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Make ideas real

R&S®PRISMON AUDIO/VIDEO CONTENT MONITORING AND MULTIVIEWER

Specifications

R&S®PRISMON
Monitoring Solutions

R&S®PRISMON
Multiviewer Solutions

Specifications | Version 25.00

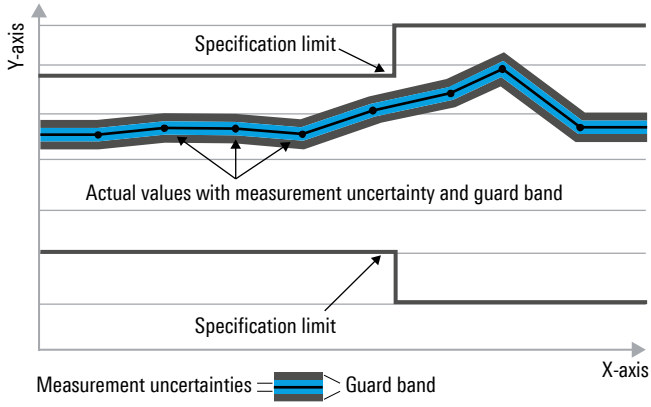
CONTENTS

Definitions

General
Product data applies under the following conditions:

- Three hours of storage at ambient temperature followed by 30 minutes of 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 <, ≤, >, ≥, ± 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.

In line with the 3GPP standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

All data quoted represent values valid at input and output interfaces of the device; data for internal processing may differ with respect to e.g. frame rate, resolution, bit-depth and sampling.

General data

R&S®PRM-BU110 base system – R&S®PRISMON BASE

Mechanical and electrical specifications

Mechanical specifications		
Dimensions		1 rack unit
Slots for optional interfaces		• 1 slot (high profile) for optional extension I/O card • 1 slot (low profile) for optional extension graphics card
Electrical specifications		
Power supply		100 V to 240 V AC, 50 Hz/60 Hz
Power consumption		max. 350 W
Redundant power supply		optional

Built-in interfaces

Network interfaces		• 2 × RJ-45 ports • 10/100/1000BASE-T

R&S®PRM-BU110 serves as platform for redundant license server only.

R&S®PRM-BU140 base system – R&S®PRISMON ULTRA

Mechanical and electrical specifications

Mechanical specifications		
Dimensions		1 rack unit
Slots for optional interfaces		• 1 slot (low profile), for optional extension graphics card • 1 slot (low profile), for optional extension I/O card
Electrical specifications		
Power supply		100 V to 240 V AC, 50 Hz/60 Hz
Power consumption		max. 550 W
Redundant power supply		optional

Built-in interfaces

Network interfaces		• 4 × RJ-45 ports • 10/100/1000BASE-T

R&S®PRM-BU230 base system – R&S®PRISMON PRIME X

Mechanical and electrical specifications

Mechanical specifications		
Dimensions		2 rack units
Slots for optional interfaces		• 7 slots (high profile), for optional extension I/O cards • 1 slot (low profile), for optional extension I/O cards
Electrical specifications		
Power supply		100 V to 240 V AC, 50 Hz/60 Hz
Power consumption		max. 750 W
Redundant power supply		optional

Built-in interfaces

Network interfaces		• 4 × RJ-45 ports • 10/100/1000BASE-T

For the complete mechanical, electrical and environmental specifications of the various base units, refer to each unit's dedicated specifications on the manufacturer's website (R&S®PRM-BU110/R&S®PRM-BU140/R&S®PRM-BU230 correspond with Dell PowerEdge R340/R440/R740). All servers support iDrac 9.

Processing capacity R&S®PRM-BU230

Uncompressed Video over IP inputs

Uncompressed inputs	**R&S®PRISMON PRIME X (R&S®PRM-BU230) with one R&S®PRM-B640 card**		**R&S®PRISMON PRIME X (R&S®PRM-BU230) with two R&S®PRM-B640 cards**	
Standard / **Resolution**	without SMPTE ST 2022-7	with SMPTE ST 2022-7	without SMPTE ST 2022-7	with SMPTE ST 2022-7
ST 2110 1080@25p/i	60	36	80	60
ST 2110 1080@30p/i	50	30	80	50
ST 2110 1080@50p	30	18	50	30
ST 2110 1080@60p	25	15	42	25
ST 2110 2160@50p	7	4	12	7
ST 2110 2160@60p	6	4	10	6
ST 2022-6 1080@25p/i	50	30	80	50
ST 2022-6 1080@30p/i	50	30	80	50
ST 2022-6 1080@50p	25	15	42	25
ST 2022-6 1080@60p	25	15	42	25

Following conditions apply:

- Operating the system above the presented values is valid if the specific configuration is approved by Rohde & Schwarz
- For each activated uncompressed multiviewer output, the overall input capacity needs to be lowered by two signals in the equivalent format
- For each activated compressed multiviewer output, the overall input capacity needs to be lowered, depending on the chosen codec and resolution; contact Rohde & Schwarz for details
- All values are not considering any advanced features such as HQ scaling, special analytics or scalable distributed multiviewing (SDM); if enabled, input capacity will be reduced
- Overall input capacity for mixed inputs can be determined by normalizing all signals to one common format, using following logic: 1 × UHD@p50/60 = 4 × HD@p50/60 = 8 × HD@25/30
- Maximum 80 uncompressed video inputs are supported per device
- Values are only valid for the latest server generations (TAZ 4.0)

Compressed Video over IP/ASI and SDI Inputs

Maximum video decoding capabilities for compressed/uncompressed signals (figures valid without streaming output)					
Standard	SMPTE ST 2022-2/ASI			NDI	SDI
Resolution	MPEG-2	H.264	H.265/HEVC	NDI	uncompressed
480@30p/I	99	99	60	60	24
576@25p/i	99	99	60	60	24
1080@25/30p/i	50	60	30	30	24
1080@50/60p	–	30	20	20	24
2160@50/60p	–	–	6	6	6

Following conditions apply:

- Operating the system above the presented values is valid if the specific configuration is approved by Rohde & Schwarz
- For each activated uncompressed multiviewer output, the overall input capacity needs to be lowered by two signals in the equivalent format
- For each activated compressed multiviewer output, the overall input capacity needs to be lowered, depending on the chosen codec and resolution; contact Rohde & Schwarz for details
- MPEG-2, H.264 and HEVC considered in distribution formats (4:2:0, 8 bit, max. 15 Mbit/s), contribution formats can reduce the inputs by 3
- Maximum 99 compressed video inputs are supported per device
- Values are only valid for the latest server generations (TAZ 4.0)

Optional bare-metal deployment

Recommended components for an optimized input/output performance	server model	Dell PowerEdge R440/R640/R740, HP ProLiant DL360 Gen10 or Cisco UCS C240 M5
	CPU	x86 CPU supporting MMX, SSE, SSE2, SSE3, SSSE3, SSE4, SSE4A, SSE4.1, SSE4.2, AVX and AVX2 instructions (1 or 2 Intel Xeon Gold 5218 or newer recommended)
	HDD	1 or 2 identical drives with at least 100 Gbyte capacity
	memory	16 Gbyte of identical memory modules evenly spread across all available memory channels
	network card	optional: 1 or 2 NVidia Mellanox ConnectX-5 Dual Port NICs (MCX516A-CCAT)
	graphic card	1 × NVidia VCQP1000V2-PB or NVidia VCNT1000-PB
	riser configuration	network card and graphical card require PCIe 3.0 × 16 slots

Optional components for R&S®PRM-BU140/R&S®PRM-BU230

Optional input interfaces

PRIOS-M SDI/ASI broadcast input card (R&S®PRM-B1000)		
Interface card options	requires 1 FH slot	
Physical connector and input format	for compressed (ASI)/uncompressed (SDI) video up to UHD with ancillary data and up to 16 embedded audio channels	• up to 2 × 3G-SDI/ASI video SFP (emSFP) receiver module • 1 × interface to breakout box
SDI/ASI BNC breakout box (R&S®PRM-B1100)		
Interfaces – physical connector and input format	for 8 × uncompressed SDTV with ancillary data and up to 16 embedded audio channels	• 8 × SD-SDI, 75 Ω BNC, 270 Mbit/s • 800 mV (V_{pp}) • in line with SMPTE ST 259M-C
	for 8 × uncompressed HDTV up to a resolution of 1080i with ancillary data and up to 16 embedded audio channels	• 8 × HD-SDI, 75 Ω BNC, 1485 Gbit/s, 1485/1001 Gbit/s • 800 mV (V_{pp}) • in line with SMPTE ST 292M
	for 8 × uncompressed HDTV up to a resolution of 1080p, each with ancillary data and up to 16 embedded audio channels or for uncompressed 2 × UHD-TV up to a resolution of 2160p via 4 quadrants	• 8 × 3G-SDI, 75 Ω BNC, 2970 Gbit/s, 2970 Gbit/s/1001 Gbit/s • 800 mV (V_{pp}) • in line with SMPTE 424M with level A or level B dual link (DL)
	for compressed video and audio in an MPEG-2 transport stream with ancillary data	• 8 × ASI, BNC, 75 Ω, 270 Mbit/s • 800 mV (V_{pp}) • in line with EN 50083-9
1 Gigabit Ethernet card (R&S®PRM-B600)		
Interface card options	requires 1 FH or HH slot	4 × 10/100/1000BASE-T via RJ-45 ports
10 Gigabit Ethernet card (R&S®PRM-B610)		
Interface card options	requires 1 FH or HH slot with 16 × PCIe lanes	2 × ports for SFP+ connections supporting 10GBASE-SR, 10GBASE-LR, and SFP+ copper direct attach physical media; card supplied without SFP modules (for specifications and compatibility of supported SFPs, see R&S®PRISMON manual)
100 Gigabit Ethernet card (R&S®PRM-B640)		
Interface card options	requires 1 FH or HH slot with 16 × PCIe lanes	2 × ports for QSFP28 connections supporting 100GBASE-SR, 100GBASE-LR, and QSFP+ copper direct attach physical media; card supplied without QSFP28 modules (for specifications and compatibility of supported QSFP28s, see R&S®PRISMON manual)

Optional output interfaces

Extension graphics card for multiviewer VideoWall output (R&S®PRM-B300)		
Available video output interfaces		• 1 × dual-link DVI-D • 1 × HDMI™ • dual display (HD) capable
Extension graphics card for multiviewer VideoWall output (R&S®PRM-B340)		
Available video output interfaces		4 × mDP

Hardware accessories population rules

Card / Platform	R&S®PRM-B1000, R&S®PRM-B1100 (8 × SDI/ASI)	R&S®PRM-B600 (4 × 1 Gbit Ethernet)	R&S®PRM-B610 (2 × 10 Gbit Ethernet)	R&S®PRM-B640 (2 × 100 Gbit Ethernet)
R&S®PRISMON ULTRA	–	≤ 1	≤ 1	≤ 1
R&S®PRISMON PRIME X	≤ 3	≤ 1	≤ 1	≤ 3

Video output card		
Card / Platform	R&S®PRM-B300	R&S®PRM-B340
R&S®PRISMON ULTRA	≤ 1	≤ 1
R&S®PRISMON PRIME X	≤ 1	≤ 1

Optional other components

Second redundant HDD (R&S®BU-Z213)		
Component options	requires 1 HDD bay	operates together with default HDD

Operating system

Base system		Debian Linux

Video and audio processing

IP input protocols

Protocols		
IPv4		IETF RFC 791
IGMP v1/v2/v3 multicast		• IETF RFC 1112 • IETF RFC 2236 • IETF RFC 3376
UDP		IETF RFC 768
RTP/RTCP		• IETF RFC 3550 • SMPTE ST 302M
	SMPTE ST 2022-2 protocol suite (TS over IP)	• SMPTE 2022-1 FEC (forward error correction) • SMPTE 2022-2 TS over IP (constant bit rate) • SMPTE 2022-3 TS over IP (variable bit rate) • selectable modes − TSoIP − TSoIP round-robin − TSoIP fail-over − T2MIoIP
	SMPTE ST 2022-6 protocol suite (SDI over IP) [1]	• SMPTE ST 2022-6 (video: YCbCr 10 bit, up to 1080p60 level A) • SMPTE ST 2022-7 • low latency
	SMPTE ST 2110 protocol suite	• SMPTE ST 2110-20 (video: YCbCr-4:2:2 up to 16 bit, up to 2160p60 [2]; YCbCr-4:4:4 up to 16 bit, up to 1080p60) • SMPTE ST 2110-30 (audio: 48 kHz) • SMPTE ST 2110-31 (PCM, compressed audio) • SMPTE ST 2110-40 • SMPTE ST 2022-7 [3] • low latency
	AMWA NMOS protocol suite	• AMWA NMOS IS-04 v1.3 • AMWA NMOS IS-05 v1.1
	OTT protocol suite	HLS, MPEG-DASH, MPEG-CMAF, HDS, Microsoft Smooth Streaming, RTMP, HbbTV, Icecast
NDI®	network device interface	NDI SDK v5.0.3 (video: YCbCr-4:2:0, 8 bit, audio: PCM, 48 kHz)
SRT	secure reliable transport (SRT)	SRT v1.4.3, downloader or receiver mode
FEC support		
Pro MPEG FEC COP 3 decoding		SMPTE 2022

[1] 3G-SDI level B dual link is not supported.

[2] Certain configurations may not be supported due to performance limitations of the respective underlying hardware platform.

[3] Not supported in connection with SMPTE ST 2110-40.

Supported IP based protocols versus Ethernet interface type

Protocol	SMPTE ST 2022-1/ SMPTE ST 2022-2/ OTT/NDI/SRT	SMPTE ST 2022-6	SMPTE ST 2022-7	SMPTE ST 2110-20/30/31/40	PTP
1 Gigabit Ethernet built-in	●	–	–	–	–
10 Gigabit Ethernet option [4]	●	–	–	–	–
100 Gigabit Ethernet option	●	●	●	●	● [5]
1 Gigabit Ethernet	●	–	–	–	–
10 Gigabit Ethernet	●	–	–	–	–
100 Gigabit Ethernet	●	●	●	●	●

Baseband SDI protocols

Protocols		
Inputs		• SD-SDI (SMPTE ST 259) • HD-SDI (SMPTE ST 292) • 3G-SDI (SMPTE ST 424, 425-1) • quad-link 3G-SDI (SMPTE ST 425-5)
Resolutions	SD-SDI (SMPTE ST 259)	576i50, 486i59.94
	HD-SDI (SMPTE ST 292)	720p50, 720p59.94, 720p60, 1080p23.98, 1080p24, 1080p25, 1080p29.97, 1080p30, 1080i50, 1080i59.94
	3G-SDI level A (SMPTE ST 424), 3G-SDI level B dual-link (SMPTE ST 425-1)	1080p50, 1080p60
	quad-link 3G-SDI (SMPTE ST 425-5)	2160p23.98, 2160p24, 2160p25, 2160p29.97, 2160p30, 2160p50, 2160p59.94, 2160p60

Baseband ancillary and VBI data

Audio data		
SD-SDI (SMPTE ST 259)	HANC data	support of 16 AES3 (PCM/non-PCM) channels, in line with SMPTE ST 272)
SMPTE ST 2022-6 (SDI over IP), HD-SDI (SMPTE ST 292), 3G-SDI (SMPTE ST 424, 425-1), Quad-link 3G-SDI (SMPTE 425-5)	HANC data	support of 16 AES3 (PCM/non-PCM channels, in line with SMPTE ST 299-1)
SMPTE ST 2110-30		• AES67 payload formats L16 and L24 at 48 kHz sampling rate • SMPTE ST 2110-30 conformance levels A and B
SMPTE ST 2110-31		• AES3 samples as AM824 payload at 48 kHz sampling rate • SMPTE ST 2110-31 conformance levels A and B

[4] 10 Gigabit Ethernet interface can be operated only in OTT/NDI/SRT or SMPTE ST 2022-1/2 mode.

[5] RTP-PTP offset measurement for SMPTE ST 2110 input.

Ancillary data		
SMPTE ST 2022-6 (SDI over IP), SD-SDI (SMPTE ST 259), HD-SDI (SMPTE ST 292), 3G-SDI (SMPTE ST 424, 425-1), Quad-link 3G-SDI (SMPTE ST 425-5) SMPTE ST 2110-40	VANC/HANC data	• AFD (SMPTE ST 2016-3) • payload identifier (SMPTE ST 352) • compressed audio metadata (SMPTE ST 2020/SMPTE RDD 6) • ANSI/SCTE 104 messages (SMPTE ST 2010) • time code (SMPTE ST 12-2) • VPS (in SMPTE ST 2031) • WSS (in SMPTE ST 2031) • teletext (in SMPTE ST 2031) • closed captions (CEA 708, SMPTE ST 334) • teletext subtitles (Free TV OP-47, SMPTE ST 2031) • program related metadata in SDI VANC (BBC white paper WHP 296 (revised July 2017))
VBI data		
SD-SDI (SMPTE ST 259)	VBI data	• WSS (ETSI EN 300294) • teletext (ETSI EN 300706) • teletext subtitles (ETSI EN 300706) • closed captions (CEA 608)

Video decoding and analysis

Video decoding [6]		
Codecs		• MPEG-2 main profile, main level (as specified in ETSI TS 101154) • MPEG-2 main profile, high level (as specified in ETSI TS 101154) • MPEG-2 422 profile, up to high level (as specified in ETSI TS 101154) • H.264/AVC (8 bit) high profile at level 4.2 (as specified in ETSI TS 101154) • H.264 high 422 profile (422 8 bit and 10 bit) at level 4.2 (as specified in ETSI TS 101154) • H.265/HEVC main profile/main tier • H.265/HEVC main10 profile (8 bit and 10 bit)/main tier incl. 4:2:0 • J2K • TICO
Resolutions	horizontal × vertical	• up to 1920 × 1080 pixel for MPEG-2, H.264, J2K, TICO • up to 3840 × 2160 pixel
Frame/field rates		23.98/24/25/29.97/30/50/59.94/60
Operational modes		• continuous • periodic thumbnails (up to HD) • round-robin (TSoIP and OTT inputs only)
Included additional component decoding		• up to 8 audio tracks • up to 6 sub-titles including language icon • 1 teletext • closed captions

[6] MPEG-2 corresponds to H.262/MPEG-2 part 2; H.264 corresponds to MPEG-4 part 10 (AVC).

Video analysis		
Determination of video frames with low luminance level (video black)		• timeout configurable per service • configurable threshold for the min. expected level of luminance
Determination of lost video signal		timeout configurable per service
Determination of video codec		• codec type from set of supported codecs • set-actual comparison for parameters of codec (template monitoring)
Determination of content mismatch	max. delay of content to be compared	60 s

Audio decoding and analysis

Audio decoding		
Codecs		• MPEG-1 audio layer II • MPEG-2 audio layer II • AAC • HE-AAC • ATSC A/52 (AC-3), (E-AC-3) • Dolby Digital™ • Dolby Digital Plus™ • Dolby E™ • VORBIS
Supported channels	depending on codec	mono, stereo, 2.1, 3.1, 4.0, 4.1, 5.0, 5.1, 7.1
Supported bit rates	depending on codec	32/40/48/56/64/72/80/88/96/104/112/120/128/144/160/176/192/200/208/216/224/232/240/248/256/272/288/304/320/336/352/368/384/400/448/512/576/640/704/768/832/896/960/1008/1024 kbit/s
Supported sampling frequency		48 kHz
Audio analysis		
Determination of audio samples with low audio level (audio silence)		• timeout configurable per service • threshold configurable in –0.1 dB steps in relation to the max. level 0 dBFS
Determination of audio samples with high audio level (audio overload)		• timeout configurable per service • threshold configurable in –0.1 dB steps in relation to the max. level 0 dBFS
Determination of audio samples with constant audio level (audio constant)		• timeout configurable per service • threshold configurable in –0.1 dB steps in relation to the max. level 0 dBFS
Determination of lost audio signal		timeout configurable per service
Determination of audio codec		• codec type from set of supported codecs • set-actual comparison for parameters of codec (template monitoring)
Loudness monitoring		• in line with EBU R128 and ITU-R BS.1770L • monitoring of program loudness, short-term loudness, momentary loudness, loudness range and true peak level • based on EIT data events or without
Detection of out of phase stereo channels (phase correlation)		• timeout configurable per service • threshold configurable in 1 % steps with a range from –100 % (phase-inverted) to 100 % (in-phase)

Data decoding and analysis

Data decoding		
Teletext decoding		• DVB teletext (ETSI TS 300472) • EBU teletext (ETSI EN 300706): normal pages, country and network identification (ETSI TS 101231 (2019-04)) • support of subpages
Subtitle decoding		• DVB subtitles (ETSI EN 300743) • EBU teletext subtitles (ETSI EN 300706): subtitle pages, country and network identification (ETSI TS 101231 (2019-04))
Determination of lost data signal		timeout configurable per service
Closed caption decoding		visualization (EIA-608 and EIA-708)
Parental rating		status icon and limit monitoring
Running state		status icon
SCTE 35/SCTE 104		logging on trigger
	splice commands	• splice_null() • splice_insert()
	splice time	• splice_time()
	splice descriptors	• splice_descriptor() • avail_descriptor() • DTMF_descriptor() • segmentation_descriptor()
HDR monitoring	only supported for HEVC/SMPTE 2110	• status icon • metadata − HDR display primaries X0, Y0, X1, Y1, X2, Y2 − HDR white point X, Y − HDR display mastering luminance min/max − HDR transfer characteristics IDC − color primaries − transfer characteristics VUI − matrix coefficients − ST2110 TCS − ST2110 colorimetry − ST2110 range

Video image quality monitoring

Data decoding		
Referenced based video quality monitoring methods	maximum resolution: UHD/4K	• LiveQM: live quality comparison of a signal video stream to a reference video stream having equal resolution and frame rate • PSNR, SSIM and SSIM MOS value for any decoded input signal • side-by-side visualization • A/V delay measurement
Reference-free video quality monitoring methods	resolution: 1080i/p, 720i/p; codec: H.264/MPEG-4 AVC	• reference-free estimation of PSNR and MOS values for decoded input signal • alarm triggers via settable thresholds for estimated PSNR and MOS values
	resolution: all; codec: H.261, MPEG-1 Part 2, H.262/MPEG-2 Part 2, H.263, MPEG-4 Part 2, H.264/MPEG-4 AVC	• macroblock detection for decoded input signal • alarm trigger via settable threshold for estimated blockiness value
Number of simultaneously executed quality monitoring engines	maximum (only on R&S®PRISMON ULTRA and R&S®PRISMON PRIME X platforms)	• 8 simultaneously executed quality monitoring engines up to 1080p60 • 2 simultaneously executed quality monitoring engines up to 2160p60
Delay of reference versus degraded video signal		max. 120 s
Delay of reference versus degraded audio signal		max. 2 s
Export of exact measurement data	CSV export	frame accurate results for last 3600 s

Video content monitoring

Video content compare		
Reference based picture comparison	maximum resolution: HD	content comparison of two video streams possibly having different resolutions and frame rates
Number of simultaneously executed monitoring engines		max. service count on respective platform
Delay of reference versus degraded video signal		max. 60 s
Video black		
Determination of video frames with low luminance level (video black)	maximum resolution: UHD/4K	detection of video going to black screen
Number of simultaneously executed monitoring engines		max. service count on respective platform

OTT source monitoring

Data decoding		
Multiprotocol download	protocols	• HLS (HTTP live streaming, draft-pantos-http-live-streaming version 19) • Microsoft Smooth Streaming ([MS-SSTR], rev 6.0, 6/30/2015) • DASH (ISO_IEC_23009-1_2014 – number and time based) • CMAF (ISO/IEC 23000-19:2018) • HDS (Adobe flash video file format specification version 10.1) • RTMP • HbbTV • Icecast
	codecs	• HLS: H.264, HEVC, AAC, AC3, E-AC3 • Microsoft Smooth Streaming: H.264, AAC • DASH: H.264, HEVC, AAC, AC3, E-AC3 • CMAF: H.264, HEVC, AAC • HDS: H.264 and AAC • RTMP: H.264 and AAC • HbbTV: H.264 and AAC • Icecast: Ogg Vorbis, Ogg Opus, MP3 and AAC
	decryption	• DASH: CENC • Microsoft Smooth Streaming, HLS: Microsoft PlayReady™ • Irdeto: authentication using AUTH0 or MITREid • VGC • Widevine • custom CPIX • HLS: AES-128 • HLS: SAMPLE-AES • gzipped manifest files
	subtitles	• HLS: WebVTT • DASH: W3C TTML text, SMPTE-TT base64 encoded PNG image • CMAF: W3C TTML text, SMPTE-TT base64 encoded PNG image • Microsoft Smooth Streaming: W3C TTML text, SMPTE-TT base64 encoded PNG image
	digital program insertion	HLS: SCTE 35 (draft-pantos-hls-rfc8216bis-00; subset)
Multiprotocol upload sniffing	protocols	• HLS (HTTP live streaming, draft-pantos-http-live-streaming version 19) • DASH (ISO_IEC_23009-1_2014 – number and time based) • CMAF (ISO/IEC 23000-19:2018) • RTMP • Icecast
	codecs	• HLS: H.264, HEVC, AAC, AC3, E-AC3 • DASH: H.264, HEVC, AAC, AC3, E-AC3 • CMAF: H.264, HEVC, AAC • HDS: H.264 and AAC • RTMP: H.264 and AAC • Icecast: Ogg Vorbis, Ogg Opus, MP3 and AAC
Multiprotocol video-on-demand download		HLS

DVB-T2 source monitoring

Data decoding		
T2-MI decode		• extraction of TS from T2-MI data stream • PID selection

Transport layer monitoring

MPEG-TS monitoring

Supported packet size		188 byte
TR 101290 V1.3.1 (only available with constant bit rate (CBR) transport streams)		
TR 101290 V1.3.1 – first priority		
TS synchronization	2	loss after packets
	7	lock after packets
Sync byte		error
PAT	1 ms to 100 s	upper repetition period
		table ID
		scrambled
Continuity count		• discontinuous packet order • packet occurs more than twice • packet lost
PMT	1 ms to 100 s	upper repetition period
		scrambled
PID distance	1 ms to 100 s	video, upper period
	1 ms to 100 s	audio, upper period
	1 ms to 100 s	data, upper period
TR 101290 V1.3.1 – second priority		
Transport		error indicator
CRC		CRC error in PSI/SI tables: PAT, CAT, PMT, NIT, BAT, SDT, EIT, TOT
PCR discontinuity	1 ms to 100 s	upper limit
PCR repetition	1 ms to 100 s	upper period
PCR jitter	1 ns to 100000 ns	upper limit
	profile	MGF3 (1 Hz)
	test mode	accuracy [7]
PTS repetition	1 ms to 100 s	upper period
CAT	1 ms to 100 s	missing
		table ID

[7] Recommended by TR 101290 for monitoring.

TR 101290 V1.3.1 – third priority		
SI repetition	1 ms to 100 s	PAT, lower period
	limit is equal to limit of first priority PAT	PAT, upper period
	1 ms to 100 s	CAT, lower period
	1 ms to 100 s	CAT, upper period
	1 ms to 100 s	PMT, lower period
	limit is equal to limit of first priority PMT	PMT, upper period
	1 ms to 100 s	NIT ACTUAL, lower period
	1 ms to 100 s	NIT ACTUAL, upper period
	1 ms to 100 s	NIT OTHER, lower period
	1 ms to 100 s	NIT OTHER, upper period
	1 ms to 100 s	SDT ACTUAL, lower period
	1 ms to 100 s	SDT ACTUAL, upper period
	1 ms to 100 s	SDT OTHER, lower period
	1 ms to 100 s	SDT OTHER, upper period
	1 ms to 100 s	BAT, lower period
	1 ms to 100 s	BAT, upper period
	1 ms to 100 s	EIT ACTUAL PF, lower period
	1 ms to 100 s	EIT ACTUAL PRESENT, upper period
	1 ms to 100 s	EIT ACTUAL FOLLOWING, upper period
	1 ms to 100 s	EIT OTHER PF, lower period
	1 ms to 100 s	EIT OTHER PRESENT, upper period
	1 ms to 100 s	EIT OTHER FOLLOWING, upper period
	1 ms to 100 s	RST, lower period
	1 ms to 100 s	RST, upper period
	1 ms to 100 s	TDT, lower period
	1 ms to 100 s	TDT, upper period
	1 ms to 100 s	TOT, lower period
	1 ms to 100 s	TOT, upper period
	1 ms to 100 s	AIT, lower period [8]
	1 ms to 100 s	AIT, upper period [8]
NIT ACTUAL	limit is equal to limit of SI repetition	repetition, lower period
	limit is equal to limit of SI repetition	repetition, upper period
		table ID
NIT OTHER	limit is equal to limit of SI repetition	repetition, lower period
	limit is equal to limit of SI repetition	repetition, upper period
SDT ACTUAL	limit is equal to limit of SI repetition	repetition, lower period
	limit is equal to limit of SI repetition	repetition, upper period
		table ID
SDT OTHER	limit is equal to limit of SI repetition	repetition, lower period
	limit is equal to limit of SI repetition	repetition, upper period
EIT ACTUAL	limit is equal to limit of SI repetition	PF repetition, lower period
	limit is equal to limit of SI repetition	present repetition, upper period
	limit is equal to limit of SI repetition	following repetition, upper period
		table ID
EIT OTHER	limit is equal to limit of SI repetition	PF repetition, lower period
	limit is equal to limit of SI repetition	present repetition, upper period
	limit is equal to limit of SI repetition	following repetition, upper period
EIT PRESENT/FOLLOWING		section missing
RST	limit is equal to limit of SI repetition	lower period
	limit is equal to limit of SI repetition	upper period
		table ID
TDT	limit is equal to limit of SI repetition	lower period
	limit is equal to limit of SI repetition	upper period
		table ID

[8] Measurements are additional measurements provided on top of TR 101290 V1.3.1 and thus lack a priority class. They were inserted close to related TR 101290 V1.3.1 measurements.

AIT	limit is equal to limit of SI repetition	lower period [9]
	limit is equal to limit of SI repetition	upper period [9]
Unreferenced PID	1 ms to 10 s	waiting period after change in PMT or CAT
DVB timing		
Time and date table (TDT)	0 s to 10000 s	alarm TDT offset between signaled time and local time
Time offset table (TOT)	0 s to 10000 s	alarm TOT offset between signaled time and local time
Digital program insertion		
SCTE 35	protocol	SCTE 35 2017 (subset)
	splice commands	• splice_null() • splice_insert()
	splice time	• splice_time()
	splice descriptors	• splice_descriptor() • avail_descriptor() • DTMF_descriptor() • segmentation_descriptor()
Adaptive streaming		
Adaptive transport streaming	protocol	CableLabs® OC-SP-EBP-I01-130118
Encoding boundary point (ATS-EBP)	error code	• PMT EBP descriptor missing/invalid • PMT scte_adaptation_field_data_descriptor missing • private adaptation field invalid • EBP invalid/timeout

Recording

Incident recording		
Recording instances		10
Maximum parallel recordings		4
Algorithm		event-triggered recording of sliding-window audio/video segments to hard disk
Sliding-window configurable parameters		• pre-buffer time • post-buffer time • rearm time
Input	type	• TS • OTT
Capture	mode	recording of single input triggered by configurable event type(s)
	trigger	• manually • Boolean logic encoded combination of event types (status, black image, still image)
File format		original container including metadata
File storage		system hard disk

[9] Measurements are additional measurements provided on top of TR 101290 V1.3.1 and thus lack a priority class. They were inserted close to related TR 101290 V1.3.1 measurements.

Multiviewer

General capabilities

Design		
Available service tile preset types		• video, teletext, radio, quality, waveform, status, studio • user customizable tile presets • storage/retrieval of up to 16 tile presets (via REST-API no limits)
Layout		• each tile freely positionable • selectable predefined sizes per service tile • aspect ratio16:9, 4:3 • aspect ratio flipable • layout designer
Tile modes		• continuous • periodic thumbnails • round-robin of services • penalty box • tile editor
Number of tiles per screen		max. 99
Number of screens		max. 8
Video visualization		
Aspect ratio handling		• automatic scaling to correct aspect ratio • support of dynamic aspect ratio changes
Audio visualization		
Total number of simultaneously visualized audio tracks		• up to 8 audio tracks per service tile • up to 8 audio channels per audio track
Audio meter scale	total scale	0 dBFS to –55 dBFS (configurable)
	red area	0 dBFS to –9 dBFS (configurable)
	yellow area	–9 dBFS to –20 dBFS (configurable)
	green area	–20 dBFS to –55 dBFS (configurable)
Peak indicator		• sample peak program meter • decay rate of peak indicator: 12 dB/s
RMS indicator		• 0 dBFS for full-scale sine wave • integration time: 80 ms for 48 kHz
Scale type		• uncompressed (dBFS) • compressed (dBFS) standard IEC 60268-18 Annex B

Metadata visualization		
Displayed metadata for tiles		• EIT present/following data and progress • service name • aspect ratio • codecs • video resolution • video bit rate • video PID • audio codec • audio language descriptor • audio PID • subtitle status icon • subtitle language descriptor • subtitle text • teletext status icon • parental ration icon • running state icon • deviation state icon • closed caption state icon • HDR status icon • A/V delay bar • A/V delay value • OSD error information • AIT state icon • DSMCC state icon • data rate • packet loss rate per minute • RTP-PTP offset • 2022-7 connection status • VITC/LTC timecodes with/without frame count • custom monitoring values
Dynamic system and description tiles		• up to 36 static text, picture tiles or dynamic text • up to 10 clocks • up to 10 graphs for displaying bit rates, PSNR or SSIM information • up to 16 logbook messages • up to 10 counters (increment or decrement)
UMD/tally visualization		
Protocol		TSL UMD protocol (over UDP/IP), versions 3.1, 4.0 and 5.0
Display		2 tallies and 1 text element (properties vary depending on protocol)

Scalable distributed multiviewer

Display of input sources from various R&S®PRISMON units within the proxy network	requires R&S®PRM-B610 or R&S®PRM-B640 for video proxy network	• connects up to 36 remote R&S®PRISMON units and displays their input sources • automated scaling of resolutions depends on tile size

HDMI™/DVI output

Resolution		
Frame size/frame rate in frames/s	requires R&S®PRM-B300 extension graphics card	• mode HD clone: 1080p25/29.97/30/50/59.94/60 identical on HDMI™ and DVI-D interfaces cloned from single multiviewer view • mode HD extended: 1080p25/29.97/30/50 separately on HDMI™ and DVI-D interfaces from different multiviewer views • mode UHD: 2160p25 on HDMI™ interface (DVI-D interface disabled)
		encoding: RGB, 8 bit

Mini-DisplayPort (mDP) output

Resolution		
Frame size/frame rate in frames/s	requires R&S®PRM-B340 extension graphics card	1080p25/29.97/30/50/59.94/60 and 2160p25/29.97/30/50/59.94/60 separately on 4 mDP interfaces from different multiviewer views; encoding: RGB, 8 bit; Note: 2160p50/59.94/60 only functional for the newest server generations

Streaming output

Transport protocols		
IPv4		IETF RFC 791
UDP		IETF RFC 768
RTP/RTCP		IETF RFC 3550
SRT		server or upload mode
Output views		
Maximum		8 [10]
Output modes		
TS over IP and SRT		
Protocols		SMPTE ST 2022-2 MPEG single program transport stream (SPTS) ISO/IEC 13818-1
Video codecs	MPEG-2	• MPEG-2 main profile, main level (as specified in ETSI TS 101154) • 1 Mbit/s to 15 Mbit/s • 576p25/29.97/30/50/59.94/60
	H.264/AVC	• H.264/AVC (as specified in ETSI TS 101154) • 1 Mbit/s to 15 Mbit/s • 576p25/29.97/30 • 720p25/29.97/30 • 1080p25/29.97/30/50/59.94/60 • 2160p25/29.97/30
Audio codecs	MP2	• up to 2 channels per view (stereo downmix, max. on 4 views) • 48 kHz
SDI over IP		
Protocols		• SMPTE ST 2022-6 • SMPTE ST 2022-7
Video codecs	uncompressed	• 1080p25/29.97/30/50/59.94/60 • YCbCr-4:2:2 10 bit
Audio codecs	uncompressed	• up to 2 channels per view (stereo downmix) • 48 kHz linear PCM, 24 bit (SMPTE ST 299-1)

[10] Depending on platform choice and actual system load.

SMPTE ST 2110		
Protocols		• SMPTE ST 2110-20 • SMPTE ST 2110-21 (type W) • SMPTE ST 2022-7 • SMPTE ST 2110-30
Video codecs	uncompressed	• 1080p25/29.97/30/50/59.94/60 • 2160p25/29.97/30 • YCbCr-4:2:2 10 bit, PTP sampled • packaging modes [11]: GPM “standard UDP size limit”, BPM and GPM no continuation “equal sized packets without line continuation”
Audio codecs	uncompressed	• up to 2 channels per view (stereo downmix, max. on 4 views) • 48 kHz, 24 bit
OTT		
Protocols		HLS, MPEG-DASH, MPEG-CMAF, HDS, Microsoft Smooth Streaming, RTMP
Video codecs	H.264	• 240p25 • 576p25 • 720p25 • 1080p25
Audio codecs	audio not supported	
NDI		
Video		• 1080p25/29.97/30/50/59.94/60 • 2160p25/29.97/30/50/59.94/60
Audio		• PCM • up to 2 channels per view (stereo downmix, max. on 4 views)

[11] Can be used for receivers that are not fully ST 2110-20 compliant with respect to packaging formats. The block packaging mode (BPM) is a subset of the general packaging mode (GPM).

Operation and management

Application HMI

Web based user interface		
Browser support	supported web browsers	• Firefox 104 or higher • Chrome 105 or higher
	recommended screen resolution	1920 × 1080 pixel or higher
Logbook	number of stored messages	up to 10 000 messages
	export format	CSV export

Application multiviewer control center (MCC)

Web based user interface		
Browser support	supported web browsers	• Firefox 104 or higher • Chrome 105 or higher
	recommended screen resolutions	1920 × 1080 pixel or higher
Device management		
Functions		• device management • room builder • scenario builder • scenario loader • tile editor • mosaic editor • mosaic manager
Dashboard information per device		• administrative name • host name • HDD free space CPU load • memory load • NTP/PTP sync state • software version • mosaic preview • device alerts
System management		
Functions		• user management • database management (backup/restore) • license management • REST-API management
Room configuration		
Creation of physical monitor layout per room		drag and drop from list of predefined types of monitors, rotatable
Predefined monitor types		• large monitor • medium monitor • small monitor
Scenario configuration		
Creation of layout per monitor per room		selection from list of predefined tile layouts
Predefined tile layouts		• 2 × 2 • 3 × 3 • 4 × 3 • 4 × 4 • custom layouts
Tile configuration		(de)select input source
Needed licenses		
Multiviewer control center output view, single license	R&S®PRM-KMCCV	one single R&S®PRM-KMCCV per configurable view
Multiviewer control center dashboard, instance license	R&S®PRM-KMCCD	one instance R&S®PRM-KMCCD per MCC dashboard instance

User management		
User management functions		• add/delete/edit • reset password • (de)activate • user rights
Privileges configurable per user		add/remove/edit: • configuration • rooms • mosaic • scenario edit • scenarios load • user management
REST-API		
Access management		token based (management options: activate/deactivate/reset)
Functions		• get all available scenarios • load a dedicated scenario

Application monitoring and notification

SNMP support		
SNMP GET		SNMP v2c (IETF RFC 1441 and following)
SNMP TRAP		• SNMP v2c (IETF RFC 1441 and following) • up to three trap sinks
Email support		
Email notification	send alert and alarm information via email to named recipients	RFC 2821
MQTT support		
Client mode	push monitoring and configuration values to an external broker	MQTT v3.1 (v3.1.1 client library)

System management

Base system		
Remote device monitoring		SNMP v1, v2c (IETF RFC 1441 and following)
Remote maintenance		• web: configuration of services and software upgrades • remote control and automation API (REST-API)
Time synchronization		
NTP		NTP v3 (RFC 1305)
PTP [12]		• IEEE 1588-2008 in the role of end station • RTP-PTP offset measurement for SMPTE ST 2110 input • hybrid end-to-end mode • configurable parameters − PTP domain (max. 4) − delay − DSCP event message − DSCP general message − hybrid delay mechanism
Software		
Configuration and version management		• import/export system configuration to file • software field-upgradeable via web UI • support of dual software images (only with hardware based deployment)
License management		• via license server (deployment: colocated or standalone) • support of floating licenses (dynamic sharing of licenses between instances of system)
Interoperability		
Discovery and registration		AMWA NMOS IS-04 v1.3
Device connection management		AMWA NMOS IS-05 v1.1

Virtualization/cloud hypervisor support

Compatibility		
VMware	VMware ESXi 7.0.1 or higher	provision as OVF image
KVM	KVM on Ubuntu 16.04 LTS or higher	provision as QEMU image

Note: Hypervisor hardware requires Intel Sandy Bridge or compatible CPU with 64-bit extensions; MMX, SSE, SSE2, SSE3, SSSE3, SSE4.1, SSE4.2, POPCNT, AVX, AES and PCLMUL instruction set support.

[12] PTP only available with 100 Gigabit Ethernet card (R&S®PRM-B640) installed.

Ordering information

Designation	Type	Order No.
System		
R&S®PRISMON system	R&S®PRM-SYSTEM	2119.7140K02/K03
Hardware and options		
Hardware platform base units		
R&S®PRISMON BASE base unit [13]	R&S®PRM-BU110	2119.6989.02
R&S®PRISMON ULTRA base unit	R&S®PRM-BU140	2119.7010.02
R&S®PRISMON PRIME X base unit	R&S®PRM-BU230	2119.7056.02
Front panel R&S®PRM-BU1XX generation 2	R&S®BU-ZFP1	2119.7404.02
Front panel R&S®PRM-BU2XX generation 2	R&S®BU-ZFP2	2119.7410.02
Hardware accessories		
Graphics card		
Extension graphics card, for VideoWall output	R&S®PRM-B300	2119.7633.02
Extension graphics card, for VideoWall mDP output, up to 4 × 4K	R&S®PRM-B340	2119.7162.02
I/O cards		
PRIOS-M SDI/ASI broadcast input card	R&S®PRM-B1000	2119.7740.02
8 × SDI/ASI BNC interface breakout box, for PRIOS-M input card	R&S®PRM-B1100	2119.7756.02
4 × 1 Gigabit Ethernet card	R&S®PRM-B600	2119.7656.02
2 × 10 Gigabit Ethernet card (without SFP modules)	R&S®PRM-B610	2119.7640.02
2 × 100 Gigabit Ethernet card (without QSFP28 modules)	R&S®PRM-B640	2119.7585.02
Mounting components		
Base unit (1 RU) rackmount rail kit (Dell), for R&S®PRM-BU110 generation 2	R&S®BU-Z705	2119.9671.02
Base unit (1 RU) rackmount rail kit (Dell), for R&S®PRM-BU140 generation 2	R&S®BU-Z706	2119.9688.02
Base unit X (2 RU) rackmount rail kit (Dell)	R&S®BU-Z708	2119.7685.02
Secondary power supplies		
Second redundant power supply, for R&S®PRM-BU110	R&S®BU-Z110	2119.7704.02
Second redundant power supply, for R&S®PRM-BU140	R&S®BU-Z112	2119.7727.02
Second redundant power supply, for R&S®PRM-BU230	R&S®BU-Z111	2119.7710.02
Secondary hard disks		
Second redundant HDD, for R&S®PRM-BU110/ R&S®PRM-BU140/R&S®PRM-BU230 generation 2	R&S®BU-Z213	2119.9571.02
Software and options		
System software dongle		
R&S®PRISMON system license dongle	R&S®PRM-DONGLE	2119.7110.02
R&S®PRISMON system license dongle, floating	R&S®PRM-DNGL-FL	2119.7110.03
Core software license		
R&S®PRISMON software instance, extended core license	R&S®PRM-KXCORE	2119.8681.02 [14]
Input, source signal types and basic monitoring		
Broadcast IP source, instance license	R&S®PRM-KBIPS	2119.8698.02 [14]
OTT source, instance license	R&S®PRM-KOTTS	2119.8700.02 [14]
SDI/ASI, instance license	R&S®PRM-KSDIS	2119.8717.02 [14]
Scalable distributed multiviewer, instance license	R&S®PRM-KSDMV	2119.8781.02 [14]
Extended source signal monitoring and analysis		
Extended source signal monitoring and analysis, instance license	R&S®PRM-KEXSM	2119.8723.02 [14]
Processing, service decoding and basic analysis		
Video thumbnail (up to HD)/pure-audio decoder and analysis, instance license	R&S®PRM-KVTAD	2119.8730.02 [14]
Video decoding and continuous analysis, single license	R&S®PRM-KSVDC	2119.8746.02 [14]
Extended service decoding		
TICO decoder, single license	R&S®PRM-KTICOS	2119.8475.02 [14]

[13] R&S®PRM-BU110 serves as platform for redundant license server only.

[14] For systems with redundant license server, the order number of the footnoted software license options ends in ".51" instead of ".02".

Designation	Type	Order No.
Advanced service analysis		
Video live quality measurement (LiveQM), instance license	R&S®PRM-KVLQM	2119.8523.02 [14]
Video content compare, instance license	R&S®PRM-KVCC	2119.8530.02 [14]
Incident recording, instance license	R&S®PRM-KIREC	2119.8669.02 [14]
Output, multiviewer formats		
VideoWall: multiviewer mosaic view output, single license	R&S®PRM-KVWMMO	2119.8752.02 [14]
Multiviewer control center (MCC)		
Multiviewer control center dashboard, instance license	R&S®PRM-KMCCD	2119.8775.02 [14]
Multiviewer control center output view, single license	R&S®PRM-KMCCV	2119.8769.02 [14]
Multiviewer control center extension image	software only image [15]	2119.6995.00
Virtualization/cloud/bare-metal options		
Hypervisor image		
R&S®PRISMON hypervisor image, for VMware	software only image [15]	2119.9013.00
R&S®PRISMON hypervisor image, for KVM	software only image [15]	2119.9065.00
Bare-metal image		
R&S®PRISMON software deploying image	software only image [15]	2119.7879.00

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

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