/Anritsu Advancing beyond

Field Master™

Handheld RF Spectrum Analyzer

MS2080A
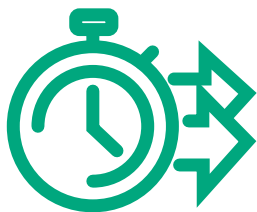9 kHz to 4/6 GHz

We've Got You Covered

The New Field Master™ MS2080A

The performance you need with the measurements you demand in a field portable spectrum analyzer

Better

Protection with >5 watts RF damage level, IP52 environmental protection, and IK08 rated 10-inch, high resolution multi-touch screen.

Faster

Full span sweep speeds of over 45 GHz per second provide maximum insight into all RF signals.

Smarter

Measurements including spectrum analysis, RTSA, Cable & Antenna Analyzer, High Accuracy Power Meter, 5GNR/LTE demods, and coverage mapping.

Field Master MS2080A

Field Master MS2080A

Key Features

Feature	Comment
Spectrum Analysis from 9 kHz to 4 GHz and 6 GHz	For coverage of common commercial RF communications bands
Spectrogram	To capture and record intermittent and drifting signals
RTSA	For real-time spectrum analysis with 2.5 µs POI
AM/FM Modulation Measurements	AM/FM modulation quality, audio output, audio spectrum and audio oscilloscope
Smart Measurements	Includes channel power, occupied bandwidth, adjacent channel power, spectral emissions, C/I, and field strength measurements
Spectrum Record and Playback	To record traces and play back at slow speed to track all spectrum activity
USB Power Sensor Support	For precision power measurements of transmitters
Site Master™ Cable and Antenna Analyzer	For RF cable and antenna testing at transmitter sites
Zero Span	For pulse measurements
Quasi-Peak Detector	For CISPR compliant interference measurements
Interference Hunting	With directional antenna and eCompass handle
Cellular Measurements	5GNR FR1 and LTE FDD/TDD transmitter measurement suites
10-Inch Multi-Touch Display	Provides quick and easy configuration and results presentation
GNSS	GPS, Galileo, GLONASS, BeiDou
Report Generation	Integrated PDF/HTML report generator for CAA trace files, photographs and screen images

Key Specifications

Performance	
Sweep speed	32 GHz/s, 45 GHz/s with Option 102
Phase noise	-97 dBc/Hz @ 1 GHz Freq and 100 kHz Offset (typical)
DANL	< -165 dBm (with pre amp On, typical)
Maximum input signal	+30 dBm
Damage Level	5 Watts
Frequency accuracy	Aging: ±1.0 x 10^{-6} per Year Accuracy: ±0.28 x 10^{-6} (-10 °C ±55°C) Plus Aging
Amplitude accuracy	±1 dB (±0.5 dB typical)
Resolution bandwidth in sweep mode	1 Hz to 5 MHz
Resolution bandwidth in zero span	10 Hz to 20 MHz with Option 102
RTSA bandwidth	20 MHz standard, 40 MHz with Option 102

Multifunctional Instrument

The Field Master MS2080A is a spectrum analyzer that integrates RF field technician's most commonly used instruments into a single package. That means less for you to carry and a single user interface to learn, making your time in the field more productive. The instruments available are:

• Spectrum Analyzer

• Real-Time Spectrum Analyzer (RTSA)

• Interference Analyzer

• True Power Meter

• Cable and Antenna Analyzer

• AM/FM Modulation Measurements

• LTE FDD/TDD Analyzer

• 5GNR FR1 Analyzer

• Coverage Mapping

Field Master MS2080A with Power Sensor and Site Master S331P and Handheld InterferenceHunter™ MA2700A

Designed for the Field

The Field Master MS2080A builds on Anritsu's pioneering history of developing reliable and dependable instruments for the world's most demanding RF measurements in the toughest environments. Designed to withstand the knocks and blows inevitable when working at remote transmitter sites. Weighing less than 4 kg, the Field Master MS2080A is small, compact, and easy to carry. An optional shoulder harness attaches to the supplied soft case to ease long-term use outdoors, especially with over six hours of continuous operation when adding the extended power pack. An environmental rating of IP52 in the soft case protects the instrument from dust and water, ensuring it is always ready to make the measurements you need in the location you need them.

*Field Master MS2080A Delivers Over 3 Hours of Field Use with Built in Battery*
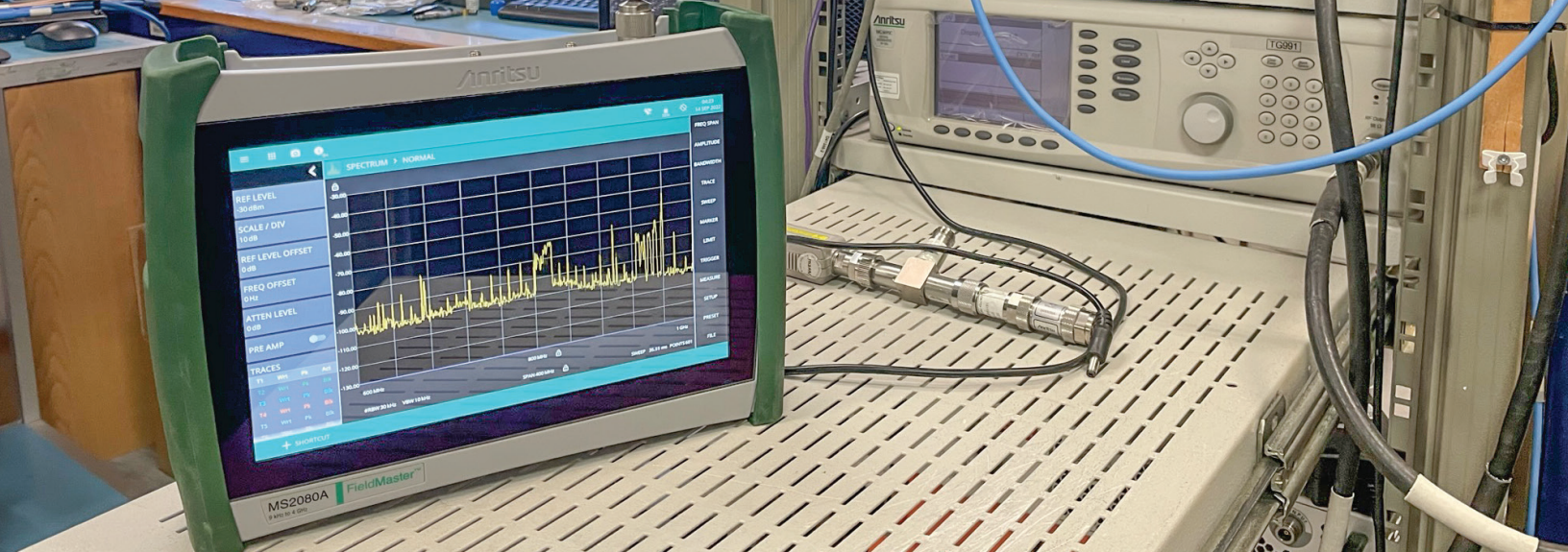
The RF Performance of the Field Master MS2080A Makes it Ideal for General Purpose Lab Applications

At Home in the Lab

For use on the bench, the hard case with rubberized easy grip bumpers and integrated kick stand makes the MS2080A an ideal instrument for general purpose lab measurements where portability and space are at a premium.

High Resolution Multi-Touch Display

The Field Master MS2080A integrates the Anritsu standard high resolution multi-touch display to deliver a familiar user experience. The large 10-inch 1280 x 800 resolution display presents measurement results in large and clear formats. Common functions are always accessible and side menus collapse to maximize graphical results display. The toughened display conforms to IK08 protection standards preventing damage from accidental knocks or drops of tools onto the screen. A variety of screen color themes provide the optimum viewing experience in direct sunlight, nighttime operation and normal indoor use. Up to five shortcut tabs along the bottom of the screen give quick access to your favorite measurement set ups, reducing test time and measurement errors.
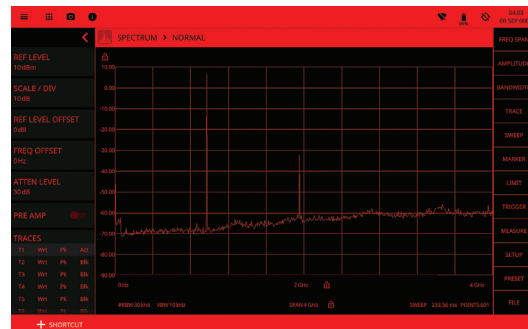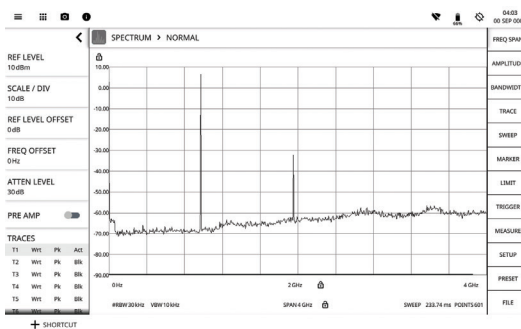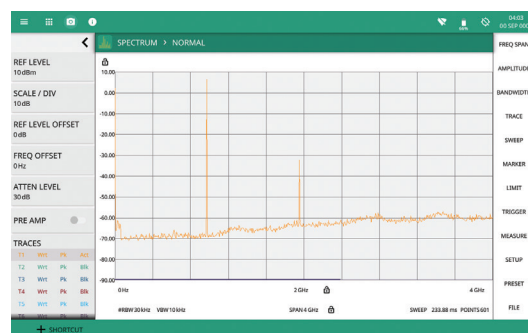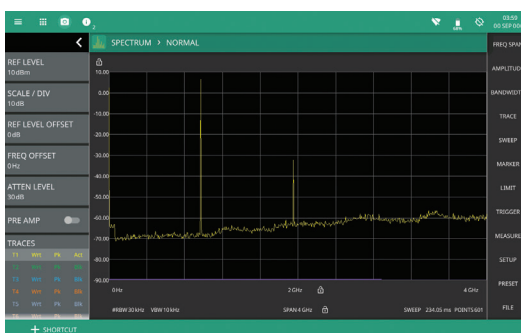
Four Selectable Color Themes Optimize Viewing for Indoor, Outdoor, High-Contrast, and Nighttime Conditions

Field Master MS2080A

Flexible Charging Options

The built-in battery provides over 3 hours of run time. For extended operation in the field, the optional accessory power pack fits into the soft case pocket to extend run time to over six hours. An accessory automotive DC/DC power adaptor connects to a standard 12 volt output to provide continuous operation when performing extensive coverage mapping runs.


Field Master MS2080A with Standard Battery and AC Charger Plus Accessory Power Pack and DC Vehicle Charger

Fully Featured Spectrum Analyzer

From HF military radio through 100 MHz broadcast FM, Land Mobile Radio at 400 MHz, and LTE and 5G cellular radio, the RF spectrum is becoming increasingly crowded. A spectrum analyzer is the primary instrument for field engineers to monitor, maintain, and optimize the performance of RF communications systems.

Field Master MS2080A is designed with the requirements of RF field engineers in mind. Building on 20 years' experience developing handheld spectrum analyzers, the Field Master MS2080A brings together all of our knowledge into a portable and rugged instrument with a familiar multi-touch interface. The typical DANL with a built in preamplifier of < -165 dBm, coupled with a TOI of +14 dBm and typical level accuracy of ±0.5 dB enable the full range of signals to be captured and displayed with confidence.
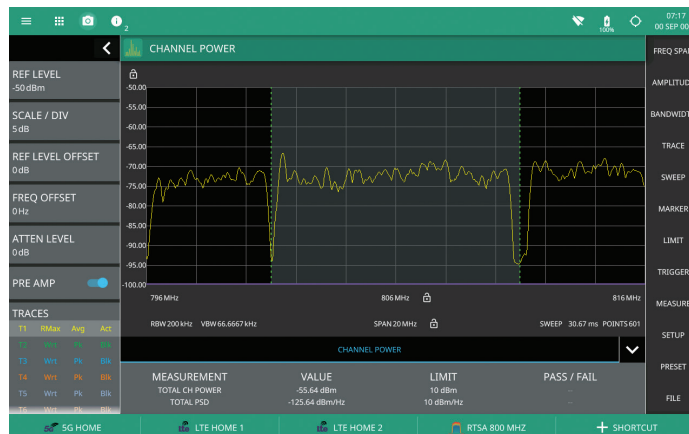

Measuring the Channel Power of an LTE Carrier Between Adjacent Carriers

Common measurements are simplified with quick setups provided for Channel Power, Occupied Bandwidth, and Adjacent Channel Power.

Field Master MS2080A

Multi-Trace, Multi-Marker Features

Display up to 6 traces simultaneously with different detectors and averaging applied to each. Up to 12 markers are provided to highlight signals of interest and monitor how they vary over time, relative to themselves and other signals. Alerts for new interfering or lost signals are generated automatically with limit save on event functionality to optimize long-term monitoring of the spectrum.
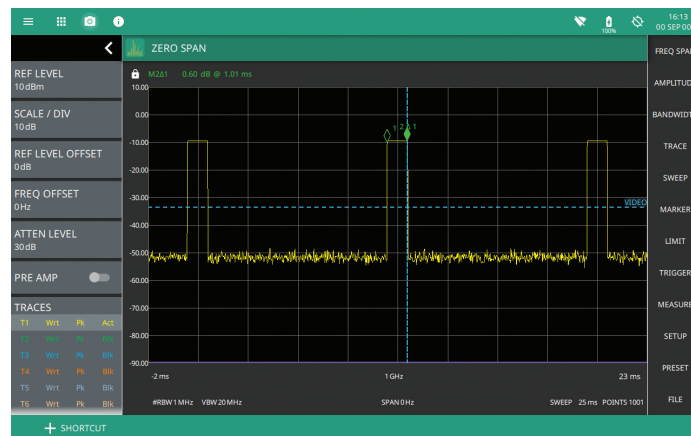

Use Zero Span to View Radar Pulses and TDD Transmitters

Analyze pulsed or TDD signals in real time using up to 40 MHz zero span analysis bandwidth with 20 MHz RBW. Coupled with a 60 ns minimum sweep time Field Master MS2080A allows viewing of pulses as narrow as 50 ns. This enables analysis of all common pulsed radar and TDD communications systems.

Option 199 – Real-Time Spectrum Analyzer (RTSA)

Field Master MS2080A features an optional RTSA with up to 40 MHz analysis bandwidth. Ideal for capturing short duration and digitally modulated signals that can be hard to identify in standard spectrum analyzer mode, the RTSA enhances the interference hunting capability of the Field Master MS2080A.

With a capture rate of 527,000 FFT/s, signals down to 2.5 μs are displayed at full amplitude and down to nine μs with reduced level accuracy. A spectrum density display uses color to maintain and present users with greater insight of the RF spectrum activity by maintaining the image of spectral occupancy over time. It is even possible to identify low power signals that would otherwise be masked by higher power signals in the spectral density view.
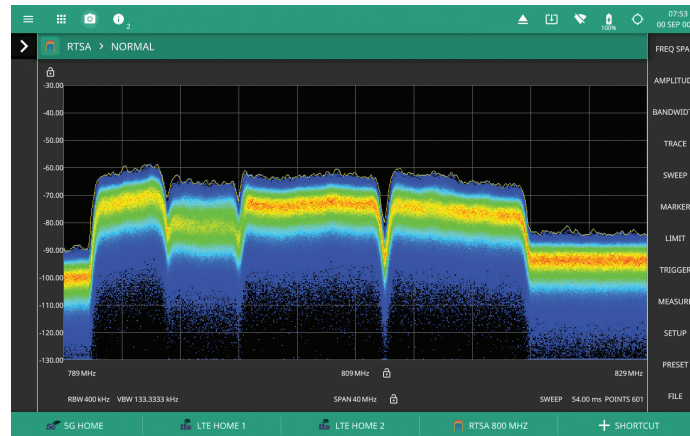
Multiple LTE Carriers Viewed with the RTSA

Open the spectrogram display to view a history of activity in the spectrum, capturing short lived and intermittent signals. For extended time monitoring and analysis, record traces to internal memory or to an external drive for later play back on the instrument or offline.

Interference Hunting

Radio frequency communications are central to many aspects of our modern life. In addition to our personal smartphone communication needs, health care monitors, logistics tracking, first responders, and smart factories have all become dependent on reliable radio communications networks. As demand for radio spectrum expands, the chances of interference from unintended or illegal sources grow. To ensure reliability of service, owners of RF communications networks and devices need tools to help identify, locate, and mitigate against interference.

The Field Master MS2080A has been designed to provide an array of features to support field technicians in detecting and locating interfering signals. Because interference originates from many sources, multiple tools are required to complete the task.

Up to 45 GHz/s sweep speed in standard spectrum analyzer mode (with Option 102), coupled with a spectrogram display, maximizes the probability of seeing short duration or TDD interferers. Switching to an RTSA mode when the frequency of the interferer has been validated ensures detection of the shortest interfering burst, or even signals below the power level of the wanted carrier that can still downgrade system performance.

For regulators, evaluating the impact of pulsed or TDD interfering signals, the Field Master MS2080A Quasi Peak detector provides CISPR 16-1-1 compliant measurements of all signals identified with markers.

Option 24 – Interference Finder

Option 24 includes AM/FM audio demodulation of interfering signals, interference hunting tone for direction finding, and geolocation of interferes on a digital map. When the interfering signal has been identified, AM/FM audio demodulation provides greater insight into the possible cause. Speech or music on the signal indicates an illegal transmitter or intermodulation with other networks. Noise or clicks may suggest heavy industrial machinery that is not suppressed, or cables insecurely attached to transmitter towers.
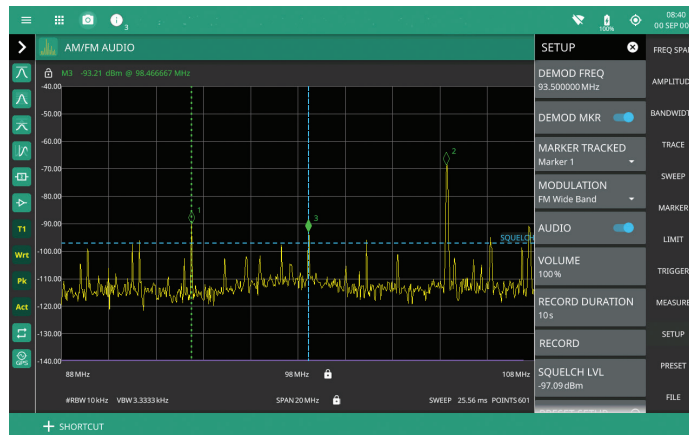
AM/FM Signal Demodulation at Marker Frequency

The interference hunting tone outputs a variable frequency tone that increases in pitch as the signal strength increase. When used in conjunction with a directional antenna, this facilitates the precise location of signals of interest. When coupled with the InterferenceHunter MA2700A handle and directional antenna, the Field Master MS2080A provides interference mapping for geolocation of the signal. The InterferenceHunter MA2700A includes an eCompass, which indicates the direction it is pointing on a digital map downloaded onto the instrument screen. Rotating through 360 degrees builds a polar plot of signals from all directions at your current position.
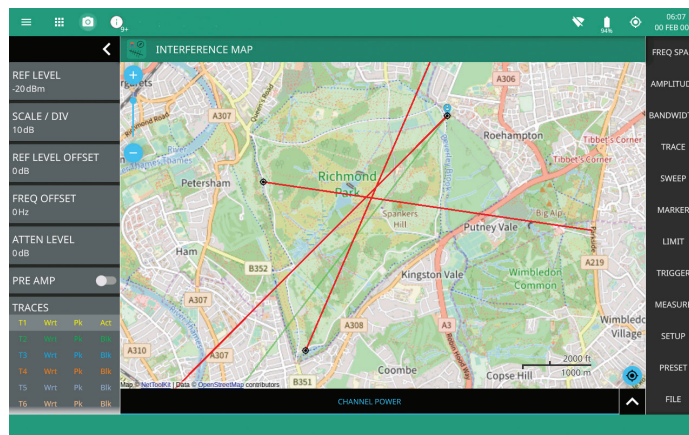
Map Triangulation

Option 509 – AM/FM Modulation Measurements

Option 509 adds a comprehensive AM/FM modulation quality measurement suite to support national regulators and AM and FM transmitter owners. Broadcast and LMR channels are becoming increasingly crowded driving a need to perform regular measurements on transmitters to confirm they are not over deviating or interfering with adjacent carriers in a very crowded spectrum.

The AM/FM Modulation Measurements Screen Provides a Unique Simultaneous Display of Results and RF and Audio Spectrum

Option 509 AM/FM Modulation Measurement provides a comprehensive analog transmitter measurement suite in a field portable spectrum analyzer. A single screen displays the RF spectrum, the audio frequency spectrum, the demodulated audio in oscilloscope format and numeric results for key parameters. All these results are updated in parallel providing the best possible real time view of the AM or FM transmitter performance.

For broadcast FM, the audio spectrum trace highlights the mono audio, stereo pilot, left-right stereo channels and RDS sub carrier. At the same time, an audio oscilloscope displays the demodulated voice or music and the RF spectrum trace shows channel occupancy. This captures all the essential transmitter information on a single screen to provide the best possible overview of transmitter performance.

Integrated software routines calculate the essential audio quality measurements of AM depth and FM deviation. SINAD and THD are measured automatically when modulating the transmitter with a fixed frequency tone, typically 1 kHz. Use the built in speaker to listen to demodulated audio continuously and in real time at even as traces are updated.

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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.

MIH Vehicle Setup with Magnetic Mount Omni Antenna on Roof of Truck
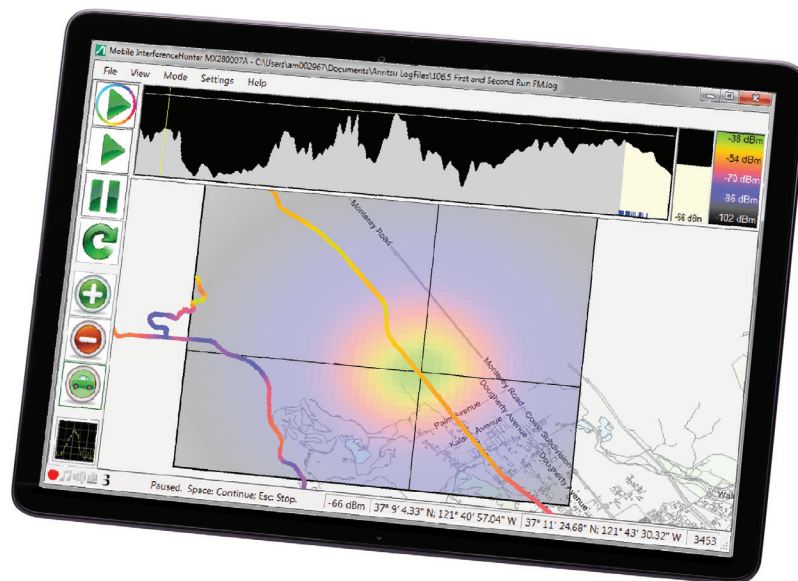
OpenStreetMap® Displayed on Windows PC Tablet.
InterferenceHunter Screen Capture. Dots Shown Along Drive
Path are Colored According to Signal Strength.

5GNR and LTE Modulation Quality and Transmitter Measurements

From the first roll out of GSM networks in the 1980's through 3G and LTE, Anritsu has been at the forefront of providing instruments to enable the installation and maintenance of cellular networks. Now with the introduction of 5GNR networks, Anritsu remains at the leading edge of cellular network testing.

Field Master MS2080A integrates all the essential instruments for 5G base station testing in the field into a single field portable instrument. Modulation quality, transmitter quality, coverage mapping, and RF cable and antenna line sweep measurements are all included. Simple mode switching between instruments provides a common user experience and results are saved to a single location to ease report generation.

Whether you are rolling out a new network as an operator or contractor, installing a private 5G network, providing network optimization, or confirming regulatory compliance, the Field Master MS2080A delivers the measurements and features you need to get the job done fast.

Option 888 – 5GNR Downlink Measurements

Installing and maintaining 5G base stations require testing of signal quality and transmitter measurements. With the introduction of active antenna systems to create the beamforming signal patterns common to 5G base stations, the availability of test access connectors has reduced. Measurements are more commonly made Over-the-Air (OTA).

Field Master MS2080A supports direct connect and OTA measurement of 5G base stations. When testing OTA, the Field Master MS2080A may see signals from multiple base stations at different locations. In this case, the results are clearly identified by each individual physical cell ID (PCI) and the relative performance and time of arrival are displayed on the results screen.

For signal quality measurements, Field Master MS2080A identifies the location of the synchronization signal block (SSB) which is used as the basis of all signal quality measurements. For FR1 5G signals, the SSB has a bandwidth of 3.6 MHz for subcarrier spacing of 15 kHz and 7.2 MHz for subcarrier spacing of 30 kHz.

Field Master MS2080A

Summary of 5G Downlink Signal Quality Measurements		
PCI Cell, Sector ID, Cell Group	SS-RSRP/RSRQ/SINR/RSSI	Time Offset
Frequency Error	Modulation Quality (SS-EVM)	Difference in Time Offset
Beam ID	PBCH Constellation	OTA Multi PCI Scanner
Channel Power	Occupied Bandwidth	Adjacent Channel Leakage Ratio
Spectral Emission Mask	Transmitter Spurious	EIRP
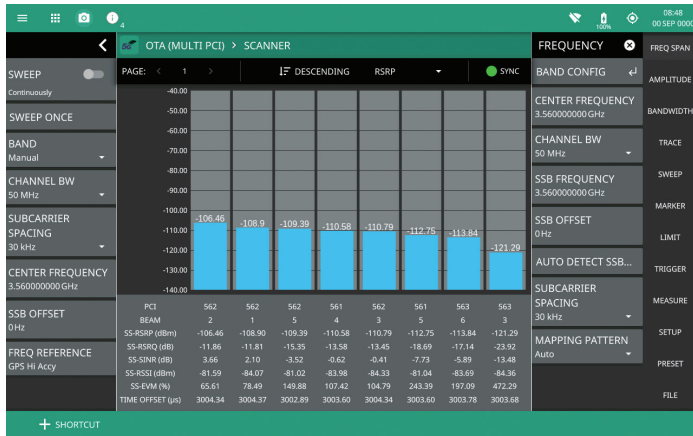
5G OTA Results
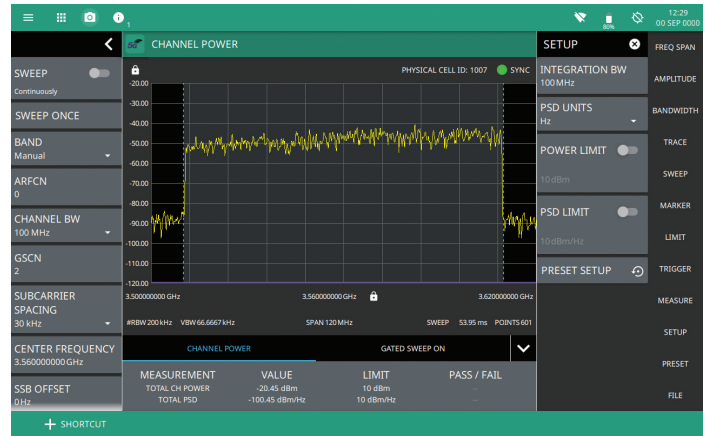
5G Channel Power Results in 5G Mode

Use the standard spectrum analyzer mode for basic transmitter quality measurements or 5G mode for time gated measurements focused on the SSB.

Field Master MS2080A has many advanced features to simplify the testing of 5G base stations. An autodetect SSB capability searches across the 5G frame to identify the location and offset of the SSB element if it is unknown. The carrier aggregation mode displays results for up to eight carriers on a single screen. Carrier aggregation is often used to increase the capacity of any given operator using distributed frequency spectrum. The single results screen summarizes the overall network performance in a convenient format.

National regulating authorities often require a measurement of EIRP to validate that total transmitted power is within statutory requirements. The Field Master MS2080A EIRP measurement corrects for signal path loss, antenna gain, and summing of vertical and horizontal powers to deliver a 3GPP compliant result.

Option 883 – LTE FDD/TDD Measurements

LTE remains at the heart of many national cellular networks and often provides the signaling control plane for 5G non-standalone (NSA) networks. Field technicians require a test instrument that includes 5G and LTE measurements.

Field Master MS2080A includes a full suite of LTE signal quality and transmitter measurements. OTA and direct connect test methods are supported with OTA results showing all detected PCIs from available base stations.

LTE Overall Capability		
FDD and TDD Network Support	MIMO Antenna Power	MIMO Time Alignment
Resource Block Usage	Carrier Aggregation (8 carriers)	Multi PCI Scanner
Constellation Diagrams for PBCH and PDSCH	Control Channel Measurements	
LTE Signal Measurements		
Cell ID, Sector ID, Cell Group	Frequency Error	Time Offset
PBCH, RS and SS Power	TDD Frame Power	PBCH
PDSCH EVM (all modulation formats)	Time Alignment Error	OFDM Symbol Transmit Power
LTE Transmitter Measurements		
Channel Power	Occupied Bandwidth	Adjacent Channel Leakage Ratio
Spectral Emission Masks		
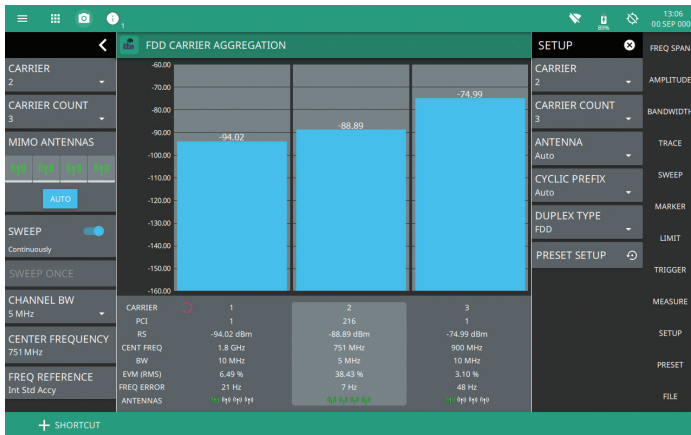
Use Carrier Aggregation Mode for Over-the-Air (OTA) Capture of Multiple LTE Signals

*LTE Modulation Quality EVM Measurement on PBCH and PDSCH*

Option 431 – Coverage Mapping

As well as measuring the performance of the 5G and LTE base stations, operators need to understand the coverage that is being achieved from each sector at each cell site. Modeling predicts coverage, but changes in the real-world environment can result in areas with limited or no network coverage.

The Field Master MS2080A coverage mapping option plots colored "breadcrumbs" that represent the signal strength of the cellular signal at any given map data point. Maps are quickly downloaded directly from a web service into the instrument memory using the Wi-Fi or Ethernet interface, eliminating the need to create maps on a PC and transfer them by memory stick.

Signal coverage can be mapped based on a number of base station metrics; transmitter channel power, spectral density, and RSSI measurements or 5G/LTE signal quality RSRP/RSRQ/SINR results. When mapping based on 5G or LTE signal quality such as RSRP is selected, the results can be filtered for any individual PCI. This enables users to understand the coverage from specific antennas and specific base station masts.
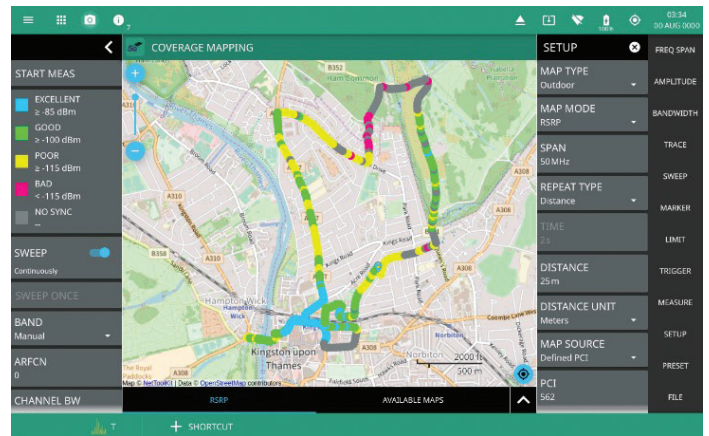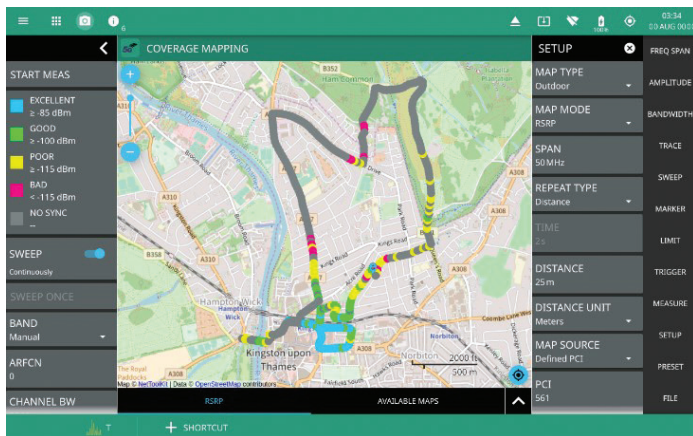
Following a Coverage Mapping Drive, Filter by Specific PCIs to See Coverage
*From Individual Base Stations or Antennas*
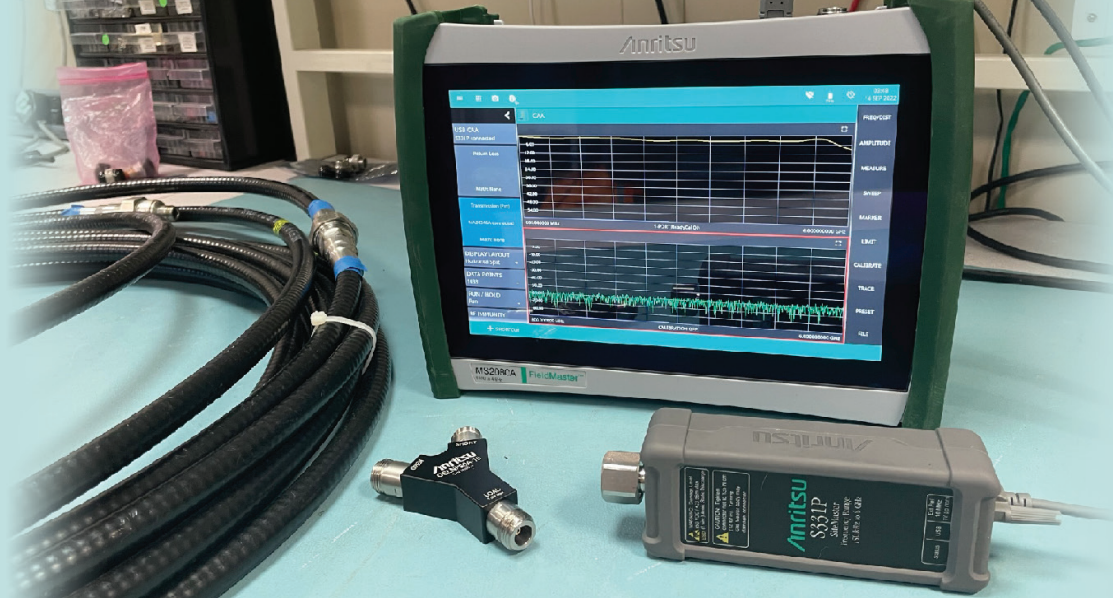
## Add S331P Site Master for Line Sweep Measurements

Field Master MS2080A supports cable and antenna line sweep measurements with the addition of the Site Master S331P. The Site Master S331P connects to the Field Master MS2080A using a 1.5 meter USB cable that supplies power and a control interface. The S331P connects directly to the cable or antenna under test due to its small form factor, eliminating the need for a test port cable. Built in factory calibration data mean measurements can be taken immediately on connecting to the test system, eliminating the need for a user calibration and reducing overall test time. When testing in extreme conditions and a user calibration is required, a wizard guides the user through an OPEN/SHORT/LOAD calibration cycle. To ensure measurement integrity when testing antennas in an open field environment, the RF immunity mode rejects measurement errors resulting from other sources of RF power in the test environment.

The Site Master S331P is available in two frequency ranges, 150 kHz to 4 GHz that covers the common PMR and cellular bands, and the 150 kHz to 6 GHz model covers all of the 5GNR FR1 band. The CAA user interface was developed using over 20 years' experience of line sweeping measurements in the field. The Site Master S331P delivers the fastest sweep speeds in a field portable instrument, making it ideal when searching for faults and monitoring results traces while tapping connectors and cable clamps. A dual measurement display shows VSWR (Return Loss) and distance-to-fault (DTF) on a single screen.

All common cable performance data is stored in memory and generation of close out reports is simplified with file formats that can be read into Anritsu's industry standard Line Sweep Tools PC results processing application.
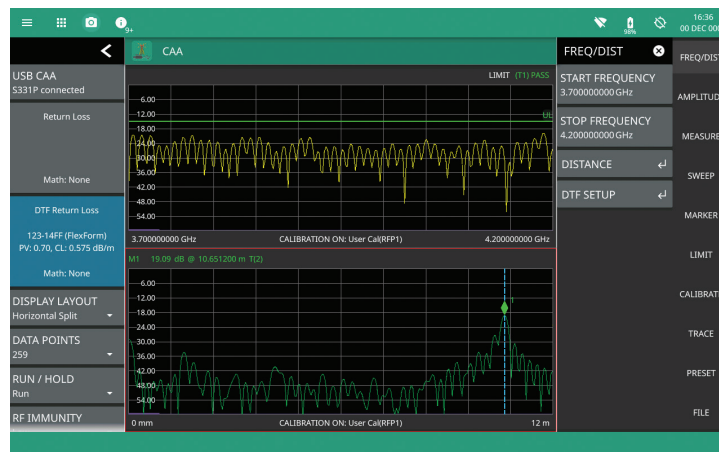
Simultaneous Display of Cable and Antenna Return Loss
and Distance-to-Fault (DTF)
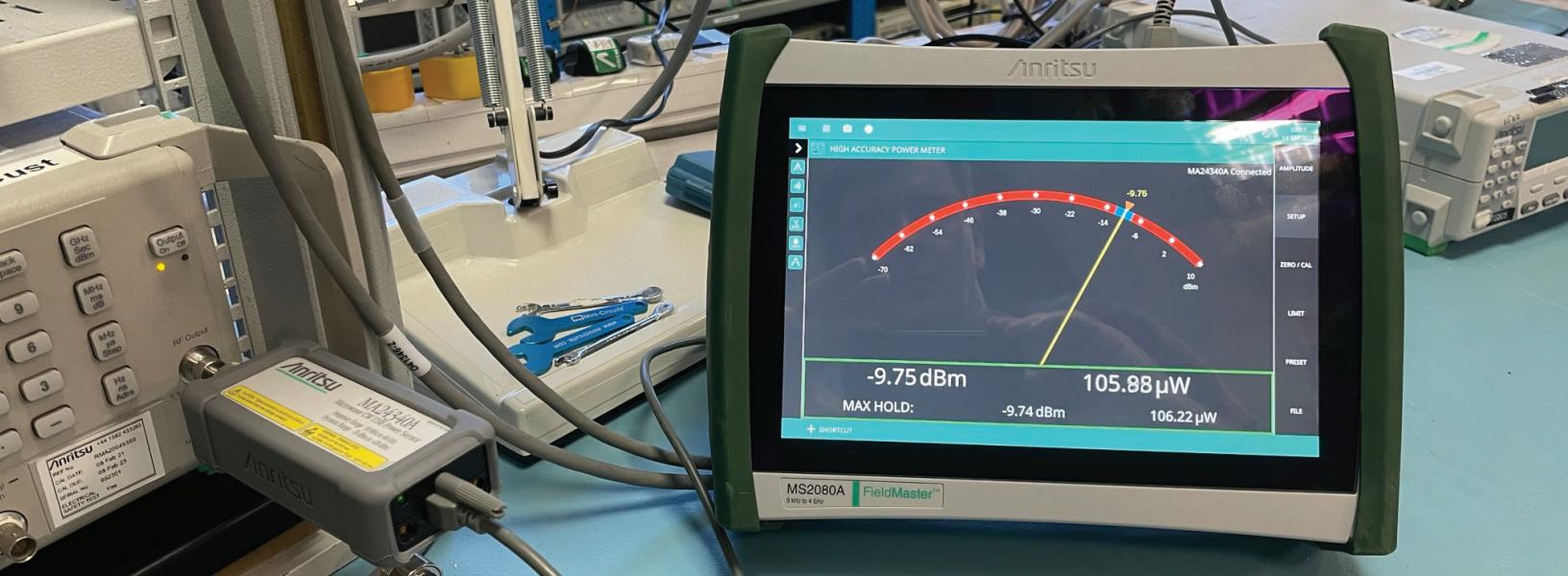
*Field Master MS2080A Supports Integration with USB Power Sensors for
Maximum Measurement Accuracy*

Option 19 – High Accuracy Power Meter

The Field Master MS2080A delivers power meter accuracy power measurements when coupled with Anritsu's USB power sensors. Connect a supported USB sensor directly to any of the Field Master MS2080A USB ports.

Microwave CW Power Sensors: MA24330A/MA24340A/MA24350A

Universal Power Sensors: MA24208A/MA24218A

RF CW Power Sensors: MA24108A/MA24118A/MA24126A

Average Power Sensor: MA24106A

When using the Field Master MS2080A to install a new cellular or LMR base station, it is important to set the transmitter power precisely. Too much transmit power can result in interference with other transmitters or adjacent cells, and too little power results in reduced cell site coverage. Option 19 provides a traditional analog power meter display with a fast-responding needle and complimentary digital read out. Limit lines with audible alarms aide testing to defined specifications and a Max Hold feature is ideal when tuning for maximum power. Select the MA241xxA series sensors for RF CW and MA243x0A series sensors for microwave CW measurements. The MA242xxA power sensors have a cascaded diode architecture to enable accurate power measurements on modulated signals. All USB sensors are powered over the USB cable so no additional batteries are required.

Laptop PC Running Remote GUI Application with Wi-Fi Connection to MS2080A

## Remote Control and Connectivity

Ethernet, Wi-Fi, and USBTMC interfaces are standard on the Field Master MS2080A, providing flexible options for remote control. Use Wi-Fi 802.11b/g/a/n to connect to wireless routers for common applications, including downloading digital maps and automatic software updates. A built in web browser enables internet access, necessary when public Wi-Fi hotspots require browser based network authentication. The USBTMC interface is ideal for controlling the Field Master MS2080A from an Android smartphone, tablet, or PC.

Standard SCPI commands provide a familiar programming language for users who plan to write their own test programs.

The Field Master MS2080A Remote GUI is a freely downloadable PC application that offers a remote user interface. Users can take full control of the Field Master MS2080A from any remote location using this PC application. The GUI replicates the instrument touchscreen on a standard PC and can be used for remote instrument control and results and trace monitoring. The tool enables saving of traces directly to the PC file system where markers and limit lines can be added and adjusted retrospectively.
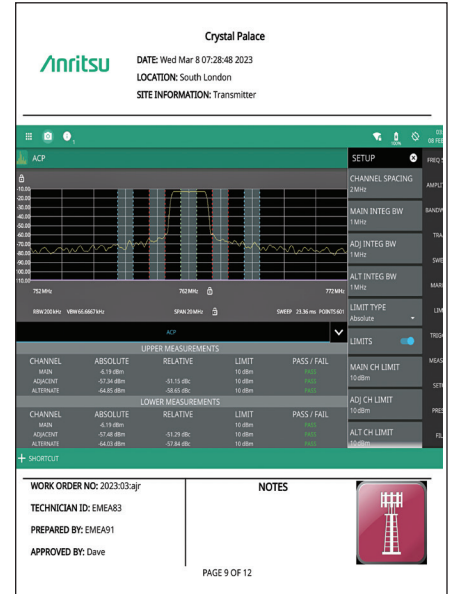
Built-in Report Generator

Field technicians installing or testing base stations typically need to create a "Close Out" report to confirm all tests have been completed and passed limits. Base station installations generate multiple trace results and the creation of the report can be time consuming. The Field Master MS2080A includes a comprehensive built in report generator that simples this process.
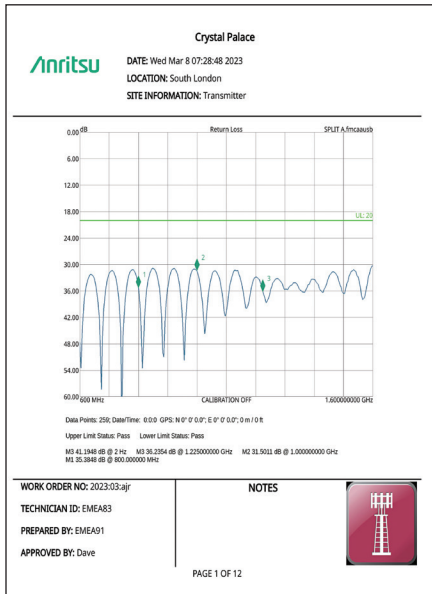
Trace Files
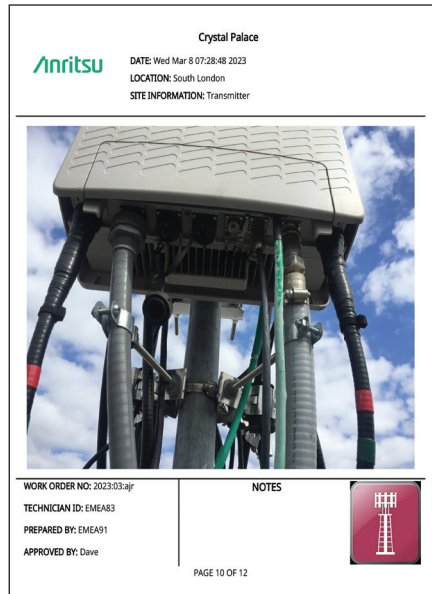
Photographs

Screen Captures

The reports are created using a Report Generator tool. Reports can include any combination of trace files (typically cable and antenna analyzer traces), screen captures (to include spectrum and 5G results) and photographs (taken on a smartphone and transferred to the instruments file memory).

Each report is user configurable to include essential site information such as GPS location, site name and contractor name. A company logo can be added to further customize the report. Once completed, the report is saved as a PDF and HTML file, for printing or distributing by email.

Ordering Information

Part Number	Description
MS2080A	Field Master (Requires Option 704)

Options

Part Number	Description
MS2080A-0704	9 kHz to 4 GHz Spectrum Analyzer
MS2080A-0706	9 kHz to 6 GHz Spectrum Analyzer
MS2080A-0019*	High Accuracy Power Meter (requires compatible USB power sensor, sold separately)
MS2080A-0024*	Interference Finder (requires GNSS Receiver Option 31 and directional antenna, sold separately)
MS2080A-0031*	GPS Receiver (requires GPS antenna, sold separately)
MS2080A-0090*	Gated Sweep
MS2080A-0102*	40 MHz Analysis Bandwidth
MS2080A-0199*	Real-Time Spectrum Analyzer
MS2080A-0431*	Coverage Mapping (requires GPS option MS2080A-0031)
MS2080A-0509*	AM/FM Modulation Measurement
MS2080A-0883*	LTE FDD/TDD Signal Analyzer
MS2080A-0888*	5GNR FDD/TDD FR1 Measurements (requires GPS option MS2080A-0031)
MS2080A-0097	Accredited Calibration to ISO17025 and ANSI/NCSL Z540-1
MS2080A-0098	Standard Calibration to ISO17025 and ANSI/NCSL Z540-1
MS2080A-0099	Premium Calibration to ISO17025 and ANSI/NCSL Z540-1 plus test data
*Time-Limited Options	Options marked with an asterisk are offered as a 90-day time limited option by ordering as a -9xxx series option. For example, MS2080A-9888 is the 90-day time limited option for 5 GNR FDD/TDD FR1 Measurements. The option start time begins when the user first activates the option.

Supporting Software
MX280007A Mobile InterferenceHunter
MS2080A PC Remote User Interface

For a full list of all accessories for the Field Master MS2080A, please refer to the Technical Data Sheet (P/N 11410-01001).

Anritsu
Advancing beyond

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