

# Video Quality Monitors

## Sentry Verify™ Standard Datasheet: VNM-VFY2



Sentry Verify™ monitors and validates MPEG Transport Stream quality at hub sites as an integral part of the source-to-edge monitoring solution.

### Key features

- Real-time 24/7 QoS monitoring and analysis of the entire channel line-up
- In-depth monitoring for compliance to closed captioning standards
- Live thumbnails and Thumbnail Wall
- Comprehensive TR 101 290 measurements
- User-triggered and alert-triggered stream captures
- QoS monitoring for JPEG2000 codec
- Error second and program availability reporting
- Stream to View (video backhauling)
- Historical reporting and graphing
- Transport Stream and Program Group bandwidth graphing
- Analyzer-quality RF measuring capability
- EBIF and Data Carousel monitoring

### Key benefits

- Cost-effective solution for QoS monitoring
- Verify RF and IP transport streams are compliant and stable for delivery
- Reduce operational costs
- Achieve regulatory compliance and protection from fines
- Verify the delivery of ad inserts

### Video quality monitoring with Sentry Verify™

Sentry Verify™ enables video service providers to accurately determine the health of the MPEG/IP transport network. Sentry Verify provides alerts and generates useful reports in the same fashion as Sentry®.

Sentry Verify provides quality of service (QoS) measurements to detect subscriber-impacting events during MPEG-over-IP transport and offers a historical database to assist with troubleshooting and trending analyses. Sentry Verify also offers a multiple alert-trigger capture capability to quickly identify and visualize issues as they arise. Sentry Verify is a cost-effective solution for large-scale deployments to hub sites and other remote locations. It provides necessary, accurate, and timely information to assist in the identification of faults within the IP network.

Sentry Verify's QoS measurements include TR 101 290 Priority 1, 2 and 3 tests and service providers can configure the system to only be notified about errors on the priority checks they are most concerned about. Sentry Verify also offers PCR measurements including PCR Interval and PCR Accuracy.

Sentry Verify can also be configured with a variety of RF inputs further extending the visibility into the transport stream quality by detecting transport stream and RF modulation errors at the edge of the network. Correlate reports and conduct comprehensive, cross-layer, root-cause analysis across locations.

## Software options

### Quality of Service (QoS) monitoring

Quality of service measurements look at the transmission and health of the MPEG/IP transport network. Sentry Verify monitors the most critical TR 101 290 Priority 1, 2 and 3 tests to offer comprehensive QoS checks and alarming. Real-time monitoring and alerting notify service providers right away if there are errors related to the priority checks they are most concerned about. This saves on operational costs related to mean time to detect (MTTD) and mean time to repair (MTTR) an issue. Sentry Verify also offers PCR measurements including PCR Interval and PCR Accuracy.

### Ad insertion monitoring

Sentry Verify provides the most complete digital ad insertion monitoring solution by combining real-time monitoring and alerting with historical auditing across the entire channel lineup in all advertising zones. Sentry Verify delivers extensive data that improves digital ad insertion on any platform, allowing engineering teams to ensure proper function of insertion technology by identifying and correcting system errors when they occur. In addition, the ad insertion verification capability allows ad sales groups to provide higher levels of customer service, resulting in greater revenue potential. Using the web-based interface you can monitor digital ad insertion across your entire network. By strategically placing Sentry or Sentry Verify in each of your ad zones, you can monitor and be alerted on all insertion opportunities network-wide, as well as issues that arise from problems.



Monitoring Ad Insertion

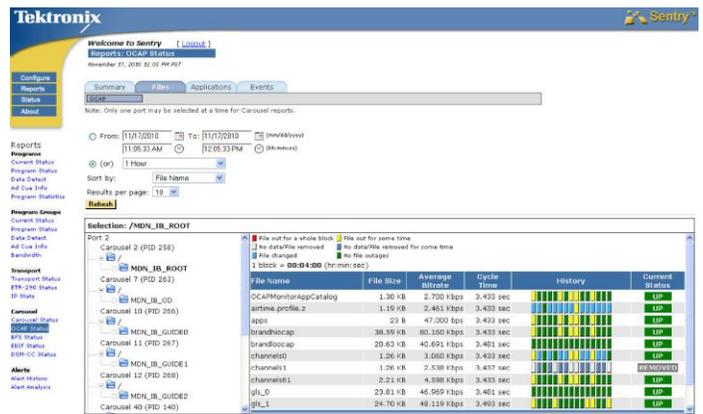
## Compliance monitoring

For Closed Caption compliance monitoring, Sentry Verify has the ability to monitor, alert and report on the availability and quality of closed captions across all channels in real time. Sentry Verify will check that the captions are present and not in error. When errors do occur, Sentry Verify will let you know how long they were in error and the reason for the error. Data and syntax anomalies within the closed captioning data stream are detected to allow for an accurate closed captioning quality of service (QoS) measurement. This applies to SCTE20 and ATSC transported caption data.

For Audio Loudness monitoring, Sentry Verify helps video service providers ensure compliance with its advanced audio level detection and analysis based on the ITU-R BS 1770 specification. Sentry Verify monitors the loudness of every audio element on every program in every transport stream in real time. The thumbnail timeline feature captures thumbnail images to help visually confirm the relative location of audio issues in programming or commercials. Sentry Verify offers 90-day historical reporting to help service providers with documents needed to prove compliance or to show when violations have occurred.

## Data Carousel and EBIF monitoring

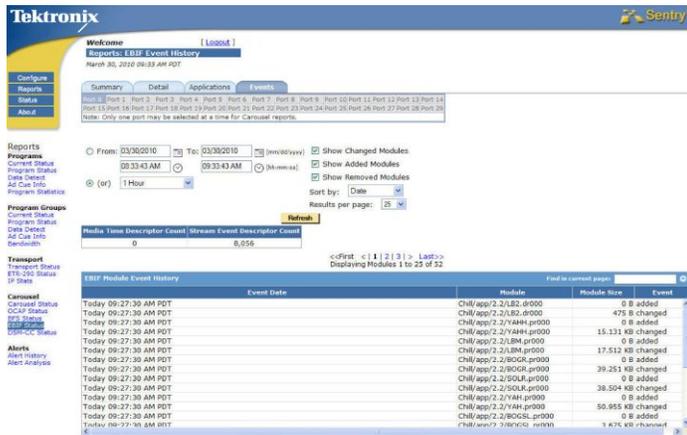
Sentry Verify monitors tru2way™, OCAP/MHP and DSM-CC carousels. Detailed reports of carousel performance and activity are based on their real-time behavior and data output. Service providers are able to identify the root cause of errors and make necessary changes to eliminate issues and guarantee rapid application deployment. The reports show detailed source and file structures and carousel changes in real time while observing streaming metrics such as cycle time, bandwidth utilization, and stream packet continuity. Real-time alerting notifies users of critical situations, enabling them to resolve issues such as outages, cycle-time fluctuations, and unauthorized changes.



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Monitoring tru2way™/OCAP Carousels

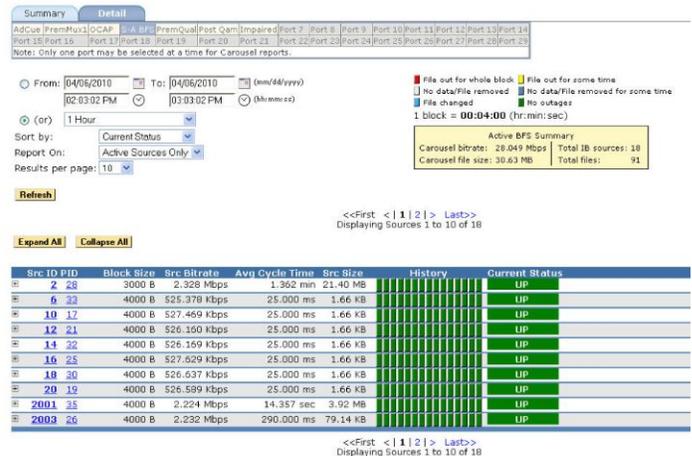
eTV applications and metadata are prone to errors introduced during transport, ad splicing and multiplexing. Sentry's EBIF module decodes the application data and signaling information enabling proactive eTV monitoring and fast troubleshooting.



Monitoring EBIF/eTV

### SA-BFS monitoring

Sentry is designed to identify and monitor data carousels within the transport, which enables it to keep detailed information about the real-time and historical status of the Scientific-Atlanta Broadcast Files System (BFS). Similar to the way other application carousels (tru2way, DSM-CC, etc) are monitored, Sentry is able to provide critical information about the status of BFS carousels. Multichannel service providers can set alerts to be notified of bit rate errors, file changes, file cycle times, and if files are missing.



Monitoring Scientific-Atlanta Broadcast Files System

## RF measurements and characteristics

### QAM demodulator characteristics

#### Modulation format

<b>QAM A</b>	16QAM, 64QAM, 256QAM compliant with ITU J-83 Annex A and DVB-C ETS 300 429
<b>QAM B</b>	64QAM, 256QAM compliant with ITU J-83 Annex B, SCTE07 compliant
<b>QAM C</b>	16QAM, 64QAM, 256QAM compliant with ITU J-83 Annex C

#### Modulation rate

<b>QAM A</b>	5 Mbaud/s min to 6.952 Mbaud/s max
<b>QAM B</b>	5.057 Mbaud/s, 5.360 Mbaud/s
<b>QAM C</b>	5 Mbaud/s min to 5.5 Mbaud/s max

<b>Input signal level</b>	-50 dBm to -15 dBm
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### QAM demodulator RF measurements

<b>RF lock indication</b>	RF lock is indicated by a LED on the rear panel and a status indicator on the UI
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#### Frequency range

<b>Minimum</b>	44 MHz
<b>Maximum</b>	1 GHz

#### Input signal strength (channel power)

<b>Range</b>	-55 dBm to -15 dBm
<b>Resolution</b>	0.1 dBm

#### Error Vector Magnitude (EVM)

<b>Range, 64QAM</b>	0.6% to 5% RMS
<b>Range, 256QAM</b>	0.6% to 2.5% RMS
<b>Resolution</b>	0.1%

#### Modulation Error Ratio (MER)

<b>Range</b>	22 dB to 41 dB
<b>Resolution</b>	0.1 dB

#### Carrier-to-Noise Ratio (CNR)

<b>Range</b>	22 dB to 41 dB
<b>Resolution</b>	1 dB

<b>Pre-Reed Solomon (RS) BER</b>	Pre-RS BER is displayed
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<b>Post-FEC Uncorrectable TS packet rate</b>	Post-FEC Uncorrectable TS packet rate is displayed
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**QAM demodulator RF measurements**

Carrier offset	Carrier offset is displayed
Resolution	1 Hz
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I/Q Constellation	I/Q Constellation is displayed

**DVB-T/T2 interface characteristics**

Connector style	F-type, female
Input termination impedance	75 $\Omega$
Input frequency range	42 MHz to 880 MHz
Input signal amplitude range	-90 dBm to -20 dBm
Input return loss	>8 dB
Bandwidth	1.7 MHz, 5 MHz, 6 MHz, 7 MHz, 8 MHz
Standards	
DVB-T	EN 300 744
DVB-T2	EN 302 755 v1.3.1 (including T2-Lite profile), DTG6.2/7, NorDig-U v2.2
DVB-T2 demodulation	Single PLP, SISO, and MISO

**DVB-T/T2 RF measurements**

Available measurements	Signal strength
	Modulation Error Ratio (MER)
	Pre-Reed Solomon (RS) BER

## Platform specifications

**Platform characteristics**

Browser support	Firefox, Safari, Google Chrome and Internet Explorer
MPEG/IP input port	
Single input Sentry	1000BASE-T Ethernet interface, 1- or 4-port ASI interface, 10GBASE-(LR or SR) interface, 4- or 8-tuner QAM A/B/C interface, DVB S/S2 or DVB T/T2 interface, QAM Annex B (ITU-T J.83)/8VSB interface
Dual input Sentry	1000BASE-T Ethernet interface (standard) plus optional 1000BASE-T Ethernet interface, 10GBASE-(LR or SR) interface, 4- or 8-tuner QAM A/B/C interface, DVB S/S2 or DVB T/T2 interface, QAM Annex B (ITU-T J.83)/8VSB interface
Management port	1000BASE-T Ethernet interface

## Supported protocols

<b>Video</b>	MPEG-2, H.264, H.265 (HEVC), VC-1, JPEG2000
<b>Audio</b>	Dolby AC-3 (5.1 Surround), E-AC-3 MPEG-1 Layer II (Mono, Stereo) AAC, HE-AAC, and HE-AAC v2
<b>Carousel</b>	tru2way™, BFS MHP / DSM-CC
<b>Digital program insertion</b>	SCTE-35 (local ads), SCTE-35 2012
<b>Misc. support</b>	HD/SD programs, SPTS or MPTS, multicast (IGMP v3) and unicast MPEG-PSI, DVB-SI, ATSC-PSIP table support SNMP trap and MIB support

## Physical characteristics

<b>Dimensions</b>	
Height	44 mm (1.73 in)
Width	437 mm (17.2 in)
Depth	600 mm (29.5 in)
<b>Weight (net)</b>	12.4 kg (27 lb.)
<b>Power supply</b>	100-240 V AC, 50-60 Hz

## Environmental characteristics

<b>Temperature</b>	
Operating	+10°C to +35°C, 30°C per hour maximum gradient Temperature of the intake air at the front and sides of the instrument
Non-operating	-20°C to +60°C, 30°C per hour maximum gradient
<b>Power</b>	4.0-1.7 A maximum, 100 - 240 V, 50/60 Hz The maximum power consumption for any board combination measured is 175 W at 120 V by safety test



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



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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.tek.com](http://www.tek.com).

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