ATSC/8VSB Digital TV Monitor

RFM300 Data Sheet

Features & Benefits

- Comprehensive 8VSB confidence monitoring for ATSC broadcast networks. Includes monitoring of the symbol distribution waterfall chart and MER, BER and SNR measurements for continuous monitoring of signal quality
- PSIP conformance and consistency checking, including Closed Caption (EIA608/708) and Regional Ratings Descriptor (RRT), allows broadcasters to determine the system is compliant with FCC regulations
- Monitoring in accordance with A/78 enables filtering and display only of errors that require immediate attention
  - Transport Stream Off-Air (TOA), Program Off-Air (POA), Component Missing (CM), Quality of Service (QoS), Technically Nonconforming (TNC)
- DPI monitoring allows analysis and diagnostics of "splice" advertising and other local content
- When used in conjunction with the VQS1000 Video Quality Software application, provides reliable and sophisticated analysis algorithms applied to decoded MPEG-2 or H.264 video to identify stuck, black, macro-blocking, and compression artifacts

Applications

- The RFM300 is a powerful solution for monitoring ATSC transmitter sites and off-air monitoring, as well as contribution and distribution monitoring at local and national operation centers and headends

RFM300 Delivers Comprehensive DTV Monitoring

The RFM300 provides a complete solution for real-time DTV monitoring of MPEG transport streams. The comprehensive RF and PSIP confidence-monitoring capability provides a powerful and cost-effective solution for monitoring DTV transmitter sites, along with contribution and distribution feeds at local and national operation centers for FCC compliance.

The RFM300 delivers comprehensive RF 8VSB measurements which include symbol distribution waterfall chart, MER and PSIP analysis (includes an Electronic Program Guide). This can be combined with a single diagnostic option to provide enhanced diagnostic capability that includes detailed service logging, in-depth PCR analysis, triggered recording and template testing. The extended confidence-monitoring probes can be installed throughout the network and powerful diagnostic capability can be added to the key monitoring points where transport streams are manipulated.

When used together with VQNet™, facility and network-wide views allow engineers to sectionalize network problems.

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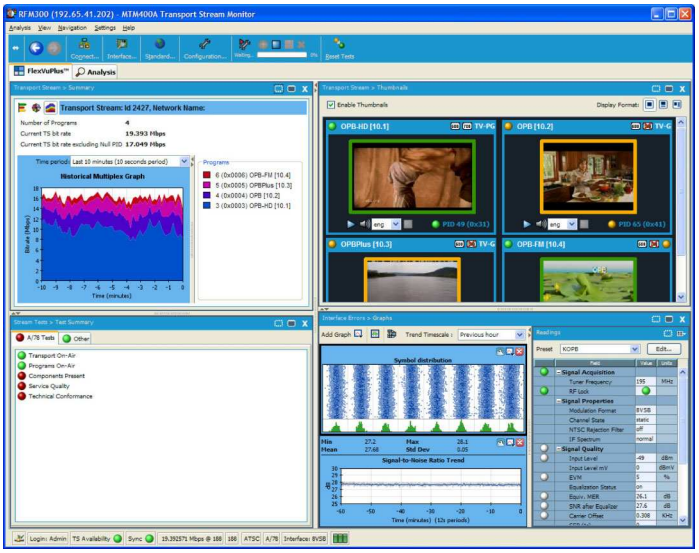
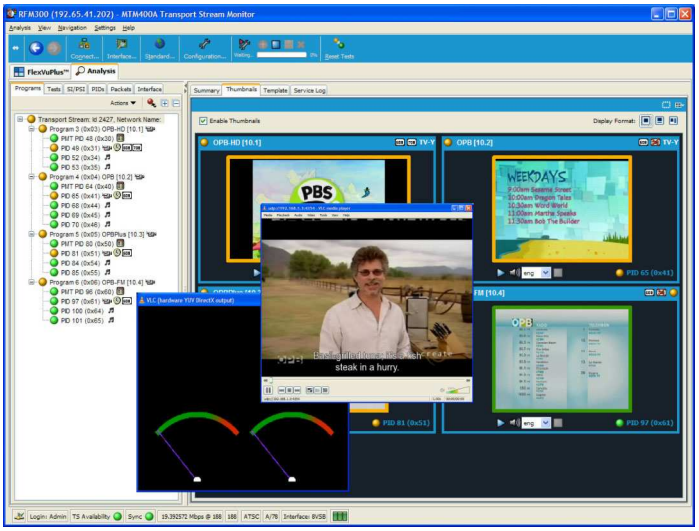
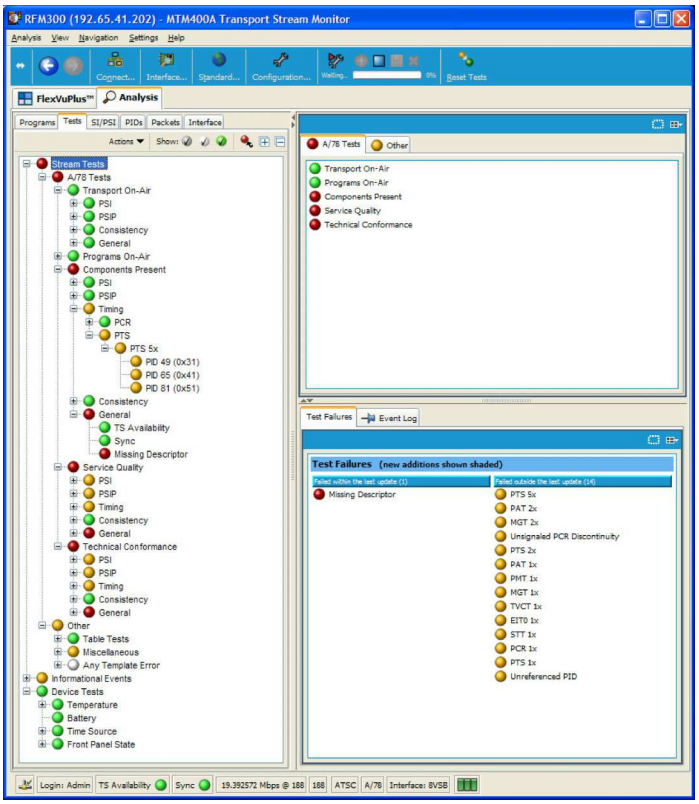


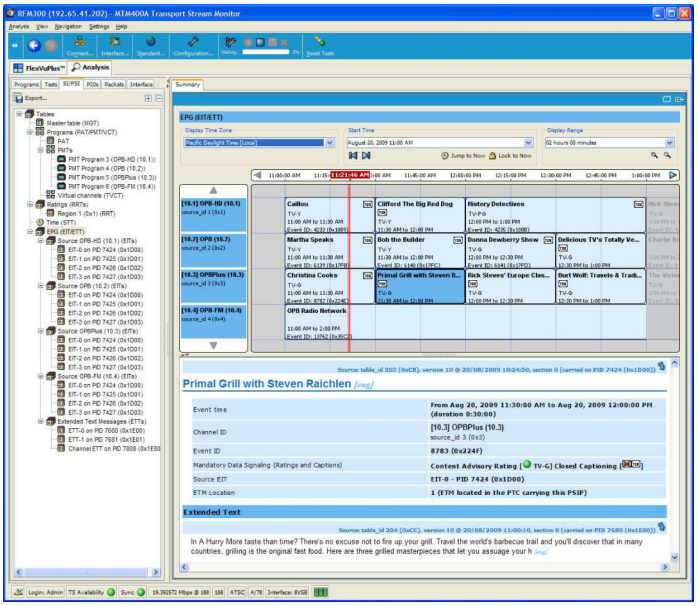
FlexVuPlus™ configurable windows in ATSC mode.



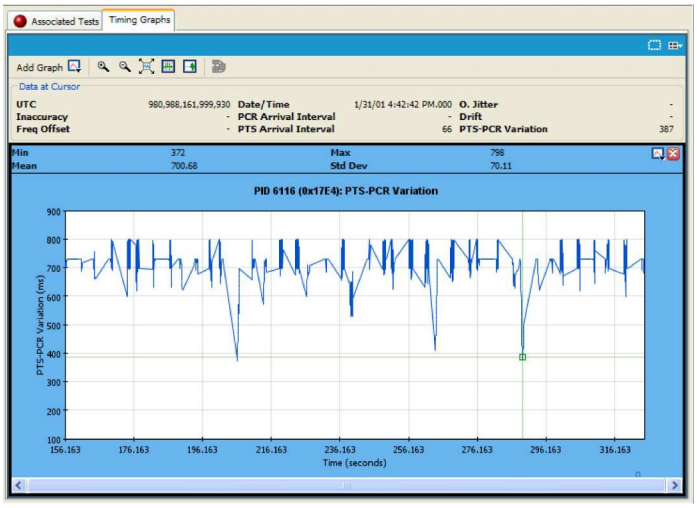
Video and audio content monitoring to ensure QoE is maintained.



A/78 modes classify five distinct levels of importance.



EPG View



Advanced Timing Analysis including PTS-PCR for real-time buffer measurements to give indication of encoding and multiplexing errors.

Characteristics

8VSB Interface Characteristics

Characteristic	Description
Input Frequency Range	54 MHz to 860 MHz, VHF/UHF channels 2 to 69 (to include low VHF frequencies)
Input Signal Level	-72 dBm to -6 dBm (-23 dBmV to +43 dBmV) typical
Modulation Format	8VSB in accordance with ATSC A/53B
Receiver Bandwidth	6 MHz
Input Termination Impedance	75 Ω nominal
Connector Type	F Type Connector
Input Return Loss	5 dB typical

8VSB Measurement Characteristics

Characteristic	Description			
RF Lock	RF lock is indicated by a LED on the rear panel and a status indicator on the UI. This includes the ability to set alarms and produce trend graphs over a seven-day period including min, max and average			
	Range	**Display Range**	**Resolution**	**Accuracy**
Input Level	-72 dBm to -2 dBm -23 dBmV to +47 dBmV relative to 75 Ω	–	1 dB	±3 dB up to -6 dBm input level typical
Error Vector Magnitude (EVM)	–	3% to 12.5% RMS	0.1% typical	–
Equivalent MER (Modulation Error Ratio)	–	15 dB to 36 dB	1 dB	±1 dB for MER <25 dB typical ±3 dB for MER 25 dB to 32 dB typical
Signal to Noise Ratio (SNR)	–	15 dB to 35 dB	1 dB	±1 dB for SNR <25 dB ±3 dB for SNR 25 dB to 35 dB typical
This includes the ability to set alarms and produce trend graphs over a seven-day period including min, max and average.				
Bit Error Ratio (BER)	Pre FEC, SER and Error Sec BER values displayed on UI. This includes the ability to set alarms and produce trend graphs over a seven-day period including min, max and average			
Symbol Distribution	The Symbol Distribution is displayed on the UI			

ASI Characteristics

Characteristic	Description
Data Rate	
Maximum Data Rate	155 Mbps*2
Minimum Data Rate	250 Kb/s

*2 Maximum transport stream bit rate is dependent on transport stream content and depth of analysis being performed. Depth of stream analysis is handled gracefully if SI/PSIP max content is exceeded to ensure critical measurements continue to be performed.

ATSC A/78A Error Classifications

Classification	Description
TOA	Transport Stream Off Air
POA	Program Off Air
CM	Component Missing
QOS	Quality Of Service
TNC	Technically Nonconforming

TR 101 290 Tests and Measurements

1st Priority Measurements	2nd Priority Measurements	3rd Priority Measurements
1.1 Ts_sync_loss	2.1 Transport error	3.1a NIT_actual_error
1.2 Sync_byte_error	2.2 CRC_error	3.1b NIT_other_error
1.3a PAT_error_2	2.3a PCR_repetition_error	3.2 SI repetition error
1.4 Continuity_count_error	2.3b PCR_discontinuity_indicator	3.4a Unreferenced PID error
1.5a PMT_error_2	2.4 PCR_accuracy_error	3.5a SDT_actual_error
1.6 PID_error	2.5 PTS_error	3.5b SDT_other_error
	2.6 CAT_error	3.6a EIT_actual_error
		3.6b EIT_other_error
		3.6c EIT_PF_error
		3.7 RST_error
		3.8 TDT_error

Other Measurements

Any Table Syntax	PAT/PMT Consistency	DPI/SIT Any Errors
A/65 MGT	Other Repetition Tests	PID Group Occupancy
A/65 STT	TS Availability	PID Bit Rate Variability
A/65 RRT	PID Occupancy	Discontinuity
A/65 EIT	Prog Occupancy	A/65 Base ID
A/65 VCT	PCR Overall Jitter (PCR_OJ)	A/53 non-AC3 Audio
A/65 ETT	PCR Frequency Offset (PCR_FO)	Transport Stream Bit Rate
MGT/R+EIT-K Presence	PCR Drift Rate (PCR_DR)	Service Log Overflow

Power Requirements

Characteristic	Description
Power Consumption (nominal)	40 VA
Voltage	100 to 240 V
Frequency	50/60 Hz

Environmental

Characteristic	Description
Temperature	
Operating	+5 °C to +40 °C
Nonoperating	-10 °C to +60 °C
Humidity	
Operating	Maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C
Nonoperating	10% to 95% relative humidity, noncondensing
Altitude	
Operating	0 m to 3000 m (9800 ft.)
Nonoperating	0 m to 12000 m (40000 ft.)
Random Vibration	
Operating	5 to 500 Hz, G_{RMS} = 2.28
Nonoperating	.5 to 500 Hz, G_{RMS} = 0.27
Functional Shock	
Operating	30 G, half sine, 11 ms duration
Electromagnetic Compatibility	
EC Declaration of Conformity	Meets EN55103. Electromagnetic environment E4
Australia / New Zealand Declaration of Conformity	Meets AS/NZS 2064
FCC	Emissions are within FCC CFR 47, Part 15, Subpart B, Class A limits
Safety	Meets 73/23/EEC, EN61010-1, UL3111-1, and CAN/CSA 22.2 No. 1010.1-92, IEC61010-1

Physical Characteristics

Dimensions	mm	in.
Height	44	1.73
Width	430	17.13
Depth	600	23.62
Weight*[3]	**kg**	**lb.**
Net	6.0	13.3
Shipping	9.0	19.7
Required Clearance	**mm**	**in.**
Top	0	0
Bottom	0	0
Left Side	Standard 19 in. rackmount	
Right Side	Standard 19 in. rackmount	
Front	Clearance for handles required	
Rear	Clearance for connectors required	

*[3] Weight does not include optional interface cards.

Ordering Information

RFM300 DTV Monitor

Base Product Includes: 1RU chassis fitted with transport stream processor card, 8VSB RF Interface, PSIP service information, manual, rack slides, US power cord and license key certificate.

Options

Opt. DIAG Includes:

- Triggered recording capability up to 160 MB
- Template testing (for user-defined service plan testing)
- In-depth PCR analysis with graphical result views
- Bit rate testing functionality
- Service logging
- RF Polling functionality

International Language Options

- Opt. L0 English User Guide

Complementary Products

- MTS4SA Standalone Deferred-time Software Package
  - Opt. TSCL DVB/ATSC/ARIB TS Compliance Analyzer Software (TS file size limited to 192 MB). For full details see separate data sheet
- VQNet Video Service Assurance Management System
- VQS1000 Video Quality Software application for single-ended QoE analysis of video and audio content

Service

- Opt. R3 Repair Service 3 Years (including warranty)
- Opt. R5 Repair Service 5 Years (including warranty)

Field Upgrade Kits

RFM3UP Opt. DIAG adds the following functionality to existing RFM300:

- Triggered recording capability up to 160 MB
- Template testing (for user-defined service plan testing)
- In-depth PCR analysis with graphical result views
- Bit rate testing functionality
- Service logging
- RF Polling functionality

CE

ISO 9001 Product(s) are manufactured in ISO registered facilities.

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For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit **www.tektronix.com**

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