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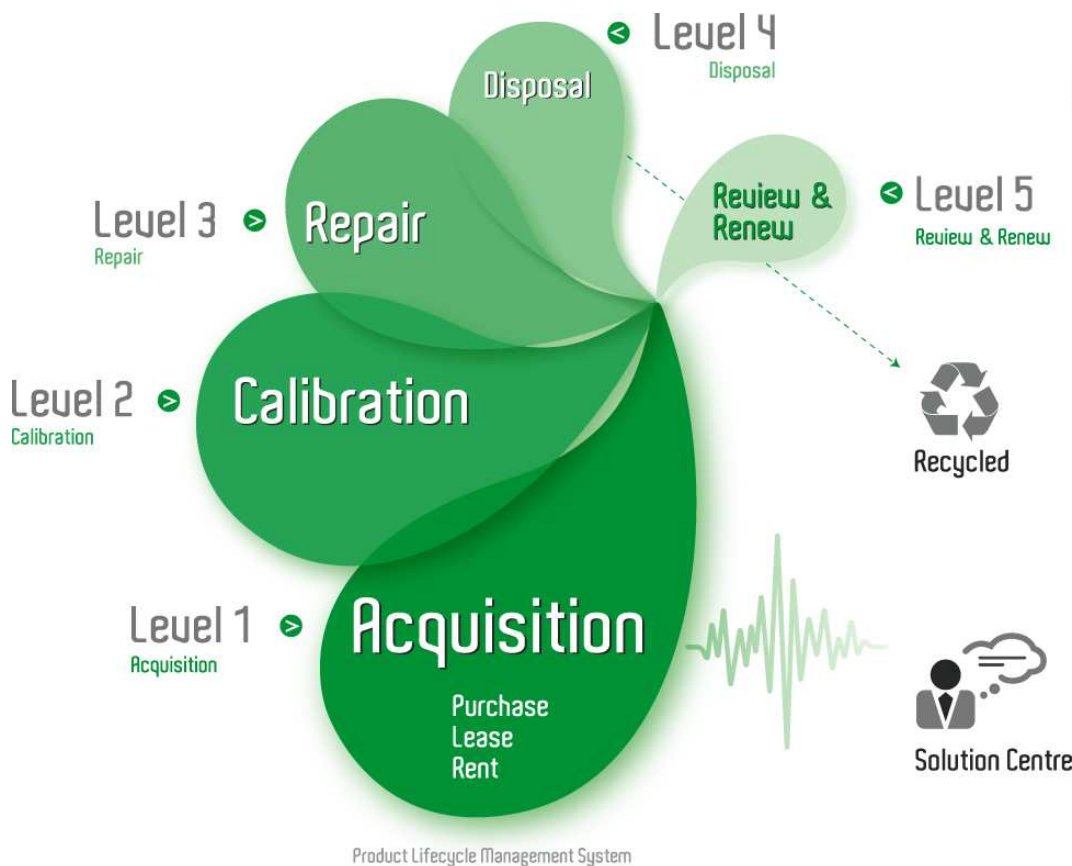
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SFU DVM400 DVRG DVG

Version
01.00

September
2006

Stream Libraries for Rohde & Schwarz TS Generators

SDTV stream library – HDTV sequences – H.264 stream library – Test Card M sequences – DVB-H stream library

- ◆ Standard-compliant and proven reliable in worldwide use
- ◆ Endless and seamless generation for video components, audio components and TS syntax including DVB-H time slicing
- ◆ Available at the push of a button
- ◆ Clear and simple property rights
- ◆ Comprehensive documentation
- ◆ Supported standards:
 - DVB
 - ATSC
 - DVB-H
 - MPEG-2
 - MPEG-4 Part 10/AVC/H.264
 - MPEG-1 Layer II
 - Dolby AC-3

New: H.264 stream library
New version: DVB-H stream library



ROHDE & SCHWARZ

Details common to all stream libraries

Devices supporting the stream libraries



*DTV Recorder
Generator R&S® DVRG*



*Digital Video
Measurement System
R&S® DVM400*



*Broadcast Test System
R&S® SFU*



*MPEG-2 Measurement
Generator R&S® DVG*

Whenever the development, production and testing of DTV components is involved, suitable test signals are needed. To meet this need, Rohde & Schwarz offers not only the generators that are required but also an extensive collection of transport stream files. You can generate the test signals, i.e. the transport streams, merely by selecting the appropriate files on your Rohde & Schwarz generator.

The following special characteristics of the collection enable you to clearly interpret the performance of the test components, thus reducing the amount of work and development time involved:

- ◆ The transport streams are standard-compliant and have been proven reliable in worldwide use
- ◆ Signal generation is endless and seamless
- ◆ The use of short moving picture sequences means that the contents are repeated quickly, making them easily recognizable; thus, you can easily check whether decoding is always performed in the same manner and whether any artifacts that may be present are repeated
- ◆ Unambiguous and simple user rights as well as detailed documentation make working with the collection highly effective

The complete collection is divided into multiple units. The SDTV stream library is part of every Rohde & Schwarz generator and already covers numerous test cases. If you have special applications, additional stream libraries are available as options.

Stream libraries available from Rohde & Schwarz

	Library	Main application
	SDTV stream library	Testing of MPEG-2 SDTV signal processing, testing of analog interfaces (PAL, NTSC)
R&S®DV-HDTV	HDTV sequences	Testing of MPEG-2 HDTV signal processing
R&S®DV-H264	H.264 stream library	Testing of H.264 SDTV and HDTV signal processing
R&S®DV-TCM	Test Card M sequences	Testing of various DTV receiver and decoder STB functions
R&S®DV-DVBH	DVB-H stream library	Testing of entire DVB-H signal processing chain (signaling, FEC, MPE, time slicing)
In addition to these libraries, a T-DMB/DAB stream library is available exclusively for the R&S®SFU.		

Broadcast standards supported

All transport streams contain all necessary PSI information as defined by MPEG-2. Furthermore, they contain all information (SI for DVB and PSIP for ATSC) stipulated by the broadcast standard for which the stream is defined. Details about the broadcast standards that are supported are provided in the individual descriptions of the libraries below.

Seamless and endless generation

All transport streams of the different TS libraries are stored in GTS format. This format allows seamless and endless generation of transport streams at the transport and elementary stream layer. The GTS format can be interpreted by all Rohde & Schwarz generators (R&S®DVG, R&S®DVRG, and with the TS generator options for the R&S®DVM400 and the R&S®SFU).

Realtime calculation of all time-relevant parameters ensures error-free replay even at the transition from the start to the end of the stored sequence. This refers to the transport stream syntax as

well as to the elementary streams. In the case of DVB-H, even the time slicing is seamless.

Use of transport stream content and creation of individual transport streams

To enable you to compose customized transport streams, the content (video, audio and IP data) that is used is delivered together with the stream libraries. If you need to compose new transport streams, you can use Advanced Stream Combiner R&S®DV-ASC. (For further information, please refer to data sheet PD5213.7654.32.) In addition to the content that is used, the configuration

files for the transport streams are also part of the stream library. Thus, you can easily modify the transport streams you receive (see table below).

Documentation on the transport streams

Comprehensive documentation on each transport stream makes working with the transport stream libraries fast and effective. The description for all libraries except R&S®DV-TCM is provided as a printout. The description for R&S®DV-TCM is stored in electronic format (HTML) on the CD that is included. Detailed information is provided by integrated hyperlinks.

	SDTV	R&S®DV-HDTV	R&S®DV-H264	R&S®DV-TCM	R&S®DV-DVBH
Elementary streams (video audio)/IP data	— (Delivered with R&S®DV-ASC)	✓	✓	—	✓
Configuration files for R&S®DV-ASC	—	✓	✓	—	✓

Additional data delivered with the stream libraries

Note: If elementary streams or IP data is taken from one of the libraries, the transport streams composed by R&S®DV-ASC can only be played on Rohde & Schwarz generators that have the related stream option enabled.

SDTV stream library

The SDTV stream library provides a wide range of preconfigured MPEG-2 transport streams for the ATSC and DVB standards. The transport streams consist of several elementary streams and contain video, audio and other data (e.g. teletext or PRBS). Video streams with different data rates, formats, frequencies and content are available.

The signal set consists of sequences with moving picture content as well as some static test patterns. The static test patterns include, for example, color bars, zone plate, CCIR17/18/331, ITS1 to ITS4, etc, and the Rohde & Schwarz Codec test pattern. Due to integrated test lines in the upper and lower picture area of this test pattern, a suitable video analyzer such as the R&S®VSA can be used to measure the analog outputs of a set-top

box (or IRD) within seconds. In addition, integrated moving picture elements allow visual checking of the decoder functionality.

Audio data streams with different sampling rates, encoded in accordance with MPEG-1 Layer II or Dolby AC-3, contain the accompanying sound for the video sequences as well as special audio test signals.



Broadcast standards supported

The transport streams include all program information, service and system tables (PSIP or SI) required by MPEG-2 and ATSC or DVB as stipulated by the selected standard.

The delivery descriptor part of the NIT in DVB streams always specifies a DVB-S network. All streams for ATSC contain the TVCT specifying terrestrial transmission, except CABLE1.GTS and CABLE2.GTS which contain CVCT.

Applications and details about transport streams provided

Moving pictures for general video and audio function test			DVB 29.97	DVB 25.00	ATSC 29.97
Video contents	Audio contents	Video data rates			
Automatic insertion machine	Classical music	2 (only 525 lines) 3/4/6/9/15 Mbit/s	×	×	×
Flower garden	Classical music	2/4/6 Mbit/s	×	×	×
Table tennis	Applause	2/4/6 Mbit/s	×	×	×
Fork lift truck	Bigband music	2/3/4/6/9 (only 525 lines), 15 Mbit/s	×	×	×
Neuschwanstein castle	Classical music	2 Mbit/s; 4/6 Mbit/s (only 625 lines)	×	×	×
DVTS encoder test sequence	Classical music	2/4/6/9/15 Mbit/s	–	×	–
Underwater sequences (length 24 s)	Psychedelic sound	4 Mbit/s	×	×	×

Dynamic test signals			DVB 29.97	DVB 25.00	ATSC 29.97
Video contents	Audio contents	Use			
Alternating all-black and all-white picture	L+R: 1 kHz/10 kHz sine only during all-white picture	Test of clamping circuits, delay measurements, delay between video and audio	×	×	–
Rohde & Schwarz Codec test pattern (16:9) Monitor test pattern with moving elements	L: sine burst 400 Hz R: sine burst 1 kHz, full scale, synchronized with moving picture elements	Test and alignment of D/A converters and analog components in the video paths of decoders; monitor geometry alignment	×	×	×
Rohde & Schwarz Codec test pattern (4:3) Monitor test pattern with moving elements	L: sine burst 400 Hz R: sine burst 1 kHz, full scale, synchronized with moving picture elements	Test and alignment of D/A converters and analog components in the video paths of decoders; monitor geometry alignment	×	×	×
Rohde & Schwarz Codec test pattern (4:3)	Tone sequence in line with CCITT 0.33	Amplitude frequency response and EBU line measurements	×	×	–
Moving zone plate	L+R: sine burst 75 Hz, –12 dB	Frequency response, both horizontal and vertical	×	×	×
Moving color bars	L+R: sine burst 1 kHz, –6 dB; –12 dB silence	EMC testing	×	×	×

Audio formats supported

DVB	MPEG-1 Layer II (stereo 32/44.1/48 ksample/s at 192/384 kbit/s)
ATSC	Dolby AC-3 (2/0, 2/2 and 3/3 LFE channels, 48 ksample/s at 256/384 kbit/s)

Video formats supported

Frequency in Hz	Sampling	Number of columns	Number of lines	Profile
DVB				
25.00	i	720	576	mp@ml
29.97	i	720	480	mp@ml
ATSC				
29.97	i	704	480	mp@ml

i: The video is interlaced.

Applications and details about transport streams provided (cont.)

Static test signals			DVB 29.97	DVB 25.00	ATSC 29.97
Video contents	Audio contents	Use			
Color bars in line with ITU-R-801 (100/0/100/0)	L: sine burst 1 kHz, full scale R: silence	Test and alignment of phase and level ratios for MPEG-2 decoders	×	×	–
Color bars in line with ITU-R-801 (100/0/75/0)	L: silence R: sine burst 1 kHz, full scale	Test and alignment of phase and level ratios for MPEG2 decoders and PAL coders	×	×	–
CCIR17 test signal in frame			–	×	–
CCIR331/1 test signal in frame	L+R: sine burst 1 kHz, –12 dB		–	×	–
CCIR331/2 test signal in frame			–	×	–
NTC 7 composite signal (ITS1)	L+R: sine burst 1 kHz, –6 dB	Test and alignment of level, tilt, overshoot, rounding, pulse distortion, reflection, color subcarrier amplitude and delay, luminance nonlinearity	×	–	×
NTC 7 combined signal (ITS2)	L+R: sine burst 50 Hz, –6 dB		×	–	×
FCC composite signal (ITS3)	L+R: sine burst 10 kHz, –6 dB		×	–	×
Vertical interval reference signal (ITS4)	L+R: sine burst 17.5 kHz, –6 dB		×	–	×
H-SWEEP test signal in frame	L+R: sine burst 50 Hz, –12 dB		×	×	–
CCIR18 test signal in frame		Amplitude frequency response	–	×	–
Multiburst test signal in frame	L+R: tone sequence 40 Hz to 15 kHz, –18 dB		×	–	–
Ramps in RGB signal	L+R: sine burst 15 kHz, –12 dB	Test of RGB matrix	×	×	–
Ramps in all components in frame	L+R: sine burst 7.5 kHz, –12 dB	Missing codes and linearity of D/A converters	×	×	–
Sweep in RGB signal	L+R: sine burst 17.5 kHz, –12 dB	Test and alignment of RGB output stages	×	×	–
Sine x/x test signal in frame	L+R: sine burst 20 kHz, –12 dB	Amplitude frequency response, nonlinear distortion	×	×	–
All-white window	L+R: sine burst 10 kHz, –12 dB	Test of sweep voltage generation and black-level adjustment of monitors	×	×	–
All-blue window	L+R: 1 kHz, 32 ksample/s, 44.1 ksample/s, 48 ksample/s, –6 dB	Test of audio decoder function	×	×	–

Special signals			DVB 29.97	DVB 25.00	ATSC 29.97
Signals	Contents	Use			
R&S®DVMD test signal	Transport stream with DVB protocol errors	Test of DVB analyzers	×	×	–
Teletext	Data elementary stream with teletext test pages	Test of teletext transcoders	×	×	–
PRBS15/23	Data elementary stream with PBRS sequence	BER test	×	×	–

Transport streams with several programs			DVB 29.97	DVB 25.00	ATSC 29.97
Number of programs	Contents				
2	See Rohde & Schwarz Codec test pattern 4:3 and 16:9		×	×	–
3	See DVTS encoder test sequence, 6/4/2 Mbit/s		–	×	–
3	See flower garden/table tennis, 6/4/2 Mbit/s		×	×	–
3	See Neuschwanstein castle, 6/4/2 Mbit/s		–	×	–
3/4	See automatic insertion machine, 6/4/3 Mbit/s, 2 Mbit/s (only 525 lines)		×	×	–
4	See fork lift truck, 6/4/3/2 Mbit/s		×	×	–
6	Various test signals (frame) and audio measurement signals		×	×	–
4	ITS 1 to ITS 4		–	–	×
4	Flower garden, table tennis, fork lift truck, automatic insertion machine		–	–	×
4	Flower garden, table tennis, Neuschwanstein castle, automatic insertion machine		–	–	×

R&S®DV-HDTV – HDTV sequences

The R&S®DV-HDTV option is a versatile combination of MPEG-2-coded streams for high-definition TV. Its versatility enables the testing of diverse units in accordance with almost all worldwide standards. In addition to several video formats for European and American television, MPEG-coded and AC-3-coded audio data are supplied.

Applications

- ◆ General testing of picture and sound decoding and display
- ◆ Testing and alignment of D/A converters in video path of decoders
- ◆ Testing of monitor geometry alignment
- ◆ Testing of left/right allocation and synchronization of audio decoders
- ◆ Testing of electromagnetic compatibility of receivers
- ◆ Testing of frequency response in analog audio path of decoders

Broadcast standards supported

All video content is available in the form of transport streams for DVB and ATSC with all required PSI (MPEG-2), SI (DVB) and PSIP (ATSC) information. The delivery descriptor part of the NIT in DVB streams specifies different network types (DVB-T, DVB-S or DVB-C, depending on the stream). All streams for ATSC contain the TVCT specifying terrestrial transmission.

Overview of available formats for different video content

All video content selections (seven film sequences/test pictures) are available in all listed video formats (6). Thus, the library contains 42 different videos.

Remark regarding use of the streams with the R&S®DVG

The library contains two sets of transport streams:

- ◆ For use with the R&S®DVG
- ◆ For use with all other generators

The difference between the two sets is that some of the streams for the R&S®DVG are shorter than the streams for the other generators since the maximal file size for the R&S®DVG is smaller. The streams that are shorter are not 100% correctly looped at the end of the file concerning the audio component. This affects neither the transport stream structure nor the video component. Only a short interruption of the audio might be observed with some decoders at the end of the file.

Related standards

Video	ITU-T H.262, ISO/IEC 13818-2
Audio	DVB: ISO/IEC 13818-3; ATSC-A52 (Dolby AC-3)
TS	ISO/IEC 13818-1
DVB	ETSI EN 300 468 V1.7.1
ATSC	A65

Audio formats supported




DVB	MPEG-1 Layer II and Dolby AC-3
ATSC	Dolby AC-3



Video formats supported

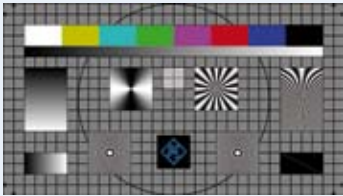
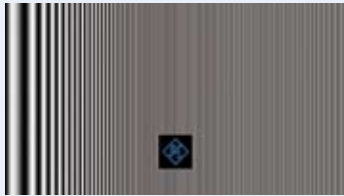
Frequency in Hz	Sampling	Number of columns	Number of lines	Profile
24.00	p	1920	1080	mp@hl
25.00	i	1920	1080	mp@hl
50.00	p	1280	720	mp@hl
29.97	i	1920	1080	mp@hl
59.94	p	1280	720	mp@hl
59.94	p	704	480	mp@hl

The frequency refers to the frame rate. If the video is interlaced (i), the field rate will be twice the frame rate. p: The video is progressive.

Video content

Name of sequence	Fireworks	Public park	Shark and other fish in the aquarium
Example picture			
Format of source	25 Hz, 1920 × 1080 i		
Generation of further formats	Smaller formats are derived by taking frame segments; progressive 50 Hz and 60 Hz formats are derived by calculating additional pictures from the source		

Name of sequence	Horizontal ramp	Color bars
Example picture		
Generation of further format	Synthetically generated in the different formats	

Name of sequence	HDTV test pattern	Horizontal frequency sweep
Example picture		
Generation of further formats	Synthetically generated in the different formats	

All MPEG-2 video elementary streams have a data rate of 16 Mbit/s.

The R&S® DV-H264 stream library consists of more than 30 transport streams. These streams contain programs with different video and audio content in various resolutions including high definition. All transport streams contain service information for DVB with an NIT defining different transmission systems. All included video elementary streams are encoded using H.264, also known as MPEG-4 Part 10 or Advanced Video Codec (AVC). The audio elementary streams are AC-3 or MPEG-1 Layer II encoded.

The transport streams are generated as seamless and endless output by the Rohde & Schwarz TS generators. The repetition time of the content depends on the signal and the format and varies between 32.000, 32.032 and 38.400 seconds for the natural scenes. Transport streams with natural scenes contain

one program. Transport streams with test patterns contain two or three programs (either moving color bars and test pattern or moving color bars, Codec 4:3 and Codec 16:9). The library is designed for the following applications:

Applications

- ◆ General testing of picture and sound decoding and display
- ◆ Testing and alignment of D/A converters in video path of decoders
- ◆ Testing of monitor geometry alignment
- ◆ Testing of left/right allocation and synchronization of audio decoders
- ◆ Testing of electromagnetic compatibility of receivers
- ◆ Testing of frequency response in analog audio path of decoders

Broadcast standards supported

The transport streams provided are all designed for DVB and contain all required PSI and SI information. The delivery descriptor part of the NIT in DVB streams specifies different network types (DVB-T, DVB-S or DVB-C, depending on the stream).

Related standards

Video	ITU-T H.264, ISO/IEC 14496-10, ETSI TS 101 154 V1.7.1
Audio	ISO/IEC 13818-3
TS	ISO/IEC 13818-1 (Amendment 3)
DVB	ETSI EN 300 468 V1.7.1

Overview of available formats for different video content

Format		Flowers	Park	Ice hockey	Codec 4:3	Codec 16:9	Color bar with moving element	Test pattern
23 Hz	1920 × 1080 p							4
24 Hz	1920 × 1080 p							6
25 Hz	720 × 576 i	4	4		3	3	3	
25 Hz	1920 × 1080 i	12	12				6	6
50 Hz	720 × 576 p			6				
50 Hz	1280 × 720 p		12	12			6	6
29 Hz	720 × 480 i	4	4		3	3	3	
29 Hz	1920 × 1080 i	12					6	6
59 Hz	720 × 480 p			6				
59 Hz	1280 × 720 p		12	12			6	6
30 Hz	720 × 480 i	4	4		3	3	3	
30 Hz	1920 × 1080 i	12	12				6	6
60 Hz	720 × 480 p			6				
60 Hz	1280 × 720 p		12	12			6	6

The number specifies the video elementary stream data rate in Mbit/s. If no number is indicated the video content is not available in the specified format.

Audio formats supported

DVB:




- ◆ MPEG-1 Layer II, stereo (used with test pictures)
- ◆ Dolby AC-3 with different numbers (up to 6) of audio channels (used with natural scenes)



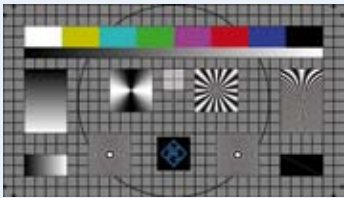
Video formats supported

Frequency in Hz	Sampling	Number of columns	Number of lines	Profile
23.976	p	1920	1080	hp@L4.0
24	p	920	1080	hp@L4.0
25	i	720	576	mp@L3.0
25	i	1920	1080	hp@L4.0
50	p	720	576	mp@L3.1
50	p	1280	720	hp@L4.0
29.97	i	720	480	mp@L3.0
29.97	i	1920	1080	hp@L4.0
59.94	p	720	480	hp@L4.0
59.94	p	1280	720	hp@L4.0
30	i	720	480	mp@L3.0
30	i	1920	1080	hp@L4.0
60	p	720	480	mp@L3.1
60	p	1280	720	hp@L4.0

The frequency refers to the frame rate. If the video is interlaced (i), the field rate will be twice the frame rate.
hp@L4.0: high profile at level 4.0; mp@L3.0: main profile at level 3.0. p: The video is progressive.

Video content

Name of sequence	Flowers	Park	Ice hockey
Example picture			
Format of source	25 Hz, 1920 × 1080 i	25 Hz, 1920 × 1080 i	50 Hz, 1280 × 720 p
Generation of further formats	Smaller formats are derived by taking frame segments; progressive 50 Hz and 60 Hz formats are derived by calculating additional pictures from the source		

Name of sequence	Codec ¹⁾ 4:3 and 16:9	Color bar with moving element	Test pattern
Example picture			
Generation of further formats	Synthetically generated in the different formats		

¹⁾ Codec sequence with PAL and NTSC specific test lines.

R&S® DV-TCM – Test Card M sequences

The transport streams of this library are specifically designed for the testing and development of DTV decoders and receivers. The transport streams provided by this option have been derived from the Test Card M libraries from Snell & Wilcox. They have been adapted for endless, continuous and error-free replay by the Rohde & Schwarz generators and allow simple and effective testing of standard as well as special DTV receiver and decoder functions without the need for any additional measuring equipment. The library contains more than thirty transport streams.

Applications

This collection contains several transport streams, some in line with the DVB and some in line with the ATSC standard. The collection allows a large variety of tests in accordance with the related standard. For details, please refer to the Rohde & Schwarz homepage where a detailed description of each stream is provided.

Tests on elementary video stream

- ◆ Use of active format descriptor AFD (only DVB streams)
 - In line with ETSI TS 101154 V1.7.1 the following AFDs are supported: 9,10,11,13,14 and 15
 - Correct aspect ratio
 - Dynamic format selection
 - Placing the AFD in sequence header, GOP header or picture header

- ◆ Decoding sequence of the group of pictures
 - I-frame only
 - Long GOP
- ◆ Decoding of various coding formats
 - SDTV – HDTV
 - Interlaced – progressive
- ◆ D/A converter tests and tests for analog signal processing
 - Color display
 - Linearity
 - Interlacing
 - Two-dimensional frequency response
 - Picture geometry

Tests on elementary audio stream

- ◆ Decoding of various coding formats
 - MPEG-1 Layer II
 - Dolby AC-3 5.1 surround
- ◆ Left-right identification
- ◆ Synchronization with video

Tests on elementary data stream

- ◆ DVB subtitles
 - Decoding
 - Synchronization with video

DVB-specific tests (SI)

- ◆ Identification of transport stream syntax
 - Virtual programs (PIDs used multiple times)
 - Dynamic variation of composition (adding and/or eliminating transport streams)
 - Use of linkage descriptor

ATSC-specific tests (PSIP)

- ◆ Identification of transport stream syntax
 - Identification of audio channel language
- ◆ Extended text table (ETT)
 - Use of table (linkage to event information table (EIT))
 - Huffman decoding



Examples from transport stream collection

Audio formats supported

DVB	MPEG-1 Layer II
ATSC	Dolby AC-3

Video formats supported

Frequency in Hz	Sampling	Number of columns	Number of lines	Profile
DVB				
25	i	720	576	mp@ml
ATSC				
29.97	i	1920	1080	mp@ml
59.94	p	1280	720	mp@ml
29.97	i	720	480	mp@ml
59.94	p	720	480	mp@ml

The frequency refers to the frame rate. If the video is interlaced (i), the field rate will be twice the frame rate.
p: The video is progressive.

Broadcast standards supported

The library contains transport streams for DVB and ATSC with all required PSI, SI (DVB) and PSIP (ATSC) information. The broadcast standard is defined by the format of the video content of the transport stream (for details, refer to the documentation about the transport streams on the Rohde & Schwarz homepage).

Details about the transport streams provided

Detailed information about each of the transport streams provided is available from the Rohde & Schwarz homepage.

Special copyrights for R&S®DV-TCM

License agreement

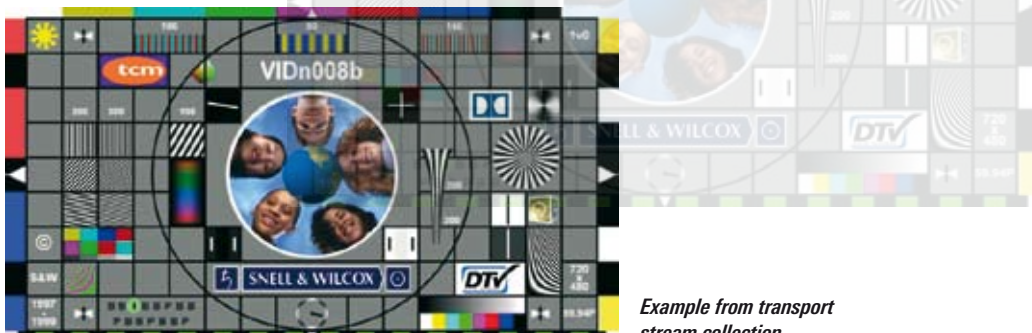
Rohde & Schwarz GmbH & Co. KG shall grant the customer the limited, non-exclusive, non-transferable right and license to play the bit streams on the licensed player and for no other purpose.

Except to the extent to which this cannot be precluded by law, the customer shall not (other than as a transitory process concomitant with playing of the bit streams) download the entire bit streams or any part thereof; amend, copy, modify or decompile the entire bit streams or any part thereof; and in particular shall not delete or amend any copyright or

proprietary notices displayed by or contained within the bit streams.

The customer shall not permit any of the bit streams to be displayed simultaneously on more than one display device nor permit any of the bit streams to be displayed simultaneously with any of the other bit streams.

The customer shall not broadcast, transmit or make available on any publicly accessible network the bit streams or any part thereof, nor shall the customer permit any third party to do so.



Example from transport stream collection

The R&S®DV-DVBH stream library contains a wide range of ready-made signals for testing systems with extremely different transmission parameters and signal contents.

All signals contain RS data sections, which supports the MPE-FEC test in the receiver. Since signals are generated using seamless time slicing, power management in the receiver is not disrupted even at the end of the sequence. All transport streams are generated with user-definable data rates (directly set on the generator by inserting null packets) without affecting the time slicing. Because of the integrated electronic service guide (ESG) the signal processing in the receiver for detection of the DVB-H service is also tested.

For the different test applications, the library contains 13 transport streams each with three different resolutions for the DVB-H video content (CIF, QVGA and QCIF). This yields a total of 39 transport streams.



“Flowers of China” video sequence

Stream details

Common to all transport streams

- ◆ Content
 - Standard program with video and audio
 - DVB-H service with video and audio
 - Electronic service guide
- ◆ RS data sections (MPE-FEC) and PSI/SI signaling (such as INT, SDT and other tables) for DVB-H are included

Details on DVB-H payload

Video	
Theme	Flowers of China
Length	46.08 s (1152 frames)
Frame rate	25 Hz
Size	CIF (352 × 288) QVGA (320 × 240) QCIF (176 × 144)
Coding	H.264 (baseline profile @ level 1.3)
Bit rate	CIF 356 kbit/s QVGA 243 kbit/s QCIF 128 kbit/s
IP encapsulation	Multicast with address 225.20.30.40 for IPV4 UDP + RTP Port 1332, RTCP Port 1333
Audio	
Length	46.08 s
Frame rate	32 ksample/s
Coding	AAC Hev2 (LC+SBR+PS)
Bit rate	18 kbit/s
IP encapsulation	Multicast with address 225.20.30.40 for IPV4 UDP + RTP Port 1334, RTCP Port 1335

Details on DVB-H ESG payload

Bootstrap and session data are included with the following IP encapsulation characteristics:

	IP encapsulation
Bootstrap	UDP + FLUTE Port 9214 Multicast address 224.0.23.14 for IPV4
Session	UDP + FLUTE Port 4000 Multicast address 225.10.20.30 for IPV4

The Flute Carousel contains an FDT instance and is repeated every second (46 times in 46.08 s).

Details on standard program payload

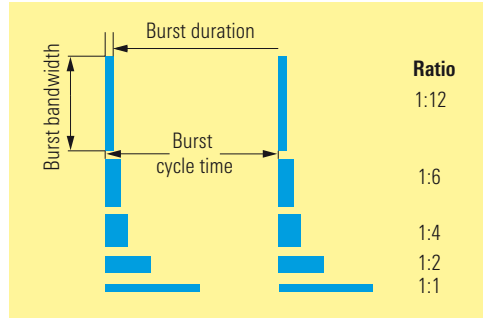
Video	
Size	720 × 576
Coding	MPEG-2
Bit rate	4 Mbit/s
Audio	
Coding	MPEG-1 Layer II
Bit rate	0.384 Mbit/s

Applications and stream characteristics

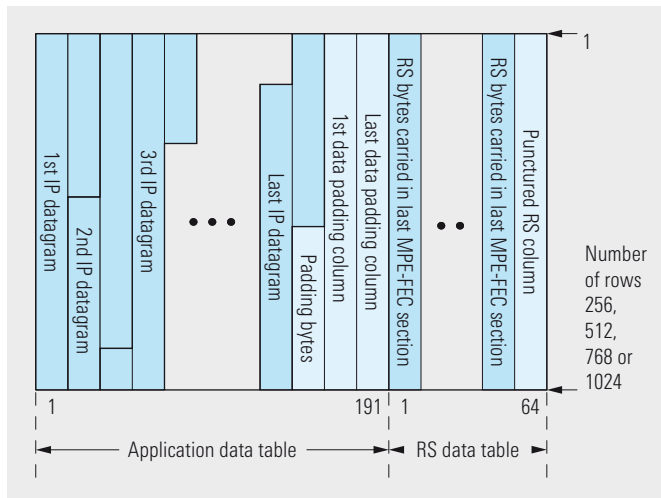
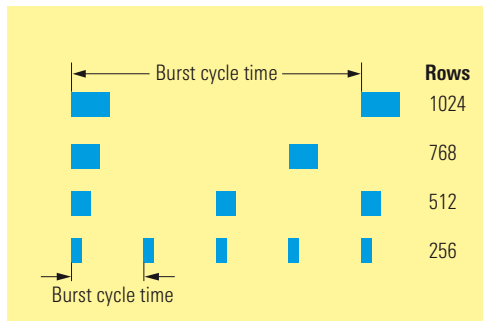
Application	Stream characteristic
Test of maximum receiver bit rate performance	Variation of burst bit rate and burst length
Test of receiver power consumption due to different burst cycle time	Variation of burst cycle time with a specific burst bit rate
Test of receiver bit error correction	Variation of FEC columns (puncturing)

Implemented time-slicing variation strategies

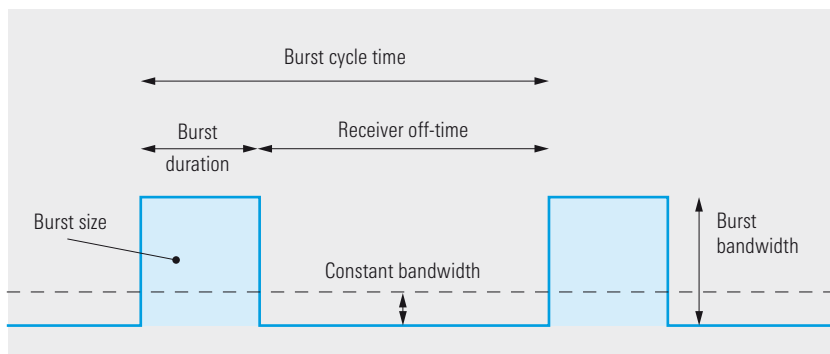
Variation of burst bandwidth and burst duration (constant burst size and constant burst cycle time):



Variation of burst cycle time, burst duration and burst size (constant burst bandwidth and constant ratio of duration to cycle time):



MPE-FEC frame



DVB-H time-slicing parameters

Related standards

Streams are based on the following specifications:

- ◆ ETSI EN 301 192 V1.4.1 "DVB specification for data broadcasting", June 2004
- ◆ ETSI EN 302 304 V1.1.1 "Transmission system for handheld terminals (DVB-H)", June 2004
- ◆ ETSI EN 300 468 V1.7.1 "Specification for service information in DVB systems", August 2005
- ◆ ETSI TR 102 377 V1.2.1 "DVB-H Implementation guidelines", November 2005

Content payloads are based on the following specifications

- ◆ IETF RFC 3984 "RTP Payload Format for H.264 Video", February 2005
- ◆ IETF RFC 3016 "RTP Payload Format for MPEG-4 Audio/Visual Streams", November 2000

ESG payloads are based on the following specifications:

- ◆ IETF RFC 3450: "Asynchronous Layered Coding (ALC) Protocol Instantiation", December 2002
- ◆ IETF RFC 3451 "Layered Coding Transport (LCT) Building Block", December 2002
- ◆ IETF RFC 3926 "FLUTE-File Delivery over Unidirectional Transport", October 2004
- ◆ ETSI TS 102 471 V1.1.1 "IP Datacast over DVB-H: Electronic Service Guide (ESG)", April 2006

Additional technical details

Availability of the various options for the various Rohde & Schwarz TS generators

	SDTV	R&S®DV-HDTV	R&S®DV-H264	R&S®DV-TCM	R&S®DV-DVBH
R&S®DVG	✓	✓ ¹⁾	—	✓ ¹⁾	—
R&S®DVRG	✓	✓	✓	✓	✓
R&S®DVM400 TS generator	✓	✓	✓	✓	✓
R&S®SFU TS generator	✓	✓ ²⁾	✓ ²⁾	✓ ²⁾	✓

¹⁾ The use of R&S®DV-HDTV and R&S®DV-TCM on the R&S®DVG requires a memory of 32 Mbyte. The memory of the R&S®DVG can be checked by pressing the ←→ buttons simultaneously and stepping through the displays with the ESC button.

²⁾ This stream library is not preinstalled. It can be copied to the hard disk of the instrument from the CD or DVD that is included.

Installation

All libraries are delivered on CD or DVD. All libraries are preinstalled on instruments purchased after the option was released (for exceptions, see table above). Libraries that are not preinstalled can be copied to the hard disk of the instrument from the CD or DVD that is included in the stream library option. The required hard disk space is specified in the table below.

Activation

The stream library options are activated via an instrument-specific key code, which is part of the delivery. The key code is valid only for the instrument specified (serial number).

The SDTV library is part of every Rohde & Schwarz TS generator that supports GTS format. You do not need to order it as a separate option, and no key code is required.

Copyrights

The streams of the different libraries are protected with a Rohde & Schwarz license key. They can only be used with a Rohde & Schwarz transport stream generator if the related option is installed. Recording or copying these libraries for use with any other players is not allowed. Furthermore, individually composed transport streams with content taken from the libraries may only be played on Rohde & Schwarz generators that have the related option installed.

For the R&S®DV-TCM option, special copyrights apply. Details are provided on page 11.

	SDTV	R&S®DV-HDTV	R&S®DV-H264	R&S®DV-TCM	R&S®DV-DVBH
Required hard disk space (approximately)	1 Gbyte	4 Gbyte (1 Gbyte, only R&S®DVG)	900 Mbyte	400 Mbyte	500 Mbyte

Required hard disk space for transport streams

Ordering information

Designation	Type	Order No.
SDTV Stream Library	–	Part of Rohde & Schwarz TS generators
HDTV Sequences	R&S®DV-HDTV	2085.7650.02
H.264 Stream Library	R&S®DV-H264	2085.9052.02
Test Card M Sequences	R&S®DV-TCM	2085.7708.02
DVB-H Stream Library	R&S®DV-DVBH	2085.8704.02



More information at
www.rohde-schwarz.com
(search term: Stream library)



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