

R&S[®]SMCVB-KS20

HEVC Streams

User Manual



1179274802
Version 04

ROHDE & SCHWARZ
Make ideas real



This document describes the following software options:

- R&S®SMCVB-KS20 HEVC Streams (1434.5292.xx)

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1179.2748.02 | Version 04 | R&S®SMCVB-KS20

Throughout this document, R&S® is indicated as R&S.

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1 Welcome to the R&S SMCVB-KS20 option

The R&S SMCVB-KS20 is a stream library contains test streams to support development and test of broadcast television equipment, consumer receivers and TV sets.

This user manual contains a reference description of the functionality that the stream library provides. All functions not discussed in this manual are described in the R&S SMCV100B user manual. The latest version is available at:

www.rohde-schwarz.com/manual/SMCV100B

1.1 Key features

The R&S SMCVB-KS20 features:

- Numerous test stream files
- Streaming of high-quality video contents
- Streaming of high-quality audio contents
- Efficient use with dedicated streams

All streams with VUI parameters are compliant to ETSI TS 101154 V2.2.1 (2015-06).



For all UHD TV signals, an open GOP (group of pictures) compressing structure is used for higher picture quality. The drawback of this structure is that a seamless switching (looping) is not possible. As a result, decoding errors and picture disturbances occur at the looping point.

1.2 Installation

Required options

The equipment layout for processing files of waveform libraries includes:

- R&S SMCV100B base unit (64 MSample ARB memory, 60 MHz RF bandwidth)
- Broadcast standard option for the "TS Player" application (R&S SMCVB-Kxxx)
- Enable Broadcast Standards option (R&S SMCVB-K519)
- Stream library option (R&S SMCVB-KSxx)

For more information on stream options, see chapter "TS Player section "Required options" in the broadcast standard option user manual of the R&S SMCV100B.

To register for access to the libraries

R&S SMCV100B stream and waveform libraries are available for download for registered users on the "Vector Signal Generator Customer Web" at the global Rohde & Schwarz information system (GLORIS).

1. For access, register at <https://gloris.rohde-schwarz.com>:
In the section "How to register", follow the instructions provided in the introduction video "How to register for GLORIS".
2. Register to GLORIS with the creation of a personal account.

Mr.
 Mrs.
 Ms.
 No information

First Name Last Name

Email

Country City

Company dun & bradstreet

Reason for registration
 Please tell us the reason for your registration (i.e. which product you have or what kind of information you want to get). If you already have a contact person at Rohde & Schwarz, please add the email address of your contact as well.

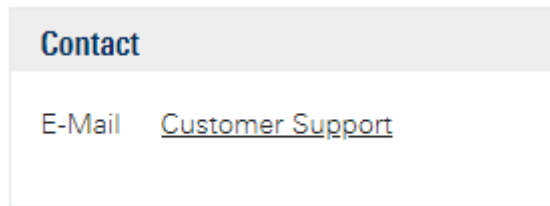
Password Retype Password

I accept the [Terms of Use](#) for a global Rohde & Schwarz Extranet account
 I accept the following [Marketing Permission](#)
 I want to register for e-commerce

3. For access to the "Vector Signal Generator Customer Web", provide the following information:
 - Specify that you want access to the "Vector Signal Generator Customer Web".
 - Include the material number and serial number of your device.
The label is located on the rear panel of the R&S SMCV100B.
- a) When using a new GLORIS account, fill the information in the "Reason for registration" field.

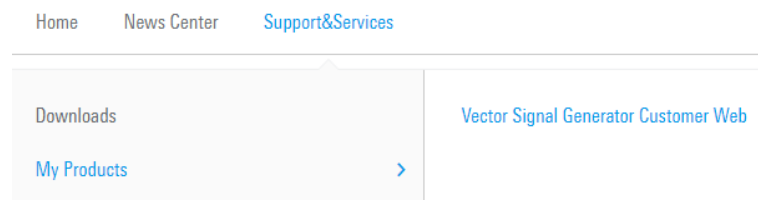
Reason for registration
 Please tell us the reason for your registration (i.e. which product you have or what kind of information you want to get). If you already have a contact person at Rohde & Schwarz, please add the email address of your contact as well.

- b) When using an existing GLORIS account, click "Customer support" and fill in the information into an email.



To access "Product Related Documents"

1. Log in to GLORIS.
2. In the menu bar, select "Support&Services > My Products > Vector Signal Generator Customer Web".



The "R&S SMCV100B Customer Web" page opens.

3. In the selection field "Product Selection for VSG", select "R&S®SMCV100B".

A webpage opens and displays search results for products related to the R&S SMCV100B.

Product Related Documents



To download a library file

This procedure describes how to download library files. It provides a step-by-step description for download of a stream library file. The download of waveform library files is analogous.

1. Access the "Product Related Documents" webpage as described in "To access "Product Related Documents"" on page 7.
2. In the search navigation bar, select "Firm-/Software" > "Waveform & Streams".

The search lists all information related to stream and waveform libraries of the R&S SMCV100B:

- R&S SMCVB-KSxx results relate to stream libraries.
- R&S SMCVB-KVxx results relate to waveform libraries.


You are searching for: Product: R&S®SMCV100B

All Product Documents Firm-/Software



Firmware Software Driver Waveform & Streams Archive

2452 Results available Sort by date ▾

Show options

 [SMCVB-KS10 DAB / T-DMB STREAMS](#)

Attachments

 [SMCVB-KS10 DAB / T-DMB STREAMS](#)  [SMCVB-KS10 DAB / T-DMB STREAMS User Manual \(download version\)](#)

3. Optionally, deactivate the filtering to display all waveform and stream library content.
 - a) On the left menu, select "Show options".
 - b) Click "Filtering on. Reset all filters."

Filtering on. Reset all filters.

4. Optionally, to filter for stream library content enter *KS in the search input field.

You are searching for: Product: R&S®SMCV100B


*KS

All Product Documents Firm-/Software



Firmware Software Driver Waveform & Streams Archive

142 Results available Sort by date ▾

Show options

 [SMCVB-KS10 DAB / T-DMB STREAMS](#)

Attachments

 [SMCVB-KS10 DAB / T-DMB STREAMS](#)  [SMCVB-KS10 DAB / T-DMB STREAMS User Manual \(download version\)](#)

5. In the search result list, navigate to the required library.
6. To download required library files, click the download link in the "Attachments" section of the library product page.

For example, for DAB/T-DMB streams, click the download link "R&S SMCVB-KS10 DAB / T-DMB STREAMS".

A download dialog opens to select and save files of the stream library.

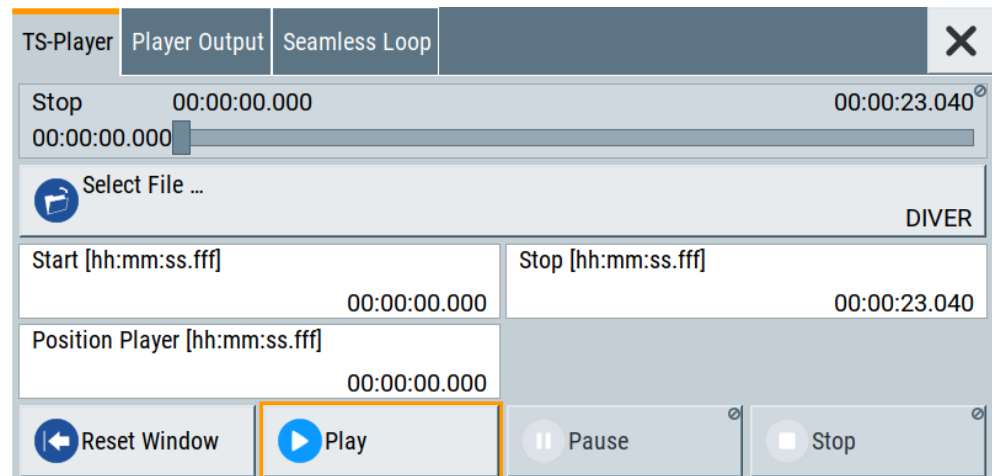
To save a library file

- ▶ Save the library file to one of the following storage locations:
 - External storage device (HDD, memory stick): Use an external USB storage device to save large files or complete libraries. Connect the storage device to one of the USB 3.0 connectors on the rear panel of the R&S SMCV100B. If detected correctly, you can access the files on the R&S SMCV100B in the `/usb/` directory in the file-select dialogs.
The R&S SMCV100B supports the following storage formats: ext2/ext3/ext4, FAT16/FAT32, NTFS (read-only), ISO9660, UDF
 - Internal memory (SSD): Use the internal memory to save single files to the user directory `/var/user/` of the R&S SMCV100B, for example, using FTP via a LAN connection.

To load and play a stream library file

1. Load the file from its storage location:
 - External storage device (HDD, memory stick): Load the file from the `/usb/` directory.
 - Internal memory (SSD): Load the file from the user directory `/var/user/`

Note: Library files are encrypted files. Loading the library file at the R&S SMCV100B requires installation of the corresponding library option. See "[Required options](#)" on page 5.
2. To load the file at the R&S SMCV100B, open the "TS Player" application in digital broadcast standard ("`<Broadcast_Standard>`") dialogs:
 - a) Select "Baseband" > "`<Broadcast_Standard>`" > "Input Signal".
 - b) Select "Source" > "TS Player".
 - c) Select "TS Player" button.
 - d) Select "Select File".
3. To select the file, navigate to the storage location (1).
4. Select "TS-Player" > "Play".



The R&S SMCV100B processes the stream file.

5. Select "<Broadcast_Standard>" > "State" > "On", to activate the baseband signal.
6. In the block diagram, select "RF" > "On".

The stream file is modulated onto the RF carrier and output at the "RF 50 Ω " connector.

For more information on loading stream files, see chapter "How to generate an internal TS signal" in the broadcast standard option user manual of the R&S SMCV100B.

1.3 What's new

Compared to the previous version the documentation provides updated installation instructions to access, download and play stream library files, see [Chapter 1.2, "Installation"](#), on page 5.

1.4 Documentation overview

This section provides an overview of the R&S SMCV100B user documentation. Unless specified otherwise, you find the documents at:

www.rohde-schwarz.com/manual/smcv100b

1.4.1 Getting started manual

Introduces the R&S SMCV100B 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.

1.4.2 User manuals 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 getting started manual.
- **Software option manual**
Contains the description of the specific functions of an option. Basic information on operating the R&S SMCV100B is not included.

The contents of the user manuals are available as help in the R&S SMCV100B. 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.

1.4.3 Service manual

Describes the performance test for checking compliance with rated specifications, firmware update, troubleshooting, adjustments, installing options and maintenance.

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

<https://gloris.rohde-schwarz.com>

1.4.4 Instrument security procedures

Deals with security issues when working with the R&S SMCV100B in secure areas. It is available for download on the internet.

1.4.5 Printed safety instructions

Provides safety information in many languages. The printed document is delivered with the product.

1.4.6 Specifications and product brochures

The specifications document, also known as the data sheet, contains the technical specifications of the R&S SMCV100B. It also lists the firmware applications 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/smcv100b

1.4.7 Calibration certificate

The document is available on <https://gloris.rohde-schwarz.com/calcert>. You need the device ID of your instrument, which you can find on a label on the rear panel.

1.4.8 Release notes and open source acknowledgment

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

The software uses several valuable open source software packages. An open source acknowledgment document provides verbatim license texts of the used open source software.

www.rohde-schwarz.com/firmware/smcv100b

1.4.9 Application notes, application cards, white papers, etc.

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

For some application sheets, see also:

www.rohde-schwarz.com/application/smcv100b

1.4.10 Videos

Find various videos on Rohde & Schwarz products and test and measurement topics on YouTube: <https://www.youtube.com/@RohdeundSchwarz>

2 Video test signals and audio test sequences

2.1 Video

2.1.1 Compression standard HEVC H.265

Recommendation ITU T H.265 (high efficiency video coding, HEVC) represents an evolution of the existing video coding standards ITU T H.262 (usually called MPEG 2) and ITU T H.264 (advanced video coding, AVC). Besides other needs for higher compression, the standard was developed to enable the transmission of 720p (HD), 1080p (full HD) and 4k (UHD) videos over broadcast channels.

2.1.2 Video formats

2.1.2.1 UHDTV 3840x2160p

Profile general_profile_idc	Main 10 2
Compatibility	Main; Main 10
Level general_level_idc	5.1 153
Tier	Main
Bit_depth_luma_minus8	0
Bit_depth_chroma_minus8	0

2.1.2.2 FULL HDTV 1920x1080p

Profile general_profile_idc	Main 1
Compatibility	Main; Main 10
Level general_level_idc	4.1 123
Tier	Main

Bit_depth_luma_minus8	0
Bit_depth_chroma_minus8	0

2.1.2.3 HDTV 1280x720p

Profile general_profile_idc	Main 1
Compatibility	Main; Main 10
Level general_level_idc	4.1 120
Tier	Main
Bit_depth_luma_minus8	0
Bit_depth_chroma_minus8	0

2.1.2.4 VUI parameters 50 Hz

Vui_timing_info_present_flag	1
Vui_num_units_tick	1
Vui_time_scale	50

2.1.2.5 VUI parameters 59.94 Hz

Vui_timing_info_present_flag	1
Vui_num_units_tick	1001
Vui_time_scale	60000

2.1.3 Moving video scene

2.1.3.1 Anthill

This sequence shows 2 scenes repeated in loops. The first scene shows an anthill from a distance, the second scene goes into detail.



The scenes are rich in detail to demonstrate the high resolution of UHDTV versus HDTV. The picture size is displayed in the left bottom corner of the frame.

2.1.3.2 Beehive

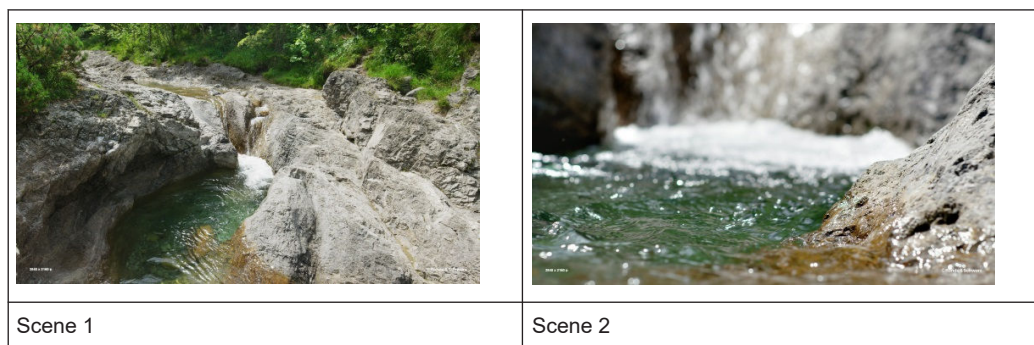
This sequence shows 2 scenes repeated in loops. The first scene shows some beehives from a distance, the second scene goes into detail.



The scenes show fast movement of the bees and also shadow of flying bees. The scenes are rich in detail to demonstrate the high resolution of UHDTV versus HDTV. The picture size is displayed in the left bottom corner of the frame.

2.1.3.3 Waterfall

This sequence shows 2 scenes repeated in loops. The first scene shows a little waterfall from a distance, the second scene goes into detail.



The moving water generally challenges the compression algorithms, so that some kind of blocking is noticeable. You can see the effect in both resolutions, because the bit rate is adapted to the picture size. The picture size is displayed in the left bottom corner of the frame.

2.1.3.4 RS 4k trailer

This video is a long sequence with several scenes. It shows a promotion video of the Rohde & Schwarz company to demonstrate 4k video. Due to limited editing tools, it was composed as 25 frames per second video. Because broadcast transmission is planned with 50 frames per second only, every picture has to be doubled (transmitted twice).

	
Scene example	Scene example

This video is available in UHDTV only.

2.1.4 Test pattern

2.1.4.1 ITU-R BT1729

This video is based on the definition of ITU R BT.1729, where 16:9 and 4:3 test patterns with moving element. Associated audio is defined for the following purposes:

- Quality control of chrominance and luminance through the production chain
- Checking and adjusting the chrominance and luminance alignment of broadcast equipment, particularly video monitors
- General testing of equipment for video production, emission and presentation
- Establishing that video circuit is active and associated audio is available.
- Checking for audio-video synchronization
- Checking for correct connection of audio channels
- Checking for correct audio levels

	2160p
	1080p
	720p

Deviant to the ITU-R BT.1729 definition, the test signals in this library include a 2160 lines version, but do not support real (analog bandwidth limited) frequency sweep zones. A digital representation is provided instead. Furthermore, a 1 kHz -6 dBFS audio is included for EMC purposes. Including the audio inhibits two of the original purposes listed above, namely checking for audio-video synchronization and checking for correct connection of audio channels.

2.2 Audio

2.2.1 Compression standard MPEG-1 layer 2

MPEG 1 audio layer 2 is an audio compression format defined by ISO/IEC 11172 3 for mono and stereo audio signals. It is used for digital television transmission in DVB, although newer compression formats with more audio channels like Dolby AC 3 and AAC are becoming common.

2.2.2 Audio parameters

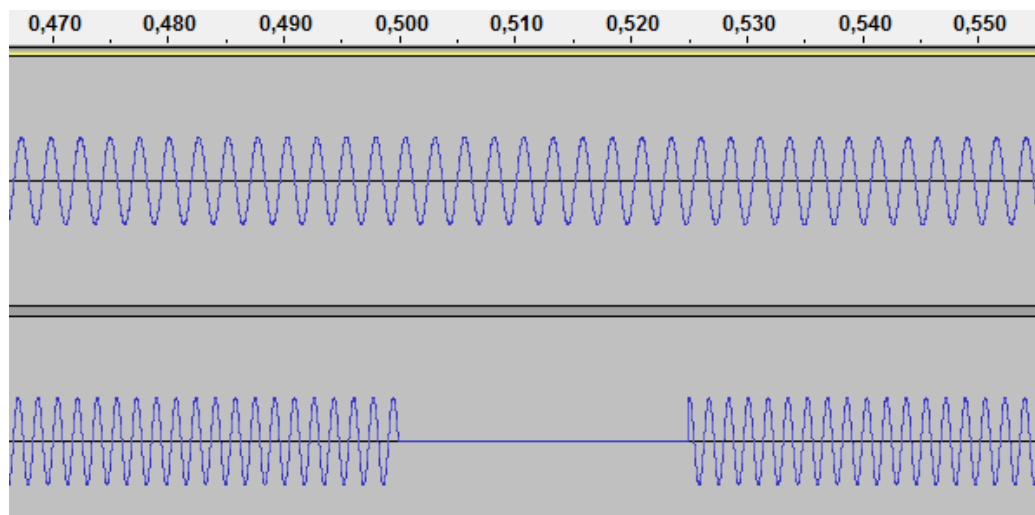
Compression	MPEG-1 layer 2
Sampling rate	48 ksample/s
Time per frame	24 ms
Bit rate	192 kbps
Channels	2 (stereo)

2.2.3 Test signal 1

Used with ITU-R BT 1729-1

Left 392 Hz / -6dB_{fs}

Right 493.9 Hz / -6dB_{fs}

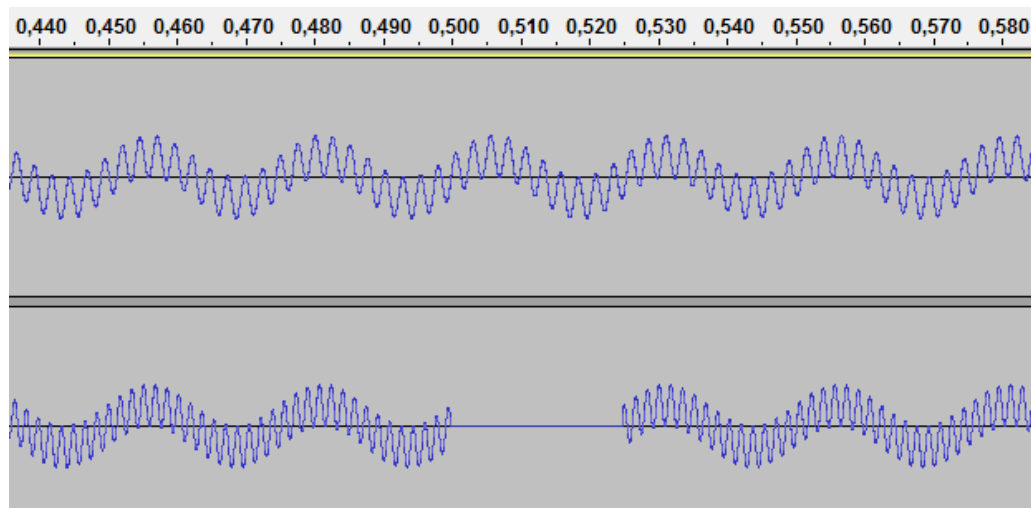


2.2.4 Test signal 2

Used with ITU-R BT 1729-2





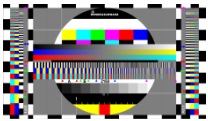
Left 392 Hz + 40 Hz / -6dB_{fs}

Right 493.9 Hz + 40 Hz / -6dB_{fs}



3 DVB transport streams

3.1 Overview

	UHDTV	Full HDTV	HDTV
Anthill 	See Chapter 3.3.1.2, "UHDTV HEVC anthill" , on page 24 (50 Hz) or Chapter 3.4.1.2, "UHDTV HEVC anthill" , on page 37 (59 Hz)	See Chapter 3.3.2.2, "Full HDTV HEVC anthill" , on page 29 (50 Hz) or Chapter 3.4.2.3, "Full HDTV HEVC beehive" , on page 43 (59 Hz)	See Chapter 3.3.3.2, "HDTV HEVC anthill" , on page 33 (50 Hz) or Chapter 3.4.3.2, "HDTV HEVC anthill" , on page 46 (59 Hz)
Beehive 	See Chapter 3.3.1.3, "UHDTV HEVC beehive" , on page 24(50 Hz) or Chapter 3.4.1.3, "UHDTV HEVC beehive" , on page 38 (59 Hz)	See Chapter 3.3.2.3, "Full HDTV HEVC beehive" , on page 29 (50 Hz) or Chapter 3.4.2.3, "Full HDTV HEVC beehive" , on page 43 (59 Hz)	See Chapter 3.3.3.3, "HDTV HEVC beehive" , on page 34 (50 Hz) or Chapter 3.4.3.3, "HDTV HEVC beehive" , on page 47 (59 Hz)
Waterfall 	See Chapter 3.3.1.4, "UHDTV HEVC waterfall" , on page 25(50 Hz) or Chapter 3.4.1.4, "UHDTV HEVC waterfall" , on page 39 (59 Hz)	See Chapter 3.3.2.4, "Full HDTV HEVC waterfall" , on page 30 (50 Hz) or Chapter 3.4.2.4, "Full HDTV HEVC waterfall" , on page 43 (59 Hz)	See Chapter 3.3.3.4, "HDTV HEVC waterfall" , on page 34 (50 Hz) or Chapter 3.4.3.4, "HDTV HEVC waterfall" , on page 48 (59 Hz)
RS 4k Trailer 	See Chapter 3.3.1.5, "UHDTV HEVC RS 4k trailer" , on page 26 (50 Hz) or Chapter 3.4.1.5, "UHDTV HEVC RS 4k trailer" , on page 39 (59 Hz)	-	-
ITU-R BT1729 	See Chapter 3.3.1.6, "UHDTV HEVC ITU-R BT1729" , on page 26 (50 Hz) or Chapter 3.4.1.6, "UHDTV HEVC ITU-R BT1729" , on page 40 (59 Hz)	See Chapter 3.3.2.5, "Full HDTV HEVC ITU-R BT1729" , on page 31 (50 Hz) or Chapter 3.4.2.5, "Full HDTV HEVC ITU-R BT1729" , on page 44 (59 Hz)	See Chapter 3.3.3.5, "HDTV HEVC ITU-R BT1729" , on page 35 (50 Hz) or Chapter 3.4.3.5, "HDTV HEVC ITU-R BT1729" , on page 48 (59 Hz)

3.2 DVB transport stream PSI/SI details

3.2.1 Network information table

These parameters are valid for all transport streams of this library. All signals have identical IDs and transmission information, so that only one channel scan on the TV receiver is necessary to display all signals.

Network	ID	2000 (0x07D0)
	Name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)
Transport stream	ID	1 (0x0001)
Original network	ID	2000 (0x07D0)
Satellite delivery system descriptor (DVB-S2)	Frequency	11.11100 GHz
	Orbital position	19.2 deg West
	Polarization	Circular-right
	Roll off	$\alpha = 0.20$
	Modulation system	DVB-S2
	Modulation type	8PSK
	Symbol rate	22.0000 Msymbol/s
	FEC inner	8/9 conv. code rate
S2 satellite delivery system descriptor	Scrambling sequence selector	Sequence index n conveyed by scrambling_sequence_index field
	Multiple input stream flags	Single
	Backwards compatibility indicator	0

3.2.2 Service description table

These parameters are valid for all transport streams of this library. All signals have an identical service name and ID, so that only one channel scan on the TV receiver is necessary to display all signals.

Service	ID	1 (0x0001)
	Service type	31 (0x1F)
	Provider name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)

	Name	R&S CH 1 (Character set UTF-8 encoding of ISO/IEC 10646-1)
PCR	PID	256 (0x0100)
Video	PID	256 (0x0100)
	Stream type	36 (0x24) HEVC
Audio	PID	272 (0x0110)
	Stream type	3 (0x03) MPEG1

3.2.3 Program map table

These parameters are not equal for all transport streams of this library. They are independent for each video format, because of different level and timing information.

See [Chapter 3.3.1, "3840x2160p \(UHDTV\)"](#), on page 22, [Chapter 3.3.2, "1920_1080p \(full HDTV\)"](#), on page 27 and [Chapter 3.3.3, "1280_720p \(HDTV\)"](#), on page 31.

3.2.4 Event information table

These parameters are not equal for all transport streams of this library. Each video format is named in an actual event for display on TV sets.

See [Chapter 3.3.1, "3840x2160p \(UHDTV\)"](#), on page 22, [Chapter 3.3.2, "1920_1080p \(full HDTV\)"](#), on page 27 and [Chapter 3.3.3, "1280_720p \(HDTV\)"](#), on page 31.

3.3 DVB 50 Hz

These streams have 50 video frames per second and are used in countries with 50 Hz electrical power supply.

3.3.1 3840x2160p (UHDTV)

3.3.1.1 PSI/SI details

Program Map Table

These parameters are valid for all 50 Hz UHDTV transport streams.

Service	ID	1 (0x0001)
Video	Stream type	36 (0x24)

	HEVC descriptor	<pre> descriptor_tag : 0x38 (56) descriptor_length : 13 profile_space : 0 tier_flag : 0 profile_idc : 0x01 (Main profile) profile_compatibility_indication : 0x00000006 (6) progressive_source_flag : 1 interlaced_source_flag : 0 non_packed_constraint_flag : 1 frame_only_constraint_flag : 1 reserved_zero_44bits : 0x000000000000 level_idc : 0x96 (Level 5) temporal_layer_subset_flag : 0 HEVC_still_present_flag : 0 HEVC_24hr_picture_present_flag : 0 reserved : 0x1F (31) </pre>
	HEVC timing and HRD descriptor	<pre> descriptor_tag : 0x3F (63) descriptor_length : 7 extension_descriptor_tag : 0x03 (3) hrd_magement_valid_flag : 0 (leak method shall be used) reserved : 0x3F (63) picture_and_timing_info_present : 1 90kHz_flag : 1 (time base is 90 kHz) reserved : 0x7F (127) num_units_in_tick : 1 </pre>
Audio	Stream type	4 (0x04)
	Audio stream descriptor	<pre> Descriptor tag 0x03 (3) Descriptor length 1 Free format flag 0 ID 1 Layer 2 Variable rate audio indicator 0 reserved 0x7 </pre>


Event Information Table

These parameters are valid for all 50 Hz UHDTV transport streams.

Service	ID	1 (0x0001)
	Service type	31 (0x1F)
	Provider name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)
	Name	R&S CH 1 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Event	ID	1 (0x0001)
	Name	2160p50 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Video	Stream content	9 (0x09)
	Component type	4 (0x04)


	Text	HEVC video (Character set UTF-8 encoding of ISO/IEC 10646-1)
Audio	Stream content	2 (0x02)
	Component type	3 (0x03)
	Text	Audio, stereo (Character set UTF-8 encoding of ISO/IEC 10646-1)

3.3.1.2 UHDTV HEVC anthill

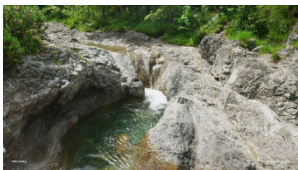
Transport stream	Bit rate	36.4 Mbps
	Payload only	20.3 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.3.1, "3840x2160p (UHDTV)" , on page 22	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	16 Mbps
	Bit rate max.	20 Mbps
	Loop time	9.600 s
	GOP size	24 (Open GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.1.3 UHDTV HEVC beehive

Transport stream	Bit rate	36.4 Mbps
	Payload only	20.0 Mbps
	Loop time	48 s (5 video loops)

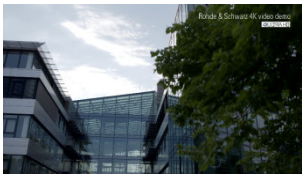
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.3.1, "3840x2160p (UHDTV)" , on page 22	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	16 Mbps
	Bit rate max.	20 Mbps
	Loop time	9.600 s
	GOP size	24 (Open GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.1.4 UHDTV HEVC waterfall

Transport stream	Bit rate	36.4 Mbps
	Payload only	20.3 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.3.1, "3840x2160p (UHDTV)" , on page 22	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	16 Mbps
	Bit rate max.	20 Mbps
	Loop time	9.600 s
	GOP size	24 (Open GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	3840

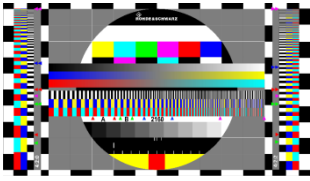
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.1.5 UHDTV HEVC RS 4k trailer

Transport stream	Bit rate	36.4 Mbps
	Payload only	20.3 Mbps
	Loop time	216 s (1 video loop)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.3.1, "3840x2160p (UHDTV)" , on page 22	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	16 Mbps
	Bit rate max.	20 Mbps
	Loop time	216.000 s
	GOP size	24 (Open GOP)
	Number of frames	10800
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	216 s
	Number of frames	8791

3.3.1.6 UHDTV HEVC ITU-R BT1729

Transport stream	Bit rate	36.4 Mbps
	Payload only	19.8 Mbps
	Loop time	48 s (48 video loops)

PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.3.1, "3840x2160p (UHDTV)" , on page 22	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	18 Mbps
	Bit rate max.	19 Mbps
	Loop time	1.000 s
	GOP size	24 (Open GOP)
	Number of frames	50
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Test signal	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s
	Number of frames	2000

This stream is provided in 2 versions with different audio content:

- ITU-R BT1729-1: Left 392 Hz, right: 493.9 Hz muting once per second
- ITU-R BT1729-2: Left 392 Hz + 40 Hz, right: 493.9 Hz + 40 Hz muting once per second

3.3.2 1920_1080p (full HDTV)

3.3.2.1 PSI/SI details

Program Map Table

These parameters are valid for all 50 Hz full HDTV transport streams.

Service	ID	1 (0x0001)
Video	Stream type	36 (0x24)

	HEVC descriptor	<pre> descriptor_tag : 0x38 (56) descriptor_length : 13 profile_space : 0 tier_flag : 0 profile_idc : 0x01 (Main profile) profile_compatibility_indication : 0x00000006 (6) progressive_source_flag : 1 interlaced_source_flag : 0 non_packed_constraint_flag : 1 frame_only_constraint_flag : 1 reserved_zero_44bits : 0x000000000000 level_idc : 0x96 (Level 5) temporal_layer_subset_flag : 0 HEVC_still_present_flag : 0 HEVC_24hr_picture_present_flag : 0 reserved : 0x1F (31) </pre>
	HEVC timing and HRD descriptor	<pre> descriptor_tag : 0x3F (63) descriptor_length : 7 extension_descriptor_tag : 0x03 (3) hrd_magement_valid_flag : 0 (leak method shall be used) reserved : 0x3F (63) picture_and_timing_info_present : 1 90kHz_flag : 1 (time base is 90 kHz) reserved : 0x7F (127) num_units_in_tick : 1 </pre>
Audio	Stream type	4 (0x04)
	Audio stream descriptor	<pre> Descriptor tag 0x03 (3) Descriptor length 1 Free format flag 0 ID 1 Layer 2 Variable rate audio indicator 0 reserved 0x7 </pre>


Event Information Table

These parameters are valid for all 50 Hz full HDTV transport streams.

Service	ID	1 (0x0001)
	Service type	31 (0x1F)
	Provider name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)
	Name	R&S CH 1 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Event	ID	1 (0x0001)
	Name	1080p50 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Video	Stream content	9 (0x09)
	Component type	2 (0x02)


	Text	HEVC video (Character set UTF-8 encoding of ISO/IEC 10646-1)
Audio	Stream content	2 (0x02)
	Component type	3 (0x03)
	Text	audio, stereo (Character set UTF-8 encoding of ISO/IEC 10646-1)

3.3.2.2 Full HDTV HEVC anthill


Transport stream	Bit rate	31.8 Mbps
	Payload only	9.4 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.3.2, "1920_1080p (full HDTV)" , on page 27	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	7 Mbps
	Bit rate max.	9 Mbps
	Loop time	9.600 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.2.3 Full HDTV HEVC beehive

Transport stream	Bit rate	31.8 Mbps
	Payload only	9.5 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.3.2, "1920_1080p (full HDTV)" , on page 27	

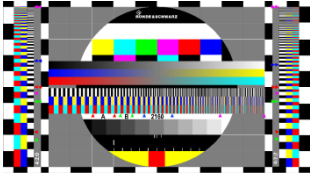
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	9.600 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG#1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.2.4 Full HDTV HEVC waterfall

Transport stream	Bit rate	31.5 Mbps
	Payload only	9.5 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.3.2, "1920_1080p (full HDTV)" , on page 27	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	9.600 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps

	Loop time	9.600 s * 5
	Number of frames	2000

3.3.2.5 Full HDTV HEVC ITU-R BT1729

Transport stream	Bit rate	49.6 Mbps
	Payload only	10.3 Mbps
	Loop time	48 s (48 video loops)
PSI/SI	See Chapter 3.3.2, "1920_1080p (full HDTV)" , on page 27	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	8.5 Mbps
	Bit rate max.	9.5 Mbps
	Loop time	1.000 s
	GOP size	25 (Closed GOP)
	Number of frames	50
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Left + right 1 kHz ±6 dBFS	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s
	Number of frames	2000

This stream is provided in 2 versions with different audio content:

- ITU-R BT1729-1: Left 392 Hz, right: 493.9 Hz muting once per second
- ITU-R BT1729-2: Left 392 Hz + 40 Hz, right: 493.9 Hz + 40 Hz muting once per second

3.3.3 1280_720p (HDTV)

3.3.3.1 PSI/SI details

Program Map Table

These parameters are valid for all 50 Hz HDTV transport streams.

Service	ID	1 (0x0001)
Video	Stream type	36 (0x24)
	HEVC descriptor	<pre> descriptor_tag : 0x38 (56) descriptor_length : 13 profile_space : 0 tier_flag : 0 profile_idc : 0x01 (Main profile) profile_compatibility_indication : 0x00000006 (6) progressive_source_flag : 1 interlaced_source_flag : 0 non_packed_constraint_flag : 1 frame_only_constraint_flag : 1 reserved_zero_44bits : 0x000000000000 level_idc : 0x96 (Level 5) temporal_layer_subset_flag : 0 HEVC_still_present_flag : 0 HEVC_24hr_picture_present_flag : 0 reserved : 0x1F (31) </pre>
	HEVC timing and HRD descriptor	<pre> descriptor_tag : 0x3F (63) descriptor_length : 7 extension_descriptor_tag : 0x03 (3) hrd_management_valid_flag : 0 (leak method shall be used) reserved : 0x3F (63) picture_and_timing_info_present : 1 90kHz_flag : 1 (time base is 90 kHz) reserved : 0x7F (127) num_units_in_tick : 1 </pre>
Audio	Stream type	4 (0x04)
	Audio stream descriptor	<pre> Descriptor tag 0x03 (3) Descriptor length 1 Free format flag 0 ID 1 Layer 2 Variable rate audio indicator 0 reserved 0x7 </pre>


Event Information Table

These parameters are valid for all 50 Hz HDTV transport streams.


Service	ID	1 (0x0001)
	Service type	31 (0x1F)
	Provider name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)
	Name	R&S CH 1 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Event	ID	1 (0x0001)
	Name	720p50 (Character set UTF-8 encoding of ISO/IEC 10646-1)

Video	Stream content	9 (0x09)
	Component type	2 (0x02)
	Text	HEVC video (Character set UTF-8 encoding of ISO/IEC 10646-1)
Audio	Stream content	2 (0x02)
	Component type	3 (0x03)
	Text	audio, stereo (Character set UTF-8 encoding of ISO/IEC 10646-1)


3.3.3.2 HDTV HEVC anthill

Transport stream	Bit rate	31.8 Mbps
	Payload only	7.4 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.3.3, "1280_720p (HDTV)" , on page 31	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	6 Mbps
	Bit rate max.	7 Mbps
	Loop time	9.600 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.3.3 HDTV HEVC beehive

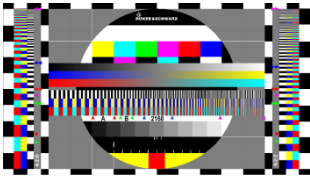
Transport stream	Bit rate	31.5 Mbps
	Payload only	7.2 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.3.3, "1280_720p (HDTV)" , on page 31	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	6 Mbps
	Bit rate max.	7 Mbps
	Loop time	9.600 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.3.4 HDTV HEVC waterfall

Transport stream	Bit rate	31.7 Mbps
	Payload only	7.3 Mbps
	Loop time	48 s (5 video loops)
PSI/SI	See Chapter 3.3.3, "1280_720p (HDTV)" , on page 31	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	6 Mbps
	Bit rate max.	7 Mbps
	Loop time	9.600 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	50 Hz
	Scanning	Progressive

	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	9.600 s * 5
	Number of frames	2000

3.3.3.5 HDTV HEVC ITU-R BT1729

Transport stream	Bit rate	49.6 Mbps
	Payload only	8.3 Mbps
	Loop time	48 s (48 video loops)
PSI/SI	See Chapter 3.3.3, "1280_720p (HDTV)" , on page 31	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	1.000 s
	GOP size	25 (Closed GOP)
	Number of frames	50
	Frame rate	50 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
	Audio Left + right 1 kHz ±6 dBFS	Compression
Bit rate		192 kbps
Loop time		9.600 s
Number of frames		2000

This stream is provided in 2 versions with different audio content:

- ITU-R BT1729-1: Left 392 Hz, right: 493.9 Hz muting once per second
- ITU-R BT1729-2: Left 392 Hz + 40 Hz, right: 493.9 Hz + 40 Hz muting once per second

3.4 DVB 59 Hz

These streams have 59.94 video frames per second and are used in countries with 60 Hz electrical power supply.

3.4.1 3840x2160p (UHDTV)

3.4.1.1 PSI/SI details

Program Map Table

These parameters are valid for all 59 Hz UHDTV transport streams.


Service	ID	1 (0x0001)
Video	Stream type	36 (0x24)
	HEVC descriptor	<pre> descriptor_tag : 0x38 (56) descriptor_length : 13 profile_space : 0 tier_flag : 0 profile_idc : 0x01 (Main profile) profile_compatibility_indication : 0x00000006 (6) progressive_source_flag : 1 interlaced_source_flag : 0 non_packed_constraint_flag : 1 frame_only_constraint_flag : 1 reserved_zero_44bits : 0x000000000000 level_idc : 0x96 (Level 5) temporal_layer_subset_flag : 0 HEVC_still_present_flag : 0 HEVC_24hr_picture_present_flag : 0 reserved : 0x1F (31) </pre>
	HEVC timing and HRD descriptor	<pre> descriptor_tag : 0x3F (63) descriptor_length : 7 extension_descriptor_tag : 0x03 (3) hrd_management_valid_flag : 0 (leak method shall be used) reserved : 0x3F (63) picture_and_timing_info_present : 1 90kHz_flag : 1 (time base is 90 kHz) reserved : 0x7F (127) num_units_in_tick : 1 </pre>
Audio	Stream type	4 (0x04)
	Audio stream descriptor	<pre> Descriptor tag 0x03 (3) Descriptor length 1 Free format flag 0 ID 1 Layer 2 Variable rate audio indicator 0 reserved 0x7 </pre>

Event Information Table

These parameters are valid for all 59 Hz UHDTV transport streams.


Service	ID	1 (0x0001)
	Service type	31 (0x1F)
	Provider name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)
	Name	R&S CH 1 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Event	ID	1 (0x0001)
	Name	2160p59 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Video	Stream content	9 (0x09)
	Component type	4 (0x04)
	Text	HEVC video (Character set UTF-8 encoding of ISO/IEC 10646-1)
Audio	Stream content	2 (0x02)
	Component type	3 (0x03)
	Text	Audio, stereo (Character set UTF-8 encoding of ISO/IEC 10646-1)

3.4.1.2 UHDTV HEVC anthill

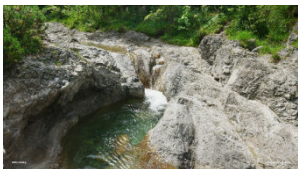
Transport stream	Bit rate	36.4 Mbps
	Payload only	20.5 Mbps
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.4.1, "3840x2160p (UHDTV)" , on page 36	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	17 Mbps
	Bit rate max.	20 Mbps
	Loop time	8.008 s
	GOP size	24 (Open GOP)

	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

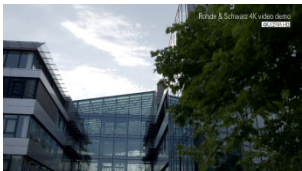
3.4.1.3 UHDTV HEVC beehive

Transport stream	Bit rate	36.4 Mbps
	Payload only	20.5 Mbps
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.4.1, "3840x2160p (UHDTV)" , on page 36	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	17 Mbps
	Bit rate max.	20 Mbps
	Loop time	8.008 s
	GOP size	24 (Open GOP)
	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

3.4.1.4 UHDTV HEVC waterfall

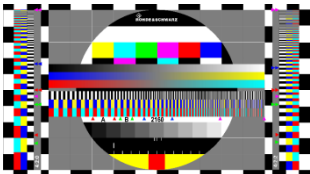
Transport stream	Bit rate	36.4 Mbps
	Payload only	20.5 Mbps
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.4.1, "3840x2160p (UHDTV)" , on page 36	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	17 Mbps
	Bit rate max.	21 Mbps
	Loop time	8.008 s
	GOP size	24 (Open GOP)
	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

3.4.1.5 UHDTV HEVC RS 4k trailer

Transport stream	Bit rate	36.4 Mbps
	Payload only	20.2 Mbps
	Loop time	360.360 s (2 video loops)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.4.1, "3840x2160p (UHDTV)" , on page 36	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	16 Mbps
	Bit rate max.	20 Mbps
	Loop time	180.180 s

	GOP size	24 (Open GOP)
	Number of frames	10800
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	180.180 s * 2
	Number of frames	15015

3.4.1.6 UHDTV HEVC ITU-R BT1729

Transport stream	Bit rate	36.4 Mbps
	Payload only	19.6 Mbps
	Loop time	48.048 s (48 video loops)
PSI/SI	See Chapter 3.2, "DVB transport stream PSI/SI details" , on page 21 and Chapter 3.4.1, "3840x2160p (UHDTV)" , on page 36	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	17 Mbps
	Bit rate max.	20 Mbps
	Loop time	1.000 s
	GOP size	24 (Open GOP)
	Number of frames	60
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
	Audio Test signal	Compression
Bit rate		192 kbps
Loop time		1.001 s * 48
Number of frames		2002

This stream is provided in 2 versions with different audio content:

- ITU-R BT1729-1: Left 392 Hz, right: 493.9 Hz muting once per second
- ITU-R BT1729-2: Left 392 Hz + 40 Hz, right: 493.9 Hz + 40 Hz muting once per second

3.4.2 1920_1080p (full HDTV)

3.4.2.1 PSI/SI details

Program Map Table

These parameters are valid for all 59 Hz full HDTV transport streams.


Service	ID	1 (0x0001)
Video	Stream type	36 (0x24)
	HEVC descriptor	<pre> descriptor_tag : 0x38 (56) descriptor_length : 13 profile_space : 0 tier_flag : 0 profile_idc : 0x01 (Main profile) profile_compatibility_indication : 0x00000006 (6) progressive_source_flag : 1 interlaced_source_flag : 0 non_packed_constraint_flag : 1 frame_only_constraint_flag : 1 reserved_zero_44bits : 0x000000000000 level_idc : 0x96 (Level 5) temporal_layer_subset_flag : 0 HEVC_still_present_flag : 0 HEVC_24hr_picture_present_flag : 0 reserved : 0x1F (31) </pre>
	HEVC timing and HRD descriptor	<pre> descriptor_tag : 0x3F (63) descriptor_length : 7 extension_descriptor_tag : 0x03 (3) hrd_management_valid_flag : 0 (leak method shall be used) reserved : 0x3F (63) picture_and_timing_info_present : 1 90kHz_flag : 1 (time base is 90 kHz) reserved : 0x7F (127) num_units_in_tick : 1 </pre>
Audio	Stream type	4 (0x04)
	Audio stream descriptor	<pre> Descriptor tag : 0x03 (3) Descriptor length : 1 Free format flag : 0 ID : 1 Layer : 2 Variable rate audio indicator : 0 reserved : 0x7 </pre>

Event Information Table

These parameters are valid for all 59 Hz full HDTV transport streams.


Service	ID	1 (0x0001)
	Service type	31 (0x1F)
	Provider name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)
	Name	R&S CH 1 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Event	ID	1 (0x0001)
	Name	2160p59 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Video	Stream content	9 (0x09)
	Component type	4 (0x04)
	Text	HEVC video (Character set UTF-8 encoding of ISO/IEC 10646-1)
Audio	Stream content	2 (0x02)
	Component type	3 (0x03)
	Text	Audio, stereo (Character set UTF-8 encoding of ISO/IEC 10646-1)

3.4.2.2 Full HDTV HEVC anthill

Transport stream	Bit rate	31.8 Mbps
	Payload only	9.2 Mbps
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.4.2, "1920_1080p (full HDTV)" , on page 41	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	8.008 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	50 Hz

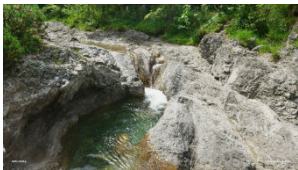
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

3.4.2.3 Full HDTV HEVC beehive

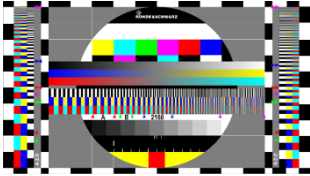
Transport stream	Bit rate	31.8 Mbps
	Payload only	9.2 Mbps
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.4.2, "1920_1080p (full HDTV)" , on page 41	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	8.008 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

3.4.2.4 Full HDTV HEVC waterfall

Transport stream	Bit rate	31.8 Mbps
	Payload only	9.2 Mbps
	Loop time	120.120 s (15 video loops)

PSI/SI	See Chapter 3.4.2, "1920_1080p (full HDTV)" , on page 41	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	8.008 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

3.4.2.5 Full HDTV HEVC ITU-R BT1729

Transport stream	Bit rate	31.8 Mbps
	Payload only	9.2 Mbps
	Loop time	48.048 s (48 video loops)
PSI/SI	See Chapter 3.4.2, "1920_1080p (full HDTV)" , on page 41	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	1.001 s
	GOP size	25 (Closed GOP)
	Number of frames	60
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	3840
	Lines	2160
Audio Test signal	Compression	MPEG-1 layer 2
	Bit rate	192 kbps

	Loop time	8.008 s
	Number of frames	2002

This stream is provided in 2 versions with different audio content:

- ITU-R BT1729-1: Left 392 Hz, right: 493.9 Hz muting once per second
- ITU-R BT1729-2: Left 392 Hz + 40 Hz, right: 493.9 Hz + 40 Hz muting once per second

3.4.3 1280_720p (HDTV)

3.4.3.1 PSI/SI details

Program Map Table

These parameters are valid for all 59 Hz HDTV transport streams.

Service	ID	1 (0x0001)
Video	Stream type	36 (0x24)
	HEVC descriptor	<pre> descriptor_tag : 0x38 (56) descriptor_length : 13 profile_space : 0 tier_flag : 0 profile_idc : 0x01 (Main profile) profile_compatibility_indication : 0x00000006 (6) progressive_source_flag : 1 interlaced_source_flag : 0 non_packed_constraint_flag : 1 frame_only_constraint_flag : 1 reserved_zero_44bits : 0x000000000000 level_idc : 0x96 (Level 5) temporal_layer_subset_flag : 0 HEVC_still_present_flag : 0 HEVC_24hr_picture_present_flag : 0 reserved : 0x1F (31) </pre>
	HEVC timing and HRD descriptor	<pre> descriptor_tag : 0x3F (63) descriptor_length : 7 extension_descriptor_tag : 0x03 (3) hrd_management_valid_flag : 0 (leak method shall be used) reserved : 0x3F (63) picture_and_timing_info_present : 1 90kHz_flag : 1 (time base is 90 kHz) reserved : 0x7F (127) num_units_in_tick : 1 </pre>

Audio	Stream type	4 (0x04)
	Audio stream descriptor	<pre> Descriptor tag 0x03 (3) Descriptor length 1 Free format flag 0 ID 1 Layer 2 Variable rate audio indicator 0 reserved 0x7 </pre>


Event Information Table

These parameters are valid for all 59 Hz HDTV transport streams.


Service	ID	1 (0x0001)
	Service type	31 (0x1F)
	Provider name	Rohde & Schwarz (Character set UTF-8 encoding of ISO/IEC 10646-1)
	Name	R&S CH 1 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Event	ID	1 (0x0001)
	Name	720p59 (Character set UTF-8 encoding of ISO/IEC 10646-1)
Video	Stream content	9 (0x09)
	Component type	4 (0x04)
	Text	HEVC video (Character set UTF-8 encoding of ISO/IEC 10646-1)
Audio	Stream content	2 (0x02)
	Component type	3 (0x03)
	Text	Audio, stereo (Character set UTF-8 encoding of ISO/IEC 10646-1)

3.4.3.2 HDTV HEVC anthill


Transport stream	Bit rate	31.8 Mbps
	Payload only	7.2 Mbps
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.4.3, "1280_720p (HDTV)" , on page 45	
Video	Compression	H.265 (HEVC)

	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	8.008 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005


3.4.3.3 HDTV HEVC beehive

Transport stream	Bit rate	31.7 Mbps
	Payload only	
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.4.3, "1280_720p (HDTV)" , on page 45	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	8.008 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

3.4.3.4 HDTV HEVC waterfall

Transport stream	Bit rate	31.8 Mbps
	Payload only	7.2 Mbps
	Loop time	120.120 s (15 video loops)
PSI/SI	See Chapter 3.4.3, "1280_720p (HDTV)" , on page 45	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	8.008 s
	GOP size	25 (Closed GOP)
	Number of frames	480
	Frame rate	59.94 Hz
	Scanning	Progressive
	Columns	1920
	Lines	1080
Audio Background music	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	8.008 s * 15
	Number of frames	5005

3.4.3.5 HDTV HEVC ITU-R BT1729

Transport stream	Bit rate	49.6 Mbps
	Payload only	8.2 Mbps
	Loop time	48.048 s (48 video loops)
PSI/SI	See Chapter 3.4.3, "1280_720p (HDTV)" , on page 45	
Video 	Compression	H.265 (HEVC)
	Bit rate min.	5 Mbps
	Bit rate max.	7 Mbps
	Loop time	1.001 s
	GOP size	25 (Closed GOP)
	Number of frames	60
	Frame rate	59.94 Hz
	Scanning	Progressive

	Columns	3840
	Lines	2160
Audio Test signal	Compression	MPEG-1 layer 2
	Bit rate	192 kbps
	Loop time	1.001 s * 48
	Number of frames	2002

This stream is provided in 2 versions with different audio content:

- ITU-R BT1729-1: Left 392 Hz, right: 493.9 Hz muting once per second
- ITU-R BT1729-2: Left 392 Hz + 40 Hz, right: 493.9 Hz + 40 Hz muting once per second

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