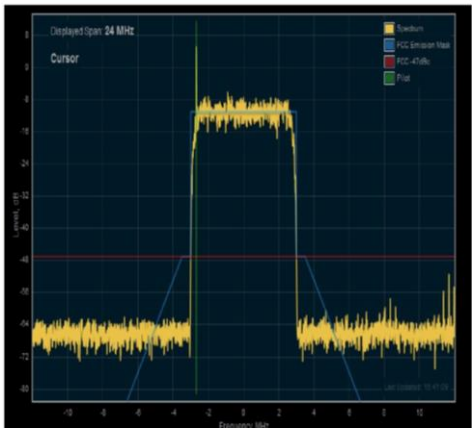
ANYWAVE
COMMUNICATION TECHNOLOGIES

PRODUCT CATALOG



RF Layer Monitoring Receiver and Signal Analyzer

Features

- Monitoring and measurement at RF Modulated Layer at the transmitter output
- Real performance metrics of the transmission system
- Combination of functional and measurement capabilities with cost effectiveness of the Receiver/Analyzer guarantees the ideal solution for monitoring RF signal quality of remote transposers, rebroadcast links, repeaters, and unmanned sites without additional costly RF test equipment
- Comprehensive set of critical RF measurements including signal MER/SNR, frequency spectrum, shoulder attenuation, frequency shift, etc.
- Estimation of signal distortions at the transmitter system output caused by the system non-linearity AM-AM/AM-PM curves and band-pass filtering - group delay, amplitude and phase responses with an ability to use the estimated numbers in a form of complex LUT and FIR for non-linear and linear pre-correction
- Early indication of signal degradation as a result of the transmitter system components aging or operational parameter variations
- An embedded solution for remote applications, in-field diagnostics, production testing and design verification
- Flexible solution with the in-field upgrade capability including diagnostic and monitoring features that can be tuned to meet the most demanding requirements of customer's application
- Rich plotting capabilities for data visualization
- Transmitter site monitoring device with rich set of hardware interfaces
- Event log

Overview

In the context where broadcasters are more and more concerned about providing the highest QoS with extending coverage of the existing transmitters and, at the same time, reducing their network OPEX costs and limiting impact on the environment, Anywave released the RF Layer Monitoring Receiver product line. The product line is based on the ActiveCore® Platform to address the broadcasting industry's most demanding needs for monitoring and diagnostics of:

- transmitter system performance
- signal quality transmitted and delivered to the service subscribers

The RF Layer Monitoring Receiver performs critical RF estimations of MER, SNR, EVM and signal spectrum in order to provide early diagnostic of the signal degradation before any impairment is noticeable to the end Customer.

The RF Layer Monitoring Receivers currently cover virtually all broadcasting industry standards. The list of supported standards includes:

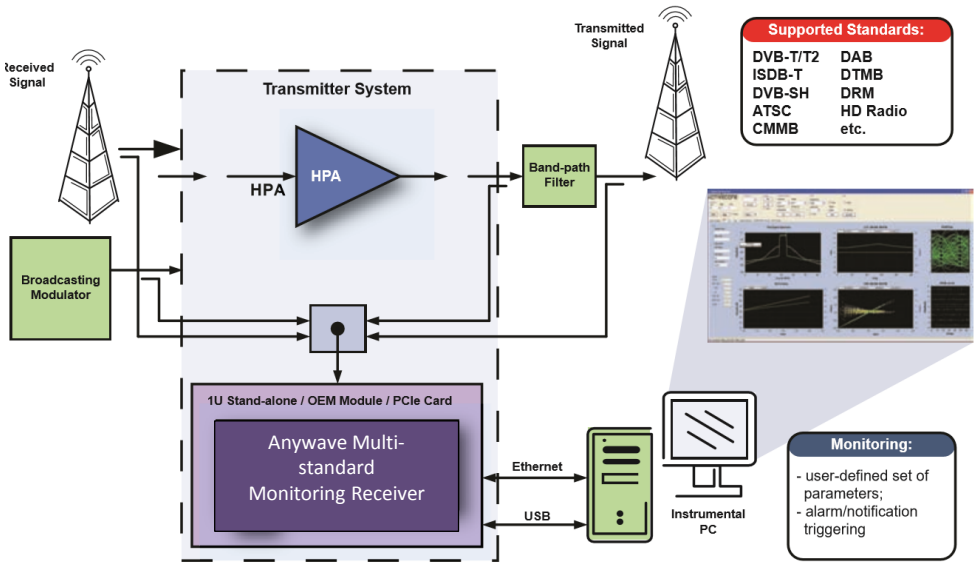
- ATSC/MH, ATSC3.0
- DVB-T/H
- DVB-T2
- DVB-S/S2
- ISDB-T
- DAB/DAB+/T-DMB
- CMMB
- DTMB
- DVB-SH
- HD Radio
- DRM+
- proprietary modulation schemes including hybrid "satellite-terrestrial" architectures

Application

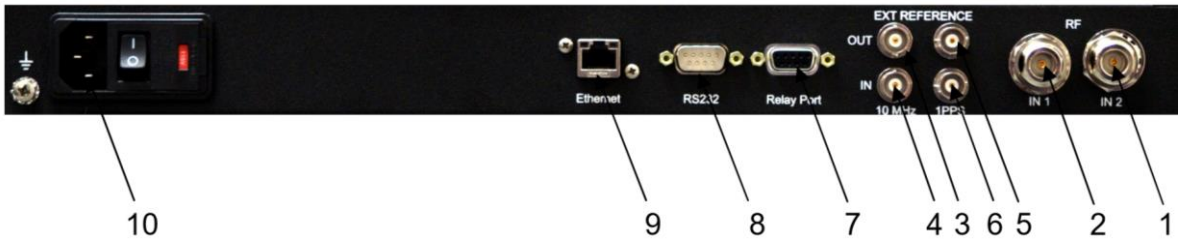
Primarily targeted to embedded applications the receiver has been designed as an easy-to-use and cost-effective solution. It can be integrated into the transmitter system for remote monitoring applications or used as a stand alone unit during in-field and production tests. Being integrated into a transmitter system the receiver can also be used as the transmitter site monitoring and controlling platform.

The Monitoring Receiver is designed to perform continuous monitoring of the transmitted signal quality and report comprehensive set of critical parameters based on the signal quality analysis. The reported values can also be used for monitoring, diagnosing, and troubleshooting transmitter system performance. For example, reported by the Receiver signal amplitude and phase errors might indicate a transmitter linearity issue, etc. The Receiver sophisticated Alarm Management System is designed and tuned to timely inform an operator about potential changes in signal quality and to perform preventive actions without the need for the operator's immediate involvement. The Receiver also provides a comprehensive set of plots allowing the operator to visually analyze monitored and estimated parameters. All monitored parameters and available plots are automatically updated. The update rate depends on the parameter set and usually does not exceed 60 sec. Monitoring tasks can be executed continuously or once per operator's request, depending on the Receiver scheduled operation.

Block Diagram



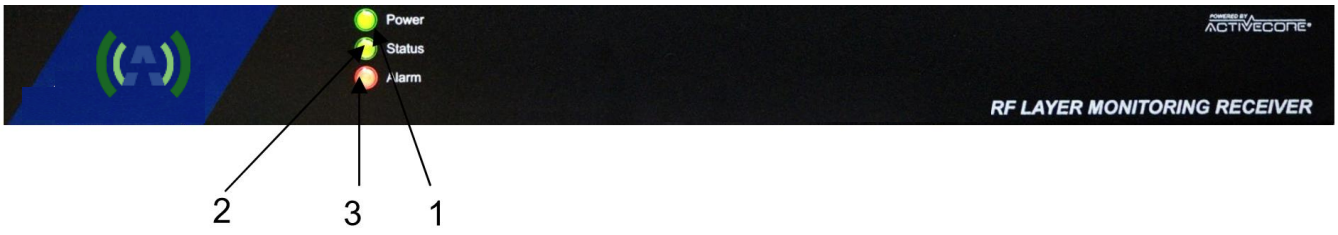
External Interfaces



Item #	Connector type	Name	Comment
1, 2	N-type - F, 50 Ohm	RF IN1 / IN2 (optional)	Two RF sampling ports for input signal
3	BNC - F, 50 Ohm	EXT REFERENCE, OUT, 10 MHz	Generated by the Receiver 10 MHz reference output signal
4	BNC - F, 50 Ohm	EXT REFERENCE, IN, 10 MHz	Input for an external 10 MHz reference source
5	BNC - F, 50 Ohm	EXT REFERENCE, OUT, 1PPS	Not used in presented in this manual applications of the Receiver
6	BNC - F, 50 Ohm	EXT REFERENCE, IN, 1PPS	Input for an external 1PPS signal synchronized with UTC
7	DB9-F	Relay Port	Please refer to Table 6 for DB9 Relay Port pin-out
8	DB9-M	RS232	Serial RS232 port, might be used for the Receiver integration. Please contact Avateq Corp. for more information
9	RJ45 Receptacle	Ethernet	The Receiver main control and communication interface
10		AC power Entry	Power Supply AC-DC 12V@8.5A 85-264V

[1] Second input is optional and installed upon a request

Front Panel



Item #	Name	Functionality
1	Power	Green - Receiver is powered On
2	Status	Green - Receiver current operation conditions and self test results are normal; Red - an internal hardware error has been detected.
3	Alarm	Green - no active alarms present; Red - there is at least one active alarm. The decision about an alarm event is made based on the Receiver alarm properties set through WEB control interface.

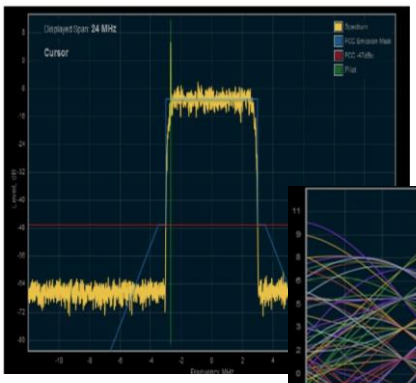
Technical Specification

Main signal input "RF in":	
Input level:	-50..0dBm;
Frequency range:	470..862 MHz (standard)
Frequency tuning step:	1 Hz
Analyzed bandwidth:	50 MHz
Connector type:	SMA, 50 Ohm
Reference frequency:	10 MHz, 1 PPS
Standard-specific measured parameters*:	- signal MER, dB; - signal RMS, dB; - signal PAR, dB; - signal CCDF.
RF signal distortions	
Non-linear:	AM-AM, AM-PM curve, an output complex LUT array is available for DPD
Linear:	Group Delay, Amplitude and Phase response, output complex FIR coefficients are available for DPD

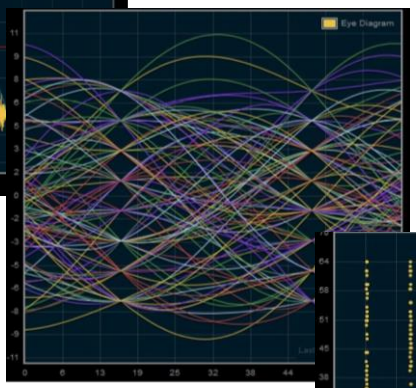
Output band-path filter	Group Delay, Amplitude and Phase responses
Default set of alarm events:	- Spectrum shoulder levels - Signal MER/SNR; - Signal max Group Delay; - Spectrum tilt/ripple
Application-specific alarm events*:	User-defined set of parameters and their thresholds
Interfaces:	
Hardware:	Ethernet, USB, CAN, PCIe, RS232
Software:	WEB GUI, host based GUI (PC GUI), SNMP, simplified machine-to-machine protocol
Power supply:	5A@12V DC (OEM module) 110-250V, 50/60Hz AC (1U unit)
Operating temperature range:	0..50, °C
Form factors:	- OEM module; - 1U stand-alone unit; - Full-size PCIe card

* Default set of parameters can be extended as per customer's requirements

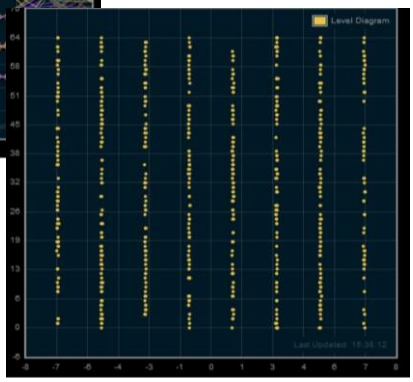
Waveforms examples



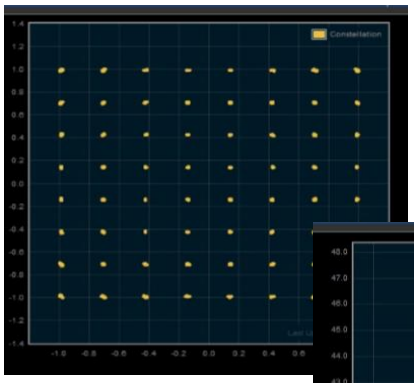
Amplitude Frequency Response



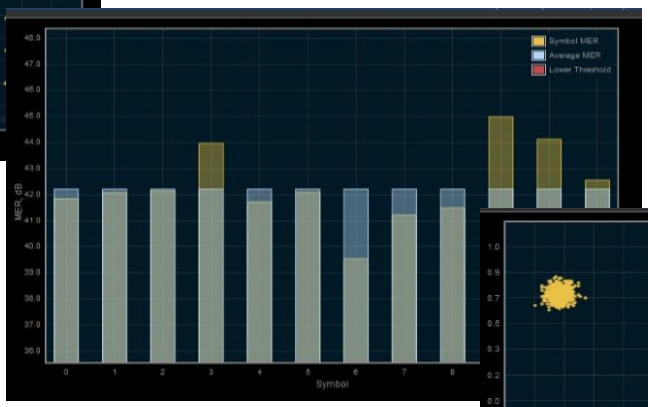
“Eye” Diagram



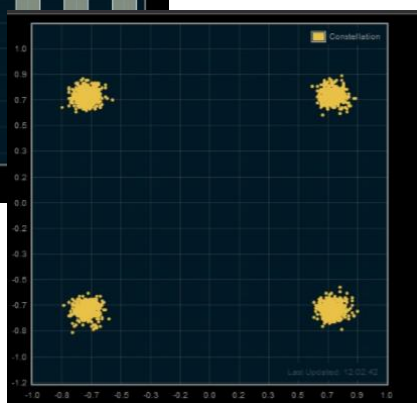
Constellation



DTMB Constellation



Symbol MER Variation



DAB Constellation

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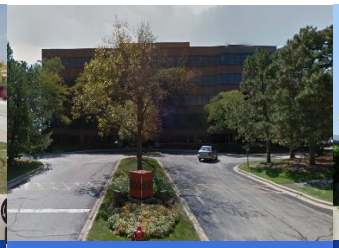
USA Headquarters



Lincolnshire, Illinois

China Headquarters

Shanghai

About Anywave

With over 150 years in combined development experience, Anywave is proving to be a world leader in the design and manufacture of broadcast transmission equipment. Anywave Communication Technologies Co. Ltd was established in 2007. However, it was in 2004 that two members of Anywave found, as CNN Money put it, “a major fix for a digital-TV headache: screens that go blank when reception is poor”. The founders of Anywave had developed a technology that when installed inside an ATSC Television receiver, ensured significantly better reception and picture quality. This was considered by the broadcast industry a major breakthrough for ATSC technology. Today, Anywave’s core technical team has an abundance of experience in the development of digital TV technologies and has made significant contributions to most broadcast digital TV standards.

Based on its innovative technologies in direct digital RF adaptive digital pre-correction and echo cancellation, the company has independently developed a series of high performance digital TV transmission technologies and has become a leading supplier in the digital broadcast market.

The company’s HQ in Shanghai, China with it’s main North American office located in Chicago IL. Anywave offers world class technical support that provides customers not only with reliable products but also with optimum system solutions; to help reduce network construction and operating costs, improve signal coverage, increase emission efficiency, and enhance system reliability.

Anywave offers a wide range and ever growing products covering all world broadcast standards. From world renowned digital exciters to full solid state TV transmitters up to 20kW.

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