

R&S® DVSG Digital Video Signal Generator

Featuring numerous
interfaces and a
large signal library



75 Years of
Driving
Innovation


ROHDE & SCHWARZ

R&S® DVSG

Digital Video Signal Generator

At a glance

The R&S® DVSG digital video signal generator is a universal platform for generating and playing compressed and uncompressed video and audio signals. It features transport stream (TS) interfaces as well as all common audio/video (AV) interfaces for the latest TV display technology.

The R&S® DVSG is modular in design. Two functional units are available for generating uncompressed analog and digital audio and video signals with a wide variety of characteristics. The AV signal generator option enables the R&S® DVSG to generate video signals synthetically. This

means that you can easily define each pixel and test the display equipment under lab conditions. In addition to working with the numerous signals that come with the instrument, you can easily import your own signals.

The AV signal player option provides exactly the type of signals that a display must be able to handle when operated by an end user. This is achieved by generating the AV signals on the basis of MPEG-2 transport streams. In addition to the comprehensive set of signals supplied with the option, you may also use your own recordings of live signals. This means that you can easily simulate any live situation in the lab.

You can record and play MPEG-2 transport streams by means of the TS player and recorder option. The numerous transport streams supplied with the option are played in a seamless loop. You can also play transport stream recordings of other devices with no problem.

Main features

- Standard-compliant output over all common audio and video interfaces
- Comprehensive signal libraries and easy import of user-provided signals
- Simulation of real operating conditions
- Support of numerous video formats up to 1080p



R&S®DVSG

Digital Video Signal Generator

Benefits and key features

Testing with only one instrument

- ▮ Digital video interfaces
- ▮ Analog video interfaces
- ▮ Digital audio interfaces
- ▮ Analog audio interfaces
- ▮ Support of numerous signal formats

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Test signals and test patterns for any test case

- ▮ AV signal player
- ▮ AV signal generator
- ▮ TS player and recorder

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Fast and easy testing

- ▮ AV signals simultaneously available on different analog and digital interfaces
- ▮ AV signal player with integrated format conversion
- ▮ Availability at the press of a button

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Reference signal source for development and testing

- ▮ Error-free signals
- ▮ Seamless signals

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Convenient portability

- ▮ Compact design (three height units)
- ▮ Integrated display

Quick exchange of signal data (files)

- ▮ USB interface
- ▮ Network interface

Fast availability even of large signal collections

- ▮ Huge hard disk capacity
- ▮ Support of USB hard disks

Easy operation

- ▮ Self-explanatory GUI

Cost-efficient solution

- ▮ Excellent price/performance ratio

Testing with only one instrument

Modern display equipment products have a large number of different AV interfaces and can handle an almost unimaginable number of video formats. The R&S®DVSG combines the following interfaces and a wide variety of video formats in only one instrument:

Digital video interfaces

- HDMI/DVI
- SDI/HD-SDI

Analog video interfaces

- RGB/YPbPr (with sync/tri-level sync)
- VGA
- S-Video
- CCVS
- SCART
- D4

Digital audio interfaces

- HDMI
- SDI/HD-SDI (embedded audio)
- S/PDIF optical

Analog audio interfaces

- SCART (stereo)
- RCA (L/R)

Support of numerous signals

The R&S®DVSG supports various formats (SD and HD) for analog and digital interfaces, ranging from PAL and NTSC signals (CCVS) up to 1080p.

Rear view of the R&S® DVSG showing interfaces



Test signals and test patterns for any test case

AV signal player

The signals of this option are generated in broadcast format for SDTV and HDTV resolution up to 1080i. They have been developed for testing TV display equipment. The option contains a comprehensive signal library:

- Signals for testing motion blur, format conversion, de-interlacing and other functions of the display equipment
- Signals for testing pixel errors, display geometry and color fidelity
- Live sequences for demonstrating the quality of display equipment under optimum conditions
- Live sequences with scene cuts, movements, complex pictures, blocking and other compression artifacts – signals that display equipment being operated by an end user must be able to handle

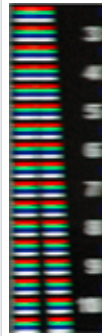
The following can be easily added to the signals of the library:

- Any TS recording can be imported and the AV contents for generating signals for the AV interfaces can be selected
- Transport streams fed to the R&S®DVSG can be used as a live source for generating AV signals

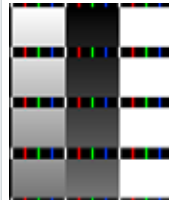
Examples of test signals of the R&S®DVSG-B30 AV signal player option

Testing motion blur and overdrive

An area containing color elements moves from right to left and back at uniform speed.



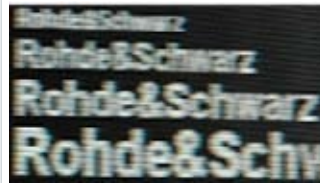
Assesses the intensity of the motion blur of plasma and LCD displays for the three primary colors and white (highest number with complete connection of the right and left areas indicates the intensity).



An unevenness of the vertical edges between the individual squares may indicate an overdrive function that is not balanced for the different steps.

Testing the readability of moving text

Text of different size moves from right to left at varying speed.



Due to motion blur, the text looks blurred. A greenish tint indicates phosphor lag on plasma displays.

Testing recognition of 3-2 pulldown

1080i test sequence with two different, moving elements:

- Red: text as video element (originally 50 Hz/59.9 Hz, interlaced)
- Green: text as film element (50 Hz/59.9 Hz, interlaced, generated with 3-2 pulldown function from 24p template)



Reverse 3-2 pulldown function for entire picture:



If the reverse 3-2 pulldown function is applied to the entire picture, the green area is easy to read, but not the red area.

Reverse 3-2 pulldown function, applied locally:



If the reverse 3-2 pulldown function is only applied to the elements generated by the 3-2 pulldown function, both the green and red areas are easy to read.

Examples of test signals of the R&S®DVSG-B30 AV signal player option

Testing the de-interlacer

Natural sequence with critical elements for de-interlacing.



Line structure:



Depending on how the de-interlacer functions and on the method used (e.g. weave or bob), different structures form on moving edges.

Staircase structure:



Demonstrating display quality

Natural sequence with many details and moving elements.



AV signal generator

The signals of this option support resolutions up to 1080p at high color depth. They make it easy to test the functionality of all pixels, the display geometry as well as the signal processing and filter characteristics. SD as well as HD formats are available.

User-generated pictures and picture sequences (BMP format) can easily be imported into the R&S®DVSG for playing.

TS player and recorder

The TS collections for the TS player and recorder option support the DVB, ATSC and ISDB-T standards. For video contents, the MPEG-2 and MPEG-4 formats in SD as well as HD resolution are supported. Audio contents are encoded in accordance with MPEG-1/2 layer I or Dolby AC-3. The TS player and recorder option includes the SDTV library. You can find details about features and applications in the "Stream Libraries for Rohde & Schwarz TS Generators" data sheet.

In addition to using ready-made transport streams, you can of course also play transport streams recorded with the R&S®DVSG or other recorders.

Examples of test signals of the R&S®DVSG-K20 TS player and recorder option

Diverse tests

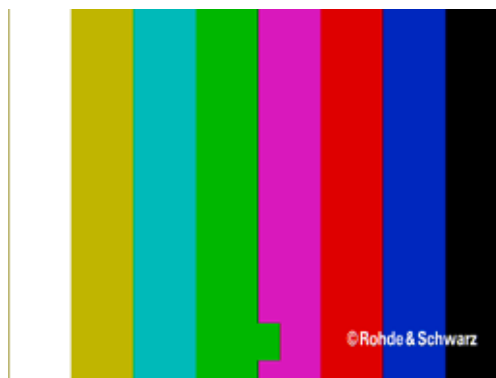
Test pattern containing numerous test lines and test elements, static and moving.
Audio-to-video synchronization (lip sync) and the correct sequence of the individual pictures are tested, for example.



Examples of test signals of the R&S®DVSG-K20 TS player and recorder option

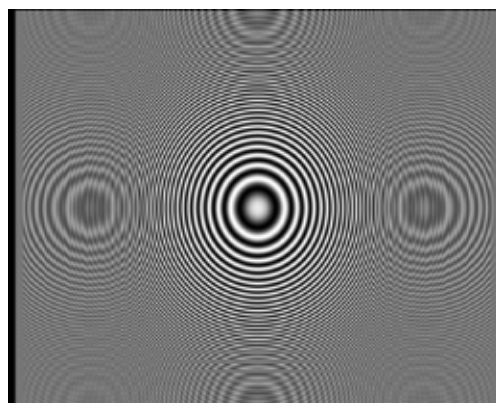
Testing EMC of TV sets

Color bar with moving element.
A disruption of the signal or the display is indicated by a fault in the movement of the green element.



Testing cross-color effects and distortions

Moving zone plate.



Testing the reproduction and processing of a natural sequence

Swimming diver.
Mainly slow movements with strong colors.



The examples shown here are from the SDTV stream library.
The "Stream Libraries" data sheet (PD 5213.7202.31) contains detailed information on this library and all other TS libraries.

Fast and easy testing

AV signals simultaneously available on different analog and digital interfaces

With only a few exceptions, the AV signals are simultaneously present at all interfaces, provided that the selected formats are compatible with the interface type. You can therefore quickly test display equipment because no switchover is required on the R&S®DVSG.

AV signal player with integrated format conversion

For the AV signal player, you can set the output formats independently of the source material. This allows you to easily test a variety of formats even if the test signal is present in only one format.

Availability at the press of a button

After selecting the signal file you want, you can play it at the press of a button.



Reference signal source for development and testing

Error-free signals

Unless intentionally specified otherwise for test purposes, the signals are generated error-free at all levels. The TS collection from Rohde&Schwarz has proven to be extremely reliable during years of service around the world.

Seamless signals

Both TS as well as AV signals are played in an endless loop so that a signal is continuously present at the interfaces. The transition from the end to the beginning of the sequence is seamless. For TS, this means that all timing parameters in the TS are calculated and inserted in realtime. In the case of the Rohde&Schwarz TS signals, the video and audio signals are furthermore cut in such a manner that no break in syntax can be detected even by a decoder. You can therefore be sure that any errors detected originate from the equipment being tested, not the signal source.

R&S®DVSG

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Typical applications

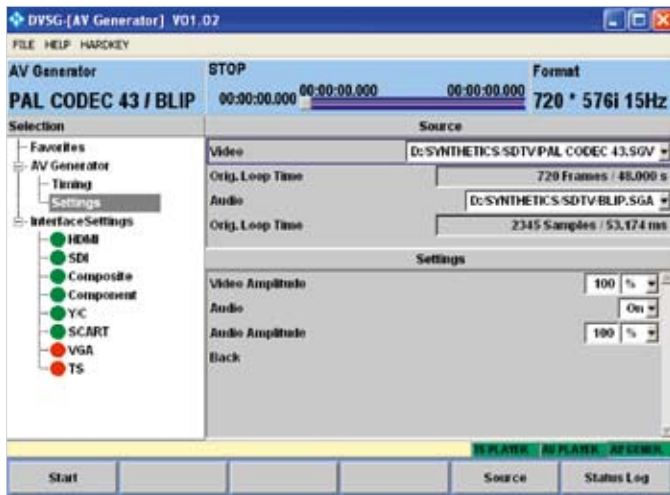
Use of the R&S®DVSG as an AV signal player and AV signal generator

The AV signal player and AV signal generator options are designed for the testing of modern display equipment such as flat screens, TV sets and projectors. You can test the equipment's display, signal processing and interfaces. Owing to its broad scope of features, the R&S®DVSG is ideal for use in R&D, production, quality assurance and by test houses.

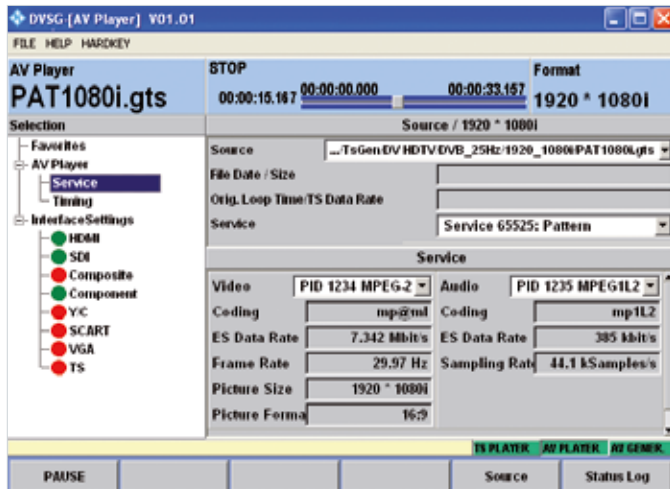
The AV signal generator option enables the R&S®DVSG to generate video signals synthetically. You can thus explicitly define each pixel and test the display equipment under lab conditions. This capability allows you to optimally test essential characteristics such as the functionality of all pixels, the display geometry as well as the signal processing/filter characteristics.

The AV signal player option enables the R&S®DVSG to generate live sequences with scene cuts, movements, complex pictures, blocking and other compression artifacts. You can thus test the processing of signals such as they occur in the typical use of display equipment. Tests of this type are particularly important for R&D and test house requirements. In R&D, you can optimize the display equipment for use under realistic conditions. The capability to generate the AV signals on the basis of MPEG-2 TS allows you also to use recordings of live signals from throughout the world. You can therefore easily simulate critical operating conditions in order to optimize the display technology and, if applicable, to perform troubleshooting.

GUI of the AV signal generator option; "Settings" view for configuring the audio and video elements



GUI of the AV signal player option; "Services" view for selecting the audio and video elements



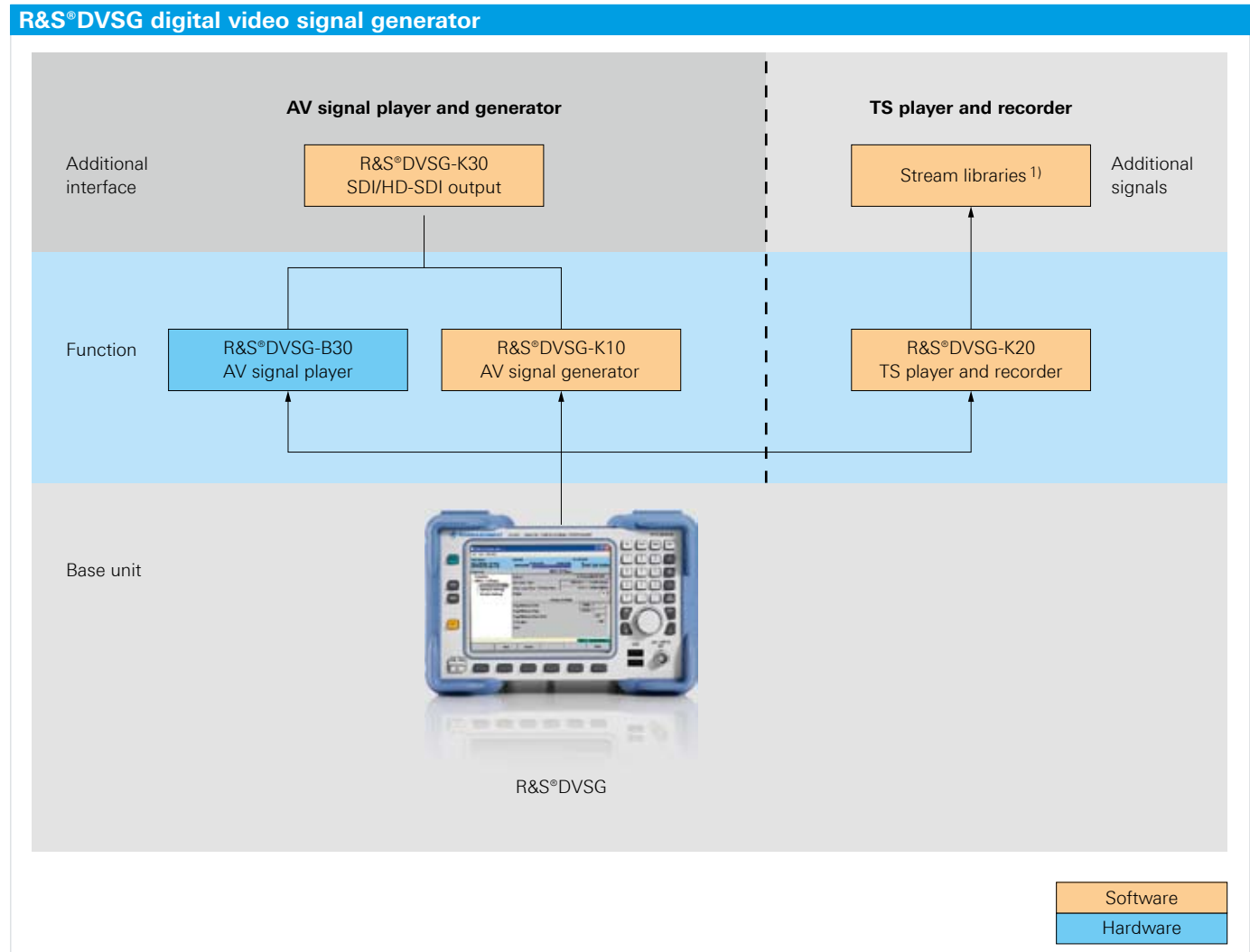
Use of the R&S®DVSG as a TS player and recorder

Equipped with the TS player and recorder option, the R&S®DVSG is a valuable R&D tool for testing set-top boxes, multiplexers, decoders and their components such as chips and boards. When it comes to production and the lab, the R&S®DVSG can be combined with a test modulator to function as a signal source in order to test set-top boxes and TV sets. For network operators and program providers, the R&S®DVSG serves as both an economical recorder for recording live signals as well as a source for setting up networks.

GUI of the TS player and recorder option; "Timing" view of the player function for configuring the section to be played and further timing parameters



Configuration rules



1) See ordering information (Stream Libraries/TS creation tool) and the "Stream Libraries for Rohde&Schwarz TS Generators" data sheet.

Ordering information

Designation	Type ¹⁾	Order No.
Base unit		
Digital Video Signal Generator	R&S®DVSG	2113.0008.02
including: quick start guide, operating manual with firmware on CD, power cable		
AV signal player and AV signal generator options		
AV Signal Player	R&S®DVSG-B30	2113.0237.02
AV Signal Generator	R&S®DVSG-K10	2113.0314.02
SDI/HD-SDI Output	R&S®DVSG-K30	2113.0337.02
TS player and recorder options		
TS Player and Recorder	R&S®DVSG-K20	2113.0320.02
Stream libraries		
HDTV Sequences	R&S®DV-HDTV	2085.7650.02
H.264 Stream Library	R&S®DV-H264	2085.9052.02
DVB-H Stream Library	R&S®DV-DVBH	2085.8704.02
Test Card M Sequences	R&S®DV-TCM	2085.7708.02
ISDB-T Stream Library	R&S®DV-ISDBT	2085.9146.02
TS creation tool		
Advanced Stream Combiner (dongle for USB interface)	R&S®DV-ASC	2085.8804.03
Rack installation		
19" Adapter (R&S®DVSG with spare slot)	R&S®ZZA-T34	1109.4464.00
19" Adapter (R&S®DVSG with second instrument)	R&S®ZZA-T33	1109.4458.00
Recommended extras		
Keyboard with USB Interface (US keyboard)	R&S®PSL-Z2	1157.6870.04
Printed operating manual (English)		2113.1862.12
Mouse with USB Interface, optical	R&S®PSL-Z10	1157.7060.02
Documentation of R&S®DVSG Calibration Values	R&S®DVSG-DCV	2082.0490.33
Service options (Service options can only be ordered in connection with the purchase of an instrument.)		
Repair options		
One-Year Repair Service following the warranty period	R&S®RO2DVSG	please contact your local sales office
Two-Year Repair Service following the warranty period	R&S®RO3DVSG	please contact your local sales office
Four-Year Repair Service following the warranty period	R&S®RO5DVSG	please contact your local sales office
Calibration options		
Two-Year Calibration Service	R&S®CO2DVSG	please contact your local sales office
Three-Year Calibration Service	R&S®CO3DVSG	please contact your local sales office
Five-Year Calibration Service	R&S®CO5DVSG	please contact your local sales office

¹⁾ Option identification: R&S®DVSG-Bxxx = hardware option; R&S®DVSG-Kxxx = software option.

Service you can rely on

- | In 70 countries
- | Person-to-person
- | Customized and flexible
- | Quality with a warranty
- | No hidden terms

About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

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For data sheet, see
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and www.rohde-schwarz.com

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