

R&S® VTC/VTE/VTS VIDEO TESTERS

Specifications



Data Sheet
Version 09.00

ROHDE & SCHWARZ
Make ideas real



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Definitions

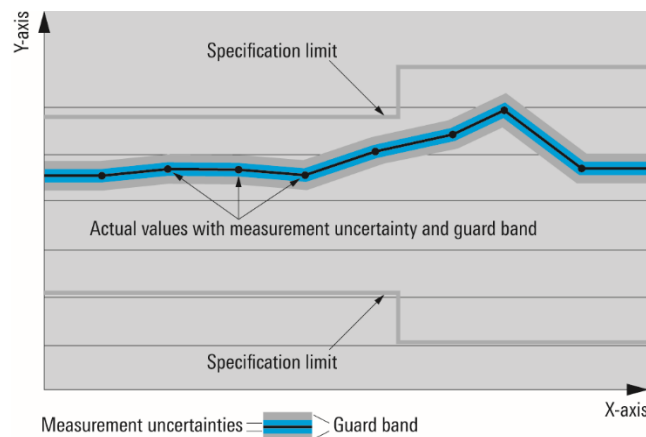
General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \leq , $>$, \geq , \pm , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with $<$, $>$ or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format “parameter: value”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

Specifications apply under the following conditions: 60 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed. Typical values are designated with the abbreviation typ. These values are verified during the final test but are not assured by Rohde & Schwarz. Nominal values are design parameters that are not assured by Rohde & Schwarz. These values are verified during product development but are not specifically tested during production.

Base units

R&S®VTC video test center base unit

Reference frequency		
Uncertainty		$< 1.0 \cdot 10^{-6}$
Aging	after 10 days of uninterrupted operation	$< 3.0 \cdot 10^{-9}/\text{day}$
Temperature effect	in operating temperature range	$< 1.0 \cdot 10^{-6}$
Input for external reference signal	frequency (sine wave)	10 MHz
	maximum deviation	$3 \cdot 10^{-6}$
	input level	$\geq -5 \text{ dBm to } \leq 19 \text{ dBm}$
	limits recommended	0 dBm to 19 dBm
	input impedance	50 Ω
	connector	BNC female, rear
Output for internal reference signal	frequency (sinewave)	10 MHz
	level	+6 dBm, $\pm 3 \text{ dB (typ.)}$
	input impedance	50 Ω
	connector	BNC female, rear
Trigger marker inputs/outputs		
Trigger in	connector	BNC female, rear
	input impedance	high impedance
	input level	LVTTTL
Marker out	connector	BNC female, rear
	load impedance	$> 200 \Omega$
	output level	LVTTTL
System data		
System	operating system	PC platform, Windows 7 Embedded, min. 500 Gbyte internal harddisk
Local control	display	11.6" WXGA 1368 x 768 pixel
	control	capacitive touch panel, rotary knob, hardkeys, softkeys
External control	control	external mouse, keyboard via USB
Remote control	command set	SCPI 1999.5
	Ethernet	10/100/1000BaseT
Connectors	Ethernet	RJ-45, rear
	USB	USB 2.0, front and rear
	AC supply input	IEC 60320 C14, rear

Operating data		
Power supply	AC input voltage range	100 V to 240 V \pm 10 %
	supply frequency	50 Hz to 60 Hz and 400 Hz \pm 5 %
	input current	max. 7.3 A to 4.6 A
	power consumption	
	standby	5 W
Electromagnetic compatibility	operational	up to 600 W
	power factor correction	in line with EN 55011 class A, EN 61326 in line with EN 61000-3-2
Immunity against RF fields		up to 10 V/m
Environmental conditions	operating temperature range	+5 °C to +45 °C ¹ , in line with EN 60068-2-1, EN 60068-2-2
	permissible temperature range	0 °C to +50 °C
	storage temperature range	-20 °C to +60 °C
	climatic resistance, cyclic test at +25 °C/+40 °C	85 % relative humidity
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz, 55 Hz to 150 Hz, 0.5 g constant, in line with EN 60068-2-6
	vibration, random	10 Hz to 300 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
	shock	40 g shock spectrum, in line with EN 60068-2-27, MIL-STD-810E
Electrical safety		in line with IEC 61010-1, EN 61010-1 and UL 61010-1, CSA C22.2 No. 61010-1
Dimensions	W x H x D	445 mm x 176 mm x 307 mm (17.5 in x 6.9 in x 12.1 in)
Weight		12 kg (26.5 lb)
Recommended calibration interval		3 years
Standard warranty period		1 year

¹ Reduced LCD brightness at higher operating temperatures.

R&S®VTE video tester base unit

Reference frequency		
Uncertainty		$< 1.0 \cdot 10^{-6}$
Aging	after 10 days of uninterrupted operation	$< 3.0 \cdot 10^{-9}/\text{day}$
Temperature effect	in operating temperature range	$< 1.0 \cdot 10^{-6}$
Input for external reference signal	frequency (sinewave)	10 MHz
	maximum deviation	$3 \cdot 10^{-6}$
	input level	$\geq -5 \text{ dBm}$ to $\leq 19 \text{ dBm}$
	limits recommended	0 dBm to 19 dBm
	input impedance	50 Ω
	connector	BNC female, rear
Output for internal reference signal	frequency (sinewave)	10 MHz
	level	+6 dBm typ. $\pm 3 \text{ dB}$
	input impedance	50 Ω
	connector	BNC female, rear
Trigger marker inputs/outputs		
Trigger in	connector	BNC female, rear
	input impedance	high impedance
	input level	LVTTTL
Marker out	connector	BNC female, rear
	load impedance	$> 200 \Omega$
	output level	LVTTTL
System data		
System	operating system	PC platform, Windows 7 Embedded, min. 500 Gbyte internal harddisk
Local control	display	7" WVGA, 800 x 480 pixel
	control	capacitive touch panel, rotary knob, hardkeys, softkeys
External control	control	external mouse, keyboard via USB
Remote control	command set	SCPI 1999.5
	Ethernet	10/100/1000BaseT
Connectors	Ethernet	RJ-45, rear
	USB	USB 2.0, front and rear
	AC supply input	IEC 60320 C14, rear

Operating data		
Power supply	AC input voltage range	100 V to 240 V \pm 10 %
	supply frequency	50 Hz to 60 Hz \pm 5 %
	input current	3.6 A to 1.5 A
	power consumption	
	standby	5 W
	operational	180 W
Electromagnetic compatibility		in line with EN 55011 class A, EN 61326
	power factor correction	in line with EN 61000-3-2
Immunity against RF fields		up to 10 V/m
Environmental conditions	operating temperature range	+5 °C to +45 °C ² , in line with EN 60068-2-1, EN 60068-2-2
	permissible temperature range	0 °C to +50 °C
	storage temperature range	-20 °C to +60 °C
	climatic resistance, cyclic test at +25 °C/+40 °C	85 % relative humidity
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz, 55 Hz to 150 Hz, 0.5 g constant, in line with EN 60068-2-6
	vibration, random	10 Hz to 300 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
	shock	40 g shock spectrum, in line with EN 60068-2-27, MIL-STD-810E
Electrical safety		in line with IEC 61010-1, EN 61010-1 and UL 61010-1, CSA C22.2 No. 61010-1
Dimensions	W x H x D	232 mm x 132 mm x 307 mm (3 HU) (9.1 in x 5.2 in x 12 in)
Weight		6 kg (13.28 lb)
Recommended calibration interval		3 years
Standard warranty period		1 year

² Reduced LCD brightness at higher operating temperatures.

R&S® VTS compact video tester base unit

Reference frequency		
Uncertainty		$< 1.0 \cdot 10^{-6}$
Aging	after 14 days of uninterrupted operation	$< 3.0 \cdot 10^{-9}/\text{day}$
Temperature effect	in operating temperature range	$< 1.0 \cdot 10^{-6}$
Input for external reference signal	frequency (sine wave)	10 MHz
	maximum deviation	$3 \cdot 10^{-6}$
	input level	$\geq -5 \text{ dBm}$ to $\leq 19 \text{ dBm}$
	limits recommended	0 dBm to 19 dBm
	input impedance	50 Ω
connector		BNC female, front
System data		
System	operating system	PC platform, Windows 7 Embedded, min. 500 Gbyte internal harddisk
External control	control	external mouse and keyboard via USB
	monitor interface	DVI-D
Remote control	command set	SCPI 1999.5
	Ethernet	10/100/1000BaseT
Connectors	Ethernet	RJ-45, rear
	USB	USB 3.0
	AC supply input	IEC 60320 C14, rear
Operating data		
Power supply	AC input voltage range	100 V to 240 V $\pm 10 \%$
	supply frequency	50 Hz to 60 Hz $\pm 5 \%$
	input current	1.7 A to 0.8 A
	power consumption	44 W (typ.)
Electromagnetic compatibility		in line with EN 55011 class B, EN 61326
	power factor correction	in line with EN 61000-3-2
Immunity against RF fields		up to 10 V/m
Environmental conditions	operating temperature range	+5 °C to +45 °C in line with EN 60068-2-1, EN 60068-2-2
	permissible temperature range	0 °C to +50 °C
	storage temperature range	-20 °C to +60 °C
	climatic resistance, cyclic test at +25 °C/+40 °C	85 % relative humidity
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, max. 1.8 g at 55 Hz, 55 Hz to 150 Hz, 0.5 g constant, in line with EN 60068-2-6
	vibration, random	10 Hz to 300 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
	shock	40 g shock spectrum, in line with EN 60068-2-27, MIL-STD-810E
Electrical safety		in line with IEC 61010-1, EN 61010-1 and UL 61010-1, CSA C22.2 No. 61010-1
Dimensions	W x H x D	229 mm x 44 mm x 406 mm (9.02 in x 1.73 in x 15.98 in)
Weight		4 kg (8.81 lb)
Recommended calibration interval		3 years
Standard warranty period		1 year

HDMI™ options (600 MHz)

HDMI™ module option

R&S®VT-B2363 HDMI™ RX/TX 600 MHz module

R&S®VT-K364 HDMI™ TX or R&S®VT-K2364 HDMI™ RX required

General		
Interface		HDMI™ in (HDMI™ type A); HDMI™ out (HDMI™ type A)
TMDS clock frequency		25 MHz to 340 MHz
TMDS character rate		up to 600 Mcsc
High-definition multimedia interface standard		HDMI™ 1.4b/2.0a
High-definition content protection standard		HDCP 1.4/ HDCP 2.2

HDMI™ generator options

R&S®VT-K364 HDMI™ TX

HDMI™ generator		
Basic data		video formats (HDMI™, DVI), audio generator, HDCP parameter, HDCP status, HotPlug status. SCDC status
TMDS clock frequency		25 MHz to 340 MHz
TMDS character rate		up to 600 Mcsc
Video		
Sampling modes		RGB, YC _b C _r 4:4:4, YC _b C _r 4:2:2 and YC _b C _r 4:2:0
Color depth		8, 10 and 12 bit
Aspect ratios		4:3, 64:27, 16:9 and 256:135
Pixelshift vertical		-63 to +63 lines/frame
Pixelshift horizontal		-63 to +63 pixel/frame
Adjustable video signal		RGB, Y, C _b /P _b and C _r /P _r , level 0 % to 200% RGB, Y, C _b /P _b and C _r /P _r , level 0 % to 100%
Resolution clipping		1 to 12 bit
Patterns		static test patterns (up to 4k)
Audio		
Audio generator (up to 8 channels)	resolution	16 bit, 20 bit, 24 bit
	sampling rates	32/44.1/48/88.2/96/176.4/192 kHz
	audio level (adjustable for each audio channel)	-99.9 dB FS to 0.0 dB FS
	audio frequency (adjustable for each audio channel)	100 Hz to 20000 Hz
	channel allocation (CEA-861-E)	HEX 00 to 31
Source video file	audio from the *.avg file	WAV, AC3
Audio return channel (ARC) analysis on HDMI™ out		R&S®VT-K2150 audio analysis
EDID reader		reading and interpreted EDID from connected device under test (DUT): export to EDID data files
SCDC		interpreted and hexadecimal display of status and control data channel

R&S®VT-K361 HDMI™ moving pictures

Basic data		play out of moving sequences (> 1 frame) with memory usage of up to 8 Gbyte for RAW audio/video.
Library		natural sequences test pattern (moving colobar, lip sync)

R&S®VT-K362 HDMI™ user defined timing

User defined timing		
Configurable InfoFrames (up to 8 InfoFrames can be sent simultaneous)		AVI InfoFrame, audio InfoFrame, SPD InfoFrame, MPEG InfoFrame, dynamic range and mastering InfoFrame (HDR), gamut boundary data, ISR1, ISR2 and up to 4 HDMI™ vendor specific InfoFrames simultaneous

HDMI™ analyzer option**R&S®VT-K2364 HDMI™ RX**

HDMI™ analysis		
Hot Plug detect (HPD)		switchable on/off
Input parameters measurements		pixel clock state HDMI™ +5 V power indication TDMS char. Clock
Video parameter measurements		video code (VIC)
		video timing parameters
		pixel clock and TMDS char. Clock vertical and horizontal frequency
Audio parameter measurements		audio coding
		N and CTS values (audio clock regeneration ACR)
		layout bit value
		channel status bits
HDCP		audio parameters error indication
		HDCP 1.4 /2.2 active indication HDCP 1.4 measurement: <ul style="list-style-type: none"> • authentication request indication • key selection vectors AKSV and BKSV • Ri' • session ID An HDCP 2.2 measurement r(n), r(rx), r(tx): pseudo-random value H,L : hash values emulation: <ul style="list-style-type: none"> • HDCP authentication denial to emulate non-HDCP devices • forcing HDCP re-authentication by sending invalid Ri' value
InfoFrames		interpreted and hexadecimal display of <ul style="list-style-type: none"> • AVI InfoFrame • Audio InfoFrame • HDMI™ Vendor Specific InfoFrame VSIF • HDMI™ Forum Vendor Specific InfoFrame VSIF • SPD InfoFrame • MPEG InfoFrame • Dynamic Range and Mastering InfoFrame (HDR) InfoFrame error indication
EDID		support of user defined EDID data to emulate various sink devices <ul style="list-style-type: none"> • import of EDID data files • library of EDID files
SCDC		interpreted and hexadecimal display of status and control data channel

HDMI™ CEC/DDC analysis options

R&S®VT-K2391 CEC/DDC analyzer

DDC	Command (enables interaction with a connected DUT)	supported DDC operations <ul style="list-style-type: none"> • read EDID • read SCDC • write SCDC
		EDID features <ul style="list-style-type: none"> • display of interpreted EDID content • save EDID data to file
		SCDC features <ul style="list-style-type: none"> • read a number of bytes at an user defined offset from the sink DUT's SCDC register and display raw value and interpreted value • write a number of bytes at an user defined offset to the sink DUT's SCDC registers
	Tracer (traces and displays DDC communication)	tracing all DDC data between <ul style="list-style-type: none"> • VTx and a source DUT • VTx and a sink DUT • a source DUT and a sink DUT using the R&S®VT-Z2390 HDMI™ pass-through adapter
		displaying <ul style="list-style-type: none"> • the data in a list view containing all traced DDC packets or a selection of traced DDC packets using the packet filter • a selected DDC packet in an interpreter window in detail, including an HDCP 1.4/2.2 packet interpreter • the waveform of a selected DDC packet in a logic analyzer view
		complementary functions all traced data can be saved to file

CEC	Command (enables interaction with a connected DUT)	supported operations <ul style="list-style-type: none"> CEC device discovery sending an user defined CEC command
	Tracer (traces and displays CEC communication)	list view displaying <ul style="list-style-type: none"> all sent CEC packets status for each packet, e.g. acknowledged or not acknowledged <ul style="list-style-type: none"> Quick mode: send one of the most common CEC commands or one of up to 20 user defined CEC commands to the DUT Advanced mode: send any user defined CEC command to the DUT or assign any user defined CEC command to a hotkey for later usage in quick mode
		debugging mode <ul style="list-style-type: none"> disable ACKs for broadcast or directed CEC packets vary timing for total bit period and low bit period
		tracing all CEC data between <ul style="list-style-type: none"> VTx and a source DUT VTx and a sink DUT a source DUT and a sink DUT using the R&S®VT-Z2390 HDMI™ pass-through adapter
		displaying <ul style="list-style-type: none"> the data in a list view containing all traced CEC packets or a selection of traced CEC packets using the packet filter a selected CEC packet in an interpreter window in detail the waveform of a selected CEC packet in a logic analyzer view
		complementary functions all traced data can be saved to file

R&S®VT- Z2390 HDMI™ Pass-Through Adapter

Interface		2 x HDMI™ in/out (HDMI™ type A); HDMI™ out (HDMI™ type A) to R&S®VT-B2363
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HDMI™ CTS testing options**R&S®VT-K367 HDMI™ 1.4 CTS sink test**

Compliance testing for HDMI™ sink devices. In line with HDMI™ CTS 1.4b.

Supported HDMI™ 1.4b sink tests	HDMI™ 1.4b	<p>Protocol:</p> <ul style="list-style-type: none"> • character synchronization (8-15) • acceptance of all valid packet types (8-16) <p>Video:</p> <ul style="list-style-type: none"> • basic format support requirements (7-17) • HDMI™ format support requirements (8-18) • pixel encoding requirements (8-19) • video format timing (8-20) <p>Audio:</p> <ul style="list-style-type: none"> • audio clock regeneration (8-21) • audio sample packet jitter (8-22) • audio formats (8-23) <p>Interoperability with DVI:</p> <ul style="list-style-type: none"> • interoperability with DVI (8-24) <p>Advanced Feature:</p> <ul style="list-style-type: none"> • deep color (8-25) • 3D video format timing (8-29) • 4K x 2K video format timing (8-30) • AVI InfoFrame (8-31)
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R&S®VT-K368 HDMI™ 2.0 CTS sink test

Compliance testing for HDMI™ sink devices. In line with HDMI™ CTS 2.0.

Supported HDMI™ 2.0 sink tests	HDMI™ 2.0	<p>Sink TMDS protection:</p> <ul style="list-style-type: none"> • scrambling (HF2-5) • scrambling \leq 340 Mcsc (HF2-9) <p>Sink Pixel Decoding</p> <ul style="list-style-type: none"> • YC_bC_r 4:2:0 (HF2-23) • YcbCr 4:2:0 deep color (HF2-24) <p>Sink Video Timing:</p> <ul style="list-style-type: none"> • 6G-2160p 24-bit color depth (HF2-6) • 6G-2160p deep color (HF2-7) • 6G-2160p 3D (HF2-8) • 21:9 (64:27) (HF2-25) • 6G-Non-2160p 24-bit color depth (HF2-36) • 6G-Non-2160p deep color (HF2-37) • 6G-Non-2160p 3D (HF2-38) <p>Sink EDID:</p> <ul style="list-style-type: none"> • YC_bC_r 4:2:0–data blocks (HF2-31) • YC_bC_r 4:2:0 BT.2020-data block (HF2-32) • YC_bC_r 4.2:0 deep color HF-VSDB (HF2-35) • 3D and multistream audio data blocks (HF2-39) • HDMI™-VSDBs – independent-view (HF2-41) • video format declaration (HF2-26) • HF-VSDB (HF2-53) • HF-VSDB (HF2-10)
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R&S®VT-K2367 HDMI™ 1.4 CTS source test

Compliance testing for HDMI™ source devices. In line with HDMI™ CTS 1.4b.

Supported HDMI™ 1.4b source tests	HDMI™ 1.4b	<p>Protocol:</p> <ul style="list-style-type: none"> • legal codes (7-16) • basic protocol (7-17) • extended control period (7-18) • packet types (7-19) • pixel encoding RGB to RGB-only sink (7-23) <p>Video:</p> <ul style="list-style-type: none"> • pixel encoding YC_bC_r to YC_bC_r sink (7-24) • video format timing (7-25) • pixel repetition (7-26) • AVI InfoFrame (7-27) <p>Audio:</p> <ul style="list-style-type: none"> • IEC 60958/IEC 61937 (7-28) • audio clock regeneration ACR (7-29) • audio sample packet jitter (7-30) • audio InfoFrame (7-31) • audio sample packet layout (7-32) <p>Interoperability with DVI:</p> <ul style="list-style-type: none"> • interoperability with DVI (7-33) <p>Advanced Feature:</p> <ul style="list-style-type: none"> • deep color (7-34) • gamut metadata transmission (7-35) • high-bitrate audio (7-36) • one bit audio (7-37) • 3D video format timing (7-38) • 4K x 2K video format timing (7-39) • extended colorimetry transmission (7-40)
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R&S®VT-K2368 HDMI™ 2.0 CTS source test

Compliance testing for HDMI™ source devices. In line with HDMI™ CTS 2.0.

Supported HDMI™ 2.0 source tests	HDMI™ 2.0	<p>TMDS Protocol:</p> <ul style="list-style-type: none"> • 6G-TMDS bit clock ratio (HF1-10) • 6G-2160p legal codes (HF1-11) • 6G-basic protocol and scrambling (HF1-12) • scrambling \leq 3.4Gbps (HF1-13) • 6G-Non-2160p legal codes (HF1-21) • 6G-Non-2160p basic protocol (HF1-22) <p>Pixel Encoding:</p> <ul style="list-style-type: none"> • YcbCr 4:2:0 deep color – TMDS pixel encoding (HF1-22) • YCbCr, 4:2:0 TMDS pixel encoding (HF1-31) <p>Video Timing:</p> <ul style="list-style-type: none"> • YCbCr, 4:2:0 (HF1-33) • 21:9 (64:27) (HF1-35) • 6G-2160p 24-bit color depth (HF1-14) • 6G-2160p deep color (HF1-15) • 6G-2160p 3D (HF1-16) • 6G-Non-2160p 24-bit color depth (HF1-24) • 6G-Non-2160p deep color (HF1-25) • 6G-Non-2160p 3D (HF1-26) • YcbCr 4:2:0 deep color (HF1-34) • 21:9(64:27) (HF1-35) <p>Audio Encoding</p> <ul style="list-style-type: none"> • 3D audio IEC sample packet (HF1-41) • 3D audio (L-PCM) packet format (HF1-36) • 3D audio (one bit) packet format (HF1-37) • MS audio IEC sample packet (HF1-42) • MS audio (L-PCM and 61937) packet format (HF1-38) • MS audio (one bit) packet format (HF1-39) • CEA-861-F audio (HF1-40) <p>HDMI™-VSIFs:</p> <ul style="list-style-type: none"> • 3D OSD disparity (HF1-47) • dual-view (HF1-48) • independent-view (HF1-49) <p>AVI InfoFrame and GCP:</p> <ul style="list-style-type: none"> • 6G -2160p (HF1-18) • 6G – Non-2160p (HF1-28) • YCbCr, 4:2:0 (HF1-51) • YcbCr 4:2:0 BT.2020 (HF1-52)
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HDMI™ options (300 MHz)**R&S®VT-B360 HDMI™ TX 300 MHz**

General		
Interface		4 x HDMI™ out (HDMI™ type A)
High-definition multimedia interface standard		HDMI™ 1.4b/2.0
High-definition content protection standard		HDCP 1.4
HDMI™ generator		
Basic data		video formats (HDMI™, DVI), audio generator, HDCP parameter, HDCP status, HotPlug status.
TMDS clock frequency (TMDS character rate)		up to 300 MHz (300 Mcsc)
Video		
Sampling modes		RGB, YCbCr, 4:4:4, YCbCr, 4:2:2 and YCbCr, 4:2:0
Color depth		8, 10 and 12 bit (4:2:0 only 8 bit)
Aspect ratios		4:3, 64:27, 16:9 and 256:135
Pixelshift vertical		-63 to +63 lines/frame
Pixelshift horizontal		-63 to +63 pixel/frame
Adjustable video signal		RGB, Y, C _b /P _b and C _r /P _r , level 0 to 200% RGB, Y, C _b /P _b and C _r /P _r , level 0 to 100%
Resolution clipping		1 to 12 bit
Patterns		static test patterns (up to 4K)
Audio		
Audio generator (up to 8 channels)	resolution	16 bit, 20 bit, 24 bit
	sampling rates	32/ 44.1/48/88.2/96/176.4/192 kHz
	audio level (adjustable for each audio channel)	-99.9 dB FS to 0.0 dB FS
	audio frequency (adjustable for each audio channel)	100 Hz to 20000 Hz
	channel allocation (CEA-861-E)	HEX 00 to 31
Source video file	audio from the *.avg file	WAV, AC3
Audio return channel (ARC) analysis on HDMI™ out1		R&S®VT-K2150 audio analysis
EDID reader		reading and interpreted EDID from connected device under test (DUT) export to EDID data files

R&S®VT-K365 HDMI™ CTS sink test

Compliance testing for HDMI™ sink devices. In line with HDMI™ CTS 1.4b and HDMI™ CTS 2.0. Only supported with R&S®VT-B360.

Supported HDMI™ 1.4b and HDMI™ 2.0 sink tests (up to 300 MHz TMDS clock frequency with R&S®VT-B360)	HDMI™ 1.4b	<p>Protocol:</p> <ul style="list-style-type: none"> character synchronization (8-15) acceptance of all valid packet types (8-16) <p>Video:</p> <ul style="list-style-type: none"> basic format support requirements (7-17) HDMI™ format support requirements (8-18) pixel encoding requirements (8-19) video format timing (8-20) <p>Audio:</p> <ul style="list-style-type: none"> audio clock regeneration (8-21) audio sample packet jitter (8-22) audio formats (8-23) <p>Interoperability with DVI:</p> <ul style="list-style-type: none"> interoperability with DVI (8-24) <p>Advanced Feature:</p> <ul style="list-style-type: none"> deep color (8-25) 3D video format timing (8-29) 4K x 2K video format timing (8-30) AVI InfoFrame (8-31)
	HDMI™ 2.0	<p>Sink TMDS Protection:</p> <ul style="list-style-type: none"> scrambling <= 340 Mcsc (HF2-9) <p>Sink Pixel Decoding</p> <ul style="list-style-type: none"> YCbCr, 4:2:0 (HF2-23) <p>Sink Video Timing:</p> <ul style="list-style-type: none"> 21:9 (64:27) (HF2-25) <p>Sink EDID:</p> <ul style="list-style-type: none"> YCbCr, 4:2:0–data blocks (HF2-31) YCbCr, 4:2:0 BT.2020-data block (HF2-32) YCbCr, 4.2:0 deep color HF-VSDB (HF2-35) 3D and multistream audio data blocks (HF2-39) HDMI™-VSDBs – independent-view (HF2-41) video format declaration (HF2-26) HF-VSDB (HF2-53)
Supported HDMI™ 2.0 sink tests (from 340 MHz up to 600 MHz TMDS clock frequency with R&S®VT-B2362)	HDMI™ 2.0	<p>Sink TMDS Protection:</p> <ul style="list-style-type: none"> scrambling (HF2-5) <p>Sink Pixel Decoding:</p> <ul style="list-style-type: none"> YCbCr 4:2:0 deep color (HF2-24) <p>Sink Video Timing:</p> <ul style="list-style-type: none"> 6G-2160p 24-bit color depth (HF2-6) 6G-2160p deep color (HF2-7) 6G-2160p 3D (HF2-8) 6G-Non-2160p 24-bit color depth (HF2-36) 6G-Non-2160p deep color (HF2-37) 6G-Non-2160p 3D (HF2-38) 21:9 (64:27) (HF2-25) <p>Sink EDID:</p> <ul style="list-style-type: none"> HF-VSDB (HF2-10)

R&S®VT-B2360 HDMI™ RX 225 MHz

General		
Interface		HDMI™ in (HDMI™ type A); HDMI™ auxiliary out (HDMI™ type A); S/PDIF in (optical)
TMDS clock frequency (TMDS character rate)		up to 225 MHz (225 Mcsc)
High-definition multimedia interface standard		HDMI™ 1.4b/2.0
High-definition content protection standard		HDCP 1.4
HDMI™ analysis		
Hot Plug detect (HPD)		switchable on/off
Input parameters measurements		pixel clock state HDMI™ +5 V power indication TMDS char. clock
Video parameter measurements		video code (VIC)
		video timing parameters
		pixel clock and TMDS char. clock
		vertical and horizontal frequency
		video parameters error indication
Audio parameter measurements		audio coding
		N and CTS values (audio clock regeneration ACR)
		layout bit value
		channel status bits
		audio parameters error indication
HDCP		measurement: <ul style="list-style-type: none"> • HDCP active indication • authentication request indication • key selection vectors AKSV and BKSV • Ri' • session ID An emulation: <ul style="list-style-type: none"> • HDCP authentication denial to emulate non-HDCP devices • forcing HDCP re-authentication by sending invalid Ri' value
InfoFrames		interpreted and hexadecimal display of <ul style="list-style-type: none"> • AVI InfoFrame • audio InfoFrame • HDMI™ vendor specific InfoFrame VSIF • HDMI™ forum vendor specific InfoFrame VSIF • SPD InfoFrame • MPEG InfoFrame InfoFrame error indication
EDID		support of user defined EDID data to emulate various sink devices <ul style="list-style-type: none"> • EDID grabbing from auxiliary output • import of EDID data files • library of EDID files

R&S®VT-B2361 HDMI™ RX 300 MHz

General		
Interface		HDMI™ in (HDMI™ type A); HDMI™ auxiliary out (HDMI™ type A); S/PDIF in (optical)
TMDS clock frequency (TMDS character rate)		up to 300 MHz (300 Mcsc)
High-definition multimedia interface standard		HDMI™ 1.4b/2.0
High-definition content protection standard		HDCP 1.4
HDMI™ analysis		
Hot Plug detect (HPD)		switchable on/off
Input parameters measurements		pixel clock state HDMI™ +5 V power indication TMDS char. clock
Video parameter measurements		video code (VIC)
		video timing parameters
		pixel clock and TMDS char. clock
		vertical and horizontal frequency
Audio parameter measurements		audio coding
		N and CTS values (audio clock regeneration ACR)
		layout bit value
		channel status bits
HDCP		audio parameters error indication
		measurement: <ul style="list-style-type: none"> • HDCP active indication • authentication request indication • key selection vectors AKSV and BKSv • Ri' • session ID An emulation: <ul style="list-style-type: none"> • HDCP authentication denial to emulate non-HDCP devices • forcing HDCP re-authentication by sending invalid Ri' value
InfoFrames		interpreted and hexadecimal display of <ul style="list-style-type: none"> • AVI InfoFrame • Audio InfoFrame • HDMI™ Vendor Specific InfoFrame VSIF • HDMI™ Forum Vendor Specific InfoFrame VSIF • SPD InfoFrame • MPEG InfoFrame InfoFrame error indication
EDID		support of user defined EDID data to emulate various sink devices <ul style="list-style-type: none"> • EDID grabbing from auxiliary output • import of EDID data files • library of EDID files

R&S®VT-K2365 HDMI™ CTS source test

Compliance testing for HDMI™ source devices. In line with HDMI™ CTS 1.4b and HDMI™ CTS 2.0.
Only supported with R&S®VT-B2360 or R&S®VT-B2361.

Supported HDMI™ 1.4b and HDMI™ 2.0 source tests (up to 225 MHz TMDS clock frequency with R&S®VT-B2360 HDMI™ RX 225 MHz; up to 300 MHz TMDS clock frequency with R&S®VT-B2361 HDMI™ RX 300 MHz)	HDMI™ 1.4b	<p>Protocol:</p> <ul style="list-style-type: none"> • legal codes (7-16) • basic protocol (7-17) • extended control period (7-18) • packet types (7-19) • pixel encoding RGB to RGB-only sink (7-23) <p>Video:</p> <ul style="list-style-type: none"> • pixel encoding YCbCr, to YCbCr, sink (7-24) • video format timing (7-25) • pixel repetition (7-26) • AVI InfoFrame (7-27) <p>Audio:</p> <ul style="list-style-type: none"> • IEC 60958/IEC 61937 (7-28) • audio clock regeneration ACR (7-29) • audio sample packet jitter (7-30) • audio InfoFrame (7-31) • audio sample packet layout (7-32) <p>Interoperability with DVI:</p> <ul style="list-style-type: none"> • Interoperability with DVI (7-33) <p>Advanced Feature:</p> <ul style="list-style-type: none"> • deep color (7-34) • Gamut metadata transmission (7-35) • high-bitrate audio (7-36) • one bit audio (7-37) • 3D video format timing (7-38) • 4K x 2K video format timing (7-39) • extended colorimetry transmission (7-40)
	HDMI™ 2.0	<p>Pixel Encoding:</p> <ul style="list-style-type: none"> • YCbCr, 4:2:0 TMDS pixel encoding (HF1-31) <p>Video timing:</p> <ul style="list-style-type: none"> • YCbCr, 4:2:0 (HF1-33) • 21:9 (64:27) (HF1-35) <p>AVI InfoFrame and GCP:</p> <ul style="list-style-type: none"> • YCbCr, 4:2:0 (HF1-51)

<p>Supported HDMI™ 2.0 source tests (from 340 MHz up to 600 MHz TMDS clock frequency with R&S®VT-B2362 HDMI™ RX/TX 600 MHz)</p>	<p>HDMI™ 2.0</p>	<p>TMDS Protocol:</p> <ul style="list-style-type: none"> • scrambling <= 3.4Gbps (HF1-13) • 6G-TMDS bit clock ratio (HF1-10) • 6G-2160p legal codes (HF1-11) • 6G-Basic protocol and scrambling (HF1-12) • 6G-Non-2160p legal codes (HF1-21) • 6G-Non-2160p basic protocol (HF1-22) <p>Pixel Encoding:</p> <ul style="list-style-type: none"> • YCbCr 4:2:0 deep color - TMDS pixel encoding (HF1-22) <p>Video Timing:</p> <ul style="list-style-type: none"> • 6G-2160p 24-bit color depth (HF1-14) • 6G-2160p deep color (HF1-15) • 6G-2160p 3D (HF1-16) • 6G-Non-2160p 24-bit color depth (HF1-24) • 6G-Non-2160p deep color (HF1-25) • 6G-Non-2160p 3D (HF1-26) • YCbCr 4:2:0 deep color (HF1-34) • 21:9(64:27) (HF1-35) <p>Audio Encoding</p> <ul style="list-style-type: none"> • 3D audio IEC sample packet (HF1-41) • 3D audio (L-PCM) packet format (HF1-36) • 3D audio (One Bit) packet format (HF1-37) • MS audio IEC sample packet (HF1-42) • MS audio (L-PCM and 61937) packet format (HF1-38) • MS audio (One Bit) packet format (HF1-39) • CEA-861-F audio (HF1-40) <p>HDMI™-VSIFs:</p> <ul style="list-style-type: none"> • 3D OSD disparity (HF1-47) • dual-view (HF1-48) • independent-view (HF1-49) <p>AVI InfoFrame and GCP:</p> <ul style="list-style-type: none"> • 6G-2160p (HF1-18) • 6G-Non-2160p (HF1-28) • YCbCr 4:2:0 BT.2020 (HF1-52)
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R&S®VT-K2366 CEC tracer

Only supported with R&S®VT-B360, R&S®VT-B2360 and R&S®VT-B2361

<p>CEC tracer</p>		<ul style="list-style-type: none"> • sending CEC commands to other devices • receiving CEC commands from other devices
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MHL options

R&S®VT-B2350 MHL RX/TX

General		
Interface	MHL in (HDMI™ type A)	normal mode/24-Bit-per-pixel mode
	MHL out (micro USB)	normal mode/24-Bit-per-pixel mode (PackedPixel mode)
		HDMI™ auxiliary out (type A)
Mobile high-definition link standard		MHL 1.4/2.2
High-definition content protection standard		HDCP 1.4
MHL analyzer		
Input parameters measurements		pixel clock state CBUS connection state
Video parameter measurements		video code (VIC)
		video timing parameters
		pixel clock vertical and horizontal frequency
Audio parameter measurements		audio coding
		N and CTS values (audio clock regeneration ACR)
		layout bit value
		channel status bits
HDCP parameter measurements		HDCP active indication
		authentication request indication
		key selection vectors AKSV and BKSV
		Ri'
		session ID An
InfoFrames		interpreted and hexadecimal view of
		AVI InfoFrame
		audio InfoFrame
		vendor specific InfoFrame VSIF (3D format indication)
		SPD InfoFrame MPEG InfoFrame
EDID		support of user defined EDID data to emulate various sink devices
MHL generator		
Basic data		video formats, audio generator, HDCP parameter, HDCP status, HotPlug status, InfoFrame editor
TMDS clock frequency		up to 222.75 MHz (normal mode/24-bit per pixel mode)
Video		
Sampling modes		RGB, YCbCr 4:4:4, YCbCr 4:2:2
Color depth		8 bit
Aspect ratios		4:3, 16:9
Pixelshift vertical		-63 lines/frame to +63 lines/frame
Pixelshift horizontal		-63 pixel/frame to +63 pixel/frame
Adjustable video signal		RGB, Y, Cb/Pb and Cr/Pr level 0 % to 200% RGB, Y, Cb/Pb and Cr/Pr level 0 % to 100%
Resolution clipping		1 bit to 8 bit
Patterns		static test patterns
Audio		
Audio generator (up to 8 channels)	resolution	16/20/24 bit
	sampling rates	32/44.1/48/88.2/96/176.4/192 kHz
	audio level (adjustable for each audio channel)	-99.9 dB FS to 0.0 dB FS
	audio frequency (adjustable for each audio channel)	100 Hz to 20000 Hz
	channel allocation (CEA-861-E)	HEX 00 to 31
Source video file	audio from the *.avg file	WAV, AC3

R&S®VT-B2351 MHL RX PackedPixel

General		
Interface	MHL in (HDMI™ type A)	normal mode/24-bit per pixel mode (PackedPixel mode) HDMI™ auxiliary out (type A)
Mobile high-definition link standard		MHL 1.4/2.2
High-definition content protection standard		HDCP 1.4
MHL analyzer		
Basic data		video formats and timing (24-bit mode and PackedPixel mode), audio formats and sampling rates, HDCP parameters, CBUS connection state
Input parameters measurements		pixel clock state CBUS connection state
Video parameter measurements		video code (VIC) video timing parameters pixel clock vertical and horizontal frequency
Audio parameter measurements		audio coding N and CTS values (audio clock regeneration ACR) layout bit value channel status bits
HDCP parameter measurements		authentication request indication HDCP active indication key selection vectors AKSV and BKSV Ri'
InfoFrames		interpreted and hexadecimal view of <ul style="list-style-type: none"> • AVI InfoFrame • audio InfoFrame • vendor specific InfoFrame VSIF (3D format indication) • SPD InfoFrame • MPEG InfoFrame
EDID		support of user defined EDID data to emulate various sink devices.

R&S®VT-K355 MHL CTS sink test

Compliance testing for MHL sink and dongle devices. In line with MHL CTS 1.4 and MHL CTS 2.2

<p>Supported MHL 1.4 and MHL 2.2 CTS system sink and dongle tests (normal mode/24-bit per pixel mode and PackedPixel mode)</p>		<ul style="list-style-type: none"> • character synchronization (4.2.1.1, 4.2.1.3, 5.2.1.1 and 5.2.1.3) • packet types (4.2.1.2, 4.2.1.4, 5.2.1.2 and 5.2.1.4) • video formats (4.2.2.1, 4.2.2.4, 5.2.2.1 and 5.2.2.4) <ul style="list-style-type: none"> - VIC 1: 640x480 at 60Hz (VGA) - VIC 2, 3: 720x480p at 60Hz - VIC 17, 18: 720x576p at 50Hz - VIC 4: 1280x720p at 60Hz - VIC 19: 1280x720p at 50Hz - VIC 5: 1920x1080i at 60Hz - VIC 20: 1920x1080i at 50Hz - VIC 32: 1920x1080p at 24Hz - VIC 34: 1920x1080p at 30Hz - VIC 31: 1920x1080p at 50Hz - VIC 16: 1920x1080p at 60Hz - VIC 6, 7: 720(1440)x480i at 60Hz - VIC 21, 22: 720(1440)x576i at 50Hz • pixel encoding (4.2.2.2, 4.2.2.5, 5.2.2.2 and 5.2.2.5) • video quantization range (4.2.2.3 and 5.2.2.3) • IEC60958/IEC61937 (4.2.3.1 and 5.2.3.1) • audio clock regeneration (4.2.3.2 and 5.2.3.2) • EDID test (4.2.5.1 and 5.2.5.1) • device capability registers test (4.2.5.2 and 5.2.5.2) • device status registers test (4.2.5.3 and 5.2.5.3) • RCP sub-commands receiving test (4.2.6.1 and 5.2.6.1) • RCP sub-commands transmitting test (4.2.6.2 and 5.2.6.2) • RAP and RAPK sub-commands tests (4.2.7.1 and 5.2.7.1) • 3D video mode support data (4.2.8.1 and 5.2.8.1) • 3D video format (4.2.8.2, 4.2.8.3, 5.2.8.2 and 5.2.8.3) <ul style="list-style-type: none"> - top-bottom - left-right - frame sequential - VIC 4:1280x720p at 60Hz - VIC 19:1280x720p at 50Hz - VIC 5:1920x1080i at 60Hz - VIC 20:1920x1080i at 50Hz - VIC 32:1920x1080p at 24Hz • UCP sub-commands receiving test (4.2.9.1 and 5.2.9.1) • UCP sub-commands transmitting test (4.2.9.2 and 5.2.9.2)
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R&S®VT-K2355 MHL CTS source test

Compliance testing for MHL source devices. In line with MHL CTS 1.4 and MHL CTS 2.2

Supported MHL 1.4 and MHL 2.2 CTS system source tests (normal mode/24-bit per pixel mode)	R&S®VT-B2350 MHL RX/TX module required	<ul style="list-style-type: none"> • legal codes (3.2.2.1) • basic protocol (3.2.2.2) • packet types (3.2.2.3) • video formats (3.2.3.1) • pixel encoding (3.2.3.2) • AVI InfoFrame (3.2.3.3) • video quantization ranges (3.2.3.4) • IEC60958/IEC61937 (3.2.4.1) • audio clock regeneration (3.2.4.2) • audio InfoFrame (3.2.4.3) • EDID reading test (3.2.6.1) • device capability registers test (3.2.6.2) • device status registers test (3.2.6.3 and 3.2.6.4) • RCP sub-commands receiving test (3.2.7.1) • RCP sub-commands transmitting test (3.2.7.2) • RAP and RAPK sub-commands tests (3.2.8.1) • 3D video mode support (3.2.9.1) • 3D video format timings (3.2.9.2) • 3D video mode indicator (3.2.9.3) • UCP sub-commands receiving test (3.2.10.1) • UCP sub-commands transmitting test (3.2.10.2)
Supported MHL 1.4 and MHL 2.2 CTS system source tests (PackedPixel mode)	R&S®VT-B2351 MHL RX PackedPixel module required	<ul style="list-style-type: none"> • legal codes (3.2.2.4) • basic protocol (3.2.2.5) • packet types (3.2.2.6) • video formats (3.2.2.5) • pixel encoding (3.2.3.6) • AVI InfoFrame (3.2.3.7) • 3D video format timings (3.2.9.4)

R&S®VT-K2356 CBUS tracer

CBUS tracer		<p>monitoring CBUS traffic sending CBUS packets upstream supported CBUS protocol layers (receiving and transmitting):</p> <ul style="list-style-type: none"> • MSC <ul style="list-style-type: none"> - all MSC commands • RCP <ul style="list-style-type: none"> - all RCP sub-commands • RAP <ul style="list-style-type: none"> - POLL - CONTENT_ON - CONTENT_OFF • UCP <ul style="list-style-type: none"> - user defined text data
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TDA options

R&S®VT-B2380 TMDs TDA

Cable to connect TPA included.

R&S®VT-Z2385 HDMI™ Type A TPA (plug) required.

General		
Interface		CLK in (SMA) 25 MHz to 340 MHz
		CH+/CH- in (SMA) 250 Mbps to 6 Gbps
		CONTROL in/out
Analog bandwidth		DC to 13 GHz (-3 dB) (typ.)
Converter resolution		8 Bit
High-definition multimedia standard		HDMI™ 1.4/HDMI™ 2.0
Time domain analyzer		
Input parameters measurements		signal state
		TMDS char. clock frequency <ul style="list-style-type: none"> • 25 MHz to 594 MHz • accuracy: 1%
		DDC EDID status
EDID		19 different EDID data to enforce various TMDS char. clocks support of user defined EDID data to emulate various sink devices
Scope measurements	cursor	2 cursors with time and voltage readouts difference between cursors
	mask	number of mask violations in 3 different regions
	horizontal histogram	mean, min, max, standard deviation of each histogram difference between histograms
	vertical histogram	mean, min, max, standard deviation of each histogram difference between histograms

R&S®VT-Z2385 HDMI™ type A TPA (plug)

General		
Interface	HDMI™ in (HDMI™ type A)	HDMI™ 2.0
	CLK out (SMA)	25 MHz to 340 MHz
	CH+/CH- Out (SMA)	250 Mbps to 6 Gbps
		CONTROL in/out
High-definition multimedia standard		HDMI™ 1.4/HDMI™ 2.0

R&S®VT-K2385 HDMI™ CTS source test (elec.)

R&S®VT-B2380 TMDS TDA required

R&S®VT-Z2385 HDMI™ type A TPA (plug) required

Time domain analyzer		
CTS measurements Note: Due to the alternative approach to sample the waveform of the TMDS data signal, the measurements do not meet the requirements of the compliance test specification in exactly the same way as it is written.	HDMI™ 1.4b measurements on TMDS lines	<ul style="list-style-type: none"> • TMDS V_L (7-2) • TMDS V_{Off} (7-3) • TMDS T_{Rise}, T_{Fall} (7-4) • TMDS inter pair skew (7-6) valid only, if skew is less than $\pm 0.5T_{Bit}$ • TMDS intra pair skew (7-7) • TMDS clock duty cycle (7-8) • TMDS clock jitter (7-9), tendency only • TMDS data eye diagram (7-10)
	HDMI™ 2.0 measurements on TMDS lines	<ul style="list-style-type: none"> • TMDS 6G V_L and V_{Swing} (HF1-1) • TMDS 6G T_{Rise}, T_{Fall} (HF1-2) • TMDS 6G inter pair skew (HF1-3) valid only, if skew is less than $\pm 0.5T_{Bit}$ • TMDS 6G intra pair skew (HF1-4) • TMDS 6G differential voltage (HF1-5) • TMDS 6G clock duty cycle (HF1-6) • TMDS clock jitter (HF1-7), tendency only
	HDMI™ 1.4b measurements on control lines	<ul style="list-style-type: none"> • EDID related behavior (7-1), function only • +5 V power (7-11) • hot plug detect (7-12) • DDC/CEC capacitance and voltage (7-13) • line degradation (7-15)

Analog options

R&S®VT-B2370 analog AV RX

Composite video

R&S®VT-K2100 video analysis/R&S®VT-K2101 video measurements options required

General		
Connector	CCVS	BNC, female, 75 Ω, DC coupling
	video level	1 V (V _{PP}) ± 6 dB
	absolute input level	-1 V to +2 V
	return loss	> 34 dB up to 10 MHz
Standard		PAL B/G, I, D/K, L NTSC
DC accuracy	reference = nominal level 1 V	±0.5%
Frequency response	0 Hz to 6 MHz	±1.0%
Timing accuracy	see reference frequency of base unit	< 3 · 10 ⁻⁶

Measurement parameter	range/unit	accuracy ³
Amplitude and delay		
Luminance bar amplitude	0 mV to 1400 mV (PAL)	±4
	0 to 200 IRE (NTSC)	±0.5
	-100 to +100 % (nom.)	±0.5
Sync amplitude	60 mV to 600 mV (PAL)	±4
	8 to 80 IRE (NTSC)	±0.5
	-80 % to +100 % (nom.)	±0.8
	-50 % to +50 % (bar)	±0.8
Burst amplitude	60 mV to 600 mV (PAL)	±4
	8 to 80 IRE (NTSC)	±0.5
	-100 % to +100 % (nom.)	±1.0
	-50 % to +50 % (bar)	±1.0
C/L gain	-50 to +50 % (bar)	±1.0
C/L delay	-500 ns to +500 ns	±5
DC level	-1000 mV to +1000 mV	±4
Linear distortions		
Baseline distortion	-40 % to +40 %	±0.5
2T pulse amplitude	-50 % to +50 %	±0.7
2T pulse k-factor	0 % to 10 %	±0.7
2T pulse half amplitude duration	100 ns to 400 ns	±3
2T pulse KPB	-10 % to +5 %	±0.7
Tilt	-40 % to +40 %	±0.5
Short/line/field time distortion	-40 % to +40 %	±0.5
Short time distortion rise/fall time	50 ns to 400 ns	±3
Nonlinear distortions		
C/L Intermodulation	-50 % to +50 % (bar)	±1.0 (mod pulse)
		±0.5 (mod bar)
Chrominance nonlinearity gain	-50 % to +50 %	±1.0
Chrominance nonlinearity phase	-50 % to +50°	±1.0
Luminance nonlinearity	0 % to +50 %	±0.3
	50 % to 100 % (single step)	±0.3
Differential gain	-50 % to +50 %	±0.5
Differential phase	-50° to +50°	±0.5
Frequency response		
Multiburst flag	0 mV to 1000 mV (PAL)	±4
	0 to 150 IRE (NTSC)	±0.5
	-100 % to +50 % (nom.)	±0.5
	-100 % to +50 % (bar)	±0.5
Multiburst packets	-100 % to +50 %	±1.0
	-40 dB to +6 dB	±0.1
Sin x/x amplitude	-40 dB to +40 dB	±0.3
Sin x/x group delay	-1000 dB to +1000 dB	±20
Noise measurements		

³ Specified error limits apply to nominal parameter values.

Luminance noise, unw/lumw/chrow (PAL)	0 mV to +50 mV (PAL)	±1.0
	0 to 7 IRE (NTSC)	±0.2
	-25 dB to +75 dB	±1.0
C/SND intermodulation	0 mV to +50 mV (PAL)	±1.0
	0 to 7 IRE (NTSC)	±0.2
	30 dB to 70 dB (nom.) dB (bar)	±1.0
SND/SND intermodulation (PAL)	0 mV to +50 mV (PAL)	±1.0
	30 dB to 70 dB (nom.) dB (bar)	±1.0
Chroma noise AM/PM	20 dB to 55 dB	±1.0
Timing measurements		
Field period	20 000 µs ± 30 µs	±0.1/±0.005 ⁴
Field pulse duration	1 µs to 7 µs	±0.005
Line period	60 µs to 68 µs	±0.005
Line blanking	7 µs to 65 µs	±0.05
Sync duration	2.7 µs to 6.7 µs	±0.005
Line sync fall/rise time	70 ns to 1000 ns	±5
Burst position	4.7 µs to 6.0 µs	±0.01
Burst duration	1.5 µs to 3.0 µs	±0.01
Lum bar duration	5 µs to 30 µs	±0.05
SC/H phase	-90° to 90°	±4
PAL phase (PAL)	-90° to 90°	±4
SC frequency	4433618 Hz ± 100 Hz (PAL)	±20/±1 ⁴
	3579545 Hz ± 100 Hz (NTSC)	
Jitter measurements		
Field jitter	0 µs to 30 µs	±0.005
Line jitter	0 ns to 4000 ns	±5
Video data measurements		
Basic amplitude	0 mV to 1400 mV (PAL)	±10
	0 to 200 IRE (NTSC)	±2.0
	-100 % to +100 % (nom.)	±2.0
	-100 % to +100 % (bar)	±2.0
Decoding/timing margining	0 % to 100 %	±2.0
Data timing	9 µs to 14 µs	±0.05
Run-in bits	6 to 24	--
Error rate	-10 dB to -70 dB	--

Component video

R&S®VT-K2371 component support and R&S®VT-K2100 video analysis/R&S®VT-K2101 video measurements options required

General		
Connector	Y/G, B/P _b , R/P _r	3 × BNC, female, 75 Ω, DC coupling
	video level	1 V (V _{pp}) ± 6 dB
	absolute input level	-1 V to +2 V
	return loss	>30 dB up to 30 MHz
Standard		RGB, YP _b P _r , (SMPTE/EBU N10, SMPTE 247M, STANAG 350 Class A/B/C)
Video format		SDTV
		HDTV up to 1080p × 1920 × 60 Hz
Synchronization	SDTV	bi-level
	HDTV	tri-level
	RGB	G
	YP _b P _r	Y
DC accuracy	reference = nominal level 1 V	±0.5 %
Frequency response	up to 10 MHz	±1.0 %
	10 Hz to 30 MHz	±2.5 %
Timing accuracy	see reference frequency of base unit	< 3 · 10 ⁻⁶

⁴ The higher accuracy could be achieved with corresponding external reference signal.

Measurement parameter	range/unit	accuracy ³
Amplitude and delay		
Lum bar amplitude	0 mV to 1400 mV (Y_{RGB})	± 4
	-700 % to +700 mV (P_bP_r)	± 4
	-100 % to +100 % (nom.) (Y_{RGB})	± 0.5
	-100 % to +100 % (nom.) (P_bP_r)	± 1.0
Sync amplitude (sync in green)	60 mV to +600 mV (bi-level)	± 4
	120 mV to +1200 mV (tri-level)	± 4
	-100 to +100 % (nom.)	± 0.8
Color bar amplitude (white/yellow/cyan/green/magenta/red/ blue/black)	0 mV to 1400 mV (Y_{RGB})	± 4
	-700 mV to +700 mV (P_bP_r)	± 4
	-100 % to +100 % (nom.) (Y_{RGB})	± 0.5
	-100 % to +100 % (nom.) (P_bP_r)	± 1.0
Inter channel delay	-500 ns to +500 ns	± 3
Inter channel amplitude	-50 % to +50 %	± 1.0
Linear distortion		
2T pulse amplitude	-50 % to +50 %	± 1.0
2T pulse k-factor	0 % to 10 %	± 1.0
2T pulse half amplitude duration	15 ns to 400 ns	± 3
Short time distortion rise/fall time	50 ns to 400 ns	± 3
Short time preshoot/overshoot	0% to +40 %	± 0.5
Nonlinear measurements		
Nonlinearity	0 % to +50 %	± 1.0
	50 % to 100 % (single step)	± 1.0
Frequency response		
Sin x/x amplitude	-40 dB to 40 dB	± 0.5
Sin x/x group delay	-1000 ns to +1000 ns	± 20 (SD)/ ± 10 (HD)
Sweep amplitude	-40 dB to 40 dB	± 0.5
Multiburst flag	0 mV to 1000 mV	± 4
	-100 % to +50 % (nom.)	± 0.5
Multiburst packets	-100 % to +50 %	± 1.0 (up to 10 MHz)
		± 2.5 (10 MHz to 30 MHz)
	-40 to +6 dB	± 0.1 (up to 10 MHz) ± 0.25 (10 MHz to 30 MHz)
Noise measurements		
Noise unweighted/lum weighted	-30 dB to -55 dB	± 1.0
	-55 dB to -65 dB	± 2.0
Timing measurements		
Field period	5000 μ s to 100000 μ s	$\pm 0.1/\pm 0.005$ ⁵
Field frequency	10 Hz to 200 Hz	± 0.001
Line period	5 μ s to 1000 μ s	± 0.005
Line frequency	1000 Hz to 200000 Hz	± 0.1
Jitter measurements		
Line jitter	0 ns to 4000 ns	± 5

⁵ The higher accuracy can be achieved with a corresponding external reference signal.

VGA specific		
Connector	connector RGB	3 × BNC, female, 75 Ω
	H-sync/V-sync	2 × BNC, female, 2 kΩ
Pixel clock		up to 200 MHz
Video format	640 × 350 pixel	all refresh rates
	640 × 400 pixel	
	720 × 400 pixel	
	640 × 480 pixel	
	800 × 600 pixel	
	848 × 480 pixel	
	1024 × 768 pixel	
	1152 × 864 pixel	
1280 × 768 pixel	up to 85 Hz	
1280 × 800 pixel		
1280 × 960 pixel		
1280 × 1024 pixel		
1360 × 768 pixel		
1440 × 900 pixel		
1400 × 1050 pixel		
1680 × 1058 pixel		up to 75 Hz
1600 × 1200 pixel	up to 70 Hz	
1920 × 1200 pixel	up to 60 Hz	

Audio

R&S®VT-K2150 audio analysis option required

Connector	L/R	2 × BNC, female, unbalanced
	input impedance	100 kΩ/600 Ω selectable
	coupling	AC/DC selectable
Frequency range	range	DC/10 Hz to 80 kHz
	error limits	±1 Hz
Maximum input voltage	RMS, sinewave	3.5 V (typ.)
Frequency response (referenced to 1 kHz)	20 Hz to 40 Hz	0.25 dB (DC coupling 0.10 dB)
	40 Hz to 20 kHz	0.10 dB
	20 kHz to 40 kHz	0.15 dB
	40 kHz to 80 kHz	0.25 dB
Crosstalk attenuation	frequency < 20 kHz, 100 kΩ input impedance	> 90 dB
RMS value	error limits at 1 kHz sin, AC coupling	±0.2 dB
	additional error with DC coupling	< ± 50 mV
	noise with A filter, 600 Ω source impedance	< 10 μV
THD+N	fundamental	20 Hz to 25 kHz
	error limits	±0.7 dB
	inherent distortion	
	fundamental 40 Hz to 5 kHz	<-90 dB
	fundamental 5 kHz to 15 kHz	<-85 dB
fundamental >15 kHz	<-80 dB	
SNR	error limits	
	bandwidth 22 kHz	±1.0 dB
	bandwidth 80 kHz	±1.5 dB
	inherent distortion	
	bandwidth 22 kHz	< 20 μV
bandwidth 80 kHz	< 50 μV	
Phase	error limits	±1°

R&S®VT-K2371 component support

Function		enables Y/G, B/P _b , R/P _r , and H-sync/V-sync inputs
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AV analysis options

R&S®VT-K2100 video analysis

Supported inputs	R&S®VT-B2360 HDMI™ RX 225 MHz	video measurements
	R&S®VT-B2361 HDMI™ RX 300 MHz	
	R&S®VT-B2363 HDMI™ RX/TX 600 MHz	
	R&S®VT-B2350 MHL Rx/Tx	video measurements
Views	R&S®VT-B2351 Rx MHL PackedPixel	video measurements on composite video
	R&S®VT-B2370 analog AV RX	video measurements on component video (R&S®VT-K2371 component support required)
		video measurements on VGA video (R&S®VT-K2371 component support required)
Input		display of life picture
Videoscope	single waveform view	all inputs
	parade and overlay waveform view	component video and VGA
	overlay sync view	VGA
	cursor measurements	marker and delta marker for timing and level measurements
Vectorscope	graphical view	vectorscope with background color picture
	cursor	waveform of selected line
	measurements for color bars and cursor position	setting of line and h-position
		luminance amplitude
	chrominance amplitude	
	chrominance phase	

R&S®VT-K2101 video measurements

Composite measurement parameters	amplitude and delay	luminance bar amplitude
		sync amplitude
		burst amplitude
		C/L gain
		C/L delay
		DC level
	linear distortions	baseline distortion
		2T pulse amplitude
		2T pulse k-factor
		2T pulse half amplitude duration
		2T pulse KPB
		tilt
		short time distortion
	line time distortion	
	field time distortion	
	nonlinear distortions	C/L intermodulation
		chrominance nonlinearity gain
		chrominance nonlinearity phase
		luminance nonlinearity
		differential gain
differential phase		
frequency response	multiburst CCIR18 (PAL)	
	multiburst NTC7 (NTSC)	
	multiburst FFC (NTSC)	
	sin x/x amplitude	
	sin x/x group delay	
noise measurements	luminance noise unweighted	
	luminance noise lum weighted	
	luminance noise chr weighted (PAL)	
	C/SND intermodulation	
	SND/SND intermodulation (PAL)	
chroma noise AM/PM		

Composite measurement parameters	timing measurements	field period
		field pulse duration
		line period
		line blanking
		line sync duration/fall/rise time
		burst position/duration
		lum bar duration
		SC/H phase
		PAL phase
	SC frequency	
	jitter measurements	field jitter
		line jitter
	video data measurements	basic amplitude
decoding margining		
timing margining		
data timing		
run-in-bits		
error rate		
Component measurement parameters (R&S®VT-K2371 component support required)	amplitude and delay	lum bar amplitude
		sync amplitude (sync in green)
		color bar amplitude
		inter channel delay
		inter channel amplitude
	linear distortion	2T pulse amplitude
		2T pulse k-factor
		2T pulse half amplitude duration
		short time distortion
	nonlinear distortions	nonlinearity
		nonlinearity step 1 to 5
	frequency response	sin x/x amplitude
		sin x/x group delay
		sweep amplitude
		multiburst flag amplitude
		multiburst amplitude 1 to 6
		multiburst frequency 1 to 6
	noise measurements	signal-to-noise unweighted
		signal-to-noise lum weighted
	timing measurements	field period/frequency
		line period/frequency
		lum bar duration
	jitter measurements	line jitter

R&S®VT-K2111 AV distortion analysis

Not available for R&S®VTS with serial number < 100200.

Supported inputs	R&S®VT-B2360 HDMI™ RX 225 MHz	audio and video measurements
	R&S®VT-B2361 HDMI™ RX 300 MHz	
	R&S®VT-B2363 HDMI™ RX/TX 600 MHz	audio and video measurements
	R&S®VT-B2350 MHL Rx/Tx	
	R&S®VT-B2351 Rx MHL PackedPixel	video measurements on composite video
	R&S®VT-B2370 analog AV RX	
Views		
Input	signal and reference characteristics	
Detection	time to match reference to input signal	
List	table view of all test results	current result, worst result, number of limit violations
Trace	graphical display of selected test results	
Log	log with test results for each video frame.	up to last 30 test cycles export to .csv (coma separated value) text file. Size only limited by hard drive volume. 1000 video frames requires up to 3 MByte. Log files are separated after 40 000 video frames.
Synchronization methods	self referenced	for deviation to previous video frame
	still picture	for deviation against a single video frame
	APL full frame	for deviation against a video sequence
	APL section	for deviation against a video sequence
	time code	for deviation against a video sequence time code inserter software is available
Maximum length of video loop	1200 video frames	for time code synchronization
	< 1200 video frames	for APL synchronization, actual number depends on APL modulation within the video loop
Scaling for video reference measurements	720 x 576 pixel	
Measurements		
General		
Signal status	OK, "---"	
Loop detection	passed, "---"	
Detection time	hh:mm.ss.ms	settings: upper limit
Frame number	n	currently evaluated frame number
Cycle number	n	current cycle number
Failure point		
Visible error	OK, fail	detection of picture errors visible for human viewers
		Customized threshold for PSNR-Y, SSIM and duration of threshold violation
Picture failure point	OK, fail	detection of picture failure point according to definitions in NorDig, MBRAI and D-Book
		settings: <ul style="list-style-type: none"> • length of period (1 s to 60 s) • number of periods (1 to 99) • gap between period (1 s to 60 s) allowed periods with visible error (0 to number of periods – 1)
Audio failure point	OK, fail	detection of audio failure point defined by loss of audio within a given period
		setting: length of test period (1 s to 60 s)
Video		
Freeze	ok, fail	detection of frozen frame
Dropped frames	0 to 1499	number of not presented frames, for time code synchronization only, setting: upper limit
Black frames	OK, fail	detection of black frame; setting: detection threshold 0% to 100%
Average picture level	0.0 % to 100.0%	average level of y

Pixel error Y, C _b , C _r	0 to 414.720 for Y 0 to 103.680 for C _b , C _r	number of pixel differences per video frame, setting: upper limit
PSNR Y, C _b , C _r	0.0 dB to 99.9 dB	peak signal-to-noise ratio, best match = 99.9 dB setting: lower limit
SSIM	0.000 to 1.000	structural similarity of Y component, best match = 1.000 setting: lower limit
MOS-V	0.00 to 5.00	mean opinion score video derived out of SSIM best match = 5.00 setting: lower limit
Rendering rate	0.00 Hz to 100.00 Hz	rendering rate of video frames for time code synchronization only settings: <ul style="list-style-type: none"> • measurement window (1 s to 99 s) • lower and upper limit
AVG rendering rate	0.00 Hz to 100.00 Hz	average value of rendering rate, for time code synchronization only settings: <ul style="list-style-type: none"> • measurement window (1 s to 99 s) • lower and upper limit
STD rendering rate	0.00 Hz to 100.00 Hz	standard deviation of rendering rate. for time code synchronization only settings: <ul style="list-style-type: none"> • measurement window (1 s to 99 s) • reference (average rendering rate or nominal value) • lower and upper limit
Audio		
Supported inputs and formats	HDMI™, MHL	PCM data, up to 44.1 kHz
Audio loss CH1 to CH8	OK, fail	audio peak level below a settable threshold and period settings: <ul style="list-style-type: none"> • threshold: -99.9 dB FS to 0.0 dB FS • period (limit setting): 1 ms to 10.000 ms • lower and upper limit
Audio level deviation CH1 to CH8	-99.9 dB to +50.0 dB	deviation of audio level between input signal and reference signal, audio peak level of reference signal has to be higher than -50.0 dB FS settings: <ul style="list-style-type: none"> • lower and upper limit
Audio video delay CH1 to CH8	-1.000 s to 1.000 s	delay of audio to video signal related to reference signal, requires loop synchronization usable audio signals are voice, rhythm music or test signals with level modulation settings: <ul style="list-style-type: none"> • lower and upper limit

R&S®VT-K2150 audio analysis

Measurement functions		level, THD+N, frequency response, signal-to-noise ratio, crosstalk, interchannel phase
Supported inputs	R&S®VT-B2360 HDMI™ RX 225 MHz R&S®VT-B2361 HDMI™ RX 300 MHz R&S®VT-B2363 HDMI™ RX/TX 600 MHz R&S®VT-B360 HDMI™ TX 300 MHz (ARC)	audio measurements (up to 8 channels)
	R&S®VT-B2350 MHL Rx/Tx R&S®VT-B2351 Rx MHL PackedPixel	audio measurements (up to 8 channels)
	R&S®VT-B2370 analog AV RX	audio L/R (2 channels)
Bandwidth	digital input	up to 96 kHz dependent on sampling frequency (32/44.1/48/96/192 kHz)
	analog input	80 kHz
Filter	up to 3 filters in combination	<ul style="list-style-type: none"> • A weighting • C message • CCITT • de-emphasis 50 15 • de-emphasis 50 • de-emphasis 75 • IEC tuner • JITTW • pre-emphasis 50 15 • pre-emphasis 50 • pre-emphasis 75 • high pass 22 Hz • high pass 400 Hz • low pass 22 kHz • low pass 30 kHz
Measurement parameters	level	FS, %FS, dB FS, dBr, dB SPL (digital input) V _{rms} , dBV, dBu, dBr, dB SPL, V _{pp} (analog input)
	THD+N	auto-tuning to input signal variable frequency range
	frequency response	all units of parameter level
		FFT size: 2K to 1M
		Hanning window
	SNR	average count: 1 to 20
	crosstalk	dB, X/Y
variable signal/noise length 1 s to 5 s detection of length of sequence		
interchannel phase	X/Y, %, ppm, dB average function deg, rad	

R&S®VT-K2158 speech quality measurement PESQ

Function		perceptual evaluation of speech quality measurements	
Supported inputs	R&S®VT-B2360 HDMI™ RX 225 MHz	PESQ measurements on HDMI™ and SPDIF signals	
	R&S®VT-B2361 HDMI™ RX 300 MHz		
	R&S®VT-B2363 HDMI™ RX/TX 600 MHz	PESQ measurements on MHL signals	
	R&S®VT-B2350 MHL Rx/Tx		
R&S®VT-B2351 Rx MHL PackedPixel	PESQ measurements on analog audio signals		
R&S®VT-B2370 analog AV RX			
Measurements		overall PESQ score (P862)	
		speech PESQ score (P862)	
		noise PESQ score (P862)	
		MOS-LQO (P862.1)	
		speech MOS-LQO (P862.1)	
		noise MOS-LQO (P862.1)	
		MOS P.800	
		MOS LQ	
		G.107 rating	
		transmission distortions and delay	
		reference signal levels, clipping and activity	
		captured signal levels, clipping and activity	
	Views		report of measurement results
			graphical display of reference waveform
		graphical display of captured waveform	
		graph of MOS values over time	
		graph of MOS LQ values over time	
		graph of reference audio voice activity	
		graph of captured audio voice activity	
		graph of captured audio drop outs over time	
	graph of reference audio clipping over time		
	graph of captured audio clipping over time		

R&S®VT-K2159 listening quality analysis POLQA

Function		perceptual objective listening quality measurements
Supported inputs	R&S®VT-B2360 HDMI™ RX 225 MHz	POLQA-NB and POLQA-SWB measurements on HDMI™ and SPDIF signals
	R&S®VT-B2361 HDMI™ RX 300 MHz	
	R&S®VT-B2363 HDMI™ RX/TX 600 MHz	POLQA-NB and POLQA-SWB measurements on MHL signals
	R&S®VT-B2350 MHL Rx/Tx	
R&S®VT-B2351 Rx MHL PackedPixel	POLQA-NB and POLQA-SWB measurements on analog audio signals	
R&S®VT-B2370 analog AV RX		
Supported modes		narrow band
		super wide band
Measurements		MOS-LQO score
		speech PESQ score (P862)
		G.107 rating
		transmission delays
		reference signal levels, signal-to-noise ratio and activity
		captured signal levels, signal-to-noise ratio and activity
Views		report of measurement results
		graphical display of reference waveform
		graphical display of captured waveform
		graph of MOS LQ values over time
		graph of reference audio voice activity
	graph of captured audio voice activity	

Broadcast modulator options

Specification of the R&S®VT-B600 and related options is given in the document "Compact Modulator/USB Compact Modulator/Broadcast TX Modulator - R&S®SFC, R&S®SFC-U, R&S®VT-B600" (PD 5214.5910.22).

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Ordering information

Option identification: R&S®VT-Bxy = hardware option, R&S®VT-Kxy = software option.

Designation	Type	Order No.
Base units and extensions		
Base units		
Video test center	R&S®VTC	2115.7400.02
Video tester	R&S®VTE	2115.7300.02
Compact video tester	R&S®VTS	2115.7100.02
Base unit extension		
512 Gbyte SSD HDD	R&S®VT-B3025	2115.7697.02
HDMI™ options (600 MHz)		
HDMI™ module option		
HDMI™ RX/TX 600 MHz module	R&S®VT-B2363	2115.7716.06
HDMI™ generator options		
HDMI™ TX	R&S®VT-K364	2115.8570.02
HDMI™ moving pictures	R&S®VT-K361	2115.7545.02
HDMI™ user defined timing	R&S®VT-K362	2115.8293.02
HDMI™ analyzer option		
HDMI™ RX	R&S®VT-K2364	2115.8587.02
HDMI™ CEC/DDC analysis options		
CEC/DDC analyzer	R&S®VT-K2391	2115.8658.02
HDMI™ pass-through adapter	R&S®VT-Z2390	2115.7680.02
HDMI™ CTS testing options		
HDMI™ 1.4 CTS sink test	R&S®VT-K367	2115.8612.02
HDMI™ 2.0 CTS sink test	R&S®VT-K368	2115.8629.02
HDMI™ 1.4 CTS source test	R&S®VT-K2367	2115.8635.02
HDMI™ 2.0 CTS source test	R&S®VT-K2368	2115.8641.02
HDMI™ options (300 MHz)		
HDMI™ TX 300 MHz	R&S®VT-B360	2115.7500.06
HDMI™ CTS sink test	R&S®VT-K365	2115.8312.02
HDMI™ RX 225 MHz	R&S®VT-B2360	2115.7616.06
HDMI™ RX 300 MHz	R&S®VT-B2361	2115.7639.06
HDMI™ CTS source test	R&S®VT-K2365	2115.8270.02
CEC tracer	R&S®VT-K2366	2115.8306.02
MHL options		
MHL RX/TX	R&S®VT-B2350	2115.7622.06
MHL RX PackedPixel	R&S®VT-B2351	2115.7645.06
MHL CTS system sink test	R&S®VT-K355	2115.8006.02
MHL CTS system source test	R&S®VT-K2355	2115.8012.02
CBUS tracer	R&S®VT-K2356	2115.8287.02
TDA options		
TMDS time domain analyzer	R&S®VT-B2380	2115.7597.06
HDMI™ type A TPA (plug)	R&S®VT-Z2385	2115.7668.02
HDMI™ CTS source test (Elec.)	R&S®VT-K2385	2115.8529.02
Analog options		
Analog A/V RX	R&S®VT-B2370	2115.7600.06
Component support	R&S®VT-K2371	2115.8258.02
AV analysis options		
Video analysis	R&S®VT-K2100	2115.8029.02
Video measurements	R&S®VT-K2101	2115.8264.02
A/V distortion analysis	R&S®VT-K2111	2115.8041.02
Audio analysis	R&S®VT-K2150	2115.8235.02
Speech quality measurement PESQ	R&S®VT-K2158	2115.8541.02
Listening quality analysis POLQA	R&S®VT-K2159	2115.8558.02

Designation	Type	Order No.
Broadcast modulator options		
Modulator options		
Broadcast TX modulator	R&S®VT-B600	2115.7522.06
Frequency extension 3 GHz	R&S®VT-K3083	2115.8335.02
Electronic attenuator 110 dB	R&S®VT-K3084	2115.8341.02
AWGN generator	R&S®VT-K1340	2115.8329.02
Extended I/Q Input	R&S®VT-K2600	2115.8358.02
Digital modulation systems		
DVB-T/DVB-H coder	R&S®VT-K601	2115.8106.02
DVB-C/ISDB-C/J.83/B coder	R&S®VT-K602	2115.8112.02
DVB-S/DVB-S2 coder	R&S®VT-K608	2115.8135.02
ISDB-T/ISDB-T _{SB} /ISDB-T _B coder	R&S®VT-K606	2115.8129.02
T-DMB/DAB coder	R&S®VT-K611	2115.8158.02
DTMB(GB20600-2006) coder	R&S®VT-K612	2115.8164.02
DIRECTV legacy modulation coder	R&S®VT-K609	2115.8141.02
CMMB coder	R&S®VT-K615	2115.8170.02
DVB-T2 coder	R&S®VT-K616	2115.8187.02
DVB-C2 coder	R&S®VT-K617	2115.8193.02
ATSC-M/H 8VSB coder	R&S®VT-K618	2115.8206.02
Analog modulation systems		
FM/RDS coder	R&S®VT-K670	2115.8212.02
ATV multistandard coder	R&S®VT-K695	2115.8229.02
Digital baseband		
TRP player	R&S®VT-K22	included in R&S®VT-B600
Basic stream library	R&S®LIB-K70	2116.9558.02
Extended SDTV library	R&S®LIB-K71	2116.9564.02
Extended HDTV library	R&S®LIB-K72	2116.9570.02
3D TV library	R&S®LIB-K73	2116.9587.02
T-DMB/DAB streams	R&S®LIB-K51	2116.9364.02
DAB+ streams	R&S®LIB-K53	2116.9387.02
ISDB-T _B streams	R&S®LIB-K54	2116.9393.02
CMMB streams	R&S®LIB-K55	2116.9406.02
ATSC and ATSC mobile DTV streams	R&S®LIB-K56	2116.9412.02
DVB-T2 MI streams	R&S®LIB-K57	2116.9429.02
EMC streams	R&S®LIB-K58	2116.9435.02
DMB streams France	R&S®LIB-K59	2116.9441.02
Customer-specific transport streams	R&S®DV-SCA	on request
Analog baseband		
Video generator	R&S®VT-K23	included in R&S®VT-B600
ATV video signals	R&S®LIB-K50	2116.9358.02
Customer-specific analog signals	R&S®ATV-SCA	on request

Service options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty, three years	R&S®WE3	
Extended warranty, four years	R&S®WE4	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with calibration coverage, three years	R&S®CW3	
Extended warranty with calibration coverage, four years	R&S®CW4	

Extended warranty with a term of one to four years (WE1 to WE4)

Repairs carried out during the contract term are free of charge ⁶. Necessary calibration and adjustments carried out during repairs are also covered. Simply contact the forwarding agent we name, your product will be picked up free of charge and returned to you in top condition a couple of days later.

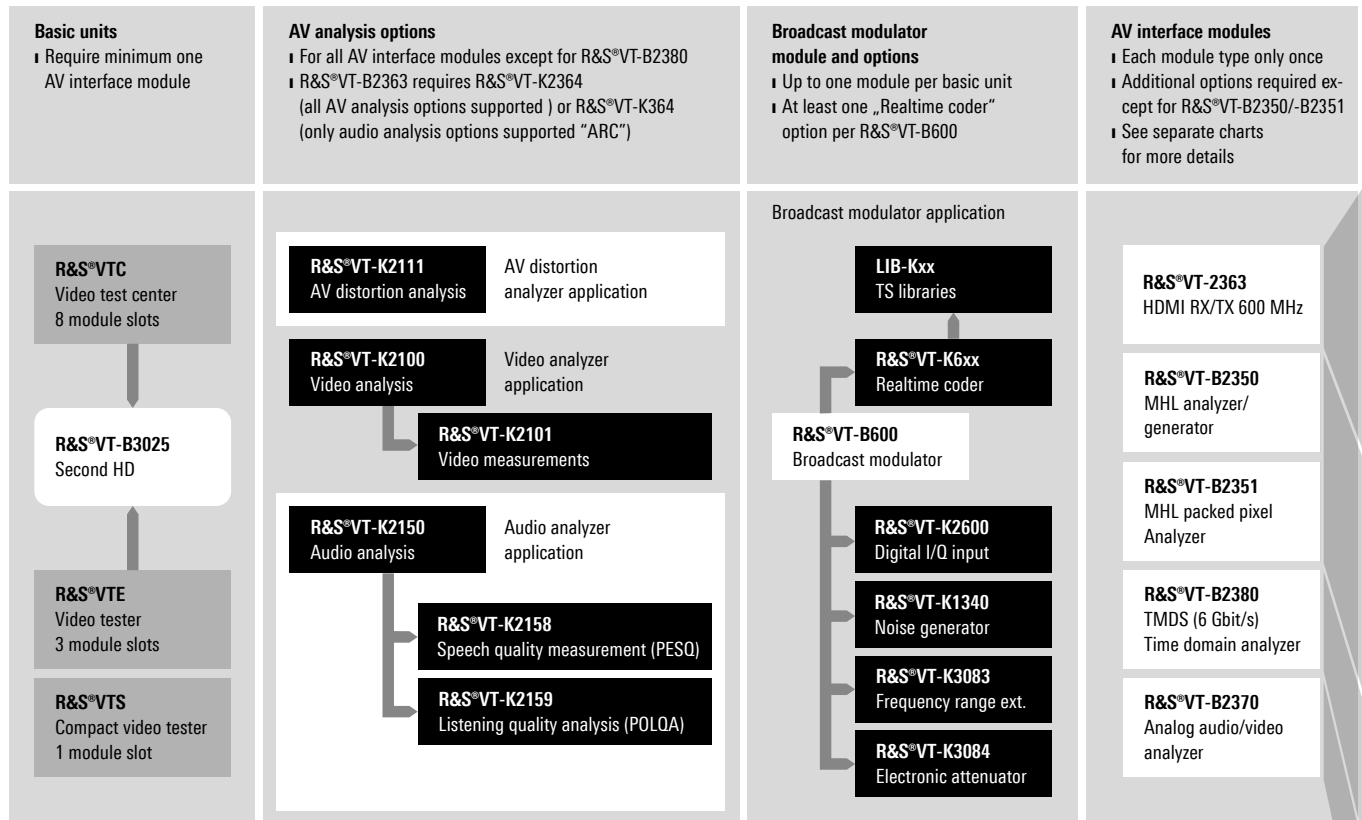
Extended warranty with calibration (CW1 to CW4)

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs ⁶ and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

For product brochure, see PD 3606.8143.12 and www.rohde-schwarz.com

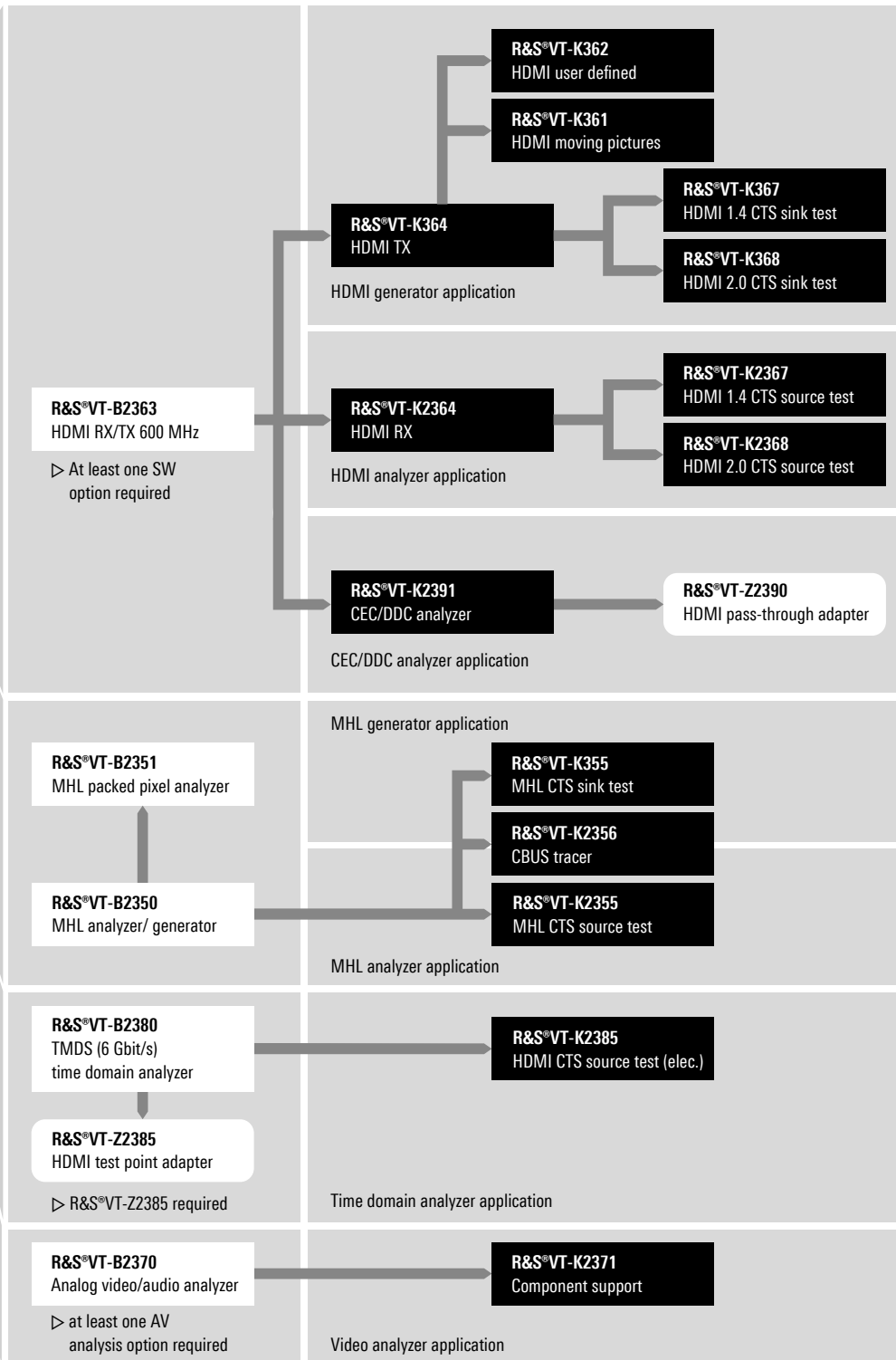
⁶ Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

Overview of base units and options



Legend

- Basic unit
- Module option
- Accessory or HW option
- SW option
- AVBrun option



Service that adds value

- ▶ Worldwide
- ▶ Local und personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

Rohde & Schwarz training

www.training.rohde-schwarz.com

Rohde & Schwarz customer support

www.rohde-schwarz.com/support

