

R&S® DVMS Digital TV Monitoring System Family

Ensuring high quality of digital TV network operation



R&S®DVMS Digital TV Monitoring System Family

At a glance

The R&S®DVMS family is a professional, attractively priced and compact solution for monitoring digital TV networks. It includes the R&S®DVMS1 and the R&S®DVMS4. Typical fields of applications for the R&S®DVMS family are signal monitoring at the transmitter site, the satellite uplink or the headend.

The R&S®DVMS1 (1 HU, ½ rack width) makes it possible to simultaneously monitor an RF signal and an ASI signal or as an alternative up to four IP flows. The R&S®DVMS4 (1 HU) allows simultaneous monitoring of up to four RF/IP/ASI signals. Interface modules for DVB-T/DVB-T2, DVB-S/DVB-S2 as well as for IP (optical/electrical) are available.

All relevant errors at the RF, IP, TS and T2-MI level are recognized and reported immediately. Thumbnail display and electronic program guide (EPG) simplify visual monitoring of the transmitted contents. Remote access is supported via an integrated web server allowing independent, simultaneous access from different locations. SNMP and SNMP traps are supported for integration into central network management systems.

High-quality analysis functions and easy-to-understand displays complement the system's extensive array of monitoring functions. The analysis functions include program clock reference (PCR) analysis and buffer analysis as well as analysis of data and object carousels as used for system software update (SSU) and HbbTV®, for example. As a result, the R&S®DVMS is also ideal for troubleshooting, for example at a multiplex center or headend. Due to its small size, the R&S®DVMS1 in particular is a versatile and valuable tool for development.

Comparison

	R&S®DVMS1	R&S®DVMS4
Number of module slots	1	4
Maximum number of simultaneously monitored inputs	4 (1 × TS and/or 1 × RF or 4 × TS IP)	4 (TS, RF and TS IP in any combination)
TS interfaces integrated in base unit	–	4 × TS
Total maximum bit rates of all inputs used	360 Mbit/s (IP) 86 Mbit/s (ASI/RF)	360 Mbit/s (IP + ASI + RF)
Integrated display (configure IP address, check firmware version or input status)	–	yes
Width	½ rack	1 rack

Key facts

- Simultaneous monitoring of up to four signals
- RF modules for DVB-T/DVB-T2 and DVB-S/DVB-S2
- IP module for electrical and optical (SFP) connections
- Support for DVB, ATSC and ISDB-T/ISDB-T_B transport streams
- T2-MI and BTS support
- Optional functions for detailed analysis
- Modular and extremely compact design (1 HU)

¹⁾ Depending on content and used/installed inputs.

Front view of the R&S®DVMS4.



Rear view of the R&S®DVMS4.



R&S®DVMS Digital TV Monitoring System Family

Benefits and key features

Immediate detection of all relevant errors at the RF, IP, TS, T2-MI and BTS level

- ▮ Extensive RF measurements for DVB-T/DVB-T2 and DVB-S/DVB-S2 signals
- ▮ Extensive IP measurements
- ▮ Template function for transmission parameters
- ▮ Monitoring of DVB, ATSC and ISDB specific TS
- ▮ T2-MI monitoring
- ▮ Template function for transport stream characteristics
- ▮ Detection of transport stream changes
- ▮ Data rate monitoring
- ▮ EPG/EIT monitoring
- ▮ MIP monitoring in SFN networks
- ▮ Encryption monitoring

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Front view of the R&S®DVMS1.



Rear view of the R&S®DVMS1.



Extensive analysis and visualization functions

- ▮ Constellation display
- ▮ Spectrum display (DVB-T and DVB-T2)
- ▮ Echo pattern display (DVB-T and DVB-T2)
- ▮ MDI display (IP flows)
- ▮ Thumbnail display
- ▮ EPG display
- ▮ Graphic display of data rates and table repetition rates
- ▮ Table interpreter
- ▮ PCR analysis
- ▮ PTS analysis
- ▮ Elementary stream analysis for video and audio according to the buffer model
- ▮ Analysis of DVB object and data carousels
- ▮ Analysis of video encoding quality (qPSNR analysis)

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Simple operation and configuration

- ▮ Clearly structured dialogs for all settings (monitoring characteristics, signal input and instrument)
- ▮ Detailed configuration capabilities for all monitoring functions and limits
- ▮ Convenient callup of measurement functions via the View Selector selection window
- ▮ Protection against unauthorized use by defining user-specific operation rights

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Extensive range of monitoring features

- ▮ Monitoring of multiple DVB-T/DVB-H and DVB-S/DVB-S2 signals through a single input with Scheduler Suite
- ▮ Triggered recording and archiving of transport stream segments
- ▮ Detailed monitoring and error logging
- ▮ Different profiles for bit rate measurements for long-term and peak evaluation
- ▮ Permanent or temporary suppression of error messages with Hiding of Events function

Powerful network functions

- ▮ Multiple user access via standard web browser (Java-based) or VNC viewer
- ▮ Integration in network management systems via built-in SNMP interface
- ▮ Simple data exchange using FTP
- ▮ Firewall-protected access
- ▮ Streaming of a selected program or PID to any point in the network

Immediate detection of all relevant errors at the RF, IP, TS, T2-MI and BTS level

Extensive RF measurements for DVB-T/DVB-T2 and DVB-S/DVB-S2 signals

The system monitors the level, frequency offset, bit rate offset, BER and MER. For DVB-T and DVB-T2, the shoulder and SFN characteristics (up to 16 impulses) are monitored and MER measurements typically achieve an accuracy of 38 dB.

Extensive IP measurements

The measurements include MDI, RTP inter-arrival jitter, IP and TS bit rate to ensure error-free transmission on the IP link.

Template function for transmission parameters

The transmission parameters can be defined in such a way that an alarm is generated when there is a deviation from the received signal. The parameters include, for example, FFT, constellation, guard interval and code rate.

Monitoring of DVB, ATSC and ISDB specific TS

- DVB transport streams are monitored in line with the TR 101 290 measurement guidelines. All measurements¹⁾ specified in the TR 101 290 measurement guidelines under priorities 1, 2 and 3 are carried out simultaneously for every component of all transport streams being monitored
- Monitoring of ATSC transport streams is derived from TR 101 290 and includes required extensions for PSIP monitoring. The monitoring functions have been implemented in line with A/65 B
- Monitoring of ISDB-T and ISDB-T_B transport streams is derived from TR 101 290 and includes required extensions to also monitor the transmission link to the transmitter (BTS). The monitoring functions have been implemented according to ARIB STD-B10/Part 2 (ISDB-T) and ABNT NBR 15603-2 (ISDB-T_B)

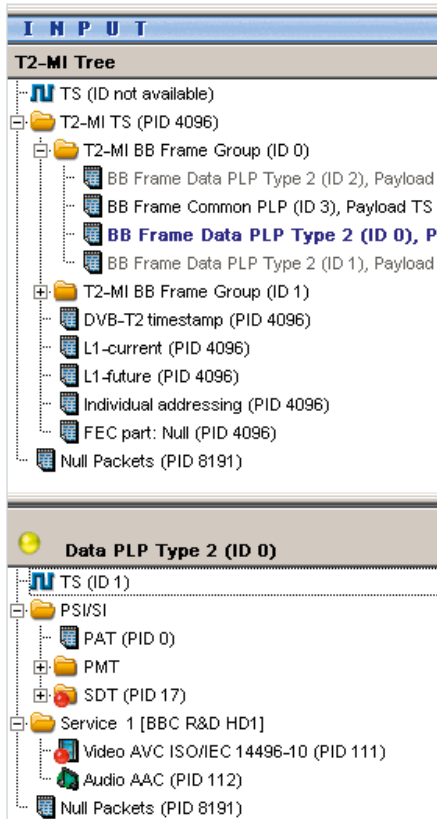
¹⁾ Buffer-related measurements are excluded. They can be performed for a selected video or audio element.

The screenshot displays the 'Monitoring * Statistics & Log' window for 'Input 1 [COFDM DVB-T] DVB [DVB-T]'. The interface includes a tree view on the left showing the signal hierarchy (Input 1, TS, PAT, PMT, CAT, NIT, SDT, EIT, TOT, MIP, Services, Video, Audio, Teletext, Null Packets). The main area shows a grid of error counters for various parameters like TS Sync, CRC, PCR Repetition, etc. Below this is a detailed log table of error events.

No.	Time/Date	Class	Event	Detail	PID	Service
361	18.05.02 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.9 dB		
362	18.05.09 2010-JUL-29	Alarm	PCR Repetition - Period too long	40.1 ms	386	16408
363	18.05.10 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.6 dB		
364	18.05.12 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	17.2 dB		
365	18.05.13 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	18.7 dB		
366	18.05.14 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	18.7 dB		
367	18.05.21 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.8 dB		
368	18.05.22 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	17.7 dB		
369	18.05.24 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.0 dB		
370	18.05.26 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.7 dB		
371	18.05.28 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	18.4 dB		
372	18.06.07 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.9 dB		
373	18.06.08 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.5 dB		
374	18.07.11 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.1 dB		
375	18.07.20 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	18.4 dB		
376	18.07.21 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	18.4 dB		
377	18.07.29 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.3 dB		
378	18.07.36 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.8 dB		
379	18.07.37 2010-JUL-29	Alarm	RF DVS-T MER - Value lower than specified limit	19.7 dB		

Error counters and report entries for all monitored characteristics.

Signal structure of a T2-MI signal.



T2-MI monitoring

T2-MI signals are monitored according to the BlueBook A14-1, an extension to the TR 101 290 measurement guidelines. In addition, up to 16 contained PLPs are monitored (TR 101 290 priorities 1 to 3 as applicable). Limits can individually be adjusted by the user for each PLP.

Template function for transport stream characteristics

Template monitoring makes it possible to compare numerous transport stream characteristics with predefined values. This allows errors to be detected that might go unnoticed when performing monitoring tasks solely as specified in TR 101 290 (for example, when a program is missing). A special feature offered by this function is the automatic generation of a template based on the transport stream being applied. The template is generated by simply pressing a key, which eliminates cumbersome manual setup.

Detection of transport stream changes

Even if no template is used for the TS characteristics, the R&S®DVMS still detects changes in the transport stream. These changes, which may be undesired, might remain undetected when monitoring is performed exclusively in accordance with priorities 1, 2 and 3.

The screenshot shows the 'Monitoring' window in the R&S DVMS software. The 'Template Name' is 'GoldenStream_10_07_20'. The interface displays a tree view of the transport stream elements and a table of monitoring results. The table has columns for 'Element', 'Preval', and 'Testresult'.

Element	Preval	Testresult
Transport Stream		
EITs actual		
Service id 16384 [label eins]		Failed
Constraint	Mandatory	OK
ServiceName	label eins	OK
PCR PID	767	OK
PMT PID	160	OK
Additional ES	Not allowed	OK
Additional ECMS	Not allowed	OK
UpperBitRate	---	---
LowerBitRate	---	---
Element PID: 34 [Teletext]		Failed
Constraint	Mandatory	OK
Type	Setting	Context
Conditional Access	No	OK
Additional ECMS	Not allowed	OK
UpperBitRate	---	---
LowerBitRate	---	---
Element PID 767 [Video MPEG2]		
Element PID 768 [Audio MPEG1]		
Service id 16388 [N24]		
Service id 16403 [ProSieben]		
Service id 16408 [SAT.1 Bayern]		
Null Packets		Failed
UpperBitRate	120107 Bits	423861 Bits
LowerBitRate	80072 Bits	OK

At the bottom of the interface, there are status indicators: 'Option ID expires in 8 months', 'History Indicator: 1 min', and 'Active User Level: Administrator'.

Template monitoring results.

Bit rate monitoring

If no template is used for the TS characteristics, the bit rates for the various elements (video, audio, data and tables) can be monitored with general values for the upper and lower limits.

EPG/EIT monitoring

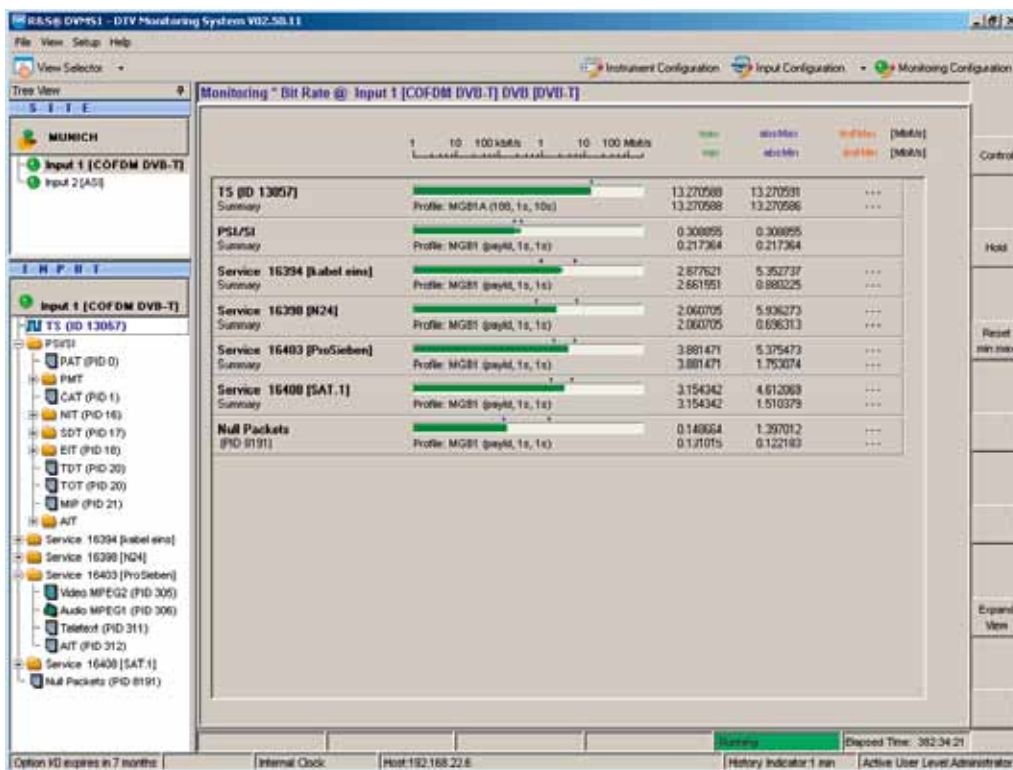
A DVB-T receiver generates its EPG using the receivable EIT tables. If tables are missing, the EPG is incomplete. The R&S®DVMS1 uses both the reference data from the SDT tables and the information provided in the TS template to provide extensive monitoring of the EIT tables.

MIP monitoring in SFN networks

The MIP packet in SFN networks is monitored completely, as specified in TR 101 290.

Encryption monitoring

Both the status and the CA alternation are monitored.



Bit rate monitoring.

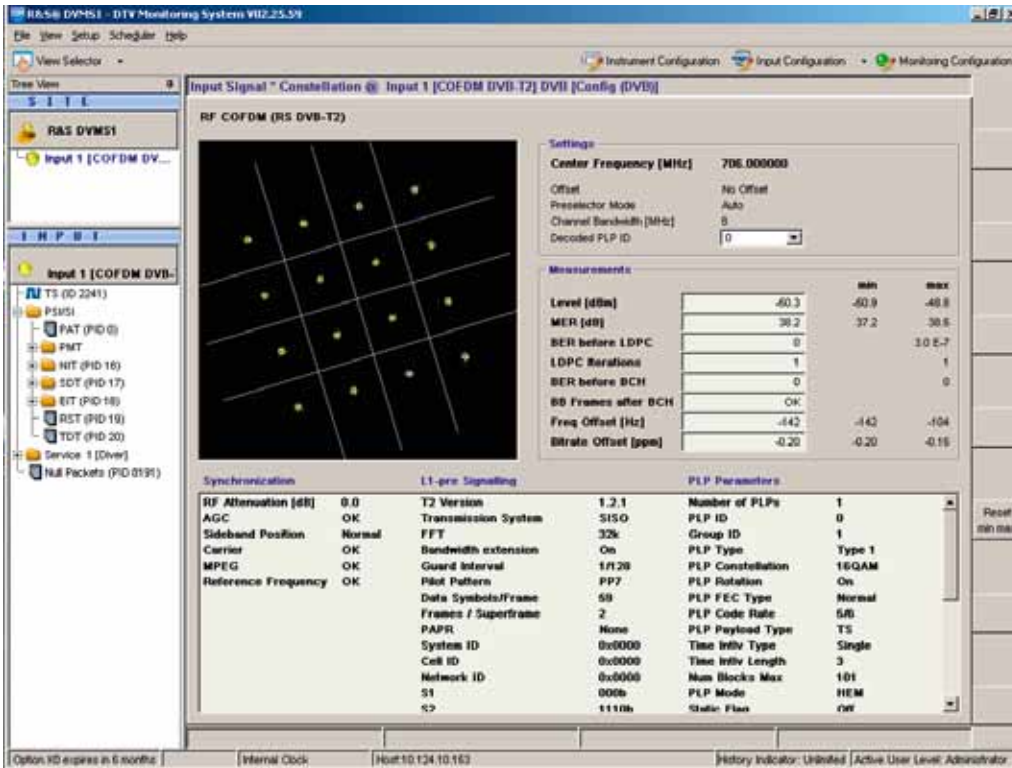
Extensive analysis and visualization functions

Constellation display

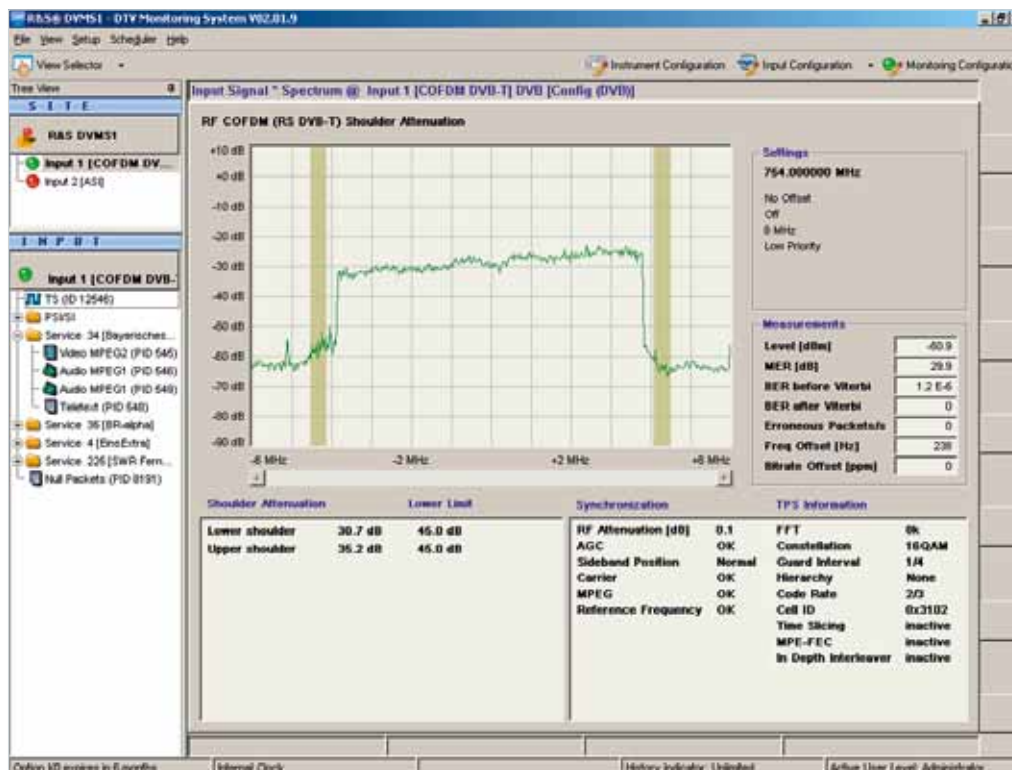
A constellation display visualizes the measurement results.

Spectrum display (DVB-T and DVB-T2)

The spectrum of the selected channel is shown, and upper and lower shoulder values are calculated.



Constellation diagram of a DVB-T2 signal.



Spectrum of a DVB-T signal.

Echo pattern display (DVB-T and DVB-T2)

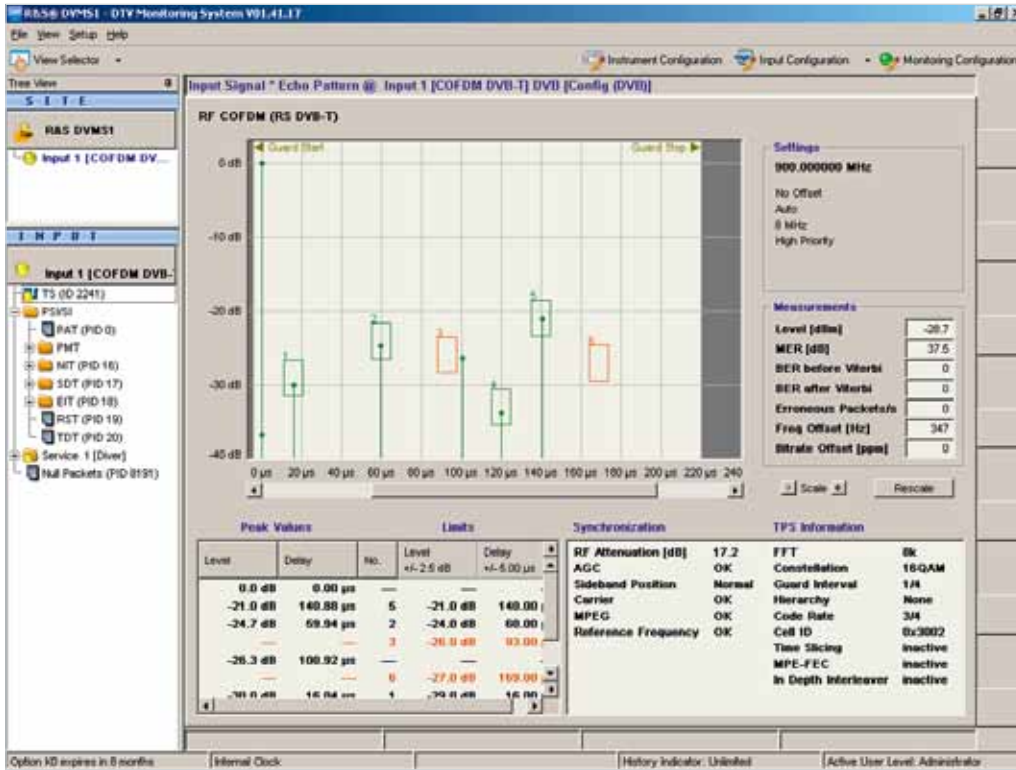
Up to 16 impulses are shown in graphical and tabular form. For ease of use, the user-defined limits are indicated.

MDI display (IP flows)

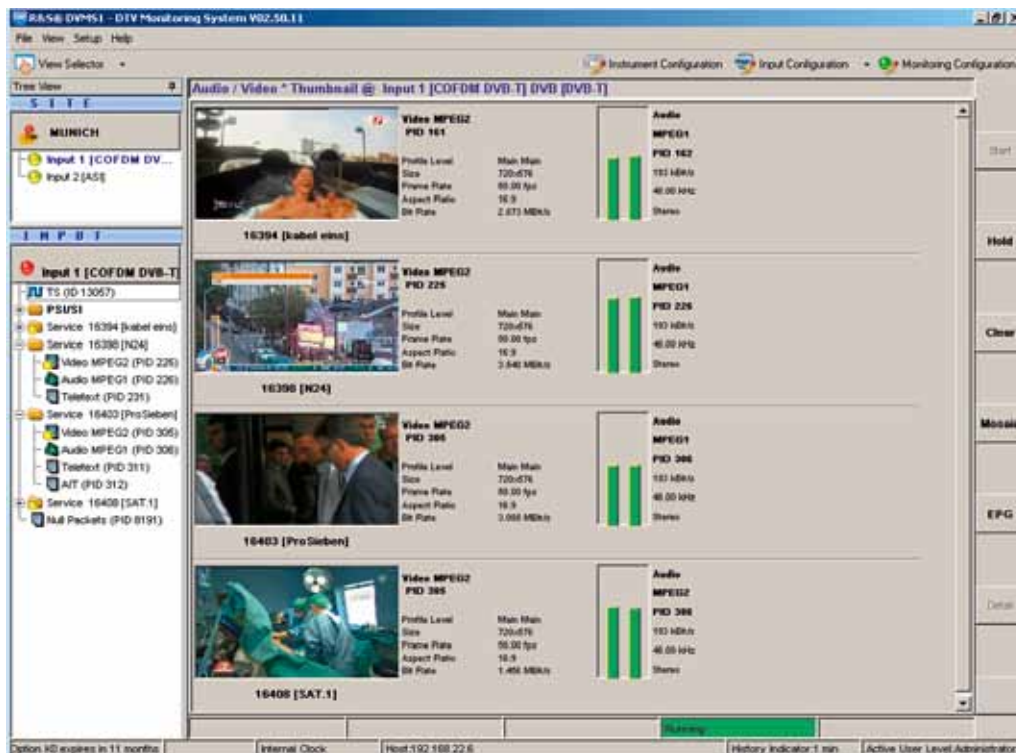
Display of the MDI delay factor and the MDI media loss rate over time.

Thumbnail display

This display shows SD and HD signals with both MPEG-2 and MPEG-4/H.264/AVC coding. The volume of the accompanying audio data is visualized for each channel using bargraphs (MPEG-2 and Dolby Digital).



Echo pattern of a DVB-T signal.



Thumbnails and audio levels.

EPG display

All EIT tables (actual and other) are evaluated (DVB and ATSC). A clearly structured display – the EPG display – is generated from this data. For analysis purposes, the data can be easily referenced to the individual tables.

Graphic display of data rates and table repetition rates

For all PIDs and tables, the corresponding value is represented as a bargraph. Maximum and minimum values are also shown.

Table interpreter

Table contents (SI/PSI/PSIP) can be represented in an easy-to-read form.

PCR analysis

The following parameters are measured and displayed graphically over time in line with TR 101 290: PCR offset, PCR drift rate, PCR overall jitter, PCR accuracy and PCR repetition. For the measurements, one of three profiles (MGF1, MGF2 or MGF3) can be selected.

PTS analysis

The difference between PCR and PTS is shown graphically.

Analysis of DVB object and data carousels

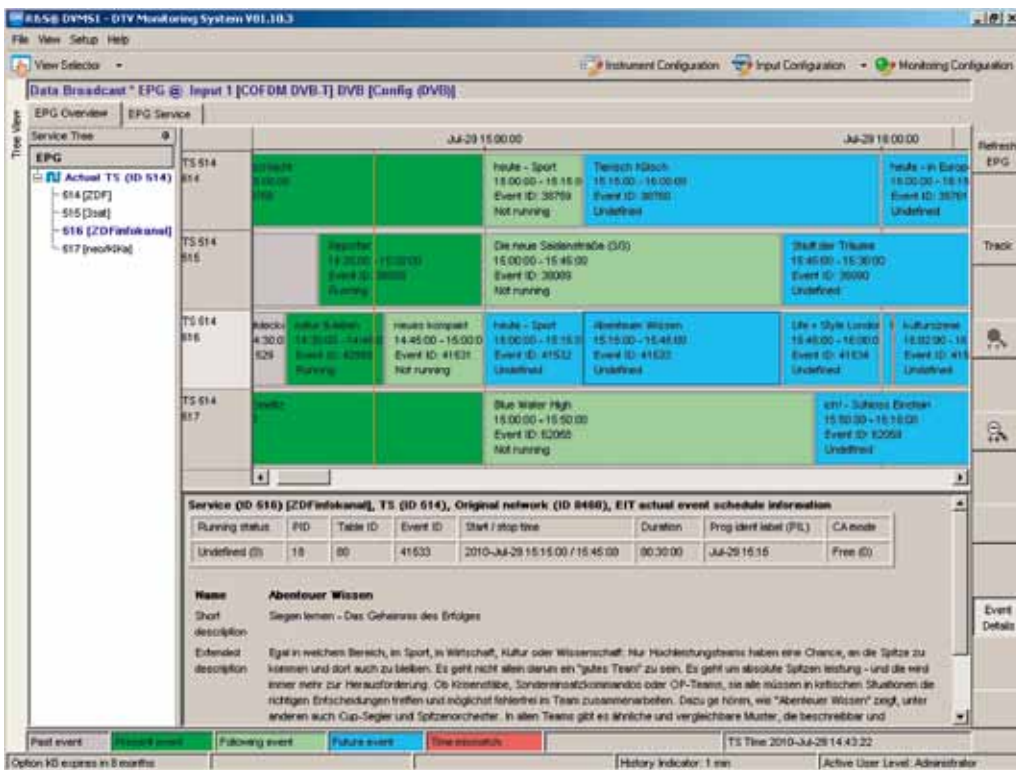
The carousels are used, for example, for system software update (SSU) and HbbTV®. The structure, syntax and timing of the carousels are analyzed and displayed.

Elementary stream analysis for video and audio according to the buffer model

A display shows the extent to which the transport buffer, multiplex buffer and elementary buffer are filled over time. SD and HD signals are supported in both MPEG-2 and MPEG-4/H.264/AVC coding. For audio signals, MPEG-1 layer 2 is supported. The analysis is performed according to the video buffer verifier (VBV) method or the leak method.

Analysis of video encoding quality (qPSNR analysis)

The encoding quality of MPEG-2 SD signals is determined in realtime and displayed graphically as a value over time and as a histogram. Both the measurement values and the video sequences that have a value below the defined limit are recorded on the hard drive for subsequent analysis. The analysis can be performed at any point along the transmission path, because no reference signal is required.



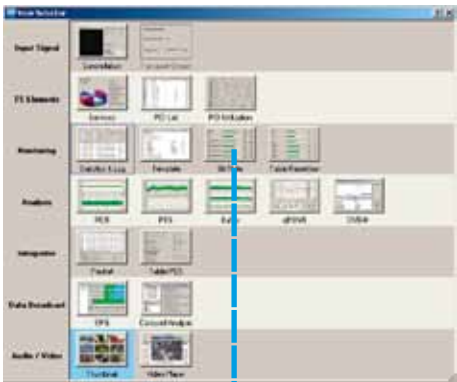
Electronic program guide (EPG) in tabular form.

Simple operation and configuration

The user interface has a clear structure and is very easy to operate. Configuration and operation are distinctly separated from each other. This makes work for the user fast and efficient. All monitoring functions and limits can be configured down to the very last detail. Protection against unauthorized use is provided by defining user-specific operation rights.

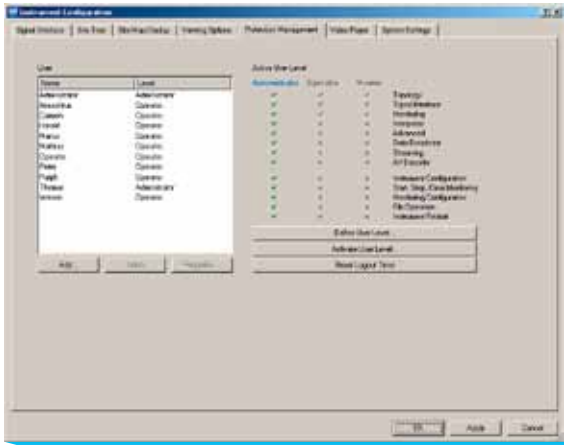
Operating concept

View Selector
Selection of the measurement view



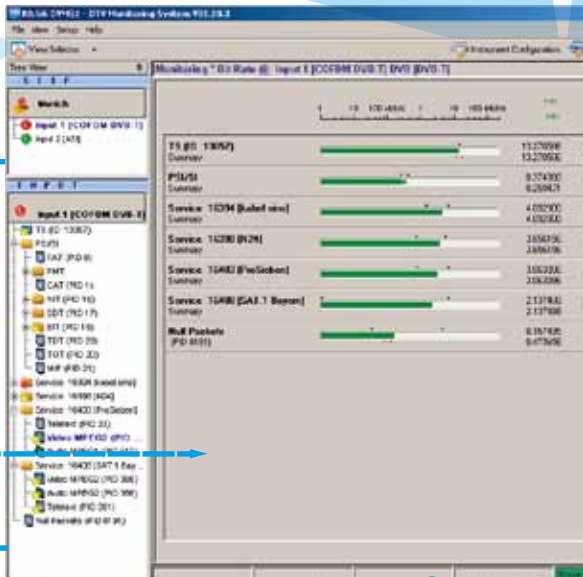
Measurement view selection

Instrument Configuration
Configuration of all instrument settings



Input selection

Element selection



The clearly structured dialogs for all settings are one of the instrument's special highlights:

- **View Selector:**
Icons enable the user to easily select the different measurement views and to quickly activate them
- **Instrument Configuration:**
This dialog provides all the settings for the instrument
- **Input Configuration:**
This dialog is used to set the parameters for signal reception

- **Monitoring Configuration:**
The settings for all measurements can be selected in a clearcut window (e.g. measurement active, measurement not active, limits, class, alarm line). The Hiding of Events function makes it possible to suppress individual measurements for specific PIDs

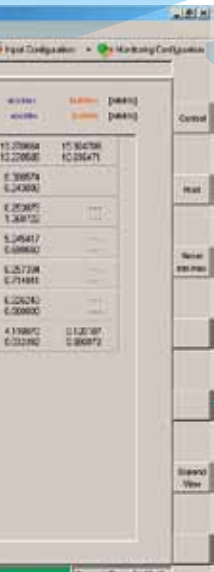
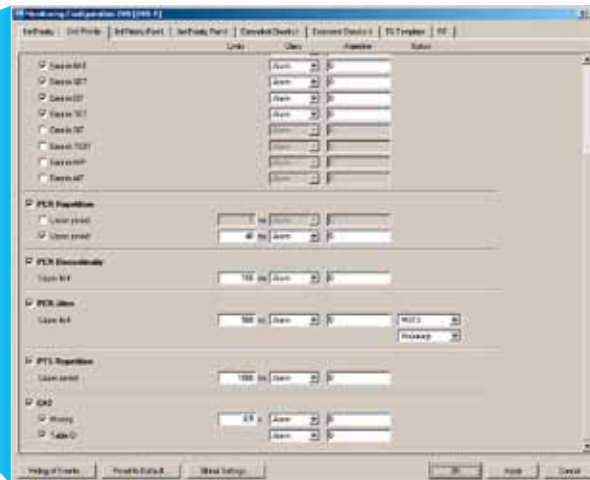
Input Configuration

Configuration of the selected measurement input



Monitoring Configuration

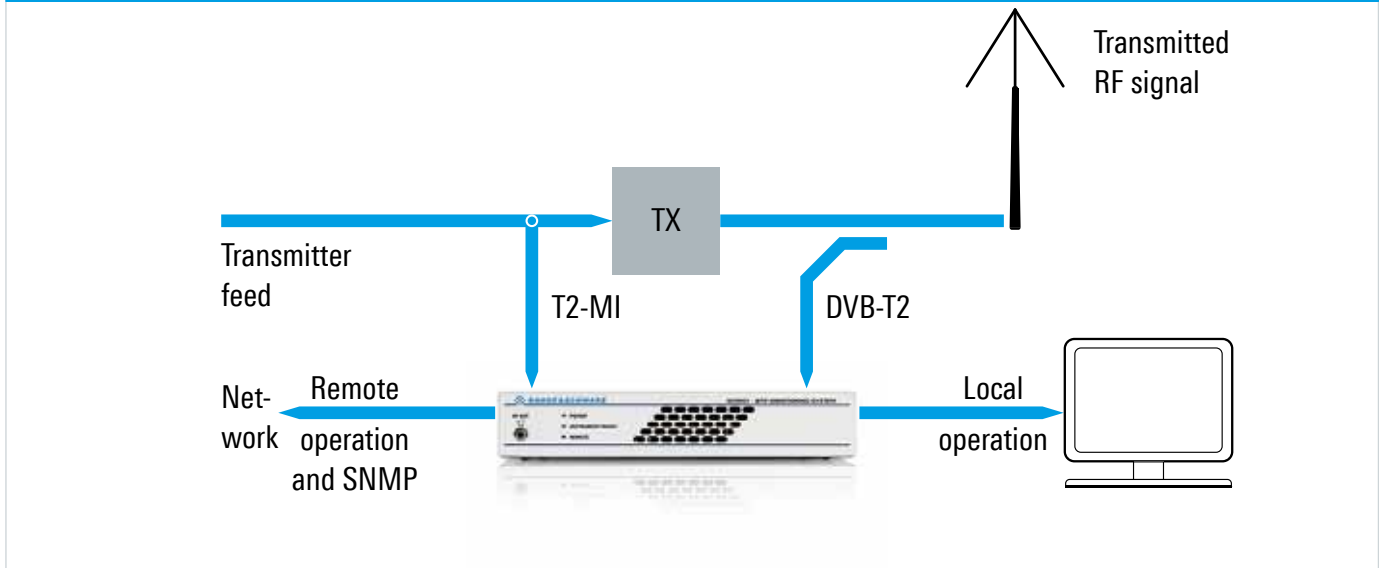
Configuration of all measurements (RF and TS) for monitoring the selected input



Operation of the selected measurement view

Use cases

Monitoring of a single DVB-T2 transmitter including related transmitter feed



Monitoring of a single DVB-T2 transmitter including related transmitter feed

The R&S®DVMS1 is used to monitor both the broadcast signal (RF and PLP characteristics) and the T2-MI signal fed to the transmitter.

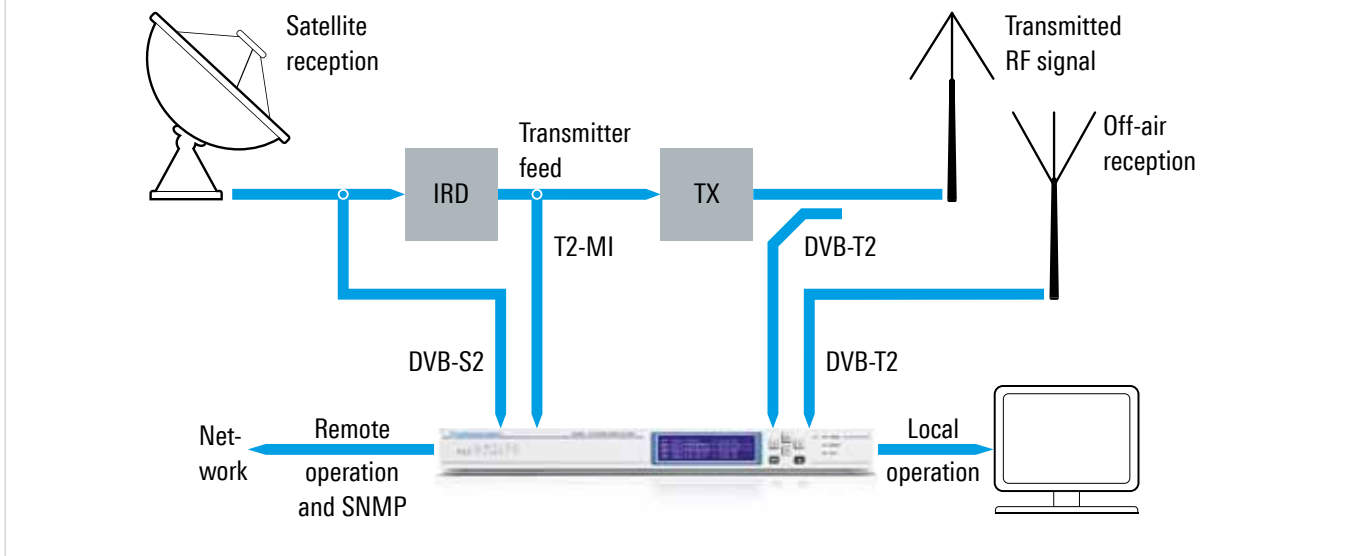
Monitored signals:

- Transmitter feed (T2-MI over ASI)
- Transmitter output (DVB-T2)

Required modules

Quantity	Type	Designation
1	R&S®DVMS-B55	DVB-T/DVB-T2 receiver module

Monitoring of one MUX at a transmitter site



Monitoring of one MUX at the transmitter site

The R&S®DVMS4 is used for monitoring one MUX at a transmitter site. The SFN characteristics are monitored using directional antennas to receive the signals from all transmitters in the SFN.

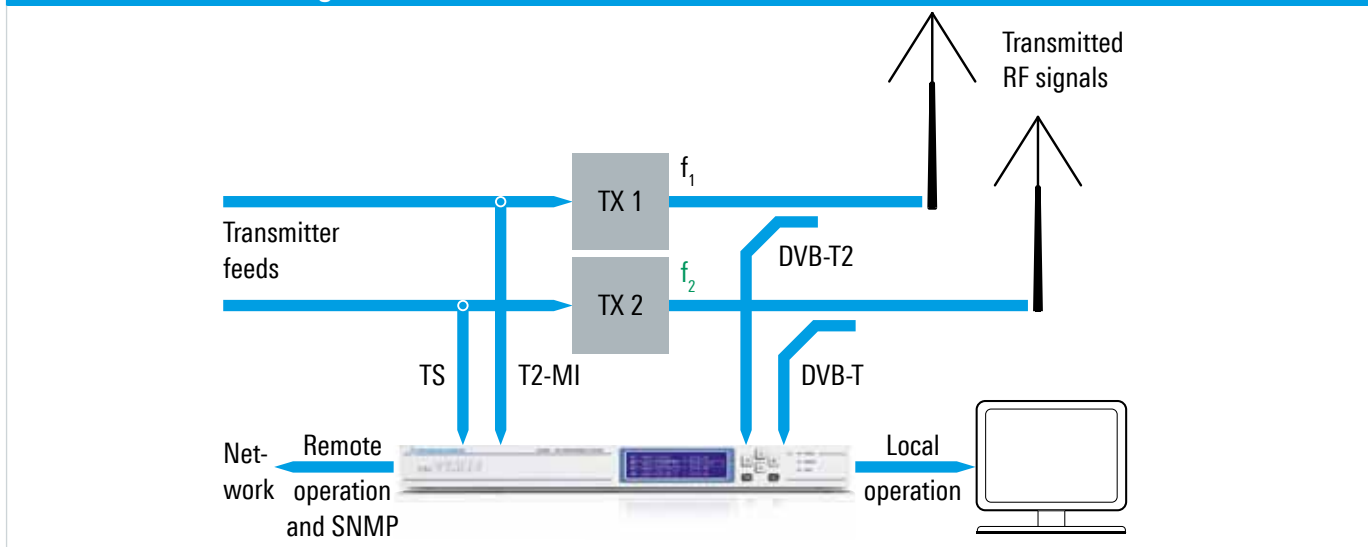
Monitored signals:

- Signal reception (DVB-S2)
- Transmitter feed (T2-MI over IP)
- Transmitter output (DVB-T2)
- SFN characteristics (DVB-T2)

Required modules

Quantity	Type	Designation
2	R&S®DVMS-B55	DVB-T/DVB-T2 receiver module
1	R&S®DVMS-B51	DVB-S/DVB-S2 receiver module
1	R&S®DVMS-B40	IP module

Simultaneous monitoring of one DVB-T and one DVB-T2 transmitter and related transmitter feeds



Simultaneous monitoring of one DVB-T and one DVB-T2 transmitter and related transmitter feeds

The R&S®DVMS4 is used to monitor both the broadcast signals (RF and PLP/TS characteristics) and the T2-MI/TS signals fed to the transmitter. Monitored signals:

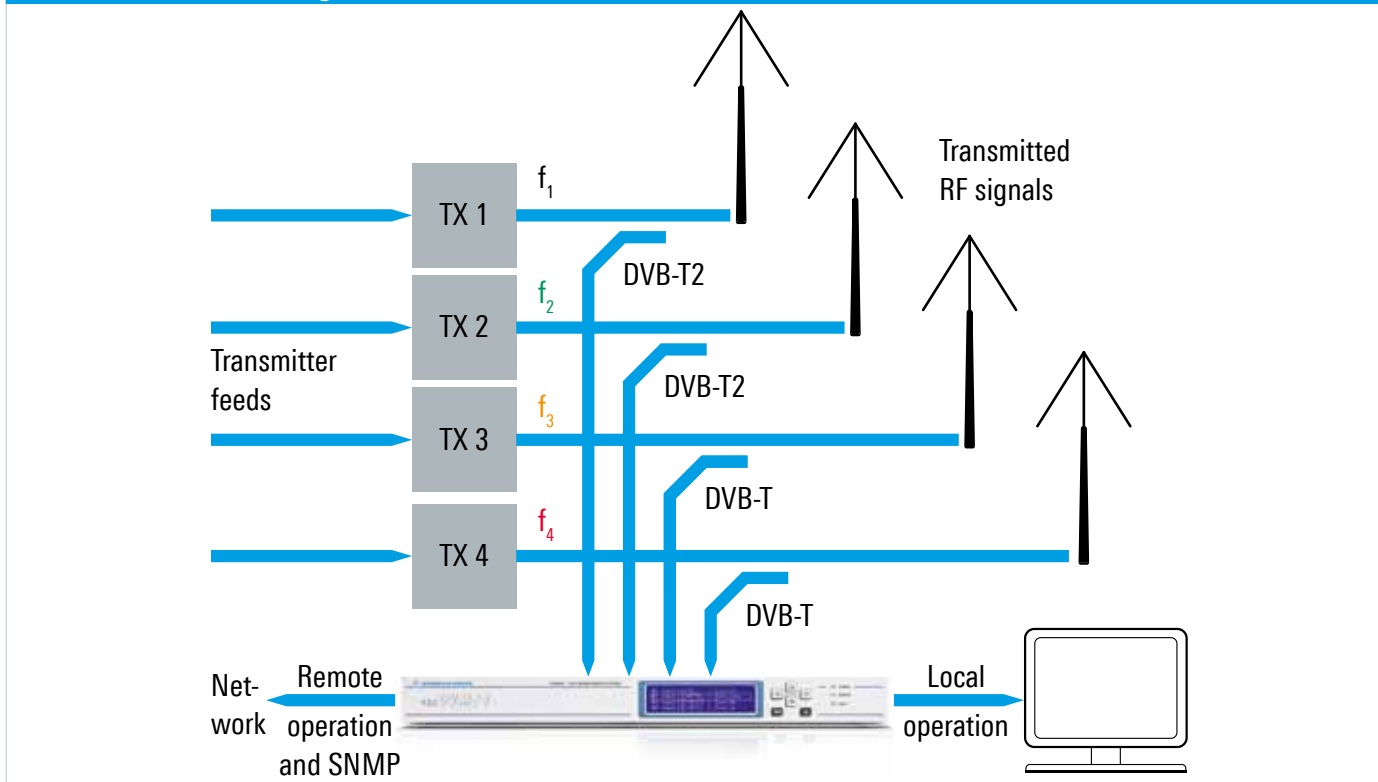
- 2 × transmitter feed (T2-MI over IP and TS over IP)
- 2 × transmitter output (DVB-T and DVB-T2)

Required modules

Quantity	Type	Designation
2	R&S®DVMS-B55	DVB-T/DVB-T2 receiver module
1	R&S®DVMS-B40	IP module

Use cases

Simultaneous monitoring of four DVB-T/DVB-T2 transmitters



Simultaneous monitoring of four DVB-T/DVB-T2 transmitters

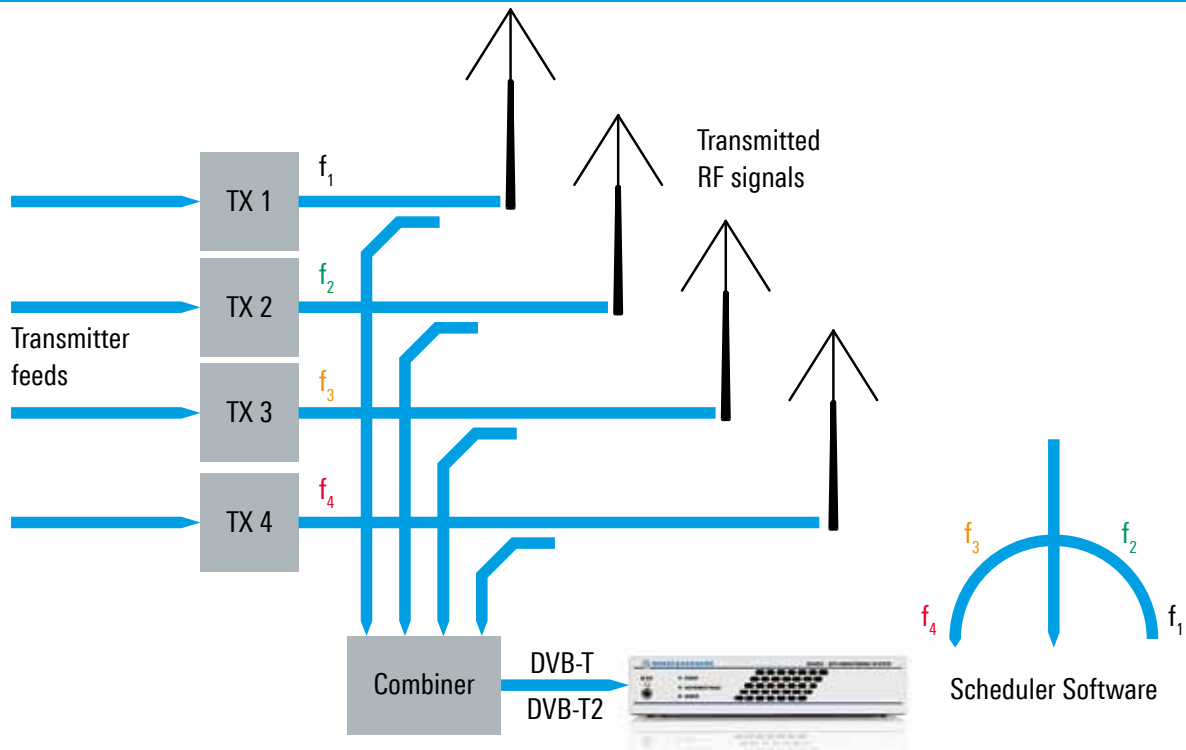
The R&S®DVMS4 is used to monitor the broadcast signals.

Monitored signals:

- 2 × transmitter output (DVB-T)
- 2 × transmitter output (DVB-T2)

Required modules		
Quantity	Type	Designation
4	R&S®DVMS-B55	DVB-T/DVB-T2 receiver module

Monitoring of four DVB-T/DVB-T2 transmitters (round robin)



Monitoring of four DVB-T/DVB-T2 transmitters (round robin)

The R&S®DVMS1 is used to monitor the broadcast signals. Scheduler Suite is used to sequentially monitor several signals with one DVB-T/DVB-T2 module. Monitored signals:

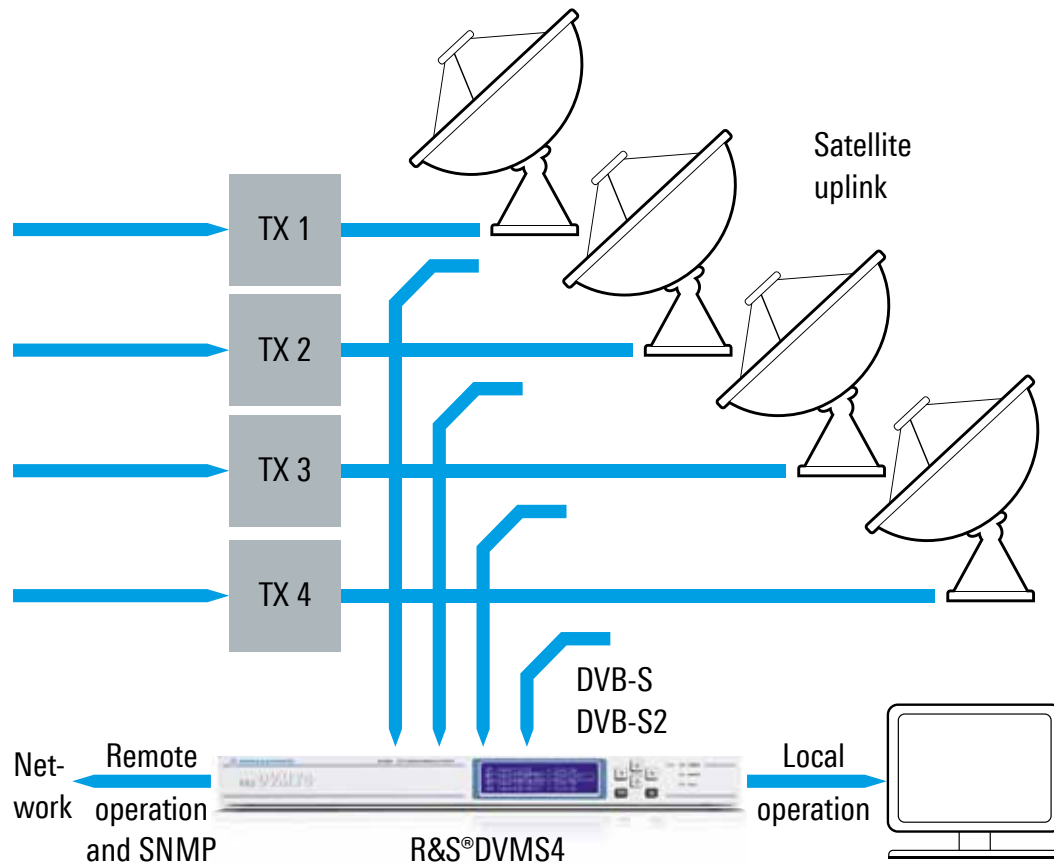
- 4 x transmitter output, sequentially (DVB-T/DVB-T2)

Required modules

Quantity	Type	Designation
1	R&S®DVMS-B55	DVB-T/DVB-T2 receiver module

Use cases

Simultaneous monitoring of four DVB-S/DVB-S2 uplinks



Simultaneous monitoring of four DVB-S/DVB-S2 uplinks

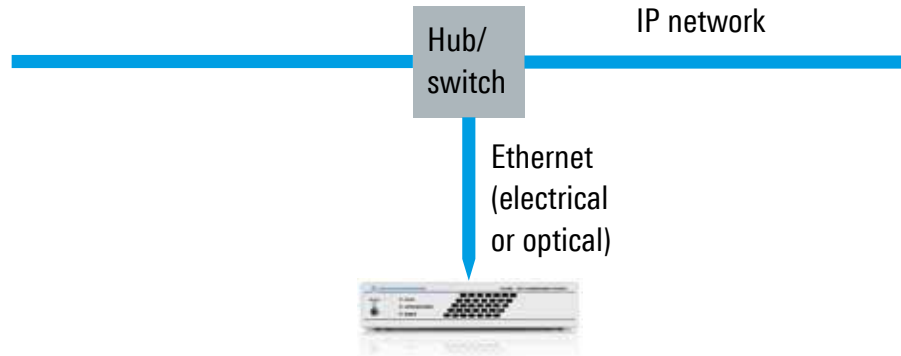
The R&S®DVMS4 is used to monitor four DVB-S/DVB-S2 signals. Monitored signals:

- 4 x satellite uplink (DVB-S/DVB-S2)

Required modules

Quantity	Type	Designation
4	R&S®DVMS-B51	DVB-S/DVB-S2 receiver module

Simultaneous monitoring of four IP flows containing TS or T2-MI signals



Simultaneous monitoring of four IP flows containing TS or T2-MI signals

The R&S®DVMS1 is used to monitor four TS or T2-MI IP flows. Monitored signals:

- 4 × IP flow (TS or T2-MI)

Required modules

Quantity	Type	Designation
1	R&S®DVMS-B40	IP module

R&S®DVMS in research and development



R&S®DVMS in research and development

The R&S®DVMS1 or R&S®DVMS4 is used for detailed stream analysis.

Examples of devices under test:

- Encoder
- Multiplexer
- Gateway
- Transmitter

Supported stream characteristics:

- DVB/T2-MI
- ATSC
- ISDB-T/T_B/BTS

Signal connections:

- ASI
- IP (electrical and optical)
- RF (DVB-T/DVB-T2 and/or DVB-S/DVB-S2)

Required modules

Depends on required interfaces

Use of multiple R&S®DVMS in one system

The instruments of the R&S®DVMS family have a powerful SNMP interface. As a result, they can easily be integrated into SNMP-based network management software (see figure on this page). For using multiple R&S®DVMS in one system, Rohde&Schwarz offers the following two software solutions:

R&S®DTV monitoring manager software

This software makes it easy to use multiple R&S®DVMS and/or R&S®DVM in one network.

Key features

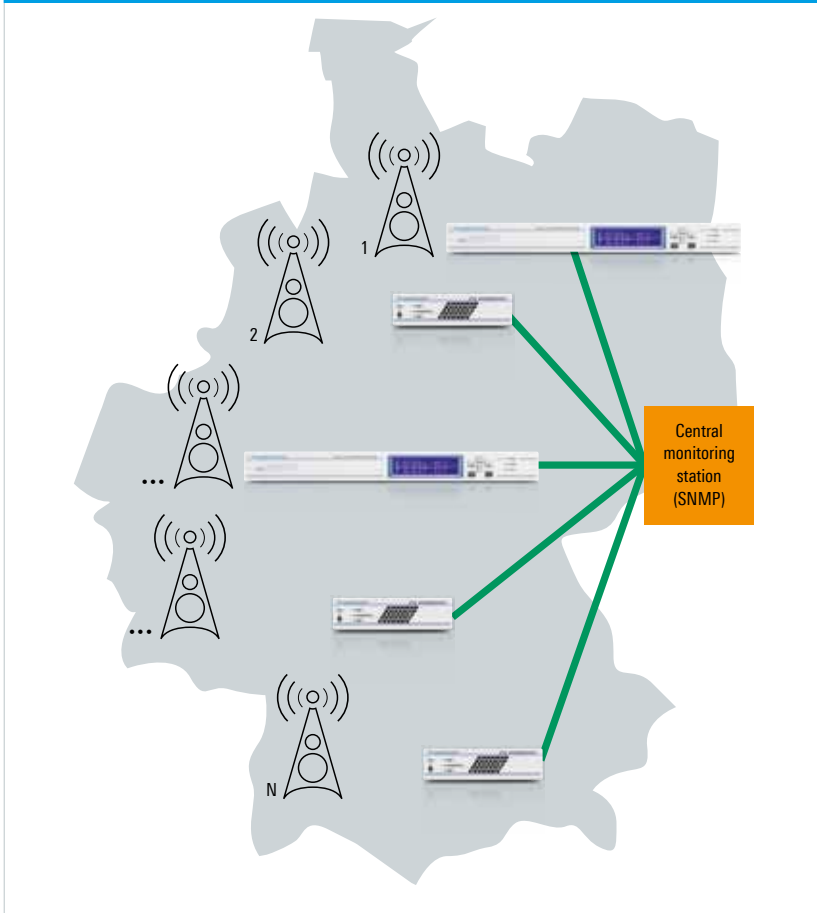
- Good overview of the status of all signals that are monitored
- Simple access to the instrument by a mouse click on the associated icon

All the instruments can be located in the same room (for example, in a rack) or distributed across a country. To integrate the measuring instruments into the software, only their IP address must be known. No other settings or SNMP knowledge is required.

Display features

- Measurement symbols on user-defined maps
- Various map layers for convenient monitoring of large networks

Connection to a central monitoring station via SNMP



R&S®TS4570 broadcast network monitoring and control software

For applications requiring additional functions or equipment in addition to the R&S®DVMS or R&S®DVM, Rohde&Schwarz offers another, extremely flexible solution – the R&S®TS4570 broadcast network monitoring and control system. This open system allows the rapid integration of any instruments with SNMP interface. The MIBs of all instruments are interpreted by the system. As a result, the user can easily implement functions without detailed SNMP or programming knowledge.

Key components

- Hierarchal network overview: via geographical maps and individual workflow diagrams
- Quality of service reporter: to log and measure performance data to prove service level agreements (SLA)
- Graphical system configuration tool: provides easy-to-use system design capabilities
- SNMP agent: enables interface to other management systems
- Web server: ensures remote access

For detailed information about the system, see the following brochure: R&S®TS4570 Broadcast Network Monitoring and Control Software – flexible SNMP-based network management solution (available under PD 5214.3881.12 or at www.rohde-schwarz.com).



Map view of R&S®TS4570.

Ordering information

Designation	Type	Order No.
Base unit		
DTV Monitoring System	R&S®DVMS1	2113.9305.02
DTV Monitoring System	R&S®DVMS4	2113.7560.02
Included: CD-ROM with firmware, software and manual; power cord; printed quick start guide		
Modules and module options		
DVB-T/DVB-T2 Receiver Module	R&S®DVMS-B55	2113.8850.02
DVB-T2 Demodulator	R&S®DVMS-K54	2113.9292.02
DVB-T Demodulator	R&S®DVMS-K53	2113.9286.02
Spectrum and Shoulder Attenuation	R&S®DVMS-K57	2113.9228.02
Echo Pattern	R&S®DVMS-K58	2113.9192.02
High-Quality MER Measurement	R&S®DVMS-K59	2113.9205.02
DVB-S/DVB-S2 Receiver Module	R&S®DVMS-B51	2113.8950.02
IP Module	R&S®DVMS-B40	2113.8938.02
Single TS Input Module	R&S®DVMS-B11	2113.8896.02
TS monitoring		
TS Monitoring	R&S®DVMS-K1	2113.9028.02
Instrument options		
Monitoring		
Advanced TS Monitoring	R&S®DVMS-K11	2113.9034.02
T2-MI Extension	R&S®DVMS-K3	2113.9234.02
TS Template Monitoring	R&S®DVMS-K12	2113.9040.02
TS Capture	R&S®DVMS-K18	2113.9086.02
Analysis		
EPG Display	R&S®DVMS-K16	2113.9063.02
Thumbnail Display	R&S®DVMS-K17	2113.9070.02
PCR/PTS Analysis	R&S®DVMS-K19	2113.9092.02
Interpreter	R&S®DVMS-K20	2113.9105.02
qPSNR Analysis	R&S®DVMS-K21	2113.9111.02
Carousel and MPE Analysis	R&S®DVMS-K22	2113.9128.02
DVB-H Analysis	R&S®DVMS-K23	2113.9134.02
Buffer Analysis	R&S®DVMS-K24	2113.9140.02
Miscellaneous		
Calibration Documentation	R&S®DVMS-DCV	2082.0490.35
Printout of DCV	R&S®DCV-ZP	1173.6506.02
19" Adapter for 1 × R&S®DVMS1 in 1 HU	R&S®ZZA-DVMS1	2113.9886.00
19" Adapter for 2 × R&S®DVMS1 in 1 HU	R&S®ZZA-DVMS1	2113.9805.02
US Keyboard with USB Connector	R&S®PSL-Z2	1157.6870.04
Optical Mouse with USB Connector	R&S®PSL-Z10	1157.7060.04
Option packages		
Monitoring Option Package (including R&S®DVMS-K11, R&S®DVMS-K12 and R&S®DVMS-K18)	R&S®DVMS-PK01	2113.9240.02
Analysis Option Package (including R&S®DVMS-K16, R&S®DVMS-K17, R&S®DVMS-K19 and R&S®DVMS-K20)	R&S®DVMS-PK02	2113.9257.02

Service options

Extended Warranty, one year	R&S®WE1DVMS	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2DVMS	
Extended Warranty, three years	R&S®WE3DVMS	
Extended Warranty, four years	R&S®WE4DVMS	
Extended Warranty with Calibration Coverage, one year	R&S®CW1DVMS	
Extended Warranty with Calibration Coverage, two years	R&S®CW2DVMS	
Extended Warranty with Calibration Coverage, three years	R&S®CW3DVMS	
Extended Warranty with Calibration Coverage, four years	R&S®CW4DVMS	

For data sheet, see PD 5214.4788.22 and www.rohde-schwarz.com.

R&S® DVMS configuration guide

- TS inputs can handle TS, BTS or T2-MI (R&S® DVMS-K3) signals
- Maximum input bit rate across all IP flows: 360 Mbit/s (equally divided across all signals/IP flows)
- Maximum input bit rate across all RF/ASI inputs: 66 Mbit/s (equally divided across all signals)
- Maximum number of simultaneously monitored PLPs per R&S® DVMS: 16

Base unit

- R&S® DVMS1 requires one module option
- Maximum number of simultaneously used inputs / IP flows: 4 in total

Module slot

R&S® DVMS1

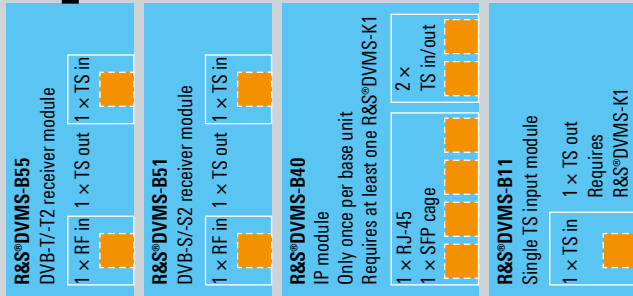
TS monitoring

- Up to 4 times per base unit (depending on installed module)
- Use of TS inputs / IP flows requires assignment of R&S® DVMS-K1

R&S® DVMS-K1
TS monitoring

Modules

- RF modules include RF monitoring
- TS monitoring requires R&S® DVMS-K1 (one per input)



Module options

- Each R&S® DVMS-B55 requires at least one R&S® DVMS-K53 or -K54



Instrument options

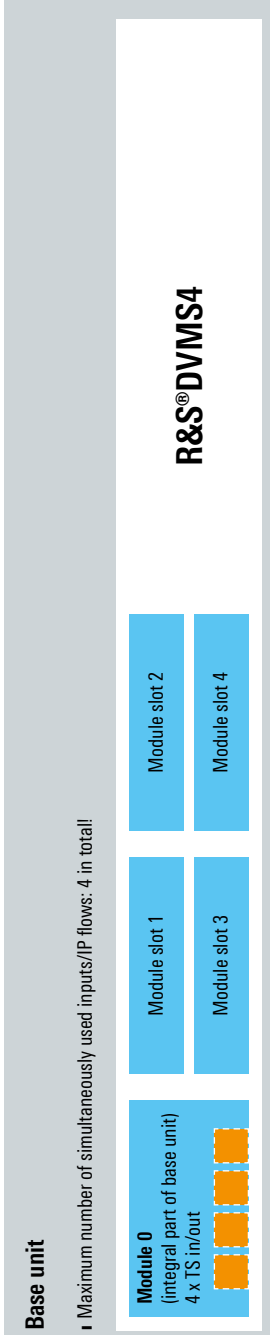


Hardware option

Software option
up to 4 times
per base unit

Software option
only required once
per base unit

- TS inputs can handle TS, BTS or T2-MI (R&S®DVMS-K3) signals
- Maximum input bit rate across all inputs/IP flows: 360 Mbit/s (equally divided across all signals/IP flows)
- Maximum number of simultaneously monitored PLPs per R&S®DVMS: 16



Base unit

- Maximum number of simultaneously used inputs/IP flows: 4 in total!

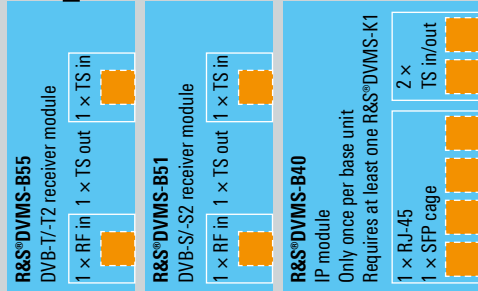
TS monitoring

- At least one R&S®DVMS-K1 required if no module is selected
- Use of TS inputs/IP flows requires assignment of R&S®DVMS-K1



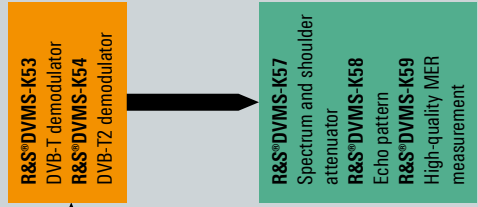
Modules

- RF modules include RF monitoring
- TS monitoring requires R&S®DVMS-K1 (one per input)



Module options

- Each R&S®DVMS-B55 requires at least one R&S®DVMS-K53 or -K54



Instrument options



Hardware option

Software option
up to 4 times per base unit

Software option
only required once per base unit

Your local Rohde&Schwarz expert will help you determine the optimum solution for your requirements. To find your nearest Rohde&Schwarz representative, visit www.sales.rohde-schwarz.com. An electronic product configurator is available on the Internet pages for the R&S®DVMS family (www.rohde-schwarz.com, search term: DVMS).

Service you can rely on

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

About Rohde & Schwarz

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

Environmental commitment

- ▮ Energy-efficient products
- ▮ Continuous improvement in environmental sustainability
- ▮ ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

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