype 0&1) , 0 to 110 for physical layer subtype 2, 0 to 360 for physical layer subtype 3
*RST: 1

Example: `BB:EVDO:ANET:OUC 5`
sets the number of additional users to 5.

Manual operation: See "Other Users Count" on page 18

[:SOURce<hw>]:BB:EVDO:ANETwork:PCHannel:STATe?

Displays the state of the pilot channel. Pilot channel is transmitted by sector on each active forward channel. It is present always and transmitted at the full sector power.

Return values:
<State> 0 | 1 | OFF | ON
*RST: ON

Example: `BB:EVDO:ANET:PCH:STAT?`
displays the state of the pilot channel.

Usage: Query only

Manual operation: See "State (Pilot Channel)" on page 16

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LENGth <Length>

Sets the duration (in slots) of a Reverse Activity bit.

Note: This parameter is available for physical layer subtype 0&1 only.

Parameters:
<Length> RL8 | RL16 | RL32 | RL64
*RST: 8

Example: `BB:EVDO:ANET:RAB:LENG RL16`
sets the duration of the Reverse Activity Bit (RAB) to 16 slots.

Manual operation: See "RAB Length" on page 17

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LEVel <Level>

Sets the power within the MAC block for the Reverse Activity channel.

Parameters:
<Level> float
Range: -25 to -7
Increment: 0.01
*RST: -7

Example: `BB:EVDO:ANET:RAB:LEV -7.0`
sets the power of the MAC block for the Reverse Activity Channel to -7.0 dB.

Manual operation: See "RAB Level" on page 17

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:MAC:INDex <Index>

For physical layer subtype 3 only sets the RAB MAC Index.

Parameters:

<Index> integer

Range: 4 to 127
*RST: 4

Manual operation: See "RAB MAC Index" on page 18

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:OFFSet <Offset>

Sets the starting time offset of the Reverse Activity bit in slots. The command is specified in Reverse Activity Length/8 units. The RA bit starts when the following equation is satisfied:

System Time mod RABlenght = RABOffset, where System Time is expressed in slots.

Note: This parameter is available for physical layer subtype 0&1 only.

Parameters:

<Offset> integer

Range: 0 to 7
*RST: 0

Example: `BB:EVDO:ANET:RAB:OFFS 1`
sets the starting time offset of the Reverse Activity bit to 1.

Manual operation: See "RAB Offset" on page 18

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:STATe <State>

Activates or deactivates the reverse activity bit (RAB).

Parameters:

<State> 0 | 1 | OFF | ON

*RST: OFF

Example: `BB:EVDO:ANET:RAB:STAT ON`
activates the Reverse Activity Bit.

Manual operation: See "State (Reverse Activity Bit)" on page 17

[:SOURce<hw>]:BB:EVDO:ANETwork:SUBType <Subtype>

Selects the physical layer subtype.

Note: The physical layer subtype settings can be queried per user.

Parameters:

<Subtype> S1 | S2 | S3

*RST: S2

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype to 2.

Options: S3 requires option R&S SMx/AMU-K87

Manual operation: See "Physical Layer Subtype (Access Network Settings)" on page 16

4.8 Multi Carrier Configuration Commands

Multi Carrier Configuration requires option

R&S SMx/AMU-K87

[:SOURce<hw>]:BB:EVDO:UP:MC:BCLass <BandClass>
[:SOURce<hw>]:BB:EVDO:DOWN:MC:BCLass <BandClass>

Selects the band class for operation, as defined in 3GPP2 C.S0057-E.

`BC17` is supported in downlink only.

Parameters:

<BandClass> BC0 | BC1 | BC2 | BC3 | BC4 | BC5 | BC6 | BC7 | BC8 | BC9 | BC10 | BC11 | BC12 | BC13 | BC14 | BC15 | BC16 | BC17 | BC18 | BC19 | BC20 | BC21

*RST: BC0

Example: see Example "Generating a downlink multi carrier signal" on page 61

Options: R&S SMx/AMU-K87

Manual operation: See "Band Class" on page 19

[:SOURce<hw>]:BB:EVDO:UP:MC:CFRequency?
[:SOURce<hw>]:BB:EVDO:DOWN:MC:CFRequency?

Queries the center frequency of the band resulting from the set active carriers.

Return values:

<CenterFrequency> integer

Example: see Example "Generating a downlink multi carrier signal" on page 61

Usage: Query only

Options: R&S SMx/AMU-K87

Manual operation: See "Center Frequency (band)" on page 19

[:SOURce<hw>]:BB:EVDO:UP:MC:CDELay <CarrierDelay>
[:SOURce<hw>]:BB:EVDO:DOWN:MC:CDELay <CarrierDelay>

Sets a delay to each active carrier.

Parameters:

<CarrierDelay> float

Range: 0 to 10E-6
Increment: 1E-9
*RST: 0

Example: see Example "Generating a downlink multi carrier signal" on page 61

Options: R&S SMx/AMU-K87

Manual operation: See "Carrier Delay" on page 19

[:SOURce<hw>]:BB:EVDO:UP:MC:CARRier<ch>:STATe <State>
[:SOURce<hw>]:BB:EVDO:DOWN:MC:CARRier<ch>:STATe <State>

Switches the selected carrier on or off.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: 0

Example: see Example "Generating a downlink multi carrier signal" on page 61

Options: R&S SMx/AMU-K87

Manual operation: See "State" on page 19

[:SOURce<hw>]:BB:EVDO:UP:MC:CARRier<ch>:CHANnel <Channel>
[:SOURce<hw>]:BB:EVDO:DOWN:MC:CARRier<ch>:CHANnel <Channel>

Sets carrier's CDMA channel number.

The available `Channel` values depend on the selectd `Band Class`.

In some cases not all channel numbers can be used. In case a non-existing channel is input, the next available channel will be used.

Parameters:

<Channel> integer

Range: 0 to 3000
*RST: 1

Example: see Example "Generating a downlink multi carrier signal" on page 61

Options: R&S SMx/AMU-K87

Manual operation: See "CDMA Channel Number" on page 20

[:SOURce<hw>]:BB:EVDO:UP:MC:CARRier<ch>:FREQuency <Frequency>
[:SOURce<hw>]:BB:EVDO:DOWN:MC:CARRier<ch>:FREQuency <Frequency>

Sets the center frequency of the carrier in MHz. In some cases not all center frequencies are defined by the selected band class. In case a non-existing frequency is input, the next available frequency will be used.

Parameters:

<Frequency> float

Range: 100 to 3000
Increment: 1E-4
*RST: 870.03

Example: see Example "Generating a downlink multi carrier signal" on page 61

Options: R&S SMx/AMU-K87

Manual operation: See "Center Frequency" on page 20

[:SOURce<hw>]:BB:EVDO:UP:MC:STATe <State>
[:SOURce<hw>]:BB:EVDO:DOWN:MC:STATe <State>

Enables or disables multi carrier operation.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: 0

Example: see Example "Generating a downlink multi carrier signal" on page 61

Options: R&S SMx/AMU-K87

4.9 Configure Traffic User Commands

[:SOURce<hw>]:BB:EVDO:USER<st>:DATA:PATTern <Pattern>

Sets the data pattern for the data portion of the packets sent to the user. The most significant bit (MSB) of this value is the MSB of the packet and the word is repeated to fill all space within the packet.This parameter is 32 bits and in a hexadecimal format.

Parameters:

<Pattern> 32 bits

Example: `BB:EVDO:USER2:DTA:PATT #H55aa55aa`
sets the data pattern for user 2.

Manual operation: See "Data Pattern (hex)" on page 27

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:LENGth <Length>

Sets the number of DRC (Data Rate Control) Lock periods that the state of the DRC Lock for the selected user will be held constant.

Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

A value of one allows updating of the DRC Lock bit at anytime.

Parameters:

<Length> DL1 | DL4 | DL8 | DL16 | DL32 | DL64
*RST: 1

Example: `BB:EVDO:USER2:DRCL:LENG DL8`
sets 8 DRCLock periods for holding the state of user 2 constant.

Manual operation: See "DRC Lock Length" on page 30

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:OFFSet <Offset>

Sets the reverse link frame offset for the reverse link. The frame offset is used to properly position the DRC Lock bit within the MAC channel.

Parameters:

<Offset> integer

Range: 0 to 15
*RST: 0

Example: `BB:EVDO:USER2:DRCL:OFFS 5`
sets the reverse link frame offset to 5.

Manual operation: See "Frame Offset" on page 30

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:PERiod <Period>

Sets the period (measured in slots) of time between successive transmissions of the DRC (Data Rate Control) Lock bit for the selected user.

Note: A value of zero will disable the DRC Lock subchannel and the MAC RPC channel of the selected user will not be punctured with the DRC Lock subchannel.

Parameters:

<Period> DP0 | DP4 | DP8 | DP16

*RST: DP4

Example: `BB:EVDO:USER2:DRCL:PER DP8`
sets the DRC Lock period for user 2 to 8 slots.

Manual operation: See "DRC Lock Period" on page 29

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:STATe <State>

Sets the state of the DRC (Data Rate Control) Lock bit for the selected user.

Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: OFF

Example: `BB:EVDO:USER2:DRCL:STAT ON`
activates the DRC Lock bit for user 2.

Manual operation: See "DRC Lock State" on page 29

[:SOURce<hw>]:BB:EVDO:USER<st>:HARQ:MODE <Mode>

Enables or disables the H-ARQ Channel. The H-ARQ channel is used by the access network to transmit positive acknowledgement (ACK) or a negative acknowledgement (NAK) in response to a physical layer packet.

Note: This parameter is enabled for Physical Layer Subtype 2 only.

Parameters:

<Mode> OFF | ACK | NAK

OFF
Disables transmission of the H-ARQ channel.

ACK
Enables transmission of H-ARQ. The channel will be transmitted with all bits set to ACK.

NAK
Enables transmission of H-ARQ. The channel will be transmitted with all bits set to NAK

*RST: OFF

Example: `BB:EVDO:USER2:SUBT S2`
sets the physical layer subtype for user 2 to 2.
`BB:EVDO:USER2:HARQ:MODE ACK`
enables ARQ channel. The channel will be transmit with all bits set to ACK.

Manual operation: See "H-ARQ Mode" on page 30

[:SOURce<hw>]:BB:EVDO:USER<st>:IFACtor <IFactor>

Controls the number of interleave slots used for the selected user on the forward link.

Four interleave slots are defined in the 1xEV-DO system.

By default, only 1 Interleave slot (Interleave Factor = 1) for an access terminal is configured and transmission to that access terminal every 4th slot is selected.

For an interleave factor > 1, packets on multiple interleave slots will be sent, increasing the data throughput to the access terminal.

Parameters:

<IFactor> integer

Range: 1 to 4
*RST: 1

Example: `BB:EVDO:USER2:IFAC 2`
sets 2 interleaved slots for user 2 on the forward link.

Manual operation: See "Interleave Factor" on page 28

[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:INDex <Index>

Sets the MAC Index used for the selected user.

MAC Index should be different for the different users. However, in case that two users are using the same value for MAC Index, the lower priority user will be disabled, or be unable to enable.

The values for the MAC Indexes for the 'OtherUsers' (see `[:SOURce<hw>]:BB:EVDO:ANETwork:OUCount`) will be assigned from a pool of valid MAC Indexes, that exclude the MAC Indexes specified for each of the four configurable users.

Parameters:

<Index> integer

Range: 5 to 63 for physical layer subtype 0&1, 6 to 127 for physical layer subtype 2, 4 to 383 for physical layer subtype 3

*RST: Physical layer subtype 0&1: 5 for user 1; 6 for user 2; 7 for user 3; 8 for user 4; / Physical layer subtype 2: 6 for user 1; 7 for user 2; 8 for user 3; 9 for user 4

Example: `BB:EVDO:USER2:MAC:IND 6`
sets the MAC index for user 2 to 16.

Manual operation: See "MAC Index" on page 28

[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:LEVel <Level>

Sets the power within the MAC channel that is dedicated to the selected user.

Parameters:

<Level> float

Range: -25 to -7
Increment: 0.01
*RST: -7

Example: `BB:EVDO:USER2:MAC:LEV -7.0`
sets the power within the MAC channel to -7.0 dB.

Manual operation: See "MAC Level" on page 28

[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:COUNt <Count>

Sets the number of packets to send to the selected user.

The number of packets to be send depends on whether the parameter "Infinite" is enabled or disabled.

If "Infinite" is enabled, there is no limit to the number of packets sent to the user.

If "Infinite" is disabled and a value is specified while packets are being sent, the new count value will be used at the end of transmission of the current packet. If a value of zero is specified, the transmission to the user will be stopped at the end of the current packet.

Parameters:

<Count> integer

Range: 0 to 65536
*RST: 65536

Example: `BB:EVDO:USER2:PACK:INF OFF`
disables sending of unlimited number of packets.
`BB:EVDO:USER2:PACK:COUNT 10`
sets the number of packets to be send to 10.

Manual operation: See "Number of Packets to Send" on page 22

[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:INFinite <Infinite>

Enables or disables sending an unlimited number of packets to the selected user.

Parameters:

<Infinite> 0 | 1 | OFF | ON

ON
Enables sending of an unlimited number of packets to the user.

OFF
Disables sending of an unlimited number of packets to the user. The number of packets to be sent can be specified.

*RST: 65536

Example: `BB:EVDO:USER2:PACK:INF OFF`
disables sending of unlimited number of packets for user 2.
`BB:EVDO:USER2:PACK:COUNT 10`
sets the number of packets to be send to user 2 to10.

Manual operation: See "Number of Packets to Send" on page 22

[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:SOFFset <SOffset>

Sets the minimum number of slots between the end of one packet and the beginning of the next.

For single slot packets, a value of zero will cause the next packet to be sent in the immediate next slot (subject to scheduling).

For multiple slot packets, a value of zero will cause the next packet transmission to start three slots after the end of the previous packet. The three slot delay is identical to the interleaving delay between slots for multiple slot packets. The offset value is attached to the end of the preceding packet.

Note: An offset value of zero with a rate change from a single slot packets to a multiple slot packets will cause the first slot of the multiple slot packet to be transmitted in the slot immediately following the single slot packet.

Parameters:

<SOffset> integer

Range: 0 to 255
*RST: 0

Example: `BB:EVDO:USER2:PACK:SOFF 10`
sets the packet start offset for user 2 to10.

Manual operation: See "Packet Start Offset" on page 22

[:SOURce<hw>]:BB:EVDO:USER<st>:PSIZe <PSize>

Sets the packet size for the packets sent to the selected user.

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Parameters:

<PSize> PS128 | PS256 | PS512 | PS768 | PS1024 | PS1536 | PS2048 | PS3072 | PS4096 | PS5120 | PS6144 | PS8192 | PS12288 | PS7168

*RST: PS128

Example:
```
BB:EVDO:ANET:SUBT S2
```
sets the physical layer subtype to 2.
```
BB:EVDO:USER2:RATE:IND 4
```
sets the rate index of user 2 to 4.
```
BB:EVDO:USER2:PSIZ PS256
```
sets the packet size for user 2 to 256.
```
SOUR:BB:EVDO:USER2:RATE?
```
queries the data rare for user 2.
```
Response: 76.8 kbps
```

Manual operation: See "Packet Size" on page 27

[:SOURce<hw>]:BB:EVDO:USER<st>:RATE?

Queries the data rate of the packets sent to the selected user.

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Return values:

<Rate> DR4K8 | DR9K6 | DR19K2 | DR38K4 | DR76K8 | DR153K6 | DR307K2 | DR614K4 | DR921K6 | DR1228K8 | DR1536K | DR1843K2 | DR2457K6 | DR3072K | DR460K8 | DR768K | DR1075K2 | DR2150K4 | DR3686K4 | DR4300K8 | DR4915K2

*RST: DR4K8

Example:
```
BB:EVDO:ANET:SUBT S2
```
sets the physical layer subtype.
```
BB:EVDO:USER2:RATE:IND 4
```
sets the rate index of user 2.
```
BB:EVDO:USER2:PSIZ PS256
```
sets the packet size for user 2.
```
SOUR:BB:EVDO:USER2:RATE?
```
queries the data rate for user 2.
```
Response: 76.8 kbps
```

Usage: Query only

Manual operation: See "Data Rate" on page 27

[:SOURce<hw>]:BB:EVDO:USER<st>:RATE:INDex <Index>

Determines the rate index.

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Parameters:

<Index> integer

Range: 1 to 12 (physical layer subtype 0&1), 1 to 14 (physical layer subtype 2), 1 to 28 (physical layer subtype 3)

*RST: 1

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype.
`BB:EVDO:USER2:RATE:IND 4`
sets the rate index of user 2.
`BB:EVDO:USER2:PSIZ PS256`
sets the packet size for user 2.
`SOUR:BB:EVDO:USER2:RATE?`
queries the data rate for user 2.
`Response: 76.8 kbps`

Manual operation: See "Rate Index" on page 23

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:INJect

Enables sending of user defined Reverse Power Control (RPC) pattern at the end of the current RPC mode.

The former RPC mode will be restart at the end of the pattern transmission.

Example: `BB:EVDO:USER2:RPC:MODE PATT`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to pattern, i.e. a user-defined sequence will be transmitted.
`BB:EVDO:USER2:RPC:ZONE0:BIT 1`
sets the bit for zone 0 to 1
`BB:EVDO:USER2:RPC:ZONE0:COUNT 10`
sets the number of RPC bits for zone 0 to 10.
`BB:EVDO:USER2:RPC:ZONE1:BIT 0`
`BB:EVDO:USER2:RPC:ZONE1:COUNT 100`
`BB:EVDO:USER2:RPC:ZONE2:BIT 1`
`BB:EVDO:USER2:RPC:ZONE2:COUNT 50`
`BB:EVDO:USER2:RPC:ZONE3:BIT 0`
`BB:EVDO:USER2:RPC:ZONE3:COUNT 10`
`BB:EVDO:USER2:RPC:INJ`
the user defined RPC pattern will be inserted at the end of the current RPC mode.

Usage: Event

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:MODE <Mode>

Sets the operation mode for the Reverse Power Control (RPC) Channel within the MAC channel for the selected user.

Parameters:

<Mode> HOLD | UP | DOWN | RANGe | PATTern

*RST: HOLD

Example: `BB:EVDO:USER2:RPC:MODE UP`
a continuous stream of Up (0) are transmitted on the Reverse Power Control (RPC) Channel within the MAC channel for user 2.

Manual operation: See "RPC Mode" on page 28

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:RANGe <Range>

Sets the number of Reverse Power Control (RPC) bits sent in each direction when the "RPC Mode" is set to Range. The specified value is used immediately.

Note: This parameter is displayed in RPC Mode "Range" only.

Parameters:

<Range> integer

Range: 1 to 256
*RST: 1

Example: `BB:EVDO:USER2:RPC:MODE RANG`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to range.
`BB:EVDO:USER2:RPC:RANG:COUN 200`
sets the number of RPC bits to 200.

Manual operation: See "RPC Range Count" on page 29

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:BIT <Bit>

The Reverse Power Control (RPC) pattern is defined in form of table with four zones (zone 0 .. 3). For each zone, a bit and a cont can be defined.

This parameter defines the RPC bits sent within the specific zone of the RPC Pattern.

Parameters:

<Bit> 0 | 1

Range: 0 to 1
*RST: 0

Example: `BB:EVDO:USER2:RPC:MODE PATT`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to pattern, i.e. a user-defined sequence will be transmitted.
`BB:EVDO:USER2:RPC:ZONE1:BIT 1`
sets the bit for zone 1 to 1.

Manual operation: See "RPC Pattern" on page 29

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:COUNt <Count>

The Reverse Power Control (RPC) pattern is defined in form of table with four zones (zone 0 .. 3). For each zone, a bit and a count can be defined.

This parameter defines the number of RPC bits sent within the specific zone of the RPC Pattern.

Parameters:
<Count> integer
Range: 1 to 128
*RST: 0

Example: `BB:EVDO:USER2:RPC:MODE PATT`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to pattern, i.e. a user-defined sequence will be transmitted.
`BB:EVDO:USER2:RPC:ZONE1:COUNT 10`
sets the number of RPC bits for zone 1 to 10.

Manual operation: See "RPC Pattern" on page 29

[:SOURce<hw>]:BB:EVDO:USER<st>:SCOunt?

Queries the slot count of the packets sent to the selected user.

Return values:
<SCount> integer

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype to 2.
`BB:EVDO:USER2:RATE:IND 4`
sets the rate index of user 2 to 4.
`BB:EVDO:USER2:PSIZ PS256`
sets the packet size for user 2 to 256.
`SOUR:BB:EVDO:USER2:SCO?`
queries the number of slots for user 2.
`Response: 2`

Usage: Query only

Manual operation: See "Slot Count" on page 27

[:SOURce<hw>]:BB:EVDO:USER<st>:STATe <State>

Enables or disables the selected user. If the user is enabled, the proper MAC Index will be placed within the MAC channel and packets may be sent to the user. If disabled, the MAC Index will not be present within the MAC channel and packets may not be sent to the user.

Note: Disabling the state of a user during a transfer aborts all transfers to the user.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON (user 1); OFF (user 2 .. 4)

Example: `BB:EVDO:USER2:STAT ON`
activates user 2.

Manual operation: See "Configure Traffic Channels" on page 15

4.10 Configure Access Terminal Commands

[:SOURce<hw>]:BB:EVDO:PREDefined <Predefined>

Sets the UL setting of Terminal 1 to one of the predefined configurations.

The predefined settings are made according to 3GPP2 C.S0032-A to allow easy receiver testing.

Parameter	Description
USER	there are no predefined settings
ULS1DR9K6	UL, Subtype 1, 9.6 kbps.
ULS1DR19K2	UL, Subtype 1, 19.2 kbps.
ULS1DR38K4	UL, Subtype 1, 38.4 kbps.
ULS1DR76K8	UL, Subtype 1, 76.8 kbps.
ULS1DR153K6	UL, Subtype 1, 153.6 kbps.
ULS2PS128LL	UL, Subtype 2, 128 bits payload, Low Latency.
ULS2PS256HC	UL, Subtype 2, 256 bits payload, Hight Capacity.
ULS2PS256LL	UL, Subtype 2, 256 bits payload, Low Latency.
ULS2PS512LL	UL, Subtype 2, 512 bits payload, Low Latency.
ULS2PS768LL	UL, Subtype 2, 768 bits payload, Low Latency.
ULS2PS1024LL	UL, Subtype 2, 1024 bits payload, Low Latency.

Parameter	Description
ULS2PS1536LL	UL, Subtype 2, 1536 bits payload, Low Latency.
ULS2PS2048LL	UL, Subtype 2, 2048 bits payload, Low Latency.
ULS2PS3072LL	UL, Subtype 2, 3072 bits payload, Low Latency.
ULS2PS4096LL	UL, Subtype 2, 4096 bits payload, Low Latency.
ULS2PS6144LL	UL, Subtype 2, 6144 bits payload, Low Latency.
ULS2PS8192LL	UL, Subtype 2, 8192 bits payload, Low Latency.
ULS2PS12288LL	UL, Subtype 2, 12288 bits payload, Low Latency.

Parameters:

<Predefined> USER | ULS1DR9K6 | ULS1DR19K2 | ULS1DR38K4 | ULS1DR76K8 | ULS1DR153K6 | ULS2PS128LL | ULS2PS256HC | ULS2PS256LL | ULS2PS512LL | ULS2PS768LL | ULS2PS1024LL | ULS2PS1536LL | ULS2PS2048LL | ULS2PS3072LL | ULS2PS4096LL | ULS2PS6144LL | ULS2PS8192LL | ULS2PS12288LL

*RST: USER

Example: `BB:EVDO:PRED ULS2PS256HC`
sets the UL settings of Terminal 1 to UL of Subtype 2 with 256 bits payload and Hight Capacity.
`BB:EVDO:TERM1:SUBT?`
Response: S2.
`BB:EVDO:TERM1:DCH:PACK1:PSIZ?`
Response: 256

Manual operation: See "Predefined Settings" on page 14

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GAIN <Gain>

(enabled for access terminal working in traffic mode)

Sets the gain of the ACK channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 to 30 dB
Increment: 0.01
*RST: 0

Example: `BB:EVDO:TERM2:ACKC:GAIN -10`
sets the relative gain of ACK channel to -10 dB

Manual operation: See "Relative Gain (ACK Channel)" on page 38

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GATing <Gating>

(enabled for access terminal working in traffic mode)

Sets the active and inactive slots of the ACK channel. This parameter is in binary format and has a maximal length of 16 bits.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern.A 0 gates the ACK channel off for the corresponding slot, a 1 activates the channel.

Parameters:

<Gating> integer

*RST: 0001

Example: `BB:EVDO:TERM2:ACKC:GAT #B11001100,8`
sets slots 3, 4, 7 and 8 of ACK channel as inactive.

Manual operation: See "Gating (bin) (ACK Channel)" on page 38

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:MODE <Mode>

(enabled for access terminal working in traffic mode)

Specifies the modulation mode of the ACK channel.

With BPSK modulation, a 0 (ACK) is mapped to +1 and a 1 (NAK) to -1.With OOK modulation, a 0 (ACK) is mapped to ON and a 1 (NAK) to OFF.

Parameters:

<Mode> BPSK | OOK

BPSK
Sets the modulation to BPSK (Binary Phase Shift Keying).

OOK
Sets the modulation to OOK (On-Off Keying).
Note: This value is only enabled for physical layer subtype 2.

*RST: BPSK

Example: `BB:EVDO:TERM2:MODE TRAF`
sets the mode of terminal 2 to traffic.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:ACKC:MODE OOK`
selects OOK modulation for ACK channel of terminal 2.

Manual operation: See "Mode (ACK Channel)" on page 38

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:STATe <State>

(enabled for access terminal working in traffic mode)

Enables or disables the ACK channel.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:ACKC:STAT OFF`
deactivates the ACK channel for terminal 2.

Manual operation: See "State (ACK Channel)" on page 37

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:VALues <Values>

(enabled for access terminal working in traffic mode)

Specifies the data pattern transmitted on the ACK Channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern.A 0 specifies an ACK, a 1 specifies a NAK. The pattern is only read for slots that are gated on.This parameter is in binary format and has a maximal length of 16 bits.

Parameters:
<Values> integer
*RST: #H1

Example: `BB:EVDO:TERM2:ACKC:VAL #B011,3`
sets the data pattern transmitted on the ACK channel for terminal 2.

Manual operation: See "Values (ACK Channel)" on page 38

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:DURation <Duration>

(enabled for access terminal working in access mode)

Sets the access cycle duration in slots. Access probes are repeated with a period of access cycle duration slots.

Parameters:
<Duration> integer
Range: 1 to 255
*RST: 16

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:ACYC:DUR 20`
sets the duration of the access cycle for terminal 2 to 20 slots.

Manual operation: See "Access Cycle Duration" on page 34

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:OFFSet <Offset>

(enabled for access terminal working in access mode)

The Access Channel transmission starts with this number of slots relative to the beginning of each access cycle duration.

Parameters:

<Offset> integer

Range: 0 to 12
Increment: -
*RST: 0

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:ACYC:OFFS 10`
sets the offset of the Access Channel to 10.

Manual operation: See "Access Cycle Offset" on page 34

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:GAIN <Gain>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Sets the gain of the auxiliary pilot channel relative to the data channel power.

Note: All other channel gains are specified relative to the pilot power, but the auxiliary pilot gain is specified relative to the data channel power.

Parameters:

<Gain> float

Range: -80 to 30
Increment: 0.01
*RST: 0

Example: `BB:EVDO:TERM2:APCH:GAIN -10`
sets the relative gain of auxiliary pilot channel to -10 dB

Manual operation: See "Relative Gain (Auxiliary Pilot Channel)" on page 35

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:PAYLoad:MINimum <Minimum>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Sets the minimum payload size in bits of the Data Channel that activates the transmission of the Auxiliary Pilot Channel.

Parameters:

<Minimum> PS128 | PS256 | PS512 | PS768 | PS1024 | PS1536 | PS2048 | PS3072 | PS4096 | PS6144 | PS8192 | PS12288

*RST: PS128

Example: `BB:EVDO:TERM2:APCH:PAYL:MIN PS256`
sets the minimum payload of the auxiliary pilot channel to 256 bits.

Manual operation: See "Minimum Payload (Auxiliary Pilot Channel)" on page 35

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:STATe <State>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Enables or disables the auxiliary pilot channel.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:APCH:STAT OFF`
deactivates the auxiliary pilot channel for terminal 2.

Manual operation: See "State (Auxiliary Pilot Channel)" on page 35

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:CLENgth <CLength>

(enabled for access terminal working in access mode)

Sets the number of frames (16 slots each) to be transmitted after the preamble. Each frame contains one data packet.

Parameters:

<CLength> integer

Range: 1 to 15 frames
*RST: 1 frame

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:CLEN 10`
for terminal 2, 10 frames will be transmitted after the preamble.

Manual operation: See "Capsule Length (Data Channel)" on page 43

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA <Data>

Selects the data source, e.g. a sequence of 0 or 1, a pseudo-random sequence with different lenght, a pattern or a data list (`DLISt`).

Parameters:

<Data> ZERO | ONE | PATTern | PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt

*RST: PN9

Example: `SOURce:BB:EVDO:TERMinal2:DCHannel:DATA PATTern`
sets the data source of terminal 2 to pattern.
`SOURce:BB:EVDO:TERMinal2:DCHannel:DATA:PATTern #H3F,8`
sets the pattern for the data source of terminal 2.

Example: `SOURce:BB:EVDO:TERMinal2:DCHannel:DATA DLISt`
sets the data source of terminal 2 to data list.
`MMEM:CDIR "<root>datalists"`
selects the directory for the data lists.
`SOURce:BB:EVDO:TERMinal2:DCHannel:DATA:DSELection "datalist.dm_iqd"`
selects `datalist.dm_iqd` file as data source. This file must be in the directory `<root>datalists` and have a file extension `*.dm_iqd`.

Manual operation: See "Data List Management" on page 13

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:DSELection <Filename>

Selects the data list for the data source.

Parameters:
<Filename> string

Example: see `[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA` on page 102

Manual operation: See "Data List Management" on page 13

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:PATTern <Pattern>

Selects the bit pattern for the data source.

Parameters:
<Pattern> 64 bits

Example: see `[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA` on page 102

Manual operation: See "Data Source (Data Channel)" on page 43

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DRATe <DRate>

(enabled for an access terminal working in access mode)

Selects the data rate for the Data Channel.

Parameters:
<DRate> DR4K8 | DR9K6 | DR19K2 | DR38K4 | DR76K8 | DR153K6 | DR307K2 | DR614K4 | DR921K6 | DR1228K8 | DR1536K | DR1843K2 | DR2457K6 | DR3072K | DR460K8 | DR768K | DR1075K2 | DR2150K4 | DR3686K4 | DR4300K8 | DR4915K2
*RST: 9.6 kbps

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:DRAT DR19K2`
sets the data rate of the data channel for terminal 2 to 19.2 kbps.

Manual operation: See "Data Rate (Data Channel)" on page 43

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:FCS[:STATe] <State>

(enabled for an access terminal working in access mode)

Enables or disables appending a standard Frame Check Sequence (FCS) to the MAC layer packet.

Parameters:
<State> 0 | 1 | OFF | ON
*RST: ON

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:FCS:STAT OFF`
disables appending of FCS to the MAC layer for terminal 2.

Manual operation: See "Append FCS (Data Channel)" on page 44

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:GAIN <Gain>

(enabled for an access terminal working in access mode)

Sets the gain in dB of the Data Channel relative to the pilot channel power.

Parameters:
<Gain> float
Range: -80 to 10 dB
Increment: 0.01
*RST: 0 dB

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:GAIN -10`
sets the relative gain of data channel to -10 dB

Manual operation: See "Relative Gain (Data Channel)" on page 43

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:CCODing <CCoding>

(enabled for an access terminal working in traffic mode)

Activates or deactivates channel coding, including scrambling, turbo encoding and channel interleaving.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<CCoding> 0 | 1 | OFF | ON
*RST: ON

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:CCOD OFF`
disables channel coding for packet 3.

Manual operation: See "Channel Coding (Packet)" on page 41

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:COUNt <Count>

(enabled for an access terminal working in traffic mode)

Sets the number of packets to be sent.

The number of packets to be send depends on whether the parameter "Infinite Packets" is enabled or disabled. If "Infinite Packets "is enabled, there is no limit to the number of packets sent.

If "Infinite Packets" is disabled, the number of packets can be specified. In this case the data channel will be switched off after the specified number of packets have been sent.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Count> integer
Range: 0 to 65536
*RST: 65536

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:INF OFF`
disables sending of unlimited umber of packets.
`BB:EVDO:TERM2:DCH:PACK3:COUN 2000`
sets number of packets to be send to 2000.

Manual operation: See "Number of Packets to Send (Packet)" on page 40

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA <Data>

Selects the data source of an access terminal working in traffic mode

Parameters:

<Data> ZERO | ONE | PATTern | PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt

*RST: PN9

Example: `SOURce:BB:EVDO:TERMinal2:MODE TRAFfic`
enables terminal 2 to work in traffic mode.
`SOURce:BB:EVDO:TERMinal2:SUBType S2`
sets physical layer subtype 2 for terminal 2.
`SOURce:BB:EVDO:TERMinal2:DCHannel:PACKet3:DATA PATTern`
sets the data source of terminal 2 to pattern.
`SOURce:BB:EVDO:TERMinal2:DCHannel:PACKet3: PATTern #H3F,8`
sets the pattern for the data source of terminal 2.

Example: `SOURce:BB:EVDO:TERMinal2:DCHannel:PACKet1:DATA DLISt`
sets the data source of terminal 2, packet 1 to data list.
`MMEM:CDIR "<root>datalists"`
selects the directory for the data lists.
`SOURce:BB:EVDO:TERMinal2:DCHannel:PACKet1:DATA: DSELection "datalist.dm_iqd"`
selects `datalist.dm_iqd` file as data source. This file must be in the directory `<root>datalists` and have a file extension `*.dm_iqd`.

Manual operation: See "Data List Management" on page 13

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA: DSELection <Filename>

(enabled for an access terminal working in traffic mode)

Selects the data list for the data source.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Filename> string

Example: see `[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel: PACKet<ch>:DATA` on page 105

Manual operation: See "Data List Management" on page 13

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA: PATTern <Pattern>

(enabled for an access terminal working in traffic mode)

Selects the bit pattern for the data source.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Pattern> 64 bits

Example: see `[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA` on page 105

Manual operation: See "Data Source (Packet)" on page 42

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DRATe?

(enabled for an access terminal working in traffic mode)

Displays the data rate in kbps of the selected packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Return values:

<DRate> float

Range: 0 to ...

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:DCH:PACK2:DRAT?`
queries the data rate of the packet number 2 for terminal 2.
`Response: '6.4'`
the data rate of packet 2 is 6.4 kbps.

Usage: Query only

Manual operation: See "Data Rate (Packet)" on page 41

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:FCS[:STATe]
<State>

(enabled for an access terminal working in traffic mode)

Enables or disables appending a standard Frame Check Sequence (FCS) and tail to the MAC layer packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:PACK:FCS:STAT OFF`
disables appending of FCS to the MAC layer for terminal 2, packet 1.

Manual operation: See "FCS (Packet)" on page 43

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:GAIN <Gain>

(enabled for an access terminal working in traffic mode)

Sets the gain in dB of the Data Channel relative to the pilot channel power.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Gain> float

Range: -80 dB to 10 dB
Increment: -
*RST: 0 dB

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:DCH:PACK3:GAIN -10`
sets the relative gain of packet 3 to -10 dB

Manual operation: See "Relative Gain (Packet)" on page 39

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:INFinite <Infinite>

(enabled for an access terminal working in traffic mode)

Enables or disables sending an unlimited number of packets.

The parameter "Number of Packets to be Send" depends on whether the parameter "Infinite Packets" is enabled or disabled. If "Infinite Packets" is enabled, there is no limit to the number of packets sent.

If "Infinite Packets" is disabled, the number of packets can be specified.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Infinite> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:INF OFF`
disables sending of unlimited umber of packets.
`BB:EVDO:TERM2:DCH:PACK3:COUN 2000`
sets number of packets to be send to 2000.

Manual operation: See "Infinite Packets (Packet)" on page 40

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:MODulation?

(enabled for physical layer subtype 2 and for an access terminal working in traffic mode)

Displays the modulation type per packet.

Return values:

<Modulation> B4 | Q4 | Q2 | Q4Q2 | E4E2

B4
The modulation type is set to BPSK modulation with 4-ary Walsh cover.

Q4
The modulation type is set to QPSK modulation with 4-ary Walsh cover.

Q2
The modulation type is set to QPSK modulation with 2-ary Walsh cover.

Q4Q2
Sum of Q4 and Q2 modulated symbols.

E4E2
Sum of E4 (8-PSK modulated with 4-ary Walsh cover) and E2 (8-PSK modulated with 2-ary Walsh cover) modulated symbols.

*RST: B4

Example: `BB:EVDO:TERM2:DCH:PACK3:MOD?`
queries the modulation for packet 3 of terminal 2.

Usage: Query only

Manual operation: See "Modulation (Packet)" on page 41

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:PSIZe <PSize>

(enabled for an access terminal working in traffic mode)

Sets the Payload Size in bits for the selected packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<PSize> PS128 | PS256 | PS512 | PS768 | PS1024 | PS1536 | PS2048 | PS3072 | PS4096 | PS6144 | PS8192 | PS12288

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:DCH:PACK3:PSIZ PS512`
sets the payload size fro packet 3 to 512.

Manual operation: See "Payload Size (Packet)" on page 40

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:STATe <State>

For an access terminal working in traffic mode, enables or disables the state of the packet(s).

Parameters:

<State> 0 | 1 | OFF | ON
*RST: 1

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:DCH:PACK2:STAT OFF`
deactivates packet 2 of terminal 2.

Manual operation: See "State (Packet)" on page 38

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:SUBPackets[:COUNt] <Count>

(enabled for physical layer subtype 2 and for an access terminal working in traffic mode)

Sets the number of sub-packets to be sent.

Parameters:

<Count> integer
Range: 1 to 4
*RST: 1

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:SUBP:COUN 4`
sets the number of sub-packets to 4, i.e. subpacket 0, 1, 2 and 3 of a packet will be sent in a subframe each (with 2 subframes interleaving between) before the next packet is started.
This is to simulate a situation where 3 times NAK has been received freom the basestation with an ACK after the 4th sub-packet

Manual operation: See "Number of Sub-packets (Packet)" on page 40

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:STATe <State>

(enabled for an access terminal working in access mode)

Enables or disables the state of the Data Channel.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:STAT OFF`
disables data channel for terminal 2.

Manual operation: See "State (Data Channel)" on page 43

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DQSPreading <DqSpreading>

Disables the quadrature spreading (complex multiply) with PN sequences and long code.

Parameters:

<DqSpreading> 0 | 1 | OFF | ON

*RST: OFF

Example: `BB:EVDO:TERM2:DQSP ON`
enables using quadrature spreading with PN sequence and long code.

Manual operation: See "Disable Quadrature Spreading" on page 33

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:COVer <Cover>

(enabled for an access terminal working in traffic mode)

Selects the Data Rate Control (DRC) Channel walsh cover.

Parameters:

<Cover> integer

Range: 0 to 7
*RST: 7

Example: `BB:EVDO:TERM2:DRCC:COV 1`
sets the DRC cover to 1.

Manual operation: See "Cover (DRC Channel)" on page 37

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GAIN <Gain>

(enabled for an access terminal working in traffic mode)

Sets the gain of the Data Rate Control (DRC) channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 dB to 10 dB
Increment: -
*RST: 0 dB

Example: `BB:EVDO:TERM2:DRCC:GAIN 10`
sets the relative gain for DRC to 10 dB.

Manual operation: See "Relative Gain (DRC Channel)" on page 36

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GATing[:STATe] <State>

(enabled for an access terminal working in traffic mode)

Activates or deactivates the Data Rate Control (DRC) Channel gating.

If gating is active, each value of the DRC channel is transmitted for one slot followed by DRCLenght-1 empty slots.

With deactivated gating, each DRC value is repeated for DRC length slots.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:DRCC:GAT:STAT OFF`
deactivates DRC gating.

Manual operation: See "Gating Active (DRC Channel)" on page 37

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:LENGth <Length>

(enabled for an access terminal working in traffic mode)

Specifies the transmission duration of the Data Rate Control (DRC) channel in slots.

Parameters:

<Length> DL1 | DL2 | DL4 | DL8

*RST: DL1

Example: `BB:EVDO:TERM2:DRCC:LENG DL2`
sets the transmission duration of DRC to 2 slots.

Manual operation: See "Length (DRC Channel)" on page 36

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:STATe <State>

(enabled for an access terminal working in traffic mode)

Enables or disables the state of the Data Rate Control (DRC) channel.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:DRCC:STAT OFF`
deactivates DRC channel.

Manual operation: See "State (DRC Channel)" on page 36

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:VALues <Values>

(enabled for an access terminal working in traffic mode)

Specifies the pattern transmitted on the Data Rate Control (DRC) Channel. The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is used for DRC length slots.

Parameters:

<Values> integer

*RST: #H0

Example: `BB:EVDO:TERM2:DRCC:VAL #H7,4`
sets transmitted pattern on DRC to #H7,4.

Manual operation: See "Values (hex) (DRC Channel)" on page 37

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:GAIN <Gain>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Sets the gain of the Data Source Control (DSC) channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 dB to 10 dB
Increment: -
*RST: 0 dB

Example: `BB:EVDO:TERM2:DSCC:GAIN 10`
sets the relative gain for DSC to 10 dB.

Manual operation: See "Relative Gain (DSC Channel)" on page 36

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:LENGth <Length>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Specifies the transmission duration of the Data Source Control (DSC) channel in slots.

Parameters:

<Length> integer

Range: 8 to 256
Increment: 8
*RST: 8

Example: `BB:EVDO:TERM2:DSCC:LENG 16`
sets the transmission duration of DSC to 16 slots.

Manual operation: See "Length (DSC Channel)" on page 36

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:STATe <State>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Enables or disables the state of the Data Source Control (DSC) channel.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:DSCC:STAT OFF`
deactivates DSC channel.

Manual operation: See "State (DSC Channel)" on page 35

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:VALues <Values>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Specifies the pattern transmitted on the Data Source Control (DSC) Channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is transmitted for DSC length slots.

Parameters:

<Values> integer

*RST: 0

Example: `BB:EVDO:TERM2:DSCC:VAL #H147,12`
sets transmitted pattern on DSC to #H147,12.

Manual operation: See "Values (oct) (DSC Channel)" on page 36

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:IMASk <IMask>

Sets the long code mask of the I channel.

Parameters:

<IMask> 44 bits

*RST: #H00000000000

Example: `BB:EVDO:TERM2:IMAS #H2FFFFFFFFFFF,42`
sets the long code mask for I channel to #H2FFFFFFFFFFF,42.

Manual operation: See "Long Code Mask I (hex)" on page 33

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:MODE <Mode>

Sets the mode (Traffic or Access) of the selected access terminal.

Parameters:
<Mode> ACCess | TRAFfic
*RST: TRAFfic

Example: `BB:EVDO:TERM2:MODE ACC`
sets the mode of terminal 2 to access.

Manual operation: See "Mode (Access Terminal)" on page 33

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:GAIN <Gain>

Sets the gain of the pilot channel.

Gains of other channels are relative to the Pilot Channel power.

This setting is used to distinguish the power between access terminals, when more than one access terminal is active.

Parameters:
<Gain> float
Range: -80 to 10 dB
Increment: 0.01
*RST: 0 dB

Example: `BB:EVDO:TERM2:PCH:GAIN 10`
sets the gain of pilot channel to 10 dB.

Manual operation: See "Gain (Pilot Channel)" on page 34

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:STATe?

Displays the state of the pilot channel.

Note: The pilot channel is always switched on.

Return values:
<State> 0 | 1 | OFF | ON
*RST: ON

Example: `BB:EVDO:TERM2:PCH:STAT?`
queries the state of the pilot channel.

Usage: Query only

Manual operation: See "State (Pilot Channel)" on page 34

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PLENgth <PLength>

(enabled for access terminal working in access mode)

Specifies the length of the preamble in frames (16 slots each) of the acces probe.

Parameters:

<PLength> integer

Range: 1 frame to 7 frames
*RST: 1 frame

Example: `BB:EVDO:TERM2:PLEN 7`
sets the preamble length to 7 frames.

Manual operation: See "Preamble Length" on page 34

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:QMASk <QMask>

Sets the long code mask of the Q channel.

Parameters:

<QMask> 44 bits

*RST: #H00000000000

Example: `BB:EVDO:TERM2:IMAS #H3FFFFFFFFFFF,42`
sets the long code mask for I channel to #H3FFFFFFFFFFF,42.

Manual operation: See "Long Code Mask Q (hex)" on page 34

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:GAIN <Gain>

(enabled for an access terminal working in traffic mode)

Sets the gain of the Reverse Rate Indicator (RRI) channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 to 10 dB
Increment: 0.01
*RST: 0 dB

Example: `BB:EVDO:TERM2:RRIC:GAIN 10`
sets the gain of pilot channel to 10 dB.

Manual operation: See "Relative Gain (RRI Channel)" on page 35

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:STATe <State>

(enabled for an access terminal working in traffic mode)

Enables or disables the state of the Reverse Rate Indicator (RRI) channel.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON

Example: `BB:EVDO:TERM2:RRIC:STAT OFF`
disables the RRI channel..

Manual operation: See "State (RRI Channel)" on page 35

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:STATe <State>

(enabled for an access terminal working in traffic mode)

Enables or disables the state of the Reverse Rate Indicator (RRI) channel.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: ON (access terminal 1)

Example: `BB:EVDO:TERM2:RRIC:STAT OFF`
disables the RRI channel..

Manual operation: See "Configure Access Terminals" on page 15

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:SUBType <Subtype>

Selects the physical layer subtype for the selected access terminal.

Parameters:

<Subtype> S1 | S2

*RST: 2

Example: `BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype 2.

Manual operation: See "Physical Layer Subtype (Access Terminal)" on page 33

List of Commands

Index

S

T

U

V

W