CX180R

Return Path Monitoring System

All-in-One Return Path Solution

- Return path ingress monitoring
- Return path spectrum analysis
- Return path MER/BER measurement
- Return path sweep
- Return path balancing

Platform Highlights

- Low system entry cost
- Space efficient 1U rackmount with built-in matrix switch
- Factory calibration - eliminates unexpected insertion loss introduced by external matrix switches
- Flexible distributed architecture for easy expansion, increased reliability, and reduced system down time
- Secured IP connection for access from any location with Internet connection via remote terminals or VeEX portable test sets
- Three independent test resources for non-blocking monitor scan and two on-demand tests.
- Interfaces with VeEX portable test sets to enable Sweep, Ingress and Digital Signal measurements for complete single person Return Path troubleshooting and maintenance

Key Features

- 5 to 65MHz Frequency range analysis
- Adjustable RBW at 125kHz, 330kHz, 1MHz that captures fast and low level transient ingress
- Fast spectrum analysis to capture bursty upstream cable modem signals and noise spikes
- Advanced QAM analysis supports QAM-16/64/128 upstream signal formats
- Return Path QAM measures MER, pre/post BER analysis, and display of Constellation diagram
- Return Path Sweep and Balancing with VeEX portable test sets
- Advanced Master/Controller software with 3D graphics for ingress analysis
- Expandable Server software for archiving return path measurements (for up to 30 days) for post review and analysis
- User programmable alarm thresholds to generate alarm tickets by email
- Supports 4 different user authority levels with over 140 users

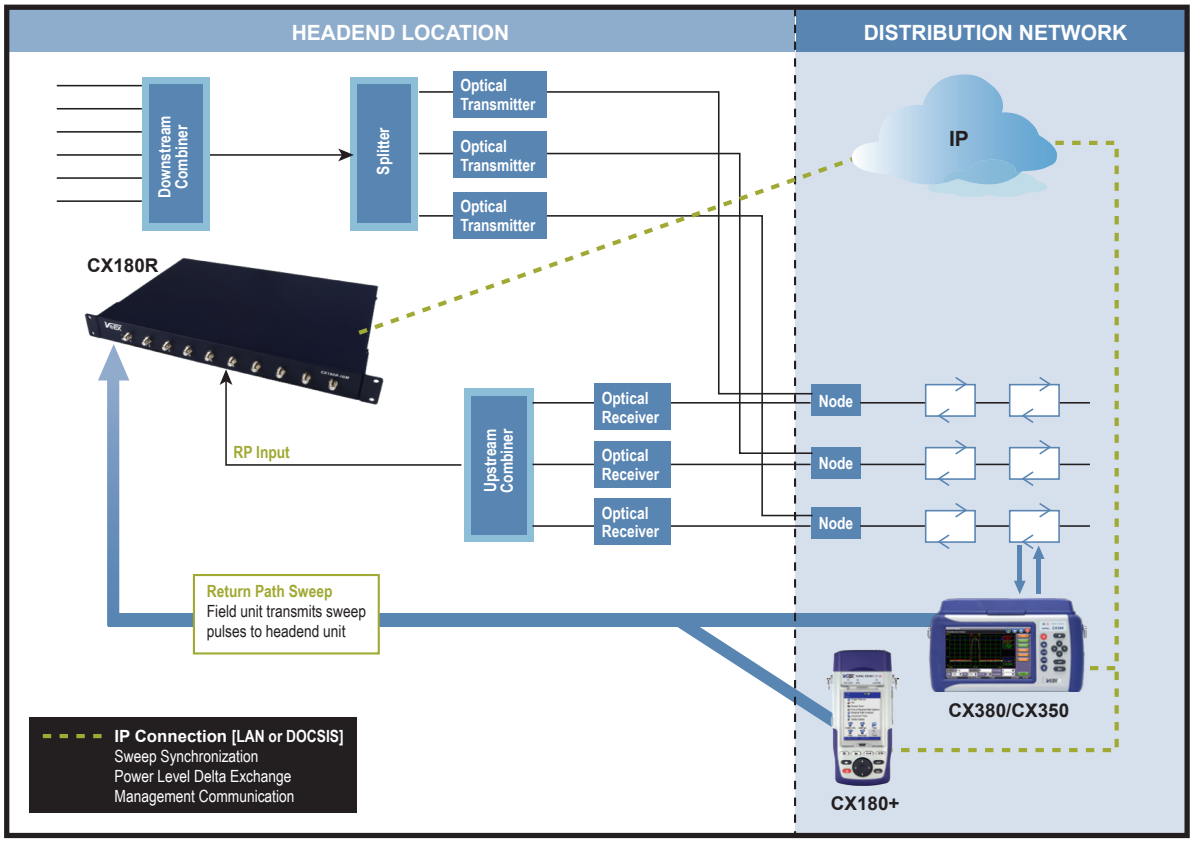
Cable Expert

Introduction

The CX180R system monitors the return path for noise and ingress that interfere with DOCSIS communications. Latest generation DOCSIS 3.0 deployments implementing higher order upstream QAM modulation and channel bonding are more vulnerable to ingress and should be monitored continuously to ensure peak performance.

The CX180R sets new standards for form factor and performance. The space saving 1U rack mount unit integrates multiple DSP based test resources dedicated to 10 nodes in each system. Each CX180R unit supports three different test modes simultaneously and independently. In ingress scan mode, fast transients can be identified at a scan rate of up to 250ms per node. In spectrum analyzer mode, on demand RF signal analysis using optimal programmable RBW and dwell time can be performed.

QAM Analysis, Sweep and Balancing tests in the Return Path by a single technician is possible using VeEX handheld test units. Up to two technicians can interface with the CX180R at any given time, maximizing productivity. Return path QAM analysis is becoming critical in DOCSIS 3.0 deployments because QAM-64 is more susceptible to noise and other network impairments compared to lower modulation schemes, for example, QPSK or QAM16. When paired with a VeEX handheld tester equipped with USG+FEC option that generates a QAM64 or QAM128 signal, operators can easily assess and benchmark MER and BER performance to qualify the network for carrying higher order modulations thus identifying the network problems prior to service activation. Return path sweep and return path balancing are two convenient options allowing operators to identify frequency dependant problems, for example, balancing of an amplifier with one person operation.



The CX180R uses a distributed system architecture that provides the most cost effective solution, yet allows maximum flexibility for future expansion and maintenance. The 1U rackmount unit can easily fit into a mini-headend where the number of nodes is typically limited. An expanding headend can start with a few CX180R systems and more can be added as demand dictates. Therefore, there is no large upfront investment needed for a bulky or expensive card nor an expensive test head that can only monitor one node at a time.

The CX180R system communicates via Internet connection with the CX180R server, which can be centralized for easy routine maintenance. The CX180R server architecture supports multiple, simultaneous CX180-Controller log-ins enabling system maintenance staff to view historical monitoring results, gain access to on-demand spectrum analysis or return path QAM analysis anywhere Internet connection is available. Field technicians, equipped with VeEX portable test sets, and Remote View option, can view ingress results and perform spectrum analysis at a remote location without needing a laptop computer.

Together, the CX180-Server and CX180R-Master allows the system to be tailored depending on the specific requirement of the Service Provider. Graphical alarms, user defined threshold settings, alarm generation by emails or SMS, trouble tickets management and data logging are but a few examples of key features supported by the system.

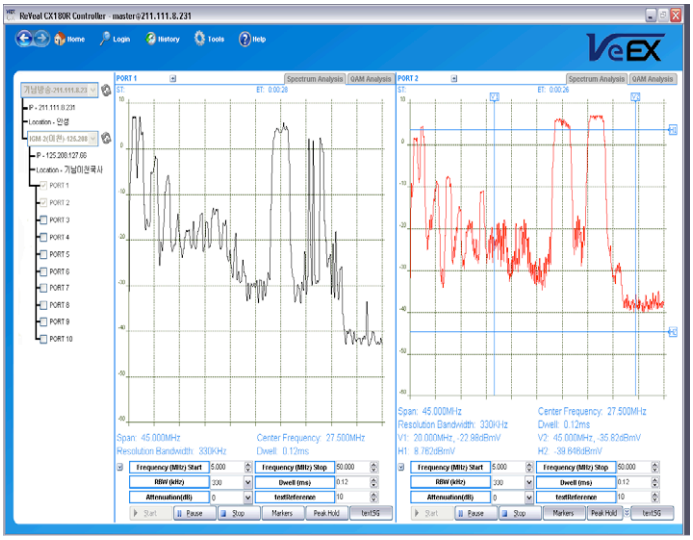
The CX180R system has a built-in, dual power switching matrix to ensure continuous operation if the main power supply fails.

Features

Return Path Spectrum Analysis

Advanced DSP technology captures fast transient signals with millisecond resolution. Dynamic changes in system noise level and short bursty pulses typical of Cable Modem upstream transmission can easily be captured to identify potential problems in operational upstream DOCSIS channels.

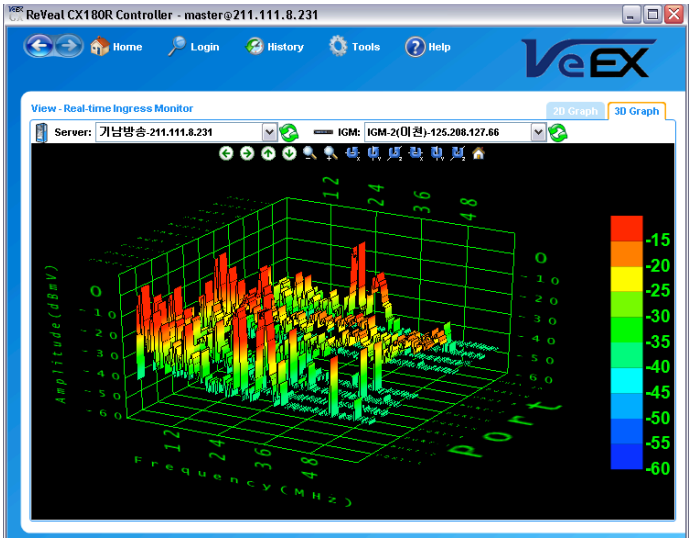
Each CX180R can perform spectrum analysis on two nodes simultaneously. Spectrum analysis can be controlled by two separate CX180R-Controller stations or by a VeEX handheld unit via Internet connection in the field.



Ingress Monitoring

Dedicated test resources scan each node at a rate of 2 - 4 times per second ensuring that abnormal signal conditions be detected and identified quickly. 125kHz RBW filter reveals low-level transient noise that 1MHz RBW cannot resolve.

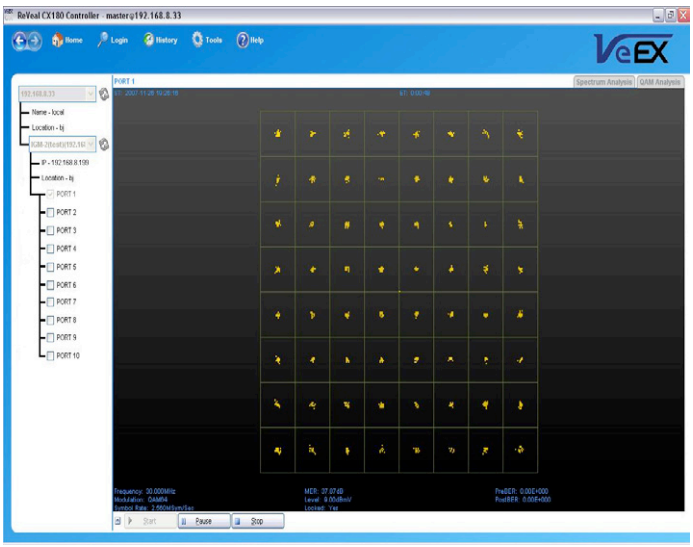
Intuitive, color-coded 3D diagrams with Zoom and 360˚ rotating functions assist maintenance staff to identify problematic nodes at a simple glance.



Return Path QAM Analysis

To ensure the return path is properly configured and provisioned for QAM64 or QAM128 upstream transmission, the CX180R system interfaces with a remote VeEX handheld unit to evaluate the quality of return path QAM signal. Parameters, including QAM level, Pre-FEC, Post-FEC, MER, Errored seconds, and Severely errored seconds are supported. Constellation diagrams allow experienced technical staff to identity problems caused by laser clipping or jitter. A CX180R-Controller working in tandem with a VeEX handheld unit via an Internet connection enables one person troubleshooting and measurement, thus reducing truck rolls and associated manpower requirements.

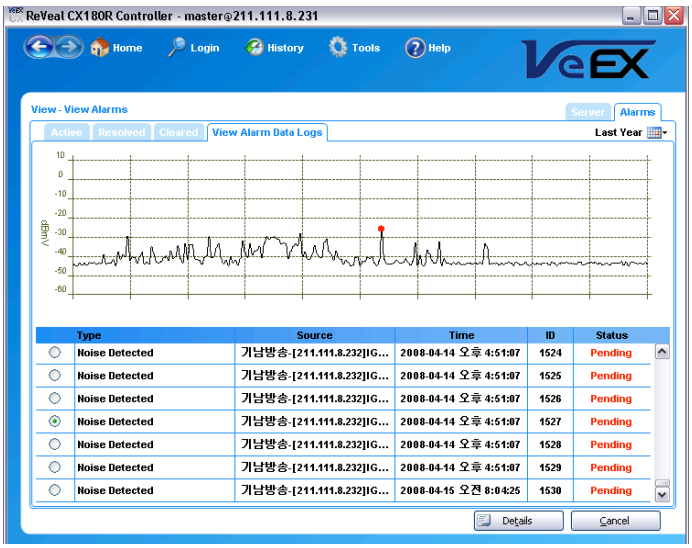
Each CX180R unit can perform two separate QAM analyses simultaneously.



Data Logging and Alarm Reporting

Alarm types, test thresholds, and reporting method can be easily defined by the system engineer on a CX180R-Master unit. Trouble tickets and status updates can be viewed remotely and updated by maintenance personnel from a CX180R-Controller station using an Internet connection.

Measured data is stored in the CX180R-Server system for an extended period of up to 30 days, depending on the capacity of hard disk which can be configured by the system administrator. Archived data can be recalled and correlated with current alarm condition in live play back mode.



Features

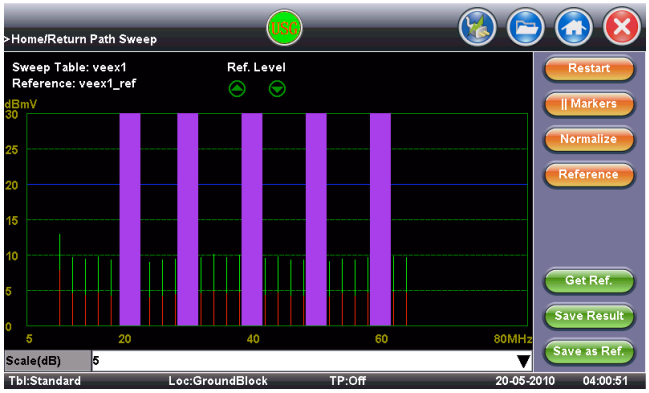
Return Path Sweep

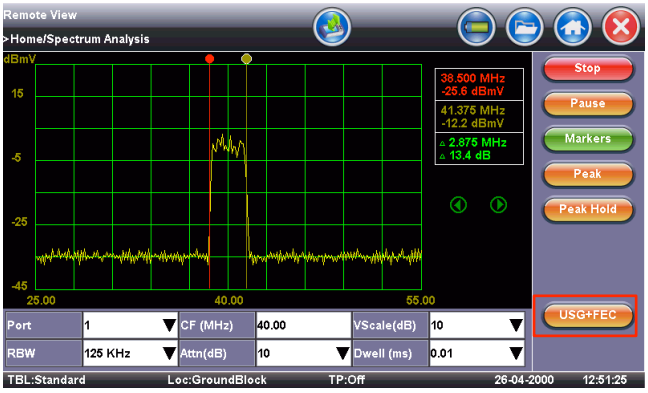
The CX180R incorporates a 5MHz to 65MHz receiver which measures sweep tones being generated by a VeEX handheld unit fitted with USG+FEC and return path sweep options.

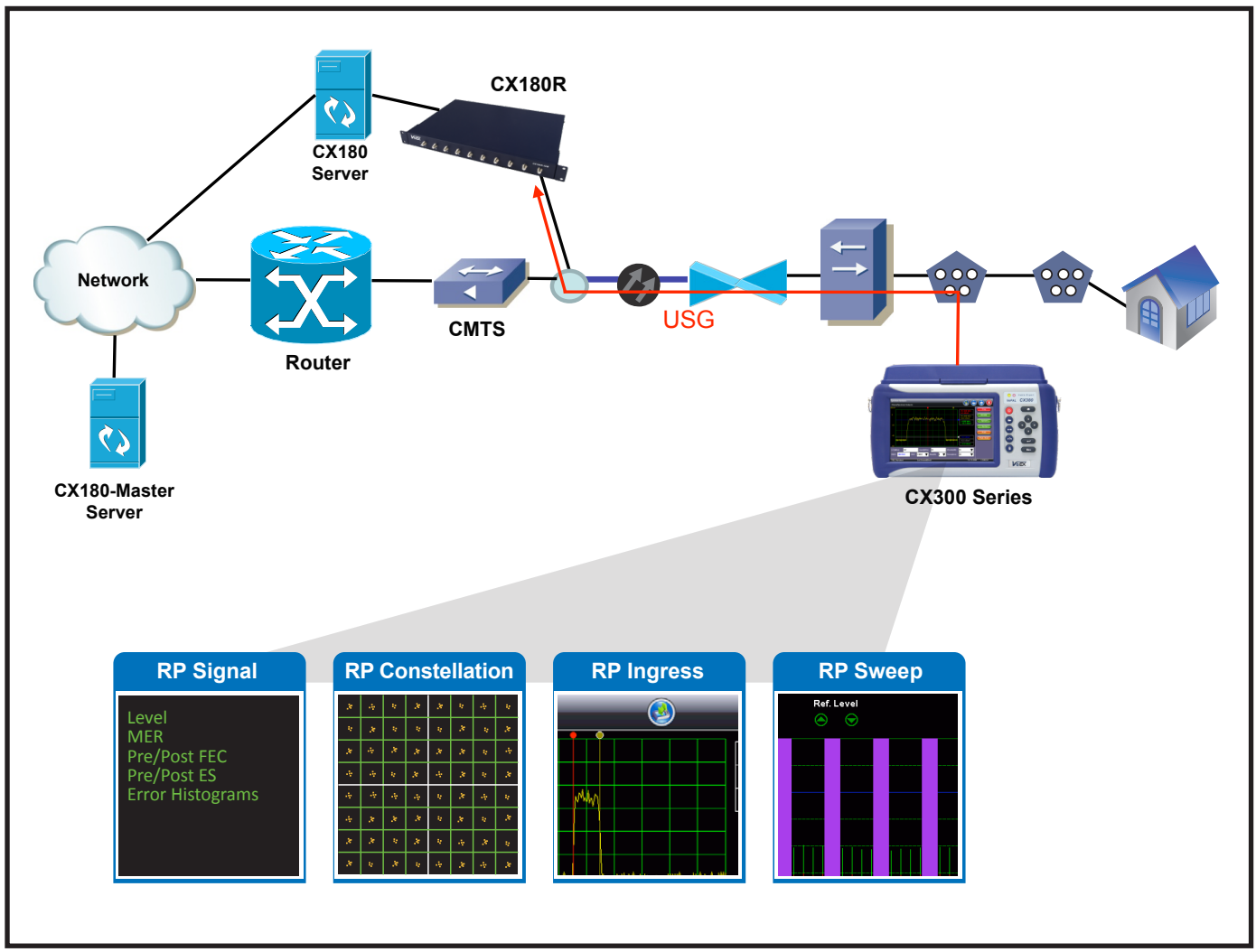
The sweep system communicates non-intrusive user defined sweep tables and measured test data to a remote VeEX field test set over the Internet, freeing up valuable downstream bandwidth which is used by telemetry systems found in competitive sweep systems. Up to two remote field test sets are able to connect to the CX180R system simultaneously to perform upstream sweep measurements.

Remote View

Return path troubleshooting and testing is simplified with the Remote View feature. Using a wired or wireless Internet connection, a technician operating a VeEX handheld test set in the field is able to access and view real time measurements being performed by the CX180R system located in the Node or Headend. Developed specifically for dual ended test applications, evaluating MER, BER and Constellation and related upstream parameters is extremely fast and easy. Real-time ingress measurements made by the CX180R spectrum analyzer can also be viewed Quasi real-time on the field test unit making it a truly unique solution for upstream testing and characterization.







Specifications

Return Path Ingress Scan

Frequency range: 5 to 65MHz
Dynamic range: 50dB
Resolution Bandwidth: 125kHz, 330kHz, 1MHz
Attenuation range: 0 to 50dB, 10dB/step
Range with attenuation: -45dBmV to +60dBmV
Scan rate per port: Twice per second at 330kHz RBW, 5 to 42MHz

Return Path Spectrum Analysis

Frequency range: 5 to 65MHz
Dynamic range: 50dB
Resolution Bandwidth: 125kHz, 330kHz, 1MHz
Attenuation range: 0 to 50dB, 10dB/step
Range with attenuation: -45dBmV to +55dBmV
Dwell time: 0.1ms to 100ms, adjustable

Return Path QAM-16/64/128 Analysis

Frequency range: 5 to 65MHz
QAM Locking range: -10 to +50dBm
Supports Annex A, B, and C
QAM level, MER, pre/post BER, Errored seconds, Severely Errored seconds
Constellation diagram
Requires CX field meter with USG+FEC option

Ordering Information

Z02-00-005P	CX180R-IGM Return Path Analyzer and Ingress Monitoring System

Test Options

499-05-076	Return Path QAM Analysis Option (per IGM)
499-05-077	CX180R - Server Software
499-05-078	CX180R - Master Software
499-05-173	Return Path Sweep Option (per IGM)

Annual Maintenance Contract

(after the first year; server provided by customer)

499-05-083	One year maintenance for CX180R - Master software

Replacement Items

A01-00-002G	AC Adaptor (3-prong)
F04-00-004G	Power Cord - US 2 m (6 ft)
F04-00-005G	Power Cord - EU 2 m (6 ft)
F04-00-006G	Power Cord - UK 2 m (6 ft)

General Specifications

CX180R

Size	320 x 300 x 38 mm (W x D x H) 12.59 x 11.81 x 1.49 in
Weight	Less than 3 kg (less than 6.6 lb)
AC Adaptor	Input: 100-240 VAC, 50-60 Hz Output: 15VDC, 3.5A
Operating Temperature	-10˚C to 50˚C (14˚F to 122˚F)
Storage Temperature	-20˚C to 70˚C (-4˚F to 158˚F)
Humidity	5% to 95% non-condensing

CX180R-Server and CX180R-Master Server Requirements

CPU	> 3GHz Quad Core
DDR	> 4Gb
Network Interface	10/100/1000-T Ethernet line card
Hard Drive	> 500Gb
Configuration	RAID (dual hard drive)
Operating System	Windows 2008 or 2003 Server package, 64 bits preferred

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