

SUNRISE TELECOM®

# CM2000™

Cable Modem Network Analyzer Series

Data Sheet

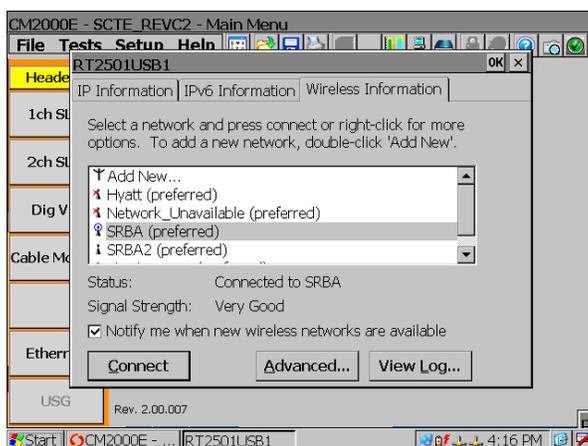


Sunrise Telecom's new CM2000 Cable Modem Network Analyzer is the latest addition to our installation, service and plant verification testing solution portfolio. An intuitive user interface and Windows CE operating system combined with a comprehensive set of customizable test functions allow cable operators to speed installations and reduce repair time, while increasing quality of service.

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 by replacing a field PC in most instances.

## KEY FEATURES

- New - WiFi 802.11g Wireless USB adapter option
- New - SNMP Agent - select MIBs from Integrated Lists to run queries on Network Devices
- New - FTP Agent - upload or download files manually
- New - Telnet Agent - monitor Internal Modem Progress, Telnet into other network devices, Capture and Save results
- New - Live search applications - local information, directions, maps, weather, etc.



- Up to 30 Mbps Throughput
- DOCSIS® 2.0 Analyzer with Advanced 1 GHz SLM
- 6.4" full VGA, color touch screen (daylight visible)
- Field replaceable 4+ hour continuous operation battery pack

- Windows® CE 5.0 Operating System with Internet Explorer®
- BPI+ and PacketCable™ digital certificates installed
- Integrated Tools for: 802.11g testing, Signature capture, Strand map viewing, SNMP, FTP or Telnet
- Weather and shock resistant
- WiFi, Ethernet and Cable Modem Net-Tools: Ping, Trace, Throughput and IP Details

## BENEFITS

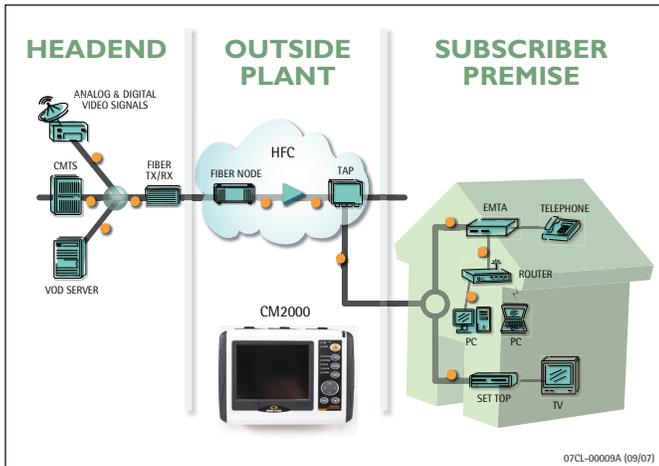
- Provides cable TV technicians an industry-leading installation and troubleshooting experience
- Easy-to-use WinCE system minimizes training and maximizes testing accuracy and consistency
- Excellent tool to perform installation, service and plant verification testing to quickly identify the cause(s) of impairment
- Validates network capacity up to 30 Mbps
- Open architecture design provides support for a variety of devices and future applications
- Use WiFi option, Ethernet or Cable Modem to access back office systems and manage test results
- User-programmable automated testing

## OPTIONAL FEATURES

- Advanced VoIP tests (MOS, R-factor, latency, jitter and lost packets)
- QAM analyzer (constellation, equalizer, frequency response and downstream spectrum)
- 64 QAM Upstream generator/return pilot generator
- realVIEW™ client provides Remote US spectrum view from realWORX system
- New - CAD Viewer displays DWG & DXF strand maps and has Save and Red-line capability

## APPLICATIONS

Select the CM2000 and then add the appropriate options for your application. The CM2000 offers the accuracy and convenience necessary for headend alignment, the comprehensive testing tools for plant maintenance and the automated testing and troubleshooting tools for service, as well as the value and durability necessary for installation and service work.

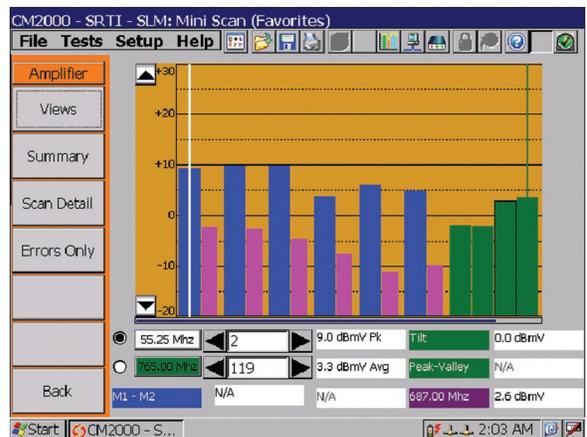


Many CM2000 features replace the need to deploy a PC in the field. Telnet application allows monitoring internal modem operation or connection to other network devices. FTP client provide simple file transfer between CM2000 and FTP server for maps, forms, tests results or any files. SNMP agent allows MIB queries to any supported network hardware. CM2-CAD option to view DXF or DWG files. Replaces paper printed strand maps with easy to use and always up-to-date files. Includes ability to red-line and save files.

CM2000 - SRTI - CM Detail			
		DOWNSTREAM	UPSTREAM
Amplifier	Channel	118 759.00 Mhz	Frequency 25.00 Mhz
CM Views	Modulation	QAM256	Modulation QAM16
Downstream	Throughput	N/A	Throughput N/A
Upstream	Level	-0.5 dBmV	Level 49.5 dBmV
Net-Tools	MER	37.8	BKER 0.00E0
Start/Stop	PreFEC BER	0.00E0	RSA Value -2.5 dBmV
Error Inject	PostFEC BER	0.00E0	Ping Time 0
Reset	Pre Err Sec	0	Tx Packets 3358
	Post Err Sec	0	Rx Packets 3357
	Sev Err Sec	0	Discard Pkts 0
	Elapsed Time	00:01:07	Lost Packets 0

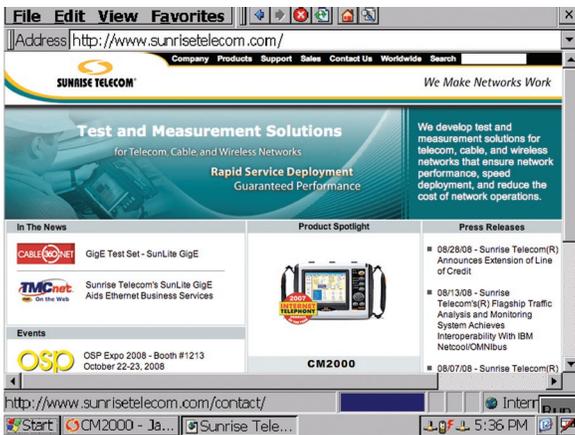
### Cable Modem

Complete range and register data is provided for the upstream and downstream. 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 testing is capable of up to 22 Mb/s downstream and 18 Mb/s upstream.



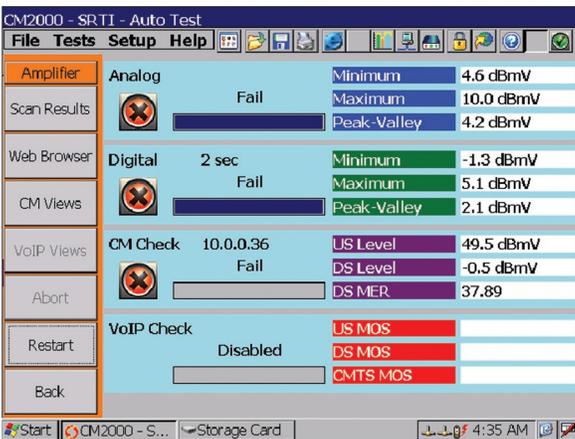
### Mini-SCAN

SLM mini-scan provides a quick view of the key channels' level, with peak and average measurement markers, plus tilt and peak-to-valley. Just check off the channel you want to include - 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.



## 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.

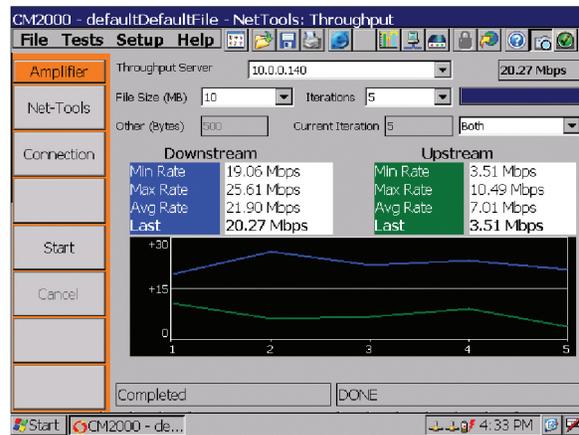


## Auto-Tests

Nine administrator programmable auto-tests provide comprehensive and consistent testing of analog and digital signals, cable modem and VoIP services.

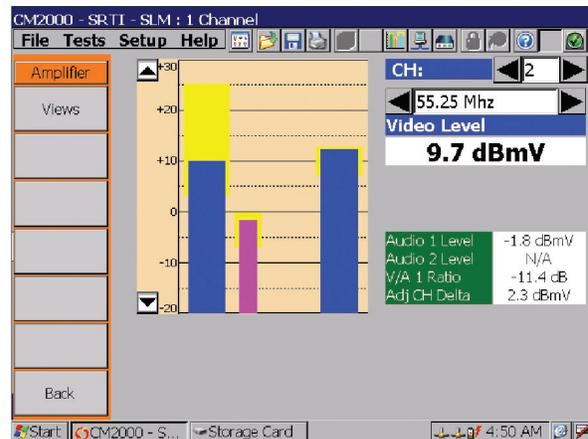
Select the tests, the pass fail limits and the channels to be tested on each of the nine configurable auto-tests.

View summary results or detailed results of every measurement or just those outside of the pass / fail limits.



## 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 by the user to best duplicate the customer's experience.



## SLM 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 two channel mode offers a quick rough balance tool to view any two channels simultaneously. User selectable measurement units of dBmV or dBuV.

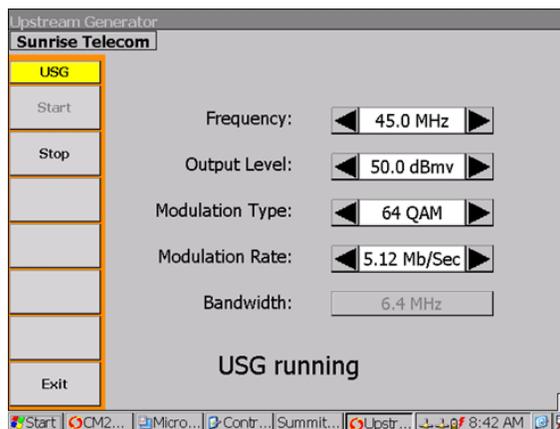
## NEW OPTIONS

### CM2-WiFi Option (Hardware Option 2.1 or newer firmware required)

- 802.11g wireless compatible
- USB adapter – Automatically recognized and connected.
- Tools – provides wireless connectivity, Ping, Trace, Throughput, Internet Explorer and IP Details for wireless networks.

### CM2-USG Option (Hardware Required)

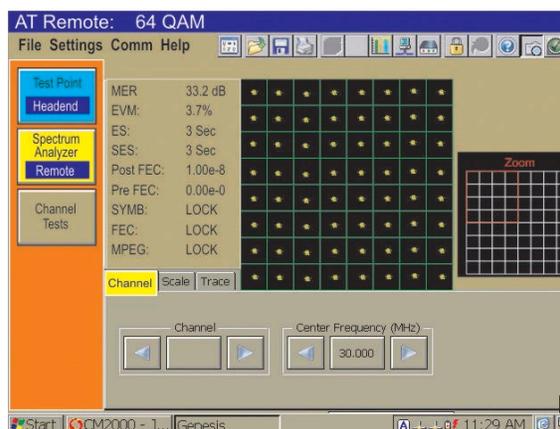
- True 64 QAM DOCSIS 2.0 Upstream Modulation
- MER, BER, Group Delay measurements are available when used with AT2500
- USG operates independently of CM2000 operation
- Includes CM2-AT remote software



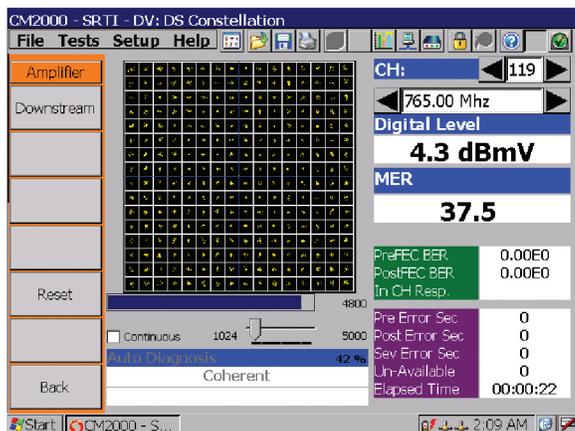
### CM2-ATremote AT Remote Software Option

CM2-ATremote Optional firmware for the CM2000 allows remote control and remote viewing of the test results. Upstream and Downstream spectrum measurements as well as individual channel measurements and Digital Analysis is included. Digital measurements include MER, Pre FEC BER, Post FEC BER, Frequency Response and Group Delay; in addition to viewing Constellation and Equalizer graphic displays.

- Remote AT2500 control via the network
- View test results on the CM2000
- Use with USG Option for one man Upstream testing



### Upstream Constellation



### QAM Option – (Constellation)

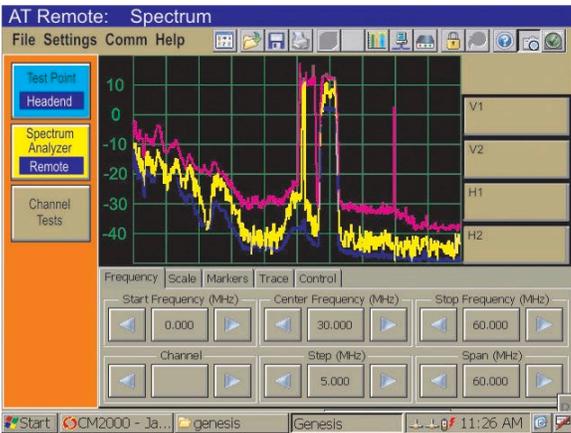
The QAM option adds constellation, equalizer and frequency response displays for digital video and downstream cable modem signal analysis, plus a downstream spectrum display and STATS mode. (Base model include MER, BER and all digital measurements).

STATS mode provides critical measurement data over time, aiding in troubleshooting intermittent faults. Results include an auto-diagnostic mode that helps identify network impairments.

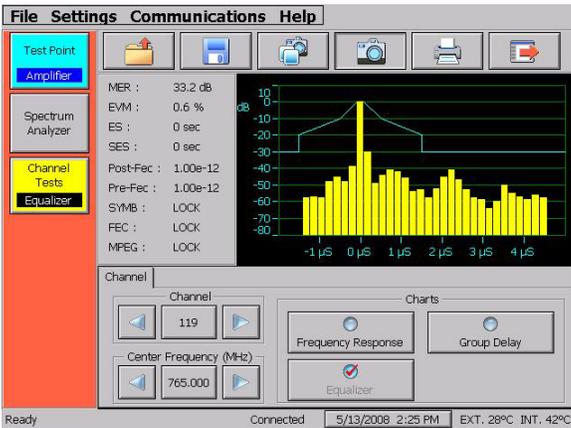
CM2000 - SRTI - VoIP Summary				
Amplifier	MTA Mode	Online	QoS Mode	Dynamic
VoIP Views	VoIP Server	10.0.0.140	Test Length	10
Connection	RTP Local	3017	Packet Rate	20 ms
	RTP Remote	3018	Total Packets	500
Start	Dynamic Service Flow		Requested	Granted
	Bandwidth	111360	111360	111360
Stop	Jitter Tolerance	800	800	800
	Downstream Upstream CMTS			
	MOS	4.2	4.2	4.2
	R-Factor	91	93	91
	Tx Packets	500	500	500
	Lost Packets	0	500	0
	Disc Packets	0	0	0
	Latency	0.0 ms	0.0 ms	1.0 ms
	Jitter	2.0 ms	0.0 ms	3.0 ms

### VoIP Option

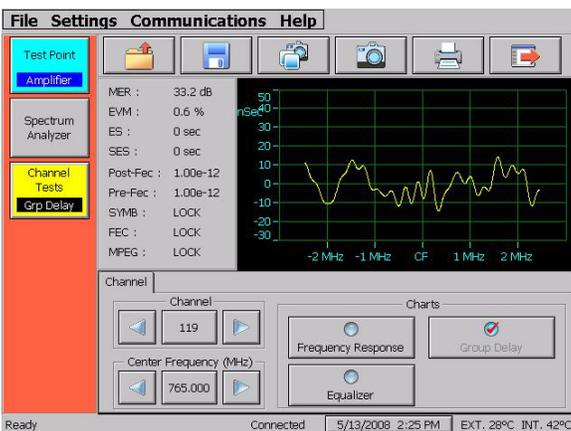
The VoIP option provides a detailed analysis of the upstream and downstream service flows, as well as the round trip analysis between the test point and the CMTS. Measurement results include: MOS, R-factor, jitter, latency and lost packets. The user may adjust the duration of the test for a quick test 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.



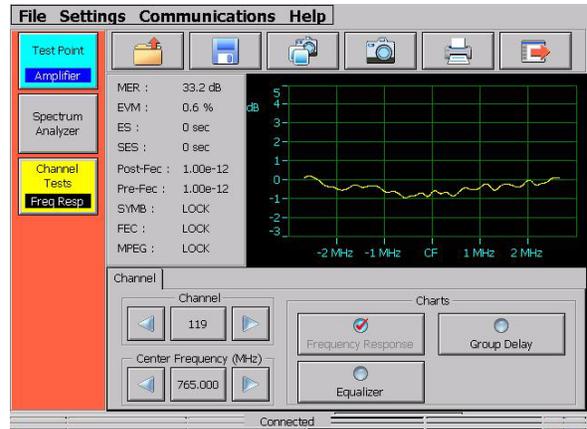
**Upstream Spectrum**



**Upstream Equalizer Stress**



**Upstream Frequency Response**

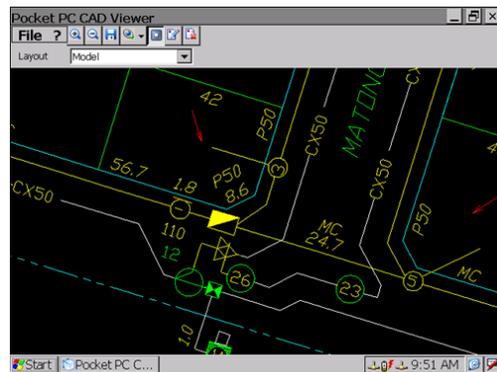


**Upstream Group Delay**

**CM2-CAD Strand Map Viewer Option**

CM2-CAD Optional firmware for the CM2000 provides a viewer to display DXF or DWG maps. Includes excellent zoom and scroll controls and the ability to red-line and save map files. Download files over the network or from the CF card or USB drive. Trial Version included

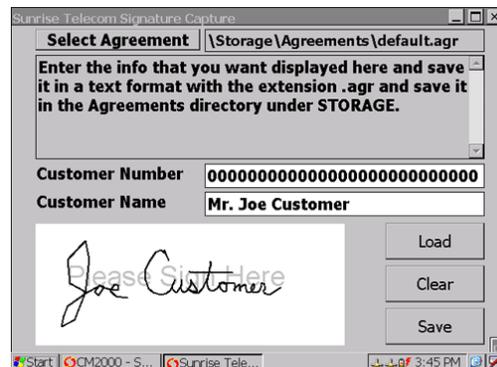
- Zoom and scroll capability
- Red-line markup and Save functions



**CM2-SIGN Signature Capture Option**

CM2-SIGN optional firmware for the CM2000 allows the system to load their own agreement forms and then select the desired agreement to capture the customer's signature, name and customer number all in a single secure file.

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



## SPECIFICATIONS

### Physical Dimensions

7" H × 10" W × 4" D  
(17.5 cm H × 25.4 cm W × 10.2 cm D)  
Weight: approximately 6 lbs.

### Power:

Battery Pack Li-ION  
AC/DC Charging  
Charging Time: 2–3 hrs  
Operating Time: 4–6 hrs continuous 8–12 hours typical  
in battery saver mode.

### Environment

0°C to 50°C  
Humidity (non-condensing): 95%

### Display Type:

Color VGA Touch Screen (640 × 480)  
Backlight: Yes (auto off)  
Daylight viewable

### Tuning

5 MHz to 1000 MHz frequency range: (except 42–50 MHz  
on CM2000 or 65–80 MHz on CM2000E)  
Channel and Frequency Tuning

### Measurements

Analog  
Digital  
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 and Ethernet)  
Throughput (18 Mb upstream, 22 Mb downstream and  
30 Mb Ethernet)

### CE and UL certified

### DOCSIS® Compatible: 1.0, 1.1 and 2.0

CM2000E DOCSIS and EuroDOCSIS compatible.

### Data Storage

Test results  
Screen capture

## ACCESSORIES:

**Standard:** User's manual, carry strap, battery charger, internal battery pack, spare connectors, Carry Case, Vehicle Charger, Strand Hooks and System Editor PC software.

## ORDERING INFORMATION

CM2000	Base model includes analog and digital SLM and cable modem testing. Deep interleave for digital video and web browser are included.
CM2000E	Base model with 6 and 8 MHz IF for DOCSIS and EuroDOCSIS, includes analog and digital SLM and cable modem testing. Deep interleave for digital video and web browser are included.
CM2-QAM	Option to add constellation, equalizer stress frequency response and downstream spectrum display screens.
CM2000-USG	CM2000 with Upstream Signal Generator allows insertion of continuous true DOCSIS upstream signal up to 64QAM that allows MER and BER measurement. See Upstream Toolkit data sheet.
CM2000E-USG	CM2000E with Upstream Signal Generator allows insertion of continuous true DOCSIS upstream signal up to 64QAM that allows MER and BER measurement. See Upstream Toolkit data sheet.
CM2-VoIP	Option to add VoIP tests, including upstream and downstream MOS, R-factor, jitter, latency and lost packets. Also provides the ability to plug in a handset to place / receive calls.
CM2-WiFi	802.11g Wireless USB Adapter adds WiFi connectivity. Test and validate in-home networks - ping trace, throughput, web browser, FTP, SNMP and more.
CM2-SIGN	Signature Capture software option to allow user to install custom agreements and collect customer signatures.
CM2-CAD	DXF & DWG Strand Map Viewer with Red-line function
CM2-PSC	Protective screen covers
CM2-BAT.	Optional spare battery pack for CM2000
CM2-RVIEW	Optional Remote Upstream realVIEW display from realWORX server

For more information or a directory of sales offices: [info@sunrisetelecom.com](mailto:info@sunrisetelecom.com) | [www.sunrisetelecom.com](http://www.sunrisetelecom.com)  
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