

TD-SCDMA, incl. TD-SCDMA enhanced features Digital Standard for R&S® SMW200A User Manual



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ROHDE & SCHWARZ

Test & Measurement

User Manual

This document describes the following software options:

- R&S®SMW-K50/-K51
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The following abbreviations are used throughout this manual: R&S®SMW200A is abbreviated as R&S SMW, R&S®WinIQSIM2 is abbreviated as R&S WinIQSIM2

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1 Preface

1.1 Documentation Overview

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

- Getting Started printed manual
- Online Help system on the instrument
- Documentation CD-ROM with:
 - Getting Started
 - Online help system (*.chm) as a standalone help
 - User Manuals for base unit and options
 - Service manual
 - Data sheet and product brochure
 - Links to useful sites on the R&S internet

Online Help

The Online Help is embedded in the software. It offers quick, context-sensitive access to the complete information needed for operation and programming. The online help contains help on operating the R&S SMW and all available options.

Getting Started

This manual is delivered with the instrument in printed form and in PDF format on the documentation CD. It provides the information needed to set up and start working with the instrument. Basic operations and typical measurement examples are described. Safety information is also included.

User Manual

User manuals are provided for the base unit and each additional (software) option.

The user manual for the base unit is a supplement to the Getting Started manual and provides basic information on operating the R&S SMW in general. In this manual, all instrument functions are described in detail. Furthermore, it provides a complete description of the remote control commands with programming examples. An introduction to remote control is provided, as well as information on maintenance, instrument interfaces and troubleshooting.

In the user manuals for the individual software options, the specific instrument functions of this option are described in detail. For additional information on default settings and parameters, refer to the data sheets. Basic information on operating the R&S SMW is not included in these user manuals.

The user manuals are available in PDF format - in printable form - on the Documentation CD-ROM delivered with the instrument.

All user manuals are also available for download from the R&S website, on the R&S SMW product page at <http://www.rohde-schwarz.com/product/SMW.html>.

Service Manual

This manual is available in PDF format on the CD delivered with the instrument. It describes how to check compliance with rated specifications, instrument function, repair, troubleshooting and fault elimination. It contains all information required for repairing the R&S SMW by replacing modules.

Release Notes

The release notes describe the installation of the firmware, new and modified functions, eliminated problems, and last minute changes to the documentation. The corresponding firmware version is indicated on the title page of the release notes. The most recent release notes are available for download from the R&S website, on the R&S SMW product page at <http://www.rohde-schwarz.com/product/SMW.html> > Downloads > Firmware.

Web Helps

Web helps are provided for the base unit and each additional (software) option. The content of the web helps correspond to the user manuals for the latest product versions.

The web help is an additional file format that offers quick online access. The web helps are not intended for download but rather to access the required information directly from the R&S website.

Web helps are available at the R&S website, on the R&S SMW product page at <http://www.rohde-schwarz.com/product/SMW.html> > Download > Web Help.

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.
<i>Input</i>	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 Conventions for Procedure Descriptions

When describing how to operate the instrument, several alternative methods may be available to perform the same task. In this case, the procedure using the touchscreen is described. Any elements that can be activated by touching can also be clicked using an additionally connected mouse. The alternative procedure using the keys on the instrument or the on-screen keyboard is only described if it deviates from the standard operating procedures.

The term "select" may refer to any of the described methods, i.e. using a finger on the touchscreen, a mouse pointer in the display, or a key on the instrument or on a keyboard.

2 Introduction

TD-SCDMA (3GPP TDD LCR) designates a mobile radio transmission method developed for 3G mobile communication by the China Wireless Telecommunication Standard group (CWTS, <http://www.cwts.org>). This standard is similar to the 3GPP TDD proposition, but with greater emphasis placed on GSM compatibility and with a chip rate limited to 1.28 Mcps. TD-SCDMA is one option of UTRA-TDD, called 1.28Mcps TDD or low chip rate (LCR) TDD.

Option TD-SCDMA (3GPP TDD LCR) enhanced MS/BS tests incl. HSDPA extends the TD-SCDMA signal generation with simulation of high speed channels in the downlink (HS-SCCH, HS-SSCH, HS-PDSCH) and the uplink (HS-SICH) and with channel coding for BCH in real time and a reference measurement channel. HSDPA (high speed downlink packet access) mode enhances the TD-SCDMA standard by data channels with high data rates especially for multi media applications.

TD-SCDMA is a mobile radio standard in which available bandwidth is divided among subscribers according to frequency (FDMA), time (TDMA) and code (CDMA). The same frequency is used for both directions of transmission (TDD). Each resource (i.e. a combination of frequency, code and time slot) can be used simultaneously by several base stations or user equipments provided the scrambling codes differ. A cell is understood to be a base station and all user equipments communicating with this base station. The R&S Signal Generator simulates a maximum of four cells at the same frequency. The Multi Carrier Mode can be used to simulate more than four cells at the same frequency or cells at several frequencies.

The TD-SCDMA signals are generated in a combination of realtime mode (real time channels) and arbitrary waveform mode. Simulation of bit and block errors can be activated for the channels generated in realtime. In arbitrary waveform mode, the signal is first calculated and then output.

The R&S Signal Generator simulates TD-SCDMA at the physical channel layer.

The following list gives an overview of the options provided by the R&S Signal Generator for generating a TD-SCDMA signal:

- Configuration of up to four TD-SCDMA cells with variable switching point of uplink and downlink.
- Freely configurable channel table for each slot and simulation of the downlink and uplink pilot time slot.
- Real time generation of one traffic channel and the SYNC channel on the downlink
- Slot modes "Dedicated" and "PRACH" on the uplink.
- Clipping for reducing the crest factor

Table 2-1: Parameters of the modulation system TD-SCDMA

Parameter	Value
Chip rate	1.28 Mcps
Carrier spacing	1.6 MHz
Data modulation	QPSK

Parameter	Value
Filter	Root-raised cosine (0.22)
Channel types	Downlink : • Primary Common Control Physical Channel (P-CCPCH) • Secondary Common Control Physical Channel (S-CCPCH) • Physical Forward Access Channel (F-FACH) • Downlink Pilot Time Slot (DwPTS) • Dedicated Physical Channel (DPCH) Uplink : • Physical Random Access Channel (P-RACH) • Uplink Pilot Time Slot (UpPTS) Dedicated Physical Channel (DPCH)
Data rates	17.6 kbps, 35.2 kbps, 70.4 kbps to 281.6 kbps depending on channel type
Number of channels	4 cells, each containing max. 7 active slots. Each slot with up to 16 DPCHs and 5 special channels.
Frame structure	Frame: 5 ms with 7 (traffic) time slots. Time slot (traffic): 675 μ s Time slot (DwPTS): 75 μ s Time slot (UpPTS): 125 μ s The number of symbols transmitted in a slot depends on the symbol rate.
Scrambling code	128 different codes with length of 16 chips
SYNC codes	32 different codes with length of 64 chips
SYNC1 codes	256 different codes with length of 128 chips
Basic midamble codes	128 different codes with length of 128 chips
Spreading code	"Orthogonal Variable Spreading Factor Code (OVSF)"; spreading factors 1, 2, 4, 8, 16

3 Modulation System

3.1 TD-SCDMA Signal Structure (Frames and Time Slots)

The TDSCDMA signal is organized in frames of 5 ms length. Each frame comprises 7 traffic time slots (Ts0 to Ts6, each 0.675 ms) and two special time slots (DwPTS and UpPTS) for synchronization.

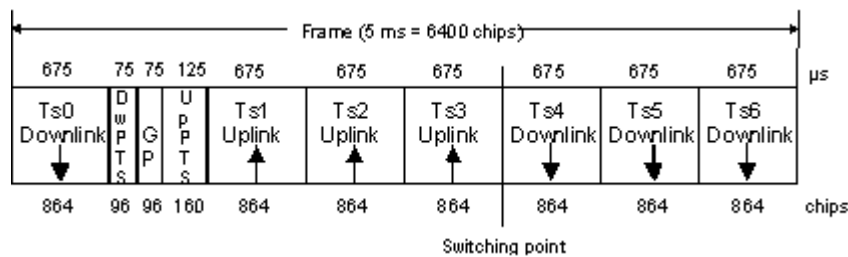


Fig. 3-1: Structure of TDSCDMA frame

Ts0 is always allocated to the downlink, Ts1 to the uplink. The other time slots are divided between the two directions of transmission, the switching point being variable.

3.2 DwPTS and UpPTS

In the downlink pilot time slot (DwPTS), the base station sends one of 32 possible 64-chip SYNC codes. The SYNC code allows the user equipment to synchronize to the base station. At the same time, the SYNC code defines the value range for the scrambling code and the basic midamble code.

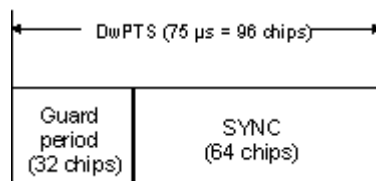


Fig. 3-2: Structure of DwPTS

The real-valued SYNC sequence is converted into a complex-valued SYNC sequence by a rotating-vector operation.

This SYNC sequence is divided up into four symbols with 16 chips each. The symbols are phase-modulated (possible phases are 45°, 135°, 225° and 315°) in order to signal the frame number of the interleaver.

In the supplied software, all symbols are modulated with 45°.

The uplink pilot time slot (UpPTS) is sent by the user equipment to initiate a call with the base station (before a P-RACH is sent, for example). The transmitted SYNC1 code is

randomly selected from eight possible codes. If the base station does not respond to the UpPTS, the UpPTS is repeated in the next frame.

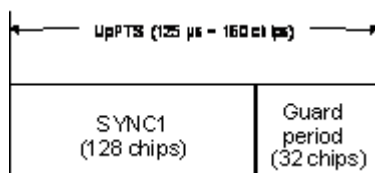


Fig. 3-3: Structure of UpPTS

The UpPTS is a complex-valued signal resulting from the real SYNC1 sequence by a rotating-vector operation.

3.3 Structure of Traffic Burst

In time slots Ts0 to Ts6, bursts can be sent by the base station or the user equipment, i.e. in both directions of transmission. The burst structure is identical for both directions. There are two types of burst, however, which are described in the following.

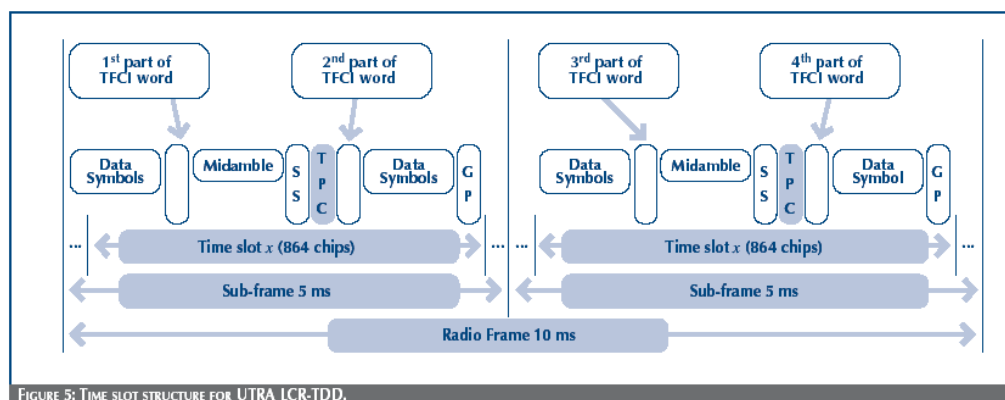


Fig. 3-4: Burst Without Layer 1 Control Information

3.3.1 Burst Without Layer 1 Control Information

This type of burst can be used for all physical channels. It comprises two data fields, a midamble and a guard period.

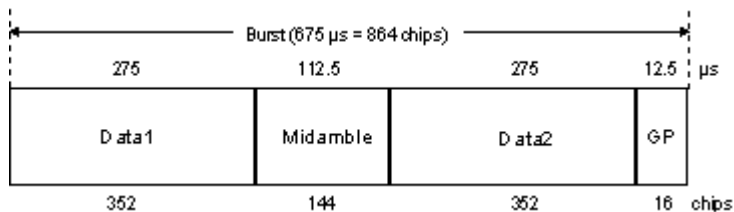


Fig. 3-5: Traffic burst without layer 1 control information

The useful data are

- alternately fed to the I and the Q path (QPSK data modulation),
- mapped from the 0/1 plane into the $-1/+1$ plane,
- spread with the complex spreading code (spreading factor SF = 1, 2, 4, 8 or 16),
- scrambled with the real-valued scrambling code,
- weighted with the channel power and
- filtered (root-raised cosine 0.22)

Since each user sends only one burst per frame, the following gross data rate is obtained:

$$Gross_data_Rate = \frac{704 * 2}{SF * 5ms} = 281600/SF \text{ kbit/s}$$

The midamble is obtained from the basic midamble by periodic repetition and shifting. For some channels, the midamble shift can be set in steps of 8 chips. The basic midamble is 128 chips long, while the length for the midamble field in the time slot is 144 chips. Each scrambling code (setting parameter at cell level) is assigned a basic midamble code.

The midamble is neither spread nor scrambled.

No signal is transmitted during the guard period. This avoids crosstalk of the burst into the next time slot at the receiver end.

3.3.2 Burst With Layer 1 Control Information

This type of burst can be used only with DPCHs (dedicated physical channels). It differs from the "normal" burst only in that the data fields are shortened ahead of and after the midamble to enable the transmission of layer 1 control information.

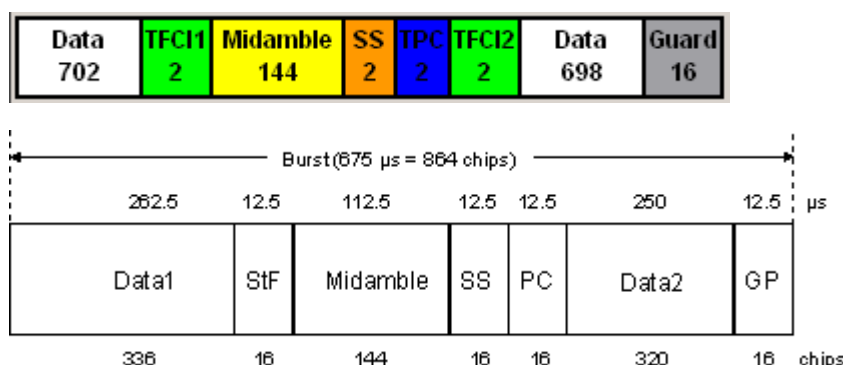


Fig. 3-6: Traffic burst with layer 1 control information

The burst consists of two fields of data symbols, a fixed-length 144 chip midamble, and control fields for Synchronization Shift (SS), Transmit Power Control (TPC), and Transport Format Indicator (TFCI). The timeslot is delimited by a 16-chip guard period (GP).

Each data field consists of a maximum of 352 chips.

The Transport Format Indicator field (TFI) conveys transport format information to the receiver, which is used by the channel decoder to recover transport channels. The information is distributed into two segments in one burst (four segments in two burst = one frame)

The synchronization shift (SS) field is used to inform the other station of a shift of the burst time ("00" means that the sync shift is increased, "11" that it is decreased). The bits are transmitted in M consecutive frames. The shift value is a multiple k of $T_{\text{chip}}/8$. M and k are transmitted by signalling. The value for M (Sync Shift Repetition) can be selected.

Analogously to the Sync Shift field, the power control (TPC) field is used to initiate an increase or decrease of transmit power.

If the spreading factor SF is lower than 16, the control symbols are transmitted 16/SF times. Control symbols are treated like data symbols, i.e. they are spread and scrambled.

4 TD-SCDMA Configuration and Settings

- To access the TD-SCDMA settings, select "Baseband > TD-SCDMA".

The remote commands required to define these settings are described in [chapter 5](#), "Remote-Control Commands", on page 86.



The dialog is extremely comprehensive. To simplify the description and the orientation through this documentation, the headings of the following section follow a common naming convention:

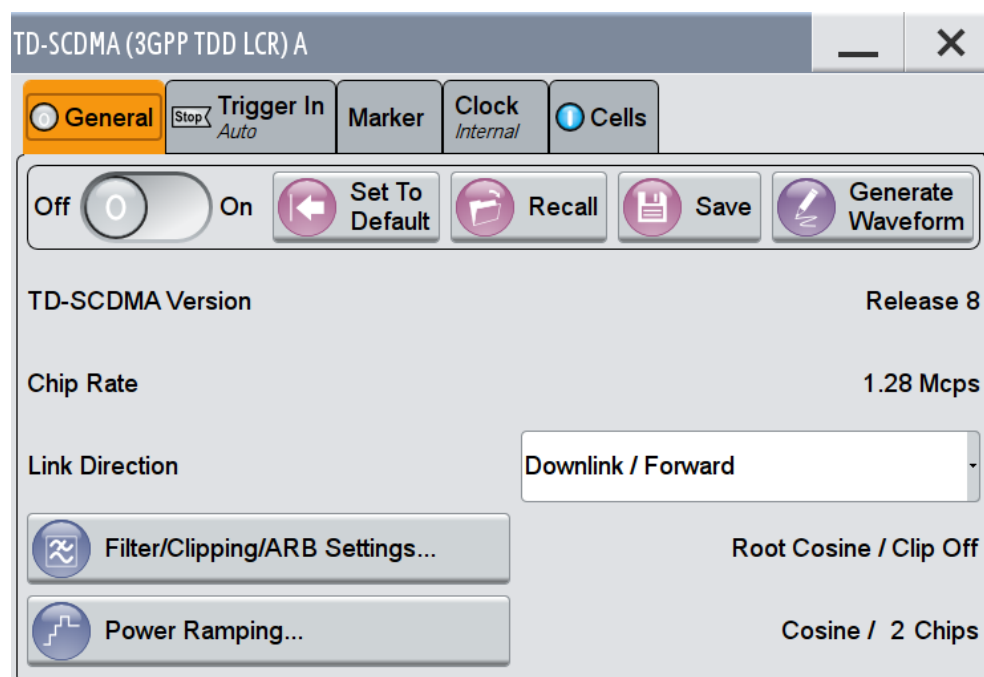
`<DialogName/TabName>< - ><SourceDialog>`

This common structure is intended to identify your current location in the dialog.

• General Settings	16
• Trigger Settings	19
• Marker Settings	23
• Clock Settings	26
• Local and Global Connector Settings	27
• Common Cell Configuration Settings	28
• Predefined Settings	31
• Cell Configuration	32
• Enhanced Channels Settings	36
• HSDPA/HSUPA Settings	52
• Slot Configuration	62
• DPCCH Settings	70
• Slot Mode PRACH Settings	75
• Filter / Clipping / ARB Settings	80
• Power Ramping	83

4.1 General Settings

- To access this dialog, select "Baseband > TD-SCDMA > General".



This dialog comprises the standard general settings, valid for the signal in both transmission directions.

Provided are the following settings:

State

Enables/disables the TD-SCDMA standard.

Enabling this standard disables all the other digital standards and digital modulation modes in the same baseband.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:STATe on page 93

Set to Default

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

Parameter	Value
Link Direction	Downlink/Forward
Filter	Root Cosine
Clipping	Off
Power ramping	Cosine / 2 chips
Trigger	Auto

Remote command:

[:SOURce<hw>] :BB:TDSCdma:PRESet on page 91

Save/Recall

Accesses the "Save/Recall" dialog, i.e. the standard instrument function for storing and recalling the complete dialog related settings in a file. The provided navigation possibilities in the dialog are self-explanatory.

The file name and the directory it is stored in are user-definable; the file extension is however predefined.

See also, chapter "File and Data Management" in the R&S SMW User Manual.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:SETTing:CATalog?` on page 92

`[ :SOURce<hw> ] :BB:TDSCdma:SETTing:LOAD` on page 92

`[ :SOURce<hw> ] :BB:TDSCdma:SETTing:STORe` on page 92

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:TDSCdma:WAVeform:CREate` on page 94

TD-SCDMA Version

Displays the current version of the TD-SCDMA standard.

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

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:VERSion?` on page 93

Chip Rate

Displays the system chip rate. This is fixed at 1.28 Mcps.

The output chip rate can be varied in the Filter/Clipping/ARB Settings dialog (see [chapter 4.14.1, "Filter Settings"](#), on page 80).

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:CRATe?` on page 88

Link Direction

Selects the transmission direction.

The settings of the basestation or the user equipment are provided in the following dialog section in accordance with the selection.

"Downlink/Forward"	The transmission direction selected is basestation to user equipment. The signal corresponds to that of a base station.
"Uplink/Reverse"	The transmission direction selected is user equipment to base station. The signal corresponds to that of a user equipment.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:LINK` on page 89

Filter / Clipping / ARB Settings

Access to the dialog for setting baseband filtering, clipping and the sequence length of the arbitrary waveform component, see [chapter 4.14, "Filter / Clipping / ARB Settings"](#), on page 80 .

Power Ramping...

Accesses the dialog for setting the power ramping, see [chapter 4.15, "Power Ramping"](#), on page 83.

Remote command:
n.a.

4.2 Trigger Settings

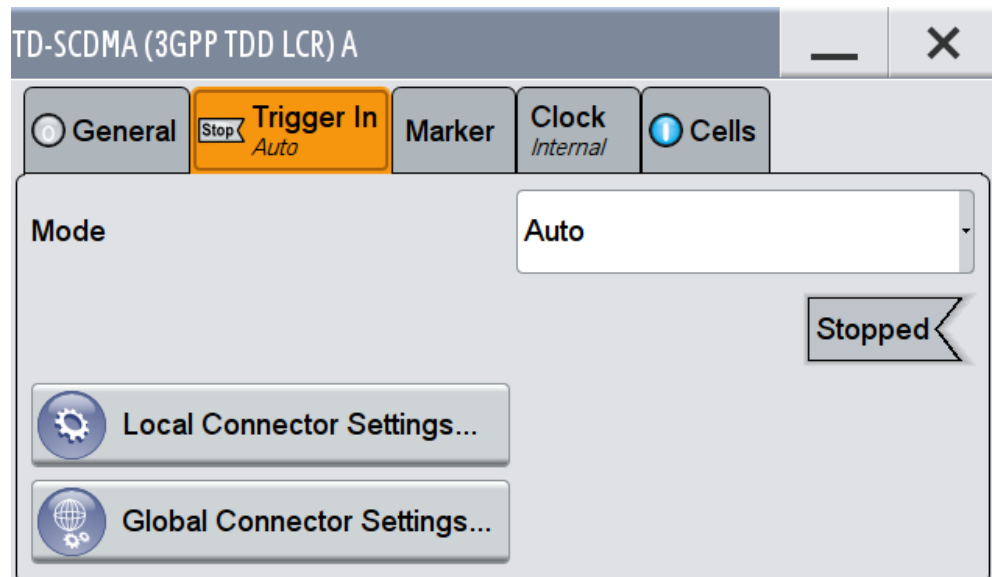
This tab provides access to the settings necessary to select and configure the trigger, like trigger source, mode, trigger delay, trigger suppression, as well as to arm or trigger an internal trigger manually. The current signal generation status is displayed in the header of the dialog together with information on the enabled trigger mode. As in the "Marker" and "Clock" dialogs, this dialog provides also an access to the settings of the related connectors.



This section focuses on the available settings.

For information on how these settings affect the signal, refer to chapter "Basics" in the R&S SMW user manual.

- To access this dialog, select "Baseband > TD-SCDMA > Trigger In".



This dialog comprises the settings required for configuring the trigger signal.



Routing and Enabling a Trigger

The provided trigger signals are not dedicated to a particular connector but can be mapped to one or more globally shared USER or local T/M/(C) connectors.

Use the [Local and Global Connector Settings](#) to configure the signal mapping as well as the polarity, the trigger threshold and the input impedance of the input connectors.

To route and enable a trigger signal, perform the following *general steps*:

- Define the signal source and the effect of a trigger event, i.e. select the "Trigger In > Mode" and "Trigger In > Source"
- Define the connector, USER or T/M/(C), the selected signal is provided at, i.e. configure the [Local and Global Connector Settings](#).

Trigger Mode

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

Note: To enable simultaneous signal generation in all basebands, the trigger settings in the available basebands are coupled in any instrument's configuration involving signal routing with signal addition (e.g. MIMO configuration, routing and summing of basebands and/or streams).

For more information, refer to chapter "Basics" in the R&S SMW user manual.

- "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:TDSCdma [ :TRIGger ] :SEQuence` on page 104

Signal Duration Unit

Defines the unit for describing the length of the signal sequence to be output in the "Single" trigger mode.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:TRIGger:SLUNit` on page 102

Trigger Signal Duration

Enters the length of the signal sequence to be output in the "Single" trigger mode. The input is expressed in the signal units.

Use this parameter to deliberately output part of the signal, an exact sequence of the signal, or a defined number of repetitions of the signal.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:TRIGger:SLENgth` on page 101

Running/Stopped

For enabled modulation, displays the status of signal generation for all trigger modes.

- "Running"
The signal is generated; a trigger was (internally or externally) initiated in triggered mode.
- "Stopped"
The signal is not generated and the instrument waits for a trigger event.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:TRIGger:RMODe?` on page 101

Arm

Stops the signal generation until a subsequent trigger event occurs.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:TRIGger:ARM:EXECute` on page 99

Execute Trigger

For internal trigger source, executes trigger manually.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:TRIGger:EXECute` on page 99

Trigger Source

Note: To enable simultaneous signal generation in all basebands, the trigger settings in the available basebands are coupled in any instrument's configuration involving signal routing with signal addition (e.g. MIMO configuration, routing and summing of basebands and/or streams).

For more information, refer to chapter "Basics" in the R&S SMW user manual.

The following sources of the trigger signal are available:

- "Internal"
The trigger event is executed manually by the "Execute Trigger".
- "Internal (Baseband A/B)"
The trigger event is provided by the trigger signal from the other basebands.
- "External Global Trigger 1 / 2"
The trigger event is the active edge of an external trigger signal provided and configured at the global USER connectors.
- "External Global Clock 1 / 2"
The trigger event is the active edge of an external global clock signal provided and configured at the global USER connectors.
- "External Local Trigger"

The trigger event is the active edge of an external trigger signal provided and configured at the local T/M/(C) connector.

With coupled trigger settings, the signal has to be provided at the T/M/C 1/2/3 connectors.

- "External Local Clock"

The trigger event is the active edge of an external local clock signal provided and configured at the local T/M/C connector.

With coupled trigger settings, the signal has to be provided at the T/M/C 1 connector.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:TRIGger:SOURce` on page 102

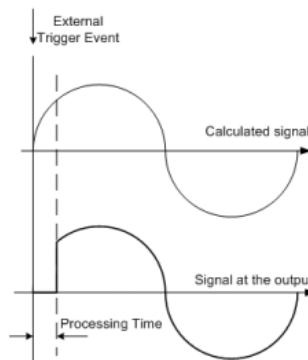
Sync. Output to External Trigger

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

"On"

Corresponds to the default state of this parameter.

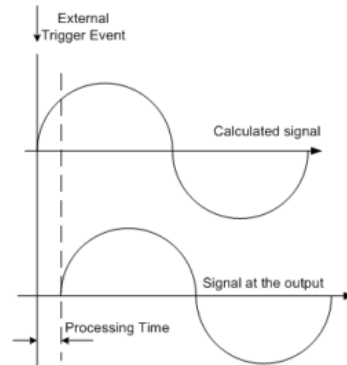
The signal calculation starts simultaneously with the external trigger event but because of the instrument's processing time the first samples are cut off and no signal is output. After elapsing of the internal processing time, the output signal is synchronous to the trigger event.



"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:TDSCdma:TRIGger:EXTernal:SYNChronize:OUTPut`
on page 99

External Trigger Delay

For external trigger signal or trigger signal from the other path, sets the trigger signal delay.

One possible application field of this feature is the synchronization of the instrument with the device under test (DUT) or other external devices.

For more information, see chapter "Basics" in the R&S SMW User Manual.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:TRIGger[:EXTernal]:DELay` on page 103

`[ :SOURCE<hw> ] :BB:TDSCdma:TRIGger:OBASeband:DELay` on page 100

External Trigger Inhibit

For external trigger signal or trigger signal from the other path, sets the duration a new trigger event subsequent to triggering is suppressed. In "Retrigger" mode for example, a new trigger event will not cause a restart of the signal generation until the specified inhibit duration does not expire.

For more information, see chapter "Basics" in the R&S SMW User Manual.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:TRIGger[:EXTernal]:INHibit` on page 104

`[ :SOURCE<hw> ] :BB:TDSCdma:TRIGger:OBASeband:INHibit` on page 100

4.3 Marker Settings

This tab provides access to the settings necessary to select and configure the marker output signal, like the marker mode or the marker delay settings.



This section focuses on the available settings.

For information on how these settings affect the signal, refer to chapter "Basics" in the R&S SMW user manual.

- To access this dialog, select "Baseband > TD-SCDMA > Marker".

This dialog comprises the settings required for configuring the marker mode and marker delay.



Routing and Enabling a Marker

The provided marker signals are not dedicated to a particular connector but can be mapped to one or more globally shared USER or local T/M/(C) connectors.

To route and enable a marker signal, perform the following *general steps*:

- Define the shape of the generated marker, i.e. select the "Marker > Mode"
- Define the connector, USER or T/M/(C), the selected signal is output at, i.e. configure the [Local and Global Connector Settings](#).

Marker Mode

Marker configuration for up to three marker channels. The settings are used to select the marker mode defining the shape and periodicity of the markers. The contents of the dialog change with the selected marker mode.

"Radio Frame" A marker signal is generated every 10 ms (traffic channel frame clock).

"Chip Sequence Period (ARB)"

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.

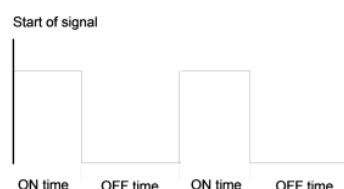
"System Frame Number (SFN) Restart"

A marker signal is generated at the start of every SFN period (every 4096 frames).

"On/Off Ratio"

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:TDSCdma:TRIGger:OUTPut<ch>:ONTime](#) on page 107

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut<ch>:OFFTime](#) on page 107

"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:TDSCdma:TRIGger:OUTPut<ch>:PERiod](#) on page 108

Remote command:

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut<ch>:ONTime](#) on page 107

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut<ch>:OFFTime](#) on page 107

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut<ch>:PERiod](#) on page 108

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut<ch>:MODE](#) on page 107

Marker x Delay

Defines the delay between the marker signal at the marker outputs relative to the signal generation start.

"Marker x" For the corresponding marker, sets the delay as a number of symbols.

Remote command:

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay](#) on page 105

"Current Range without Recalculation"

Displays the dynamic range within which the delay of the marker signals can be set without restarting the marker and the signal.
Move the setting mark to define the delay.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:TRIGger:OUTPut<ch>:DElay:MINimum?`

on page 106

`[ :SOURCE<hw> ] :BB:TDSCdma:TRIGger:OUTPut<ch>:DElay:MAXimum?`

on page 106

"Fix marker delay to current range"

Restricts the marker delay setting range to the dynamic range.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:TRIGger:OUTPut:DElay:FIXed` on page 105

4.4 Clock Settings

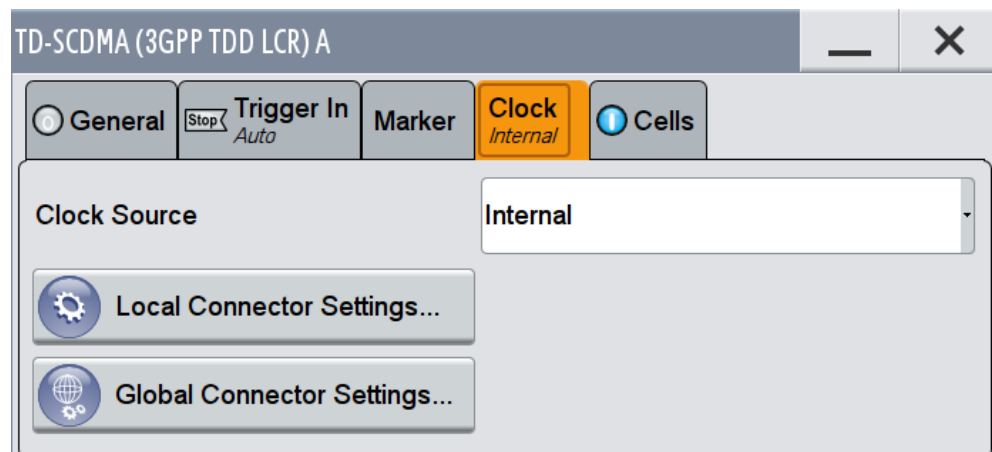
This dialog provides an access to the settings necessary to select and configure the clock signal, like the clock source and clock mode.



This section focuses on the available settings.

For information on how these settings affect the signal, refer to chapter "Basics" in the R&S SMW user manual.

- To access this dialog, select "Baseband > TD-SCDMA > Clock".



This dialog comprises the settings required for configuring the clock.



Defining the Clock

The provided clock signals are not dedicated to a particular connector but can be mapped to one or more globally shared USER and the two local T/M/C connectors.

Use the [Local and Global Connector Settings](#) to configure the signal mapping as well as the polarity, the trigger threshold and the input impedance of the input connectors.

To route and enable a trigger signal, perform the following *general steps*:

- Define the signal source, i.e. select the "Clock > Source"
- Define the connector, USER or T/M/C, the selected signal is provided at, i.e. configure the [Local and Global Connector Settings](#).

Clock Source

Selects the clock source.

- "Internal"
The instrument uses its internal clock reference.
- "External Global Clock 1/2"
The instrument expects an external clock reference at the global USER connector, as configured in the "Global Connector Settings" dialog.
- "External Local Clock"
The instrument expects an external clock reference at the local T/M/C connector.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:CLOCK:SOURce` on page 109

Clock Mode

Enters the type of externally supplied clock.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:CLOCK:MODE` on page 108

Clock Multiplier

Enters the multiplication factor for clock type "Multiple".

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:CLOCK:MULTiplier` on page 108

Measured External Clock

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

Remote command:

`CLOCK:INPut:FREQuency?`

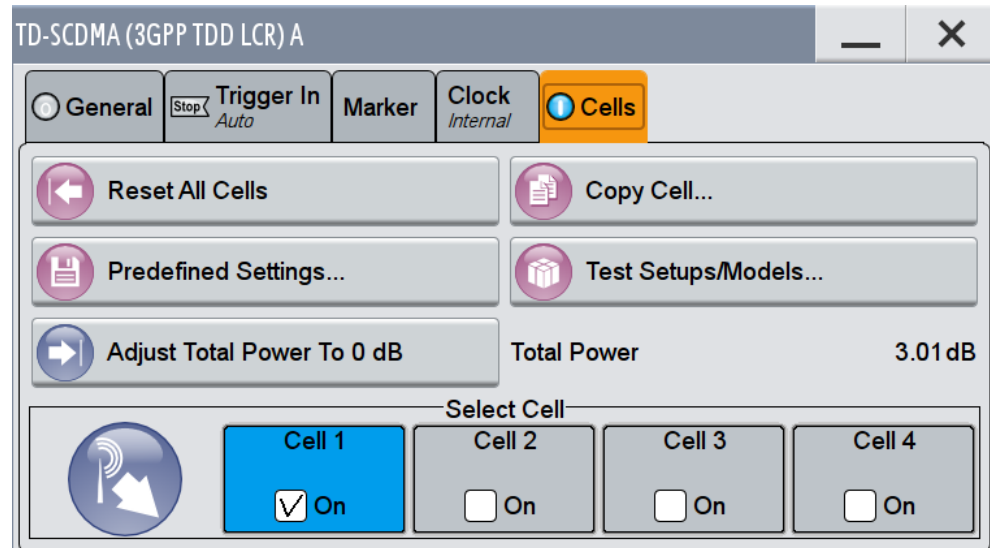
4.5 Local and Global Connector Settings

Each of the "Trigger In", "Marker" and "Clock" dialogs as well as the "Trigger Marker Clock" dialog provides a quick access to the related local and global connector settings.

For more information, refer to the description R&S SMW User Manual, section "Local and Global Connectors".

4.6 Common Cell Configuration Settings

- To access this dialog select "Baseband > TD-SCDMA > Cells".



In this dialog, the cells can be reseted to the predefined settings, parameters of one cell can be copied to another cell, and the total power can be set to 0 dB. Each cell can be activated or deactivated. Active cells are highlighted in blue. Clicking a cell opens the configuration dialog for setting the cell parameters.

Provided are the following settings:

Reset All Cells

Resets all cells to the predefined settings. The reset applies to the selected link direction. The following table gives an overview of the settings. The preset value for each parameter is specified in the description of the remote-control commands.

Parameter	Value
"Cell Configuration"	
State	OFF
(Use) Scrambling Code	ON
Scrambling Code (value)	0
SYNC-DL Code	0
SYNC-UL Code	0
Basic Midamble Code ID	0
Number of Users	16
Switching Point	3
DwPTS Power	0.0 dB

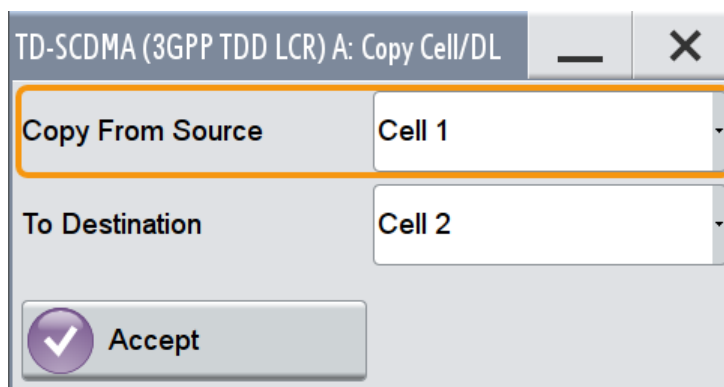
Parameter	Value
"Slot Configuration"	
State	OFF
Slot Mode (only in uplink)	Dedicated
Channel Configuration	
State	OFF
"Channel Type"	Depending on channel number
Current User	1
Slot Format	0
Spreading Factor	16
Spreading Code	0
Power	0 dB
Data Source	PRBS: PN9, Data Pattern: 0
Number of TFCI bits	0
TFCI Value	0
Number of Sync Shift & TPC bits	0 & 0
Sync Shift Pattern	1
Sync Shift Repetition M	1
TPC Source/TPC Pattern	01
Read Out Mode	Continuous

Remote command:

[:SOURce<hw>] :BB:TDSCdma:RESet on page 91

Copy Cell...

Copies the settings of a cell to a second cell.



"Copy From Source"

Selects the cell whose settings are to be copied.

"To Destination"

Selects the cell whose settings are to be overwritten.

"Accept"

Starts the copy process.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:COPIY:SOURce on page 88

[:SOURce<hw>] :BB:TDSCdma:COPIY:DESTination on page 87

[:SOURce<hw>] :BB:TDSCdma:COPIY:EXECute on page 87

Predefined Settings

Access the dialog for setting predefined configurations, see [chapter 4.7, "Predefined Settings"](#), on page 31 .

Remote command:

n.a.

Test Setups/Models

Accesses the dialog for selecting one of the test models defined in the TD-SCDMA standard and the self-defined test setups.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:SETTing:TMODe1 on page 93

Adjust Total Power to 0dB

Sets the power of an enabled channel so that the total power of all the active channels is 0 dB. This does not change the power ratio among the individual channels.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:POWer:ADJust on page 89

Total Power

Displays the total power of the active channels for the selected link direction.

The total power is calculated from the power ratio of the powered up code channels with modulation on. If the value is not equal to 0 dB, the individual code channels (whilst still retaining the power ratios) are internally adapted so that the "Total Power" for achieving the set output level is 0 dB.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:POWer [:TOTal] ? on page 89

Select Cell

Selects the cell and accesses the corresponding dialog with cell related settings, see [chapter 4.8, "Cell Configuration"](#), on page 32.

Remote command:

n.a.

Cell On / Cell Off

Activates or deactivates the cells.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:STATe on page 114

4.7 Predefined Settings

- To access this dialog select "TD-SCDMA > Cells > Predefined Settings".

The settings provided in this dialog depend on the link direction and apply only to Cell1.

With the "Predefined Settings" function, it is possible to create highly complex scenarios with just a few keystrokes. This function is of use if, say, just the envelope of the signal is of interest.

Use PCCPCH (Downlink Slot 0, code 0+1)

(This feature is available in the downlink only.)

Selects, if P-CCPCH is used in the scenario or not.

If P-CCPCH is used, both P-CCPCHs are activated in slot 0 with spreading code 0+1.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:PPARameter:PCCPch:STATE` on page 111

Spreading Factor Dedicated Channels

Selects the spreading factor for the DPCHs.

The available spreading factors depend on the link direction.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:PPARameter:DPCH:SFACTOR`

on page 110

Number of Dedicated Channels

Sets the number of activated DPCHs.

The minimum number is 1 and the maximum number depends on the spreading factor:

Max. No. DPCH = 3 x Spreading Factor

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:PPARameter:DPCH:COUNT on page 110

Crest Factor

Selects the desired range for the crest factor scenario.

The crest factor of the signal is kept in the desired range by varying the distribution of the channels inside one slot and in between several slots.

"Minimum"	The crest factor is minimized. The channels are distributed uniformly over the slots and over the code domain of the individual slot.
"Average"	An average crest factor is set. The channel are distributed uniformly over the slots and successively in the code domain of the individual slot.
"Worst"	The crest factor is set to an unfavorable value (i.e. maximum). The channels are distributed in clusters over the slots and successively in the code domain of the individual slot.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:PPARameter:DPCH:CRESt on page 110

Accept

Presets the channel table of cell 1 with the parameters defined in the "Predefined Settings" dialog.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:PPARameter:EXECute on page 111

4.8 Cell Configuration

- To access this dialog select "Cells> Select Cells > Cell1...Cell4 ".

The "Common" dialog comprises the general parameters of the cell; the "Slots" tab, the slot related settings respectively.

4.8.1 Common Settings

- To access this dialog select "Common".

TD-SCDMA A: Cell1/DL

Common Slots

State: Off ☒ On SYNC-DL Code: 0

☒ Use Scrambling Code: 0 Phase Rotation: Auto

Basic Midamble Code ID: 0 SYNC-UL Code: 0

DwPTS Mode: Auto Number of Users: 16

DwPTS Power: 0.00 dB Time Delay: 0 Chips

This dialog comprises the common settings required for configuring the cell.

Provided are the following settings:

State

Activates or deactivates the selected cell.

The number of the selected cell is displayed in the dialog header.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:STATE on page 114

Use (Scrambling Code)

Activates or deactivates the scrambling code.

The scrambling code is deactivated, for example, for test purposes.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:SCODE:STATE on page 114

Scrambling Code

Sets the scrambling code. The scrambling code identifies the cell and is the starting value of the scrambling code generator.

The scrambling code is used for transmitter-dependent scrambling of the chip sequence. The value range is 0 to 127.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:SCODE on page 113

Basic Midamble Code ID

Displays the basic midamble code ID of the cell.

The basic midamble code ID is derived from the scrambling code.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:MCODe? on page 113

DwPTS Mode/ UpPTS Mode

Selects whether to use the pilot time slot and its power or not. In case of Auto and On, the DwPTS/UpPTS is used. This is indicated in the Select Slot in Subframe to Configure graph.

For details regarding the DwPTS/UpPTS, see [chapter 3.2, "DwPTS and UpPTS"](#), on page 12.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:DWPTs:MODE on page 112

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:DWPTs:STATe? on page 112

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:UPPTs:MODE on page 112

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:UPPTs:STATe? on page 112

DwPTS Power/ UpPTS Power

Sets the power of the downlink/uplink pilot time slot.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:UPPTs:MODE on page 112 [:

SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:UPPTs:POWer on page 112

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:DWPTs:POWer on page 112

SYNC-DL Code

Displays the SYNC-DL code.

The SYNC-DL code is transmitted in the DwPTS (downlink pilot time slot). It is used by the user equipment to synchronize to the base station.

The SYNC-DL code is derived from the scrambling code and the basic midamble code ID.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SDCode? on page 114

Phase Rotation

Selects the phase rotation for the downlink pilots.

"Auto" Sets the default phase rotation sequence according to the presence of the P-CCPCH.

"S1" There is a P-CCPCH in the next four subframes.

"S2" There is no P-CCPCH in the next four subframes.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:PROTation on page 113

SYNC-UL Code

Sets the SYNC-UL code.

The SYNC-UL code is transmitted in the UpPTS. It is used by the base station to synchronize to the user equipment.

The SYNC-UL code is derived from the scrambling code and the basic midamble code ID.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SUCode on page 115

Number of Users

Selects the total number of users of the cell. The number of users influences the actual midamble sequence transmitted in the burst.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:USERS on page 115

Time Delay

(This feature is available for cell 2, 3, and 4 only)

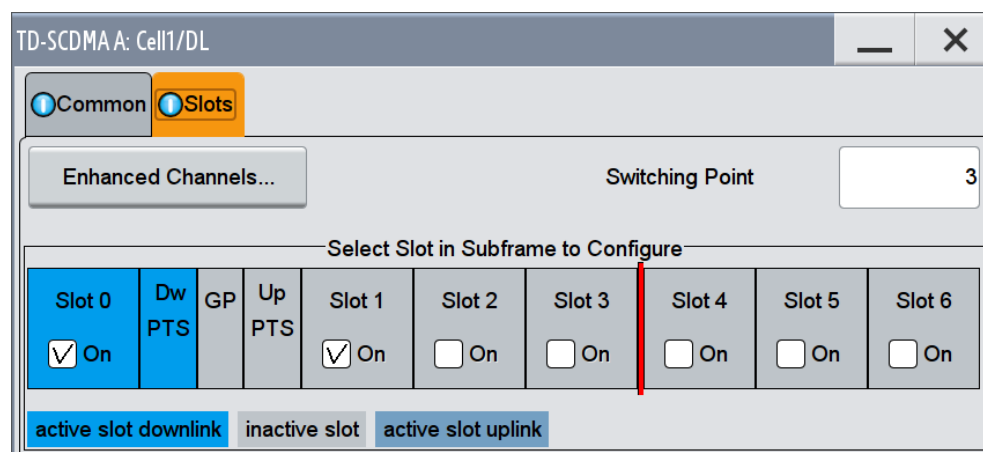
Enters the time delay of the signal of the selected cell compared to the signal of cell 1.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:TDElay on page 115

4.8.2 Slots

- To access this dialog select "Cell1...Cell4 > Slots".



In this dialog the slots are selected for configuration.

Provided are the following settings:

Enhanced Channels...

(available for cell1 only)

Accesses the dialog for setting enhanced channel configurations, see [chapter 4.9, "Enhanced Channels Settings"](#), on page 36.

Remote command:

n.a.

Switching Point

Sets the switching point between the uplink slots and the downlink slots in the frame.

Slot 0 is always allocated to the downlink, Slot 1 is always allocated to the uplink.

In the "Select Slot in Subframe to Configure" section, the switching point is indicated by a red bar. The slots to the left of the red bar are generated for link direction downlink, to the right of the red bar for link direction uplink. Only the slots for one link direction are active at a time, the slots of the other link direction are inactive.

Select Slot in Subframe to Configure									
Slot 0	Dw PTS	GP	Up PTS	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
☒ On				☒ On	☐ On	☐ On	☐ On	☒ On	☒ On
active slot downlink				inactive slot		active slot uplink			

The DwPTS is always active in downlink mode. The UpPTS is only active if PRACH is selected for the uplink slots.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SPOint on page 114

Select Slot in Subframe to Configure

Displays the slots of the cell.

Active slots are highlighted blue (downlink) and green (uplink). Select a slot in the subframe to access the dialog for configuring the channels of the selected slot, see [chapter 4.11, "Slot Configuration"](#), on page 62.

Remote command:

n.a.

Slot Icon

Activates or deactivates the slot in the subframe.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:STATE
on page 144

GP (Guard Period)

The base station sends 16 chips of GP in each subframe and is inserted between the DwPTS and UpPTS in each subframe. The GP is used to avoid the multipath interference.

Remote command:

n.a.

4.9 Enhanced Channels Settings

1. To access this dialog select "Cells> Select Cells > Cell1".
2. Select "Slots > Enhanced Settings".

The layout of the "Enhanced Channels Settings" dialog depends on the "Transmission direction". For "Downlink/Forward" direction, the Broadcast Channels (BCH) section is provided. All other sections are offered for both link directions.

4.9.1 Broadcast Channels (BCH) Common Settings

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Downlink/Forward"
2. Select "Cells > Select Cells > Cell1".
3. Select "Slots > Enhanced Channels > BCH Common".

Slot 0	Dw PTS	GP	Up PTS	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
☒ On				☐ On	☐ On	☐ On	☐ On	☐ On	☐ On

The "Broadcast Channels (BCH)" section is where the enhanced state of the channel can be activated.

State (BCH)

Activates or deactivates P-CCPCH 1/2 channel coding.

When activated, Slot 0 is active with P-CCPCH 1 and 2 switched on. The data source is fixed to BCH.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:STATE` on page 133

Coding Type (BCH)

Displays the coding scheme.

The coding scheme of P-CCPCH (BCH) is specified in the standard. The channel is generated automatically with the counting system frame number (SFN). The system information after the SFN field is provided by the selected data source.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:TYPE?` on page 133

Mapping On Physical Channels: BCH mapped to <Slot> 0, P-CCPCH1/2

Displays the slots of Cell1 used to transmit the broadcast channels. For BCH Slot 0 is always used.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SLOTstate<ch0>?
on page 132

Spreading Code Selection (BCH)

Selects if the spreading codes of the channels is set automatically or manually. For BCH, the spreading code is always set to Auto as the spreading code for the P-CCPCH is defined by the standard.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SCSMode?
on page 132

4.9.2 Broadcast Channels (BCH) Details Settings

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Downlink/Forward"
2. Select "Cells> Select Cells > Cell1".
3. Select "Slots > Enhanced Channels > BCH Details".

TD-SCDMA A: Enhanced Channels Settings 1 - Downlink

BCH Common BCH Details DCH Common DCH Details DCH Error Insertion

Slot Format 0

Data Bits per Frame (10 ms) 352 DTCH

Transport Channels

DTCH	DCH
246	246
PN 9	PN 9
☒ On	☐ On

Data Source PN 9

Transport Time Interval 20 ms Transport Blocks 1

Transport Block Size 246 Size of CRC 16

Rate Matching Attribute 256 Error Protection Conv 1/3

Interleaver 1 State ☒ On Interleaver 2 State ☒ On

This dialog comprises the detailed settings required for BCH configuration.

Provided are the following settings:

Slot Format

Displays the slot format of the selected channel.

A slot format defines the complete structure of a slot made of data and control fields. The slot format depends on the coding type selected.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SFormat?

on page 132

Data Bits Per Frame (10 ms)

Displays the data bits in the DPDCH component of the DPCH frame at physical level. The value depends on the slot format.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:BPFrame?

on page 127

Transport Channel

In the "Transport Channel " section, the transport channels (TCHs) can be configured. For more information refer to [chapter 4.9.5, "Transport Channel"](#), on page 44.

4.9.3 Dedicated Channels (DCH) Common Settings

- To access this dialog select "Enhanced Channels > DCH Common".

Mapping on Physical Channels: Select Slots To Use									
Slot 0	Dw PTS	GP	Up PTS	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
☐ On				☐ On	☐ On	☐ On	☒ On	☐ On	☐ On

In the "Dedicated Channels (DCH)" section, the enhanced state of the channel can be activated and enhanced channel settings can be made.

State (DCH)

Activates or deactivates DCH channel coding.

When the state is set to On, it activates the slots selected in the "Mapping On..." graph below. The number and configuration of the DPCHs is defined by the selected coding type. State and slot format of the channels are preset. The data source is fixed to DCH.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:STATE

on page 126

Coding Type

Selects the channel coding.

The current TD-SCDMA specification defines 4 reference measurement channel (RMC) in the uplink and 5 measurement channel coding types in the downlink, which differ in the input data bit rate to be processed.

Additionally, special RMCs are defined for HSDPA, HSUPA, HS-SICH and PLCCH.

Select one of the predefined downlink RMCs to preconfigure the settings for UE Tests according to 3GPP TS25.102, Annex A.2.

Select one of the predefined uplink RMCs to preconfigure the settings for BS Tests according to 3GPP TS25.142, Annex A.

The selected coding type defines the number of slots selected in section "Mapping On Physical Channels: Select Slots To Use".

"RMC 12.2 kbps"	Downlink/uplink 12.2 kbps measurement channel. Note: If RMC12K2, RMC64K, RMC144K, or RMC384K are selected for the uplink, they are automatically converted to UP_RMCxxx.
"RMC 64 kbps"	Downlink/uplink 64 kbps measurement channel
"RMC 144 kbps"	Downlink/uplink 144 kbps measurement channel
"RMC 384 kbps"	Downlink/uplink 384 kbps measurement channel
"RMC 2048 kbps"	Downlink 2048 kbps measurement channel
"RMC PLCCH"	Downlink RMC PLCCH channel (see RMC PLCCH Channel Settings)
"HSDPA"	(downlink only) HSDPA reference measurement channel (see chapter 4.10, "HSDPA/HSUPA Settings" , on page 52).
"RMC HS-SICH"	Uplink RMC for transport channel HS-SICH (see chapter 4.9.7, "RMC HS-SICH Channel Settings" , on page 49)
"HSUPA"	(uplink only) HSUPA reference measurement channel (see chapter 4.10, "HSDPA/HSUPA Settings" , on page 52).
"User"	The channel settings are user-definable

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:TYPE on page 127

Resource Units On Physical Layer

Displays the resource units on the physical layer needed to generate the selected channel.

The table below gives an overview of the used resource units (RU) depending on the selected Coding Type. The used Number of Time Slots and Number of Channels is also displayed by the corresponding parameters.

RMC	Resources Units Allocated	Description	Transport Channels
Downlink			
RMC 12.2 Kbps	1TS (2*SF16) = 2RU/5ms	1 slot with 2 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 64 Kbps	1TS (8*SF16) = 8RU/5ms	1 slot with 8 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 144 Kbps	2TS (8*SF16) = 16RU/5ms	2 slots with 8 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 384 Kbps	4TS (10*SF16) = 40RU/5ms	4 slots with 10 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 2048 kbps	5TS (1*SF1) = 80RU/5ms (8PSK)	5 slots with 1 code channel using spreading factor 1	1DTCH + 1DCCH

RMC	Resources Units Allocated	Description	Transport Channels
RMC-PLCCH	1TS (1*SF16) = 1RU/5ms (QPSK)	1 slot with 1 code channel using spreading factor 16	1DTCH
Uplink			
RMC 12.2 Kbps	1TS (1*SF8) = 2RU/5ms	1 slot with 1 code channel using spreading factor 8	1DTCH + 1DCCH
RMC 64 Kbps	1TS (1*SF2) = 8RU/5ms	1 slot with 1 code channel using spreading factor 2	1DTCH + 1DCCH
RMC 144 Kbps	2TS (1*SF2) = 16RU/5ms	2 slots with 1 code channel using spreading factor 2	1DTCH + 1DCCH
RMC 384 Kbps	4TS (1*SF2 + 1*SF8) = 40RU/5ms	4 slots with 2 code channel using spreading factor 2 and 8	1DTCH + 1DCCH
RMC HS-SICH	1TS (1*SF16) = 1RU/5ms	1 slot with 1 code channel using spreading factor 16	

See "RMC Configuration" on page 52 and "E-DCH Fixed Reference Channel (FRC)" on page 54 for an overview of the used Resources units in HSDPA and HSUPA mode respectively.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:RUPLayer?
```

on page 125

Mapping On Physical Channels: Select Slots To Use

Displays the slots of Cell1. The slots used to transmit the transport channel are highlighted.

The number selected slots is determined by the selected coding type. If a slot is deactivated, another slot is activated automatically to keep the number of activated slots unchanged.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:SLOTstate<ch>
```

on page 126

Spreading Code Selection For Used DPCHs

Selects the spreading code selection mode for the used transport channels.

"User" The spreading codes can be set manually.

"Auto" The spreading codes are distributed evenly over the slot domains in order to ensure the minimum crest factor.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:SCSMode
```

on page 126

4.9.4 Dedicated Channels (DCH) Details Settings

- To access this dialog select "Enhanced Channels > DCH Details".

TD-SCDMA A: Enhanced Channels Settings 1 - Downlink

☐ BCH Common
 ☐ BCH Details
 ☐ DCH Common
 ☒ DCH Details
 ☐ DCH Error Insertion

Number of Time Slots:

Number of Channels:

Slot Format:

Data Bits per Frame (10 ms):

Transport Channels							
DTCH 1	DTCH 2	DTCH 3	DTCH 4	DTCH 5	DTCH 6	DTCH 7	DCCH
244	100	100	100	100	100	100	100
PN 9	PN 9	PN 9	PN 9	PN 9	PN 9	PN 9	PN 9
☒ On	☐ On	☐ On	☐ On	☐ On	☐ On	☐ On	☒ On

Data Source:

This dialog comprises the detailed settings required for DCH configuration.

Provided are the following settings:

Number of Time Slots (DCH)

Sets the number of time slots to be used.

The initial value is preset according to the selected [Coding Type](#).

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:TSCount`
on page 127

Number of Channels (DCH)

Sets the number of channels to be used.

The initial value is preset according to the selected [Coding Type](#).

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:CCount`
on page 121

Slot Format

Displays the slot format of the selected channel.

A slot format defines the complete structure of a slot made of data and control fields. The slot format depends on the coding type selected.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SFormat?

on page 126

Data Bits Per Frame (10 ms)

Displays the data bits in the DPDCH component of the DPCH frame at physical level. The value depends on the slot format.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BPFrame?

on page 120

Transport Channel

In the "Transport Channel " section, the transport channels (TCHs) can be configured. For more information refer to [chapter 4.9.5, "Transport Channel"](#), on page 44.

4.9.5 Transport Channel

- To access this dialog select "Enhanced Channels > BCH Details" or "Enhanced Settings > DCH Details".

Transport Channels							
DTCH 1 244 PN 9 ☒ On	DTCH 2 100 PN 9 ☐ On	DTCH 3 100 PN 9 ☐ On	DTCH 4 100 PN 9 ☐ On	DTCH 5 100 PN 9 ☐ On	DTCH 6 100 PN 9 ☐ On	DTCH 7 100 PN 9 ☐ On	DCCH 100 PN 9 ☒ On
Data Source		PN 9					
Transport Time Interval		20 ms		Transport Blocks		1	
Transport Block Size		244		Size of CRC		16	
Rate Matching Attribute		256		Error Protection		Conv 1/3	
Interleaver 1 State				☒ On		Interleaver 2 State	
						☒ On	

In the "Transport Channel " section, the transport channels (TCHs) can be configured.

The most important parameters of the TCH are displayed (transport block size and data source). The associated parameters shown in the section below depend on which TCH is currently selected. A wide arrow beneath the block indicates which TCH is currently selected.

DTCH On/DCCH On

Displays the transport channel state.

Note: For BCH, only the DTCH component is active.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:STATE on page 124

Data Source

Selects the data source for the transport channel.

The following are available for selection as data sources:

- | | |
|----------------|---|
| "All 0""All 1" | 0 data and 1 data is generated internally. |
| "PN xx" | PRBS data as per CCITT with period lengths between 2^9-1 and $2^{23}-1$ is generated internally. |
| "Pattern" | A user-definable bit pattern with a maximum length of 64 bits is generated internally.
The bit pattern is defined in the "Pattern" entry field. |
| "Data List" | Internal data from a programmable data list is used. The data list can be generated by the Data Editor or generated externally.
Data lists are selected in the "Select Data List" field. |

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA on page 128

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA on page 121

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:DSElect on page 129

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA:DSElect on page 122

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:PATtern on page 129

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA:PATtern on page 123

Transport Time Interval

Displays the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TTInterval? on page 131

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TTInterval on page 125

Transport Blocks

Displays the number of transport blocks for the TCH.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBCount?
```

on page 131

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TBCount
```

 on page 124**Transport Block Size**

Displays the size of the transport block at the channel coding input.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBSize?
```

on page 131

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TBSize
```

 on page 125**Size Of CRC**

Displays the type (length) of the CRC.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:CRCSIZE?
```

on page 128

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:CRCSIZE
```

 on page 121**Rate Matching Attribute**

Displays the rate matching.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:RMATtribute?
```

on page 130

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:RMATtribute
```

 on page 124**Error Protection**

Displays the error protection.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:EPROtection?
```

on page 129

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:EPROtection
```

 on page 123

Interleaver 1 State

Activates or deactivates the channel coding interleaver state 1 of the transport channel. Interleaver state 1 can be set independently in each TCH. Activation does not change the symbol rate.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:IONE

on page 130

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:DTCH<ch> | DCCH:IONE on page 123

Interleaver 2 State

Activates or deactivates the channel coding interleaver state 2 off all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:ITWO

on page 130

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:DTCH<ch> | DCCH:ITWO on page 124

4.9.6 RMC PLCCH Channel Settings

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Downlink/Forward"
2. Select "Cells> Select Cells > Cell1".
3. Select "Slots > Enhanced Channels > DCH Common".
4. Select "Coding Type > RMC PLCCH".
5. Select "DCH Details"

TD-SCDMA A: Enhanced Channels Settings 1 - Downlink

BCH Common BCH Details DCH Common **DCH Details**

Slot Format 0

Transmission Time Interval (TTI) 5 ms

Information Bits

Number of Sync Shift & TPC Information Bits 21 & 21

Sync Shift Pattern 000...

TPC Pattern 000...

Repetition Encoder On

This dialog comprises the detailed settings required for DCH configuration of the RMC PLCCH channel.

Provided are the following settings:

Transmission Time Interval (TTI) – RMC PLCCH

Displays the transmission time interval.

Remote command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TTInterval?](#)
on page 118

Number of Sync Shift&TPC Information Bits

Displays the number of information bits used for sync shift and TPC. The RMC PLCCH does not contain data bits.

Remote command:

n.a.

Sync Shift Pattern

Sets the sync shift pattern. The pattern length is 21 bits.

Remote command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:SSPattern](#)
on page 117

TPC Pattern

Sets the TPC pattern. The pattern length is 21 bits.

Remote command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TPCPattern](#)
on page 117

Repetition Encoder

Displays the state of the repetition encoder.

Remote command:

n.a.

4.9.7 RMC HS-SICH Channel Settings

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Uplink/Reverse"
2. Select "Cells> Select Cells > Cell1".
3. Select "Slots > Enhanced Channels > DCH Common".
4. Select "Coding Type > RMC HS-SICH".
5. Select "DCH Details"

The screenshot shows a software interface for configuring TD-SCDMA channels. The title bar reads 'TD-SCDMA A: Enhanced Channels Settings 1 - Uplink'. There are two tabs: 'DCH Common' and 'DCH Details', with 'DCH Details' being the active tab. Below the tabs, the 'Transport Channel HS-SICH' section contains several configuration fields: 'Slot Format' is set to 5; 'Transmission Time Interval (TTI)' is set to 5 ms; 'CQI Modulation' is a dropdown menu currently showing 'QPSK'; 'CQI Value' is a text input field showing '0'; and 'ACK/NAK Pattern (bin)' is a text input field showing '111...'. The interface has a standard Windows-style look with a close button (X) in the top right corner.

This dialog comprises the detailed settings required for DCH configuration of the RMC HS-SICH channel.

Provided are the following settings:

Transmission Time Interval (TTI) – RMC HS-SICH

Displays the transmission time interval.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICH:TTIInterval?`

on page 119

CQI Modulation

Sets the CQI modulation.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:CQI:
MODulation on page 118
```

CQI Value

Sets the CQI value.

With the CQI (Channel quality indicator), the user equipment informs the base station about the received quality of downlink HS-PDSCH. Thus the base station can adapt the modulation and coding scheme to improve the signal quality.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:CQI:VALue
on page 118
```

ACK/NAK Pattern

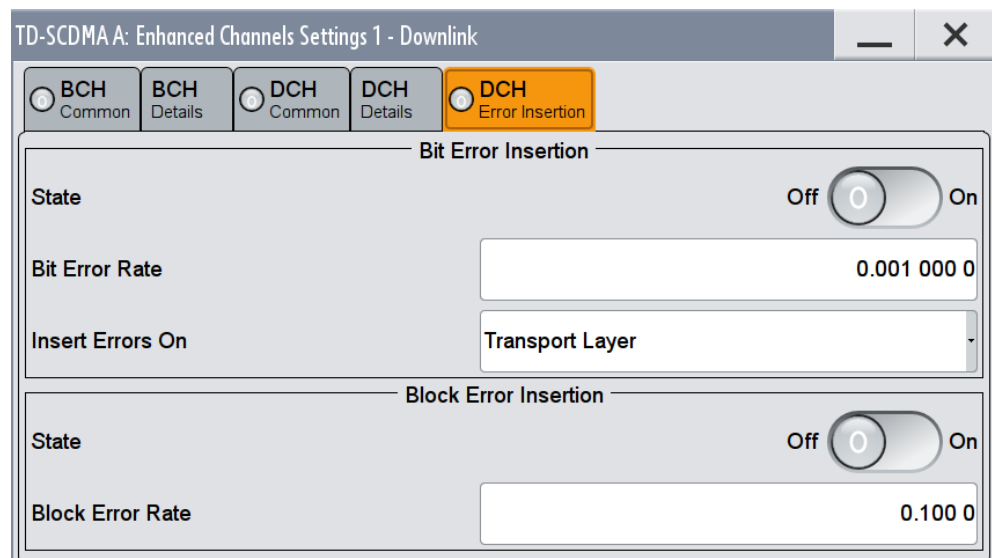
Sets the ACK/NAK Pattern. The pattern has a maximal length of 36 bits; a "1" corresponds to ACK, a "0" to NAK.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:ANPattern
on page 118
```

4.9.8 Bit Error Insertion

- To access this dialog select "Enhanced Channels > DCH Error Insertion".



In this dialog the bit error and the block error simulation is configured and activated.

State (Bit Error)

Activates or deactivates bit error generation.

Bit errors are inserted into the data fields of the enhanced channels. If channel coding is active, it is possible to select the layer in which the errors are inserted (physical or transport layer).

When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:BIT:STATE
```

on page 119

Bit Error Rate

Enters the bit error rate.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:BIT:RATE
```

on page 119

Insert Errors On

Selects the layer in the coding process at which bit errors are inserted.

"Transport Layer" Bit errors are inserted in the transport layer.
This selection is only available if channel coding is active.

"Physical Layer" Bit errors are inserted in the physical layer.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:BIT:LAYER
```

on page 119

4.9.9 Block Error Insertion

In the "Block Error Insertion" section, the block error simulation is configured and activated.

State (Block Error)

Activates or deactivates block error generation.

The CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate an invalid signal.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:BLOCK:STATE
```

on page 120

Block Error Rate

Enters the block error rate.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:BLOCK:RATE
```

on page 120

4.10 HSDPA/HSUPA Settings

The HSDPA settings are available only for downlink transmission and "Coding Type > HSDPA".

The HSUPA settings are available only for uplink transmission and "Coding Type > HSUPA".

4.10.1 HSDPA Settings

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Downlink/Forward"
2. Select "Cells> Select Cells > Cell1...Cell4".
3. Select "Slots > Enhanced Channels > DCH Common".
4. Select "Coding Type > HSDPA"

TD-SCDMA A: Enhanced Channels Settings 1 - Downlink

BCH Common **BCH** Details **DCH** Common **DCH** Details

State Off On

Coding Type HSDPA

RMC Configuration H-RMC 0.5 Mbps (QPSK)

Resource Units on Physical Layer 2 TS (10 * SF 16)

Mapping on Physical Channels: Select Slots To Use

Slot 0	Dw PTS	GP	Up PTS	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
☐ On				☐ On	☐ On	☐ On	☒ On	☒ On	☐ On

Spreading Code Selection for Enhanced Channels Auto

The settings can be configured in the "DCH Details" dialog. The settings are divided into several sections, which are described below.

Provided are the following settings:

RMC Configuration

(HSDPA only)

Enables a predefined set of RMC channels or fully configurable user mode.

Following combinations are possible:

RMC Config.	Modulation	Resources Units Allocated	Description	Transport Channels
H-RMC 0.5 Mbps	QPSK	2TS (10*SF16) = 20RU/5ms	2 slots with 10 code channels using spreading factor 16	1H-DTCH
H-RMC 1.1 Mbps	QPSK	2TS (10*SF16) = 20RU/5ms	2 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	2TS (12*SF16) = 24RU/5ms	2 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 1.6 Mbps	QPSK	3TS (10*SF16) = 30RU/5ms	3 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	3TS (12*SF16) = 36RU/5ms	3 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 2.2 Mbps	QPSK	4TS (10*SF16) = 40RU/5ms	4 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	4TS (12*SF16) = 48RU/5ms	4 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 2.8 Mbps	QPSK	5TS (10*SF16) = 50RU/5ms	5 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	5TS (12*SF16) = 50RU/5ms	5 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 64QAM	64QAM (Category 16UE)	3TS (14*SF16) = 42RU/5ms	3 slots with 14 code channels using spreading factor 16	1H-DTCH
	64QAM (Category 19UE)	5TS (14*SF16) = 70RU/5ms	5 slots with 14 code channels using spreading factor 16	1H-DTCH
	64QAM (Category 22UE)	5TS (14*SF16) = 70RU/5ms	5 slots with 14 code channels using spreading factor 16	1H-DTCH
User	-	-	-	-

Several parameters are automatically set, depending on the selected RMC.

However, it is also possible to change these parameters.

In this case, the value of the parameter "RMC Configuration" is automatically set to User.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:RMC

on page 153

4.10.2 HSUPA Settings

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Uplink/Reverse"
2. Select "Cells> Select Cells > Cell1...Cell4 ".
3. Select "Slots > Enhanced Channels > DCH Common ".

4. Select "Coding Type > HSUPA"

TD-SCDMA A: Enhanced Channels Settings 1 - Uplink

DCH Common | DCH Details

State: Off ☐ On

Coding Type: HSUPA

E-DCH Fixed Reference Channel (FRC): 1

Resource Units on Physical Layer: 2 TS (1 * SF 4)

Mapping on Physical Channels: Select Slots To Use

Slot 0	DwPTS	GP	UpPTS	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
☐ On				☒ On	☒ On	☐ On	☐ On	☐ On	☐ On

Spreading Code Selection for Enhanced Channels: Auto

The settings can be configured in the "DCH Details" dialog. The settings are divided into several sections, which are described below.

Provided are the following settings:

E-DCH Fixed Reference Channel (FRC)

(HSUPA only)

Selects a predefined E-DCH fixed reference channel or fully configurable user mode.

Following combinations are possible:

FRC	Modulation	Resources Units Allocated	Description	Transport Channels
1	QPSK	2TS(1*SF4) =2RU/5ms	2 slots with 1 code channel using spreading factor 4	1DTCH
2	QPSK	2TS(1*SF2) =2RU/5ms	2 slots with 1 code channel using spreading factor 2	1DTCH
3	16QAM	3TS(1*SF2) =3RU/5ms	3 slots with 1 code channel using spreading factor 2	1DTCH
4	16QAM	4TS(1*SF1) =2RU/5ms	4 slots with 1 code channel using spreading factor 1	1DTCH
User	-	-	-	-

Several settings are preconfigured according to the selected FRC.

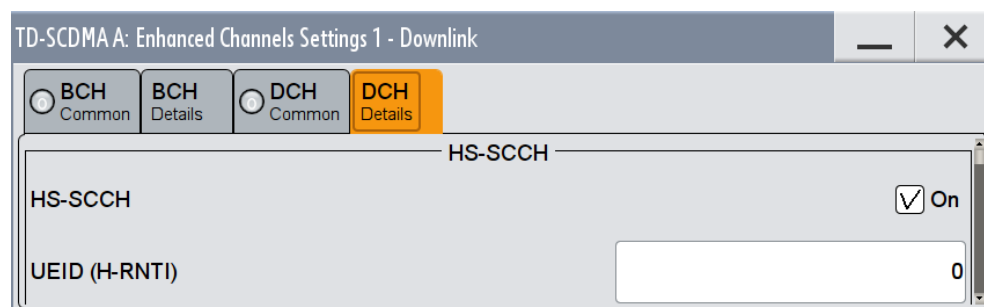
Remote command:

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:FRC on page 156

4.10.3 HS-SCCH Settings (HSDPA)

This section describes the "HS-SCCH" settings.

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Downlink/Forward"
2. Select "Cells> Select Cells > Cell1...Cell4 "
3. Select "Slots > Enhanced Channels > DCH Common "
4. Select "Coding Type > HSDPA".
5. Select "DCH Details".



The settings can be configured in the "DCH Details" dialog.

HS-SCCH State

(HSDPA only)

Enables/disables the HS-SCCH.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SCCH
```

on page 154

UEID (H-RNTI)

(HSDPA only)

Sets the UE identity which is the HS-DSCH Radio network identifier(H-RNTI) defined in 3GPP TS25.331, "Radio resource control (RRC); Protocol Specification".

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:UEID
```

on page 155

4.10.4 Global Settings

This section describes the HSDPA/HSUPA global settings.

HSDPA Global Settings	HSUPA Global Settings																												
Global Settings <table> <tr> <td>UE Category</td><td>1</td></tr> <tr> <td>Maximum Information Bit Throughput /kbps</td><td>199.2</td></tr> <tr> <td>Number of HS-PDSCH Time Slots</td><td> 2 </td></tr> <tr> <td>Number of HS-PDSCH Codes per TS</td><td> 10 </td></tr> <tr> <td>Slot Format</td><td>0</td></tr> <tr> <td>Transmission Time Interval (TTI)</td><td>5 ms</td></tr> </table>	UE Category	1	Maximum Information Bit Throughput /kbps	199.2	Number of HS-PDSCH Time Slots	2	Number of HS-PDSCH Codes per TS	10	Slot Format	0	Transmission Time Interval (TTI)	5 ms	Global Settings <table> <tr> <td>UE Category</td><td>1</td></tr> <tr> <td>Maximum Information Bit Throughput /kbps</td><td>56.4</td></tr> <tr> <td>Number of E-DCH Time Slots</td><td> 2 </td></tr> <tr> <td>Number of E-DCH Codes per TS</td><td> 1 </td></tr> <tr> <td>Spreading Factor</td><td> 4 </td></tr> <tr> <td>Number of E-UCCH per TTI</td><td> 4 </td></tr> <tr> <td>Slot Format</td><td>20</td></tr> <tr> <td>Transmission Time Interval (TTI)</td><td>5 ms</td></tr> </table>	UE Category	1	Maximum Information Bit Throughput /kbps	56.4	Number of E-DCH Time Slots	2	Number of E-DCH Codes per TS	1	Spreading Factor	4	Number of E-UCCH per TTI	4	Slot Format	20	Transmission Time Interval (TTI)	5 ms
UE Category	1																												
Maximum Information Bit Throughput /kbps	199.2																												
Number of HS-PDSCH Time Slots	2																												
Number of HS-PDSCH Codes per TS	10																												
Slot Format	0																												
Transmission Time Interval (TTI)	5 ms																												
UE Category	1																												
Maximum Information Bit Throughput /kbps	56.4																												
Number of E-DCH Time Slots	2																												
Number of E-DCH Codes per TS	1																												
Spreading Factor	4																												
Number of E-UCCH per TTI	4																												
Slot Format	20																												
Transmission Time Interval (TTI)	5 ms																												

UE Category

Displays the UE category that is minimum required to receive the selected RMC or FRC.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:UECategory?` on page 164

Maximum Information Bit Throughput /kbps

Displays maximum information bits sent in each TTI before coding.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:MIPT?` on page 161

Number of HS-PDSCH/E-DCH Time Slots

Sets the number of time slots.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:TSCount` on page 163

Number of HS-PDSCH/E-DCH Codes per TS

Sets the number of physical channels per time slot.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:CTSCount` on page 158

Spreading Factor (FRC)

(HSUPA only)

Selects the spreading factor for the FRC.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:SFACTOR` on page 157

Number of E-UCCH per TTI

(HSUPA only)

Sets the number of E-UCCH channels per TTI.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:EUCtti
on page 156

Slot Format (HSDPA/HSUPA)

Displays the slot format of the selected channel.

A slot format defines the complete structure of a slot made of data and control fields. The slot format depends on the coding type selected.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
SFORmat? on page 163

Transmission Time Interval (TTI)

Displays the transmission time interval (TTI).

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
TTInterval? on page 163

4.10.5 Coding Configuration

This section describes the HSDPA/HSUPA settings, related to the coding.

HSDPA Coding Configuration	HSUPA Coding Configuration																																
Coding Configuration <table> <tr> <td>Data Source</td><td>PN 9</td></tr> <tr> <td>Modulation</td><td>QPSK</td></tr> <tr> <td>Number of Coded Bits per TTI (Physical Layer)</td><td>1 760</td></tr> <tr> <td>Transport Block Size Table</td><td>Category 1-3</td></tr> <tr> <td>Transport Block Size Index</td><td>37</td></tr> <tr> <td>Information Bit Payload (Ninf)</td><td>996</td></tr> <tr> <td>Coding Rate</td><td>0.566</td></tr> <tr> <td>Virtual IR Buffer Size (per HARQ process)</td><td>2 800</td></tr> </table>	Data Source	PN 9	Modulation	QPSK	Number of Coded Bits per TTI (Physical Layer)	1 760	Transport Block Size Table	Category 1-3	Transport Block Size Index	37	Information Bit Payload (Ninf)	996	Coding Rate	0.566	Virtual IR Buffer Size (per HARQ process)	2 800	Coding Configuration <table> <tr> <td>Data Source</td><td>PN 9</td></tr> <tr> <td>Modulation</td><td>QPSK</td></tr> <tr> <td>Number of Coded Bits per TTI</td><td>306</td></tr> <tr> <td>Transport Block Size Table 0</td><td>Category 1-2</td></tr> <tr> <td>Transport Block Size Index</td><td>14</td></tr> <tr> <td>Information Bit Payload (Ninf)</td><td>282</td></tr> <tr> <td>Coding Rate</td><td>0.539</td></tr> <tr> <td>Number of HARQ Processes</td><td>4</td></tr> </table>	Data Source	PN 9	Modulation	QPSK	Number of Coded Bits per TTI	306	Transport Block Size Table 0	Category 1-2	Transport Block Size Index	14	Information Bit Payload (Ninf)	282	Coding Rate	0.539	Number of HARQ Processes	4
Data Source	PN 9																																
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Transport Block Size Index	14																																
Information Bit Payload (Ninf)	282																																
Coding Rate	0.539																																
Number of HARQ Processes	4																																

Data Source (HSDPA/HSUPA)

Selects the data source for the HSDPA/HSUPA channels.

The following are available for selection as data sources:

- "All 0""All 1" 0 data and 1 data is generated internally.
- "PN xx" PRBS data as per CCITT with period lengths between 2^9-1 and $2^{23}-1$ is generated internally.
- "Pattern" A user-definable bit pattern with a maximum length of 64 bits is generated internally.
The bit pattern is defined in the "Pattern" entry field.

"Data List" Internal data from a programmable data list is used. The data list can be generated by the Data Editor or generated externally. Data lists are selected in the "Select Data List" field.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:DATA on page 159

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:DATA:PATtern on page 160

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:DATA:DSElect on page 159

Modulation (HSDPA/HSUPA)

Sets the modulation scheme for each HSDPA RMC or HSUPA FRC.

64QAM is not available for the HSUPA FRCs.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:MODulation on page 161

Number of Coded Bits Per TTI

Displays the number of bits after coding.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:NCBTti? on page 161

Transport Block Size Table

(HSDPA only)

Sets the transport block size table, according to the specification 3GPP TS 25.321.

The values available depend on the selected modulation.

Modulation	TBS Table	
	Downlink	Uplink
QPSK	category [1, 3] category [4, 6] category [7, 9] category [10,12] category [13, 15] category [16, 18] category [19, 21] category [22, 24]	category [1, 2] category [3, 6]

Modulation	TBS Table	
	category [4, 6] category [7, 9] category [10, 12] category [13, 15] category [16, 18] category [19, 21] category [22, 24]	category [1, 2] category [3, 6]
16QAM		
64QAM	category [16, 18] category [19, 21] category [22, 24]	-

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TBS:TABLE
on page 155

Transport Block Size Table 0

(HSUPA only)

Sets the transport block size table, according to the specification 3GPP TS 25.321, Annex BC.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:TBS:TABLE
on page 157

Transport Block Size Index

Selects the index for the corresponding table, as described in 3GPP TS 25.321.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:
TBS:INDEX on page 163

Information Bit Payload (Ninf)

Displays the payload of the information bit. i.e. transport block size. This value determines the number of transport layer bits sent in each TTI before coding.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:
BPAYload? on page 158

Coding Rate (HSDPA/HSUPA)

Displays the resulting coding rate.

The coding rate is calculated as a relation between the Information Bit Payload and "Number of Coded Bits per TTI".

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:
CRATE? on page 158

Virtual IR Buffer Size (Per HARQ process)

(HSDPA only)

Sets the size of the virtual IR buffer.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:VIBSize
on page 155

4.10.6 Signal Structure

This section describes the HSDPA settings, necessary to configure the signal structure.

Signal Structure	
Inter TTI Distance	1
Number of HARQ Processes	4
Signalling Pattern	0,1,2,3

Inter TTI Distance

(HSDPA only)

Sets the inter TTI distance, i.e. distance between two packets in HSDPA packet mode and determines whether data is send each TTI or there is a DTX transmission in some of the TTIs.

An "Inter TTI Distance" of 1 means continuous generation.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TTIDistance
on page 155

Number of HARQ Processes

Sets the number of HARQ processes. This value determines the distribution of the payload in the subframes and depends on the "Inter TTI Distance".

A minimum of 3 HARQ Processes are required to achieve continuous data transmission.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:
HARQ:LENGTH on page 160

Signaling Pattern

Displays the distribution of packets over time. The Signaling Pattern displays a HARQ-Process cycle and is a sequence of HARQ-IDs and "-". A HARQ-ID indicates a packet, a "-" indicates no packet (see figure). The Signaling Pattern is cyclically repeated.

Long signaling patterns with regular repeating groups of HARQ-ID and "-" are not displayed completely. The signaling pattern is shortened and ". . ." is displayed but the scheduling is performed according to the selected "Inter TTI Distance". Long signaling patterns with irregularity in the HARQ-ID and "-" groups are displayed completely.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SPATtern?`

on page 154

4.10.7 HARQ Setup

This section describes the HSDPA/HSUPA Hybrid-ARQ settings.

HARQ Setup	
HARQ Mode	Constant ACK
Redundancy Version Parameter	0

HARQ Mode

Sets the HARQ simulation mode.

- | | |
|-----------------|---|
| "Constant ACK" | New data is used for each new TTI. This mode is used to simulate maximum throughput transmission. |
| "Constant NACK" | Enables NACK simulation, i.e. depending on the sequence selected with parameter "Redundancy Version Sequence" packets are retransmitted. This mode is used for testing with varying redundancy version. |

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA: HARQ:MODE` on page 160

Redundancy Version Parameter

(for "HARQ Mode" set to Constant ACK)

Enters the redundancy version parameter.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA: RVParameter` on page 162

Redundancy Version Sequence

(for "HARQ Mode" set to Constant NACK)

Sets the retransmission sequence.

The sequence has a length of maximum 30 values. The sequence length determines the maximum number of retransmissions. New data is retrieved from the data source after reaching the end of the sequence.

For HSUPA, this parameter is read-only.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:RVSequence on page 162

Retransmission Sequence Number

(for HSUPA and "HARQ Mode" set to Constant ACK)

Sets the retransmission sequence number.

The value is fixed to 0.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSNumber? on page 157

Retransmission Sequence

(for HSUPA and "HARQ Mode" set to Constant NACK)

Sets the retransmission sequence.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSEquence on page 156

4.11 Slot Configuration

1. To access this dialog select "Cells> Select Cells > Cell1...Cell4 ".
2. Select "Slots > Slot0...Slot6 > Common".

Data 44		Midamble 144						Data 44		Guard 16	
Channel Type	Enhanced	Crt.User/Mid.Shift	Slot Fmt	Spred Fact	Spred Code	Power /dB	Data	DList / Pattern	DPCCH Settings	State	Dom Conf
0 P-CCPCH 1	Off	1/120	0	16	1	0.00	PN 9			On	
1 P-CCPCH 2	Off	1/120	0	16	2	0.00	PN 9			On	
2 S-CCPCH 1		1/120	0	16	1	0.00	PN 9		Config...	Off	
3 S-CCPCH 2		1/120	0	16	1	0.00	PN 9		Config...	Off	
4 FPACH		1/120	0	16	1	0.00	PN 9			Off	
5 PDSCH		1/120	0	16	1	0.00	PN 9		Config...	Off	

This dialog comprises the common settings required for configuring the slot.

4.11.1 Common Settings

State

Activates or deactivates the selected slot. The index of the selected slot is displayed in the dialog header.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN | UP:CELL<st>:SLOT<ch0>:STATE

on page 144

Slot Mode

(This feature is available in the uplink only.)

Selects the slot mode.

"Dedicated" Selects the Dedicated mode. In this mode, the instrument generates a signal with a dedicated physical control channel (DPCCH) and up to 6 dedicated physical data channels (DPDCH). The signal is used for voice and data transmission.

"PRACH" In this mode, the instrument generates a single physical random access channel (PRACH). This channel is needed to set up the connection between the mobile and the base station. All the PRACH parameters can be set in the PRACH Settings section (see [chapter 4.13, "Slot Mode PRACH Settings"](#), on page 75).

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:MODE on page 145

4.11.2 Channel Table

The "Channel table" is located in the lower part of the "Common" dialog.

The channel table is where the individual channel parameters are set. The structure of the channel currently being edited is displayed graphically in the table header.

The number of channels and the available channel types depend on the link direction. In downlink, Channels 0 to 5 are assigned to the special channels, with the allocation of the channels being fixed. In uplink, Channels 0 is assigned to a special channel, with the allocation of the channel being fixed. It is possible to simulate the signal of a base station that supports high speed channels.

See [table 4-1](#) and [table 4-2](#) for overview of the supported channel types and their sequence in the TD-SCDMA channel table.

Table 4-1: Supported channel types (Downlink)

Index	Shortform	Name	Function
0	P-CCPCH 1	Primary Common Control Phys. Channel 1	Transfers the system frame number (SFN) Timing reference for additional downlink channels Contains the BCH transport channel
1	P-CCPCH 2	Primary Common Control Phys. Channel 2	Transfers the system frame number (SFN) Timing reference for additional downlink channels Contains the BCH transport channel
2	S-CCPCH 1	Secondary Common Control Phys. Channel	
3	S-CCPCH 2	Secondary Common Control Phys. Channel	
4	FPACH	Fast Physical Access Channel	
5	PDSCH	Phys. Downlink Shared Channel	
6-21	DPCH QPSK	Dedicated Phys. Channel Modulation QPSK	Transfers the user data and the control information
	DPCH 8PSK	Dedicated Phys. Channel Modulation 8PSK	
	HS-SCCH 1	High Speed Shared Control Channel 1	
	HS-SCCH 2	High Speed Shared Control Channel 2	
	HS-PDSCH (QPSK)	High Speed Phys. Downlink Shared Channel QPSK	
	HS-PDSCH (16QAM)	High Speed Phys. Downlink Shared Channel 16 QAM	
	HS-PDSCH (64QAM)	High Speed Phys. Downlink Shared Channel 64QAM	
	PLCCH	Physical layer common control channel	
	E-AGCH	E-DCH Absolute Grant Channel	
	E-HICH	E-DCH Hybrid ARQ Indicator Channel	

Table 4-2: Supported channel types (Uplink)

Index	Shortform	Name	Function
0	PUSCH	Phys. Uplink Shared Channel	
1-16	DPCH QPSK	Dedicated Phys. Channel Modulation QPSK	
	DPCH 8PSK	Dedicated Phys. Channel Modulation 8PSK	
	HS-SICH	High Speed Shared Information Channel	

Index	Shortform	Name	Function
	E-PUCH (QPSK)	E-DCH Uplink Physical Channel (QPSK)	
	E-PUCH (16QAM)	E-DCH Uplink Physical Channel (16QAM)	
	E-RUCCH	E-DCH Random Access Uplink Control Channel	

Channel Number

Displays the consecutive channel numbers. The range depends on the selected transmission direction.

All available channels are displayed, even those that are inactive. Each channel is activated/deactivated by the "State" button.

Remote command:

n.a.

Channel Type

Selects the channel type.

In the uplink, the channel type is fixed for channel number 0.

In the downlink, the channel type is fixed for channel numbers 0 to 5.

For the remaining numbers, the choice lies between the relevant standard channels and the high speed channels (see [table 4-1](#) and [table 4-2](#)).

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:TYPE on page 143

Enhanced

Displays the enhanced state. If the enhanced state is set to ON, the channel coding cannot be changed.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:ENHanced? on page 141

Crt.User/Mid.Shift

Enters the value for the user and displays the midamble shift.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:USER on page 144

Slot Fmt

Enters the slot format for the selected channel.

The range of the values depends on the channel selected. For DPCH 8PSK channels, for example, the value range for the slot formats is 0 to 24.

A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate.

Parameters set via the slot format can subsequently be changed individually.

The structure of the channel currently selected is displayed in a graphic above the channel table.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:SFORMAT on page 143
```

Sprd. Fact.

Enters the spreading factor for the selected channel. The selection depends on the channel type and interacts with the slot format.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:SFACtor on page 143
```

Sprd. Code

Enters the spreading code for the selected channel. The code channel is spread with the set spreading code. The range of values for the spreading code depends on the channel type and the spreading factor. Depending on the channel type, the range of values can be limited.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:SCODE on page 142
```

Power/dB

Sets the channel power in dB.

The power entered is relative to the powers outputs of the other channels. If "Adjust Total Power to 0 dB" is executed (top level of the TD-SCDMA dialog), all the power data is relative to 0 dB.

The value range is -80 dB to 0 dB.

Note: The maximum channel power of 0 dB applies to non-blanked channels (duty cycle 100%), with blanked channels, the maximum value can be increased (by Adjust Total Power) to values greater than 0 dB to $10 \cdot \log_{10}(1/\text{duty_cycle})$.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:POWER on page 142
```

Data

Selects data source.

The data sources "PN9", "PN11", "PN15", "PN16", "PN20", "PN21", "PN23", "ALL0", "ALL1", "Pattern" and "Data List" are available to choose from.

If the "Pattern" data type is used, the bit pattern can be entered in a bit editor that is called in the column "DList/Pattern". The length is limited to 64 bits.

If the "Data List" data type is used, the list can be selected from a file window that is called in the "DList/Pattern" column. The selected data list is shown in the "DList/Pattern" column.

Remote command:

```
[ :SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA on page 136
[ :SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA:DSElect on page 137
[ :SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA:PATtern on page 137
```

DPCCH Settings

Calls the dialog for configuring the control fields of the selected channel.

The selected slot format predetermines the setting of the control fields.

So a change is also made to the control fields by changing the slot format and vice versa.

The dialog is described in [chapter 4.12, "DPCCH Settings"](#), on page 70

Remote command:

n.a.

State

Activates or deactivates the channel.

Remote command:

```
[ :SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:STATe on page 143
```

Dom. Conf.

Displays whether the channel has a code domain conflict with one of the channels lying above it (with a lower channel number). If there is a conflict, a red dot appears and the column is colored soft orange. If there is no conflict, the column is colored soft blue.

The R&S Signal Generator helps to resolve code domain conflicts. You get the button required for this purpose by clicking the table field in a subdialog.

The graphical display of the code domain occupancy by all the active code channels can be called by clicking the Code Domain button (see also [chapter 4.11.3, "Code Domain"](#), on page 67).

Remote command:

```
[ :SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:DCONflict?
on page 144
```

4.11.3 Code Domain

The channelization codes are taken from a code tree of hierarchical structure (see [figure 4-1](#)). The higher the spreading factor, the smaller the symbol rate and vice versa. The product of the spreading factor and symbol rate is constant and always yields the chip rate.

The outer branches of the tree (right-most position in the figure) indicate the channelization codes for the smallest symbol rate (and thus the highest spreading factor). The use of a channelization code of the level with spreading factor N blocks the use of all other channelization codes of levels with spreading factor $>N$ available in the same branch of the code tree. Channelization codes with smaller spreading factor are contained in the codes with larger spreading factor in the same code branch. When using such competitive channelization codes at the same time, the signals of associated code channels are mixed such that they can no longer be separated in the receiver. Orthogonality will then be lost.

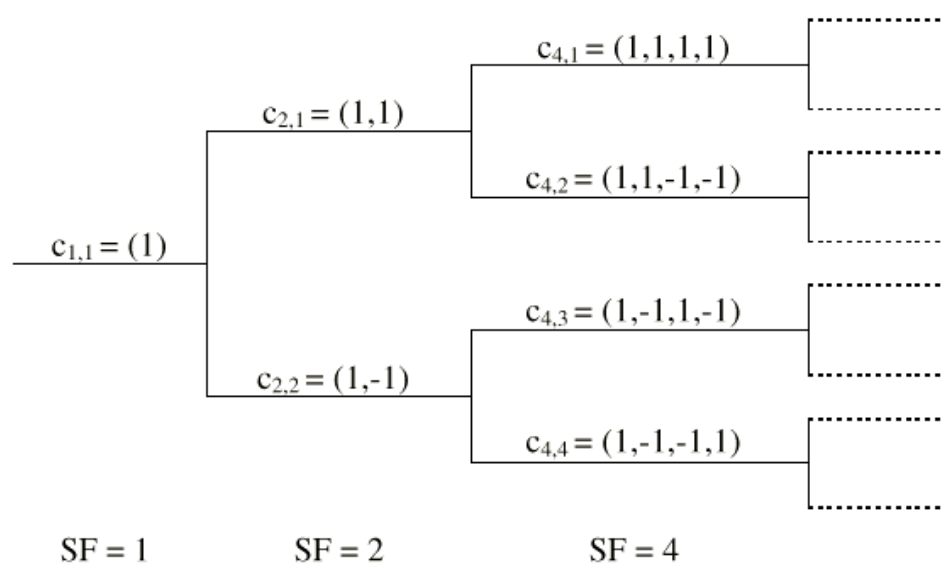
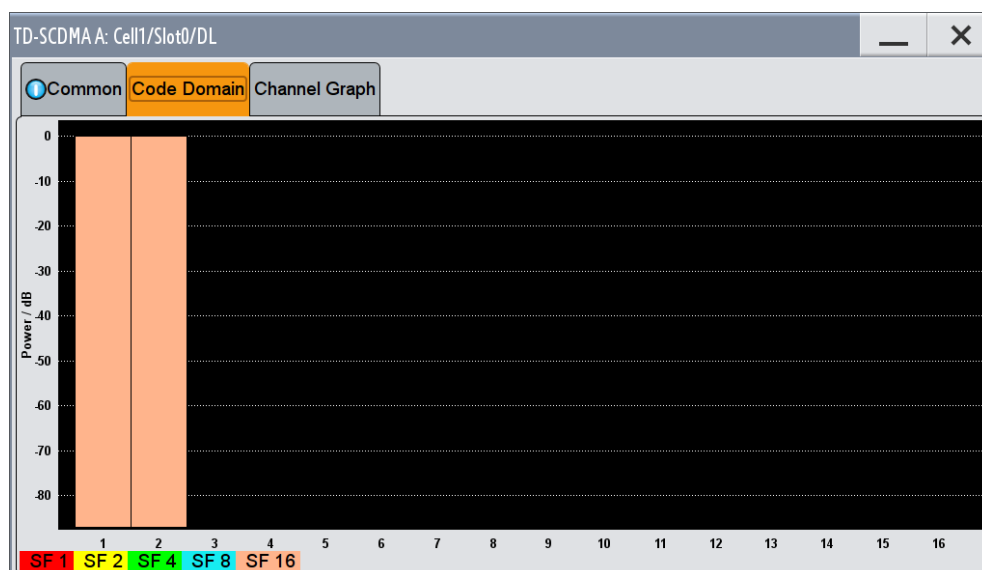


Fig. 4-1: Code tree of channelization codes

The domain of a certain channelization code is the outer branch range (with minimum symbol rate and max. spreading factor) which is based on the channelization code selected in the code tree. Using a spreading code means that its entire domain is used.

1. To access this dialog select "Cells > Select Cells > Cell1...Cell4".
2. Select "Slots > Slot0...Slot6 > Code Domain".

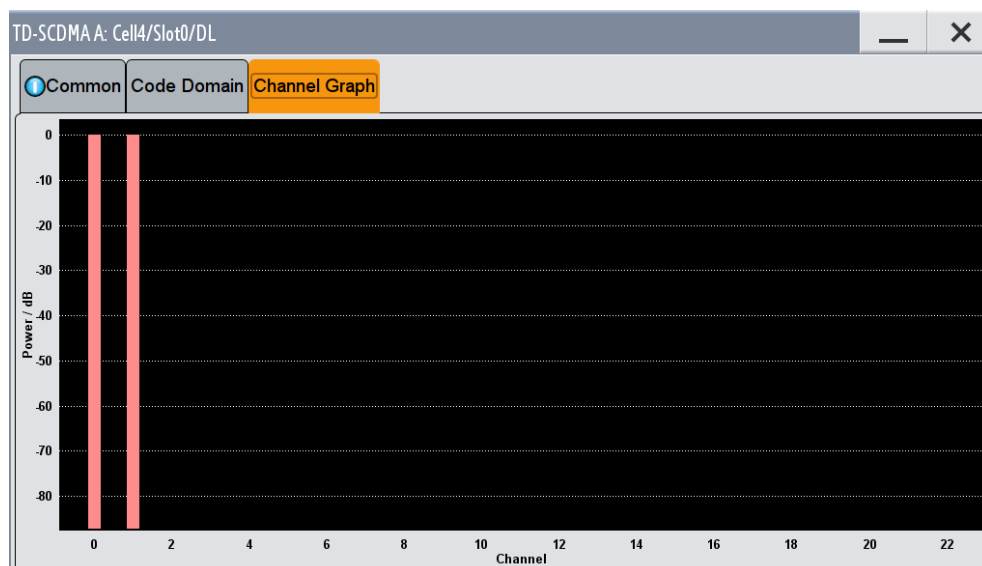


The "Code Domain" dialog indicates the assigned code domain.

The channelization code is plotted at the X axis, the colored bars indicate coherent code channels. The colors are assigned to the spreading factor, the allocation is shown below the graph. The relative power can be taken from the height of the bar.

4.11.4 Channel Graph

1. To access this dialog select "Cells> Select Cells > Cell1...Cell4".
2. Select "Slots > Slot0...Slot6 > Channel Graph".



The channel graph dialog shows the active code channels.

The channel number is plotted on the X axis. The red bars represent the special channel (P-CCPCH1 to PDSCH in the downlink, P-CCPCH1 to PUSCH in the uplink), the green bars the data channels (DPCH). The height of the bars shows the relative power of the channel. The graph is calculated from the settings that have been made.

4.12 DPCCH Settings

1. To access this dialog select "Cells> Select Cells > Cell1...Cell4".
2. Select "Slots > Slot0...Slot6 > Common".
3. Select "DPCCH Settings > Config..."

Data	Midamble	Data	Guard
44	144	44	16

Slot Format: 0

Midamble Shift: 120

TFCI Sync Shift TPC

Number of TFCI Bits: 0

TFCI Value: 0

The selected slot format predetermines the setting of the parameter provided in this dialog. Whenever the TFCI State and Pilot Length settings are changed, the slot format is adjusted accordingly. Pilot Length and TFCI State can be selected for the S-CCPCH channel.

4.12.1 Slot Structure and Slot Format

The upper section of the dialog is where the slot structure and slot information is displayed.

Slot Structure

Displays the slot structure.

The structure of the slot depends on the slot format selected.

Data 44	Midamble 144	Data 44	Guard 16
--------------------------	-------------------------------	--------------------------	---------------------------

Remote command:

n.a.

Slot Format

Displays the slot format.

The slot format display changes when the "Number of TFCI Bits" and the "Number of Sync Shift & TPC Bits" are modified.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:SFORmat on page 143

Midamble Shift

Displays the midamble shift.

The midamble can be shifted in the range of 0 to 120 chips in increments of 8 chips. Channels belonging to the same user equipment are characterized by the same midamble shift.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:MSHift? on page 141

4.12.2 TFCI Settings

The "TFCI Settings" section is where the TFCI length and value are set.

Number of TFCI Bits

Selects the length of the TFCI field expressed in bits.

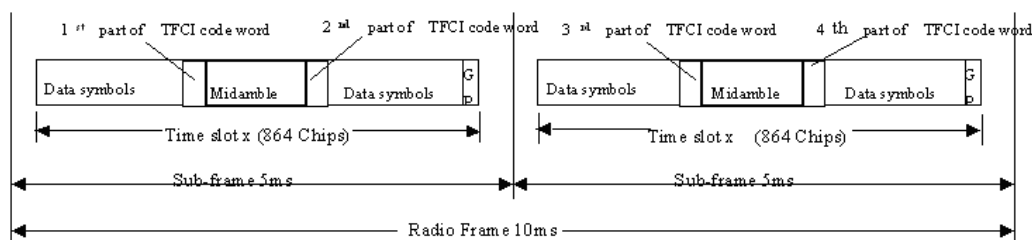
Remote command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:TFCI:LENGth on page 138

TFCI Value

Enters the value of the TFCI field. The value range is 0 to 1023.

The coded TFCI word is divided into 4 parts:



Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:TFCI:VALue on page 139
```

4.12.3 Sync Shift Settings

The "Sync Shift Settings" section is where the settings regarding the Sync Shift are set.

The screenshot shows the "Sync Shift" configuration window. It has three tabs: "TFCI", "Sync Shift" (which is selected and highlighted in orange), and "TPC". Below the tabs, there are three settings:

- Number of Sync Shift & TPC Bits**: A dropdown menu showing "0 & 0".
- Sync Shift Pattern**: A text field containing "1..." with a button to the right.
- Sync Shift Repetition M**: A text field containing the value "1".

Number of Sync Shift & TPC Bits

Selects the length of the sync shift and the length of the TPC field expressed in bits. The available values depend on the slot format.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:SYNC:LENGTH on page 137
```

Sync Shift Pattern

Enters the bit pattern for the sync shift. The maximum pattern length is 64 bits.

The following values are allowed:

- 0: decreases the sync shift
- 1: increases the sync shift
- -: the sync shift stays unchanged

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:SYNC:PATtern on page 138
```

Sync Shift Repetition M

Enters the value for the sync shift repetition. This value defines the spacing for the sync shift which is used to transmit a new timing adjustment. M specifies the spacing in sub-frames of 5 ms each.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:SYNC:REPetition on page 138
```

4.12.4 E-UCCH Settings

The "E-UCCH Settings" section is available only for "Link Direction > Uplink/ Reverse" and "Channel Type" E-PUCH QPSK/16QAM.

Setting	Value
Number Of E-UCCH Channels	0
Number Of Phy. Chan. Bits Per E-UCCH	32
(Bits 0..15 Mapped To E-UCCH Part 1 And Bits 16..31 Mapped To E-UCCH Part 2)	
E-TFCI Value	0
Retransmission Sequence Number	0
HARQ Process ID	0

These settings are preconfigured and disabled, if a HSUPA coding type is enabled for the corresponding channel.

Number of E-UCCH Channels

Sets the number of the E-DCH Uplink Control Channels (E-UCCH).

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:EUCCh:CCount on page 135
```

Number of Phy. Chan. Bits per E-UCCH

Displays the number of physical channel bits per one E-UCCH.

The value is fixed to 32.

Remote command:

n.a.

E-TFCI Value

Enters the value of the TFCI field.

If a HSUPA is enabled for the corresponding channel, the E-TFCI value is set of the value configured for the parameter [Transport Block Size Index](#).

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:EUCc:TFCI on page 136
```

Retransmission Sequence Number (E-UCCH)

Sets the retransmission sequence number.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:EUCc:RSNumber on page 135
```

HARQ Process ID

Sets the HARQ process ID.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:EUCc:HPID on page 135
```

4.12.5 TPC Settings

The "TPC Settings" section is where the TPC field is set.

Number of Sync Shift & TPC Bits

Selects the length of the sync shift and the length of the TPC field expressed in bits. The available values depend on the slot format.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:SYNC:LENGth on page 137
```

TPC Source

Selects the data source for the TPC field of the DPCCH.

If "Pattern" is selected, an entry field appears for the bit pattern. The maximum bit pattern length is 64 bits.

If "Data List" is selected, a button appears for calling the "File Select" window.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC:DATA on page 139

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC:DATA:PATtern on page 140

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC:DATA:DSElect on page 139

Read Out Mode

Selects TPC data usage.

With TD-SCDMA, the TPC bits are used to signal the increase or reduction in transmit power to the called station. With all read out modes, one bit is taken from the data stream for the TPC field for each slot and entered into the bit stream several times (depending on the symbol rate). The difference between the modes lies in the usage of the TPC bits.

These different modes can be used, for example, to deliberately set a base station to a specific output power (e.g. with the pattern 11111) and then let it oscillate around this power (with Single + alt. 01 and Single + alt. 10). This then allows power measurements to be carried out at the base station (at a quasi-constant power).

"Continuous" The TPC bits are used cyclically.

"Single + All 0" The TPC bits are used once, and then the TPC sequence is continued with 0 bits.

"Single + All 1" The TPC bits are used once, and then the TPC sequence is continued with 1 bits.

"Single + alt. 01" The TPC bits are used once, and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

"Single + alt. 10" The TPC bits are used once, and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC:READ on page 140

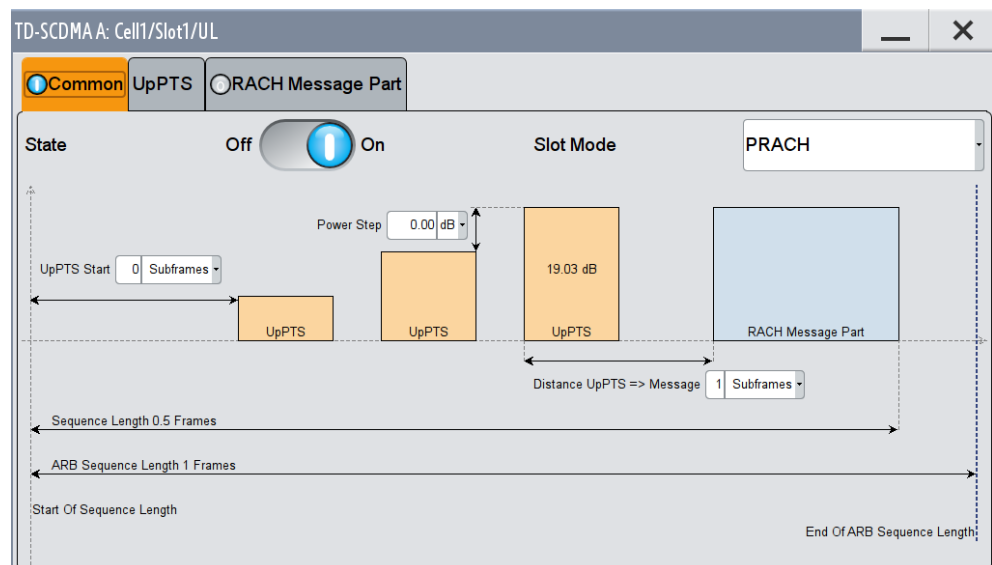
4.13 Slot Mode PRACH Settings

1. To access this dialog select "TD-SCDMA > General > Transmission Direction > Uplink /Reverse"

2. Select "Cells> Select Cells > Cell1...Cell4".
3. Select "Slots > Slot0...Slot6> Common".
4. Select "Slot Mode > PRACH"

4.13.1 Common Settings

- To access this dialog select "Slot Mode > PRACH > Common"



This dialog comprises the common PRACH settings.

Provided are the following settings:

Power Step

Enters the power by which the UpPTS is increased from repetition to repetition. The power set under Power is the "target power", used during the last repetition of the preamble.

Example:

UpPTS Power = 0 dB

UpPTS Repetition = 3

Power Step = 3

Generated power sequence:

Preamble 1 -6 dB	→ + 3 dB	Preamble 2 -3 dB	→ + 3 dB	Preamble 3 0 dB
---------------------	----------	---------------------	----------	--------------------

Remote command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PSTep
on page 151
```

UpPTS Start

Enters the number of the subframe in which the first UpPTS should be transmitted. The value range is 0 to 10.

Remote command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:START
on page 151
```

Distance UpPTS

Enters the value to vary the timing between UpPTS and RACH.

Remote command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:DISTance
on page 149
```

Sequence Length

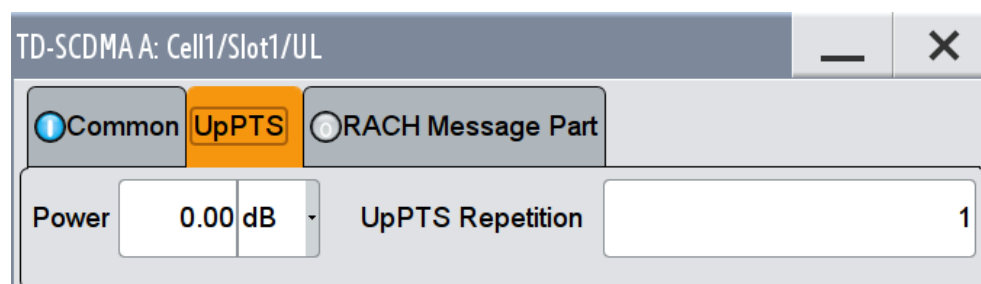
Displays the value of the sequence length.

Remote command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:SENGth?
on page 152
```

4.13.2 UpPTS Settings

- To access this dialog select "Slot Mode > PRACH > UpPTS"



This dialog comprises the UpPTS settings.

Provided are the following settings:

Power

Enters the power of the UpPTS.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:POWer`
on page 150

`[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:`
`PCORrection?` on page 150

UpPTS Repetition

Enters the number of UpPTS repetitions before a PRACH burst happens.

Remote command:

`[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:`
`REPetition` on page 151

4.13.3 RACH Message Part Settings

- To access this dialog select "Slot Mode > PRACH > RACH Message Part"

The screenshot shows a software interface for configuring TD-SCDMA settings. The title bar reads "TD-SCDMA A: Cell1/Slot1/UL". There are three tabs: "Common", "UpPTS", and "RACH Message Part", with the last one being selected and highlighted in orange. The "RACH Message Part" tab contains several settings:

- State:** A toggle switch set to "Off".
- Message Length:** A dropdown menu showing "1 Subframe (5 ms)".
- Slot Format:** A numeric input field set to "0".
- Power:** A numeric input field set to "0.00 dB".
- Spreading Factor:** A dropdown menu showing "16".
- Spreading Code:** A numeric input field set to "1".
- Data Source:** A dropdown menu showing "PN 9".
- Current User:** A numeric input field set to "1".
- Midamble Shift:** A numeric input field set to "120".

This dialog comprises the RACH (random access channel) message part settings.

Provided are the following settings:

State (RACH Message Part)

Activates or deactivates the RACH (random access channel) message part.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:STATE
```

on page 149

Message Length

Selects the message length of the random access channel expressed in subframes.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:LENGTH
```

on page 146

Slot Format (PRACH)

Displays the slot format of the PRACH. The slot format depends on the selected spreading factor.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFORMAT?
```

on page 148

Power (RACH Message Part)

Enters the power of the PRACH message part.

The value range is -80 dB to 0 dB.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:POWER
```

on page 147

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:
```

PCORrection on page 147

Spreading Factor (PRACH)

Selects the spreading factor for the PRACH.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFACTOR
```

on page 148

Spreading Code (PRACH)

Enters the spreading code for the PRACH. The code channel is spread with the set spreading code. The range of values of the spreading code depends on the channel type and the spreading factor.

Remote command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SCODE
```

on page 148

Data Source (PRACH)

Selects data source for the PRACH.

The data sources "PN9", "PN11", "PN15", "PN16", "PN20", "PN21", "PN23", "ALL0", "ALL1", "Pattern" and "Data List" are available to choose from.

If the "Pattern" data type is used, the bit pattern can be entered in a bit editor via the "Data Pattern 0" button. The length is limited to 64 bits.

If the "Data List" data type is used, the list can be selected from a file window via the "Select Data List..." button.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA
on page 145

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:
DSElect on page 146

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:
PATtern on page 146

Current User (PRACH)

Enters the number of current user.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:USER
on page 149

Midamble Shift (PRACH)

Displays the value for the midamble shift.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:MSHift?
on page 147

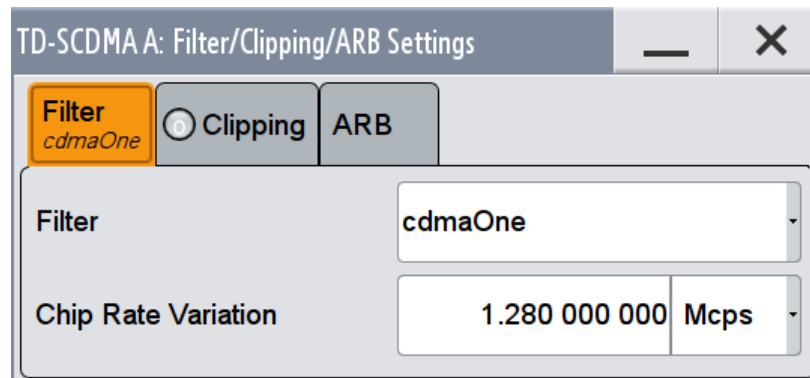
4.14 Filter / Clipping / ARB Settings

- To access this dialog, select "TD-SCDMA > General > Filter/Clipping/ARB Settings".

The dialog comprises the settings, necessary to configure the baseband filter, to enable clipping and adjust the sequence length of the arbitrary waveform component

4.14.1 Filter Settings

- To access this dialog, select "Filter".



This dialog comprises the settings required for configuring the baseband filter.

Provided are the following settings :

Filter

Selects the baseband filter.

Remote command:

[\[:SOURCE<hw>\]:BB:TDSCdma:FILTer:TYPE](#) on page 95

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:TDSCdma:FILTer:PARAMeter:APCO25](#) on page 96

[\[:SOURCE<hw>\]:BB:TDSCdma:FILTer:PARAMeter:COSine](#) on page 96

[\[:SOURCE<hw>\]:BB:TDSCdma:FILTer:PARAMeter:GAUSS](#) on page 96

[\[:SOURCE<hw>\]:BB:TDSCdma:FILTer:PARAMeter:PGAuss](#) on page 97

[\[:SOURCE<hw>\]:BB:TDSCdma:FILTer:PARAMeter:RCOSine](#) on page 98

[\[:SOURCE<hw>\]:BB:TDSCdma:FILTer:PARAMeter:SPHase](#) on page 98

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:TDSCdma:FILTer:PARAMeter:LPASs](#) on page 97

[\[:SOURCE<hw>\]:BB:TDSCdma:FILTer:PARAMeter:LPASSEVM](#) on page 97

Chip Rate Variation

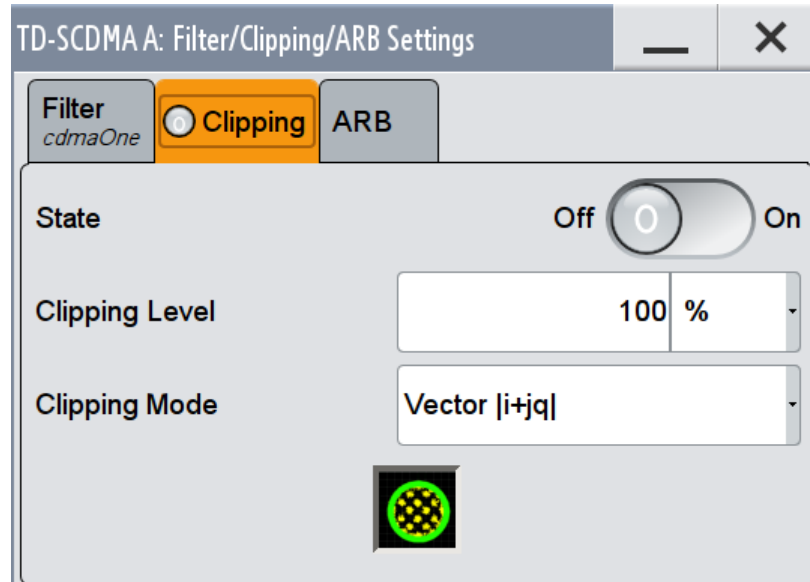
Enters the chip rate.

Remote command:

[\[:SOURCE<hw>\]:BB:TDSCdma:CRATe:VARiation](#) on page 88

4.14.2 Clipping Settings

- To access this dialog, select "Clipping".



This dialog comprises the settings required for configuring the clipping.

Provided are the following settings:

Clipping State

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.

Remote command:

[\[:SOURCE<hw>\]:BB:TDSCdma:CLIPping:STATe](#) on page 95

Clipping Level

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:TDSCdma:CLIPping:LEVel](#) on page 94

Clipping Mode

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 $|i + jq|$. The I and Q components are mapped together, the angle is retained.
- "Scalar $|i| + |q|$ "

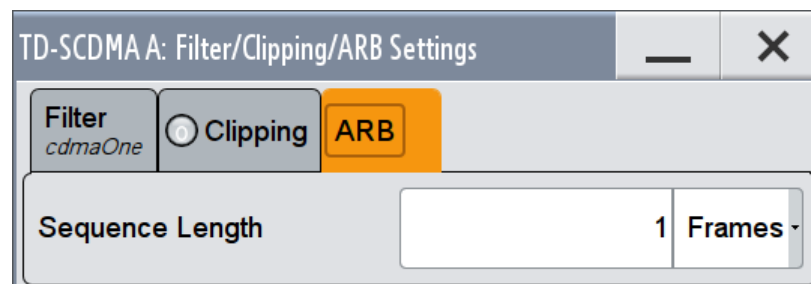
The limit is related to the absolute maximum of all the I and Q values $|i| + |q|$. The I and Q components are mapped separately, the angle changes.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:CLIPping:MODE` on page 95

4.14.3 ARB Settings

- To access this dialog, select "ARB".



This dialog comprises the settings required for configuring the ARB.

Provided are the following settings:

Sequence Length ARB

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

The maximum sequence length depends on the installed ARB memory size and the current chip rate.

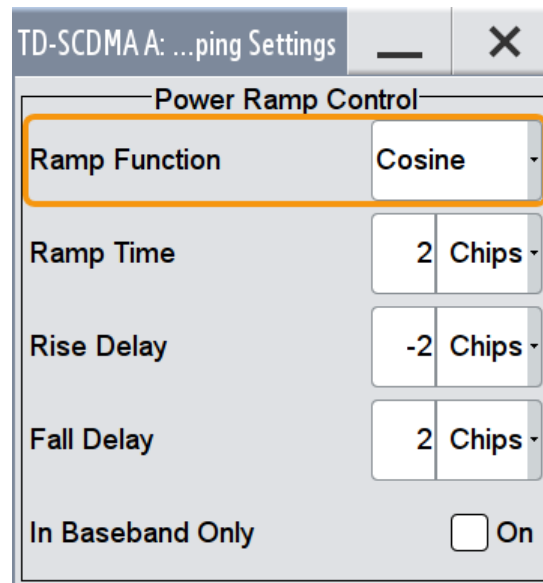
In pure amplifier tests with several channels and no real time channels, it is possible to improve the statistical properties of the signal by increasing the sequence length.

Remote command:

`[ :SOURCE<hw> ] :BB:TDSCdma:SLENgth` on page 98

4.15 Power Ramping

- To access this dialog select "TD-SCDMA > General > Power Ramping"



This dialog comprises the settings required for power ramping

Ramp Function

Selects the form of the transmitted power, i.e. the shape of the rising and falling edges during power ramp control.

"Linear" The transmitted power rises and falls linear fashion.

"Cosine" The transmitted power rises and falls with a cosine-shaped edge. This gives rise to a more favorable spectrum than the Linear setting.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:PRAMP:SHAPE on page 90

Ramp Time

Sets the power ramping rise time and fall time for a burst.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:PRAMP:TIME on page 91

Rise Delay

Sets the offset in the rising edge of the envelope at the start of a burst. A positive value gives rise to a delay and a negative value causes an advance.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:PRAMP:RDElay on page 90

Fall Delay

Sets the offset in the falling edge of the envelope at the end of a burst. A positive value gives a rise to a delay and a negative value causes an advance.

Remote command:

[:SOURCE<hw>] :BB:TDSCdma:PRAMP:FDElay on page 90

In Baseband Only

Activates or deactivates power ramping for the baseband signals.

Remote command:

[:SOURce<hw>] :BB:TDSCdma:PRAMP:BBONLY on page 90

5 Remote-Control Commands

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

The commands in the `SOURce:BB:TDSCdma` subsystem are described in three sections, separated into general remote commands, commands for cell settings and commands for slot settings

Common Suffixes

The following common suffixes are used in remote commands:

Suffix	Value range	Description
<code>SOURce<hw></code>	[1] .. 4	available baseband signals
<code>OUTPut<ch></code>	[1] .. 3	available markers



Basic tasks that are also performed in the base unit in the same way are not described here.

For a description of such tasks, see the R&S SMW User Manual.

In particular, this includes:

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

The following commands specific to the TD-SCDMA are described here:

5.1 General Commands

<code>[SOURce<hw>]:BB:TDSCdma:COPY:DESTination</code>	87
<code>[SOURce<hw>]:BB:TDSCdma:COPY:EXECute</code>	87
<code>[SOURce<hw>]:BB:TDSCdma:COPY:SOURce</code>	88
<code>[SOURce<hw>]:BB:TDSCdma:CRATe?</code>	88
<code>[SOURce<hw>]:BB:TDSCdma:CRATe:VARiation</code>	88
<code>[SOURce<hw>]:BB:TDSCdma:LINK</code>	89
<code>[SOURce<hw>]:BB:TDSCdma:POWer:ADJust</code>	89
<code>[SOURce<hw>]:BB:TDSCdma:POWer[TOTAL]?</code>	89

[SOURce<hw>]:BB:TDSCdma:PRAMp:BBONly.....	90
[SOURce<hw>]:BB:TDSCdma:PRAMp:FDElay.....	90
[SOURce<hw>]:BB:TDSCdma:PRAMp:RDElay.....	90
[SOURce<hw>]:BB:TDSCdma:PRAMp:SHApe.....	90
[SOURce<hw>]:BB:TDSCdma:PRAMp:TIME.....	91
[SOURce<hw>]:BB:TDSCdma:PRESet.....	91
[SOURce<hw>]:BB:TDSCdma:RESet.....	91
[SOURce<hw>]:BB:TDSCdma:SETTing:CATalog?.....	92
[SOURce<hw>]:BB:TDSCdma:SETTing:LOAD.....	92
[SOURce<hw>]:BB:TDSCdma:SETTing:STORE.....	92
[SOURce<hw>]:BB:TDSCdma:SETTing:TMODeI.....	93
[SOURce<hw>]:BB:TDSCdma:SETTing:TMODeI:CATalog?.....	93
[SOURce<hw>]:BB:TDSCdma:STATe.....	93
[SOURce<hw>]:BB:TDSCdma:VERSion?.....	93
[SOURce<hw>]:BB:TDSCdma:WAVEform:CREate.....	94

[SOURce<hw>]:BB:TDSCdma:COPY:DESTination <Destination>

The command selects the cell whose settings are to be overwritten.

Parameters:

<Destination> 1 | 2 | 3 | 4
 Range: 1 to 4
 *RST: 2 (Cell2)

Example:

```
BB:TDSC:LINK DOWN
selects the downlink/forward transmit direction (base station to
mobile station).
BB:TDSC:COPY:SOUR 1
selects cell 1 as the source.
BB:TDSC:COPY:DEST 4
selects cell 4 as the destination.
BB:TDSC:COPY:EXEC
starts copying the parameter set of cell 1 to cell 4.
```

Manual operation: See ["Copy Cell..."](#) on page 29

[SOURce<hw>]:BB:TDSCdma:COPY:EXECute

The command starts the copy process. The dataset of the selected source cell is copied to the destination cell.

Example:

```
BB:TDSC:COPY:EXEC
starts copying the parameter set of the selected source cell to the
selected destination cell.
```

Usage: Event

Manual operation: See ["Copy Cell..."](#) on page 29

[:SOURce<hw>]:BB:TDSCdma:COPY:SOURce <Source>

The command selects the cell whose settings are to be copied.

Parameters:

<Source> 1 | 2 | 3 | 4
 Range: 1 to 4
 *RST: 1 (Cell1)

Example:

BB:TDSC:LINK UP
 selects the uplink transmit direction (mobile station to base station).
 BB:TDSC:COPY:SOUR 1
 selects cell 1 as the source.
 BB:TDSC:COPY:DEST 4
 selects cell 4 as the destination.
 BB:TDSC:COPY:EXEC
 starts copying the parameter set of cell 1 to cell 4.

Manual operation: See ["Copy Cell..."](#) on page 29

[:SOURce<hw>]:BB:TDSCdma:CRATe?

The command queries the system chip rate. The output chip rate which determines the rate of the spread symbols as is used for signal output can be set with the command SOUR:BB:TDSC:CRAT:VAR.

Return values:

<CRate> R1M28
 *RST: R1M28

Example:

BB:TDSC:CRAT?
 queries the system chip rate.
 Response: R1M2
 the system chip rate is 1.2288 Mcps.

Usage: Query only

Manual operation: See ["Chip Rate"](#) on page 18

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

The command 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: 1 cps
 *RST: 1.28 Mcps
 Default unit: Hz (c/s)

Example:

BB:TDSC:CRAT:VAR 4086001
 sets the chip rate to 4.08 Mcps.

Manual operation: See ["Chip Rate Variation"](#) on page 81

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

The command defines the transmission direction. The signal either corresponds to that of a base station (FORWard | DOWN) or that of a mobile station (REVerse | UP).

Parameters:

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

Example:

BB:TDSC:LINK DOWN
 the transmission direction selected is base station to mobile station. The signal corresponds to that of a base station.

Manual operation: See ["Link Direction"](#) on page 18

[SOURce<hw>]:BB:TDSCdma:POWER:ADJust

The command sets the power of the active channels in such a way that the total power of the active channels is 0 dB. This will not change the power ratio among the individual channels.

Example:

BB:TDSC:POW:ADJ
 the total power of the active channels is set to 0 dB, the power ratio among the individual channels is unchanged.

Usage:

Event

Manual operation: See ["Adjust Total Power to 0dB"](#) on page 30

[SOURce<hw>]:BB:TDSCdma:POWER[:TOTal]?

The command queries the total power of the active channels. After "Power Adjust", this power corresponds to 0 dB.

Return values:

<Total> float

Example:

BB:TDSC:POW:TOT?
 queries the total power of the active channels.
 Response: -22.5
 the total power is -22.5 dB.

Usage: Query only

Manual operation: See ["Total Power"](#) on page 30

[:SOURce<hw>]:BB:TDSCdma:PRAMP:BBONLY <BbOnly>

The command activates or deactivates power ramping for the baseband signals.

Parameters:

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

Example: BB:TDSC:PRAMP:BBON ON
activates power ramping for the baseband signals.

Manual operation: See ["In Baseband Only"](#) on page 85

[:SOURce<hw>]:BB:TDSCdma:PRAMP:FDElay <FDElay>

The command sets the offset in the falling edge of the envelope at the end of a burst. A positive value gives a rise to a delay and a negative value causes an advance.

Parameters:

<FDElay> integer
Range: -4 to 4
*RST: 2

Example: BB:TDSC:PRAMP:FDEL 8.0
sets the offset in the falling edge of the envelope to 8.0 chips.

Manual operation: See ["Fall Delay"](#) on page 84

[:SOURce<hw>]:BB:TDSCdma:PRAMP:RDElay <RDElay>

The command sets the offset in the falling edge of the envelope at the end of a burst. A positive value gives a rise to a delay and a negative value causes an advance.

Parameters:

<RDElay> integer
Range: -4 to 4
*RST: -2

Example: BB:TDSC:PRAMP:RDEL 8.0
sets the offset in the rising edge of the envelope to 8.0 chips.

Manual operation: See ["Rise Delay"](#) on page 84

[:SOURce<hw>]:BB:TDSCdma:PRAMP:SHAPE <Shape>

The command selects the form of the transmitted power, i.e. the shape of the rising and falling edges during power ramp control.

Parameters:

<Shape> LINear | COSine
 *RST: COSine

Example:

BB:TDSC:PRAM:SHAP LIN
 sets linear shape for the rising and falling edges during power ramp control.

Manual operation: See ["Ramp Function"](#) on page 84

[:SOURce<hw>]:BB:TDSCdma:PRAMP:TIME <Time>

The command sets the power ramping rise time and fall time for a burst.

Parameters:

<Time> integer
 Range: 0 to 4
 *RST: 2

Example:

BB:TDSC:PRAM:TIME 2.0
 sets the power ramping rise time and fall time for a burst to 2 chips.

Manual operation: See ["Ramp Time"](#) on page 84

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

The command produces a standardized default for the TD-SCDMA standard. The settings correspond to the *RST values specified for the commands.

An overview is provided by table in [Set to Default](#).

Example:

BB:TDSC:PRES
 resets all the TD-SCDMA settings to default values.

Usage:

Event

Manual operation: See ["Set to Default"](#) on page 17

[:SOURce<hw>]:BB:TDSCdma:RESet

The command resets all cells to the predefined settings. The reset applies to the selected link direction.

An overview is provided by table in [Set to Default](#).

Example:

BB:TDSC:RES
 resets all the cells to the predefined settings.

Usage:

Event

Manual operation: See ["Reset All Cells"](#) on page 28

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

This command reads out the files with TD-SCDMA settings in the default directory. The default directory is set using command `MMEM:CDIRectory`. Only files with the file extension `*.tdscdma` will be listed.

Return values:

<Catalog> string

Example:

```
MMEM:CDIR "/var/user/temp/tdscdma"
sets the default directory to /var/user/temp/tdscdma.
BB:TDSC:SETT:CAT?
reads out all the files with TD-SCDMA settings in the default directory.
Response: "'TDSCDMA_UP','TDSCDMA_DN'"
the files "TDSCDMA_UP" and "TDSCDMA_DN" are available.
```

Usage: Query only

Manual operation: See ["Save/Recall"](#) on page 18

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

This command loads the selected file with TD-SCDMA settings. The directory is set using command `MMEM:CDIRectory`. A path can also be specified, in which case the files in the specified directory are read. The file extension may be omitted. Only files with the file extension `*.tdscdma` will be loaded.

Setting parameters:

<Filename> string

Example:

```
BB:TDSC:SETT:LOAD 'tdscdma_1'
loads file tdscdma_1.
```

Usage: Setting only

Manual operation: See ["Save/Recall"](#) on page 18

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

This command stores the current TD-SCDMA settings into the selected file. The directory is set using command `MMEM:CDIRectory`. A path can also be specified, in which case the files in the specified directory are read. Only the file name has to be entered. TD-SCDMA settings are stored as files with the specific file extensions `*.tdscdma`.

Setting parameters:

<Filename> string

Example:

```
BB:TDSC:SETT:STOR 'tdscdma_1'
stores the current TD-SCDMA settings into file tdscdma_1.
```

Usage: Setting only

Manual operation: See ["Save/Recall"](#) on page 18

[[:SOURce<hw>]:BB:TDSCdma:SETting:TMODe] <TModel>

This command selects the file with the test models defined in the TD-SCDMA standard or a self-defined test setup.

Setting parameters:

<TModel> string

Example: BB:TDSC:SETT:TMOD 'Test_Mode_ACLR'
calls the specified test model.

Usage: Setting only

Manual operation: See ["Test Setups/Models"](#) on page 30

[[:SOURce<hw>]:BB:TDSCdma:SETting:TMODe:CATalog?]

This command queries the file with the test models defined in the TD-SCDMA standard or a self-defined test setup.

Return values:

<Catalog> string

Example: MMEM:CDIR "/var/user/temp/tdscdma"
sets the default directory to /var/user/temp/tdscdma.
BB:TDSC:SETT:CAT?
reads out all the files with the test models.
Response: "'TDSCDMA_TM1','TDSCDMA_TM2'"
the files TDSCDMA_TM1 and TDSCDMA_TM2 are available.

Usage: Query only

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

The command activates modulation in accordance with the TD-SCDMA standard. Activating this standard deactivates all the other digital standards and digital modulation modes (in case of two-path instruments, this affects the same path).

BB:TDSC:STAT ON deactivates the other standards and digital modulation.

Parameters:

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

Example: BB:TDSC:STAT ON
activates modulation in accordance with the TD-SCDMA standard.

Manual operation: See ["State"](#) on page 17

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

The command queries the version of the TD-SCDMA standard underlying the definitions.

Return values:

<Version> string

Example:

BB:TDSC:VERS?
 queries the TD-SCDMA version.
 Response: Release C
 TD-SCDMA Release 6.

Usage:

Query only

Manual operation: See ["TD-SCDMA Version"](#) on page 18**[[:SOURce<hw>]:BB:TDSCdma:WAVEform:CREate <Filename>**

This command creates a waveform using the current settings of the "TD-SCDMA" dialog. The file name is entered with the command. 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:

MMEM:CDIR "/var/user/temp/waveform"
 BB:TDSC:WAV:CRE "tdscdma_1"
 creates the waveform file tdscdma.wv in the default directory.

Usage:

Setting only

Manual operation: See ["Generate Waveform File"](#) on page 18

5.2 Filter/Clipping/ARB Settings

[:SOURce<hw>]:BB:TDSCdma:CLIPping:LEVel	94
[:SOURce<hw>]:BB:TDSCdma:CLIPping:MODE	95
[:SOURce<hw>]:BB:TDSCdma:CLIPping:STATE	95
[:SOURce<hw>]:BB:TDSCdma:FILTer:TYPE	95
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:APCO25	96
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:COSine	96
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:GAUSS	96
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASs	97
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASSEVM	97
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:PGAuss	97
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:RCOSine	98
[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:SPHase	98
[:SOURce<hw>]:BB:TDSCdma:SLENgth	98

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

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.

Parameters:

<Level> integer
 Range: 1 to 100
 Increment: 1
 *RST: 100
 Default unit: PCT

Example:

BB:TDSC:CLIP:LEV 80
 sets the limit for level clipping to 80% of the maximum level.
 BB:TDSC:CLIP:STAT ON
 activates level clipping.

Manual operation: See ["Clipping Level"](#) on page 82

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

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:TDSC:CLIP:MODE VECT
 sets the amplitude as reference level.

Manual operation: See ["Clipping Mode"](#) on page 82

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

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

Parameters:

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

Example:

BB:TDSC:CLIP:STAT ON
 activates level clipping

Manual operation: See ["Clipping State"](#) on page 82

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

The command selects the filter type.

Parameters:

<Type> RCOSine | COSine | GAUSSs | LGAuss | CONE | COF705 |
 COEQUALizer | COFEQUALizer | C2K3x | APCO25 | SPHase |
 RECTangle | PGAuss | LPASs | DIRac | ENPSHape | EWPSHape |
 LPASSEVM
 *RST: RCOSine

Example:

BB:TDSC:FILT:TYPE RCOS
 sets the filter type RCOSine.

Manual operation: See ["Filter"](#) on page 81

[[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:APCO25 <Apco25>

The command 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:TDSC: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 81

[[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:COSine <Cosine>

The command sets the roll-off factor for the Cosine filter type.

Parameters:

<Cosine> float
 Range: 0.00 to 1.0
 Increment: 0.01
 *RST: 0.35

Example:

BB:TDSC: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 81

[[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:GAUSSs <Gauss>

The command sets the B x T for the Gauss filter type.

Parameters:

<Gauss> float
 Range: 0.15 to 2.5
 Increment: 0.01
 *RST: 0.5

Example: BB:TDSC: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 81

[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:LPASs <LPass>

The command sets the cut off frequency factor for the Lowpass (ACP Opt.) filter type.

Parameters:

<LPass> float
Range: 0.05 to 2
Increment: 0.01
*RST: 0.5

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

Manual operation: See ["Cut Off Frequency Factor"](#) on page 81

[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:LPASSEVM <LPassEvm>

The command sets the cut off frequency factor for the Lowpass (EVM Opt.) filter type.

Parameters:

<LPassEvm> float
Range: 0.05 to 2
Increment: 0.01
*RST: 0.5

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

Manual operation: See ["Cut Off Frequency Factor"](#) on page 81

[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:PGAuss <PGauss>

The command sets the B x T for the Pure Gauss filter type.

Parameters:

<PGauss> float
Range: 0.15 to 2.5
Increment: 0.01
*RST: 0.5

Example: BB:TDSC: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 81

[[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:RCOSine <RCosine>

The command sets the roll-off factor for the Root Cosine filter type.

Parameters:

<RCosine> float
 Range: 0 to 1
 Increment: 0.01
 *RST: 0.22

Example: BB:TDSC: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 81

[[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:SPHase <SPHase>

The command sets the 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:TDSC: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 81

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

The command sets the sequence length of the arbitrary waveform component of the TD-SCDMA signal in the number of frames. This component is calculated in advance and output in the arbitrary waveform generator. It is added to the realtime signal components.

Parameters:

<SLength> integer
 Range: 1 frame to 5000 frames
 *RST: 1 frame

Example: BB:TDSC:SLEN 10
 sets the sequence length to 10 frames.

Manual operation: See ["Sequence Length ARB"](#) on page 83

5.3 Trigger Settings

This section lists the remote control commands, necessary to configure the trigger.

[:SOURce<hw>]:BB:TDSCdma:TRIGger:ARM:EXECute	99
[:SOURce<hw>]:BB:TDSCdma:TRIGger:EXECute	99
[:SOURce<hw>]:BB:TDSCdma:TRIGger:EXTErnal:SYNChronize:OUTPut	99
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:DELay	100
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:INHibit	100
[:SOURce<hw>]:BB:TDSCdma:TRIGger:RMODE?	101
[:SOURce<hw>]:BB:TDSCdma:TRIGger:SLENgth	101
[:SOURce<hw>]:BB:TDSCdma:TRIGger:SLUNit	102
[:SOURce<hw>]:BB:TDSCdma:TRIGger:SOURce	102
[:SOURce<hw>]:BB:TDSCdma:TRIGger[:EXTErnal]:DELay	103
[:SOURce<hw>]:BB:TDSCdma:TRIGger[:EXTErnal]:INHibit	104
[:SOURce<hw>]:BB:TDSCdma[:TRIGger]:SEQUence	104

`[:SOURce<hw>]:BB:TDSCdma:TRIGger:ARM:EXECute`

Stops signal generation for trigger modes "Armed Auto" and "Armed Retrigger". A subsequent internal or external trigger event restarts signal generation.

Example: `BB:TDSC:TRIG:ARM:EXEC`
stops signal generation for trigger modes "Armed Auto" and "Armed Retrigger".

Usage: Event

Manual operation: See ["Arm"](#) on page 21

`[:SOURce<hw>]:BB:TDSCdma:TRIGger:EXECute`

The command executes a trigger. The internal trigger source must be selected using the command `SOUR:BB:TDSC:TRIG:SOUR INT` and a trigger mode other than "AUTO" must be selected using the command `SOUR:BB:TDSC:TRIG:SEQ`.

Example: `BB:TDSC:TRIG:SOUR INT`
sets internal triggering.
`BB:TDSC:TRIG:SEQ RETR`
sets Retrigger mode, i.e. every trigger event causes signal generation to restart.
`BB:TDSC:TRIG:EXEC`
executes a trigger.

Usage: Event

Manual operation: See ["Execute Trigger"](#) on page 21

`[:SOURce<hw>]:BB:TDSCdma:TRIGger:EXTErnal:SYNChronize:OUTPut <Output>`

(enabled for "Trigger Source" External)

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

See also ["Sync. Output to External Trigger"](#) on page 22 for a detailed description of the applications of this setting.

Parameters:

<Output>

0 | 1 | OFF | ON

ON

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 outputted. 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 outputted. This mode is recommended for triggering of short signal sequences with signal duration comparable with the processing time of the instrument.

*RST: ON

Example:

BB:TDSC:TRIG:SOUR EXT

sets external triggering.

BB:TDSC:TRIG:EXT:SYNC:OUTP ON

enables synchronous output to external trigger

Manual operation: See ["Sync. Output to External Trigger"](#) on page 22**[[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:DELay <Delay>**

The command specifies the trigger delay (expressed as a number of chips) for triggering by the trigger signal from the second path.

Parameters:

<Delay>

float

Range: 0 chips to 65 535 chips

Increment: 0.01 chip

*RST: 0 chips

Example:

BB:TDSC:TRIG:SOUR OBAS

sets for path A the internal trigger executed by the trigger signal from the second path (path B).

BB:TDSC:TRIG:OBAS:DEL 50

sets a delay of 50 symbols for the trigger.

Manual operation: See ["External Trigger Delay"](#) on page 23**[[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:INHibit <Inhibit>**

The command 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 chips to $(2^{26}-1)$ chips
 Increment: 1 chip
 *RST: 0 chips

Example:

BB:TDSC:TRIG:SOUR OBAS
 sets for path A the internal trigger executed by the trigger signal from the second path (path B).
 BB:TDSC:TRIG:INH 200
 sets a restart inhibit for 200 chips following a trigger event.

Manual operation: See ["External Trigger Inhibit"](#) on page 23

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

The command queries the current status of signal generation for all trigger modes with TD-SCDMA modulation on.

Return values:

<RMode> RUN | STOP
RUN
 the signal is generated. A trigger event occurred in the triggered mode.
STOP
 the signal is not generated. A trigger event did not occur in the triggered modes, or signal generation was stopped by the command :BB:TDSC:TRIG:ARM:EXECute (armed trigger modes only).

Example:

BB:TDSC:TRIG:MODE ARET
 selects the Armed_Retrigger mode.
 BB:TDSC:TRIG:RMOD?
 queries the current status of signal generation.
 Response: RUN
 the signal is generated, an external trigger was executed.

Usage: Query only

Manual operation: See ["Running/Stopped"](#) on page 21

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

The command defines the length of the signal sequence to be output in the "Single" trigger mode (SOUR:BB:TDSC:SEQ SING). The unit is defined with command SOUR:BB:TDSC:TRIG:SLUNit. It is then possible to output deliberately just part of the frame, an exact sequence of the frame, or a defined number of repetitions of the frame.

Parameters:

<SLength> float
 Range: 1 to $2^{32}-1$ chips
 *RST: 1 Chip Sequence Length (CSL)

Example:

BB:TDSC:SEQ SING
 sets trigger mode Single.
 BB:TDSC:TRIG:SLUN CHIP
 sets unit chips for the entry of sequence length.
 BB:TDSC:TRIG:SLEN 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 ["Trigger Signal Duration"](#) on page 21

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:SLUNit <SIUnit>

The command defines the unit for the entry of the length of the signal sequence (SOUR:BB:TDSC:TRIG:SLEN) to be output in the "Single" trigger mode (SOUR:BB:TDSC:SEQ SING).

Parameters:

<SIUnit> FRAME | CHIP | SEQUENCE
 *RST: SEQUENCE

Example:

BB:TDSC:SEQ SING
 sets trigger mode Single.
 BB:TDSC:TRIG:SLUN FRAM
 sets unit frames for the entry of sequence length.
 BB:TDSC:TRIG:SLEN 2
 sets a sequence length of 2 frames. The current frame will be output twice after the next trigger event.

Manual operation: See ["Signal Duration Unit"](#) on page 20

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

Selects the trigger signal source and determines the way the triggering is executed. Provided are internal triggering by means of a command, external trigger signal via one of the provided local or global connectors and triggering by a signal from the other paths.

Parameters:

<Source>

INTB | INTernal | OBASeband | EGT1 | EGT2 | EGC1 | EGC2 |
ELTRigger | INTA | ELClock | BEXternal | EXternal**INTernal**

Internal

INTA | INTB

Internal trigger from the other baseband

EGT1 | EGT2

External global trigger

EGC1 | EGC2

External global clock

ELTRigger

External local trigger

ELClock

External local clock

OBASeband|BEXternal|EXternal

Provided only for backward compatibility with other R&S signal generators.

The R&S SMW accepts these values und maps them automatically as follow:

EXTernal = EGT1, BEXternal = EGT2, OBASeband = INTA or INTB (depending on the current baseband)

*RST: INTernal

Example:BB:TDSC:TRIG:SOUR INT
selects an internal trigger source.**Manual operation:** See ["Trigger Source"](#) on page 21**[:SOURce<hw>]:BB:TDSCdma:TRIGger[:EXTernal]:DELay <Delay>**

Specifies the trigger delay (expressed as a number of samples) for external triggering. The value affects all external trigger signals.

Parameters:

<Delay>

float

Range: 0 to 65535

Increment: 0.01

*RST: 0

Example:BB:TDSC:TRIG:SOUR EXT
selects an external trigger.
BB:TDSC:TRIG:EXT:DEL 50
sets a delay of 50 symbols for the trigger.**Manual operation:** See ["External Trigger Delay"](#) on page 23

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

Specifies the number of samples by which a restart is to be inhibited following an external trigger event.

Parameters:

<Inhibit> integer
 Range: 0 to 67108863
 *RST: 0

Example:

BB:TDSC:TRIG:SOUR EXT
 selects an external trigger.
 BB:TDSC:TRIG:EXT:INH 200
 sets a restart inhibit for 200 samples following a trigger event.

Manual operation: See ["External Trigger Inhibit"](#) on page 23

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

The command selects the trigger mode.

Parameters:

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

AUTO

The modulation signal is generated continuously.

RETRigger

The modulation signal is generated continuously. A trigger event (internal or external) causes a restart.

AAUTo

The modulation signal is generated only when a trigger event occurs. After the trigger event the signal is generated continuously, signal generation is stopped with command SOUR:BB:TDSC:TRIG:ARM:EXEC and started again when a trigger event occurs.

ARETrigger

The modulation signal is generated only when a trigger event occurs. The device automatically toggles to RETRIG mode. Every subsequent trigger event causes a restart. Signal generation is stopped with command SOUR:BB:TDSC:TRIG:ARM:EXEC and started again when a trigger event occurs.

SINGLE

The modulation signal is generated only when a trigger event occurs. After the trigger event, the signal is generated once to the set sequence length (SOUR:BB:TDSC:TRIG:SELEN). Every subsequent trigger event causes a restart.

*RST: AUTO

Example:

```
BB:TDSC:SEQ AAUT
```

sets the "Armed_auto" trigger mode; the device waits for the first trigger (e.g. with *TRG) and then generates the signal continuously.

Manual operation: See ["Trigger Mode"](#) on page 20

5.4 Marker Settings

This section lists the remote control commands, necessary to configure the markers.

OUTPut<ch>

The numeric suffix to OUTPut distinguishes between the available markers.

[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed	105
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay	105
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MAXimum?	106
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MINimum?	106
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:MODE	107
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:OFFTime	107
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:ONTime	107
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:PERiod	108

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed](#) <Fixed>

The command restricts the marker delay setting range to the current range. In this range the delay can be set without restarting the marker and signal. If a delay is entered in setting ON but is outside this range, the maximum possible delay is set and an error message is generated.

The numeric suffix in OUTPut has no significance for this command, since the setting always affects every marker.

Parameters:

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

Example:

```
BB:TDSC:TRIG:OUTP:DEL:FIX ON
```

restricts the marker signal delay setting range to the current range.

Manual operation: See ["Marker x Delay"](#) on page 25

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay](#) <Delay>

The command defines the delay between the signal on the marker outputs and the start of the signal, expressed in terms of chips. Command

[BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed](#) can be used to restrict the range of values to the dynamic range, i.e. the range within which a delay of the marker signals can be set without restarting the marker and signal.

Parameters:

<Delay> float
 Range: 0 chips to 2000 chips
 Increment: 0.001 chips
 *RST: 0 chips

Example: BB:TDSC:TRIG:OUTP2:DEL 1600
 sets a delay of 1600 chips for the corresponding marker signal.

Manual operation: See "[Marker x Delay](#)" on page 25

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

The command queries the maximum marker delay for setting :BB:TDSC:TRIG:OUTP:DEL:FIX ON.

Return values:

<Maximum> float

Example: BB:TDSC:TRIG:OUTP:DEL:FIX ON
 restricts the marker signal delay setting range to the dynamic range.
 BB:TDSC:TRIG:OUTP:DEL:MAX?
 queries the maximum of the dynamic range.
 Response: 20000
 the maximum for the marker delay setting is 20000 chips.

Usage: Query only

Manual operation: See "[Marker x Delay](#)" on page 25

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

The command queries the minimum marker delay for setting :BB:TDSCdma:TRIGger:OUTPut: DELay:FIXed ON.

Return values:

<Minimum> float

Example: BB:TDSC:TRIG:OUTP:DEL:FIX ON
 restricts the marker signal delay setting range to the dynamic range.
 BB:TDSC:TRIG:OUTP:DEL:MIN?
 queries the minimum of the dynamic range.
 Response: 0
 the minimum for the marker delay setting is 0 symbols.

Usage: Query only

Manual operation: See "[Marker x Delay](#)" on page 25

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

The command defines the signal for the selected marker output.

Parameters:

<Mode>

RFRame | SFNR | CSPeriod | RATio | USER | FACTIVE

RFRame

A marker signal is generated every 10 ms (traffic channel clock).

SFNR

A marker signal is generated at the start of every SFN period (every 4096 frames).

CSPeriod

A marker signal is generated at the start of each arbitrary waveform sequence (depending on the set sequence length). The marker signal is also generated if the signal contains no ARB.

RATio

A regular marker signal corresponding to the Time Off / Time On specifications in the commands

SOURce:BB:TDSCdma:TRIGger:OUTPut:OFFTime and
SOURce:BB:TDSCdma:TRIGger:OUTPut:ONTime is generated.

USER

A marker signal is generated at the beginning of every user-defined period. The period is defined with command

SOUR:BB:TDSC:TRIG:OUTP:PERiod.

*RST: RFRame

Example:

```
BB:TDSC:TRIG:OUTP2:MODE RFR
```

selects the traffic channel clock for the corresponding marker signal.

Manual operation: See "[Marker Mode](#)" on page 25

```
[ :SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:OFFTime <OffTime>
```

```
[ :SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:ONTime <OnTime>
```

The command sets the number of chips in a period (ON time + OFF time) during which the marker signal in setting SOURce:BB:TDSCdma:TRIGger:OUTPut:MODE RATio on the marker outputs is ON.

Parameters:

<OnTime>

integer

Range: 1 chips to $2^{24}-1$ chips

Increment: 1 chips

*RST: 1 chips

Example:

```
BB:TDSC:TRIG:OUTP2:ONT 2000
```

sets an ON time of 2000 chips for marker.

Manual operation: See "[Marker Mode](#)" on page 25

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

The command sets the repetition rate for the signal at the marker outputs, expressed in terms of chips. The setting is only valid for selection "USER"

in :BB:TDSC:TRIG:OUTP:MODE.

Parameters:

<Period> integer
 Range: 1 chips to (2³²-1) chips
 Increment: 1 chips
 *RST: 12800 chips

Example:

BB:TDSC:TRIG:OUTP2:MODE USER
 selects the user marker for the corresponding marker signal.
 BB:TDSC:TRIG:OUTP2:PER 1600
 sets a period of 1600 chips, i.e. the marker signal is repeated every 1600th chip.

Manual operation: See "[Marker Mode](#)" on page 25

5.5 Clock Settings

This section lists the remote control commands, necessary to configure the clock.

[:SOURce<hw>]:BB:TDSCdma:CLOCK:MODE	108
[:SOURce<hw>]:BB:TDSCdma:CLOCK:MULTiplier	108
[:SOURce<hw>]:BB:TDSCdma:CLOCK:SOURce	109

[[:SOURce<hw>]:BB:TDSCdma:CLOCK:MODE <Mode>

The command enters the type of externally supplied clock

(BB:TDSCdma:CLOCK:SOURce EXTeRnal). When MCHip is used, a multiple of the chip clock is supplied and the chip clock is derived internally from it. The multiplier is entered with the command :BB:TDSCdma:CLOCK:MULTiplier.

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:

BB:TDSC:CLOC:MODE MCH
 sets the type of externally supplied clock.

Manual operation: See "[Clock Mode](#)" on page 27

[[:SOURce<hw>]:BB:TDSCdma:CLOCK:MULTiplier <Multiplier>

The command specifies the multiplier for clock type "Multiplied"

(:BB:TDSCdma:CLOCK:MODE MCHip) in the case of an external clock source.

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
 Increment: 1
 *RST: 4

Example:

BB:TDSC:CLOC:SOUR EXT
 selects the external clock source.
 BB:TDSC:CLOC:MODE MCH
 selects clock type "Multiplied", i.e. the supplied clock has a rate which is a multiple of the chip rate.
 BB:TDSC:CLOC:MULT 12
 the multiplier for the external clock rate is 12.

Manual operation: See ["Clock Multiplier"](#) on page 27

[SOURce<hw>]:BB:TDSCdma:CLOCK:SOURce <Source>

Selects the clock source.

Parameters:

<Source> INTERNAL | EGC1 | EGC2 | ELCLock | EXTERNAL
INTERNAL
 The instrument uses its internal clock reference
EGC1|EGC2
 External global clock
ELCLock
 External local clock
 *RST: INTERNAL

Example:

BB:TDSC:CLOC:SOUR: INT
 selects an internal clock reference.

Manual operation: See ["Clock Source"](#) on page 27

5.6 Predefined Settings

The R&S Signal Generator gives you the opportunity to generate predefined test settings for cell 1: These predefined settings enable the creation of highly complex scenarios with just a few keystrokes. The settings take effect only after execution of command

BB:TDSCdma:PPARameter:EXECute.

[SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:COUNT.....110
 [SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:CRESt.....110
 [SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:SFACTOR.....110
 [SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:EXECute.....111
 [SOURce<hw>]:BB:TDSCdma:DOWN:PPARameter:PCCPch:STATe.....111

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:COUNT <Count>

This command sets the number of activated DPCHs. The minimum number is one and the maximum number depends on the spreading factor:

Max. No. DPCH = 3 x Spreading Factor

Parameters:

<Count> integer
 Range: 1 to 48
 *RST: 12

Example: BB:TDSC:DOWN:PPAR:DPCH:COUN 48
 selects if P-CCPCH is used in the scenario or not.

Manual operation: See ["Number of Dedicated Channels"](#) on page 31

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:CRESt <Crest>

This commands selects the desired range for the crest factor of the test scenario. The crest factor of the signal is kept in the desired range by automatically setting appropriate channelization codes and timing offsets. The setting takes effect only after execution of command :SOURce:BB:TDSC:DOWN | UP:PPARameter:EXEC.

Parameters:

<Crest> MINimum | AVERage | WORSt

MINimum

The crest factor is minimized. The channelization codes are distributed uniformly over the code domain. The timing offsets are increased by 3 per channel.

AVERage

An average crest factor is set. The channelization codes are distributed uniformly over the code domain. The timing offsets are all set to 0.

WORSt

The crest factor is set to an unfavorable value (i.e. maximum). The channelization codes are assigned in ascending order. The timing offsets are all set to 0.

*RST: MINimum

Example: BB:TDSC:DOWN:PPAR:DPCH:CRES WORS
 sets the crest factor to an unfavorable value.

Manual operation: See ["Crest Factor"](#) on page 32

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:SFACTOR <SFactor>

This command sets the the spreading factor for the DPCHs.

Max. No. DPCH = 3 x Spreading Factor

Parameters:

<SFactor> 1 | 2 | 4 | 8 | 16
 *RST: 16

Example:

BB:TDSC:DOWN | UP:PPAR:DPCH:SFAC 16
 sets the the spreading factor for the DPCH.

Manual operation: See ["Spreading Factor Dedicated Channels"](#) on page 31

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:EXECute

This command presets the channel table of cell 1 with the parameters defined by the PPARameter commands. Scrambling Code 0 is automatically selected.

Example:

BB:TDSC:DOWN:PPAR:EXEC
 configures the signal sequence as defined by
 the :BB:TDSC:PPARameter commands.

Usage:

Event

Manual operation: See ["Accept"](#) on page 32

[:SOURce<hw>]:BB:TDSCdma:DOWN:PPARameter:PCCPch:STATe <State>

This command defines, if P-CCPCH is used in the scenario or not. If P-CCPCH is used, both P-CCPCHs are activated in slot 0 with spreading code 0+1.

Parameters:

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

Example:

BB:TDSC:DOWN:PPAR:PCCP:STAT ON
 selects if P-CCPCH is used in the scenario or not.

Manual operation: See ["Use PCCPCH \(Downlink Slot 0, code 0+1\)"](#) on page 31

5.7 Cell Settings

CELL<st>

Value Range [1] | 2 | 3 | 4

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:MODE	112
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:MODE	112
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:POWer	112
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:POWer	112
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:STATe?	112
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:STATe?	112
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:MCODe?	113
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:PROTation	113
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SCODE	113

[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SCODE:STATE.....	114
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SDCode?.....	114
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SPOint.....	114
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:STATE.....	114
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SUCode.....	115
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:TDElay.....	115
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:USERS.....	115

[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:MODE

[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:MODE <Mode>

The command selects whether to use the pilot time slot and its power or not. In case of "Auto" and "On", the DwPTS/UpPTS is used. This is indicated in the "Select Slot in Sub-frame to Configure" graph.

Parameters:

<Mode> AUTO | ON | OFF
 *RST: AUTO

Example: BB:TDSC:DOWN:CELL1:DWPT:MODE ON
 the DwPTS is used.

Manual operation: See ["DwPTS Mode/ UpPTS Mode"](#) on page 34

[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:POWER

[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:POWER <Power>

Sets the power of the downlink/uplink pilot time slot.

Parameters:

<Power> float
 Range: -80 to 10
 Increment: 0.01
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:DWPT:POW -12.5
 sets the power of the downlink pilot slot.

Manual operation: See ["DwPTS Power/ UpPTS Power"](#) on page 34

[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:STATE?

[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:STATE?

The command queries the state of the downlink/uplink pilot time slot.

Return values:

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

Example: BB:TDSC:DOWN:CELL1:DWPT:STAT?
 queries the state of the downlink pilot slot.

Usage: Query only

Manual operation: See ["DwPTS Mode/ UpPTS Mode"](#) on page 34

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:MCODe?

The command queries the basic midamble code id. The value is set automatically by the change of the scrambling code parameter (it is equal to scrambling code).

Return values:

<MCode> integer
 Range: 0 to 127
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:SCOD 15
 queries the basic midamble code id.

Usage: Query only

Manual operation: See ["Basic Midamble Code ID"](#) on page 33

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:PROTation <PRotation>

The command selects the phase rotation for the downlink pilots.

Parameters:

<PRotation> AUTO | S1 | S2
AUTO
 Sets the default phase rotation sequence according to the presence of the P-CCPCH.
S1
 There is a P-CCPCH in the next four subframes.
S2
 There is no P-CCPCH in the next four subframes.
 *RST: AUTO

Example: BB:TDSC:DOWN:CELL1:PROT AUTO
 sets the phase rotation to AUTO.

Manual operation: See ["Phase Rotation"](#) on page 34

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SCODe <SCode>

The command sets the scrambling code. The scrambling code is used for transmitter-dependent scrambling of the chip sequence.

Parameters:

<SCode> integer
 Range: 0 to 127
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:SCOD 15
 sets the scrambling code for cell 1.

Manual operation: See ["Scrambling Code"](#) on page 33

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SCODE:STATE <State>

The command activates or deactivates the scrambling code. The scrambling code is deactivated, for example, for test purposes.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:SCOD:STAT ON
 activates the scrambling code for cell 1.

Manual operation: See ["Use \(Scrambling Code\)"](#) on page 33

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SDCode?

The command queries the SYNC-DL code. The SYNC-DL code is transmitted in the DwPTS to synchronize the mobile station to the base station. The SYNC-DL code is derived from the scrambling code and the basic midamble code ID.

Return values:

<SdCode> integer
 Range: 0 to 31
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:SDC?
 queries the SYNC-DL code.

Usage: Query only

Manual operation: See ["SYNC-DL Code"](#) on page 34

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SPOint <SPoint>

The command sets the switching point between the uplink slots and the the downlink slots in the frame.

Parameters:

<SPoint> float
 Range: 1 to 6
 *RST: 3

Example: BB:TDSC:DOWN:CELL1:SPO 4
 sets the switching point in the frame.

Manual operation: See ["Switching Point"](#) on page 35

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:STATE <State>

The command activates and deactivates the specified cell.

Parameters:

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

Example:

BB:TDSC:DOWN:CELL1:STAT ON
 activates cell 1

Manual operation: See ["Cell On / Cell Off"](#) on page 30

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SUCode <SuCode>

The command sets the SYNC-UL code. The SYNC-UL code is transmitted in the UpPTS to synchronize the base station to the mobile station.

Parameters:

<SuCode> float
 Range: 0 to 255

Example:

BB:TDSC:DOWN:CELL1:SUC 120
 sets the SYNC-UL code.

Manual operation: See ["SYNC-UL Code"](#) on page 34

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:TDElay <TDelay>

The command sets the time shift of the selected cell compared to cell 1 in chips.

The command is only valid for cell 2, 3 and 4.

Parameters:

<TDelay> integer
 Range: 0 chips to 6400 chips
 *RST: 0 chips

Example:

BB:TDSC:DOWN:CELL2:TDEL 100
 'shifts cell 2 by 100 chips compared to cell 1.

Manual operation: See ["Time Delay"](#) on page 35

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:USERS <Users>

The command sets the total number of users of the cell.

Parameters:

<Users> 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16
 *RST: 16

Example:

BB:TDSC:DOWN:CELL1:USER 4
 sets the total number of users.

Manual operation: See ["Number of Users"](#) on page 35

5.8 Enhanced Channels of Cell 1

CELL<st>

Value Range CELL1

DTCH<ch>

Value Range 1 . . 7

[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:SSPattern.....	117
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TPCPattern.....	117
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TTINterval?.....	118
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:ANPattern.....	118
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:CQI:MODulation.....	118
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:CQI:VALue.....	118
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:TTINterval?.....	119
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:LAYer.....	119
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:RATE.....	119
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:STATe.....	119
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BLOCK:RATE.....	120
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BLOCK:STATe.....	120
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BPFRame?.....	120
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:CCOunt.....	121
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: CRCSize.....	121
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: DATA.....	121
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: DATA:DSElect.....	122
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: DATA:PATtern.....	123
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: EPROtection.....	123
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: IONE.....	123
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[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: STATe.....	124
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: TBCount.....	124
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: TBSize.....	125
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: TTINterval.....	125
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:RUPLayer?.....	125
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SCSMODE.....	126
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SFORMAT?.....	126

[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SLOTstate<ch>.....	126
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:STATE.....	126
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:TSCount.....	127
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:TYPE.....	127
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:BPFRame?.....	127
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:CRCSize?.....	128
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA.....	128
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:DSElect.....	129
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:PATtern.....	129
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:EPRotecton?.....	129
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:IONE.....	130
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:ITWO.....	130
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:RMATtribute?.....	130
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:STATE.....	131
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBCount?.....	131
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBSIZE?.....	131
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TTInterval?.....	131
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SCSMODE?.....	132
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SFORMAT?.....	132
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SLOTstate<ch0>?.....	132
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:STATE.....	133
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:TYPE?.....	133

[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:SSPattern <SsPattern>

Sets the sync shift pattern. The pattern length is 21 bits.

Parameters:

<SsPattern> integer
*RST: 0

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:PLCC:SSP #HA5,8
sets the sync shift pattern.

Manual operation: See ["Sync Shift Pattern"](#) on page 48

[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TPCPattern <TpcPattern>

Sets the TPC pattern. The pattern length is 21 bits.

Parameters:

<TpcPattern> integer
*RST: 0

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:PLCC:TPCP #HA5,8
sets the TPC pattern

Manual operation: See ["TPC Pattern"](#) on page 48

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TTInterval?

Queries the transmission time interval.

Return values:

<TtInterval> 5MS | 10MS | 20MS | 40MS | 80MS

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:PLCC:TTIN?
queries the TTI value
Response: 5ms

Usage:

Query only

Manual operation:

See "[Transmission Time Interval \(TTI\) – RMC PLCCH](#)" on page 48

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIC:ANPattern
<AnPattern>**

Sets the ACK/NACK Pattern. The pattern has a maximal length of 36 bits; a "1" corresponds to ACK, a "0" to NAK.

Parameters:

<AnPattern> integer

Example:

BB:TDSC:UP:CELL1:ENH:DCH:HSIC:ANP #HAA,8
sets the ACK/NACK pattern

Manual operation:

See "[ACK/NAK Pattern](#)" on page 50

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIC:CQI:MODulation
<Modulation>**

Sets the CQI modulation.

Parameters:

<Modulation> QPSK | QAM16 | QAM64
*RST: QPSK

Example:

BB:TDSC:UP:CELL1:ENH:DCH:HSIC:CQI:MOD QAM16
sets the CQI modulation

Manual operation:

See "[CQI Modulation](#)" on page 50

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIC:CQI:VALue
<Value>**

Sets the CQI value.

Parameters:

<Value> integer
Range: 0 to 63
*RST: 0

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSIC:CQI:VAL 10
sets the CQI value

Manual operation: See ["CQI Value"](#) on page 50

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIC:TTINterval?

Queries the transmission time interval.

Return values:

<TtInterval> 5MS | 10MS | 20MS | 40MS | 80MS

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSIC:TTIN?
queries the TTI
Response: 5ms

Usage: Query only

Manual operation: See ["Transmission Time Interval \(TTI\) – RMC HS-SICH"](#) on page 49

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:LAYer
<Layer>**

The command sets the layer in the coding process at which bit errors are inserted.

Parameters:

<Layer> TRANsport | PHYSical
*RST: TRANsport

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:LAY TRAN
inserts the bit errors in the transport layer.

Manual operation: See ["Insert Errors On"](#) on page 51

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:RATE <Rate>

The command sets the bit error rate.

Parameters:

<Rate> float
Range: 1.10E-7 to 5.10E-1
*RST: 1.10E-3

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:RATE 5E-1
sets the bit error rate.

Manual operation: See ["Bit Error Rate"](#) on page 51

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:STATe
<State>**

The command activates or deactivates bit error generation.

Parameters:

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

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:STAT ON
 activates the bit error generation.

Manual operation: See ["State \(Bit Error\)"](#) on page 50

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BLOCK:RATE
 <Rate>

The command sets the block error rate.

Parameters:

<Rate> float
 Range: 10E-4 to 5.10E-1
 *RST: 10E-1

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:BLOC:RATE 10E-1
 sets the block error rate.

Manual operation: See ["Block Error Rate"](#) on page 51

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BLOCK:STATE
 <State>

The command activates or deactivates block error generation. The CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate an invalid signal.

Parameters:

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

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:BLOC:STAT ON
 activates block error generation.

Manual operation: See ["State \(Block Error\)"](#) on page 51

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BPFRame?

The command queries the data bits in the DPDCH component of the DPCH frame at physical level. The value depends on the slot format.

Return values:

<BpFrame> string

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:BPFR?
 queries the data bits in the DPDCH component of the DPCH frame at physical level.

Usage: Query only

Manual operation: See ["Data Bits Per Frame \(10 ms\)"](#) on page 44

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:CCOunt <CCount>

Sets the number of channels to be used.

The number of time slots is set with the command

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:TSCount.

Parameters:

<CCount> integer
Range: 1 to 16

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:CCO 2
sets two channels

Manual operation: See ["Number of Channels \(DCH\)"](#) on page 43

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:CRCSize <CrCSize>

Sets the type (length) of the CRC.

Parameters:

<CrCSize> NONE | 8 | 12 | 16 | 24
*RST: 16

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:CRCS?
queries the type (length) of the CRC.

Manual operation: See ["Size Of CRC"](#) on page 46

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA <Data>

The command selects the data source for the specified channel.

For the traffic channels, this value is specific for the selected radio configuration.

Parameters:

<Data>

PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLIS | ZERO | ONE | PATtern

PNxx

PRBS data as per CCITT with period lengths between 29-1 and 223-1 is generated internally.

DLIS

Internal data from a programmable data list is used. The data list can be generated by the Data Editor or generated externally. Data lists are selected in the "Select Data List" field. The data list is selected with the command

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL <data list name>.

ZERO | ONE

Internal 0 and 1 data is used.

PATtern

A user-definable bit pattern with a maximum length of 64 bits is generated internally. The bit pattern is defined in the "Pattern entry field". The bit pattern is selected with the command

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATT <bit pattern>.

*RST: PN9

Example:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA PN9
selects PN9 as the data source of the transport channel.**Manual operation:** See ["Data Source"](#) on page 45**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA:DSElect <DSelect>**

The command selects the data list for the DLIS data source selection.

The lists are stored as files with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the following commands is defined with the command MMEORY:CDIR. To access the files in this directory, you only have to give the file name, without the path and the file extension.

For the traffic channels, this value is specific for the selected radio configuration.

Parameters:

<DSelect>

string

Example:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA DLIS
selects the Data Lists data source for the transport channel.
MMEORY:CDIR "/var/user/temp/Lists"
selects the directory for the data lists.
BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA:DSEL
"tdscdma_1"
selects file tdscdma_1 as the data source. This file must be in specified directory and it must have the file extension *.dm_iqd.

Manual operation: See ["Data Source"](#) on page 45

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA:PATtern <Pattern>

The command sets the bit pattern for the PATtern selection. The first parameter determines the bit pattern (choice of hexadecimal, octal, or binary notation). The second specifies the number of bits to use. The maximum length is 64 bits.

For the traffic channels, this value is specific for the selected radio configuration.

Parameters:

<Pattern> 64 bit pattern
 Range: #B0,1 to #B111..1,64
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA:PATT
 #H800FE038,30
 defines the bit pattern.

Manual operation: See ["Data Source"](#) on page 45

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:EPRotecton <EProtection>

Sets the error protection.

Parameters:

<EProtection> NONE | TURBo3 | CON2 | CON3
 *RST: CON3

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:EPR CON2
 sets the error protection.

Manual operation: See ["Error Protection"](#) on page 46

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:IONE <IOne>

The command activates or deactivates the channel coding interleaver state 1 of the transport channel. Interleaver state 1 can be set independently in each TCH. Activation does not change the symbol rate.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:IONE ON
 activates the channel coding interleaver state 1 of the transport channel.

Manual operation: See ["Interleaver 1 State"](#) on page 47

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:ITWO <ITwo>

The command activates or deactivates the channel coding interleaver state 2 off all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:ITWO ON
 activates the channel coding interleaver state 2 of all the transport channel.

Manual operation: See ["Interleaver 2 State"](#) on page 47

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:RMATtribute <RmAttribute>

Sets the rate matching.

Parameters:

<RmAttribute> integer
 Range: 16 to 1024
 *RST: 256

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:RMAT 32
 sets the rate matching.

Manual operation: See ["Rate Matching Attribute"](#) on page 46

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:STATE <State>

Sets the state of the transport channel.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:STAT ON
 enables the transport channel.

Manual operation: See ["DTCH On/DCCH On"](#) on page 45

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TBCount <TbCount>

Sets the number of transport blocks for the TCH.

Parameters:

<TbCount> integer
 Range: 1 to 24
 *RST: 1

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TBC 2
 sets the number of transport blocks for the TCH.

Manual operation: See ["Transport Blocks"](#) on page 46

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:
 TBSize <TbSize>**

Sets the size of the transport block at the channel coding input.

Parameters:

<TbSize> float
 Range: 0 to 4096
 *RST: 244

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TBS 4096
 sets the size of transport block of the channel coding input.

Manual operation: See ["Transport Block Size"](#) on page 46

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:
 TTInterval <TtInterval>**

Sets the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

Parameters:

<TtInterval> 5MS | 10MS | 20MS | 40MS
 *RST: 20 ms

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TTIN 40MS
 sets the number of frames into which a TCH is divided.

Manual operation: See ["Transport Time Interval"](#) on page 45

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:RUPLayer?

The command queries the resource units on the physical layer needed to generate the selected channel.

Return values:

<RupLayer> string

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:RUPL?
 queries the resource units on the physical layer needed to generate the selected channel.

Usage: Query only

Manual operation: See ["Resource Units On Physical Layer"](#) on page 41

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SCSMODE <ScsMode>

The command sets the spreading code selection mode for the used transport channels.

Parameters:

<ScsMode> AUTO | USER
 *RST: AUTO

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:SCSM AUTO
 queries the spreading code.

Manual operation: See ["Spreading Code Selection For Used DPCHs"](#) on page 42

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SFORMAT?

The command queries the slot format of the selected channel. A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate. The slot format (and thus the symbol rate, the pilot length, and the TFCI State) depends on the coding type selected.

Return values:

<SFormat> string

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:SFORMAT?
 queries the channel coding type.

Usage: Query only

Manual operation: See ["Slot Format"](#) on page 43

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SLOTSTATE <ch> <SlotState>

The command queries the state of the slots off cell 1 used to transmit the transport channel.

Parameters:

<SlotState> 0 | 1 | OFF | ON

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:SLOT 3?
 queries the state of slot 3.

Manual operation: See ["Mapping On Physical Channels: Select Slots To Use"](#) on page 42

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:STATE <State>

The command activates or deactivates the enhanced state for the DCH channel coding.

Parameters:

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

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:STAT ON
 deactivates the enhanced state for the DCH channel.

Manual operation: See ["State \(DCH\)"](#) on page 40

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:TSCount
 <TsCount>

Sets the number of time slots to be used.

Parameters:

<TsCount> integer
 Range: 1 to 5
 *RST: 1

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:TSC 2
 sets 2 time slots.

Manual operation: See ["Number of Time Slots \(DCH\)"](#) on page 43

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:TYPE <Type>

The command sets the channel coding type.

Parameters:

<Type> RMC12K2 | RMC64K | RMC144K | RMC384K | RMC2048K |
 HRMC526K | HRMC730K | UP_RMC12K2 | UP_RMC64K |
 UP_RMC144K | UP_RMC384K | HSDPA | HSUPA | HS_SICH |
 PLCCH | USER | USER
 *RST: RMC12K2

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE RMC12K2
 sets the channel coding type to RMC12K2.

Manual operation: See ["Coding Type"](#) on page 40

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:BPFRame?

The command queries the data bits in the DPDCH component of the DPCH frame at physical level. The value depends on the slot format.

Return values:

<BpFrame> string

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:BPFR?
 queries the data bits in the DPDCH component of the DPCH frame at physical level.

Usage: Query only

Manual operation: See ["Data Bits Per Frame \(10 ms\)"](#) on page 39

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:CRCSIZE?

The command queries the type (length) of the CRC.

Return values:

<CrcSize> NONE | 8 | 12 | 16 | 24

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:CRCS?
queries the type (length) of the CRC.

Usage:

Query only

Manual operation: See ["Size Of CRC"](#) on page 46

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA <Data>

The command selects the data source for the specified channel.

For the traffic channels, this value is specific for the selected radio configuration.

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLIST | ZERO | ONE | PATtern

PNxx

PRBS data as per CCITT with period lengths between 2^9-1 and $2^{23}-1$ is generated internally.

DLIST

Internal data from a programmable data list is used. The data list can be generated by the Data Editor or generated externally. Data lists are selected in the "Select Data List" field. The data list is selected with the command

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL <data list name>.

ZERO | ONE

Internal 0 and 1 data is used.

PATtern

A user-definable bit pattern with a maximum length of 64 bits is generated internally. The bit pattern is defined in the "Pattern entry field". The bit pattern is selected with the command

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATT <bit pattern>.

*RST: PN9

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA PN9
selects PN9 as the data source of the transport channel.

Manual operation: See ["Data Source"](#) on page 45

**[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:
DSElect <DSelect>**

The command selects the data list for the DLIS data source selection.

The lists are stored as files with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the following commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

For the traffic channels, this value is specific for the selected radio configuration.

Parameters:

<DSelect> string

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA DLIS
selects the Data Lists data source for the transport channel.
MMEM:CDIR "/var/user/temp/Lists"
selects the directory for the data lists.

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL
"tdscdma_1"
selects file `tdscdma_1` as the data source. This file must be in the
specified directory and must have the file extension *.dm_iqd.

Manual operation: See ["Data Source"](#) on page 45

**[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:
PATtern <Pattern>**

The command sets the bit pattern for the PATtern selection. The first parameter determines the bit pattern (choice of hexadecimal, octal, or binary notation). The second specifies the number of bits to use. The maximum length is 64 bits.

For the traffic channels, this value is specific for the selected radio configuration.

Parameters:

<Pattern> 64 bit pattern
Range: #B0,1 to #B111..1,64
*RST: 0

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATT
#H800FE038,30
defines the bit pattern.

Manual operation: See ["Data Source"](#) on page 45

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:EPRotectioN?

The command queries the error protection.

Return values:

<EProtection> NONE | TURBo3 | CON2 | CON3

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:EPR?
queries the error protection.

Usage: Query only

Manual operation: See ["Error Protection"](#) on page 46

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:IONE <IOne>

The command activates or deactivates the channel coding interleaver state 1 of the transport channel. Interleaver state 1 can be set independently in each TCH. Activation does not change the symbol rate.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:IONE ON
activates the channel coding interleaver state 1 of the transport channel.

Manual operation: See ["Interleaver 1 State"](#) on page 47

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:ITWO <ITwo>

The command activates or deactivates the channel coding interleaver state 2 off all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:ITWO ON
activates the channel coding interleaver state 2 of all the transport channel.

Manual operation: See ["Interleaver 2 State"](#) on page 47

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:RMATtribute?

The command queries the rate matching.

Return values:

<RmAttribute> integer

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:RMAT?
queries the rate matching.

Usage: Query only

Manual operation: See ["Rate Matching Attribute"](#) on page 46

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:STATe <State>

The command queries the state of the transport channel.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:STAT?
 queries the state of the transpor channel.

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBCount?

The command queries the number of transport blocks for the TCH.

Return values:

<TbCount> integer

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TBC?
 queries the number of transport blocks for the TCH.

Usage: Query only

Manual operation: See ["Transport Blocks"](#) on page 46

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBSize?

The command queries the size of the transport block at the channel coding input.

Return values:

<TbSize> integer

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TBS?
 queries the size of transport block of the channel coding input.

Usage: Query only

Manual operation: See ["Transport Block Size"](#) on page 46

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TTInterval?

The command queries the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

Return values:

<TtInterval> 5MS | 10MS | 20MS | 40MS | 80MS

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TTIN?
 queries the number of frames into which a TCH is divided.

Usage: Query only

Manual operation: See ["Transport Time Interval"](#) on page 45

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SCSMode?

The command queries the spreading code predetermined in the standard. For BCH, the spreading code is always "Auto."

Return values:

<ScsMode> AUTO
*RST: AUTO

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:SCSM?
 queries the spreading code.

Usage: Query only

Manual operation: See ["Spreading Code Selection \(BCH\)"](#) on page 38

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SFormat?

The command queries the slot format of the selected channel. A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate. The slot format (and thus the symbol rate, the pilot length, and the TFCI State) depends on the coding type selected.

Return values:

<SFormat> string

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:SFOR?
 queries the channel coding type.

Usage: Query only

Manual operation: See ["Slot Format"](#) on page 39

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SLOTstate<ch0>?

The command queries the state of the slots off cell 1 used to transmit the broadcast channels. Slot 0 is always ON and all the other slots are always OFF.

Return values:

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

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:SLOT1?
 queries the state of slot 1.

Usage: Query only

Manual operation: See ["Mapping On Physical Channels: BCH mapped to <Slot> 0, P-CCPCH1/2"](#) on page 38

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:STATe <State>

The command activates and deactivates the enhanced state for the P-CCPCH 1/2 channel. If the enhanced state is activated, the channel coding cannot be changed in the channel table.

Parameters:

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

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:STAT ON
 deactivates the enhanced state for the P-CCPCH 1/2 channel.

Manual operation: See "State (BCH)" on page 37

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:TYPE?

The command queries the channel coding type.

Return values:

<Type> BCHSfn

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:TYPE?
 queries the channel coding type.

Usage: Query only

Manual operation: See "Coding Type (BCH)" on page 37

5.9 Channel Settings

CELL<st>

Value Range CELL1

SLOT<ch0>

Value Range [0] .. 6

CHANnel<us0>

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**[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:EUCCh:CCOUNT <CCOUNT>**

Sets the number of the E-DCH Uplink Control Channels (E-UCCH).

Parameters:

<CCOUNT> integer
 Range: 0 to 8
 *RST: 0

Example: BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
 sets channel type E-PUCH QPSK
 BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUCCh:CCO 5
 sets number of E-UCCH channels

Manual operation: See ["Number of E-UCCH Channels"](#) on page 73

**[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:EUCCh:HPID <Hpid>**

Sets the HARQ process ID.

Parameters:

<Hpid> float
 Range: 0 to 3
 *RST: 0

Example: BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
 sets channel type E-PUCH QPSK
 BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUCCh:HPID 2
 sets number HARQ process ID

Manual operation: See ["HARQ Process ID"](#) on page 74

**[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:EUCCh:RSNUMBER <RsNumber>**

Sets the retransmission sequence number.

Parameters:

<RsNumber> integer
Range: 0 to 3

Example:

BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
sets channel type E-PUCH QPSK
BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUECC:RSN 2
sets retransmission sequence number

Manual operation: See ["Retransmission Sequence Number \(E-UCCH\)"](#) on page 74

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCC:h:EUECC:TFCI <Tfci>**

Enters the value of the TFCI field.

Parameters:

<Tfci> float
Range: 0 to 63
*RST: 0

Example:

BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
sets channel type E-PUCH QPSK
BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUECC:TFCI 10
sets the TFCI value

Manual operation: See ["E-TFCI Value"](#) on page 74

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DATA <Data>**

The command determines the data source for the selected channel.

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATtern

PNxx

PRBS data as per CCITT with period lengths between 29-1 and 223-1 is generated internally.

DLISt

Internal data from a programmable data list is used.

ZERO | ONE

Internal 0 and 1 data is used.

PATtern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

*RST: PN9

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DATA PN9
sets the data source for the selected channel to PN9.

Manual operation: See ["Data"](#) on page 66

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DATA:DSElect <DSelect>**

Selects the data list as data source.

The lists are stored as files with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the following commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Parameters:

<DSelect> string

Example:

```
BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA DLIS
selects the Data Lists data source.
MMEM:CDIR "/var/user/temp/Lists"
selects the directory for the data lists.
BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA:DSEL
"tdscdma_1"
selects file tdscdma_1 as the data source. This file must be in the
directory and must have the file extension *.dm_iqd.
```

Manual operation: See ["Data"](#) on page 66

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DATA:PATtern <Pattern>**

The command determines the bit pattern. The first parameter determines the bit pattern (choice of hexadecimal, octal, or binary notation), the second specifies the number of bits to use.

Parameters:

<Pattern> integer
Range: #B0,1 to B11..1,64
*RST: 0

Example: BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA:PATT #H3F, 8
defines the bit pattern.

Manual operation: See ["Data"](#) on page 66

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:SYNC:LENGTH <Length>**

The command sets the length of the Sync Shift and the length of the TPC field in bits. The available values depend on the slot format.

Parameters:

<Length> 0 | 2 | 3 | 4 | 8 | 16 | 32 | 48
*RST: 0

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:LENG 2
sets the Sync Shift and the length of the TPC field to 2 bits.

Manual operation: See ["Number of Sync Shift & TPC Bits"](#) on page 72

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:SYNC:PATtern <Pattern>**

The command sets the bit pattern for the sync shift. The maximum pattern length is 64 bits.

Parameters:

<Pattern> string
*RST: 1

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:PATT
10-01
sets the bit pattern for the sync shift.

Manual operation: See ["Sync Shift Pattern"](#) on page 72

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:SYNC:REPetition <Repetition>**

The command sets the value for the sync shift repetition. This value is used to define the time lag for which the sync shift is used to transmit a new time adjustment. Thereby, M specifies the time lag in subframes a 5 ms.

Parameters:

<Repetition> integer
Range: 1 to 8
*RST: 1

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:REP 1
sets the value for the sync shift repetition.

Manual operation: See ["Sync Shift Repetition M"](#) on page 73

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TFCI:LENGth <Length>**

The command sets the length of the TFCI field in bits.

Parameters:

<Length> 0 | 4 | 6 | 8 | 12 | 16 | 24 | 32 | 48
*RST: 0

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TFCI:LENG
12
sets the length of the TFCI field to 12 bits.

Manual operation: See ["Number of TFCI Bits"](#) on page 71

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TFCI:VALue <Value>
```

The command sets the value of the TFCI field.

Parameters:

<Value> integer
 Range: 0 to 1023
 *RST: 0

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TFCI:VAL 0
 sets the value of the TFCI field to 0.

Manual operation: See ["TFCI Value"](#) on page 71

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TPC:DATA <Data>
```

The command sets the data source for the TPC field of the DPCCH.

Parameters:

<Data> DList | ZERO | ONE | PATtern

DList

A data list is used. The data list is selected with the command
 SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:
 DATA:DSEL

ZERO | ONE

Internal 0 and 1 data is used.

PATtern

Internal data is used. The bit pattern for the data is defined by the
 command

BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:DATA:
 PATT

*RST: PATtern

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:DATA
 PATT

selects as the data source for the TPC field of channel 6 of cell 4
 the bit pattern defined with the following command.

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:DATA:
 PATT #H3F, 8

defines the bit pattern.

Manual operation: See ["TPC Source"](#) on page 75

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TPC:DATA:DSElect <DSelect>
```

The command selects the data list for the Data List TPC source selection.

The lists are stored as files with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the following commands is defined with the command "MMEMory:CDIR". To access the files in this directory, you only have to give the file name, without the path and the file extension.

For the traffic channels, this value is specific for the selected radio configuration.

Parameters:

<DSelect> string

Example:

```
BB:TDSC:DOWN:CELL1:SLOT3:CHAN5:DPCC:TPC:DATA
DLIS
```

selects the Data Lists data source.

```
MMEM:CDIR "/var/user/temp/Lists"
```

selects the directory for the data lists.

```
BB:TDSC:DOWN:CELL1:SLOT3:CHAN5:DPCC:TPC:DATA:
DSEL "tdscdma_1"
```

selects file tdscdma_1 as the data source. This file must be in the directory and must have the file extension *.dm_iqd.

Manual operation: See ["TPC Source"](#) on page 75

```
[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TPC:DATA:PATtern <Pattern>
```

The command sets the bit pattern. The maximum bit pattern length is 64 bits.

Parameters:

<Pattern> integer
Range: #B0,1 to #B111...1,64
*RST: 01

Example:

```
BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:DATA:
PATT #H3F,8
```

defines the bit pattern.

Manual operation: See ["TPC Source"](#) on page 75

```
[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TPC:READ <Read>
```

The command sets the read out mode for the bit pattern of the TPC field.

Parameters:

<Read>

CONTInuous | S0A | S1A | S01A | S10A

CONTInous

The TPC bits are used cyclically.

S0A

The TPC bits are used once and then the TPC sequence is continued with 0 bits.

S1A

The TPC bits are used once and then the TPC sequence is continued with 1 bit.

S01A

The TPC bits are used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

S10A

The TPC bits are used once, and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

*RST: CONTInuous

Example:BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:READ
S01A

the TPC bits are used once, and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

Manual operation: See ["Read Out Mode"](#) on page 75**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:ENHanced?**

The command queries the enhanced state. If the enhanced state is set to ON, the channel coding cannot be changed.

Return values:

<Enhanced>

0 | 1 | 2 | OFF | ON | NOvalue

*RST: NOvalue

Example:BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:ENH?
queries the enhanced state of channel 6.**Usage:**

Query only

Manual operation: See ["Enhanced"](#) on page 65**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:MSHift?**

The command queries the midamble shift.

The midamble can be shifted in a value range of 0 to 128 chips in increments of 8 chips. Channels belonging to the same mobile station are characterized by the same midamble shift.

Return values:

<MShift> integer
 Range: 0 to 128
 *RST: 120

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:MSH?
 queries the midamble shift.

Usage: Query only

Manual operation: See "Midamble Shift" on page 71

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
 POWer <Power>**

The command sets the channel power in dB.

Parameters:

<Power> float
 Range: -80 dB to 0 dB
 Increment: 0.01 dB
 *RST: 0 dB

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:POW -20
 set the channel power to -20 dB.

Manual operation: See "Power/dB" on page 66

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
 SCODE <SCode>**

The command sets the spreading code for the selected channel. The code channel is spread with the set spreading code. The range of values of the spreading code depends on the channel type and the spreading factor. Depending on the channel type, the range of values can be limited.

Parameters:

<SCode> float
 Range: 1 to 16
 *RST: 1

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SCOD 1
 set the spreading code for channel 6 to 1.

Manual operation: See "Sprd. Code" on page 66

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
SFACtor <SFactor>**

The command sets the spreading factor for the selected channel. The selection depends on the channel type and interacts with the slot format.

Parameters:

<SFactor> 1 | 2 | 4 | 8 | 16
*RST: 16

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SFAC 16
sets the spreading factor for channel 6 to 16.

Manual operation: See "Sprd. Fact." on page 66

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
SFORmat <SFormat>**

The command sets the slot format for the selected channel. A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate. The slot format displays changes when a change is made to the "Number of TFCI Bits" and the "Number of Sync Shift & TPC Bits" field settings.

Parameters:

<SFormat> float
Range: 0 to 69
*RST: -

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SFOR 0
sets the slot format for channel 6 to 0.

Manual operation: See "Slot Fmt" on page 65

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
STATe <State>**

The command activates or deactivates the channel.

Parameters:

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

Example: BB:TDSC:UP:CELL1:SLOT3:CHAN6:STAT ON
activates channel 6.

Manual operation: See "State" on page 67

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
TYPE <Type>**

The command sets the channel type.

In the uplink, the channel type is fixed for channel number 0. In the downlink, the channel type is fixed for channel numbers 0 to 5. For the remaining numbers, the choice lies between the relevant standard channels and the high speed channels.

Parameters:

<Type> P_CCPCH1 | P_CCPCH2 | S_CCPCH1 | S_CCPCH2 | FPACH |
 PDSCH | DPCH_QPSK | DPCH_8PSK | HS_SCCH1 |
 HS_SCCH2 | HS_PDS_QPSK | HS_PDS_16QAM | PUSCH |
 UP_DPCH_QPSK | UP_DPCH_8PSK | HS_SICH |
 HS_PDS_64QAM | E_PUCH_QPSK | E_PUCH_16QAM |
 E_RUCCH | PLCCH | EAGCH | EHICH
 *RST: depending on channel number

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:TYPE DPC_QPSK
 sets the channel type DPC_QPSK for channel 6 of the channel table.

Manual operation: See ["Channel Type"](#) on page 65

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
 USER <User>**

The command sets the number of the user.

Parameters:

<User> float
 Range: 1 to 16
 *RST: 1

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:USER 3
 sets the number of the users to 3.

Manual operation: See ["Crt.User/Mid.Shift"](#) on page 65

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:DCONflict?

The command queries the global domain conflict state per slot.

Return values:

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

Example:

BB:TDSC:UP:CELL1:SLOT3:DCON?
 queries whether the slot has a code domain conflict.

Usage: Query only

Manual operation: See ["Dom. Conf."](#) on page 67

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:STATe <State>

The command activates and deactivates the slot in the subframe.

Parameters:

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

Example:

BB:TDSC:DOWN:CELL1:SLOT0:STAT ON
 activates slot0.

Manual operation: See ["Slot Icon"](#) on page 36

[[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:MODE <Mode>

The command sets the mode in which the slot is to work.

Parameters:

<Mode> DEDicated | PRACH

DEDicated

The instrument generates a signal with a dedicated physical control channel (DPCCH) and up to 6 dedicated physical data channels (DPDCH). The signal is used for voice and data transmission.

PRACH

The instrument generates a single physical random access channel (PRACH). This channel is needed to set up the connection between the mobile station and the base station.

*RST: DEDicated

Example:

BB:TDSC:UP:CELL4:SLOT3:MODE PRACH
 sets the PRACH mode for the selected slot.

Manual operation: See ["Slot Mode"](#) on page 63

**[[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA
 <Data>**

The command determines the data source for the PRACH.

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLIS | ZERO | ONE | PATtern

PNxx

PRBS data as per CCITT with period lengths between 2^9-1 and $2^{23}-1$ is generated internally.

DLIS

Internal data from a programmable data list is used.

ZERO | ONE

Internal 0 and 1 data is used.

PATtern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

*RST: PN9

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:DATA PN9
selects PN9 as the data source for the PRACH.

Manual operation: See ["Data Source \(PRACH\)"](#) on page 79

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:
DSElect <DSelect>**

The command selects the data list for the Data List data source selection.

The lists are stored as files with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the following commands is defined with the command MMEORY:CDIR. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Parameters:

<DSelect> string

Example:

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA DLIS
selects the Data Lists data source.

MMEORY:CDIR "/var/user/temp/Lists"
selects the directory for the data lists.

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:DSEL
"tdscdma_1"

selects file tdscdma_1 as the data source. This file must be in the directory and it must have the file extension *.dm_iqd

Manual operation: See ["Data Source \(PRACH\)"](#) on page 79

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:
PATTERN <Pattern>**

The command determines the bit pattern. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Parameters:

<Pattern> integer

Range: #B0,1 to B11..1,64

Example:

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:PATT #H3F,
8

defines the bit pattern.

Manual operation: See ["Data Source \(PRACH\)"](#) on page 79

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:LENGTH
<Length>**

The command sets the message length of the random access channel in subframes.

Parameters:

<Length> 1 | 2 | 4
 *RST: 1

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:LENG 1
 sets the message length of the random access channel to 1 sub-frame.

Manual operation: See ["Message Length"](#) on page 79

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:MSHift?

The command queries the value of the midamble shift.

Return values:

<MSHift> integer
 Range: 0 to 128
 *RST: 120

Example:

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:MSH?
 queries the value of the midamble shift.

Usage: Query only

Manual operation: See ["Midamble Shift \(PRACH\)"](#) on page 80

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:PCORrection <PCorrection>

The command queries the value of the power correction.

Parameters:

<PCorrection> float
 *RST: -

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:POW -10
 sets the power of the PRACH message part
 BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:PCOR?
 queries the value of the power correction.
 Response: 2.99086185076844

Manual operation: See ["Power \(RACH Message Part\)"](#) on page 79

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:POWer <Power>

The command sets the power of the PRACH message part.

Parameters:

<Power> float
 Range: -80.0 dB to 0.0 dB
 Increment: 0.01 dB
 *RST: 0 dB

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:POW 1
 sets the power of the PRACH message part.

Manual operation: See ["Power \(RACH Message Part\)"](#) on page 79

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SCODE
 <SCode>

The command sets the spreading code for the PRACH. The code channel is spread with the set spreading code.

Parameters:

<SCode> integer
 Range: 1 to 16
 *RST: 1

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SCOD 16
 sets the power of the PRACH message part.

Manual operation: See ["Spreading Code \(PRACH\)"](#) on page 79

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFACTOR
 <Sfactor>

The command sets the spreading factor for the PRACH.

Parameters:

<Sfactor> 4 | 8 | 16
 *RST: 16

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SFAC 16
 sets the power of the PRACH message part.

Manual operation: See ["Spreading Factor \(PRACH\)"](#) on page 79

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFORMAT?

This command queries the slot format of the PRACH. The slot format depends on the selected spreading factor.

Return values:

<SFormat> integer
 Range: 0 to 25
 *RST: 0

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SFOR 1
queries the slot format of the PRACH.

Usage: Query only

Manual operation: See ["Slot Format \(PRACH\)"](#) on page 79

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:STATe
<State>

The command activates or deactivates the RACH (random access channel) message part.

Parameters:

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

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:STAT ON
activates the RACH (random access channel) message part.

Manual operation: See ["State \(RACH Message Part\)"](#) on page 79

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:USER
<User>

The command sets number of current user.

Parameters:

<User> float
Range: 1 to 16
*RST: 1

Example: BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:USER 1
sets number of current user.

Manual operation: See ["Current User \(PRACH\)"](#) on page 80

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:DISTance
<Distance>

The command sets the value to vary the timing between UpPTS and RACH.

Parameters:

<Distance> integer
Range: 1 to 4
*RST: 1

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:DIST 1
sets the number of the subframe in which the first UpPTS should be transmitted.

Manual operation: See ["Distance UpPTS"](#) on page 77

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PCORrection?

The command queries the power corection of the UpPTS.

The value is computed based on:

- UpPTS power
BB:TDSC:UP:CELL:SLOT:PRAC:PTS:POW
- power step
BB:TDSC:UP:CELL:SLOT:PRAC:PTS:PST
- message power
BB:TDSC:UP:CELL:SLOT:PRAC:MSG:POW
- UpPTS length, Message Length
BB:TDSC:UP:CELL:SLOT:PRAC:MSG:LENG
- ARB sequence length
BB:TDSC:SLEN

Return values:

<PCorrection> float
*RST: 1

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:POW -12
 sets the power of the UpPTS.
 BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:PCOR?
 queries the power correction of the UpPTS.
 Response: 0.8890863332626

Usage: Query only

Manual operation: See "Power" on page 78

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:POWer<Power>

The command sets the power of the UpPTS.

Parameters:

<Power> float
Range: -80 dB to 0 dB
Increment: 0.01 dB
*RST: 0 dB

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:POW -12
 sets the power of the UpPTS.

Manual operation: See "Power" on page 78

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PSTep
<PStep>**

The command sets the power by which the UpPTS is increased from repetition to repetition.

Parameters:

<PStep> float
Range: 0.0 dB to 10.0 dB
Increment: 0.01
*RST: 0 dB

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:PST 3
defines the power by which the UpPTS is increased from repetition to repetition.

Manual operation: See ["Power Step"](#) on page 76

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:REPetition
<Repetition>**

The command sets the number of UpPTS repetitions before a PRACH burst happens.

Parameters:

<Repetition> integer
Range: 1 dB to 10 dB
*RST: 1 dB

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:REP 1
sets the number of UpPTS repetitions before a PRACH burst happens.

Manual operation: See ["UpPTS Repetition"](#) on page 78

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:STARt
<Start>**

The command sets the number of the subframe in which the first UpPTS should be transmitted.

Parameters:

<Start> integer
Range: 0.0 dB to 10.0 dB
*RST: 0.0 dB

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:STAR 3
sets the number of the subframe in which the first UpPTS should be transmitted.

Manual operation: See ["UpPTS Start"](#) on page 77

[[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:SLENgth?

The command queries the sequence length of the PRACH slot.

The value is computed based on:

- Start Subframe
BB:TDSC:UP:CELL:SLOT:PRAC:PTS:STAR
- UpPTS Repetition
BB:TDSC:UP:CELL:SLOT:PRAC:PTS:REP
- Distance UpPTS and RACH
BB:TDSC:UP:CELL:SLOT:PRAC:PTS:DIST
- Message Length
BB:TDSC:UP:CELL:SLOT:PRAC:MSG:LENG

Return values:

<SLength> float
Range: 0.5 to 13.5
Increment: 0.5
*RST: 0.5

Example:

BB:TDSC:UP:CELL:SLOT:PRAC:PTS:STAR 3
sets the number of the subframe in which the first UpPTS should be transmitted.
BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:REP 2
sets the number of UpPTS repetitions before a PRACH burst happens.
BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:DIST 2
sets the number of the subframe in which the first UpPTS should be transmitted.
BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:LENG 1
sets the message length of the random access channel to 1 sub-frame.
BB:TDSC:UP:CELL4:SLOT3:PRAC:SLEN?
queries the sequence length.
Response: 3.5

Usage: Query only

Manual operation: See "Sequence Length" on page 77

5.10 HSDPA/HSUPA Settings

CELL<st>

Value Range CELL1

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[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:RMC <Rmc>

Enables a predefined set of RMC channels or fully configurable user mode.

Parameters:

<Rmc> HRMC_0M5_QPSK | HRMC_1M1_QPSK |
 HRMC_1M1_16QAM | HRMC_1M6_QPSK |
 HRMC_1M6_16QAM | HRMC_2M2_QPSK |
 HRMC_2M2_16QAM | HRMC_2M8_QPSK |
 HRMC_2M8_16QAM | HRMC_64QAM_16UE |
 HRMC_64QAM_19UE | HRMC_64QAM_22UE | USER
 *RST: HRMC_0M5_QPSK

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RMC
 HRMC_2M8_QPSK
 sets the RMC mode

Manual operation: See ["RMC Configuration"](#) on page 52

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SCCH <Scch>

Enables/disables the HS-SCCH.

Parameters:

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

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:SCCH ON
 enables HS-SCCH

Manual operation: See ["HS-SCCH State"](#) on page 55

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SPATtern?

Queries the distribution of packets over time.

The Signaling Pattern displays a HARQ-Process cycle and is a sequence of HARQ-IDs and "-". A HARQ-ID indicates a packet, a "-" indicates no packet. The Signaling Pattern is cyclically repeated.

Return values:

<SPattern> string

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:TTID 2
 sets the TTI distance
 BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:HARQ:LENG 4
 BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:SPAT?
 queries the signaling pattern
 Response: '0,-,1,-2,-,3,-'

Usage:

Query only

Manual operation: See ["Signaling Pattern"](#) on page 60

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TBS:TABLE
<Table>

Sets the transport block size table, according to the specification 3GPP TS 25.321.

Parameters:

<Table> C1TO3 | C4TO6 | C10TO12 | C7TO9 | C13TO15 | C16TO18 |
 C19TO21 | C22TO24
***RST:** C1TO3

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:TSB:TABL
 C13TO15
 sets the transport block table

Manual operation: See ["Transport Block Size Table"](#) on page 58

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TTIDistance
<TtiDistance>

Sets the inter TTI distance, i.e. distance between two packets in HSDPA packet mode and determines whether data is send each TTI or there is a DTX transmission in some of the TTIs.

An Inter TTI Distance of 1 means continuous generation.

Parameters:

<TtiDistance> integer
Range: 1 to 8
***RST:** 1

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:TTID 2
 sets the TTI distance

Manual operation: See ["Inter TTI Distance"](#) on page 60

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:UEID <Ueid>

Sets the UE identity.

Parameters:

<Ueid> integer
Range: 0 to 65535
***RST:** 0

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:UEID 2
 sets the UE ID

Manual operation: See ["UEID \(H-RNTI\)"](#) on page 55

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:VIBSize
<VibSize>

Sets the size of the virtual IR buffer.

Parameters:

<VibSize> float
 Range: 704 to 63360
 Increment: 704

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:VIBS 2800
 sets the size of the virtual IR buffer

Manual operation: See ["Virtual IR Buffer Size \(Per HARQ process\)"](#) on page 60

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:EUCTti <Euctti>

Sets the number of E-UCCH channels per TTI.

Parameters:

<Euctti> integer
 Range: 1 to 8
 *RST: 4

Example:

BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:EUCT 2
 sets the number of channels

Manual operation: See ["Number of E-UCCH per TTI"](#) on page 56

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:FRC <Frc>

Selects a predefined E-DCH fixed reference channel or fully configurable user mode.

Parameters:

<Frc> 1 | 2 | 3 | 4 | USER
 *RST: 1

Example:

BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:EUCT 2
 sets the number of channels

Manual operation: See ["E-DCH Fixed Reference Channel \(FRC\)"](#) on page 54

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSEquence
 <RSequence>**

(for "HSUPA" and "HARQ Mode" set to Constant NACK)

Sets the retransmission sequence.

Parameters:

<RSequence> string
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE HSUPA
sets the channel coding type to HSUPA.
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:HARQ:MODE CNAC
sets the HARQ mode
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RSEQ '0,2,3'
sets the retransmission sequence

Manual operation: See ["Retransmission Sequence"](#) on page 62

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSNumber?

(for HARQ Mode set to Constant ACK)

Queries the retransmission sequence number.

The value is fixed to 0.

Return values:

<RsNumber> integer
Range: - to -

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:HARQ:MODE CACK
sets the HARQ mode
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RSN?
queries the retransmission sequence number
Response: 0

Usage: Query only

Manual operation: See ["Retransmission Sequence Number"](#) on page 62

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:SFACTOR
<SFactor>**

Selects the spreading factor for the FRC.

Parameters:

<SFactor> 1 | 2 | 4 | 8 | 16
*RST: 4

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:SFAC 2
sets the spreading factor

Manual operation: See ["Spreading Factor \(FRC\)"](#) on page 56

**[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:TBS:TABLE
<Table>**

Sets the transport block size table, according to the specification 3GPP TS 25.321, Annex BC.

Parameters:

<Table> C1TO2 | C3TO6
 *RST: C1TO2

Example:

BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:TBS:TABL C3TO6
 sets the transport blk table

Manual operation: See ["Transport Block Size Table 0"](#) on page 59

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:BPAYload?

Queries the payload of the information bit. i.e. transport block size. This value determines the number of transport layer bits sent in each TTI before coding.

Return values:

<BPayload> float

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:BPAY?
 queris the Ninf

Usage:

Query only

Manual operation: See ["Information Bit Payload \(Ninf\)"](#) on page 59

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:CRATe?

Queries the coding rate.

Return values:

<CRate> float

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:CRAT?
 queris the coding rate

Usage:

Query only

Manual operation: See ["Coding Rate \(HSDPA/HSUPA\)"](#) on page 59

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:CTSCount <CtsCount>

Sets the number of physical channels per time slot.

Parameters:

<CtsCount> integer
 Range: 1 to 14

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:CTSC
 2
 sets the number of codes per TS

Manual operation: See ["Number of HS-PDSCH/E-DCH Codes per TS"](#) on page 56

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
DATA <Data>
```

The command determines the data source for the HSDPA/HSUPA channels.

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLIS | ZERO | ONE | PATtern

PNxx

PRBS data as per CCITT with period lengths between 2^9-1 and $2^{23}-1$ is generated internally.

DLIS

Internal data from a programmable data list is used.

ZERO | ONE

Internal 0 and 1 data is used.

PATtern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

*RST: PN9

Example:

```
BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA
PN11
selects the data source
```

Manual operation: See ["Data Source \(HSDPA/HSUPA\)"](#) on page 57

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
DATA:DSElect <DSelect>
```

The command selects the data list for the Data List data source selection.

The lists are stored as files with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the following commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Parameters:

<DSelect> string

Example:

```
BB:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA DLIS
selects the Data Lists data source.
MMEM:CDIR "/var/user/temp/Lists"
selects the directory for the data lists.
BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA:
DSEL "tdscdma_1"
selects file tdscdma_1 as the data source. This file must be in the
directory and must have the file extension *.dm_iqd
```

Manual operation: See ["Data Source \(HSDPA/HSUPA\)"](#) on page 57

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:DATA:PATtern <Pattern>

The command determines the bit pattern. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Parameters:

<Pattern> integer
 Range: #B0,1 to B11..1,64

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA:PATT #H3F, 8
 defines the bit pattern.

Manual operation: See ["Data Source \(HSDPA/HSUPA\)"](#) on page 57

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:HARQ:LENGth <Length>

Sets the number of HARQ processes. This value determines the distribution of the payload in the subframes and depends on the Inter TTI Distance.

A minimum of 3 HARQ Processes are required to achieve continuous data transmission.

Parameters:

<Length> integer
 Range: 1 to 8
 *RST: 4

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:HARQ:LENG 5
 sets the number of HARQ processes

Manual operation: See ["Number of HARQ Processes"](#) on page 60

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:HARQ:MODE <Mode>

Sets the HARQ simulation mode.

Parameters:

<Mode> CACK | CNACK

CACK

New data is used for each new TTI. This mode is used to simulate maximum throughput transmission.

CNACK

Enables NACK simulation, i.e. depending on the sequence selected with command

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RVS packets are retransmitted. This mode is used for testing with varying redundancy version.

*RST: CACK

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:HARQ:MODE CNAC
sets the HARQ mode

Manual operation: See ["HARQ Mode"](#) on page 61

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:MIBT?

Queries maximum information bits sent in each TTI before coding.

Return values:

<Mibt> float

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:MBIT?
queris the maximum information bit troughput

Usage: Query only

Manual operation: See ["Maximum Information Bit Throughput /kbps"](#) on page 56

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:MODulation <Modulation>

Sets the modulation scheme for each HSDPA RMC or HSUPA FRC.

The HSUPA FRCs do not support modulation scheme 64QAM.

Parameters:

<Modulation> QPSK | QAM16 | QAM64
*RST: QPSK

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:MOD QAM16
sets the modulation

Manual operation: See ["Modulation \(HSDPA/HSUPA\)"](#) on page 58

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:NCBTti?

Queries the number of bits after coding.

Return values:

<NcbTti> float

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:NCBT?
queris the number of bits after coding

Usage: Query only

Manual operation: See ["Number of Coded Bits Per TTI"](#) on page 58

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
RVParameter <RvParameter>**

(for HARQ Mode set to Constant ACK)

Sets the redundancy version parameter, i.e. indicates which redundancy version of the data is sent. .

Parameters:

<RvParameter> integer
Range: 0 to 7

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:HARQ:
MODE CACK
sets the HARQ mode
BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:RVP 2
sets the redundancy version parameter

Manual operation: See ["Redundancy Version Parameter"](#) on page 61

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
RVSequence <RvSequence>**

(for HARQ Mode set to Constant NACK)

Sets the retransmission sequence.

The sequence has a length of maximum 30 values. The sequence length determines the maximum number of retransmissions. New data is retrieved from the data source after reaching the end of the sequence.

For HSUPA, the command is a query only.

Parameters:

<RvSequence> string
*RST: 0

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:HARQ:
MODE CNAC
sets the HARQ mode
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RVS '0,2,1'
sets the redundancy version sequence
BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE HSUPA
sets the channel coding type to HSUPA.
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:HARQ:MODE CNAC
sets the HARQ mode
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RSEQ '0,2,3'
sets the retransmission sequence
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RVS?
queries the redundancy version sequence
Response: '0,2,1'

Manual operation: See ["Redundancy Version Sequence"](#) on page 61

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:SFORmat?

Queries the slot format of the selected channel.

A slot format defines the complete structure of a slot made of data and control fields. The slot format depends on the coding type selected.

Return values:

<SFormat> string

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:SFOR?
queris the slot format

Usage: Query only

Manual operation: See ["Slot Format \(HSDPA/HSUPA\)"](#) on page 57

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:TBS:INDEX <Index>

Sets the index for the corresponding table, as described in 3GPP TS 25.321.

Parameters:

<Index> integer
Range: 0 to 63
*RST: -

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:TBS:IND 20
sets the TB table index

Manual operation: See ["Transport Block Size Index"](#) on page 59

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:TSCount <TsCount>

Sets the number of time slots.

Parameters:

<TsCount> integer
Range: 2 to 5

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:TSC 3
sets the number of time slots

Manual operation: See ["Number of HS-PDSCH/E-DCH Time Slots"](#) on page 56

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:TTInterval?

Queries the transmission time interval (TTI).

Return values:

<TtInterval> 5MS

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:TTIN?
queris the TTI
Response: 5MS

Usage:

Query only

Manual operation: See ["Transmission Time Interval \(TTI\)"](#) on page 57

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
UECategory?**

Queries the UE category that is minimum required to receive the selected RMC or FRC.

Return values:

<UeCategory> float

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RMC
HRMC_2M8_16QAM
sets a RMC
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:UEC?
queris the UE category
Response: 13

Usage:

Query only

Manual operation: See ["UE Category"](#) on page 56

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