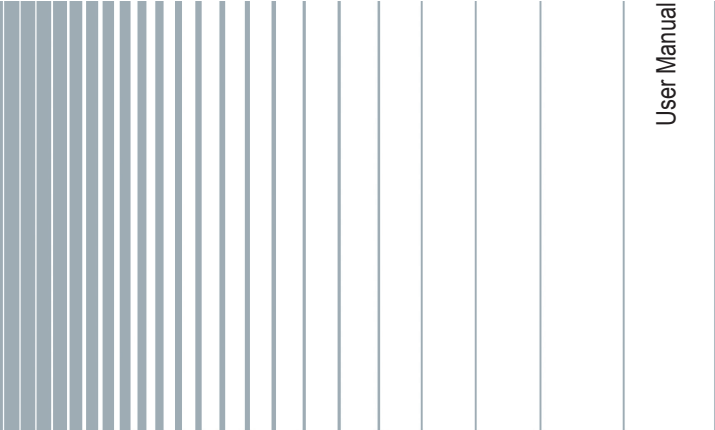


DVB-H/T, DVB-S2/S2X Digital Standard for R&S[®]SMBV100A User Manual



1178.6804.02 – 18



This document describes the following software options:

- R&S®SMBV-K52/-K116
1415.8148.xx, 1427.8002.xx

This manual version corresponds to firmware version:
FW 3.50.082.xx and later of the R&S®SMBV100A

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

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1 Preface

1.1 About this Manual

This operating manual provides all the information **specific to the DVB-H/T and DVB-S2/S2X options R&S SMBV-K52/-K116**. All general instrument functions and settings common to all applications and operating modes are described in the main R&S SMBV operating manual.

The main focus in this manual is on the provided settings and the tasks required to generate a signal. The following topics are included:

- **Welcome to the DVB options**
Introduction to and getting familiar with the option
- **About the DVB options**
Background information on basic terms and principles in the context of the signal generation
- **DVB Configuration and Settings**
A concise description of all functions and settings available to configure signal generation with their corresponding remote control command
- **Remote Control Commands**
Remote commands required to configure and perform signal generation in a remote environment, sorted by tasks
(Commands required to set up the instrument or to perform common tasks on the instrument are provided in the main R&S SMBV operating manual)
Programming examples demonstrate the use of many commands and can usually be executed directly for test purposes
- **List of remote commands**
Alphabetical list of all remote commands described in the manual
- **Index**

The functions specific to the discontinued products R&S[®]SMU200A, R&S[®]SMATE200A, R&S[®]SMJ100A and R&S[®]AMU200A are not described here.

Find the description of the corresponding option at the following page:

<https://www.rohde-schwarz.com/product/SMU200A> > "Downloads"

1.2 Documentation Overview

This section provides an overview of the R&S SMBV user documentation. Unless specified otherwise, you find the documents on the R&S SMBV product page at:

www.rohde-schwarz.com/manual/smbv100a

1.2.1 Quick Start Guide Manual

Introduces the R&S SMBV and describes how to set up and start working with the product. Includes basic operations, typical measurement examples, and general information, e.g. safety instructions, etc. A printed version is delivered with the instrument.

1.2.2 Operating Manual and Help

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

- Base unit manual
Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the quick start guide manual.
- Software option manual
Contains the description of the specific functions of an option. Basic information on operating the R&S SMBV is not included.

The contents of the user manuals are available as help in the R&S SMBV. The help offers quick, context-sensitive access to the complete information for the base unit and the software options.

All user manuals are also available for download or for immediate display on the Internet.

1.2.3 Service Manual

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

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS, <https://gloris.rohde-schwarz.com>).

1.2.4 Instrument Security Procedures

Deals with security issues when working with the R&S SMBV in secure areas. It is available for download on the Internet.

1.2.5 Basic Safety Instructions

Contains safety instructions, operating conditions and further important information. The printed document is delivered with the instrument.

1.2.6 Data Sheets and Brochures

The data sheet contains the technical specifications of the R&S SMBV. It also lists the options and their order numbers and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

See www.rohde-schwarz.com/brochure-datasheet/smbv100a

1.2.7 Release Notes and Open Source Acknowledgment (OSA)

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation.

The open source acknowledgment document provides verbatim license texts of the used open source software.

See www.rohde-schwarz.com/firmware/smbv100a

1.2.8 Application Notes, Application Cards, White Papers, etc.

These documents deal with special applications or background information on particular topics.

See www.rohde-schwarz.com/application/smbv100a.

2 Welcome to the DVB-H/T and DVB-S2/S2X Options

The R&S SMBV-K52/-K116 are firmware applications that add functionality to generate signals in accordance with:

- The DVB-H/T (Digital Video Broadcasting - Transmission System for Handheld Terminals) standard
- The standards describing the second-generation DVB system for satellite communication DVB-S2 and the optional extension DVB-S2X.

DVB (digital video broadcasting) provides a communications infrastructure for powerful transmission of MPEG-2-based data. Besides satellite-based (DVB-S), terrestrial (DVB-T) and cable-bound (DVB-C) transmission schemes, the version (DVB-H) is for portable/handheld terminals. DVB-H is an extension to DVB and is compatible with the basic concept of the standard. The extensions bring advantages that are especially important for portable devices: low power consumption, small hardware and robustness against fading effects.

The DVB-S2 standard is introduced as successor the DVB-S for the transmission of digital video broadcasts over satellite links. The DVB-S2X standard is an optional extension of the DVB-S2 standard. DVB-S2X allows an efficiency gain of up to 51% compared to DVB-S2. With that, higher data rates can be transported over the same satellite transponder capacity.

The main advantages of the DVB-H / DVB-T digital standard option **R&S SMBV-K52** are:

- Possibility to test both mobile communications standards (such as WCDMA 3GPP FDD, TD-SCDMA, GSM/EDGE) and DVB-H or DVB-T using only one signal generator
- Simple generation of standard-compliant DVB-H or DVB-T signals

Option **R&S SMBV-K116** extends the functionalities with the following key features:

- Fully encoded DVB-S2 and DVB-S2X signal generation
- Support of the stream types: transport stream (TS), generic packetized (GP), generic continuous (GC), generic stream encapsulated high efficiency mode (GSE-HEM)
- Signal generation from arbitrary data sources and TS or GSE files
- Channel coding according to the standard, incl. scrambling, interleaving, outer code (BCH), inner code (LDPC) with varying code rates from 1/4 to 31/45
- Support of all specified Walsh-Hadamard sequences for VL-SNR (very low signal to noise ratio) mode
- Configurable header information, incl. baseband (BB) header, VL-SNR header, TS header, GSE header
- Supported modulation schemes:
 - For DVB-S2: QPSK, 8PSK, 16APSK, 32APSK
 - For DVB-S2X: QPSK, 8APSK, 8PSK, 16APSK, 32APSK, 64APSK, 128APSK, 256APSK

- For VL-SNR: QPSK, pi/2 BPSK
- Pilot insertion and configuration
- Signals suitable for testing of satellite transponders, components and ground modems

This operating manual contains a description of the functionality that the application provides, including remote control operation.

All functions not discussed in this manual are the same as in the base unit and are described in the R&S SMBV operating manual. The latest version is available at:

www.rohde-schwarz.com/manual/SMBV100A

2.1 Accessing the DVB Dialog

To open the dialog with DVB settings

- ▶ In the block diagram of the R&S SMBV, select "Baseband > DVB".

A dialog box opens that displays the provided general settings.

The signal generation is not started immediately. To start signal generation with the default settings, select "State > On".

2.2 Scope



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

In particular, it includes:

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

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

2.3 Notes on Screenshots

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

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

3 About the DVB Options

The digital video broadcasting (DVB) suite of standards described methods for data and video signals transmission through different medium including cable, terrestrial, mobile and satellite.

This section provides brief background information on basic terms and principles used in the DVB standards.

3.1 About the DVB-H/T

The Digital Video Broadcasting - Handheld (DVB-H) standard is based on the earlier standard DVB-T, which is used for terrestrial digital broadcasting.

The block diagram on [Figure 3-1](#) shows the components of the DVB-H transmission system.

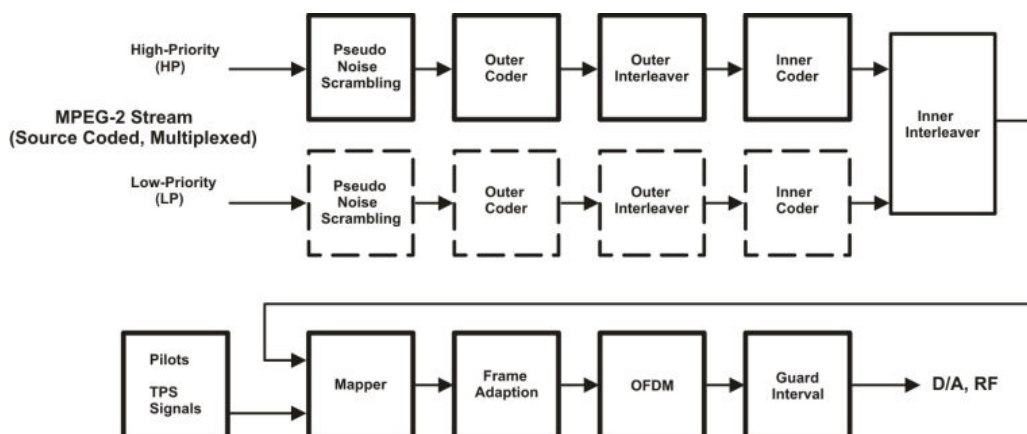


Figure 3-1: Components of the transmission system DVB-H

DVB-H provides features to meet the specific requirements for handheld, mobile terminals such as:

- Power off some part of the reception chain to increase the battery duration
- Ease access to the services when receivers switching to the next cell
- Mitigate the effects of man-made noise and severe mobile multipath channels on the receiving capabilities
- Offer sufficient flexibility and scalability to allow reception of services at various speeds
- Offer the flexibility to be used in various transmission bands and channel bandwidths

The basic technical extensions that make it possible to receive digital video broadcasting services on handheld terminals are:

- 4K mode and in-depth interleavers
- Time-slicing

- Forward error correction for multiprotocol encapsulated data (MPE-FEC)

3.2 About the DVB-S2/S2X

Figure 3-2 illustrates schematically the components of the DVB-S2/S2X transmission systems. The block diagram is a simplified version of the DVB-S2 system specified in the DVB standard.

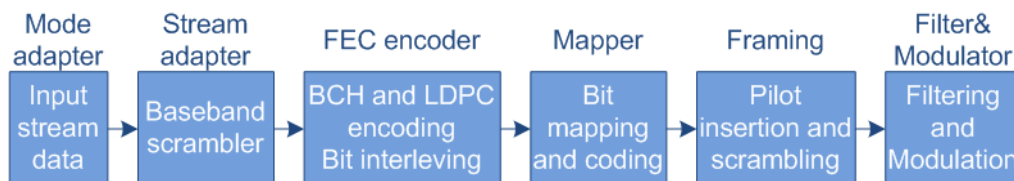


Figure 3-2: Components of the transmission system DVB-S2/S2X

FEC = Forward error correction

BCH = Bose-Chaudhuri-Hocquenghem multiple error correction binary block codes

LDPC = Low-density parity check

The main improvements of the second-generation DVB system for satellites (DVB-S2) compared to DVB-S are:

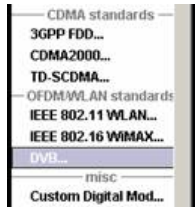
- Input stream adapter, suitable for operation with single and multiple input streams and different formats (packetized or continuous)
- FEC system based on LDPC codes concatenated with BCH codes
- Range of code rates (from 1/4 up to 9/10);
Four constellations with different spectrum efficiency and optimized for operation over non-linear transponders
- Three predefined spectrum shapes with rolloff factors 0.35, 0.25 and 0.20
- Adaptive coding and modulation (ACM) functionality for optimized channel coding and modulation on a frame-by-frame basis.

The DVB-S2X is an extension to the DVB-S2 standard. The DVB-S2X reuses the DVB-S2 system architecture and improves it with the following:

- Adds finer MODCOD steps, higher-order modulations and complex constellations
- Three new sharper spectrum shapes
- Defines the VL-SNR (low signal to noise ratio) mode for example for mobile applications
- Optional periodic pilots and physical layer scrambles for easy synchronization
- GSE-Lite compliant signaling and streaming
- Adds a high-efficiency mode (GSE-HEM) intended to transport GSE and GSE-Lite packets

4 DVB User Interface

Access:



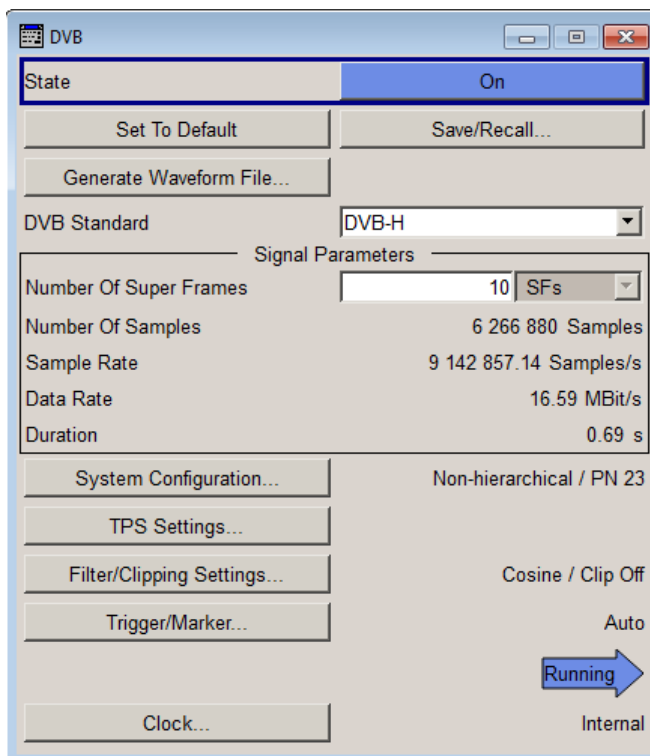
- ▶ Select "Baseband > DVB".

The remote commands required to define these settings are described in [Chapter 5, "Remote-control commands"](#), on page 50.

- [General Settings](#)..... 13
- [DVB-T/DVB-H System Configuration Settings](#)..... 18
- [DVB-T/DVB-H TPS Settings](#)..... 21
- [DVB-S2/DVB-S2X System Configuration Settings](#)..... 25
- [TS Header Settings](#)..... 31
- [GSE Header Settings](#)..... 33
- [BB Header Settings](#)..... 35
- [Filter/Clipping Settings](#)..... 37
- [Trigger/Marker/Clock Settings](#)..... 41

4.1 General Settings

The menu is split into several sections for configuring the standard.



- The upper menu section is where the DVB-H digital standard is selected, enabled, and reset, and where the generated waveform file can be selected.
- In the "Signal Parameters" section, the number of super-frames can be selected and signal relevant parameters are displayed, if a signal is being generated.
- The buttons in the lower menu section lead to submenus to configure the system and setting the filter, trigger, and clock parameters.

State.....	15
Set To Default.....	15
Save/Recall.....	16
Generate Waveform File.....	16
DVB Standard.....	16
VL-SNR Mode.....	17
Number of Super Frames.....	17
Number of Frames.....	17
Number of Samples / Duration.....	17
Sample Rate / Data Rate.....	17
System Configuration.....	17
TPS Settings.....	17
Filtering/Clipping.....	18
Trigger/Marker.....	18
Execute Trigger.....	18
Arm.....	18
Clock.....	18

State

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

Remote command:

[:SOURce<hw>] :BB:DVB:STATe on page 52

Set To Default

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

Parameter	Value
State	Not affected by "Set to default"
Number of Super-Frames	1
Hierarchy Mode	Non-hierarchical
HP Sorce	PN 23
Filter Type	Cosine
Clipping	OFF
Trigger Mode	Auto
Cell Identification	ON
Time-Slicing	ON
ID [4 hex]	0000
MPE-FEC	OFF
PN Scrambler	ON
Outer Coder	ON
Outer Interleaver	ON
Inner Coder	ON
Rate	1/2
Inner Bit Interleaver	ON
Inner Symbol Interleaver	ON
Inner Interleaver Mode	Native
TX Mode	2 K
OFDM/RF Bandwidth	8 MHz
Modulation	QPSK
Alpha	1
Guard Inerval	1/8

Remote command:

[:SOURce<hw>] :BB:DVB:PRESet on page 52

Save/Recall...

Calls the "Save/Recall" dialog.

From the "Save/Recall" dialog, the "File Select" windows for saving and recalling DVB-H configurations and the "File Manager" is called.

DVB-H configurations are stored as files with the predefined file extension `*.dvb`. The file name and the directory they are stored in are user-definable.

The complete settings in the DVB-H menu are saved and recalled.

"Recall DVB-H Setting" Opens the "File Select" window for loading a saved DVB-H configuration.

The configuration of the selected (highlighted) file is loaded by pressing the "Select" button.

"Save DVB-H Setting" Opens the "File Select" window for saving the current DVB-H signal configuration.

The name of the file is specified in the File name entry field, the directory selected in the save into field. The file is saved by pressing the "Save" button.

The "Fast Save" checkbox determines whether the instrument performs an absolute or a differential storing of the settings. Enable this function to accelerate the saving process by saving only the settings with values different to the default ones. "Fast Save" is not affected by the "Preset" function.

"File Manager" Calls the "File Manager".

The dialog is used to copy, delete, and rename files and to create new directories.

Remote command:

`[:SOURce<hw>] :BB:DVB:SETTing:CATalog?` on page 52

`[:SOURce<hw>] :BB:DVB:SETTing:LOAD` on page 53

`[:SOURce<hw>] :BB:DVB:SETTing:STORE` on page 53

`[:SOURce<hw>] :BB:DVB:SETTing:STORE:FAST` on page 53

`[:SOURce<hw>] :BB:DVB:SETTing:DELeTe` on page 52

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

Remote command:

`[:SOURce<hw>] :BB:DVB:WAVEform:CREate` on page 53

DVB Standard

Selects the DVB standard to be used to generate the modulation signal.

Remote command:

`[:SOURce<hw>] :BB:DVB:STANdard` on page 54

VL-SNR Mode

(requires option R&S SMBV-K116)

For "DVB Standard > DVB-S2X", includes the VL-SNR (very low - signal to noise ratio) header in the physical layer frame.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBX:VSMODE on page 54

Number of Super Frames

For "DVB Standard > DVB-T/H", sets the number of the transmitted super-frames. Each super-frame consists of four OFDM frames.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBH|DVBT:SFRAMES on page 54

Number of Frames

(requires option R&S SMBV-K116)

For "DVB Standard > DVB-S2/S2X", sets the number of the transmitted frames.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS|DVBX:FRAMES on page 54

Number of Samples / Duration

For "DVB Standard > DVB-T/H" and "State > On", displays the number of the transmitted samples and the signal duration.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBH|DVBT:SAMPLE:LENGTH? on page 55

[:SOURce<hw>] :BB:DVB:DVBH|DVBT:DURATION? on page 55

Sample Rate / Data Rate

For "DVB Standard > DVB-T/H" and "State > On", displays the sample and data rates.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBH|DVBT:SAMPLE:RATE? on page 55

[:SOURce<hw>] :BB:DVB:DVBH|DVBT:DRATE? on page 55

System Configuration...

Calls the System Configuration menu for configuring the DVB-H system.

The hierarchy mode and the data source are displayed next to the button.

The menu is described in [Chapter 4.2, "DVB-T/DVB-H System Configuration Settings"](#), on page 18.

Remote command:

n.a.

TPS Settings...

Calls the "TPS Settings" menu for setting the TPS parameters and viewing the status of the parameter bits.

The menu is described in [Chapter 4.3, "DVB-T/DVB-H TPS Settings"](#), on page 21.

Remote command:

n.a.

Filtering/Clipping

Calls the menu for setting baseband filtering and clipping. The current filter and the clipping state are displayed next to the button.

The menu is described in [Chapter 4.8, "Filter/Clipping Settings"](#), on page 37.

Remote command:

n.a.

Trigger/Marker

Calls the menu for selecting the trigger mode and trigger source, for configuring the marker signals, and for setting the time delay of an external trigger signal.

This menu is described in [Chapter 4.9, "Trigger/Marker/Clock Settings"](#), on page 41.

The currently selected trigger mode and trigger source are displayed next to the button.

Remote command:

n.a.

Execute Trigger

Executes the trigger manually. A manual trigger can be executed only if an internal trigger source and a trigger mode other than "Auto" have been selected.

Remote command:

[\[:SOURCE<hw>\]:BB:DVB:TRIGGER:EXECUTE](#) on page 61

Arm

Stops signal generation manually. This button appears only with "Running" signal generation in the "Armed_Auto" and "Armed_Retrigger" trigger modes.

Remote command:

[\[:SOURCE<hw>\]:BB:DVB:TRIGGER:ARM:EXECUTE](#) on page 60

Clock

Calls the menu for selecting the clock source and for setting a delay.

This menu is described in [Chapter 4.9.4, "Clock Settings"](#), on page 48.

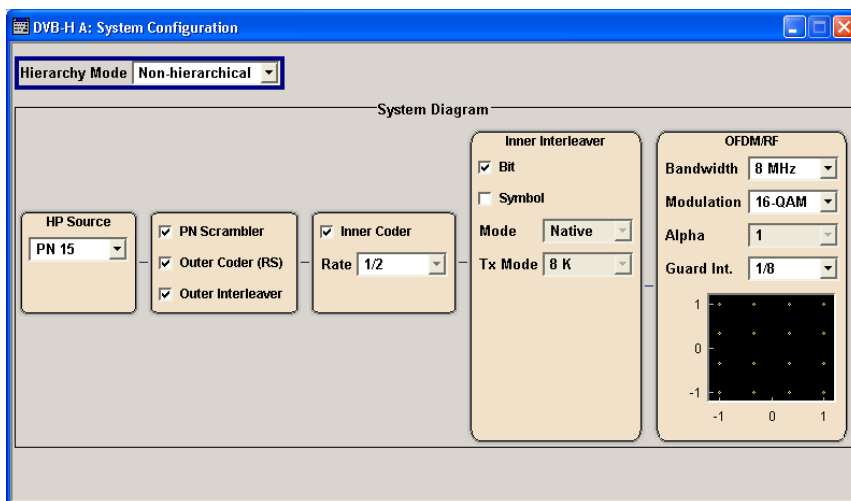
Remote command:

n.a.

4.2 DVB-T/DVB-H System Configuration Settings

The "System Configuration" dialog allows you to configure the DVB system. The DVB system is displayed in form of a block diagram including all parameters necessary to configure the system.

The system diagram depends on the selected "Hierarchy Mode".



Settings:

Hierarchy Mode 19

HP/LP Source 19

PN Scrambler 20

Outer Coder (RS) 20

Outer Interleaver 20

Inner Coder 20

Rate 20

Inner Bit Interleaver 20

Inner Symbol Interleaver 20

Inner Interleaver Mode 21

Inner Interleaver Tx Mode 21

OFDM/RF Bandwidth 21

OFDM/RF Modulation 21

OFDM/RF Alpha 21

OFDM/RF Guard Int 21

Hierarchy Mode

Selects the hierarchy mode.

"Hierarchical" Both inputs are used. The inputs are identical and simply differ in the prioritization.

"Non-hierarchical" The high priority input is used.

Remote command:

```
[ : SOURce<hw> ] : BB : DVb : DVbH | DVbT : HMODe on page 70
```

HP/LP Source

Selects the data source.

LP is provided in hierarchical mode, see [Hierarchy Mode](#) .

Remote command:

```
[ : SOURce<hw> ] : BB : DVb : DVbH | DVbT [ : HP | LP ] : DATA on page 70
```

```
[ : SOURce<hw> ] : BB : DVb : DVbH | DVbT [ : HP | LP ] : DATA : DSElection on page 70
```

PN Scrambler

Activates/deactivates the PN scrambling. The data packets of the incoming transport stream are transformed to a pseudo random binary sequence (PRBS). This transformation is performed to obtain a bit sequence that has a positive effect on the transmitted RF spectrum.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT [ :HP|LP ] :PNScrambler [ :STATe ]
```

on page 71

Outer Coder (RS)

Activates/deactivates the outer coder. The outer coder applies a Reed-Solomon error correction code to the PRBS data stream.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT [ :HP|LP ] :OCODer [ :STATe ] on page 71
```

Outer Interleaver

Activates/deactivates the outer convolutional interleaver.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT [ :HP|LP ] :OINTerleaver [ :STATe ]
```

on page 71

Inner Coder

Activates/deactivates the inner coder. The inner coder is a punctured convolutional error-correcting coder.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT [ :HP|LP ] :ICODer [ :STATe ] on page 71
```

Rate

If "Inner Coder > On", selects the code rate of the inner coder.

The incoming bits (m) to be encoded is transformed into an bit symbol (containing n-bits), where m/n is the code rate.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT [ :HP|LP ] :ICODer:RATE on page 70
```

Inner Bit Interleaver

Activates/deactivates the inner bit interleaver.

The inner interleaver consists of a bit-wise interleaving followed by symbol interleaving. Both interleaving processes are block based.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT:IINTerleaver:BIT [ :STATe ]
```

on page 72

Inner Symbol Interleaver

Activates/deactivates the inner symbol interleaver.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT:IINTerleaver:SYMBOL [ :STATe ]
```

on page 72

Inner Interleaver Mode

Selects the inner interleaver mode. Interleaver mode in-depth is available only for transmission mode 2K and 4K.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBH | DVBT:IINTERleaver:SYMBOL:MODE`
on page 72

Inner Interleaver Tx Mode

Selects the transmission mode.

This setting determines the number of the OFDM subcarriers. For transmission mode 8K, the in-depth interleaver mode is not available.

Transmission mode 4K is available for DVB-H.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBH | DVBT:IINTERleaver:SYMBOL:TMODE`
on page 72

OFDM/RF Bandwidth

Selects the system bandwidth.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBH | DVBT:OFDM:BWIDth` on page 73

OFDM/RF Modulation

Selects the constellation for the OFDM modulation.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBH | DVBT:OFDM:MODulation` on page 73

OFDM/RF Alpha

For "Hierarchy Mode > Hierarchical" and "Modulation > 16-QAM/64-QAM", selects the alpha value.

This value is used to shape the constellation of the modulation. For nonhierarchical mode, this value is always 1 and cannot be changed.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBH | DVBT:OFDM:ALPHa` on page 73

OFDM/RF Guard Int

Selects the value for the guard interval. The guard interval extends the length of the transmitted symbol. The guard intervals are given as fractions of a symbol period.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBH | DVBT:OFDM:GINTerval` on page 73

4.3 DVB-T/DVB-H TPS Settings

The "TPS Settings" dialog allows you to select the bits to transmit via the TPS signal and displays the status of the parameter bits.

Settings:

Cell Identification 22
 ID [4 hex] 22
 Time Slicing 22
 MPE FEC 22
 TPS Table 22

Cell Identification

Activates/deactivates the TPS cell identification. If activated, the cell from which the signal comes from is identified.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT:TPS:ID:STATE on page 82
```

ID [4 hex]

Sets the cell ID for cell identification.

The cell ID identifies the cell from which the signal is transmitted. This value is read by the receiver if [Cell Identification](#) is activated.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT:TPS:ID:PATTERN on page 82
```

Time Slicing

Indicates the status of the time-slicing bit.

If activated, the average power consumption of the terminal is reduced.

In this implementation, time-slicing information is not generated.

Time slicing is always used for DVB-H and permanently disabled for DVB-T.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT:TPS:TSLICING[:STATE]? on page 83
```

MPE FEC

Activates/deactivates the multiprotocol encapsulation forward error correction bit. MPE-FEC must be performed in the transport stream. This implementation does not support MPE-FEC.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBH|DVBT:TPS:MFEC[:STATE] on page 82
```

TPS Table

The TPS parameter bit table displays the status of the transmitted TPS parameter bits.

Bit	Value	Purpose
0	x	Initialization
1-16	xxxxxxxxxxxxxxxx	Synchronization word
17-22	100001	Length indicator (Cell ID on/off)
23-24	xx	Frame number
25-26	10	Constellation
27	0	Inner interleaver mode
28-29	00	Alpha
30-32	000	Code rate HP stream
33-35	000	Code rate LP stream
36-37	10	Guard interval
38-39	01	Transmission mode
40-47	xxxxxxx	Cell identifier
48	1	Time slicing
49	1	MPE-FEC
50-53	0000	Reserved
54-67	xxxxxxxxxxxx	BCH error protection

Table 4-1: TPS signaling information transmitted in DVB-H

Bit number	Format	Purpose
0	0/1	Initialization bit for the differential 2PSK modulation. The modulation of the TPS initialization bit is derived from the PRBS sequence
1-16		Bits 1 to 16 of the TPS are the synchronization words for the TPS blocks in the super-frames:
	0011010111101110	Synchronization word for the first and the third TPS block in each super-frame
	11001010000100001	Synchronization word for the second and the fourth TPS block in each super-frame
17-22		The first 6 bits of the TPS information is used as a TPS length indicator to signal the number of used bits of the TPS:
	010111	Cell identification is not transmitted (23 TPS bits in use)
	011111	Cell identification information is transmitted (31 TPS bits in use)
	100001	Cell identification information is transmitted for DVB-H (33 TPS bits in use)
23-24		Indicates the frame in the super-frame. Four frames constitute a super-frame.
	00	Frame 1 in the super-frame
	01	Frame 2 in the super-frame
	10	Frame 3 in the super-frame
	11	Frame 4 in the super-frame
25-26		Indicates the constellation
	00	QPSK

Bit number	Format	Purpose
	01	16-QAM
	10	64-QAM
	11	Reserved
27		Indicates the interleaver mode. The in-depth interleaver can be used for 2K and 4K transmission mode. For transmission mode 8K, only the native interleaver is used:
	0	The native interleaver is used
	1	The in-depth interleaver is used
28-29		Indicates the hierarchical transmission and the value of the alpha-factor
	00	Transmission in nonhierarchical mode
	01	Alpha = 1
	10	Alpha = 2
	11	Alpha = 4
30-32		Indicates the code rate for the HP transmission stream
	000	1/2
	001	2/3
	010	3/4
	011	5/6
	100	7/8
	101	reserved
	110	reserved
	111	reserved
33-35		Indicates the code rate for the LP transmission stream
	000	1/2
	001	2/3
	010	3/4
	011	5/6
	100	7/8
	101	reserved
	110	reserved
	111	reserved
36-37		Indicates the value for the guard interval
	00	1/32

Bit number	Format	Purpose
	01	1/16
	10	1/8
	11	1/4
38-39		Indicates the transmission mode
	00	2K mode
	01	8K mode
	10	4K mode
	11	reserved
40-47	Cell_id	32 bits are used for the cell ID. Every frame contains 8 bits. The 8 bits are used to identify the cell from which the signal comes from.
48		Indicates the usage of time-slicing
	0	Time-slicing is not used
	1	At least one elementary stream uses time-slicing
49		Indicates the usage of MPE-FEC
	0	MPE-FEC is not used
	1	At least one elementary stream uses MPE-FEC
50-53	reserved	
54-67	xxxxxxxxxxxxxxxx	BCH error protection

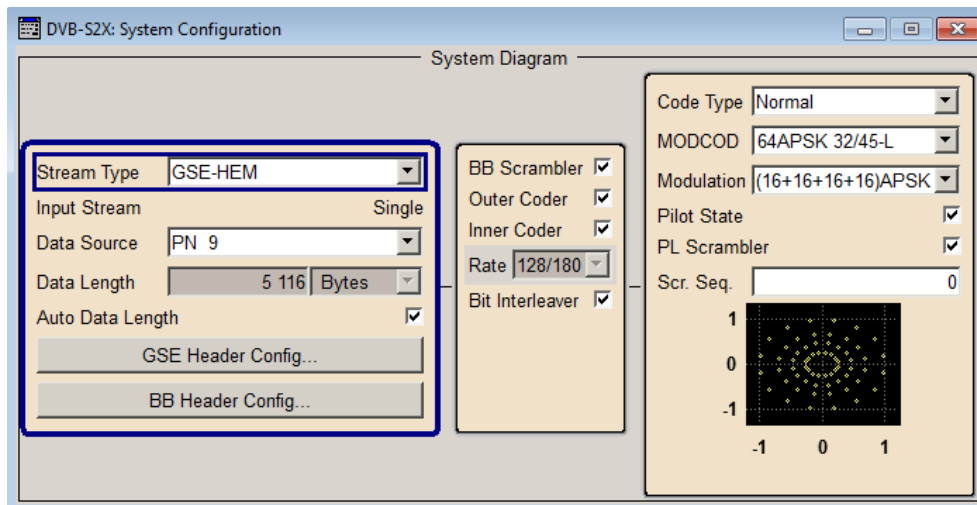
4.4 DVB-S2/DVB-S2X System Configuration Settings

These settings require option R&S SMBV-K116.

Access:

1. Select "DVB > DVB Standard > DVB-S2/DVB-S2X"

2. Select "System".



This dialog comprises the settings to configure the DVB system. The DVB system is displayed in form of a block diagram including all related parameters. The provided settings depend on the selected [DVB Standard](#).

The four blocks indicate the first four logical signal processing parts:

- Mode adaptation:
Input stream configuration, incl. configuration of the header information
- Stream adaptation:
Baseband scrambling and FEC (forward error correction) encoding
- Constellation mapping:
Modulation and coding
- Pilot:
Insertion and scrambling of the optional pilot.

The last processing part is the baseband spectrum shaping. Find the required filter parameters in the "Filter" dialog, see [Chapter 4.8.1, "Filter Settings"](#), on page 37.

Settings:

Stream Type	27
Input Stream	27
Data Source	27
Data Length	28
Auto Data Length	28
TS Header Config	28
GSE Header Config	28
BB Header Config	29
BB Scrambler	29
Outer Coder	29
Inner Coder	29
Rate	29
SF	29
Bit Interleaver	29
Code Type	30

MODCOD.....30
 Modulation30
 Pilot State30
 PL Scrambler30
 Scr. Sequence31

Stream Type

Selects the type of input stream:

- "Transport"
 Transport stream TS
- "GP"
 Generic packetized
- "GC"
 Generic continuous
- "GSE-HEM" ("DVB Standard > DVB-S2X")
 Generic stream encapsulation, high efficiency mode (HEM) packetized.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS | DVBX:STYPe on page 76

Input Stream

Indicates that the input stream is single (SIS).

Multiple input streams (MIS) are not supported.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS | DVBX:ISTReam? on page 76

Data Source

Selects the data source.

The following standard data sources are available:

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

See also "Main Dialog > Data List Management".

"TS File, Select File"

For "DVB Standard > DVB-S2", uses a transport stream (TS) file as data source. TS files are files with extension *.gts, *.ts or *.trp

File extension	Format	Description
*.gts	Rohde & Schwarz proprietary	
*.trp	MPEG-2	Standard DVB file format for HD video transport Contains High Definition Transportation Stream
*.ts	MPEG	Standard digital container format for transmission and storage of audio, video, and Program and System Information Protocol (PSIP) data.

Select "Select File" to access the standard "File Select" dialog.

"GSE File, Select File"

For "DVB Standard > DVB-S2X", uses a generic stream encapsulation (GSE) file as data source. GSE files are files with extension *.gse.

Select "Select File" to access the standard "File Select" dialog.

Remote command:

[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:DATA on page 76
 [:SOURCE<hw>] :BB:DVB:DVBS | DVBX:DATA :
 DSElection | TSElection | GSElection on page 77
 [:SOURCE<hw>] :BB:DVB:DVBS | DVBX:DATA:PATtern on page 76

Data Length

If "Auto Data Length > Off", sets the data length in bytes.

The value is used to calculate the value of the parameter [Total Length](#).

Remote command:

[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:DATA:LENGth on page 77

Auto Data Length

Defines if the "Data Length" is set automatically or manually.

Remote command:

[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:ADLength:STATe on page 77

TS Header Config

For "Stream Type > Transport", accesses the transport stream header settings, see [Chapter 4.5, "TS Header Settings"](#), on page 31.

GSE Header Config

For "Stream Type > GSE-HEM", accesses the GSE header settings, see [Chapter 4.6, "GSE Header Settings"](#), on page 33.

BB Header Config

Accesses the baseband header settings, see [Chapter 4.7, "BB Header Settings"](#), on page 35.

BB Scrambler

Activates baseband scrambling.

Remote command:

`[:SOURce<hw>] :BB:DVB:DVBS | DVBX:BSCRambler [:STATe]` on page 78

Outer Coder

Enables the BCH outer coder.

BCH codes are Bose-Chaudhuri-Hocquenghem multiple error correction binary block codes.

Remote command:

`[:SOURce<hw>] :BB:DVB:DVBS | DVBX:OCODer [:STATe]` on page 78

Inner Coder

Applies LDPC (low-density parity check) encoding to data bits.

Remote command:

`[:SOURce<hw>] :BB:DVB:DVBS | DVBX:ICODer [:STATe]` on page 78

Rate

Selects the code rate of the inner LDPC coder.

The code rate is calculated as $code\ rate = m/n$, where:

- m is the number of incoming bits
- n are the number of bits in the coded output symbol

A wide range of code rates is specified. The available code rates depend on the selected "Modulation", modulation coder ("MODCOD") and if "VL-SNR Mode" is used or not.

Remote command:

`[:SOURce<hw>] :BB:DVB:DVBS | DVBX:ICODer:RATE` on page 78

SF

For "DVB Standard > DVB-S2X" with enabled [VL-SNR Mode](#) and "Code Type > Short", sets the spreading factor.

Per default, the VL-SNR mode uses "Modulation > pi/2 BPSK" and "SF = 2". The spreading factor of 2 means that encoded bits are repeated twice before they are mapped into the constellation.

Remote command:

`[:SOURce<hw>] :BB:DVB:DVBS | DVBX:SFACTOR` on page 79

Bit Interleaver

If enabled, the output of the LDPC encoder is bit interleaved using a block interleaver.

Remote command:

`[:SOURce<hw>] :BB:DVB:DVBS | DVBX:BINTerleaver [:STATe]` on page 79

Code Type

Selects the FEC code type.

"Code Type > Medium" is available if "VL-SNR Mode > On".

In VL-SNR mode, the required Walsh-Hadamard sequence is selected automatically as function of the parameters **MODCOD** and "Code Type".

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS | DVBX:CTYPe on page 79

MODCOD

Selects the MODCOD.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS | DVBX:MCOD on page 80

Modulation

Selects the modulation scheme.

Suitable modulation schemes are selected automatically to fit the selected **MODCOD**.

The DVB-S2/S2X standards specify different modulation schemes, ranging in power and spectrum efficiency. The available values depend on the used "DVB Standard", the selected "MODCOD", "Code Type" and if "VL-SNR Mode" is used or not.

- "DVB Standard > DVB-S2"
QPSK, 8PSK, 16APSK, 32APSK
- "DVB Standard > DVB-S2X"
QPSK, 8APSK, 8PSK, 16APSK, 32APSK, 64APSK, 128APSK, 256APSK
- "DVB Standard > DVB-S2X" with "VL-SNR Mode > On"
QPSK, pi/2 BPSK

The constellation diagram illustrates the selected modulation and coding.

Example:

"Modulation = (16 + 16 + 16 + 16) APSK" is an APSK modulation with 64 constellation points, distributed on 4 concentric rings with 16 constellation point each.

The radius of each ring is defined as function of the selected code rate.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS | DVBX:MODulation on page 80

Pilot State

Activates/deactivates the pilot.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS | DVBX:PSTate [:STATe] on page 81

PL Scrambler

Activates/deactivates pilot scrambling.

The pilot data is scrambled with the selected scrambling sequence ([Scr. Sequence](#)).

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS | DVBX:PSCRambler [:STATe] on page 81

Scr. Sequence

For "DVB Standard > DVB-S2X", sets the bit sequence used to scramble the pilot.

Remote command:

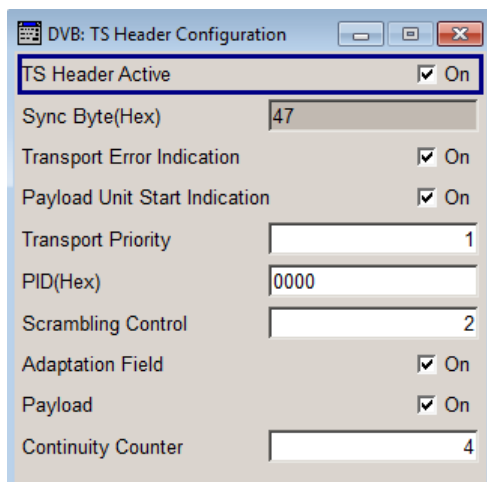
[:SOURCE<hw>] :BB:DVB:DVbX:SSEquence on page 81

4.5 TS Header Settings

These settings require option R&S SMBV-K116.

Access:

1. Select "DVB > DVB Standard > DVB-S2/DVB-S2X"
2. Select "System".
3. Select "Stream Type > Transport".
4. Select "TS Header Config".



The dialog lists the transport stream header settings.

Settings:

TS Header Active	32
Sync Byte (Hex)	32
Transport Error Indication	32
Payload Unit Start Indication	32
Transport Priority	32
PID (Hex)	32
Scrambling Control	32
Adaptation Field	32
Payload	32
Continuity Counter	33

TS Header Active

Inserts header information in the transport stream.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig[:STATE]` on page 83

Sync Byte (Hex)

Displays the information carried by the synchronization byte. The value is in a hexadecimal format.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig:SBYTE?` on page 83

Transport Error Indication

Inserts transport error indication information in the header.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig:TEINdication[:STATE]`
on page 84

Payload Unit Start Indication

If enabled, the PES (packetized elementary streams), PSI (program specific information), or DVB-MIP (megaframe initialization) packet begin immediately after the header.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig:PUS` on page 84

Transport Priority

Marks the current packet as high priority packet compared to packets with the same PID.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig:TPriority` on page 84

PID (Hex)

Sets the packet identifier PID in hexadecimal format.

Packet identifiers describe the payload data.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig:PID:PATtern` on page 84

Scrambling Control

Sets the scrambling information.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig:SCONtrol` on page 85

Adaptation Field

Inserts an adaptation field in the packet.

Remote command:

`[:SOURCE<hw>] :BB:DVB:DVBS | DVBX:THConfig:AFIeld[:STATE]` on page 85

Payload

Adds a payload field in packet.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:THConfig:PAYLoad [ :STATe ]
```

on page 85

Continuity Counter

Sets the sequence number of the first payload packet.

Remote command:

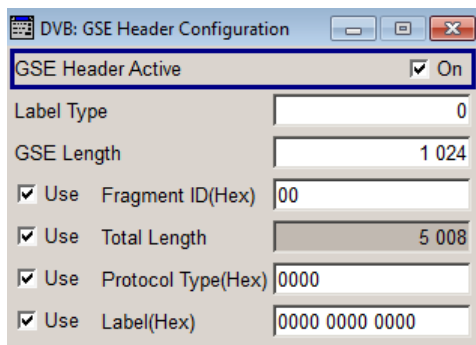
```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:THConfig:CCounter on page 85
```

4.6 GSE Header Settings

These settings require option R&S SMBV-K116.

Access:

1. Select "DVB > DVB Standard > DVB-S2X"
2. Select "System".
3. Select "Stream Type > GSE-HEM".
4. Select an arbitrary data source, e.g. "Data Source > PN15".
5. Select "GSE Header Config".



The dialog lists the generic stream encapsulation (GSE) header settings.

Settings:

GSE Header Active	33
Label Type	34
GSE Length	34
Use, Fragment ID (Hex).....	34
Use, Total Length.....	34
Use, Protocol Type (Hex).....	34
Use, Label (Hex).....	34

GSE Header Active

Inserts header information in the transport stream.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBX:GHConfig[:STATe] on page 86

Label Type

Set the type of the used label field.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBX:GHConfig:LTYPe on page 86

GSE Length

Sets the number of bytes following in the GSE packet.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBX:GHConfig:GLENgth on page 87

Use, Fragment ID (Hex)

Indicates that a PDU fragment is included in the GSE packet.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBX:GHConfig:FID:PATtern on page 87
 [:SOURce<hw>] :BB:DVB:DVBX:GHConfig:FIUse[:STATe] on page 87

Use, Total Length

Indicates the total length in bytes, calculated as follows:

"Total Length" = PDU length ("Data Length") + [2 bytes if "Use Protocol Type > On"] + [6 (or 3) bytes if "Use Label > On"].

Extension headers are not supported and hence not included in the calculation.

Example:

If "Data Length = 4000", "Use Protocol Type > On" and "Use Label > Off", the "Total Length = 4002"

Remote command:

[:SOURce<hw>] :BB:DVB:DVBX:GHConfig:TLENgth? on page 87
 [:SOURce<hw>] :BB:DVB:DVBX:GHConfig:TLUse[:STATe] on page 88

Use, Protocol Type (Hex)

Indicates the payload type carried in the PDU.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBX:GHConfig:PTYPe:PATtern on page 88
 [:SOURce<hw>] :BB:DVB:DVBX:GHConfig:PTUSE[:STATe] on page 88

Use, Label (Hex)

For "Label Type = 0 | 1", sets the label used for addressing.

The value range changes depending on the "Label Type".

"Label Type" value	"Label" value range
0	000000000000 to FFFFFFFF
1	000000 to FFFFFF

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS:GHConfig:LABel:PATtern on page 88

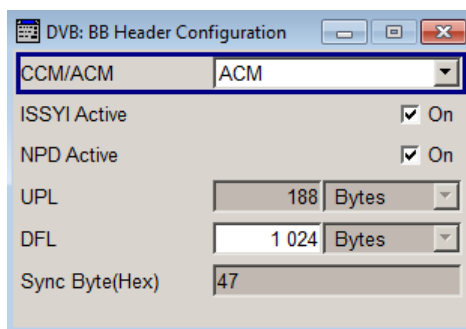
[:SOURce<hw>] :BB:DVB:DVBS:GHConfig:LUSE[:STATe] on page 89

4.7 BB Header Settings

These settings require option R&S SMBV-K116.

Access:

1. Select "DVB > DVB Standard > DVB-S2/DVB-S2X"
2. Select "System".
3. Select "BB Header Config".



The dialog lists the baseband (BB) header settings.

Use the "Filter" settings, to set the filter parameter [Roll-off factor](#) and determine the RO bits of the BB header.

Settings:

CCM/ACM	35
ISSYI Active	36
GSE-Lite Active	36
NPD Active	36
UPL	36
DFL	36
Auto DFL	36
Sync (Hex)	36

CCM/ACM

Selects whether constant coding and modulation (CCM) or adaptive coding and modulation (ACM) communication is used.

In ACM mode, for instance, the receiver sends feedback information on received signal quality. Depending on this feedback, the channel coding and modulation is optimized on a frame-by-frame basis.

Remote command:

[:SOURce<hw>] :BB:DVB:DVBS|DVBS:BHConfig:CACM on page 89

ISSYI Active

If enabled, sets the ISSYI (input stream synchronization indicator) bit to 1.

The ISSY field is inserted after the user packets (UP) or in the BB header of the GSE-HEM stream.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:BHConfig:IACTive [ :STATe ]
```

on page 89

GSE-Lite Active

For [Stream Type](#) > "GSE-HEM", indicates that the GSE stream is GSE-Lite compliant.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:BHConfig:GLACTive [ :STATe ]
```

on page 90

NPD Active

Activates null-packet deletion (NPD).

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:BHConfig:NACTive [ :STATe ]
```

on page 90

UPL

Indicates the user packet length (UPL).

The user packet length depends on the "Stream Type":

- For "Transport", "UPL = 188 Bytes"
- For "GC", "UPL = 0 Bytes" which results in a continuous stream
- For "GP", UPL is a configurable value.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:BHConfig:UPL
```

on page 90

DFL

If "Auto DFL > Off", sets the data field length (DFL).

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:BHConfig:DFL
```

on page 91

Auto DFL

Defines if the "DFL" is set automatically or manually.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:BHConfig:ADFL:STATe
```

on page 90

Sync (Hex)

Indicates the user packet synchronization byte.

The value and the value range depend on the used [Stream Type](#) :

- For "TS" and "GP", "Sync = 47".
This value indicates MPEG transport stream packets.
- For "GC", the value is configurable.

Remote command:

```
[ :SOURCE<hw> ] :BB:DVB:DVBS | DVBX:BHConfig:SBYTe:PATtern
```

on page 91

4.8 Filter/Clipping Settings

Access:

- ▶ Select "Main dialog > Filter/Clipping Settings".



The dialog comprises the settings, necessary to configure the baseband filter and to enable clipping.

4.8.1 Filter Settings

Provided are the following settings:

Settings:

Filter.....	37
Rolloff Range.....	38
Rolloff Factor or BxT.....	38
Cutoff Frequency Shift.....	38
Cutoff Frequency Factor.....	39
Symbol/Sample Rate Variation	39

Filter

Selects the baseband filter.

The DVB-S2/S2X standards use the predefined root cosine (RRC) filter to shape the baseband signal spectrum.

Remote command:

[:SOURce<hw>] :BB:DVB:FILTer:TYPE on page 56

Rolloff Range

(requires option R&S SMBV-K116)

For "DVB Standard > DVB-S2X", selects whether the high or the low filter roll-off range is used, see [Table 4-2](#).

Remote command:

[\[:SOURCE<hw>\]:BB:DVB:FILTer:RORange](#) on page 57

Rolloff Factor or BxT

Sets the filter parameter.

The rolloff factor affects the steepness of the filter slopes. A "Rolloff Factor = 0" results in the steepest slopes; values near to 1 make the slopes more flat.

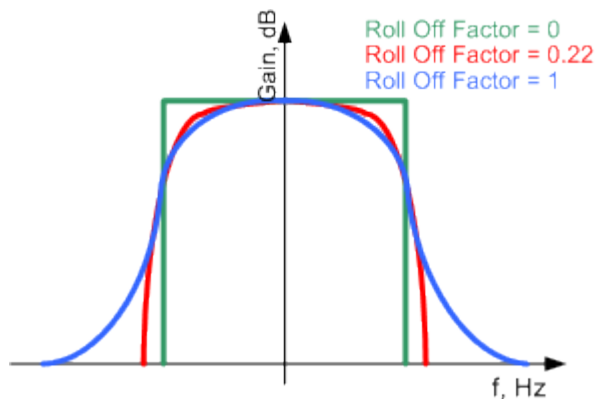


Figure 4-1: Example of the frequency response of a filter with different rolloff factors

For "DVB Standard > DVB-S2/S2X", the rolloff factors are predefined.

Table 4-2: Predefined sets of spectrum shapes

"DVB Standard"	"Rolloff Range"	"Rolloff Factor"
"DVB-S2"	-	0.35, 0.25, 0.20
"DVB-S2X"	Low	0.15, 0.1, 0.05
	High	0.35, 0.25, 0.20

Remote command:

[\[:SOURCE<hw>\]:BB:DVB:FILTer:PARAmeter:APCO25](#) on page 56

[\[:SOURCE<hw>\]:BB:DVB:FILTer:PARAmeter:COSine](#) on page 56

[\[:SOURCE<hw>\]:BB:DVB:FILTer:PARAmeter:GAUSS](#) on page 57

[\[:SOURCE<hw>\]:BB:DVB:FILTer:PARAmeter:PGAuss](#) on page 57

[\[:SOURCE<hw>\]:BB:DVB:FILTer:PARAmeter:RCOSine](#) on page 57

[\[:SOURCE<hw>\]:BB:DVB:FILTer:PARAmeter:SPHase](#) on page 57

[\[:SOURCE<hw>\]:BB:DVB:FILTer:ROFactor](#) on page 57

Cutoff Frequency Shift

The cutoff frequency is a filter characteristic that defines the frequency at the 3 dB down point. The "Cut Off Frequency Shift" affects this frequency in the way that the fil-

ter flanks are "moved" and the transition band increases by "Cut Off Frequency Shift"*"Sample Rate".

- A "Cut Off Frequency Shift" = -1 results in a very narrow-band filter
- Increasing the value up to 1 makes the filter more broad-band
- By "Cut Off Frequency Shift" = 0, the -3 dB point is at the frequency determined by the half of the selected "Sample Rate".

Tip: Use this parameter to adjust the cutoff frequency and reach spectrum mask requirements.

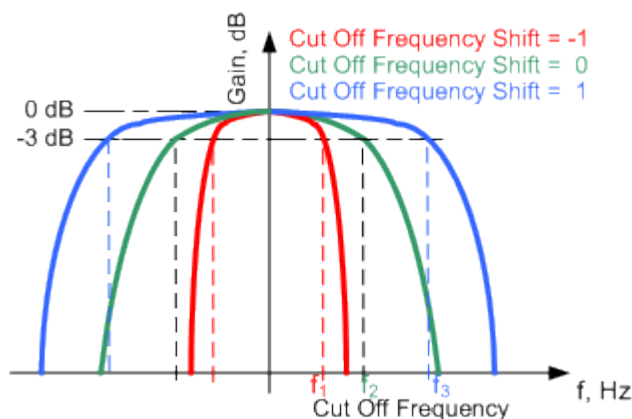


Figure 4-2: Example of the frequency response of a filter with different cutoff frequency shift

Remote command:

`[:SOURCE<hw>] :BB:DVB:FILTer:PARAmeter:COsine:COFS` on page 56

Cutoff Frequency Factor

Sets the value for the cutoff frequency factor. The cutoff frequency of the filter can be adjusted to reach spectrum mask requirements.

Remote command:

`[:SOURCE<hw>] :BB:DVB:FILTer:PARAmeter:LPASs` on page 57

`[:SOURCE<hw>] :BB:DVB:FILTer:PARAmeter:LPASSEVM` on page 57

Symbol/Sample Rate Variation

Sets the symbol/sample rate of the signal. A variation of this parameter only affects the ARB clock rate; all other signal parameters remain unchanged.

Remote command:

`[:SOURCE<hw>] :BB:DVB:SRATe:VARiatiOn` on page 58

4.8.2 Clipping Settings

DVB signals can have a high crest factor (~ 11dBm) because of high amplitude variations that come along with OFDM signals having a noise-like spectrum. High crest factors entail two basic problems:

- The nonlinearity of the power amplifier (compression) causes intermodulation which expands the spectrum (spectral regrowth).

- Since the level in the D/A converter is relative to the maximum value, the average value is converted with a relatively low resolution. This results in a high quantization noise.

Both effects increase the adjacent-channel power.

Since clipping the signal not only changes the peak value but also the average value, the effect on the crest factor is unpredictable.

The following pictures demonstrate the effect of clipping with vector mode ($|i+jq|$), using the default signal configuration with a PN23 input sequence.

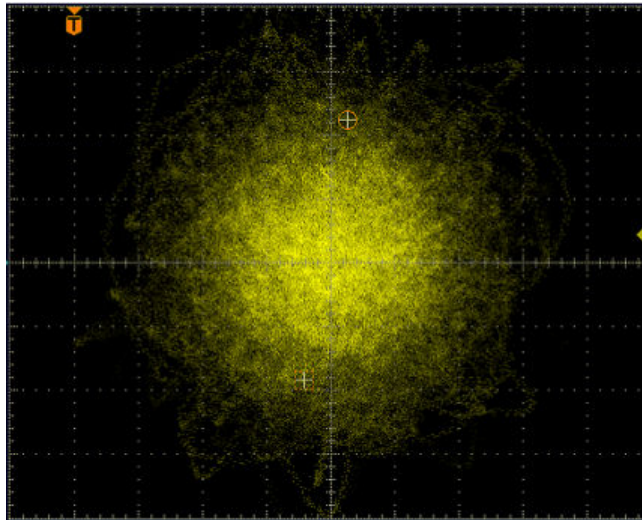


Figure 4-3: Constellation diagram of the signal without clipping, shows the level mapping

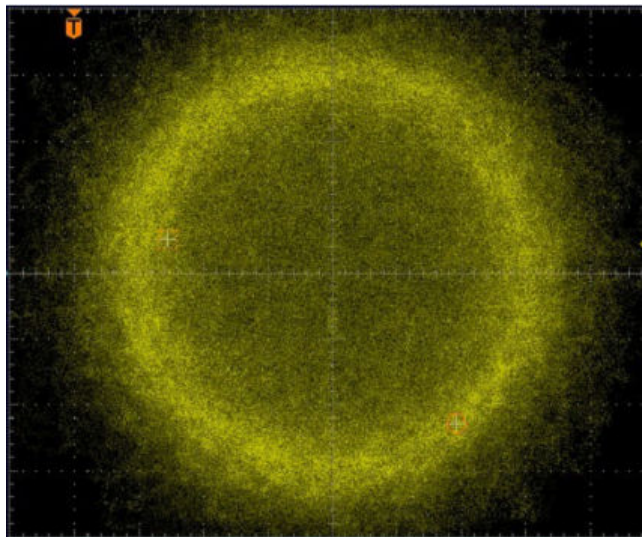


Figure 4-4: Constellation diagram with clipping level 10 %, vector mode ($|i+jq|$)

Settings:

Clipping State.....	41
Clipping Level.....	41
Clipping Mode.....	41

Clipping State

Switches baseband clipping on and off.

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

Remote command:

`[:SOURCE<hw>] :BB:DVB:CLIPPING:STATE` on page 59

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:DVB:CLIPPING:LEVEL` on page 58

Clipping Mode

Selects the clipping method. The dialog displays a graphical illustration on how this two methods work.

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

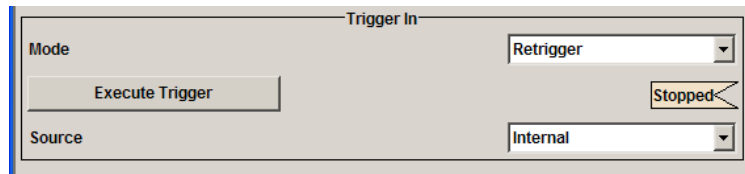
Remote command:

`[:SOURCE<hw>] :BB:DVB:CLIPPING:MODE` on page 59

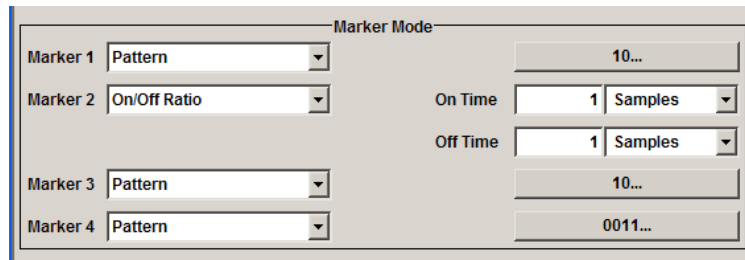
4.9 Trigger/Marker/Clock Settings

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

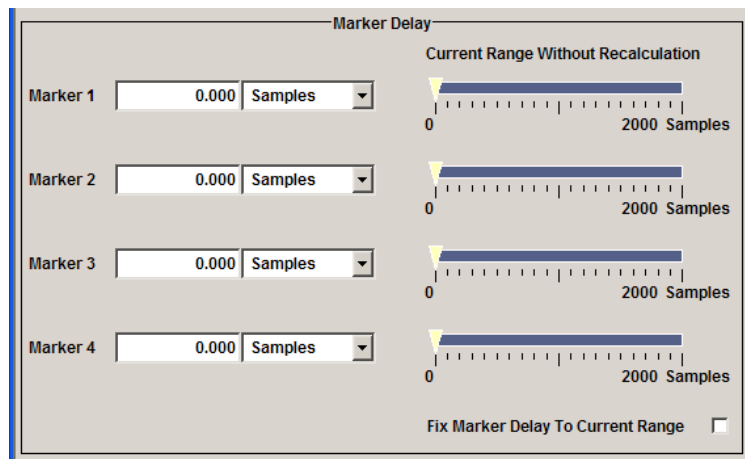
The "Trigger In" section is where the trigger for the signal is set. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation ("Running" or "Stopped") is indicated for all trigger modes.



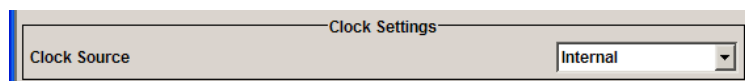
The "Marker Mode" section is where the marker signals at the "Marker" output connectors are configured.



The "Marker Delay" section is where a marker signal delay can be defined, either without restriction or restricted to the dynamic section, i.e., the section in which it is possible to make settings without restarting signal and marker generation.



The "Clock Settings" section is where the clock source is selected and - in the case of an external source - the clock type.



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



4.9.1 Trigger Settings

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

Trigger Mode

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

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

Remote command:

[\[:SOURCE<hw>\]:BB:DVB\[:TRIGGER\]:SEQUENCE](#) on page 63

Signal Duration Unit

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

Remote command:

[\[:SOURCE<hw>\]:BB:DVB:TRIGGER:SLUNIT](#) on page 61

Signal Duration

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

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

Remote command:

[\[:SOURCE<hw>\]:BB:DVB:TRIGGER:SLLENGTH](#) on page 61

Running/Stopped

With 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:DVB:TRIGger:RMODe?` on page 61

Arm

Stops signal generation manually. This button appears only with "Running" signal generation in the "Armed_Auto" and "Armed_Retrigger" trigger modes.

Remote command:

`[:SOURce<hw>] :BB:DVB:TRIGger:ARM:EXECute` on page 60

Execute Trigger

Executes the trigger manually. A manual trigger can be executed only if an internal trigger source and a trigger mode other than "Auto" have been selected.

Remote command:

`[:SOURce<hw>] :BB:DVB:TRIGger:EXECute` on page 61

Trigger Source

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

- "Internal"
The trigger event is executed by "Execute Trigger".
- "External"
The trigger event is the active edge of an external trigger signal, supplied at the TRIGGER connector.
Use the "Global Trigger/Clock Settings" dialog to define the polarity, the trigger threshold and the input impedance of the trigger signal.

Remote command:

`[:SOURce<hw>] :BB:DVB:TRIGger:SOURce` on page 62

Sync. Output to External Trigger

(enabled for Trigger Source External)

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

For R&S SMBV instruments:

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

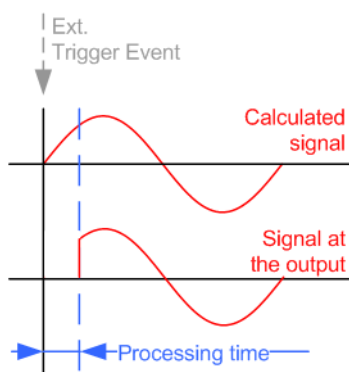
Table 4-3: Typical Applications

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

"On"

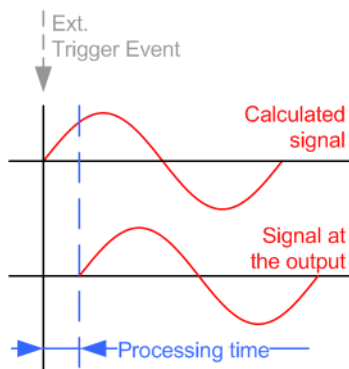
Corresponds to the default state of this parameter.

The signal calculation starts simultaneously with the external trigger event but because of the instrument's processing time the first samples are cut off and no signal is 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.



Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger:EXternal:SYNChronize:OUTPut`
on page 61

Trigger Delay

Delays the trigger event of the signal from:

- The external trigger source

Use this setting to:

- Synchronize the instrument with the device under test (DUT) or other external devices

Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger [:EXternal<ch>] :DELay` on page 62

Trigger Inhibit

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

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

This parameter is only available on external triggering.

Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger [:EXternal<ch>] :INHibit` on page 62

4.9.2 Marker Mode

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

The R&S SMBV supports only two markers.

Marker Mode

Selects a marker signal for the associated MARKER output.

"Restart"	A marker signal is generated at the start of every sequence length loop.
"Super Frame Start"	A marker signal is generated at the start of every super-frame period.
"Frame Start"	A marker signal is generated at the start of each frame.
"Pulse"	A regular marker signal is generated. The pulse frequency is defined by entering a divider. The frequency is derived by dividing the sample rate by the divider. The input box for the divider opens when "Pulse" is selected, and the resulting pulse frequency is displayed below it.

Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:PULSe:DIVider` on page 65
`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:PULSe:FREQuency?`
on page 65

"Pattern" A marker signal that is defined by a bit pattern is generated. The pattern has a maximum length of 64 bits and is defined in an input field which opens when pattern is selected.

Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:PATTern` on page 65

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



Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:ONTime` on page 64

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:OFFTime` on page 64

Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:MODE` on page 64

4.9.3 Marker Delay

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

The R&S SMBV supports only two markers.

Marker x Delay

Enters the delay between the marker signal at the marker outputs and the start of the frame or slot.

The input is expressed as a number of samples. If the setting "Fix marker delay to dynamic range" is enabled, the setting range is restricted to the dynamic range. In this range the delay of the marker signals can be set without restarting the marker and signal.

Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:DELay` on page 66

Current Range without Recalculation

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

The delay can be defined by moving the setting mark.

Remote command:

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:DELay:MINimum?` on page 66

`[:SOURCE<hw>] :BB:DVB:TRIGger:OUTPut<ch>:DELay:MAXimum?` on page 66

Fix marker delay to current range

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

Remote command:

`[:SOURce<hw>] :BB:DVB:TRIGger:OUTPut:DELaY:FIXed` on page 66

4.9.4 Clock Settings

The clock settings are used to set the clock source and a delay if required.

Sync. Mode

(for R&S SMBV only)

Selects the synchronization mode.

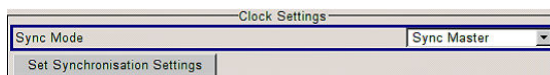
This parameter is used to enable generation of very precise synchronous signal of several connected R&S SMBVs.

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

Avoid unnecessary cable length and branching points.

"None" The instrument is working in stand-alone mode.

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



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

Remote command:

`[:SOURce<hw>] :BB:DVB:CLOCK:SYNChronization:MODE` on page 67

Set Synchronization Settings

(for R&S SMBV only)

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

Remote command:

`[:SOURce<hw>] :BB:DVB:CLOCK:SYNChronization:EXECute` on page 68

Clock Source

Selects the clock source.

"Internal" The internal clock reference is used to generate the sample clock.

"External" The external clock reference is fed in as the sample clock or multiple thereof via the CLOCK connector.

The sample rate must be correctly set to an accuracy of +/-2 % (see data sheet).

The polarity of the clock input can be changed with the aid of "Global Trigger/Clock Settings".

Remote command:

`[:SOURce<hw>] :BB:DVB:CLOCK:SOURce` on page 67

Clock Mode

Enters the type of externally supplied clock.

"Sample" A sample clock is supplied via the CLOCK connector.

"Multiple Sample" A multiple of the sample clock is supplied via the CLOCK connector; the sample clock is derived internally from this.

Remote command:

`[:SOURce<hw>] :BB:DVB:CLOCK:MODE` on page 67

Clock Multiplier

Enters the multiplication factor for clock type "Multiple".

Remote command:

`[:SOURce<hw>] :BB:DVB:CLOCK:MULTIPLIER` on page 67

Measured External Clock

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

Remote command:

`CLOCK:INPut:FREQuency?`

4.9.5 Global Settings

This section provides access general trigger, clock and mapping settings.

Global Trigger/Clock Settings

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

This dialog is to set the trigger threshold, the input impedance and the polarity of the clock and trigger inputs.

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

5 Remote-control commands

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



Conventions used in SCPI command descriptions

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

Common suffixes

The following common suffixes are used in remote commands:

Suffix	Value range	Description
SOURce<hw>	1	available baseband signals
OUTPut<ch>	1 .. 2	available markers R&S SMBV supports two markers
EXTernal<ch>	1	external trigger connectors

Programming examples

This description provides simple programming examples. The purpose of the examples is to present **all** commands for a given task. In real applications, one would rather reduce the examples to an appropriate subset of commands.

The programming examples have been tested with a software tool which provides an environment for the development and execution of remote tests. To keep the example as simple as possible, only the "clean" SCPI syntax elements are reported. Non-executable command lines (e.g. comments) start with two // characters.

At the beginning of the most remote control program, an instrument (p)reset is recommended to set the instrument to a definite state. The commands *RST and SYSTem:PRESet are equivalent for this purpose. *CLS also resets the status registers and clears the output buffer.

The following commands specific to the DVB are described here:

• Primary Commands	51
• Filter Settings	56
• Clipping Settings	58
• Trigger Settings	60
• Marker Settings	63
• Clock Settings	66
• DVB-T/DVB-H System Configuration	69
• DVB-S2/DVB-S2X System Configuration	74
• TPS Settings	82

- [TS Header](#).....83
- [GSE Header](#).....86
- [BB Header](#).....89

5.1 Primary Commands

Example: Saving and recalling settings

```

SOURCE1:BB:DVB:STANDARD DVBH
SOURCE1:BB:DVB:DVBH:HMODE HIER
SOURCE1:BB:DVB:DVBH:SFRAMES 10
SOURCE1:BB:DVB:DVBH:STATE 1
SOURCE1:BB:DVB:WAVEFORM:CREATE "/var/user/dvbh.wv"
SOURCE1:BB:DVB:DVBH:SAMPLE:LENGTH?
// 6266880
SOURCE1:BB:DVB:DVBH:SAMPLE:DURATION?
// 0.68544
SOURCE1:BB:DVB:DVBH:SAMPLE:RATE?
// 9142857.14285714
SOURCE1:BB:DVB:DVBH:SAMPLE:DRATE?
// 16.5882352941176

SOURCE1:BB:DVB:SETTING:STORE "/var/user/dvbh"
SOURCE1:BB:DVB:PRESET
SOURCE1:BB:DVB:SETTING:CATALOG?
// dvbh,dvbt,dvb_h
SOURCE1:BB:DVB:SETTING:DELETE "dvb_h"
SOURCE1:BB:DVB:SETTING:LOAD "/var/user/dvbt"
    
```

- [\[:SOURCE<hw>\]:BB:DVB:STATE](#)..... 52
- [\[:SOURCE<hw>\]:BB:DVB:PRESET](#)..... 52
- [\[:SOURCE<hw>\]:BB:DVB:SETTING:CATALOG?](#)..... 52
- [\[:SOURCE<hw>\]:BB:DVB:SETTING:DELETE](#)..... 52
- [\[:SOURCE<hw>\]:BB:DVB:SETTING:LOAD](#)..... 53
- [\[:SOURCE<hw>\]:BB:DVB:SETTING:STORE](#)..... 53
- [\[:SOURCE<hw>\]:BB:DVB:SETTING:STORE:FAST](#)..... 53
- [\[:SOURCE<hw>\]:BB:DVB:WAVEFORM:CREATE](#)..... 53
- [\[:SOURCE<hw>\]:BB:DVB:STANDARD](#)..... 54
- [\[:SOURCE<hw>\]:BB:DVB:DVBH|DVBT:SFRAMES](#)..... 54
- [\[:SOURCE<hw>\]:BB:DVB:DVBX:VSMODE](#)..... 54
- [\[:SOURCE<hw>\]:BB:DVB:DVBS|DVBSX:FRAMES](#)..... 54
- [\[:SOURCE<hw>\]:BB:DVB:DVBH|DVBT:SAMPLE:LENGTH?](#)..... 55
- [\[:SOURCE<hw>\]:BB:DVB:DVBH|DVBT:DURATION?](#)..... 55
- [\[:SOURCE<hw>\]:BB:DVB:DVBH|DVBT:SAMPLE:RATE?](#)..... 55
- [\[:SOURCE<hw>\]:BB:DVB:DVBH|DVBT:DRATE?](#)..... 55

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

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

Parameters:

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

Example: See [Example "Saving and recalling settings"](#) on page 51.

Manual operation: See ["State"](#) on page 15

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

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

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

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Event

Manual operation: See ["Set To Default"](#) on page 15

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

Queries the files with settings in the default directory. Listed are files with the file extension *.dvb.

Return values:

<Catalog> <filename1>,<filename2>,...

Returns a string of filenames separated by commas.

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Query only

Manual operation: See ["Save/Recall..."](#) on page 16

[:SOURce<hw>]:BB:DVB:SETTing:DELeTe <Filename>

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

Setting parameters:

<Filename> string

Filename or complete file path; file extension can be omitted

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Setting only

Manual operation: See ["Save/Recall..."](#) on page 16

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

Loads the selected file from the default or the specified directory. Loaded are files with extension `*.dvb`.

Setting parameters:

<Filename> string
Filename or complete file path; file extension can be omitted

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Setting only

Manual operation: See ["Save/Recall..."](#) on page 16

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

Stores the current settings into the selected file; the file extension (`*.dvb`) is assigned automatically.

Setting parameters:

<Filename> string
Filename or complete file path

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Setting only

Manual operation: See ["Save/Recall..."](#) on page 16

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

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

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

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

Parameters:

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

Manual operation: See ["Save/Recall..."](#) on page 16

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

Stores the current settings as an ARB signal in a waveform file (`*.wv`).

Setting parameters:

<Filename> string
Filename or complete file path; file extension is assigned automatically

- Example:** See [Example "Saving and recalling settings"](#) on page 51.
- Usage:** Setting only
- Manual operation:** See ["Generate Waveform File..."](#) on page 16

[:SOURce<hw>]:BB:DVB:STANdard <Standard>

Selects the DVB standard to be used.

Parameters:

<Standard> DVBH | DVBT | DVBS | DVBX
 *RST: DVBH

Example: See [Example "Saving and recalling settings"](#) on page 51.

Options: DVBS|DVBX require option R&S SMBV-K116

Manual operation: See ["DVB Standard"](#) on page 16

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:SFRames <SFrames>

Sets the number of super-frames to be transmitted.

Parameters:

<SFrames> integer
 Range: 1 to 1633 (dynamic)
 *RST: 1

Example: See [Example "Saving and recalling settings"](#) on page 51.

Manual operation: See ["Number of Super Frames"](#) on page 17

[:SOURce<hw>]:BB:DVB:DVBX:VSMoDe <VSMoDe>

Includes the VL-SNR (very low - signal to noise ratio) header in the physical layer frame.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Options: R&S SMBV-K116

Manual operation: See ["VL-SNR Mode"](#) on page 17

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:FRAMes <Frames>

Sets the number of the transmitted frames.

Parameters:

<Frames> integer
 Range: 1 to UINT_MAX
 *RST: 1

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Options: R&S SMBV-K116

Manual operation: See ["Number of Frames"](#) on page 17

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:SAMPlE:LENGth?

Queries the number of the transmitted samples.

Return values:

<Length> integer

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Query only

Manual operation: See ["Number of Samples / Duration"](#) on page 17

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:DURation?

Queries the signal duration.

Return values:

<Duration> float

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Query only

Manual operation: See ["Number of Samples / Duration"](#) on page 17

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:SAMPlE:RATE?

Queries the sample rate.

Return values:

<Rate> float

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Query only

Manual operation: See ["Sample Rate / Data Rate"](#) on page 17

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:DRATe?

Queries the data rate.

Return values:

<DRate> float
 Increment: 0.01

Example: See [Example "Saving and recalling settings"](#) on page 51.

Usage: Query only

Manual operation: See ["Sample Rate / Data Rate"](#) on page 17

5.2 Filter Settings

[:SOURce<hw>]:BB:DVB:FILTer:TYPE	56
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:APCO25	56
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:COSSine	56
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:COSSine:COFS	56
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:GAUSSs	57
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:LPASSs	57
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:LPASSEVM	57
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:PGAuss	57
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:RCOSSine	57
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:SPHase	57
[:SOURce<hw>]:BB:DVB:FILTer:RORange	57
[:SOURce<hw>]:BB:DVB:FILTer:ROFactor	57
[:SOURce<hw>]:BB:DVB:SRATe:VARiation	58

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

Selects the filter type.

Parameters:

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

Example:

```
SOURce1:BB:DVB:STANdard DVBT
SOURce1:BB:DVB:FILTer:TYPE COSine
SOURce:BB:DM:FILTer:PARAmeter:COSSine 0.1
SOURce:BB:DM:FILTer:PARAmeter:COFS -0.1
SOURce1:BB:DVB:SRATe:VARiation?
// 9142857.14285714
```

Manual operation: See ["Filter"](#) on page 37

[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:APCO25 <Apco25>
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:COSSine <Cosine>
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:COSSine:COFS <Cofs>


```
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:GAUSs <Gauss>
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:LPASs <LPass>
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:LPASSEVM <LPassEvm>
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:PGAuss <PGauss>
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:RCOSine <RCosine>
[:SOURce<hw>]:BB:DVB:FILTer:PARAmeter:SPHase <SPHase>
```

Sets the filter parameter.

Filter Type	Parameter	Parameter name	Min	Max	Increment	Default
APCO25	Rolloff factor	<Apco25>	0.05	0.99	0.01	0.2
COSine	Cutoff frequency shift	<Cosf>	-1	1	0.01	-0.1
COSine	Rolloff factor	<Cosine>	0	1	0.01	0.1
GAUSs	BxT	<Gauss>	0.15	2.5	0.01	0.5
LPASs	Cutoff frequency factor	<LPass>	0.05	2	0.01	0.5
LPASSEVM	Cutoff frequency factor	<LPassEvm>	0.05	2	0.01	0.5
PGAuss	BxT	<PGauss>	0.15	2.5	0.01	0.5
RCOSine	Rolloff factor	<RCosine>	0	1	0.01	0.22
SPHase	BxT	<SPHase>	0.15	2.5	0.01	2

Parameters:

<SPHase> float
 Range: 0.15 to 2.5
 Increment: 0.01
 *RST: 2

Example: See [\[:SOURce<hw>\]:BB:DVB:FILTer:TYPE](#) on page 56

Manual operation: See ["Rolloff Factor or BxT"](#) on page 38

```
[:SOURce<hw>]:BB:DVB:FILTer:RORange <RORange>
```

Sets whether the high or the low filter roll-off range is used.

Parameters:

<RORange> HIGH | LOW
 *RST: HIGH

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Options: R&S SMBV-K116

Manual operation: See ["Rolloff Range"](#) on page 38

```
[:SOURce<hw>]:BB:DVB:FILTer:ROFactor <ROff>
```

Sets the filter parameter.

Parameters:
 <ROff> RO35 | RO25 | RO20 | RO15 | RO10 | RO05
 *RST: RO20

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Options: R&S SMBV-K116

Manual operation: See ["Rolloff Factor or BxT"](#) on page 38

[:SOURce<hw>]:BB:DVB:SRATE:VARIation <Variation>

Sets the output sample/symbol rate.

Parameters:
 <Variation> float
 Range: 400 to 40E6
 Increment: 0.001
 *RST: 9142857.14

Example: See [\[:SOURce<hw>\]:BB:DVB:FILTer:TYPE](#) on page 56

Manual operation: See ["Symbol/Sample Rate Variation "](#) on page 39

5.3 Clipping Settings

[:SOURce<hw>]:BB:DVB:CLIPping:LEVel	58
[:SOURce<hw>]:BB:DVB:CLIPping:MODE	59
[:SOURce<hw>]:BB:DVB:CLIPping:STATe	59

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

Sets the limit for level clipping. This value indicates at what point the signal is clipped.

Parameters:
 <Level> integer
 Value specified as a percentage, relative to the highest level.
 100 PCT indicates that clipping does not take place.
 Range: 1 to 100
 *RST: 100

Example:
 SOURce1:BB:DVB:CLIPping:LEVel 80
 SOURce1:BB:DVB:CLIPping:MODE SCAL
 SOURce1:BB:DVB:CLIPping:STATe 1

Manual operation: See ["Clipping Level"](#) on page 41

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

Sets the method for level clipping.

Parameters:

<Mode> VECTor | SCALar
*RST: VECTor

Example: See [\[:SOURce<hw>\]:BB:DVB:CLIPping:LEVel](#) on page 58

Manual operation: See "[Clipping Mode](#)" on page 41

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

Activates level clipping.

Parameters:

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

Example: See [\[:SOURce<hw>\]:BB:DVB:CLIPping:LEVel](#) on page 58

Manual operation: See "[Clipping State](#)" on page 41

5.4 Trigger Settings

Example: Trigger configuration

```
SOURce1:BB:DVB:TRIGger:SOURce INTernal
SOURce1:BB:DVB:TRIGger:SEQuence ARETrigger
SOURce1:BB:DVB:STAT ON
SOURce1:BB:DVB:TRIGger:EXECute
SOURce1:BB:DVB:TRIGger:ARM:EXECute
SOURce1:BB:DVB:TRIGger:RMODE?
// stopped
SOURce1:BB:DVB:TRIGger:EXECute
SOURce1:BB:DVB:TRIGger:RMODE?
// run

// SOURce1:BB:DVB:TRIGger:SEQuence SING
// SOURce1:BB:DVB:TRIGger:SLUNit SEQ
// SOURce1:BB:DVB:TRIGger:SLENgth 2

// SOURce1:BB:DVB:TRIGger:SEQuence AAUT
// SOURce1:BB:DVB:TRIGger:SOURce EXT
// SOURce1:BB:DVB:TRIGger:EXTernal:SYNChronize:OUTPut 1
// SOURce1:BB:DVB:TRIGger:EXTernal1:INHibit 100
// SOURce1:BB:DVB:TRIGger:EXTernal1:DELay 10

// SOURce1:BB:DVB:TRIGger:SOURce OBAS
// SOURce1:BB:DVB:TRIGger:OBASeband:DELay 100
// SOURce1:BB:DVB:TRIGger:OBASeband:INHibit 10
```

[:SOURce<hw>]:BB:DVB:TRIGger:ARM:EXECute.....	60
[:SOURce<hw>]:BB:DVB:TRIGger:EXECute.....	61
[:SOURce<hw>]:BB:DVB:TRIGger:EXTernal:SYNChronize:OUTPut.....	61
[:SOURce<hw>]:BB:DVB:TRIGger:RMODE?.....	61
[:SOURce<hw>]:BB:DVB:TRIGger:SLUNit.....	61
[:SOURce<hw>]:BB:DVB:TRIGger:SLENgth.....	61
[:SOURce<hw>]:BB:DVB:TRIGger:SOURce.....	62
[:SOURce<hw>]:BB:DVB:TRIGger[:EXTernal<ch>]:DELay.....	62
[:SOURce<hw>]:BB:DVB:TRIGger[:EXTernal<ch>]:INHibit.....	62
[:SOURce<hw>]:BB:DVB[:TRIGger]:SEQuence.....	63

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

Stops signal generation; a subsequent trigger event restarts signal generation.

Example: See [Example "Trigger configuration"](#) on page 60

Usage: Event

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

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

Executes a trigger.

Example: See [Example "Trigger configuration"](#) on page 60

Usage: Event

Manual operation: See "[Execute Trigger](#)" on page 18

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

Enables signal output synchronous to the trigger event.

Parameters:

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

Example: See [Example "Trigger configuration"](#) on page 60

Manual operation: See "[Sync. Output to External Trigger](#)" on page 44

[:SOURce<hw>]:BB:DVB:TRIGger:RMODE?

Queries the signal generation status.

Return values:

<RMode> STOP | RUN

Example: See [Example "Trigger configuration"](#) on page 60

Usage: Query only

Manual operation: See "[Running/Stopped](#)" on page 43

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

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

Parameters:

<SLunit> FRAME | SEQUENCE
*RST: SEQUENCE

Example: See [Example "Trigger configuration"](#) on page 60

Manual operation: See "[Signal Duration Unit](#)" on page 43

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

Defines the length of the signal sequence that is output in the SINGLE trigger mode.

Parameters:

<SLength> integer
 Range: 1 to 7000
 *RST: 4

Example: See [Example "Trigger configuration"](#) on page 60

Manual operation: See ["Signal Duration"](#) on page 43

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

Selects the trigger source:

- INTernal: manual trigger or *TRG.
- EXTernal: trigger signal on the TRIGGER connector.

Parameters:

<Source> INTernal|EXTernal
 *RST: INTernal

Example: See [Example "Trigger configuration"](#) on page 60

Manual operation: See ["Trigger Source"](#) on page 44

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

Specifies the trigger delay for external triggering.

Parameters:

<Delay> float
 Range: 0 to 65535
 Increment: 0.01
 *RST: 0
 Default unit: Sample

Example: BB:DVB:TRIG:SOUR EXT
 BB:DVB:TRIG:DEL 50

Manual operation: See ["Trigger Delay"](#) on page 46

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

Specifies the duration by which a restart is to be inhibited following a trigger event.

Parameters:

<Inhibit> integer
 Range: 0 to 67108863
 *RST: 0

Example: BB:DVB:TRIG:SOUR EXT1
 BB:DVB:TRIG:INH 200

Manual operation: See ["Trigger Inhibit"](#) on page 46

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

Selects the trigger mode:

- AUTO = auto
- RETRigger = retrigger
- AAUTo = armed auto
- ARETrigger = armed retrigger
- SINGle = single

Parameters:

<Sequence> AUTO | RETRigger | AAUTo | ARETrigger | SINGle
 *RST: AUTO

Example: See [Example "Trigger configuration"](#) on page 60

Manual operation: See ["Trigger Mode"](#) on page 43

5.5 Marker Settings

Example: Marker configuration

```
SOURce1:BB:DVB:TRIGger:OUTPut1:MODE PULS
// sets a pulse marker
SOURce1:BB:DVB:TRIGger:OUTPut1:PULSe:DIVider 2
SOURce1:BB:DVB:TRIGger:OUTPut1:PULSe:FREQuency?

SOURce1:BB:DVB:TRIGger:OUTPut1:MODE PATtern
// sets a bit pattern marker
SOURce1:BB:DVB:TRIGger:OUTPut1:PATtern #H2,2

SOURce1:BB:DVB:TRIGger:OUTPut1:MODE RAT
SOURce1:BB:DVB:TRIGger:OUTPut1:ONTime 10
SOURce1:BB:DVB:TRIGger:OUTPut1:OFFTime 10

// Marker delay configuration
SOURce1:BB:DVB:TRIGger:OUTPut:DElay:FIXed 1
// restricts the marker signal delay
SOURce1:BB:DVB:TRIGger:OUTPut:DElay:MINimum?
// 0
SOURce1:BB:DVB:TRIGger:OUTPut:DElay:MAXimum?
// 2000
SOURce1:BB:DVB:TRIGger:OUTPut2:DElay 1600
// delays the marker signal output
```

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:MODE.....	64
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:ONTime.....	64
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:OFFTime.....	64
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PATtern.....	65

<code>[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:DIVider</code>	65
<code>[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:FREQUency?</code>	65
<code>[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay</code>	66
<code>[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut:DELay:FIXed</code>	66
<code>[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay:MINimum?</code>	66
<code>[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay:MAXimum?</code>	66

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

Defines the signal for the selected marker output.

Parameters:

<Mode> REStart | SFRAme | SFRAME | FRAMe | PULSe | PATTeRn | RATio | TRIGger

REStart

Marks the start of every sequence length loop. Restart mode is available only for ETI data source.

SFRAme

Marks the start of every super-frame period.

FRAMe

Marks the start of every frame.

PULSe

Generated continuously according to the frequency and frequency divider.

PATTeRn

A marker signal according to a bit pattern

RATio

A regular marker signal that is defined by an on/off ratio

TRIGger

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

*RST: REStart

Example: See [Example "Marker configuration"](#) on page 63

Manual operation: See ["Marker Mode"](#) on page 46

`[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:ONTime <OnTime>`

`[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:OFFTime <OffTime>`

Sets the number of samples during which the marker output is on or off.

*) If R&S SMBV-B9 is installed, the minimum marker duration depends on the sample/symbol rate.

See chapter "Basics on ..." in the R&S SMBV operating manual.

Parameters:

<OffTime> integer
 Range: 1 to 16777215
 *RST: 1

Example: See [Example "Marker configuration"](#) on page 63

Manual operation: See ["Marker Mode"](#) on page 46

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PATTern <Pattern>

Defines the bit pattern used to generate the marker signal.

Parameters:

<Pattern> 64 bits
 0 = marker off, 1 = marker on

Example: See [Example "Marker configuration"](#) on page 63

Manual operation: See ["Marker Mode"](#) on page 46

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:DIVider <Divider>

Sets the divider for pulse marker mode (PULSe).

*) If R&S SMBV-B9 is installed, the minimum marker duration depends on the sample/symbol rate.

See chapter "Basics on ..." in the R&S SMBV operating manual.

Parameters:

<Divider> integer
 Range: 2 to 1024
 *RST: 2

Example: See [Example "Marker configuration"](#) on page 63

Manual operation: See ["Marker Mode"](#) on page 46

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:FREQuency?

Queries the pulse frequency of the pulsed marker signal PULSe.

Return values:

<Frequency> float

Example: See [Example "Marker configuration"](#) on page 63

Usage: Query only

Manual operation: See ["Marker Mode"](#) on page 46

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

Defines the delay between the signal on the marker outputs and the start of the signals.

Parameters:

<Delay> float
 Range: 0 to 16777215
 Increment: 0.001
 *RST: 0

Example: See [Example "Marker configuration"](#) on page 63

Manual operation: See ["Marker x Delay"](#) on page 47

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

Restricts the marker delay setting range to the dynamic range.

Parameters:

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

Example: See [Example "Marker configuration"](#) on page 63

Manual operation: See ["Fix marker delay to current range"](#) on page 47

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

Queries the min/max marker delay.

Return values:

<Maximum> float
 Range: 0 to max

Example: See [Example "Marker configuration"](#) on page 63

Usage: Query only

Manual operation: See ["Current Range without Recalculation"](#) on page 47

5.6 Clock Settings

[:SOURce<hw>]:BB:DVB:CLOCK:MODE.....	67
[:SOURce<hw>]:BB:DVB:CLOCK:MULTIPLIER.....	67
[:SOURce<hw>]:BB:DVB:CLOCK:SOURce.....	67
[:SOURce<hw>]:BB:DVB:CLOCK:SYNCHRONIZATION:MODE.....	67
[:SOURce<hw>]:BB:DVB:CLOCK:SYNCHRONIZATION:EXECUTE.....	68

[:SOURce<hw>]:BB:DVB:CLOCK:MODE <Mode>

Sets the type of externally supplied clock.

Parameters:

<Mode> SAMP | MSAMP
 *RST: SAMP

Example:

```
SOURce1:BB:DVB:CLOCK:SOURce EXTernal
SOURce1:BB:DVB:CLOCK:MODE MSAMP
SOURce1:BB:DVB:CLOCK:MULTIplier 12
```

Options: R&S SMBV-B10

Manual operation: See "Clock Mode" on page 49

[:SOURce<hw>]:BB:DVB:CLOCK:MULTIplier <Multiplier>

The command specifies the multiplier for clock type "Multiple Sample" (:BB:DVB:CLOCK:MODE MSAMPle) in the case of an external clock source.

Parameters:

<Multiplier> integer
 Range: 1 to 64
 Increment: 1
 *RST: 4

Example: See [:SOURce<hw>]:BB:DVB:CLOCK:MODE on page 67

Manual operation: See "Clock Multiplier" on page 49

[:SOURce<hw>]:BB:DVB:CLOCK:SOURce <Source>

Selects the clock source.

Parameters:

<Source> INTernal | EXTernal
INTernal
 The internal clock reference is used.
EXTernal
 The external clock reference is supplied to the CLOCK connector.
 *RST: INTernal

Example: See [:SOURce<hw>]:BB:DVB:CLOCK:MODE on page 67

Manual operation: See "Clock Source" on page 48

[:SOURce<hw>]:BB:DVB:CLOCK:SYNChronization:MODE <Mode>

Selects the synchronization mode.

Parameters:

<Mode>

NONE | MASTer | SLAVe

NONE

Standalone mode

MASTer

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

SLAVe

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

*RST: NONE

Example:

```
SOURce1:BB:DVB:CLOCK:SYNChronization:MODE MASTer
```

```
SOURce1:BB:DVB:CLOCK:SYNChronization:EXECute
```

Manual operation: See "[Sync. Mode](#)" on page 48

[:SOURce<hw>]:BB:DVB:CLOCK:SYNChronization:EXECute

Adjusts the settings as required for the selected synchronization mode.

Example:

See [\[:SOURce<hw>\]:BB:DVB:CLOCK:SYNChronization:MODE](#) on page 67.

Usage:

Event

Manual operation: See "[Set Synchronization Settings](#)" on page 48

5.7 DVB-T/DVB-H System Configuration

Example: Example of a DVB-H configuration

```

SOURCE1:BB:DVB:STANDARD DVBH
SOURCE1:BB:DVB:DVBH:HMODE HIER
SOURCE1:BB:DVB:DVBH:SFRAMES 10

SOURCE1:BB:DVB:DVBH:HP:DATA PN23
SOURCE1:BB:DVB:DVBH:LP:DATA DLIS
SOURCE1:BB:DVB:DVBH:LP:DATA:DSELECTION "/var/user/dvbh.gts"

SOURCE1:BB:DVB:DVBH:HP:PNSCRAMBLER:STATE 1
SOURCE1:BB:DVB:DVBH:HP:OCODER:STATE 1
SOURCE1:BB:DVB:DVBH:HP:OINTERLEAVER:STATE 1
SOURCE1:BB:DVB:DVBH:HP:ICODER:STATE 1
SOURCE1:BB:DVB:DVBH:HP:ICODER:RATE CR7D8

SOURCE1:BB:DVB:DVBH:IINTERLEAVER:BIT:STATE 1
SOURCE1:BB:DVB:DVBH:IINTERLEAVER:SYMBOL:STATE 1
SOURCE1:BB:DVB:DVBH:IINTERLEAVER:SYMBOL:MODE IDEP
SOURCE1:BB:DVB:DVBH:IINTERLEAVER:SYMBOL:TMODE T8K

SOURCE1:BB:DVB:DVBH:OFDM:BWIDTh 8
SOURCE1:BB:DVB:DVBH:OFDM:MODULATION QAM64
SOURCE1:BB:DVB:DVBH:OFDM:ALPHA 4
SOURCE1:BB:DVB:DVBH:OFDM:GINTERVAL GI1D32

SOURCE1:BB:DVB:STATE 1
    
```

[:SOURCE<hw>]:BB:DVB:DVBH DVBT:HMODE.....	70
[:SOURCE<hw>]:BB:DVB:DVBH DVBT[:HP LP]:DATA.....	70
[:SOURCE<hw>]:BB:DVB:DVBH DVBT[:HP LP]:DATA:DSELECTION.....	70
[:SOURCE<hw>]:BB:DVB:DVBH DVBT[:HP LP]:ICODER:RATE.....	70
[:SOURCE<hw>]:BB:DVB:DVBH DVBT[:HP LP]:ICODER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBH DVBT[:HP LP]:OCODER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBH DVBT[:HP LP]:OINTERLEAVER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBH DVBT[:HP LP]:PNSCRAMBLER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:IINTERLEAVER:BIT[:STATE].....	72
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:IINTERLEAVER:SYMBOL:MODE.....	72
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:IINTERLEAVER:SYMBOL:TMODE.....	72
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:IINTERLEAVER:SYMBOL[:STATE].....	72
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:OFDM:ALPHA.....	73
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:OFDM:BWIDTh.....	73
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:OFDM:GINTERVAL.....	73
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:OFDM:MODULATION.....	73

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:HMODE <HMode>

Selects either to use one path or both path with different priority.

Parameters:

<HMode> NHierarchical | HIERarchical
 *RST: NHierarchical

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [Hierarchy Mode](#) " on page 19

[:SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:DATA <Data>

Selects the data source to be used.

Parameters:

<Data> PAC0 | PAC1 | PN15 | PN23 | DLISt

ZERO

Internal 0 is used.

ONE

Internal 1 is used.

PN15/23

Internally generated PRBS data as per CCITT with period lengths between (2^9-1 and $2^{23}-1$).

DLISt

Internal data from a TS file is used.

*RST: PN23

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [HP/LP Source](#) " on page 19

[:SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:DATA:DSELECTION <DSelection>

Selects an existing TS file from the default directory or from the specific directory.

TS files are files with extension *.gts, *.ts, or *.trp.

Parameters:

<DSelection> string
 Filename incl. file extension or complete file path

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [HP/LP Source](#) " on page 19

[:SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:ICODer:RATE <Rate>

Selects the code rate of the inner coder.

Parameters:

<Rate> CR1D2 | CR2D3 | CR3D4 | CR5D6 | CR7D8
 *RST: CR1D2

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See [" Rate "](#) on page 20

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:ICODer[:STATe] <State>

Activates/deactivates the inner coder.

Parameters:

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

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See [" Inner Coder "](#) on page 20

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:OCODer[:STATe] <State>

Activates/deactivates the outer coder (RS).

Parameters:

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

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See [" Outer Coder \(RS\) "](#) on page 20

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:OINTerleaver[:STATe] <State>

Activates/deactivates the outer interleaver.

Parameters:

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

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See [" Outer Interleaver "](#) on page 20

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:PNScrambler[:STATe] <State>

Activates/deactivates the PN scrambler.

Parameters:

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

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [PN Scrambler](#) " on page 20

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:IINTERleaver:BIT[:STATE] <State>

Activates/deactivates the inner bit interleaver.

Parameters:

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

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [Inner Bit Interleaver](#) " on page 20

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:IINTERleaver:SYMBOL:MODE <Mode>

Selects the inner interleaver mode.

Parameters:

<Mode> NATive | NATive | IDEPth

NATive

The interleaver interleaves the bits over one OFDMA symbol.

IDEPth

The interleaver interleaves the bits over two (4K transmission mode) or four (2K transmission mode) OFDMA symbols.

*RST: NATive

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [Inner Interleaver Mode](#) " on page 21

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:IINTERleaver:SYMBOL:TMODE <TMode>

Selects the transmission mode.

Parameters:

<TMode> T2K | T4K | T8K
*RST: T2K

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [Inner Interleaver Tx Mode](#) " on page 21

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:IINTERleaver:SYMBOL[:STATE] <State>

Activates/deactivates the inner symbol interleaver.

Parameters:

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

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [Inner Symbol Interleaver](#) " on page 20

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:OFDM:ALPHA <Alpha>

Selects the α value. This value is used to shape the constellation of the modulation.

For DVB-H, this value is always 1.

Parameters:

<Alpha> 1 | 2 | 4
 *RST: 1

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [OFDM/RF Alpha](#) " on page 21

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:OFDM:BWIDTh <BWidth>

Selects the system bandwidth.

Parameters:

<BWidth> 5 | 6 | 7 | 8
 *RST: 8 MHz

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [OFDM/RF Bandwidth](#) " on page 21

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:OFDM:GINTerval <GInterval>

Selects the OFDM/RF guard interval.

Parameters:

<GInterval> GI1D4 | GI1D8 | GI1D16 | GI1D32
 *RST: GI1D8

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [OFDM/RF Guard Int](#) " on page 21

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:OFDM:MODulation <Modulation>

Selects the constellation for the OFDM modulation.

Parameters:

<Modulation> QPSK | QAM16 | QAM64
 *RST: QAM64

Example: See [Example "Example of a DVB-H configuration"](#) on page 69

Manual operation: See " [OFDM/RF Modulation](#) " on page 21

5.8 DVB-S2/DVB-S2X System Configuration

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

Example: Configuring the DVB-S2/DVB-S2X settings

```

SOURCE1:BB:DVB:STANDARD DVBX
SOURCE1:BB:DVB:DVBX:VSMODE 0
SOURCE1:BB:DVB:DVBX:FRAMES 5

SOURCE1:BB:DVB:DVBX:STYPE TRAN
SOURCE1:BB:DVB:DVBX:DATA PN9
SOURCE1:BB:DVB:DVBX:ADLENGTH:STATE 0
SOURCE1:BB:DVB:DVBX:DATA:LENGTH 3000
SOURCE1:BB:DVB:DVBX:BSCRAMBLER:STATE 1
SOURCE1:BB:DVB:DVBX:OCODER:STATE 1
SOURCE1:BB:DVB:DVBX:ICODER:STATE 1
SOURCE1:BB:DVB:DVBX:BINTELEAVER:STATE 1
SOURCE1:BB:DVB:DVBX:CTYPE NORM
SOURCE1:BB:DVB:DVBX:MODULATION APSK64_16_16_16_16
SOURCE1:BB:DVB:DVBX:MCOD?
// APSK64_X_N3245L
SOURCE1:BB:DVB:DVBX:ICODER:RATE?
// CR128D180
SOURCE1:BB:DVB:DVBX:PSTATE:STATE 1
SOURCE1:BB:DVB:DVBX:PSCRAMBLER:STATE 1
SOURCE1:BB:DVB:DVBX:SSEQUENCE 3

SOURCE1:BB:DVB:DVBX:THCONFIG:TEINDICATION:STATE 1
SOURCE1:BB:DVB:DVBX:THCONFIG:SBYTE?
// #47,8
SOURCE1:BB:DVB:DVBX:THCONFIG:PUS 1
SOURCE1:BB:DVB:DVBX:THCONFIG:TPRIORITY 1
SOURCE1:BB:DVB:DVBX:THCONFIG:PID:PATTERN #H0A00,13
SOURCE1:BB:DVB:DVBX:THCONFIG:SCONTROL 1
SOURCE1:BB:DVB:DVBX:THCONFIG:AFIELD:STATE 1
SOURCE1:BB:DVB:DVBX:THCONFIG:PAYLOAD:STATE 1
SOURCE1:BB:DVB:DVBX:THCONFIG:CCOUNTER 1
SOURCE1:BB:DVB:DVBX:THCONFIG:STATE 1

SOURCE1:BB:DVB:DVBX:BHCONFIG:CACM ACM
SOURCE1:BB:DVB:DVBX:BHCONFIG:IACTIVE:STATE 1
SOURCE1:BB:DVB:DVBX:BHCONFIG:NACTIVE:STATE 1
SOURCE1:BB:DVB:DVBX:BHCONFIG:UPL?
// 188
SOURCE1:BB:DVB:DVBX:BHCONFIG:ADFL:STATE 0
SOURCE1:BB:DVB:DVBX:BHCONFIG:DFL 464
SOURCE1:BB:DVB:DVBX:BHCONFIG:SYNC:PATTERN?
// #47,8

```

```

SOURCE1:BB:DVB:DVbX:VSMoDe 1
SOURCE1:BB:DVB:DVbX:STYPe GP
SOURCE1:BB:DVB:DVbX:STYPe GHEM

SOURCE1:BB:DVB:DVbX:GHConfig:LTYPe 1
SOURCE1:BB:DVB:DVbX:GHConfig:GLENgth 2048
SOURCE1:BB:DVB:DVbX:GHConfig:FID:PATTErn #H01,8
SOURCE1:BB:DVB:DVbX:GHConfig:FIUSE:STATe 1
SOURCE1:BB:DVB:DVbX:GHConfig:TlUSE:STATe 1
SOURCE1:BB:DVB:DVbX:GHConfig:TLENgth?
// 3005
SOURCE1:BB:DVB:DVbX:GHConfig:PTYPe:PATTErn #H0001,16
SOURCE1:BB:DVB:DVbX:GHConfig:PTUSE:STATe 1
SOURCE1:BB:DVB:DVbX:GHConfig:LABel:PATTErn #H000011,24
SOURCE1:BB:DVB:DVbX:GHConfig:LUSE:STATe 1
SOURCE1:BB:DVB:DVbX:GHConfig:STATe 1
SOURCE1:BB:DVB:DVbX:BHConfig:GLACTive:STATe 1
SOURCE1:BB:DVB:DVbX:BHConfig:DFL 464
SOURCE1:BB:DVB:DVbX:CTYPe MED
SOURCE1:BB:DVB:DVbX:MCOD BPSK_X_VM1145

SOURCE1:BB:DVB:FiLTER:RORange LOW
SOURCE1:BB:DVB:FiLTER:ROFactor R010
SOURCE1:BB:DVB:CLiPPing:STATe 1
    
```

```

SOURCE1:BB:DVB:STATe 1
    
```

[:SOURCE<hw>]:BB:DVB:DVBS DVbX:STYPe.....	76
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:ISTReam?.....	76
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:DATA.....	76
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:DATA:PATTErn.....	76
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:DATA:DSELectio[n] TSELectio[n] GSELectio[n].....	77
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:ADLEngth:STATe.....	77
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:DATA:LENgth.....	77
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:BSCRambler[:STATe].....	78
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:OCODEr[:STATe].....	78
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:ICODEr[:STATe].....	78
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:ICODEr:RATE.....	78
[:SOURCE<hw>]:BB:DVB:DVbX:SFACTo[r].....	79
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:BiNTErleaver[:STATe].....	79
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:CTYPe.....	79
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:MCOD.....	80
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:MODulation.....	80
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:PSTate[:STATe].....	81
[:SOURCE<hw>]:BB:DVB:DVBS DVbX:PSCRambler[:STATe].....	81
[:SOURCE<hw>]:BB:DVB:DVbX:SSEQuence.....	81

[:SOURce<hw>] :BB:DVB:DVBS|DVBX:SType <SType>

Selects the input stream type.

Parameters:

<SType> TRANsport | GP | GC | GHEM
*RST: TRANsport

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Stream Type](#) " on page 27

[:SOURce<hw>] :BB:DVB:DVBS|DVBX:ISStream?

Queries the input stream type.

Return values:

<ISStream> string

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Usage: Query only

Manual operation: See " [Input Stream](#) " on page 27

[:SOURce<hw>] :BB:DVB:DVBS|DVBX:DATA <Data>

Selects the data source.

Parameters:

<Data> ZERO | ONE | PATtern | PN9 | PN11 | PN15 | PN16 | PN20 |
PN21 | PN23 | DLISt | TFIle | GFIle

PATtern

To set the bit pattern, use the command `[:SOURce<hw>] :BB:DVB:DVBS|DVBX:DATA:PATtern.`

DLISt|TFIle|GFIle

To select the data list, TS file or the GSE file, use the command `[:SOURce<hw>] :BB:DVB:DVBS|DVBX:DATA:DSElection|TSElection|GSElection.`

*RST: PN9

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Data Source](#) " on page 27

[:SOURce<hw>] :BB:DVB:DVBS|DVBX:DATA:PATtern <Pattern>

Sets the the bit pattern.

Parameters:

<Pattern> 64 bits
 *RST: #H0,1

Example:

```
SOURce1:BB:DVB:DVBS:DATA PATtern
SOURce1:BB:DVB:DVBS:DATA:PATtern #H39C,12
```

Manual operation: See "[Data Source](#)" on page 27

**[:SOURce<hw>]:BB:DVB:DVBS|DVBS:DATA:
 DSELection|TSELection|GSELection <FSelection>**

Selects an existing data list, transport file (TS) or GSE file from the default or from the specific directory.

- TS files are files with extension *.gts, *.ts, or *.trp.
- GSE files are files with extension *.gse
- Data lists are files with extension *.dm_iqd

Parameters:

<FSelection> string
 Filename incl. file extension or complete file path

Example:

```
SOURce1:BB:DVB:DVBS:DATA TFILE
SOURce1:BB:DVB:DVBS:DATA:TSELection "/var/user/temp/dvb.gts"
```

Manual operation: See "[Data Source](#)" on page 27

[:SOURce<hw>]:BB:DVB:DVBS|DVBS:ADLength:STATE <State>

Defines if the data length is set automatically or manually.

Parameters:

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

Example:

See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Auto Data Length](#)" on page 28

[:SOURce<hw>]:BB:DVB:DVBS|DVBS:DATA:LENGTH <DLength>

Sets the data length.

Parameters:

<DLength> integer
 Range: 1 to 65536
 *RST: 5000
 Default unit: Bytes

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Data Length](#)" on page 28

[:SOURCE<hw>] : BB : DVB : DVBS | DVBSX : BSCRambler [: STATE] <BScrambler>

Activates baseband scrambling.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[BB Scrambler](#)" on page 29

[:SOURCE<hw>] : BB : DVB : DVBS | DVBSX : OCODer [: STATE] <OCoder>

Enables the BCH outer coder.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Outer Coder](#)" on page 29

[:SOURCE<hw>] : BB : DVB : DVBS | DVBSX : ICODer [: STATE] <ICoder>

Activates the inner coder.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Inner Coder](#)" on page 29

[:SOURCE<hw>] : BB : DVB : DVBS | DVBSX : ICODer : RATE <Rate>

Selects the code rate of the inner coder.

Parameters:

<Rate> CR1D4 | CR1D3 | CR2D5 | CR1D2 | CR3D5 | CR2D3 | CR3D4 |
 CR4D5 | CR5D6 | CR8D9 | CR9D10 | CR2D9 | CR13D45 |
 CR9D20 | CR90D180 | CR96D180 | CR11D20 | CR100D180 |
 CR104D180 | CR26D45 | CR18D30 | CR28D45 | CR23D36 |
 CR116D180 | CR20D30 | CR124D180 | CR25D36 |
 CR128D180 | CR13D18 | CR132D180 | CR22D30 |
 CR135D180 | CR140D180 | CR7D9 | CR154D180 | CR1D5 |
 CR11D45 | CR4D15 | CR14D45 | CR7D15 | CR8D15 |
 CR32D45

*RST: CR1D4

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Rate](#) " on page 29

[:SOURce<hw>] :BB:DVB:DVbX:SFACtor <SFactor>

Sets the spreading factor.

Parameters:

<SFactor> integer
 Range: 1 to 2
 *RST: 1

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [SF](#) " on page 29

[:SOURce<hw>] :BB:DVB:DVbS|DVbX:BInterleaver[:STATe] <BInterleaver>

Enables the bit interleaver.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Bit Interleaver](#) " on page 29

[:SOURce<hw>] :BB:DVB:DVbS|DVbX:CTYPe <CType>

Selects the code type.

Parameters:

<CType> NORMal | MEDium | SHORt
 *RST: NORMal

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Code Type](#)" on page 30

[[:SOURce<hw>]:BB:DVB:DVBS|DVBX:MCOD <Modcod>

Selects the MODCOD.

Parameters:

<Modcod> QPSK_S_14 | QPSK_S_13 | QPSK_S_25 | QPSK_S_12 |
 QPSK_S_35 | QPSK_S_23 | QPSK_S_34 | QPSK_S_45 |
 QPSK_S_56 | QPSK_S_89 | QPSK_S_910 | PSK8_S_35 |
 PSK8_S_23 | PSK8_S_34 | PSK8_S_56 | PSK8_S_89 |
 PSK8_S_910 | APSK16_S_23 | APSK16_S_34 |
 APSK16_S_45 | APSK16_S_56 | APSK16_S_89 |
 APSK16_S_910 | APSK32_S_34 | APSK32_S_45 |
 APSK32_S_56 | APSK32_S_89 | APSK32_S_910 |
 QPSK_X_N1345 | QPSK_X_N920 | QPSK_X_N1120 |
 APSK8_X_N59L | APSK8_X_N2645L | PSK8_X_N2336 |
 PSK8_X_N2536 | PSK8_X_N1318 | APSK16_X_N12L |
 APSK16_X_N815L | APSK16_X_N59L | APSK16_X_N2645 |
 APSK16_X_N35 | APSK16_X_N35L | APSK16_X_N2845 |
 APSK16_X_N2336 | APSK16_X_N23L | APSK16_X_N2536 |
 APSK16_X_N1318 | APSK16_X_N79 | APSK16_X_N7790 |
 APSK32_X_N23L | APSK32_X_N3245 | APSK32_X_N1115 |
 APSK32_X_N79 | APSK64_X_N3245L | APSK64_X_N1115 |
 APSK64_X_N79 | APSK64_X_N45 | APSK64_X_N56 |
 APSK128_X_N34 | APSK128_X_N79 | APSK256_X_N2945L |
 APSK256_X_N23L | APSK256_X_N3145L |
 APSK256_X_N3245 | APSK256_X_N1115L |
 APSK256_X_N34 | QPSK_X_S1145 | QPSK_X_S415 |
 QPSK_X_S1445 | QPSK_X_S715 | QPSK_X_S815 |
 QPSK_X_S3245 | PSK8_X_S715 | PSK8_X_S815 |
 PSK8_X_S2645 | PSK8_X_S3245 | APSK16_X_S715 |
 APSK16_X_S815 | APSK16_X_S2645 | APSK16_X_S35 |
 APSK16_X_S3245 | APSK32_X_S23 | APSK32_X_S3245 |
 QPSK_X_VN29 | BPSK_X_VM15 | BPSK_X_VM1145 |
 BPSK_X_VM13 | BPSK_X_VS15S | BPSK_X_VS1145 |
 BPSK_X_VS15 | BPSK_X_VS415 | BPSK_X_VS13
 *RST: QPSK_S_14

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

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

[[:SOURce<hw>]:BB:DVB:DVBS|DVBX:MODulation <Modulation>

Selects the modulation scheme.

Parameters:

<Modulation> QPSK | APSK16 | APSK32 | PSK8 | P2BPsK | APSK16_8_8 |
 APSK32_4_12_16R | APSK64_8_16_20_20 | APSK8_2_4_2 |
 APSK32_4_8_4_16 | APSK64_16_16_16_16 |
 APSK64_4_12_20_28 | APSK128 | APSK256
 *RST: QPSK

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

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

[:SOURce<hw>] :BB:DVB:DVBS|DVBSX:PState[:STATe] <PState>

Activates the pilot.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Pilot State](#) " on page 30

[:SOURce<hw>] :BB:DVB:DVBS|DVBSX:PScrambler[:STATe] <PScrambler>

Activates pilot scrambling.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [PL Scrambler](#) " on page 30

[:SOURce<hw>] :BB:DVB:DVBSX:SSequence <SSequence>

Sets the bit sequence number used to scramble the pilot.

Parameters:

<SSequence> integer
 Range: 0 to 6
 *RST: 0

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Scr. Sequence](#) " on page 31

5.9 TPS Settings

[:SOURCE<hw>]:BB:DVB:DVBH DVBT:TPS:ID:PATtern.....	82
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:TPS:ID:STATe.....	82
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:TPS:MFEC[:STATe].....	82
[:SOURCE<hw>]:BB:DVB:DVBH DVBT:TPS:TSLicing[:STATe]?.....	83

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:TPS:ID:PATtern <Pattern>

Sets the pattern for cell identification.

Parameters:

<Pattern> 16 bits
 Range: 0000 to FFFF
 *RST: 0000

Example:

```
SOURCE1:BB:DVB:STANDARD DVBH
SOURCE1:BB:DVB:DVBH:HMODE HIER

SOURCE1:BB:DVB:DVBH|DVBT:TPS:TSLicing:STATe?
// 1
SOURCE1:BB:DVB:DVBH|DVBT:TPS:ID:STATe?
// 1
SOURCE1:BB:DVB:DVBH:TPS:ID:PATtern #HAAAA,16
SOURCE1:BB:DVB:DVBH:TPS:MFEC:STATe 1
```

Manual operation: See " ID [4 hex] " on page 22

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:TPS:ID:STATe <State>

Activates/deactivates the TPS cell identification.

Parameters:

<State> 0 | 1 | OFF | ON

Example: See [\[:SOURCE<hw>\]:BB:DVB:DVBH|DVBT:TPS:ID:PATtern](#) on page 82.

Manual operation: See " Cell Identification " on page 22

[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:TPS:MFEC[:STATe] <State>

Activates/deactivates the multiprotocol encapsulation forward error correction bit.

Parameters:

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

Example: See [\[:SOURCE<hw>\]:BB:DVB:DVBH|DVBT:TPS:ID:PATtern](#) on page 82.

Manual operation: See " MPE FEC " on page 22

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:TSLicing[:STATe]?

Queries the time slicing state.

Return values:

<State> 0 | 1 | OFF | ON
 Always 1 for DVB-H
 Always 0 for DVB-T

Example: See [:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:ID: PATTern on page 82.

Usage: Query only

Manual operation: See " Time Slicing " on page 22

5.10 TS Header

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig[:STATe].....	83
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:SBYTE?.....	83
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:TEIndication[:STATe].....	84
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:PUS.....	84
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:TPriority.....	84
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:PID:PATTern.....	84
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:SCONtrol.....	85
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:AFIeld[:STATe].....	85
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:PAYLoad[:STATe].....	85
[:SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:CCOunter.....	85

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig[:STATe] <State>

Inserts header information in the transport stream.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " TS Header Active " on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:SBYTE?

Queries the information carried by the synchronization byte.

Return values:

<SByte> 8 bits
 Hexadecimal value

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Usage: Query only

Manual operation: See "[Sync Byte \(Hex\)](#)" on page 32

**[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:TEIndication[:STATe]
<TEIndication>**

Inserts transport error indication information in the header.

Parameters:

<TEIndication> 0 | 1 | OFF | ON

*RST: 0

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Transport Error Indication](#)" on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:PUS <PSUIndication>

If enabled, the PES (packetized elementary streams), PSI (program specific information), or DVB-MIP (megaframe initialization) packet begin immediately after the header.

Parameters:

<PSUIndication> 0 | 1 | OFF | ON

*RST: 0

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Payload Unit Start Indication](#)" on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:TPriority <TPriority>

Marks the current packet as high priority packet compared to packets with the same PID.

Parameters:

<TPriority> integer

Range: 0 to 1

*RST: 0

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Transport Priority](#)" on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:PID:PATtern <Pattern>

Sets the packet identifier PID.

Parameters:

<Pattern> 13 bits
Hexadecimal value

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[PID \(Hex\)](#)" on page 32

[:SOURCE<hw>]:BB:DVB:DVBS|DVBX:THConfig:SCONtrol <SControl>

Sets the scrambling information.

Parameters:

<SControl> integer
Range: 0 to 3
*RST: 0

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Scrambling Control](#)" on page 32

[:SOURCE<hw>]:BB:DVB:DVBS|DVBX:THConfig:AFieLd[:STATe] <AField>

Inserts an adaptation field in the packet.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Adaptation Field](#)" on page 32

[:SOURCE<hw>]:BB:DVB:DVBS|DVBX:THConfig:PAYLoad[:STATe] <Payload>

Adds a payload field in packet.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Payload](#)" on page 32

[:SOURCE<hw>]:BB:DVB:DVBS|DVBX:THConfig:CCOunter <CCounter>

Sets the sequence number of the first payload packet.

Parameters:

<CCounter> integer
 Range: 0 to 15
 *RST: 0

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Continuity Counter](#)" on page 33

5.11 GSE Header

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig[:STATe]	86
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LTYPe	86
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:GLENgth	87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FIUSe[:STATe]	87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FID:PATtern	87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLENgth?	87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLUSe[:STATe]	88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTYPe:PATtern	88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTUSe[:STATe]	88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LABel:PATtern	88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LUSE[:STATe]	89

[\[:SOURce<hw>\]:BB:DVB:DVBX:GHConfig\[:STATe\]](#) <GHActive>

Inserts header information in the transport stream.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[GSE Header Active](#)" on page 33

[\[:SOURce<hw>\]:BB:DVB:DVBX:GHConfig:LTYPe](#) <LType>

Set the type of the used label field.

Parameters:

<LType> integer
 Range: 0 to 3
 *RST: 0

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Label Type](#) " on page 34

[:SOURCE<hw>]:BB:DVB:DVBX:GHConfig:GLENGTH <GLength>

Sets the number of bytes following in the GSE packet.

Parameters:

<GLength> integer
 Range: 1 to 4096
 *RST: 1024

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [GSE Length](#) " on page 34

[:SOURCE<hw>]:BB:DVB:DVBX:GHConfig:FIUSE[:STATE] <FIUse>

Includes a PDU fragment in the GSE packet.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Use, Fragment ID \(Hex\)](#)" on page 34

[:SOURCE<hw>]:BB:DVB:DVBX:GHConfig:FID:PATTERN <FId>

Sets the PDU fragment ID.

Parameters:

<FId> 8 bits
 Hexadecimal value

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See " [Use, Fragment ID \(Hex\)](#)" on page 34

[:SOURCE<hw>]:BB:DVB:DVBX:GHConfig:TLENGTH?

Queries the total length.

Return values:

<TLength> integer
 Range: 1 to 65536
 *RST: 1
 Default unit: Bytes

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Usage: Query only

Manual operation: See "[Use, Total Length](#)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TlUse[:STATe] <TLUse>

Includes the total length indication in the GSE header.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Use, Total Length](#)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PType:Pattern <PType>

Queries the payload type carried in the PDU.

Parameters:

<PType> 16 bits
Hexadecimal value

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Use, Protocol Type \(Hex\)](#)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTUse[:STATe] <PTUse>

Includes the payload type indication in the GSE header.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Use, Protocol Type \(Hex\)](#)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:Label:Pattern <Pattern>

Sets the label used for addressing.

Parameters:

<Pattern> 48 bits
Hexadecimal value

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Use, Label \(Hex\)](#)" on page 34

[:SOURCE<hw>]:BB:DVB:DVBX:GHConfig:LUSE[:STATe] <LUse>

Includes the label indication in the GSE header.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Use, Label \(Hex\)](#)" on page 34

5.12 BB Header

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

[:SOURCE<hw>]:BB:DVB:DVBS DVBX:BHConfig:CACM.....	89
[:SOURCE<hw>]:BB:DVB:DVBS DVBX:BHConfig:IACtive[:STATe].....	89
[:SOURCE<hw>]:BB:DVB:DVBX:BHConfig:GLActive[:STATe].....	90
[:SOURCE<hw>]:BB:DVB:DVBS DVBX:BHConfig:NACTive[:STATe].....	90
[:SOURCE<hw>]:BB:DVB:DVBS DVBX:BHConfig:UPL.....	90
[:SOURCE<hw>]:BB:DVB:DVBS DVBX:BHConfig:ADFL:STATe.....	90
[:SOURCE<hw>]:BB:DVB:DVBS DVBX:BHConfig:DFL.....	91
[:SOURCE<hw>]:BB:DVB:DVBS DVBX:BHConfig:SBYTE:PATTern.....	91

[:SOURCE<hw>]:BB:DVB:DVBS|DVBX:BHConfig:CACM <CAcm>

Selects whether constant coding and modulation (CCM) or adaptive coding and modulation (ACM) communication is used.

Parameters:

<CAcm> CCM | ACM
 *RST: CCM

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[CCM/ACM](#)" on page 35

[:SOURCE<hw>]:BB:DVB:DVBS|DVBX:BHConfig:IACtive[:STATe] <IActive>

Sets the ISSYI (input stream synchronization indicator) bit to 1.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[ISSYI Active](#)" on page 36

[:SOURCE<hw>]:BB:DVB:DVBS|DVBS|DVBS|DVBS:BHConfig:GLActive[:STATE] <GLActive>

Sets that the GSE stream is GSE-Lite compliant.

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[GSE-Lite Active](#)" on page 36

[:SOURCE<hw>]:BB:DVB:DVBS|DVBS|DVBS|DVBS:BHConfig:NACTive[:STATE] <NACTive>

Activates null-packet deletion (NPD).

Parameters:

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

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[NPD Active](#)" on page 36

[:SOURCE<hw>]:BB:DVB:DVBS|DVBS|DVBS|DVBS:BHConfig:UPL <UPLength>

Sets the user packet length (UPL).

Parameters:

<UPLength> integer
 Range: 1 to 8192
 *RST: 100

Example: See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[UPL](#)" on page 36

[:SOURCE<hw>]:BB:DVB:DVBS|DVBS|DVBS|DVBS:BHConfig:ADFL:STATE <State>

Defines if the DFL is set automatically or manually.

Parameters:

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

Example:

See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Auto DFL](#)" on page 36

[:SOURCE<hw>] : BB : DVB : DVBS | DVBSX : BHConfig : DFL <DFLength>

Sets the data field length (DFL).

Parameters:

<DFLength> integer
 Range: 1 to 7264
 *RST: 1024

Example:

See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[DFL](#)" on page 36

[:SOURCE<hw>] : BB : DVB : DVBS | DVBSX : BHConfig : SBYTe : PATtern <Sync>

Sets the user packet synchronization byte.

Parameters:

<Sync> 8 bits
 Hexadecimal value

Example:

See [Example "Configuring the DVB-S2/DVB-S2X settings"](#) on page 74.

Manual operation: See "[Sync \(Hex\)](#)" on page 36

List of Commands

[:SOURCE<hw>]:BB:DVB:CLIPPING:LEVEL.....	58
[:SOURCE<hw>]:BB:DVB:CLIPPING:MODE.....	59
[:SOURCE<hw>]:BB:DVB:CLIPPING:STATE.....	59
[:SOURCE<hw>]:BB:DVB:CLOCK:MODE.....	67
[:SOURCE<hw>]:BB:DVB:CLOCK:MULTIPLIER.....	67
[:SOURCE<hw>]:BB:DVB:CLOCK:SOURCE.....	67
[:SOURCE<hw>]:BB:DVB:CLOCK:SYNCHRONIZATION:EXECUTE.....	68
[:SOURCE<hw>]:BB:DVB:CLOCK:SYNCHRONIZATION:MODE.....	67
[:SOURCE<hw>]:BB:DVB:DVBT:DRATE?.....	55
[:SOURCE<hw>]:BB:DVB:DVBT:DURATION?.....	55
[:SOURCE<hw>]:BB:DVB:DVBT:HMODE.....	70
[:SOURCE<hw>]:BB:DVB:DVBT:IINTERLEAVER:BIT[:STATE].....	72
[:SOURCE<hw>]:BB:DVB:DVBT:IINTERLEAVER:SYMBOL:MODE.....	72
[:SOURCE<hw>]:BB:DVB:DVBT:IINTERLEAVER:SYMBOL:TMODE.....	72
[:SOURCE<hw>]:BB:DVB:DVBT:IINTERLEAVER:SYMBOL[:STATE].....	72
[:SOURCE<hw>]:BB:DVB:DVBT:OFDM:ALPHA.....	73
[:SOURCE<hw>]:BB:DVB:DVBT:OFDM:WIDTH.....	73
[:SOURCE<hw>]:BB:DVB:DVBT:OFDM:GINTERVAL.....	73
[:SOURCE<hw>]:BB:DVB:DVBT:OFDM:MODULATION.....	73
[:SOURCE<hw>]:BB:DVB:DVBT:SAMPLE:LENGTH?.....	55
[:SOURCE<hw>]:BB:DVB:DVBT:SAMPLE:RATE?.....	55
[:SOURCE<hw>]:BB:DVB:DVBT:SFRAMES.....	54
[:SOURCE<hw>]:BB:DVB:DVBT:TPS:ID:PATTERN.....	82
[:SOURCE<hw>]:BB:DVB:DVBT:TPS:ID:STATE.....	82
[:SOURCE<hw>]:BB:DVB:DVBT:TPS:MFEC[:STATE].....	82
[:SOURCE<hw>]:BB:DVB:DVBT:TPS:TSLICING[:STATE]?.....	83
[:SOURCE<hw>]:BB:DVB:DVBT[:HP LP]:DATA.....	70
[:SOURCE<hw>]:BB:DVB:DVBT[:HP LP]:DATA:DSELECTION.....	70
[:SOURCE<hw>]:BB:DVB:DVBT[:HP LP]:ICODER:RATE.....	70
[:SOURCE<hw>]:BB:DVB:DVBT[:HP LP]:ICODER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBT[:HP LP]:OCODER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBT[:HP LP]:OINTERLEAVER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBT[:HP LP]:PNSCRAMBLER[:STATE].....	71
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:ADLENGTH:STATE.....	77
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BHCONFIG:ADFL:STATE.....	90
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BHCONFIG:CACM.....	89
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BHCONFIG:DFL.....	91
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BHCONFIG:IACTIVE[:STATE].....	89
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BHCONFIG:NACTIVE[:STATE].....	90
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BHCONFIG:SBYTE:PATTERN.....	91
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BHCONFIG:UPL.....	90
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BININTERLEAVER[:STATE].....	79
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:BSCRAMBLER[:STATE].....	78
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:CTYPE.....	79
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:DATA.....	76
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:DATA:DSELECTION TSELECTION GSELECTION.....	77
[:SOURCE<hw>]:BB:DVB:DVBS DVBSX:DATA:LENGTH.....	77

[SOURce<hw>]:BB:DVB:DVBS DVBX:DATA:PATtern.....	76
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[SOURce<hw>]:BB:DVB:DVBS DVBX:ISTReam?.....	76
[SOURce<hw>]:BB:DVB:DVBS DVBX:MCOD.....	80
[SOURce<hw>]:BB:DVB:DVBS DVBX:MODulation.....	80
[SOURce<hw>]:BB:DVB:DVBS DVBX:OCODer[:STATe].....	78
[SOURce<hw>]:BB:DVB:DVBS DVBX:PSCRambler[:STATe].....	81
[SOURce<hw>]:BB:DVB:DVBS DVBX:PSTate[:STATe].....	81
[SOURce<hw>]:BB:DVB:DVBS DVBX:STYPe.....	76
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:AFIeld[:STATe].....	85
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:CCOunter.....	85
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:PAYLoad[:STATe].....	85
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:PID:PATtern.....	84
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:PUS.....	84
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:SBYTe?.....	83
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:SCONtrol.....	85
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:TEIndication[:STATe].....	84
[SOURce<hw>]:BB:DVB:DVBS DVBX:THConfig:TPRiority.....	84
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[SOURce<hw>]:BB:DVB:DVBS DVBX:GHConfig:FID:PATtern.....	87
[SOURce<hw>]:BB:DVB:DVBS DVBX:GHConfig:FIUSe[:STATe].....	87
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[SOURce<hw>]:BB:DVB:DVBS DVBX:GHConfig:LTYPe.....	86
[SOURce<hw>]:BB:DVB:DVBS DVBX:GHConfig:LUSE[:STATe].....	89
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[:SOURCE<hw>]:BB:DVB:TRIGGER:OUTPUT<ch>:ONTIME..... 64

[:SOURCE<hw>]:BB:DVB:TRIGGER:OUTPUT<ch>:PATTERN..... 65

[:SOURCE<hw>]:BB:DVB:TRIGGER:OUTPUT<ch>:PULSE:DIVIDER..... 65

[:SOURCE<hw>]:BB:DVB:TRIGGER:OUTPUT<ch>:PULSE:FREQUENCY?..... 65

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