CM3000 Series

Sweep System, Spectrum and DOCSIS 3.0 Cable Modem Network Analyzer

VeEX's Spectrum Analyzer and CaLan® compatible CM3000 Series Sweep Systems and DOCSIS 3.0 Cable Modem Network Analyzers are the latest addtion to our service and plant verification testing and troubleshooting solutions.

With an intuitive user interface, VGA color touch screen and Windows CE™ operating system combined with a comprehensive measurement suite and an extensive PC toolkit, the CM3000 Series simplifies and speeds plant maintenance and increases quality of service.

Its new, fast spectrum mode allows the user to view short duration ingress, impulse noise, electrical interference, CPD and other impairments on a single screen - even under upstream QAM signals.

The one-button Proof-of-Performance CCN, CSO, CTB & HUM measurements option simplifies the testing and troubleshooting process. The WinCE Operating System helps protect your investment, provides future flexibility and allows the addition of many PC like functions, providing a one instrument solution.

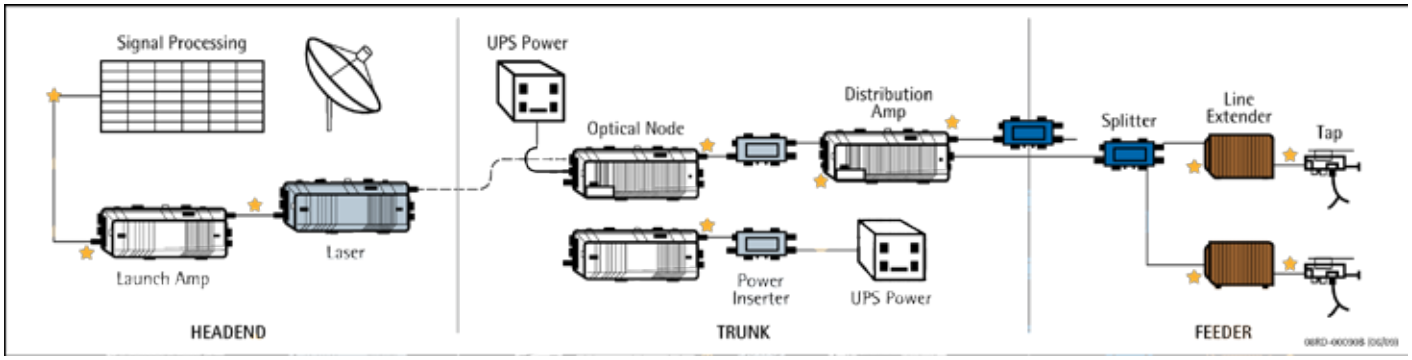
Platform Highlights

- Provides cable TV technicians with a next-generation plant maintenance tool with Sweep & Spectrum Analysis
- Easy-to-use WinCE system minimizes training and maximizes testing accuracy and consistency
- Compatible with existing CaLan sweep installations - works side by side with legacy deployments
- Open architecture design provides suppport for a variety of devices and future applications
- Interfaces to the web-based realGATE™ Test Management system, providing a full array of management tools for tracking assets, analyzing test data and implementing workforce management
- Simplifies Proof-of-Performance testing
- Use WiFi option, Ethernet or cable modem to access back office systems and manage test results
- Advanced Gated measurements allow characterization & troubleshooting closer to the source

Key Features

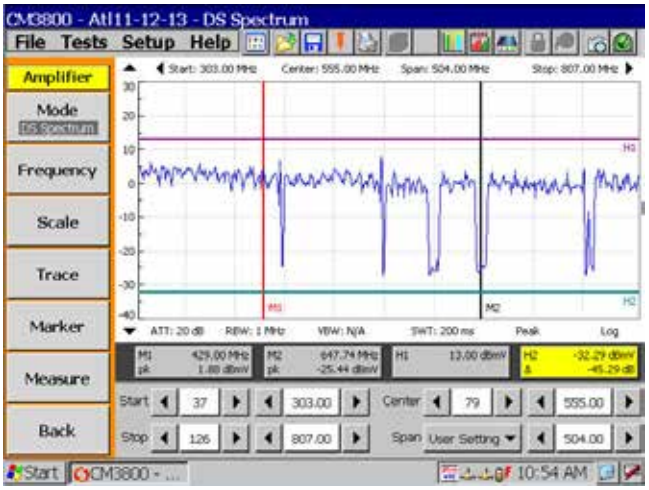
- New Fast Spectrum with 0.3 uSec sample rate
- Now with Equalizer Stress, Frequency Response and Group Delay measurements in Digital & Cable Mode
- i-QAM option identifies impairments in a QAM signal
- Gated CCN, CSO, CTB & HUM tests on active channels
- DOCSIS 3.0 Cable Modem with up to 8 DS and 4 US bonded channels
- High resolution true non-interfering 5 to 1000 MHz downstream sweep system with manual & automatic Gain & Slope offsets
- Future proof flexible and upgradeable DSP software defined receiver technology
- Fast 5 to 200 MHz upstream sweep, plus ingress detection and display
- WiFi 802.11g Wireless USB adapter option
- Fast 1 GHz Spectrum Analyzer with 1,000 MHz Span and 1 MHz to 30 kHz RBW
- 6.4" full VGA, color touch screen (daylight visible)
- BPI+ and PacketCable™ digital certificates installed
- Weather and shock resistant
- Net-Tools: ping, trace, throughput and IP details via WiFi, Ethernet and Cable Modem
- User programmable automated 24 hour testing
- Additional applications for live search, Telnet, SNMP, FTP, Remote Desktop plus options for WiFi, Signature Capture and more

Applications

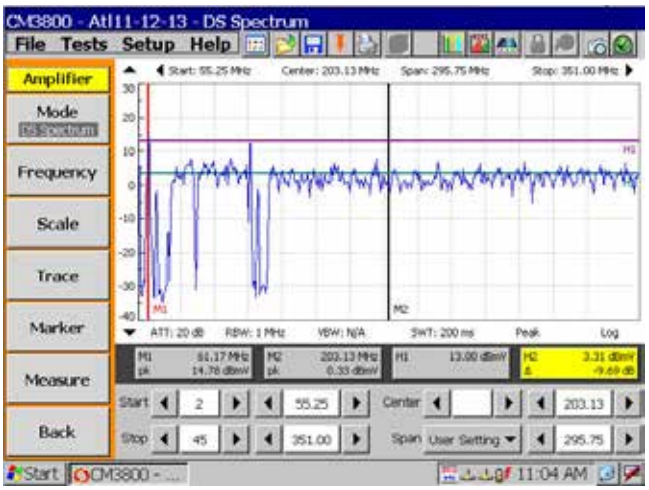


Spectrum Analyzer

The CM3000 Series incorporates a 5 to 1000 MHz downstream and upstream spectrum analyzer. The user may select a Center Frequency or Channel and Span, Start Stop frequency to make level measurements, view ingress, noise, or impairments. Three markers are provided for frequency and level readout. Markers may be configured to make peak level (RMS of peak) measurements for analog signals or average power level measurements across a specified bandwidth for digital carrier level measurements and be set to measure from the live, peak hold or min hold traces.



Attenuation and Reference level controls allow the user to scale the signal level and position it on the display in 10 dB, 5 dB, 2 dB or 1 dB per division. A Peak Hold function provides a second trace of the maximum level obtained over successive sweeps, which is essential in measuring impulse noise and ingress in forward or return systems.

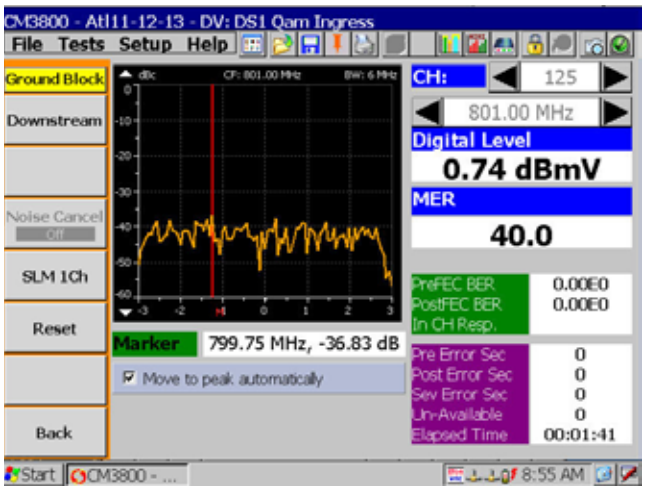


A 3rd Min Hold trace is also available. Resolution bandwidth may be set at 1 MHz, 300, 100 or 30 kHz. The upstream spectrum analyzer incorporates a 100 MHz low pass filter to isolate the lower band of frequencies and reduce the likelihood higher level downstream signals are overloading the analyzer.

The fast spectrum display allows users to view short duration ingress, impulse noise and electrical interference. By using the peak hold, min hold and live trace simultaneously the user can view impairments not seen on other meters - even under an upstream QAM signal.

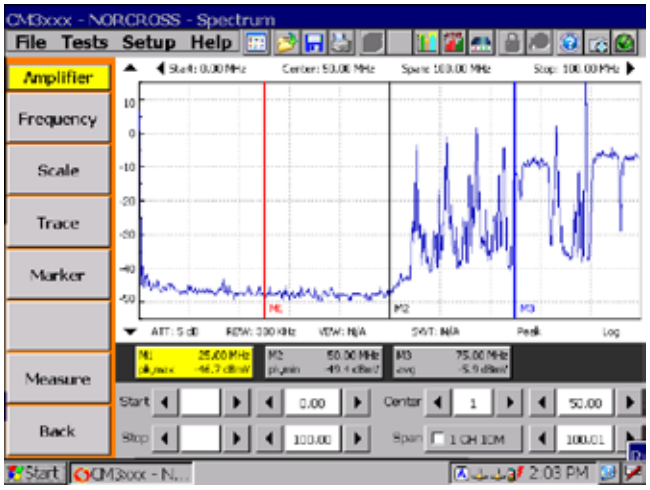
i-QAM Impairments in a QAM Option

The i-QAM digital analysis tool identifies and quantifies distortions “hidden” under the QAM signal. View the spectrum of the QAM channel as though the QAM signal was not present.



Gated Measurements

A new gated measurement feature provides in service CCN, CSO & CTB measurements. CCN and CSO measurements, made during the VBI. CTB measurements require insertion of an in channel switch to make the measurements. Simply setup the quiet line & field for each channel as well as the frequency offset from the carrier for the measurement. CCN, CSO & CTB become simple one button measurements.



Sweep System

Sweeping the network helps ensure that the frequency response from the Combiner through the RF Launch amplifiers and input to the lasers is flat and at the proper level. The same applies for the trunk and feeder distribution network, and even out to the end-of-the-line. Saved test results can be used as a reference, and thus sweep may be done from any point in the network.

Select the CM3800 for Annex B and C or CM3800E with 6 and 8 MHz IF systems for Annex A, B and C, then add the features that customize the CM3800 for your specific needs. Most features can be added in the field at any time.

The CM3000 Series incorporates a CaLan compatible (CaLan 3010H or 3010R with option 052 and running the latest 5.53 firmware) downstream sweep receiver and an upstream sweep transmitter. CM3000 Series qualifies the network for today's expanding subscriber services, checking both downstream and upstream paths.

In addition to raw sweep measurements, sweep results can be automatically compared to reference traces to determine the difference or frequency response between any two points in the network. Manual and Automatic Gain & Slope allow a Reference to be used from any location.

Site files can be created to help manage the field assets, their configuration, sweep references and results data. Users may even customize the records that they want to keep for any number of locations. Flash Card and USB memory, combined with the ability to upload and download files over the network, allow virtually unlimited storage of test results, reference files and site files.

Upstream Sweep

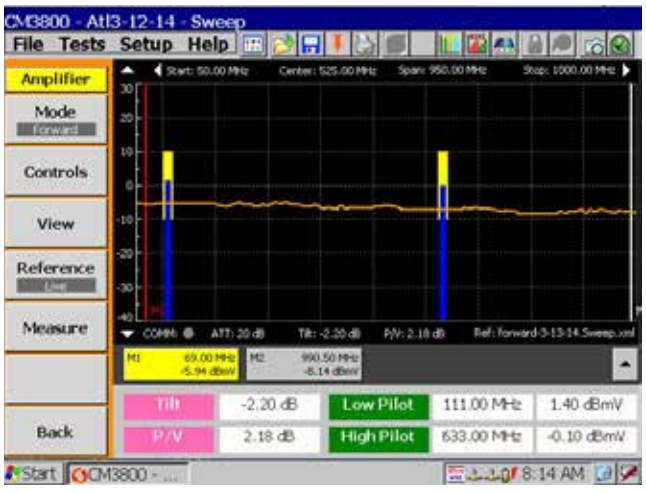
The CM3000 Series upstream transmitter covers the frequency range from 5 to 200 MHz, and transmitter output levels of 10 to 50 dBmV. Although diplexers limit the frequency response of the amplifiers, upstream lasers can be tested to their full 200 MHz capability.

Ingress Warning messages from the 3010 headend unit are displayed and allow display of the upstream spectrum. Switches attached to the 3010 headend simplify upstream monitoring with automatic polling of multiple upstream paths and display of the ingress.

Downstream Sweep

Unparalleled sweep speed, accuracy and resolution combined with non-interference, make the CM300 Series the ideal downstream sweep solution. With a 5 to 1000 MHz frequency range, the user can view the utilized bandwidth and band edges of any network. Display controls allow the user to set start and stop or center frequency and scan or scroll through any portion of the spectrum.

Simultaneous display of the low and high pilot with pass/fail limits and the sweep trace make network setup and balancing simple and fast. Sweep Trace smoothing and averaging help make display interpretation simple and foolproof along with direct Tilt and Peak-to-Valley measurements.



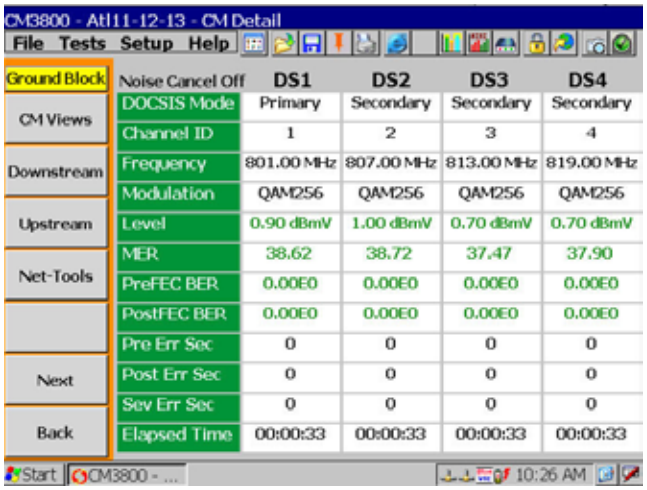
Marker settings, reference files, smoothing and averaging are all saved and recalled the next time the sweep function is used.

Manual or Automatic Slope & Gain Offsets allow References to be used from any location to help identify signature buildup. Automatic offsets are based on the pilot limit settings for each test location.

Sweepless Sweep Mode

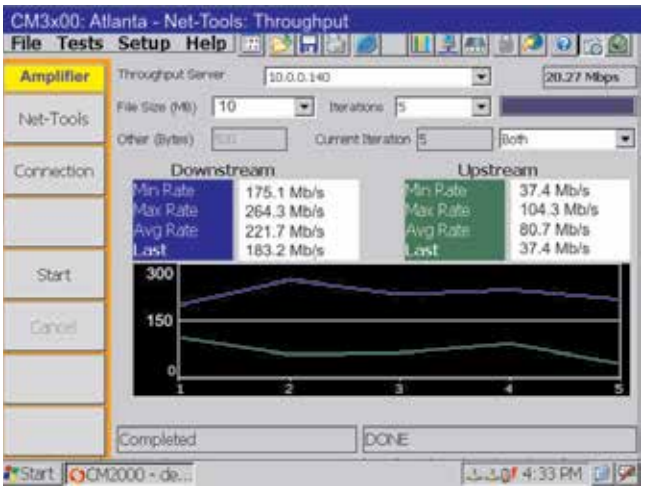
Measurements are made per the Active Full Scan channel table rather than frequencies based on the Sweep Table. The sweep trace is produced by plotting a line between points. The horizontal scale maintains frequency integrity.

Operates just like Forward sweep, except the result data is based on channel measurements, in place of sweep measurements. The end points for start & stop are the lowest and highest channels.



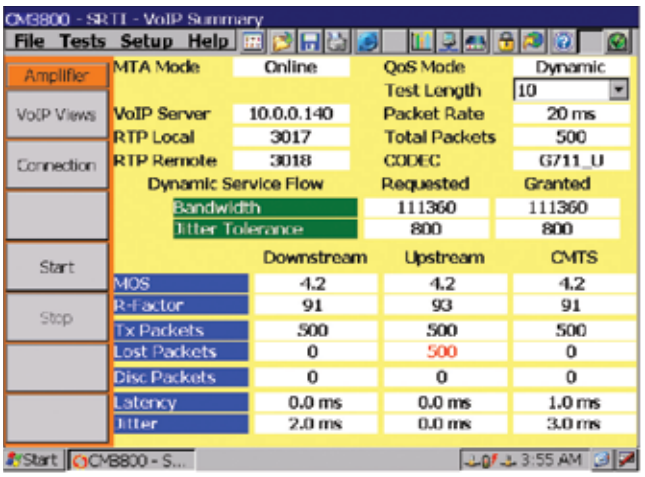
Cable Modem

The integrated DOCSIS 3.0 modem provides comprehensive analysis of up to 8 DS and 4 US bonded DOCSIS channels simultaneously and provides backward compatibility for testing DOCSIS 2.0, 1.1 & 1.0. Complete modem range and register data is provided for testing the upstream and downstream path. Key features include selectable DS channels, UCDs and DOCSIS mode. Results include comprehensive upstream and downstream network performance data. Additional testing includes network tools like PING, traceroute and throughput tests.



Throughput Tests

Upstream and downstream throughput tests are displayed over time as multiple tests are run, and may be performed via the RF cable modem or Ethernet connection to the home network or modem. File sizes and the number of tests may be selected to best duplicate the customer's experience.

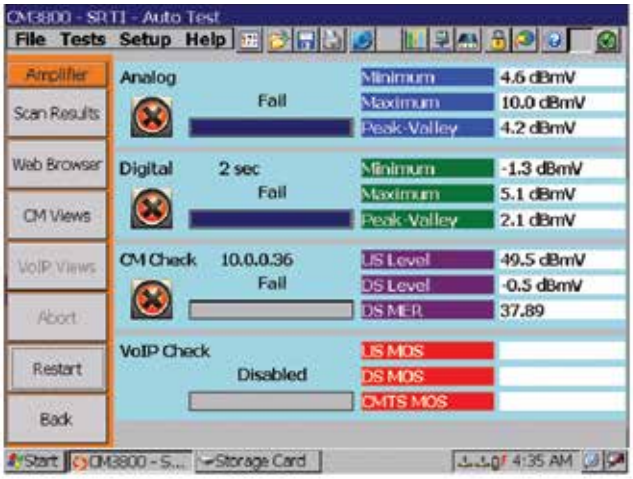


VoIP Option

The VoIP option provides a detailed analysis of the upstream and downstream service flows, as well as the round trip analysis between the test point and the CMTS. Measurement results include: MOS, R-factor, jitter, latency and lost packets. The user may adjust the duration of the test for a quick test, or as required to identify long term or intermittent impairments. Measurements can be made without provisioning the MTA. If the MTA is provisioned, a customer's handset can be plugged in to make or receive calls.

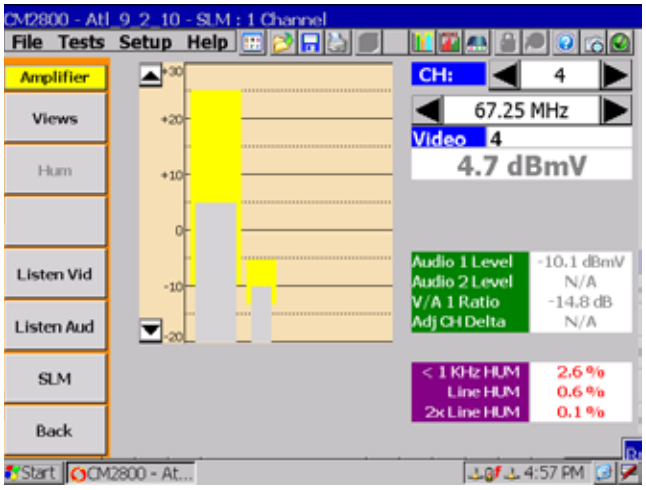
WinCE PC Tools

The WinCE Internet Explorer web browser provides a PC-like browsing experience with full VGA display. Browse to CMTS data, diagnostics, e-mail, provisioning pages or live websites via the Ethernet, 802.11g wireless WiFi or cable modem Interface. Other PC Tools include, Ping, Trace Route, FTP, Telnet and realGATE connection.



Auto-Tests

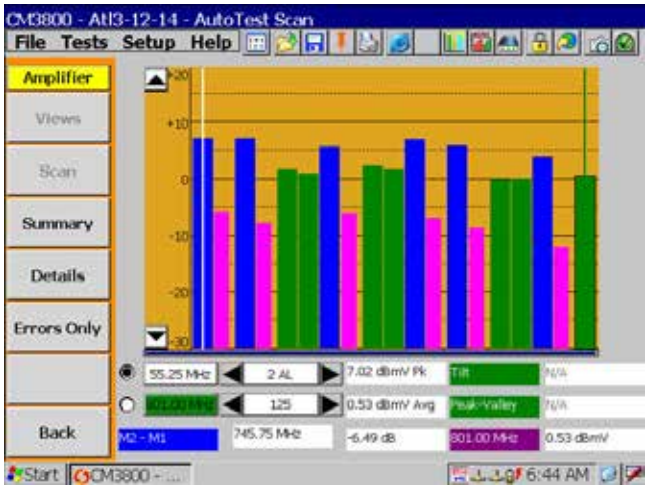
Nine administrator programmable auto-tests provide comprehensive and consistent testing of analog and digital signals, cable modem and VoIP services. Select the tests, the pass/fail limits and the channels to be tested on each of the nine configurable auto-tests. View summary results or detailed results of every measurement or just those outside of the pass/fail limits. The CM3-24H option allows the user to schedule multiple un-attended Auto-Tests over a time period.



SLM and HUM Tests (Analog)

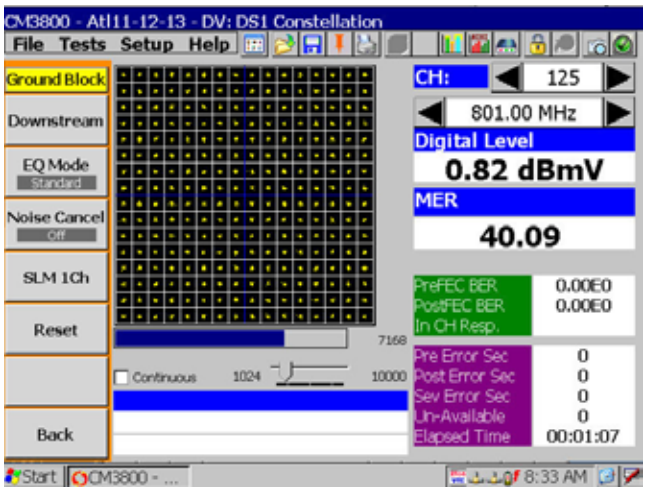
The SLM (signal level meter) automatically switches between analog and digital mode, depending on the channel plan setup. Both numeric and graphic results are displayed with measurements of the analog channel video and audio carrier, second audio (if used) and the upper adjacent channel. A HUM measurement function provides composite (0 to 1 kHz, line rate and 2x line rate) HUM measurements on any analog channel with input levels as low as -20 dBmV.

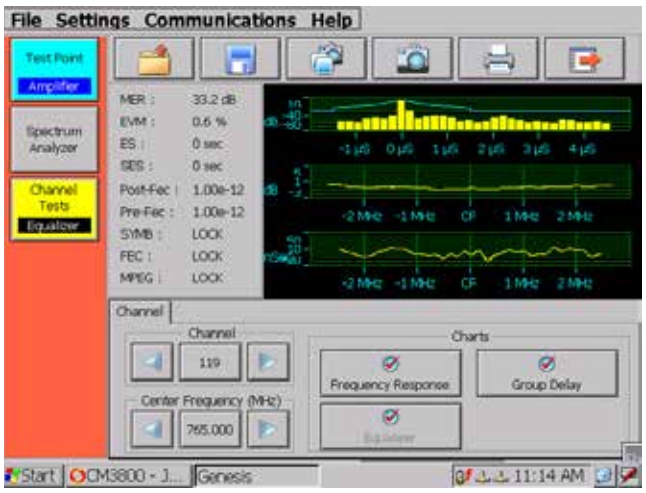
A two channel mode offers a quick rough balance tool to view any two channels simultaneously. dBmV or dBuV units of measurement are user selectable.



Mini-Scan

SLM mini-scan provides a quick view of the key channel levels, with peak and average measurement markers, plus tilt and peak-to-valley. Select any 2 to 150, and view the results on a simple bar graph with pass/fail indication. A full scan is also available to scan through the entire channel plan of analog and digital channels. Scan and Mini Scan are incredibly fast, scanning up to 100 channels in less than two seconds.

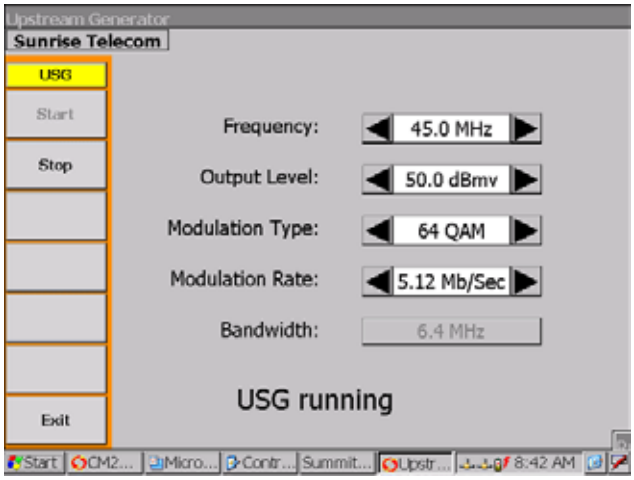




QAM Analyzer

The QAM option provides constellation, equalizer and frequency response displays for digital video and downstream cable modem signal analysis, plus a downstream spectrum display and STATS mode. STATS mode provides critical measurement data over time, aiding in troubleshooting intermittent faults.

In Digital Video mode a Standard or Minimum Equalizer mode may be selected to emulate typical CPE devices or to minimize the effect of the equalizer, since it masks network impairments.



CM3-USG Option (Hardware Required)

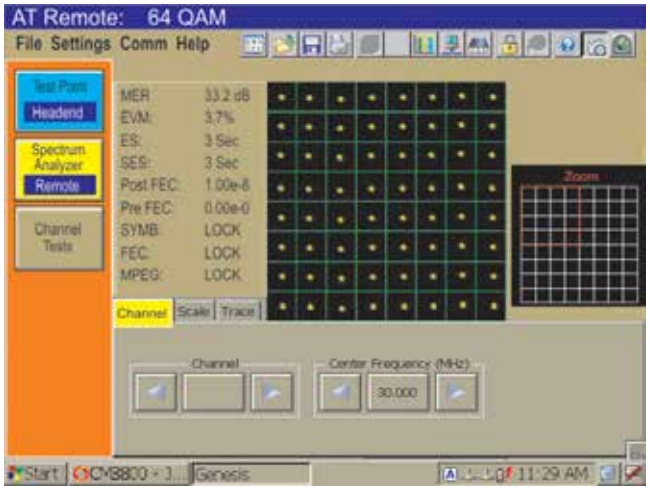
The Upstream Signal Generator (USG) option provides DOCSIS 3.0, 2.0, 1.1 and 1.0 compatible, continuous upstream signals to facilitate upstream testing on actual upstream signals. Insert the test signals in the upstream and make remote measurements with an AT2500 using the CM3-ATrmote software. CM3-ATremote is included with the USG option or may be purchased separately.

- 5 to 42 MHz (5 to 65 MHz for “E” versions)
- DOCSIS 3.0 standard output Levels
- True QPSK, 16 QAM, 64 QAM & 256 QAM Upstream Modulation
- 0.6 to 5.12 Mb/Sec Symbol Rate

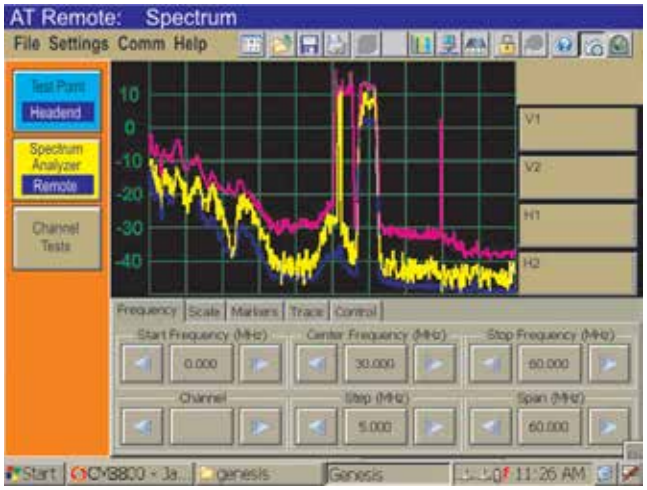
CM3-ATremote Software Option

Remote operation of the AT2500RQ spectrum analyzer in both spectrum and QAM modes provide an ideal one-man upstream testing solution when used with the USG option. The actual spectrum display results can be viewed on the CM3000 Series screen, with full access to control functions such as span, frequency, amplitude and resolution bandwidth. The QAM mode provides access to digital measurements including MER, Pre FEC BER, Post FEC BER, Constelllaiton, Frequency Response Equalizer and Group Delay Remotely.

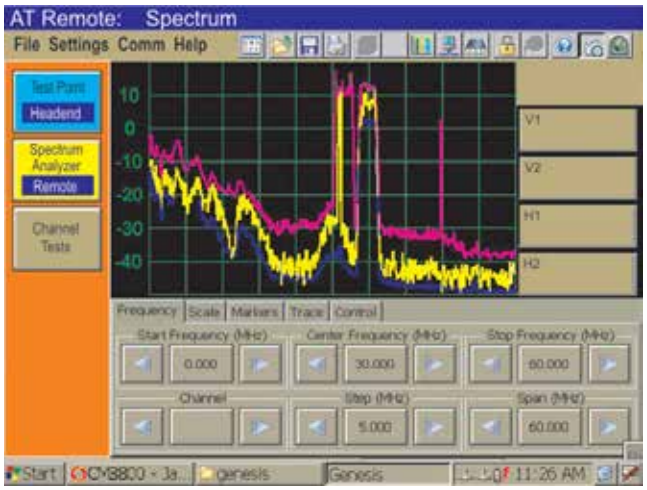
- View remote AT2500 test results on the CM3000
- Use with USG Option for one man Upstream testing
- Includes Spectrum Analysis display



Upstream Constellation



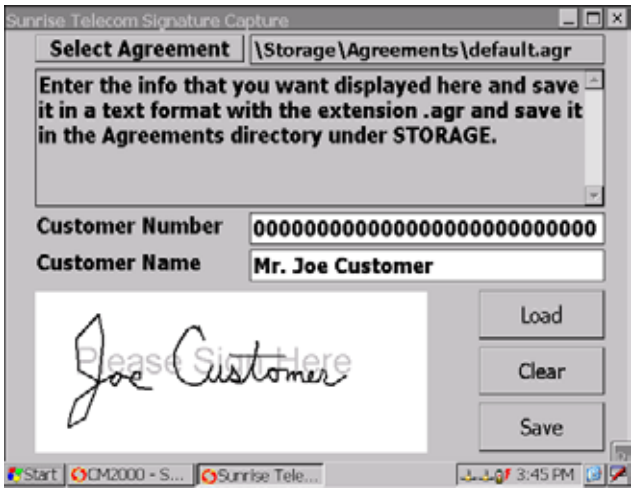
Upstream Spectrum



CM3-CAD Strand Map Viewer Option

Optional firmware for the CM3000 Series provides the ability to display DXF or DWG maps. Includes zoom and scroll controls, and red-line capability. Trial Version included.

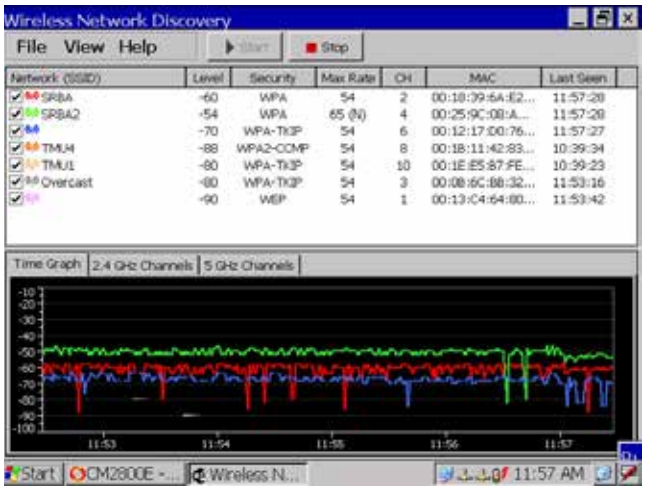
- Zoom and scroll capability
- Red-line markup and Save functions



CM3-SIGN Signature Capture Option

Optional 3800 firmware allows the system to load custom agreement forms, select the desired agreement, and capture the customer's signature, all in a single secure file.

- Capture signatures in the field on the touch screen
- Select from multiple user customizable agreements



WiFi USB Adapter Option

The USB WiFi adapter is automatically recognized when plugged into the USB port. The WiFi adapter provides connectivity to any 802.11g compatible network and may be used to test and troubleshoot in-home networks. WiFi tools include IP Detail, Ping, Traceroute, Throughput, Web Browser, Telnet SNMP, FTP and more.

Specifications

Tuning

Sweep and SLM Frequency range
- 5 MHz to 200 MHz US
- 5 to 1000 MHz DS

QAM Analyzer Frequency Range
- CM3800: 50 MHz to 1000 MHz
- CM3800E: 80 MHz to 1000 MHz

Cable Modem Frequency Range:
- CM3800: 5 to 42 MHz US and 50 MHz to 1000 MHz DS
- CM3800E: 5 MHz to 65 MHz US and 80 MHz to 1000 MHz DS

Channel and Frequency Tuning

Measurements

Upstream and Downstream Sweep
Analog and Digital SLM
Digital QAM Analysis
Cable Modem
- Spectrum Display (upstream and optional downstream)
- VoIP Option (MOS, R-factor, jitter, latency and lost packets)
- Programmable Automated Tests
- Ping and TraceRoute (RF, Ethernet and WiFi (optional))

DOCSIS® Compatible: 1.0, 1.1, 2.0 and 3.0

CM3800E DOCSIS and EuroDOCSIS compatible

Standard Accessories

User's manual, carry strap, AC battery charger, internal battery pack, spare connectors, carry case, vehicle charger, strand hooks and System Editor PC software.

Optional Features

i-QAM option signal analysis qualifies & identifies impairments in the QAM signal
64 QAM & 256 QAM upstream generator/return pilot generator
realVIEW™ client provides Remote US spectrum view from realWORX system
CAD Viewer displays DWG and DXF strand maps and has Save and Red-line capability
AT2500 Remote and Measurement Control software
WiFi USB Interface

General

Size	25.4 x 17.5 x 10.2 cm (W x H x D) 10 x 7 x 4 in
Weight	Approximately 2.72 kg (6 lb)
Battery	Li-ion smart battery AC/DC Charging
Battery Charging Time	2-3 hrs
Battery Operating Time	4-6 hrs continuous, 8-12 hrs typical in battery saver mode
Operating Temperature	0˚C to 45˚C (32˚F to 113˚F) Humidity (non-condensing): 95%
Storage Temperature	-20˚C to 70˚C (-4˚F to 158˚F)
Display Type	Color VGA Touch Screen: 640x480 Backlight: Yes (Auto Off) Daylight viewable
Data Storage	Test results and Screen capture
CE and UL certified	

VeEX Inc.
2827 Lakeview Court
Fremont, CA 94538 USA
Tel: +1.510.651.0500
Fax: +1.510.651.0505
www.veexinc.com
customercare@veexinc.com

D05-00-062P A00 2014/07