

HDMI 2.0 signal generator for testing 4k consumer electronics equipment

A new signal generator module for the R&S®VTC / VTE / VTS video testers can now generate signals for testing next-generation 4k display devices. It offers four parallel 4k UltraHD HDMI outputs and supports the 3G mode specified in the HDMI 2.0 standard with 4:2:0 pixel encoding as well as the required signaling.

HDMI Licensing, LLC has released a new version of its interface standard: HDMI 2.0. Rohde & Schwarz played an active role in developing the corresponding test standards. This makes the company one of the first T&M equipment manufacturers to offer an HDMI 2.0 3G mode update for its R&S®VTC, R&S®VTE and R&S®VTS video testers. These video testers cover virtually all of the tests that have to be performed on A/V components in the consumer sector. For more information, visit www.the-av-experts.com

Test signals in line with CEA-861-F and VESA

With their combined generator and analyzer functions, the R&S®VTC / VTE / VTS video testers can be flexibly used to test a wide range of A/V interfaces. For example, the [R&S®VT-B2361 HDMI RX 300 MHz](#) analyzer module is already available for source tests in line with HDMI 2.0.

An appropriate generator module is now also available for testing HDMI sinks such as TV sets, projectors and monitors. The new [R&S®VT-B360 HDMI TX 300 MHz signal generator module](#) (Fig. 1) offers a range of static test patterns such as color bars, primary colors, greyscales, monoscopes, ramps, etc. that can be output in all CEA-861-F and VESA video formats up to 4k (3G mode) (Figs. 2 and 4). The test signal content can be adjusted by changing the pixel encoding, DVI mode, 3D mode, level, bit depth and pixel shift. There is also a PCM tone generator for generating audio test signals with different sampling rates and audio levels for up to eight channels.

The [R&S®VT-K361 HDMI moving pictures software option](#) provides an extra 8 Gbyte of RAM to play uncompressed moving picture sequences in all supported resolutions (Fig. 5). With UltraHD resolutions of 4096 × 2160 pixels or 3840 × 2160 pixels, playout of up to 20 seconds is possible, depending on refresh rate and coding. Rounding out the range of functions is a signal library with nature scenes and test patterns that permit lip sync and EMC measurements, for example. The [AVG pattern import software](#) allows conversion of pictures or picture sequences into customer-specific test signals (Fig. 6).

The [R&S®VT-K362 HDMI user defined option](#) can be used to generate user-specific signals (Fig. 3). This option allows users to configure nonstandard resolutions and set InfoFrames as required (AVI, audio, SPD, VSI).

ARC	audio return channel
CEC	consumer electronics control
CTS	compliance test specification
DDC	display data channel
EDID	extended display identification data
HDCP	high-definition content protection
HEAC	HDMI Ethernet audio channel
HEC	HDMI Ethernet channel

DDC, CEC and HEAC testing

The HDCP encryption function can be activated and tested at all inputs. Supported TV resolutions and formats can be output and saved using the EDID reader. The saved EDID data can either be analyzed in plain text or loaded as binary file into the R&S®VT-B2360 / -B2361 HDMI analyzer modules.

Fig. 1: The R&S®VT-B360 HDMI TX 300 MHz signal generator module permits HDMI interface testing of 4k UltraHD consumer electronics equipment.





Fig. 2: Signal menu for selecting test patterns and signal timing.



Fig. 3: The R&S®VT-K362 HDMI user defined option permits configuration of user-specific InfoFrame contents and other settings.

The R&S®VT-K2366 CEC tracer option is used to test consumer electronics equipment to ensure correct processing of the CEC function, which is part of the HDMI standard. The ARC and HEC can also be tested using the module's basic functions.

Protocol test in line with CTS

To ensure interoperability, specific test signals described in official specifications are provided in addition to the generator module characteristics presented above, which are frequently used for functional tests. The R&S®VT-K365 HDMI CTS sink test software option contains protocol tests in line with HDMI CTS 1.4b and 2.0 (see product brochure for details).

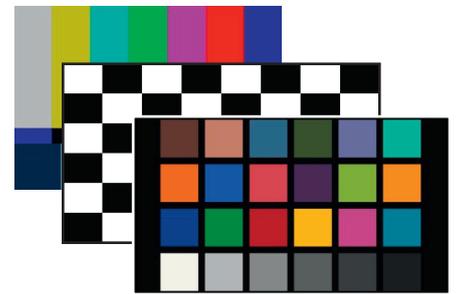


Fig. 4: The R&S®VT-B360 base module offers a range of static test patterns in the relevant resolutions.

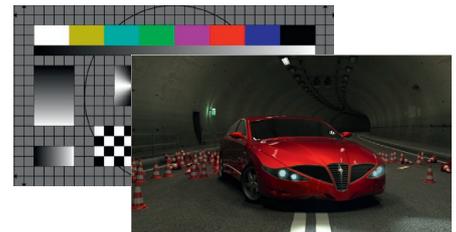


Fig. 5: The R&S®VT-K361 HDMI moving pictures option provides 2D and 3D moving picture sequences at resolutions of up to 4k.

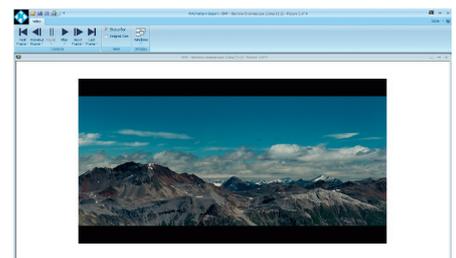


Fig. 6: The AVG pattern import software tool permits users to generate their own test patterns and test sequences.

Summary

With the new HDMI generator module and expanded functional range of the HDMI analysis modules, the family of video testers offers a unique range of functions for testing next-generation 4k UltraHD consumer electronics equipment in development, quality assurance and manufacturing.

Harald Gsödl