

**ROHDE & SCHWARZ**

Make ideas real



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

## Specifications

Specifications | Version 26.00



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# Definitions

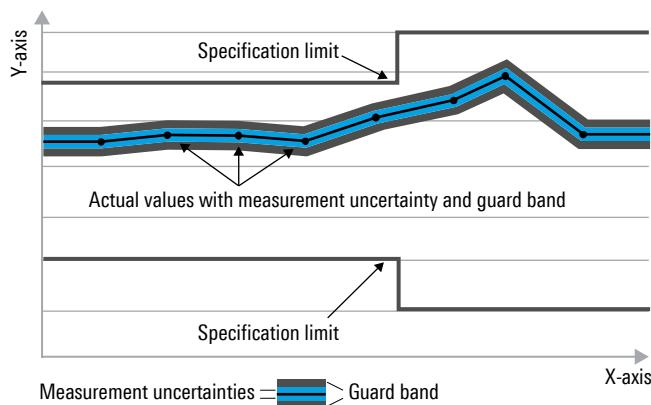
## General

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  $<$ ,  $\leq$ ,  $>$ ,  $\geq$ ,  $\pm$  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.

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 (Msamples/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msamples/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®PRISMON software

#### Bare-metal deployment

Recommended components for an optimized input/output performance	server model	Dell PowerEdge R440/R640/R740, HP ProLiant DL360 Gen10, Cisco UCS C240 M5 or Lenovo SR655 v3
	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) or AMD Epyc 9354
	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 or MCX556A-EDAT)
	graphic card	1 x NVidia VCQP1000V2-PB or NVidia VCNT1000-PB
riser configuration		network card and graphical card require PCIe 3.0 x 16 slots

#### Virtualization/cloud deployment

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.

#### Processing capacity R&S®PRISMON software

Each installation of R&S®PRISMON software theoretically supports the following maximum amount of video inputs and multiviewer output screens, no matter if running on R&S®PRM-BU230 base systems, bare-metal deployment on COTS hardware or virtualized/cloud deployment.

Design		
Number of inputs		80 (max.)
Number of multiviewer screens		8 (max.)
Number of tiles per multiviewer screen		99 (max.)

**Note:** These limitations are defined by the software framework. The useable capacity of an installation of the R&S®PRISMON software depends on the underlying hardware or hypervisor environment and the various performance requirements of each individual input and output flavor. For bare-metal deployments on third-party COTS servers and hypervisors, those need to be evaluated on a case-by-case basis. Ask Rohde & Schwarz to consult and assist this process.

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

### Mechanical and electrical specifications

<b>Electrical specifications</b>	
Power supply	220 V to 240 V AC, 50 Hz/60 Hz
Power consumption	1100 W (max.), titanium-level PSU
Redundant power supply	included
<b>Mechanical specifications</b>	
Slots for optional interfaces	8 slots (6 x FL, 2 x HL), for optional extension I/O cards
Dimensions	2 rack units

### Built-in interfaces

Network interfaces	4 x RJ-45 ports, supporting 1GBASE-T or 10GBASE-T
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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-BU230, TAZ 5.0 corresponds with Lenovo SR655 V3 servers). All servers support XClarity 2.

### Processing capacity R&S®PRM-BU230 for uncompressed video over IP inputs

The usable uncompressed video over IP capacity of an R&S®PRISMON software installation on an R&S®PRM-BU230 is defined by the maximum IP input data rate a single system can process. A modern R&S®PRM-BU230 (Lenovo based, TAZ 5.0) can process up to **75 Gbit/s input on a single 100G interface** or up to **300 Gbit/s input if fully equipped with four 100G interfaces** (2 x R&S®PRM-B640 options). Use the following table to calculate the total input data rate.

Format	Data rate	Data rate excluding 2022-7 redundancy	Data rate including 2022-7 redundancy
ST2110 720 at 50p	approx. 1.0 Gbit/s	approx. 2.0 Gbit/s	
ST2110 720 at 60p	approx. 1.2 Gbit/s	approx. 2.4 Gbit/s	
ST2110 1080 at 25p/i	approx. 1.1 Gbit/s	approx. 2.2 Gbit/s	
ST2110 1080 at 30p/i	approx. 1.3 Gbit/s	approx. 2.6 Gbit/s	
ST2110 1080 at 50p	approx. 2.2 Gbit/s	approx. 4.4 Gbit/s	
ST2110 1080 at 60p	approx. 2.6 Gbit/s	approx. 5.2 Gbit/s	
ST2110 2160 at 50p	approx. 8.8 Gbit/s	approx. 17.6 Gbit/s	
ST2110 2160 at 60p	approx. 10.3 Gbit/s	approx. 20.6 Gbit/s	
2022-6 HD at 1.5G	approx. 1.6 Gbit/s	approx. 3.2 Gbit/s	
2022-6 HD at 3G	approx. 3.1 Gbit/s	approx. 6.2 Gbit/s	

#### Note:

- 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 usable input capacity needs to be lowered by twice the data rate 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 might be reduced
- Maximum 80 uncompressed video inputs are supported per device, see above
- Values are only valid for the latest server generations (TAZ 5.0 based on Lenovo SR655 V3)

## Processing capacity R&S®PRM-BU230 for compressed video over IP/ASI and SDI inputs

Resolution	Standard	Maximum video decoding capabilities for compressed/uncompressed signals (figures valid without streaming output)			NDI	SDI
		MPEG-2	H.264	H.265/HEVC		
480 at 30p/l		80	80	80	80	32
576 at 25p/i		80	80	80	80	32
1080 at 25p/i /30p/i		80	80	60	80	32
1080 at 50p/60p		–	60	40	80	32
2160 at 50p/60p		–	–	12	40	8

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 80 compressed video inputs are supported per device
- Values are only valid for the latest server generations (TAZ 5.0 corresponds with Lenovo SR655 V3 servers)

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

### Optional input interfaces

<b>PRIOS-M SDI/ASI broadcast input card (R&amp;S®PRM-B1000)</b>		
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	1 x interface to breakout box
<b>SDI/ASI BNC breakout box (R&amp;S®PRM-B1100)</b>		
Interfaces – physical connector and input format	for 8 x uncompressed SDTV with ancillary data and up to 16 embedded audio channels for 8 x uncompressed HDTV up to a resolution of 1080i with ancillary data and up to 16 embedded audio channels for 8 x uncompressed HDTV up to a resolution of 1080p, each with ancillary data and up to 16 embedded audio channels or for uncompressed 2 x UHD-TV up to a resolution of 2160p via 4 quadrants for compressed video and audio in an MPEG-2 transport stream with ancillary data	<ul style="list-style-type: none"> <li>• 8 x SD-SDI, 75 Ω BNC, 270 Mbit/s</li> <li>• 800 mV (V<sub>pp</sub>)</li> <li>• in line with SMPTE ST 259M-C</li> <li>• 8 x HD-SDI, 75 Ω BNC, 1485 Gbit/s, 1485/1001 Gbit/s</li> <li>• 800 mV (V<sub>pp</sub>)</li> <li>• in line with SMPTE ST 292M</li> <li>• 8 x 3G-SDI, 75 Ω BNC, 2970 Gbit/s, 2970 Gbit/s/1001 Gbit/s</li> <li>• 800 mV (V<sub>pp</sub>)</li> <li>• in line with SMPTE 424M with level A or level B dual link (DL)</li> <li>• 8 x ASI, BNC, 75 Ω, 270 Mbit/s</li> <li>• 800 mV (V<sub>pp</sub>)</li> <li>• in line with EN 50083-9</li> </ul>
<b>1 GbE card (R&amp;S®PRM-B600)</b>		
Interface card options	requires 1 FH or HH slot	4 x 10/100/1000BASE-T via RJ-45 ports
<b>10 GbE card (R&amp;S®PRM-B610)</b>		
Interface card options	requires 1 FH or HH slot with 16 x PCIe lanes	2 x 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)
<b>100 GbE card (R&amp;S®PRM-B640)</b>		
Interface card options	requires 1 FH or HH slot with 16 x PCIe lanes	2 x 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

<b>Extension graphics card for multiviewer VideoWall output (R&amp;S®PRM-B300)</b>		
Available video output interfaces		<ul style="list-style-type: none"> <li>• 1 x dual-link DVI-D</li> <li>• 1 x HDMI™</li> <li>• dual display (HD) capable</li> </ul>
<b>Extension graphics card for multiviewer VideoWall output (R&amp;S®PRM-B340)</b>		
Available video output interfaces		4 x mDP

**Hardware accessories population rules**

<b>Platform</b>	<b>Card</b>	R&S®PRM-B1000, R&S®PRM-B1100 (8 x SDI/ASI)	R&S®PRM-B600 (4 x 1 GbE)	R&S®PRM-B610 (2 x 10 GbE)	R&S®PRM-B640 (2 x 100 GbE)
R&S®PRISMON PRIME X		≤ 4	≤ 1	≤ 1	≤ 3

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

**Optional other components**

<b>Second redundant HDD (R&amp;S®BU-Z213)</b>		
Component options	requires 1 HDD bay	operates together with default HDD

**Operating system**

<b>Base system</b>		Debian GNU/Linux 12 "Bookworm"

# Video and audio processing

## IP input protocols

Protocols		
IPv4		IETF RFC 791
IGMP v1/v2/v3 multicast		<ul style="list-style-type: none"> <li>• IETF RFC 1112</li> <li>• IETF RFC 2236</li> <li>• IETF RFC 3376</li> </ul>
UDP		IETF RFC 768
RTP/RTCP		<ul style="list-style-type: none"> <li>• IETF RFC 3550</li> <li>• SMPTE ST 302M</li> </ul>
	SMPTE ST 2022-2 protocol suite (TS over IP)	<ul style="list-style-type: none"> <li>• SMPTE 2022-1 FEC (forward error correction)</li> <li>• SMPTE 2022-2 TS over IP (constant bit rate)</li> <li>• SMPTE 2022-3 TS over IP (variable bit rate)</li> <li>• selectable modes <ul style="list-style-type: none"> <li>- TSoIP</li> <li>- TSoIP round robin</li> <li>- TSoIP fail over</li> <li>- T2MIoIP</li> </ul> </li> </ul>
	SMPTE ST 2022-6 protocol suite (SDI over IP) <sup>1</sup>	<ul style="list-style-type: none"> <li>• SMPTE ST 2022-6 (video: YCbCr 10 bit, up to 1080p60 level A)</li> <li>• SMPTE ST 2022-7</li> <li>• low latency</li> </ul>
	SMPTE ST 2110 protocol suite	<ul style="list-style-type: none"> <li>• SMPTE ST 2110-20 (video: YCbCr-4:2:2 up to 16 bit, up to 2160p60<sup>2</sup>; YCbCr-4:4:4 up to 16 bit, up to 1080p60)</li> <li>• SMPTE ST 2110-30 (audio: 48 kHz)</li> <li>• SMPTE ST 2110-31 (PCM, compressed audio)</li> <li>• SMPTE ST 2110-40</li> <li>• SMPTE ST 2022-7<sup>3</sup></li> <li>• low latency</li> </ul>
	AMWA NMOS protocol suite	<ul style="list-style-type: none"> <li>• AMWA NMOS IS-04 v1.3</li> <li>• AMWA NMOS IS-05 v1.1</li> </ul>
	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
<b>FEC support</b>		
Pro MPEG FEC COP 3 decoding		SMPTE 2022

<sup>1</sup> 3G-SDI level B dual link is not supported.

<sup>2</sup> Certain configurations may not be supported due to performance limitations of the respective underlying hardware platform.

<sup>3</sup> 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 GbE built-in	●	—	—	—	—
10 GbE option <sup>4</sup>	●	—	—	—	—
100 GbE option	●	●	●	●	● <sup>5</sup>
1 GbE	●	—	—	—	—
10 GbE	●	—	—	—	—
100 GbE	●	●	●	●	●

## Baseband SDI protocols

Protocols	
Inputs	<ul style="list-style-type: none"> <li>• SD-SDI (SMPTE ST 259)</li> <li>• HD-SDI (SMPTE ST 292)</li> <li>• 3G-SDI (SMPTE ST 424, 425-1)</li> <li>• quad-link 3G-SDI (SMPTE ST 425-5)</li> </ul>
Resolutions	<p>SD-SDI (SMPTE ST 259)</p> <p>HD-SDI (SMPTE ST 292)</p> <p>3G-SDI level A (SMPTE ST 424), 3G-SDI level B dual link (SMPTE ST 425-1)</p> <p>quad-link 3G-SDI (SMPTE ST 425-5)</p>
	<p>576i50, 486i59.94</p> <p>720p50, 720p59.94, 720p60, 1080p23.98, 1080p24, 1080p25, 1080p29.97, 1080p30, 1080i50, 1080i59.94</p> <p>1080p50, 1080p60</p> <p>2160p23.98, 2160p24, 2160p25, 2160p29.97, 2160p30, 2160p50, 2160p59.94, 2160p60</p>

## 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		<ul style="list-style-type: none"> <li>• AES67 payload formats L16 and L24 at 48 kHz sampling rate</li> <li>• SMPTE ST 2110-30 conformance levels A and B</li> </ul>
SMPTE ST 2110-31		<ul style="list-style-type: none"> <li>• AES3 samples as AM824 payload at 48 kHz sampling rate</li> <li>• SMPTE ST 2110-31 conformance levels A and B</li> </ul>

<sup>4</sup> 10 GbE interface can be operated only in OTT/NDI/SRT or SMPTE ST 2022-1/2 mode.

<sup>5</sup> RTP-PTP offset measurement for SMPTE ST 2110 input.

<b>Ancillary data</b>		
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	<ul style="list-style-type: none"> <li>AFD (SMPTE ST 2016-3)</li> <li>payload identifier (SMPTE ST 352)</li> <li>compressed audio metadata (SMPTE ST 2020/SMPTE RDD 6)</li> <li>ANSI/SCTE 104 messages (SMPTE ST 2010)</li> <li>time code (SMPTE ST 12-2)</li> <li>VPS (in SMPTE ST 2031)</li> <li>WSS (in SMPTE ST 2031)</li> <li>teletext (in SMPTE ST 2031)</li> <li>closed captions (CEA 708, SMPTE ST 334)</li> <li>teletext subtitles (Free TV OP-47, SMPTE ST 2031)</li> <li>program related metadata in SDI VANC (BBC white paper WHP 296 (revised July 2017))</li> </ul>
<b>VBI data</b>		
SD-SDI (SMPTE ST 259)	VBI data	<ul style="list-style-type: none"> <li>WSS (ETSI EN 300294)</li> <li>teletext (ETSI EN 300706)</li> <li>teletext subtitles (ETSI EN 300706)</li> <li>closed captions (CEA 608)</li> </ul>

## Video decoding and analysis

Video decoding <sup>6</sup>		
Codecs		<ul style="list-style-type: none"> <li>MPEG-2 main profile, main level (as specified in ETSI TS 101154)</li> <li>MPEG-2 main profile, high level (as specified in ETSI TS 101154)</li> <li>MPEG-2 422 profile, up to high level (as specified in ETSI TS 101154)</li> <li>H.264/AVC (8 bit) high profile at level 4.2 (as specified in ETSI TS 101154)</li> <li>H.264 high 422 profile (422 8 bit and 10 bit) at level 4.2 (as specified in ETSI TS 101154)</li> <li>H.265/HEVC main profile/main tier</li> <li>H.265/HEVC main10 profile (8 bit and 10 bit)/main tier incl. 4:2:0</li> <li>J2K</li> </ul>
Resolutions	horizontal × vertical	<ul style="list-style-type: none"> <li>up to 1920 × 1080 pixel for MPEG-2, H.264, J2K, up to 3840 × 2160 pixel for H.265/HEVC</li> </ul>
Frame/field rates		23.98/24/25/29.97/30/50/59.94/60
Operational modes		<ul style="list-style-type: none"> <li>continuous</li> <li>periodic thumbnails (up to HD)</li> <li>round robin (TSoIP and OTT inputs only)</li> </ul>
Included additional component decoding		<ul style="list-style-type: none"> <li>up to 8 audio tracks</li> <li>up to 6 sub-titles including language icon</li> <li>1 teletext</li> <li>closed captions</li> </ul>

<sup>6</sup> MPEG-2 corresponds to H.262/MPEG-2 part 2; H.264 corresponds to MPEG-4 part 10 (AVC).

<b>Video analysis</b>		
Determination of video frames with low luminance level (video black)		<ul style="list-style-type: none"> <li>• timeout configurable per service</li> <li>• configurable threshold for the min. expected level of luminance</li> </ul>
Determination of lost video signal		timeout configurable per service
Determination of video codec		<ul style="list-style-type: none"> <li>• codec type from set of supported codecs</li> <li>• set-actual comparison for parameters of codec (template monitoring)</li> </ul>
Determination of content mismatch	max. delay of content to be compared	60 s

## Audio decoding and analysis

<b>Audio decoding</b>		
Codecs		<ul style="list-style-type: none"> <li>• MPEG-1 audio layer II</li> <li>• MPEG-2 audio layer II</li> <li>• AAC</li> <li>• HE-AAC</li> <li>• ATSC A/52 (AC-3), (E-AC-3)</li> <li>• Dolby Digital</li> <li>• Dolby Digital Plus</li> <li>• Dolby E</li> <li>• VORBIS</li> </ul>
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
<b>Audio analysis</b>		
Determination of audio samples with low audio level (audio silence)		<ul style="list-style-type: none"> <li>• timeout configurable per service</li> <li>• threshold configurable in –0.1 dB steps in relation to the max. level 0 dBFS</li> </ul>
Determination of audio samples with high audio level (audio overload)		<ul style="list-style-type: none"> <li>• timeout configurable per service</li> <li>• threshold configurable in –0.1 dB steps in relation to the max. level 0 dBFS</li> </ul>
Determination of audio samples with constant audio level (audio constant)		<ul style="list-style-type: none"> <li>• timeout configurable per service</li> <li>• threshold configurable in –0.1 dB steps in relation to the max. level 0 dBFS</li> </ul>
Determination of lost audio signal		timeout configurable per service
Determination of audio codec		<ul style="list-style-type: none"> <li>• codec type from set of supported codecs</li> <li>• set actual comparison for parameters of codec (template monitoring)</li> </ul>
Loudness monitoring		<ul style="list-style-type: none"> <li>• in line with EBU R128 and ITU-R BS.1770L</li> <li>• monitoring of program loudness, short-term loudness, momentary loudness, loudness range and true peak level</li> <li>• based on EIT data events or without</li> </ul>
Detection of out of phase stereo channels (phase correlation)		<ul style="list-style-type: none"> <li>• timeout configurable per service</li> <li>• threshold configurable in 1 % steps with a range from –100 % (phase-inverted) to 100 % (in-phase)</li> </ul>

## Data decoding and analysis

Data decoding	
Teletext decoding	<ul style="list-style-type: none"> <li>DVB teletext (ETSI TS 300472)</li> <li>EBU teletext (ETSI EN 300706): normal pages, country and network identification (ETSI TS 101231 (2019-04))</li> <li>support of subpages</li> </ul>
Subtitle decoding	<ul style="list-style-type: none"> <li>DVB subtitles (ETSI EN 300743)</li> <li>EBU teletext subtitles (ETSI EN 300706): subtitle pages, country and network identification (ETSI TS 101231 (2019-04))</li> </ul>
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	<ul style="list-style-type: none"> <li>splice commands           <ul style="list-style-type: none"> <li>splice_null()</li> <li>splice_insert()</li> </ul> </li> <li>splice time</li> <li>splice descriptors           <ul style="list-style-type: none"> <li>splice_descriptor()</li> <li>avail_descriptor()</li> <li>DTMF_descriptor()</li> <li>segmentation_descriptor()</li> </ul> </li> </ul>
HDR monitoring	<p>only supported for HEVC/SMPTE 2110</p> <ul style="list-style-type: none"> <li>status icon</li> <li>metadata           <ul style="list-style-type: none"> <li>HDR display primaries X0, Y0, X1, Y1, X2, Y2</li> <li>HDR white point X, Y</li> <li>HDR display mastering luminance min/max</li> <li>HDR transfer characteristics IDC</li> <li>color primaries</li> <li>transfer characteristics VUI</li> <li>matrix coefficients</li> <li>ST2110 TCS</li> <li>ST2110 colorimetry</li> <li>ST2110 range</li> </ul> </li> </ul>

## Video image quality monitoring

<b>Data decoding</b>		
Referenced based video quality monitoring methods	maximum resolution: UHD/4K	<ul style="list-style-type: none"> <li>• LiveQM: live quality comparison of a signal video stream to a reference video stream having equal resolution and frame rate</li> <li>• PSNR, SSIM and SSIM MOS value for any decoded input signal</li> <li>• side-by-side visualization</li> <li>• A/V delay measurement</li> </ul>
Reference-free video quality monitoring methods	resolution: 1080i/p, 720i/p; codec: H.264/MPEG-4 AVC	<ul style="list-style-type: none"> <li>• reference-free estimation of PSNR and MOS values for decoded input signal</li> <li>• alarm triggers via settable thresholds for estimated PSNR and MOS values</li> </ul>
	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	<ul style="list-style-type: none"> <li>• macroblock detection for decoded input signal</li> <li>• alarm trigger via settable threshold for estimated blockiness value</li> </ul>
Number of simultaneously executed quality monitoring engines	maximum (only on R&S®PRISMON ULTRA and R&S®PRISMON PRIME X platforms)	<ul style="list-style-type: none"> <li>• 8 simultaneously executed quality monitoring engines up to 1080p60</li> <li>• 2 simultaneously executed quality monitoring engines up to 2160p60</li> </ul>
Delay of reference versus degraded video signal		120 s (max.)
Delay of reference versus degraded audio signal		2 s (max.)
Export of exact measurement data	CSV export	frame accurate results for last 3600 s

## Video content monitoring

<b>Video content compare</b>		
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		maximum service count on respective platform
Delay of reference versus degraded video signal		60 s (max.)
<b>Video black</b>		
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		maximum service count on respective platform

## OTT source monitoring

Data decoding		
Multiprotocol download	protocols	<ul style="list-style-type: none"> <li>HLS (HTTP live streaming, draft-pantos-http-live-streaming version 19)</li> <li>Microsoft Smooth Streaming ([MS-SSTR], rev 6.0, 6/30/2015)</li> <li>DASH (ISO_IEC_23009-1_2014 – number and time based)</li> <li>CMAF (ISO/IEC 23000-19:2018)</li> <li>HDS (Adobe flash video file format specification version 10.1)</li> <li>RTMP</li> <li>HbbTV</li> <li>Icecast</li> </ul>
	codecs	<ul style="list-style-type: none"> <li>HLS: H.264, HEVC, AAC, AC3, E-AC3</li> <li>Microsoft Smooth Streaming: H.264, AAC</li> <li>DASH: H.264, HEVC, AAC, AC3, E-AC3</li> <li>CMAF: H.264, HEVC, AAC</li> <li>HDS: H.264 and AAC</li> <li>RTMP: H.264 and AAC</li> <li>HbbTV: H.264 and AAC</li> <li>Icecast: Ogg Vorbis, Ogg Opus, MP3 and AAC</li> </ul>
	decryption	<ul style="list-style-type: none"> <li>DASH: CENC</li> <li>Microsoft Smooth Streaming with static keys</li> <li>Irdeto: authentication using AUTH0 or MITREid</li> <li>VGC</li> <li>Widevine</li> <li>custom CPIX</li> <li>HLS: AES-128</li> <li>HLS: SAMPLE-AES</li> <li>gzipped manifest files</li> </ul>
	subtitles	<ul style="list-style-type: none"> <li>HLS: WebVTT</li> <li>DASH: W3C TTML text, SMPTE-TT base64 encoded PNG image</li> <li>CMAF: W3C TTML text, SMPTE-TT base64 encoded PNG image</li> <li>Microsoft Smooth Streaming: W3C TTML text, SMPTE-TT base64 encoded PNG image</li> </ul>
	digital program insertion	HLS: SCTE 35 (draft-pantos-hls-rfc8216bis-00; subset)
Multiprotocol upload sniffing	protocols	<ul style="list-style-type: none"> <li>HLS (HTTP live streaming, draft-pantos-http-live-streaming version 19)</li> <li>DASH (ISO_IEC_23009-1_2014 – number and time based)</li> <li>CMAF (ISO/IEC 23000-19:2018)</li> <li>RTMP</li> <li>Icecast</li> </ul>
	codecs	<ul style="list-style-type: none"> <li>HLS: H.264, HEVC, AAC, AC3, E-AC3</li> <li>DASH: H.264, HEVC, AAC, AC3, E-AC3</li> <li>CMAF: H.264, HEVC, AAC</li> <li>HDS: H.264 and AAC</li> <li>RTMP: H.264 and AAC</li> <li>Icecast: Ogg Vorbis, Ogg Opus, MP3 and AAC</li> </ul>
Multiprotocol video-on-demand download		HLS

## DVB-T2 source monitoring

Data decoding	
T2-MI decode	<ul style="list-style-type: none"> <li>• extraction of TS from T2-MI data stream</li> <li>• PID selection</li> </ul>

## Transport layer monitoring

### MPEG-TS monitoring

Supported packet size		188 byte
<b>TR 101290 V1.3.1</b> (only available with constant bit rate (CBR) transport streams)		
<b>TR 101290 V1.3.1 – first priority</b>		
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		<ul style="list-style-type: none"> <li>• discontinuous packet order</li> <li>• packet occurs more than twice</li> <li>• packet lost</li> </ul>
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
<b>TR 101290 V1.3.1 – second priority</b>		
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 <sup>7</sup>
PTS repetition	1 ms to 100 s	upper period
CAT	1 ms to 100 s	missing table ID

<sup>7</sup> 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 <sup>8</sup>
	1 ms to 100 s	AIT, upper period <sup>8</sup>
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
AIT	limit is equal to limit of SI repetition	lower period <sup>8</sup>
	limit is equal to limit of SI repetition	upper period <sup>8</sup>
Unreferenced PID	1 ms to 10 s	waiting period after change in PMT or CAT

<sup>8</sup> 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.

<b>DVB timing</b>		
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
<b>Digital program insertion</b>		
SCTE 35	protocol	SCTE 35 2017 (subset)
	splice commands	<ul style="list-style-type: none"> <li>• splice_null()</li> <li>• splice_insert()</li> </ul>
	splice time	<ul style="list-style-type: none"> <li>• splice_time()</li> </ul>
	splice descriptors	<ul style="list-style-type: none"> <li>• splice_descriptor()</li> <li>• avail_descriptor()</li> <li>• DTMF_descriptor()</li> <li>• segmentation_descriptor()</li> </ul>
<b>Adaptive streaming</b>		
Adaptive transport streaming	protocol	CableLabs OC-SP-EBP-I01-130118
Encoding boundary point (ATS-EBP)	error code	<ul style="list-style-type: none"> <li>• PMT EBP descriptor missing/invalid</li> <li>• PMT scte_adaptation_field_data_descriptor missing</li> <li>• private adaptation field invalid</li> <li>• EBP invalid/timeout</li> </ul>

## Recording

<b>Incident recording</b>		
Recording instances		10
Maximum parallel recordings		4
Algorithm		event-triggered recording of sliding-window audio/video segments to hard disk
Sliding-window configurable parameters		<ul style="list-style-type: none"> <li>• pre-buffer time</li> <li>• post-buffer time</li> <li>• rearm time</li> </ul>
Input	type	<ul style="list-style-type: none"> <li>• TS</li> <li>• OTT</li> </ul>
Capture	mode	recording of single input triggered by configurable event type(s)
	trigger	<ul style="list-style-type: none"> <li>• manually</li> <li>• Boolean logic encoded combination of event types (status, black image, still image)</li> </ul>
File format		original container including metadata
File storage		system hard disk

# Multiviewer

## General capabilities

<b>Design</b>	
Available service tile preset types	<ul style="list-style-type: none"> <li>video, teletext, radio, quality, waveform, status, studio</li> <li>user customizable tile presets</li> <li>storage/retrieval of up to 16 tile presets (via REST-API no limits)</li> </ul>
Layout	<ul style="list-style-type: none"> <li>each tile freely positionable</li> <li>selectable predefined sizes per service tile</li> <li>aspect ratio 16:9, 4:3</li> <li>aspect ratio flipable</li> <li>layout designer</li> </ul>
Tile modes	<ul style="list-style-type: none"> <li>continuous</li> <li>periodic thumbnails</li> <li>round robin of services</li> <li>penalty box</li> <li>tile editor</li> </ul>
Number of tiles per screen	99 (max.)
Number of screens	8 (max.)
<b>Video visualization</b>	
Aspect ratio handling	<ul style="list-style-type: none"> <li>automatic scaling to correct aspect ratio</li> <li>support of dynamic aspect ratio changes</li> </ul>
<b>Audio visualization</b>	
Total number of simultaneously visualized audio tracks	<ul style="list-style-type: none"> <li>up to 8 audio tracks per service tile</li> <li>up to 8 audio channels per audio track</li> </ul>
Audio meter scale	total scale
	red area
	yellow area
	green area
Peak indicator	<ul style="list-style-type: none"> <li>sample peak program meter</li> <li>decay rate of peak indicator: 12 dB/s</li> </ul>
RMS indicator	<ul style="list-style-type: none"> <li>0 dBFS for full-scale sine wave</li> <li>integration time: 80 ms for 48 kHz</li> </ul>
Scale type	<ul style="list-style-type: none"> <li>uncompressed (dBFS)</li> <li>compressed (dBFS) standard IEC 60268-18 Annex B</li> </ul>

<b>Metadata visualization</b>		
Displayed metadata for tiles		<ul style="list-style-type: none"> <li>• EIT present/following data and progress</li> <li>• service name</li> <li>• aspect ratio</li> <li>• codecs</li> <li>• video resolution</li> <li>• video bit rate</li> <li>• video PID</li> <li>• audio codec</li> <li>• audio language descriptor</li> <li>• audio PID</li> <li>• subtitle status icon</li> <li>• subtitle language descriptor</li> <li>• subtitle text</li> <li>• teletext status icon</li> <li>• parental ration icon</li> <li>• running state icon</li> <li>• deviation state icon</li> <li>• closed caption state icon</li> <li>• HDR status icon</li> <li>• A/V delay bar</li> <li>• A/V delay value</li> <li>• OSD error information</li> <li>• AIT state icon</li> <li>• DSMCC state icon</li> <li>• data rate</li> <li>• packet loss rate per minute</li> <li>• RTP-PTP offset</li> <li>• 2022-7 connection status</li> <li>• VITC/LTC timecodes with/without frame count</li> <li>• custom monitoring values</li> </ul>
Dynamic system and description tiles		<ul style="list-style-type: none"> <li>• up to 36 static text, picture tiles or dynamic text</li> <li>• up to 10 clocks</li> <li>• up to 10 graphs for displaying bit rates, PSNR or SSIM information</li> <li>• up to 16 logbook messages</li> <li>• up to 10 counters (increment or decrement)</li> </ul>
<b>UMD/tally visualization</b>		
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 (or other 10G connections) for video proxy network	<ul style="list-style-type: none"> <li>• connects up to 36 remote R&amp;S®PRISMON units and displays their input sources</li> <li>• automated scaling of resolutions depends on tile size</li> </ul>
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## HDMI™/DVI output

<b>Resolution</b>	
Frame size/frame rate in frames/s	requires R&S®PRM-B300 extension graphics card
	<ul style="list-style-type: none"> <li>• mode HD clone: 1080p25/29.97/30/50/59.94/60 identical on HDMI™ and DVI-D interfaces cloned from single multiviewer view</li> <li>• mode HD extended: 1080p25/29.97/30/50 separately on HDMI™ and DVI-D interfaces from different multiviewer views</li> <li>• mode UHD: 2160p25 on HDMI™ interface (DVI-D interface disabled)</li> </ul> <p>encoding: RGB, 8 bit</p>

## Mini-DisplayPort (mDP) output

<b>Resolution</b>	
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

<b>Transport protocols</b>		
IPv4		IETF RFC 791
UDP		IETF RFC 768
RTP/RTCP		IETF RFC 3550
SRT		server or upload mode
<b>Output views</b>		
Maximum		8 <sup>9</sup>
<b>Output modes</b>		
TS over IP and SRT		
Protocols		SMPTE ST 2022-2 MPEG single program transport stream (SPTS) ISO/IEC 13818-1
Video codecs	MPEG-2	<ul style="list-style-type: none"> <li>• MPEG-2 main profile, main level (as specified in ETSI TS 101154)</li> <li>• 1 Mbit/s to 15 Mbit/s</li> <li>• 576p25/29.97/30/50/59.94/60</li> </ul>
	H.264/AVC	<ul style="list-style-type: none"> <li>• H.264/AVC (as specified in ETSI TS 101154)</li> <li>• 1 Mbit/s to 15 Mbit/s</li> <li>• 576p25/29.97/30</li> <li>• 720p25/29.97/30</li> <li>• 1080p25/29.97/30/50/59.94/60</li> <li>• 2160p25/29.97/30</li> </ul>
Audio codecs	MP2	<ul style="list-style-type: none"> <li>• up to 2 channels per view (stereo downmix, max. on 4 views)</li> <li>• 48 kHz</li> </ul>
SDI over IP		
Protocols		<ul style="list-style-type: none"> <li>• SMPTE ST 2022-6</li> <li>• SMPTE ST 2022-7</li> </ul>
Video codecs	uncompressed	<ul style="list-style-type: none"> <li>• 1080p25/29.97/30/50/59.94/60</li> <li>• YCbCr-4:2:2 10 bit</li> </ul>
Audio codecs	uncompressed	<ul style="list-style-type: none"> <li>• up to 2 channels per view (stereo downmix)</li> <li>• 48 kHz linear PCM, 24 bit (SMPTE ST 299-1)</li> </ul>

<sup>9</sup> Depending on platform choice and actual system load.

SMPTE ST 2110		
Protocols		<ul style="list-style-type: none"> <li>• SMPTE ST 2110-20</li> <li>• SMPTE ST 2110-21 (type W)</li> <li>• SMPTE ST 2022-7</li> <li>• SMPTE ST 2110-30</li> </ul>
Video codecs	uncompressed	<ul style="list-style-type: none"> <li>• 1080p25/29.97/30/50/59.94/60</li> <li>• 2160p25/29.97/30</li> <li>• YCbCr-4:2:2 10 bit, PTP sampled</li> <li>• packaging modes <sup>10</sup> <ul style="list-style-type: none"> <li>- GPM “standard UDP size limit”</li> <li>- BPM and GPM no continuation “equal sized packets without line continuation”</li> </ul> </li> </ul>
Audio codecs	uncompressed	<ul style="list-style-type: none"> <li>• up to 2 channels per view (stereo downmix, max. on 4 views)</li> <li>• 48 kHz, 24 bit</li> </ul>
OTT		
Protocols		HLS, MPEG-DASH, MPEG-CMAF, HDS, Microsoft Smooth Streaming, RTMP
Video codecs	H.264	<ul style="list-style-type: none"> <li>• 240p25</li> <li>• 576p25</li> <li>• 720p25</li> <li>• 1080p25</li> </ul>
Audio codecs	audio not supported	
NDI		
Video		<ul style="list-style-type: none"> <li>• 1080p25/29.97/30/50/59.94/60</li> <li>• 2160p25/29.97/30/50/59.94/60</li> </ul>
Audio		<ul style="list-style-type: none"> <li>• PCM</li> <li>• up to 2 channels per view (stereo downmix, max. on 4 views)</li> </ul>

<sup>10</sup> 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	<ul style="list-style-type: none"> <li>• Firefox 104 or higher</li> <li>• Chrome 127 or higher</li> </ul>
	recommended screen resolution	1920 x 1080 pixel or higher
Logbook	<p>number of stored messages export format</p>	<p>up to 10 000 messages CSV export</p>

## Application multiviewer control center (MCC)

Web based user interface		
Browser support	supported web browsers	<ul style="list-style-type: none"> <li>• Firefox 104 or higher</li> <li>• Chrome 127 or higher</li> </ul>
	recommended screen resolutions	1920 x 1080 pixel or higher
Device management		
Functions		<ul style="list-style-type: none"> <li>• device management</li> <li>• room builder</li> <li>• scenario builder</li> <li>• scenario loader</li> <li>• tile editor</li> <li>• mosaic editor</li> <li>• mosaic manager</li> </ul>
Dashboard information per device		<ul style="list-style-type: none"> <li>• administrative name</li> <li>• host name</li> <li>• HDD free space CPU load</li> <li>• memory load</li> <li>• NTP/PTP sync state</li> <li>• software version</li> <li>• mosaic preview</li> <li>• device alerts</li> </ul>
System management		
Functions		<ul style="list-style-type: none"> <li>• user management</li> <li>• database management (backup/restore)</li> <li>• license management</li> <li>• REST-API management</li> </ul>
Room configuration		
Creation of physical monitor layout per room		drag & drop from list of predefined types of monitors, rotatable
Predefined monitor types		<ul style="list-style-type: none"> <li>• large monitor</li> <li>• medium monitor</li> <li>• small monitor</li> </ul>
Scenario configuration		
Creation of layout per monitor per room		selection from list of predefined tile layouts
Predefined tile layouts		<ul style="list-style-type: none"> <li>• 2 x 2</li> <li>• 3 x 3</li> <li>• 4 x 3</li> <li>• 4 x 4</li> <li>• custom layouts</li> </ul>
Tile configuration		(de)select input source
Needed licenses		
Multiviewer control center dashboard, instance license	R&S®PRM-KMCCD	one instance R&S®PRM-KMCCD per MCC dashboard instance

<b>User management</b>		
User management functions		<ul style="list-style-type: none"> <li>• add/delete/edit</li> <li>• reset password</li> <li>• (de)activate</li> <li>• user rights</li> </ul>
Privileges configurable per user		add/remove/edit: <ul style="list-style-type: none"> <li>• configuration</li> <li>• rooms</li> <li>• mosaic</li> <li>• scenario edit</li> <li>• scenarios load</li> <li>• user management</li> </ul>
<b>REST-API</b>		
<b>Access management</b>		token based (management options: activate/deactivate/reset)
Functions		<ul style="list-style-type: none"> <li>• get all available scenarios</li> <li>• load a dedicated scenario</li> </ul>

## Application monitoring and notification

<b>SNMP support</b>		
SNMP GET		SNMP v2c (IETF RFC 1441 and following)
SNMP TRAP		<ul style="list-style-type: none"> <li>• SNMP v2c (IETF RFC 1441 and following)</li> <li>• up to three trap sinks</li> </ul>
<b>Email support</b>		
Email notification	send alert and alarm information via email to named recipients	RFC 2821
<b>MQTT support</b>		
Client mode	push monitoring and configuration values to an external broker	MQTT v3.1 (v3.1.1 client library)

## System management

<b>Base system</b>		
Remote device monitoring		SNMP v1, v2c (IETF RFC 1441 and following)
Remote maintenance		<ul style="list-style-type: none"> <li>web: configuration of services and software upgrades</li> <li>remote control and automation API (REST-API)</li> </ul>
<b>Time synchronization</b>		
NTP		NTP v3 (RFC 1305)
PTP <sup>11</sup>		<ul style="list-style-type: none"> <li>IEEE 1588-2008 in the role of end station</li> <li>RTP-PTP offset measurement for SMPTE ST 2110 input</li> <li>hybrid end-to-end mode</li> <li>configurable parameters               <ul style="list-style-type: none"> <li>- PTP domain (max. 4)</li> <li>- delay</li> <li>- DSCP event message</li> <li>- DSCP general message</li> <li>- hybrid delay mechanism</li> </ul> </li> </ul>
<b>Software</b>		
Configuration and version management		<ul style="list-style-type: none"> <li>import/export system configuration to file</li> <li>software field-upgradeable via web UI</li> <li>support of dual software images (only with hardware based deployment)</li> </ul>
License management		<ul style="list-style-type: none"> <li>via license server (deployment: colocated or standalone)</li> <li>support of floating licenses (dynamic sharing of licenses between instances of system)</li> </ul>
<b>Interoperability</b>		
Discovery and registration		AMWA NMOS IS-04 v1.3
Device connection management		AMWA NMOS IS-05 v1.1

## Virtualization/cloud hypervisor support

<b>Compatibility</b>		
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.

<sup>11</sup> PTP only available with 100 GbE card (R&S®PRM-B640) installed.

## Ordering information

Designation	Type	Order No.
<b>System</b>		
R&S®PRISMON system	R&S®PRM-SYSTEM	2119.7140K02/K03
<b>Hardware and options</b>		
<b>Hardware platform base units</b>		
R&S®PRISMON PRIME X base unit	R&S®PRM-BU230	2119.7056.02
<b>Hardware accessories</b>		
<b>Graphics card</b>		
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
<b>I/O cards</b>		
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 GbE card	R&S®PRM-B600	2119.7656.02
2 × 10 GbE card (without SFP modules)	R&S®PRM-B610	2119.7640.02
2 × 100 GbE card (without QSFP28 modules)	R&S®PRM-B640	2119.7585.02
<b>Software and options</b>		
<b>System software dongle</b>		
R&S®PRISMON system license dongle, floating	R&S®PRM-DNGL-FL	2119.7110.03
<b>Core software license</b>		
R&S®PRISMON software instance, extended core license	R&S®PRM-KXCORE	2119.8681.02 <sup>12</sup>
<b>Processing, service decoding and basic analysis</b>		
Video thumbnail (up to HD)/pure-audio decoder and analysis, instance license	R&S®PRM-KVTAD	2119.8730.02 <sup>12</sup>
Video decoding and continuous analysis, single license	R&S®PRM-KSVDC	2119.8746.02 <sup>12</sup>
<b>Extended service decoding</b>		
TICO decoder, single license	R&S®PRM-KTICOS	2119.8475.02 <sup>12</sup>
<b>Advanced service analysis</b>		
Video live quality measurement (LiveQM), instance license	R&S®PRM-KVLQM	2119.8523.02 <sup>12</sup>
<b>Output, multiviewer formats</b>		
VideoWall: multiviewer mosaic view output, single license	R&S®PRM-KVWMMO	2119.8752.02 <sup>12</sup>
<b>Multiviewer control center (MCC)</b>		
Multiviewer control center dashboard, instance license	R&S®PRM-KMCCD	2119.8775.02 <sup>12</sup>
<b>Software and images</b>		
Multiviewer control center extension image	software only image <sup>13</sup>	2119.6995.00
R&S®PRISMON hypervisor image, for VMware	software only image <sup>13</sup>	2119.9013.00
R&S®PRISMON hypervisor image, for KVM	software only image <sup>13</sup>	2119.9065.00
R&S®PRISMON bare-metal software deploying image	software only image <sup>13</sup>	2119.7879.00

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

<sup>12</sup> For systems with redundant license server, the order number of the footnoted software license options ends in ".51" instead of ".02".

<sup>13</sup> Contact support.media@rohde-schwarz.com to get an SFT download link to the image.

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