Product Brochure

Anritsu Advancing beyond

Microwave Spectrum Monitor Module

OEM Assembly for Custom System Integration

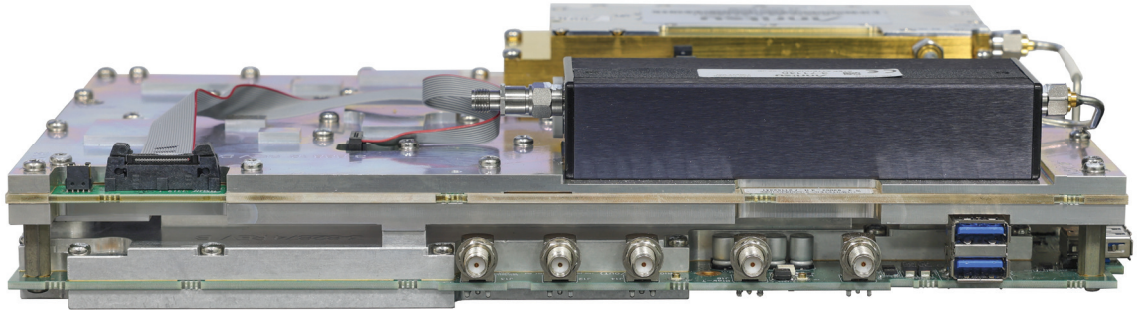
MS27200A

9 kHz to 9 GHz/14 GHz/20 GHz/26.5 GHz/32 GHz/43.5 GHz/54 GHz

MS27200A Microwave Spectrum Monitor Module

OVERVIEW

Anritsu is proud to introduce the world's most advanced MS27200A Microwave Spectrum Monitor Module. With frequency coverage up to 54 GHz, the new MS27200A Microwave Spectrum Monitor Module completely redefines the standards for spectrum monitoring, setting another new industry benchmark for performance and accuracy. The MS27200A is the culmination of over 60 years of microwave test and measurement equipment development, using the very latest technologies to deliver accuracy and precision in measurements previously reserved only for benchtop instruments.



MS27200A Microwave Spectrum Monitor Module is Available with 9 kHz to 54 GHz Frequency Range Options

Key Specifications

Parameter	Specification
Frequency Range	9 kHz to 9/14/20/26.5/32/43.5/54 GHz
Analysis Bandwidth	22 MHz (standard), 120 MHz (Option 104), and 150 MHz (option dependent)
RTSA Bandwidth	22 MHz (standard), 120 MHz (Option 104), and 150 MHz (option dependent)
Third-Order-Intercept Point (TOI)	(–20 dBm tones 2 MHz apart, 0 dB input attenuation, preamp OFF, reference level –20 dBm)
DANL (with pre amp)	–164 dBm in 1 Hz RBW
Amplitude Range	DANL to +30 dBm
Phase Noise @ 1 GHz	–106 dBc/Hz @ 100 kHz offset (typical)
RBW	1 Hz to 10 MHz
Amplitude Accuracy	< 20 GHz ±1.3 dB < 20 GHz (±0.5 dB typical)

Key Features

Feature	Specification
Control Interfaces	Ethernet, USBTMC
PC Control	Remote SCPI programming
Automated Monitoring Software	MX280001A Vision™ Monitor PC application
IQ	Capture and streaming IQ data through Ethernet, USB, and PCIe interfaces
Cellular Modulation Quality Measurements	WCDMA, LTE and 5GNR
Continuous Operation and Recovery	Built in watchdog timer and auto recover on power failure provide continuity of service
Traces	Up to six traces
Markers and Limits	12 intelligent markers and comprehensive limits
Event Capture	Save traces and alarms on defined events

High Performance

Typical applications for the MS27200A Microwave Spectrum Monitor Module requires excellent noise floor for signal detection and high TOI to minimize internal distortions when the input is exposed to multiple input signals. With a displayed average noise level (DANL) of –164 dBm and a TOI of typically +20 dBm, signal detection, and measurement integrity are assured. Measurement bandwidths of up to 150 MHz with IQ capture and steaming options provide class leading functionality in a small form factor package.

Rich in Features to Enhance Spectrum Monitoring

The MS27200A Microwave Spectrum Monitor Module is packed with all the features required to perform long term spectrum monitoring. In addition to six simultaneous traces, each of which can be configured with a different detector, the MS27200A Microwave Spectrum Monitor Module offers:

- Built-in RTSA (150 MHz bandwidth) with 2.05 µs POI provides the ultimate signal analysis and interference capture tool
- 12 intelligent markers for labeling and identifying signals
- Limit lines with multiple segments and automatic set up around active signals
- Save on events including time interval and mask violation
- Smart measurements to rapidly characterize signals OBW, Channel Power, and spectral emission
- Spectrogram with time stamps for historic recording
- Record and playback of trace data for analysis of intermittent signals

24/7 Operation

The MS27200A Microwave Spectrum Monitor Module is designed for continuous operation. Recovery features are included to ensure reliable and uninterrupted monitoring. A built-in watchdog timer resets the instrument in the event of a software interruption. Should a break in the power supply occur, when the power is restored the instrument will resume normal operation in the same state it was in prior to loss of power.

WCDMA, 5GNR, and LTE Modulation Quality Measurements

Options for 5G and LTE demodulations enables detailed analysis of these common cellular standards. Measurements including base station PCI and bandwidth as well as frequency to facilitate the identification of rogue or illicit transmitters. Coupled with the spectrogram and IQ capture, field technicians have an array of tools to capture and analyze signals in the cellular spectrum.

IQ Capture and Streaming

The MS27200A Microwave Spectrum Monitor Module provides for the capture of IQ data of Signals-of-Interest (SOI) for later post processing. When an illicit signal is detected, post capture analysis is performed to identify the source of the signal. The 150 MHz RTSA measurement bandwidth enables the captures of transient and continuous signals to internal instrument memory or directly to a mass storage device. Dedicated PCIe interfaces provide the bandwidth required for the most demanding cases where real-time streaming is required.

Real-Time Spectrum Analyzer (Option 199)

For many spectrum and network stakeholders, basic spectrum sweeps may not give enough information. The RTSA option provides real-time signal capture with 150 MHz bandwidth and the ability to capture signals down to a 2.05 µs duration with 100% POI at full amplitude. This provides unrivaled insight into interference in the wireless spectrum, capturing interfering signals that are too short in duration to be seen with conventional spectrum analyzers yet may be degrading system performance. The spectrogram provides the maximum output of the RTSA Fast Fourier Transform (FFT) over time with settable 50 ms to five seconds resolution. The spectrogram provides a history of spectral activity enabling intermittent interferers to be detected and recorded.

Pulse Radar Measurements

The wide bandwidth of the enables detailed analysis of pulsed radar signals. In zero span the default bandwidth is 40 MHz and the minimum sweep time is 60 ns, with pulse rise time measurements as short as 20 ns. Up to 12 markers can be positioned on the traces to simplify pulse repetition, pulse width, and rise time measurements. In zero span, a fixed frequency IF output option is also available to interface with external analysis tools. To get fully automated pulse characterization with measurements made in compliance with IEEE Std 181-2011, section 5.2.1, add pulse analyzer Option 421.

Option 509 adds comprehensive AM/FM modulation quality measurements for detailed characterization of broadcast FM and LMR transmitters.

LTE Base Station Analyzer (Option 883)

The MS27200A Microwave Spectrum Monitor Module features several measurements for installation and maintenance of LTE, FDD, and TDD radios. The goal of these measurements is to help maximize data rate and capacity with accurate power settings, ensuring low out-of-channel emissions and good signal quality. These attributes help to create a low dropped or blocked call rate, and a good customer experience. LTE sites also play a critical role in most early 5G deployments, acting as the anchor to 5G communications. Cell site technicians or RF engineers can make measurements OTA to spot-check a transmitter's coverage and signal quality without taking the cell site off-line. When the OTA test results are ambiguous, the user can directly connect the device to the base station to check the signal quality and transmitter power.

The MS27200A Microwave Spectrum Monitor Module offers the following LTE measurements:

- Cell ID, Sector ID, Cell Group
- Frequency Error
- Time Offset
- PBCH, RS, and SS Power
- Signal Quality (EVM)
- PBCH
- PDSCH (QPSK, 16QAM, 64QAM, 256QAM)
- MIMO Antenna Power and Time Alignment Error (TAE)
- Channel Power
- UL/DL Interference
- Resource Block Usage
- OFDM Symbol Transmit Power (OSTP)
- Carrier Aggregation
- Multi-PCI Scanner
- Control Channel Measurements
- PBCH and PDSCH Constellations
- SIB Decoding of MCC and MNC

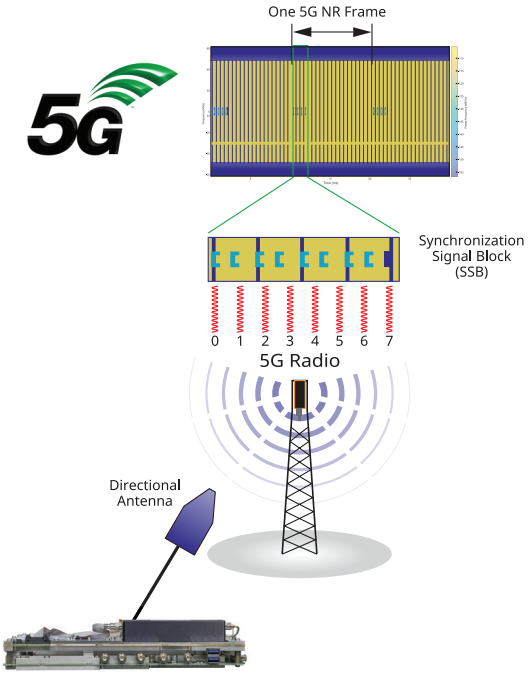
5G NR Base Station Measurements (Option 888)

The rapid introduction of 5G NR networks requires an instrument that can validate the performance of the gNB base stations quickly in a field environment. In both the 3.5 GHz and (mmWave) 28/39 GHz bands, the adoption of active antenna systems means that new test methods need to be considered. Some radios may have test monitor ports integrated, but many operators will make gNB transmitter measurements OTA.

The MS27200A Microwave Spectrum Monitor Module performs the essential measurements in full compliance with the 3GPP TS 38.104 V15. Measurements supported include:

- PCI Cell/Sector ID
- Frequency Error
- Time Offset
- Difference in Time Offset
- Modulation Quality (EVM)
- PBCH Constellation
- SS-RSRP/RSRQ/SINR/RSSI
- Channel Power
- Occupied Bandwidth
- Adjacent Channel Leakage Ratio
- Transmitter Spurious
- Carrier Aggregation
- OTA Multi PCI Scanner
- EIRP
- TDD Uplink Interference with Gated Spectrum
- SIB Decoding of MCC and MNC

A key part of 5G NR signals is the synchronization signal block (SSB). Decoding the SSB can reveal the important cell characteristics, like cell ID, frequency error, and beam powers. Making measurements on the SSB allows transmitter testing on a live gNB. As well as obtaining beam ID, the RSRP is returned for each of the beams in the SSB. In order to properly decode the signal, the user must know center frequency, bandwidth, and subcarrier spacing of the signal under test. This can be entered manually or by using a 3GPP-defined band and an absolute radio-frequency channel number (ARFCN). It is also critical to know the frequency position of the SSB relative to the center frequency of the signal. This can also be entered manually as an offset from center or by entering the Global Synchronization Channel Number (GSCN). In cases where the SSB location is unknown, the MS27200A Spectrum Monitor Module has an Auto SSB Detect feature that searches the 3GPP-defined raster of potential SSB positions to find it automatically. In some cases, especially in mmWave, a single transmitter can be transmitting up to eight carriers simultaneously. The MS27200A Microwave Spectrum Monitor Module has a carrier aggregation feature that allows up to eight individual carriers to be set up and measured sequentially in a loop to ensure all are working correctly.



MS27200A Microwave Spectrum Monitor Module Returns RSRP vs Beam Index Based on OTA Analysis of the 5G NR SSB

WCDMA Base Station Measurements (Option 871)

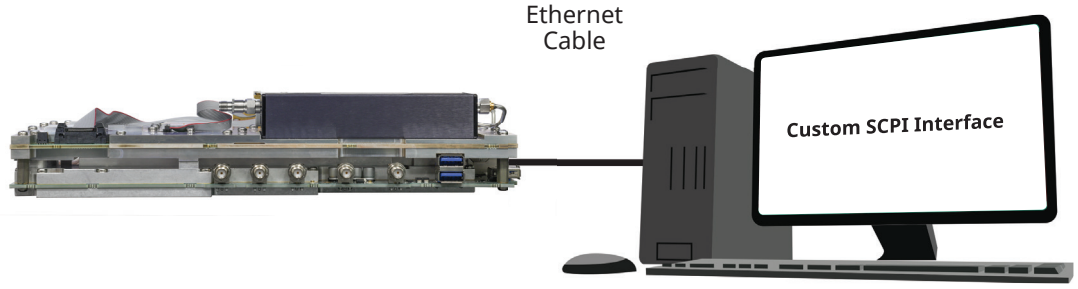
Network operators with legacy 3GPP WCDMA networks continue to need field maintenance instruments. The WCDMA base station measurement option includes the essential measurements required for base station maintenance. This provides field engineers a single test instrument that supports the most common technologies in a network. WCDMA measurements supported include:

- Occupied Bandwidth
- Spectral Emission Mask
- Channel Power
- Adjacent Channel Power
- Carrier Frequency
- Frequency Error
- Scrambling Code
- Common Pilot Channel Power (CPICH)
- Primary Synchronization Channel Power (P-SCH)
- Secondary Synchronous Channel Power (S-SCH)
- Primary Common Control Physical Channel (P-CCPCH)
- EVM on P-CPICH Pilot Chan

INSTRUMENT CONTROL OPTIONS

The MS27200A Microwave Spectrum Monitor Module can be controlled using customer written PC application or with the MX280001A Vision Monitor PC software application.

Custom SCPI Interface



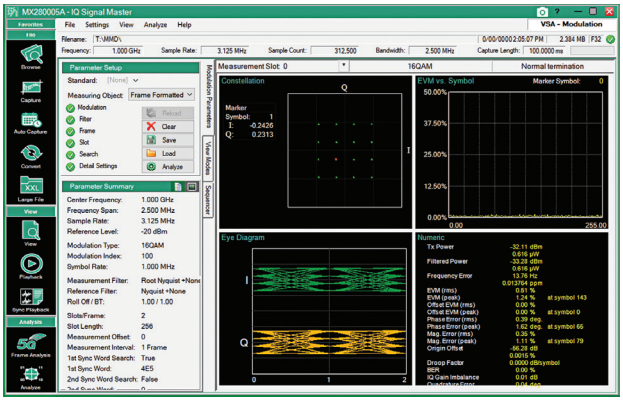
The MS27200A Microwave Spectrum Monitor Module with Customer PC Application

Connect to any MS27200A Microwave Spectrum Monitor Module on the same network to take manual control of the instrument, configure measurements, and save results. Traces and IQ data can be stored directly to the PC memory for ease of later recall and playback functionality. Full screen captures can be saved as well as individual result traces, traces saved by “Save on Event” triggers, or traces continuously saved over a defined period of time.

The MS27200A is controlled via SCPI for all operation. All the standard features of a spectrum analyzer are available to capture specific events and save images or trace files directly to the PC memory or on the board’s internal storage. Programmatic real-time configuration of the spectrum monitor allows targeted configurations for detailed signal analysis and investigation.

IQ Signal Master MX8000A Vector Signal Analysis Software

IQ Signal Master MX280005A Vector Signal Analysis Software provides a comprehensive suite of measurements that deliver post processing and analysis of IQ data files captured on Anritsu MS2090A, MS27200A, MS27201A and MS2710xA spectrum analyzers. The software is designed to bring together all the essential tools required to capture IQ data files and then gain critical insights into the nature of the captured signals. Modes within the application support the ability to capture or stream IQ data into the PC memory, perform modulation quality measurements and playback IQ data with high frequency and time resolution.



IQ Signal Master

A file conversion mode allows IQ data captured on the supported analyzers to be converted to the format required for playback using an Anritsu MG3710E Vector Signal Generator further enhancing the overall capability.

The software is designed for national RF spectrum regulators, security agencies and defense electronics companies who need to gain critical insight into RF signals that have been captured in the field. It is also suitable for organizations that need to monitor and protect RF spectrum from unlicensed operators or unintended sources of interference.

PCIe Streaming Kit

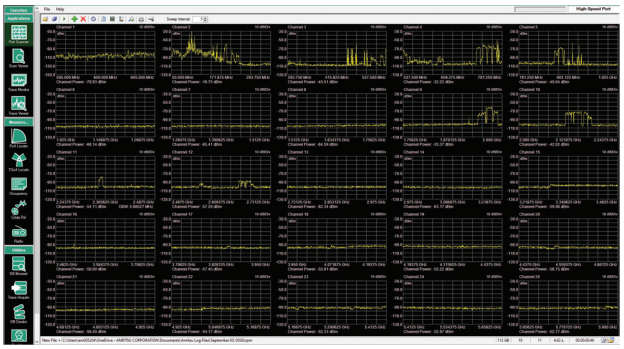
IQ Signal Master MX280005A Vector Signal Analysis Software provides a comprehensive suite of measurements that deliver post processing and analysis of IQ data files captured from the MS27200A Microwave Spectrum Monitor Module. The software is designed to bring together all the essential tools required to capture IQ data files and then gain critical insights into the nature of the captured signals. Modes within the application support the ability to capture or stream IQ data into PC memory using a PCIe streaming kit, perform modulation quality measurements, and playback IQ data with high frequency and time resolution.

IQ Signal Master Key Features:

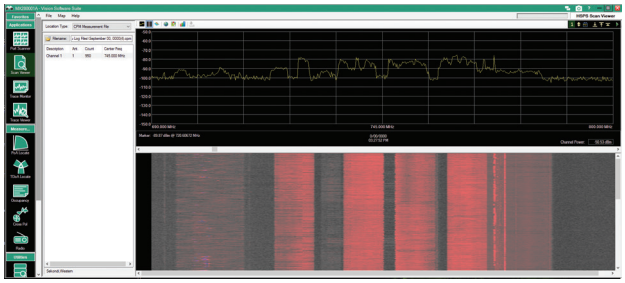
- PC application for IQ data capture and post processing
- IQ file browser with detailed view of IQ file metadata
- IQ data capture control from within the MX280005A GUI
- Basic IQ data viewer
- IQ Player offers high resolution Frequency vs Time display
- AM/FM demodulation
- Spectrum view of data window in capture
- IQ file format converter
- Continuous or single shot captures
- Modulation quality and analysis of common modulation standards

INSTRUMENT CONTROL OPTIONS *(Continued)*

MX280001A Vision Monitor Software Application (Option 400)



View the Spectrum Traces from Multiple MS27200As on a Single PC Monitor with the Vision High-Speed Port Scanner Option



Log Spectrum Traces for Extended Time Periods and Monitor for Interfering Signals with Alarms and Alerts

When long-term monitoring is required, the optional Vision software offers a full suite of spectrum monitoring and trace archiving options.

Vision Monitor software offers a range of applications for monitoring the RF spectrum over a period of time and storing results to a database. Vision Monitor is an ideal tool for long-term interference monitoring. Limits can be set with automated alarms for limit violations to capture short-term or intermittent signals. Other features include a scanner option that enables the monitoring of a range of frequency bands or channels over time with unique settings for each channel being monitored. A multi-trace view shows the spectrum for all channels being monitored on the same display.

The Vision Monitor application is fully automated. Measurements can be captured and periodically uploaded to a database for further processing. Depending on need and storage capacity, users can store spectrum history over many months or years with a user-defined capture assigned schedule.

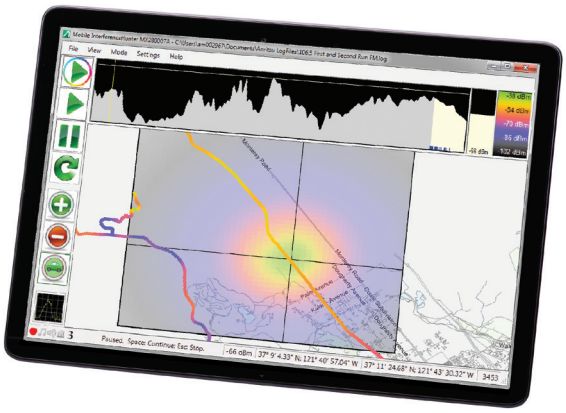
All spectrum measurement databases are searchable, allowing the user to quickly locate patterns of signal activity relevant to an investigation. The spectrum history can also potentially be used in legal proceedings for documenting illegal or unlicensed broadcast activity. Other functions provided by Vision Monitor include:

- Threshold and trace mask settings for alarm generation
- Email alert sent when threshold violation generates an alarm
- Reporting on spectrum integrity on a daily or weekly basis
- Vision runs on a PC/laptop using the Windows® operating system (Windows 10/11)
- Option 401 (enable Vision Locate)

When using MX280001A Vision™ software, the spectrum traces from multiple MS27200A Spectrum Monitor Modules are displayed on the PC screen providing a quick and clear overview of all activity in the area under surveillance.

Mobile InterferenceHunter™ MX280007A

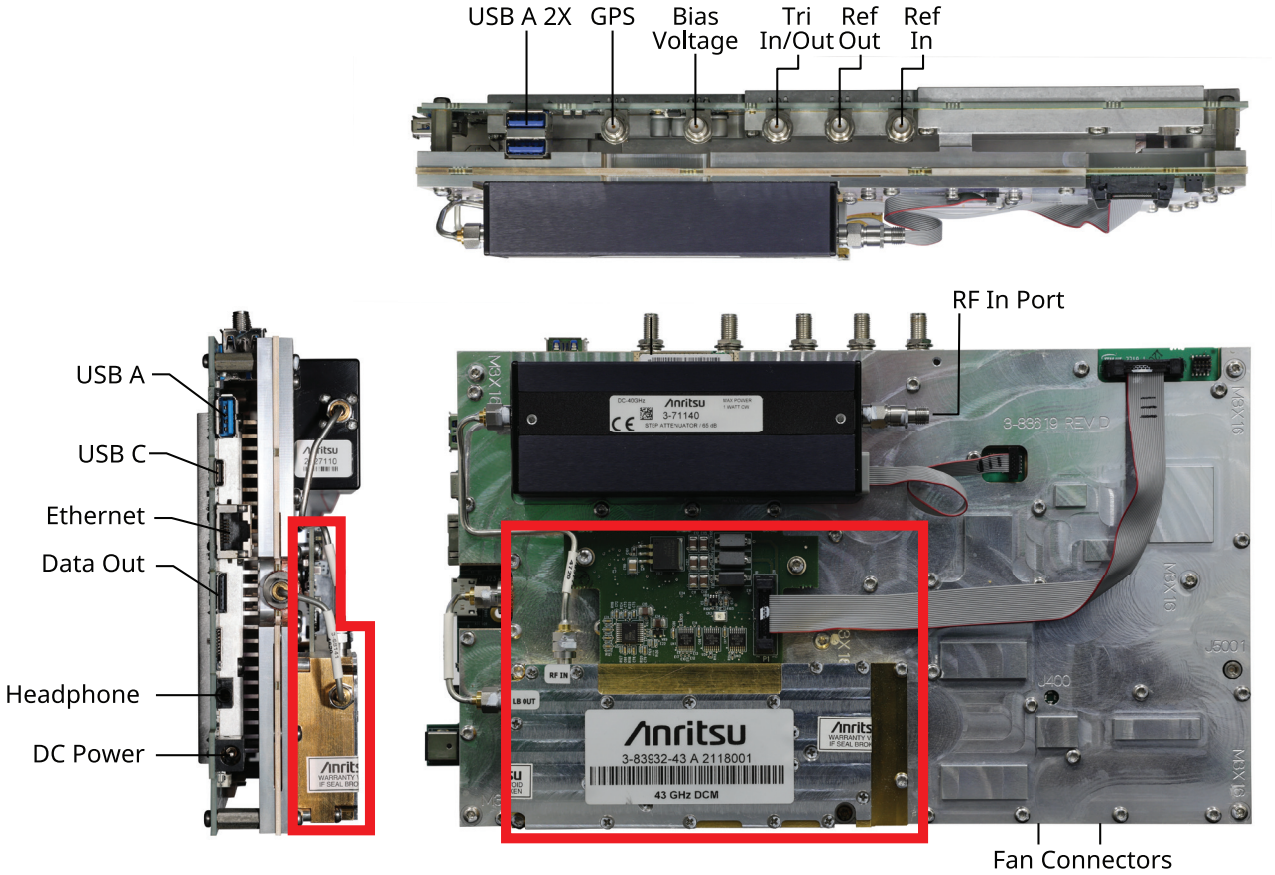
Anritsu's Mobile Interference Hunter (MIH) MX280007A software is a field proven application for identifying the location of interfering signals over a wide area. Mobile interference hunting is achieved by applying proprietary algorithms to channel power data captured with geolocation positioning information during an area drive in a vehicle. MIH can distinguish between multiple signal sources, reflections, RF shadows, drifting signals, bursty signals, and multi-path transmitters making it a cost effective solution for a wide range of interferers.



OpenStreetMap® Displayed on Windows PC Tablet. InterferenceHunter Screen Capture. Dots Shown Along Drive Path are Colored According to Signal Strength.

MS27200A Spectrum Monitor Module Interfaces

The MS27200A Microwave Spectrum Monitor Module comes standard with: 2 x USB 3.0 type A host port and a high-speed Data Out port. USB ports provide for saving of screen images as a .png, saving IQ data files, IQ data streaming, and facilitate software or option updates. The Data Out port is used for high-speed IQ streaming. Integrated rack mount flanges on the case simplify installation into any system, this is not the MS27201A where it is a 2U configuration and the low power consumption and air cooling allow for integration immediately adjacent to other instruments maximizing space efficiency.



■ Downconverter module only on > 20 GHz units

Ordering Information

Part Number	Description
MS27200A	Microwave Spectrum Monitor Module (requires Option 709, 714, 720, 726, 732, 743 or 754)
Options	
MS27200A-0709	Frequency Range 9 kHz to 9 GHz
MS27200A-0714	Frequency Range 9 kHz to 14 GHz
MS27200A-0720	Frequency Range 9 kHz to 20 GHz
MS27200A-0726	Frequency Range 9 kHz to 26.5 GHz
MS27200A-0732	Frequency Range 9 kHz to 32 GHz
MS27200A-0743	Frequency Range 9 kHz to 43.5 GHz
MS27200A-0754	Frequency Range 9 kHz to 54 GHz
MS27200A-0005	Wi-Fi Connectivity
MS27200A-0006	Remove Wi-Fi Connectivity
MS27200A-0007	Secure Data
MS27200A-0017	Secure Communication
MS27200A-0024	Interference Finder (Option 31 and directional antenna recommended, sold separately)
MS27200A-0027	Channel Scanner
MS27200A-0031	GNSS Receiver (requires GNSS antenna, sold separately)
MS27200A-0089	Zero Span IF Output
MS27200A-0090	Gated Sweep
MS27200A-0103	55 MHz Analysis Bandwidth
MS27200A-0104	120 MHz Analysis Bandwidth
MS27200A-0105	150 MHz Analysis Bandwidth
MS27200A-0124	IQ Waveform Capture (includes MX280005A IQ Signal Master base feature set)
MS27200A-0125	IQ Waveform Streaming (includes MX280005A IQ Signal Master base feature set) (requires Option 124)
MS27200A-0126	IQ Waveform Capture (includes MX280005A IQ Signal Master base feature set) (non-export controlled)
MS27200A-0127	IQ Waveform Streaming (includes MX280005A IQ Signal Master base feature set) (requires Option 126, non-export controlled)
MS27200A-0128	Enable Vector Signal Analysis (requires Option 124 or 126)
MS27200A-0199	Real-Time Spectrum Analysis (RTSA)
MS27200A-0400	Enable Vision Monitor
MS27200A-0401	Enable Vision Locate (Option 400 required)
MS27200A-0407	Enable Vision High-Speed Port Scanner
MS27200A-0421	Pulse Analyzer
MS27200A-0509	AM/FM Modulation Measurements
MS27200A-0871	WCDMA FDD Measurements (requires Option 31)
MS27200A-0883	LTE FDD/TDD Measurements (requires Option 31)
MS27200A-0888	5GNR FDD/TDD Measurements (requires Option 31)
MS27200A-xxxx-0097	Accredited Calibration to ISO17025 and ANSI/NCSL Z540-1, includes calibration certificate, test report, and uncertainty data
MS27200A-xxxx-0098	Accredited Calibration to ISO17025 and ANSI/NCSL Z540-1, includes calibration certificate, test report, and uncertainty data
MS27200A-xxxx-0099	Premium Calibration to ISO17025 and ANSI/NCSL Z540-1, includes calibration certificate, test report, and uncertainty data (xxxx is the frequency option number)

Supporting Software	
MX280005A	IQ Signal Master™ Vector Modulation Analysis
MX280001A	Vision™ Monitor
MX280007A	Mobile InterferenceHunter™

Anritsu Advancing beyond

Specifications are subject to change without notice.

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