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

Introduction

Anritsu is proud to introduce the world's most advanced MS27200A Microwave Spectrum Monitor Module. With frequency coverage up to 54 GHz, the new Microwave Spectrum Monitor Module completely redefines the standards for remote 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.

Instrument Highlights

- Modulation Bandwidth: up to 150 MHz
- Dynamic Range: > 106 dB in 1 Hz RBW
- DANL: –164 dBm in 1 Hz RBW
- Phase Noise: –106 dBc/Hz @ 10 kHz offset at 1 GHz
- RTSA with 2.05µs POI
- Resolution Bandwidth (RBW): 1 Hz up to 10 MHz
- Full-band Preamplifiers
- Operation to +55 °C
- GNSS (GPS, GLONASS, Galileo, BeiDou)
- PCIe Data Out Port

Capabilities and Functional Highlights

- 5GNR FDD and TDD Analyzer
- Real-Time Spectrum Analyzer
- LTE FDD and TDD Analyzer
- WCDMA FDD Signal Analyzer
- Spectrogram
- Field Strength
- Occupied Bandwidth
- Channel Power
- Adjacent Channel Power
- AM/FM Audio Demodulation
- Multi-language Support
- Zero Span IF Output
- Gated Sweep
- Spectral Emissions Mask
- Signal Strength and RSSI
- Carrier Aggregation
- Total Harmonic Distortion (THD)
- Channel Scanner
- IQ Waveform Capture/Streaming
- USB 3.0
- Pulse Profile Measurements
- AM/FM Modulation Measurements
- Compatible only with SCPI commands for programming, Anritsu Remote Tool is not supported

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Definitions

Specifications	All specifications and characteristics apply to revision 1 modules under the following conditions, unless otherwise stated: • Over the 25 ± 5 °C temperature range. • After 10 minutes of warm-up time, where the instrument is left in the ON state. • When using the internal reference signal.
Typical Performance	Typical specifications are not tested and are not warranted. They are generally representative of characteristic performance.
Nominal Performance	Nominal specifications are design parameters; they are not tested and are not warranted.
Time Base Error	Input Frequency × Frequency Reference Error.
Calibration Cycle	Calibration is within the recommended 12 month period.
	All specifications in this data sheet are subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com.

Spectrum Analyzer Performance

Frequency (usable to 0 Hz)

MS27200A-0709	9 kHz to 9 GHz (Option 709)
MS27200A-0714	9 kHz to 14 GHz (Option 714)
MS27200A-0720	9 kHz to 20 GHz (Option 720)
MS27200A-0726	9 kHz to 26.5 GHz (Option 726)
MS27200A-0732	9 kHz to 32 GHz (Option 732)
MS27200A-0743	9 kHz to 43.5 GHz (Option 743)
MS27200A-0754	9 kHz to 54 GHz (Option 754)
Tuning Resolution	1 Hz
Span	10 Hz to max frequency, Zero Span
Frequency Reference	Internal, GNSS, External
Internal Frequency Reference	Aging: ± 1.0 x 10^{-6} per 10 years Accuracy: ±3.0 x 10^{-7} (–10 °C to 55 °C) plus aging (see "GNSS Receiver (Option 31)" on page 9 for improved accuracy)
External Frequency Reference	10 MHz, -10 dBm to +10 dBm

Bandwidth

Analysis Bandwidth	22 MHz (standard), 55 MHz (Option 103), 120 MHz (Option 104), 150 MHz (Option 105)
RTSA Bandwidth	22 MHz (standard), 55 MHz (Option 103), 120 MHz (Option 104), 150 MHz (Option 105)
Resolution Bandwidth (RBW)	1 Hz to 10 MHz (in RTSA, minimum RBW varies by span, max is 40 MHz), 1 Hz to 40 MHz in zero span
RBW Selectivity	4:1 nominal (–60 dB / –3 dB)
Video Bandwidth (VBW)	0.1 Hz to 10 MHz, 1 Hz to 40 MHz in zero span
CISPR Bandwidth	Resolution bandwidth when using Quasi-Peak marker function: 200 Hz, 9 kHz, and 120 kHz
VBW/Average Type	Linear/Log

Sweep

Manual Sweep	Maximum sweep time is 3600 s (1 hour)
Sweep Points	10 to 10,001 (1001 in zero span)
Sweep Rate (non-zero span)	40 GHz/s typical (full span, RBW = VBW = 3 MHz)

Zero Span

Sweep Time	60 ns to 3600 s in zero span
Sweep Time Accuracy	±2 % in zero span

Spectral Purity – SSB Phase Noise

Offset from 1 GHz GHz	Maximum	Typical
10 kHz	–102 dBc/Hz	–106 dBc/Hz
100 kHz	–106 dBc/Hz	–110 dBc/Hz
1 MHz	–111 dBc/Hz	–116 dBc/Hz
10 MHz	–123 dBc/Hz	–129 dBc/Hz

Spurs (0 dB input attenuation)

Residual Spurs (RF input terminated)	Preamp = Off	Preamp = On
< 14 GHz	–90 dBm, maximum	–100 dBm, maximum
14 to 20 GHz	–85 dBm, maximum	–100 dBm, maximum
> 20 to 32 GHz	–80 dBm, maximum	–100 dBm, maximum
> 32 to 54 GHz	–80 dBm, maximum	–95 dBm, maximum
Input-Related Spurious (–30 dBm input)	–60 dBc typical	

Amplitude Ranges

Dynamic Range	>106 dB minimum at 2.4 GHz, 2/3 (TOI-DANL) in 1 Hz RBW
Measurement Range	DANL to +30 dBm
Reference Level Range	–150 dBm to +30 dBm
Attenuator Resolution	0 to 65 dB, 5 dB steps
Reference Level Offset	99.9 dB external loss to 99.9 dB external gain
Amplitude Units	dBm, dBm/m^2, dBW/m^2
Maximum Continuous Input	+30 dBm peak typical, ± 50 VDC (≥ 1 0 dB attenuation) +23 dBm peak typical, ± 50 VDC (< 10 dB attenuation) +10 dBm peak typical, ± 50 VDC (preamp = On)

Amplitude Accuracy (10 dB attenuation, -50 dBm ≤ input signal ≤ -10 dBm, 1 kHz RBW, auto-coupled, excluding effects of VSWR, noise, and spurs)

	20 °C to 30 °C (after 30 minute warm-up)		–10 °C to 55 °C (after 60 minute warm-up)	
9 GHz and 20 GHz Modules	Maximum	Typical	Maximum	Typical
9 kHz to 14 GHz	± 1.3 dB	± 0.5 dB	± 2.0 dB	± 0.5 dB
> 14 GHz to 18 GHz	± 1.3 dB	± 0.5 dB	± 2.0 dB	± 0.5 dB
> 18 GHz to 20 GHz	–	± 1.0 dB	–	± 1.0 dB
26.5 GHz to 54 GHz Modules				
9 kHz to 14 GHz	± 1.3 dB	± 0.5 dB	± 2.0 dB	± 0.5 dB
> 14 GHz to 20 GHz	± 1.3 dB	± 0.5 dB	± 2.0 dB	± 0.5 dB
> 20 GHz to 43.5 GHz	± 1.8 dB	± 0.5 dB	± 2.5 dB	± 0.5 dB
> 43.5 GHz to 54 GHz	± 1.8 dB	± 0.5 dB	± 2.5 dB	± 0.5 dB

Displayed Average Noise Level (DANL) (RMS detection, VBW/Avg type = Log, reference level = –20 dBm for preamp Off and –50 dBm for preamp On, auto attenuation On)

	Preamp = Off		Preamp = On	
9 GHz to 20 GHz Modules	Maximum	Typical	Maximum	Typical
100 kHz to 10 MHz		–145 dBm		–159 dBm
10 MHz to 4 GHz	–145 dBm	–148 dBm	–161 dBm	–164 dBm
> 4 GHz to 9 GHz	–142 dBm	–145 dBm	–159 dBm	–162 dBm
> 9 GHz to 14 GHz	–136 dBm	–139 dBm	–156 dBm	–159 dBm
> 14 GHz to 20 GHz	–138 dBm	–144 dBm	–156 dBm	–161 dBm
26.5 GHz to 54 GHz Modules				
100 kHz to 10 MHz		–145 dBm		–159 dBm
10 MHz to 4 GHz	–145 dBm	–148 dBm	–161 dBm	–164 dBm
> 4 GHz to 9 GHz	–142 dBm	–145 dBm	–159 dBm	–162 dBm
> 9 GHz to 14 GHz	–136 dBm	–139 dBm	–156 dBm	–159 dBm
> 14 GHz to 20 GHz	–138 dBm	–142 dBm	–156 dBm	–159 dBm
> 20 GHz to 32 GHz	–135 dBm	–140 dBm	–154 dBm	–159 dBm
> 32 GHz to 43.5 GHz	–135 dBm	–140 dBm	–152 dBm	–154 dBm
> 43.5 GHz to 54 GHz	–130 dBm	–134 dBm	–147 dBm	–151 dBm

Third-Order Intercept (TOI) (–20 dBm tones 2 MHz apart, 0 dB input attenuation, preamp OFF, reference level –20 dBm)

2.4 GHz	+14 dBm minimum
50 MHz to < 9 GHz	+15 dBm typical
9 GHz to 20 GHz	+20 dBm typical
> 20 GHz to 32 GHz	+11 dBm typical
> 32 GHz to 54 GHz	+15 dBm typical

P1dB (nominal)

< 4 GHz	+5 dBm
4 GHz to 20 GHz	+12 dBm
> 20 GHz to 32 GHz	+7 dBm
> 32 GHz to 54 GHz	+12 dBm

Second Harmonic Distortion (0 dB input attenuation –30 dBm input)

50 MHz	–75 dBc maximum
< 10 GHz	–80 dBc typical
≥ 10 GHz	–75 dBc typical

VSWR (≥ 1 0 dB input attenuation)

≤ 20 GHz	1.5:1 typical
> 20 GHz to 54 GHz	2.0:1 typical

Spectrum Analyzer Features (Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

Smart Measurements

Field Strength	Measures field strength in dBm/m^2, dBW/m^2, dBV/m, dBmV/m, dBµV/m, dBA/m, V/m, W/m^2, W/cm^2, A/m) with antenna gain vs. frequency plot
Channel Power	Measures the total power in a specified bandwidth
Occupied Bandwidth	Measures 99 % to 1 % power channel of a signal
Adjacent Channel Power	Measures the power in two upper and two lower adjacent channels
Spectral Emission Mask	Standards based limits for wireless emissions
Carrier-to-Interference (C/I)	Measures the ratio of power (dB) in an RF carrier to the interference power in the channel
Burst Power Average	Measures average power between two time markers in zero span
Total Harmonic Distortion	Measures average power between two time markers in zero span

Setup Parameters

Frequency	Center/Start/Stop, Frequency Step, Frequency Offset
Span	Span (Manual/Increment 1, 2, 5), Full Span, Last Span, Zero Span
Amplitude	Reference Level (Manual/Auto and Offset), Scale/Division, Y-Axis Unit (dBm, dBW, dBV, dBmV, dBµV, dBA, V, W, A), Preamp (On/Off), Attenuation (Auto/Manual), Attenuation Level, Impedance (50 Ω, 75 Ω, other), Custom IMP Loss, Field Strength
Bandwidth	RBW/VBW (Auto/Manual), VBW Type (Linear/Logarithmic), RBW:VBW Ratio, SPAN:RBW Ratio
Sweep	Continuous on/off, Restart, Sweep Once, Sweep to N, Auto/Manual Time, Points Gated Sweep (see "Gated Sweep (Option 90)" on page 9)

Trace Functions

Traces	Up to Six Traces
Trace Type	Clear/Write, Average (2 to 1000), Max Hold, Min Hold, Rolling Average, Rolling Max Hold, Rolling Min Hold
Trace Math	T1-T2, T2-T1 (when T5 and T6 are selected)
Trace Mode	Active, Hold/View, Blank
Detector Type per Trace	Peak, RMS/Avg, Negative, Sample, Normal
Trace Record	Record live samples with manual tagging to internal or external storage
Trace Playback	Play recorded samples from internal or external storage; set playback interval
CSV Logging	Record live or playback traces in CSV format for post processing

Trigger Functions

Trigger Input Sources (zero span only)	Free Run, GNSS/Internal, Video, External1/2
Trigger Output	Enables GPS 1 PPS output
Settings	Timestamps (on/off), Level, Time Interval, Delay, Holdoff, Periodic, Slope (Rising/Falling), Hysteresis Refer to Section "IQ Waveform Capture (Option 124/126)" on page-10 for IQ Trigger Functions

Spectrogram

Number of Lines	142
Trace Time/Position Cursor	Up to Six Cursors (return historical trace data by trace position or time)
Color Setup	Color Scale Top/Bottom (dBm), Reference Hue

Marker Functions

Markers	Up to 12 Markers
Marker Measurements	Power, Frequency, Time (Spectrogram)
Marker Mode	Normal, Delta, Fixed
Delta Marker	Relative to any Normal or Fixed Marker
Marker Function	None, Noise, Counter Marker (1 Hz, 100 mHz, 10 mHz, 1 mHz resolutions), Quasi-Peak (per CISPR 16-1-1)
Marker Trace	Assign Marker to any Trace
Peak Search	Peak Search, Next Peak, Next Peak Left, Next Peak Right, Next Point Left, Next Point Right
Peak Search Setup	Peak Threshold, Peak Excursion
Marker →	Mkr → Center, Mkr → Ref Level
Marker Values	Up to 12 Markers Showing Marker Mode, Function, Trace, Frequency, Amplitude, Delta Frequency & Offset

Limit Line Functions

Limit Setup	Upper/Lower, Limit On/Off, Limit Alarm On/Off, Set Default Limit Line, Frequency Mode (Absolute/Relative) Amplitude Mode (Absolute/Relative)
Limit Line Edit	Frequency, Relative Frequency, Amplitude, Relative Amplitude, Add Point, Add Vertical, Add Gap, Delete Point, Next Point Left/Right
Limit Line Move	Center, X-Offset (Hz), Left, Right, Y-Offset, Up, Down, To Marker 1, Marker 1 Offset (dB)
Limit Line Envelope	Select Envelope (Upper/Lower), Set Envelope, Envelope Points (2-41), Amplitude Offset, Shape (Square/Slope)

Real-Time Spectrum Analyzer (Option 199) (Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

Setup Parameters

Frequency	Center/Start/Stop, Frequency Step, Frequency Offset
	Span, Full Span (max span: 22 MHz standard, 55 MHz with Option 103, 120 MHz with Option 104, 150 MHz with Option 105)
Amplitude	Reference Level (Manual/Auto and Offset), Scale/Division, Y-Axis Unit (dBm, dBW, dBV, dBmV, dBµV, dBA), Preamp (on/off), Attenuation (Auto/Manual), Attenuation Level
Bandwidth	RBW (span dependent), Auto RBW (on/off), Span:RBW Ratio

Probability of Intercept

Analysis Bandwidth	Density Resolution	Span	RBW	POI
22 MHz (Standard)	Normal	22 MHz	10 MHz	2.520 µs
	High			4.420 µs
55 MHz (Opt. 103)	Normal	55 MHz	25 MHz	2.210 µs
	High			4.110 µs
120 MHz (Opt. 104)	Normal	120 MHz	40 MHz	2.055 µs
	High			3.950 µs
150 MHz (Opt. 105)	Normal	150 MHz	40 MHz	2.055 µs
	High			3.950 µs

Acquisition Time	50 ms to 5 s
FFT Rate	527,000 FFT/s (normal resolution), 263,000 FFT/s (high resolution)
Minimum Detectable Signal	5 ns

Trace Functions

Traces	Up to Six Traces
Trace Type	Clear/Write, Average (2 to 1000), Max Hold, Min Hold, Rolling Average, Rolling Max Hold, Rolling Min Hold, T1-T2, T2-T1
Trace Mode	Active, Hold/View, Blank
Detector Type per Trace	Peak, Sample, Negative, Normal
Trace Record	Record live samples with manual tagging to internal or external storage (only applies to trace data)
Trace Playback	Play recorded samples from internal or external storage; set playback interval (only applies to trace and not for spectral density graphic data)
CSV Logging	Record live or playback traces in CSV format for post processing

Sweep Functions

Sweep	Continuous (on/off), Sweep Once

Marker Functions

Markers	Up to 12 Markers
Marker Measurements	Power, Frequency, Time (Spectrogram)
Marker Mode	Normal, Delta, Fixed
Delta Marker	Relative to any Normal or Fixed Marker
Marker Function	None, Noise
Marker Trace	Assign Marker to any Trace
Peak Search	Peak Search, Next Peak, Next Peak Left, Next Peak Right, Next Point Left, Next Point Right
Peak Search	Threshold (on/off), Peak Excursion (on/off)
Marker Values	Center on Marker, Ref Level to Marker, up to 12 Markers Showing Marker Mode, Function, Trace, Frequency, Amplitude, Delta Frequency & Offset

Limit Line Functions

Limit Setup	Upper/Lower, Limit On/Off, Limit Alarm On/Off, Set Default Limit Line, Frequency Mode (Absolute/Relative), Amplitude Mode (Absolute/Relative)
Limit Line Edit	Frequency, Amplitude, Add Point, Add Vertical, Add Gap, Delete Point, Next Point Left/Right
Limit Line Move	Center, X-Offset, Left, Right, Y-offset, Up, Down, Marker Offset, To Marker 1
Limit Line Envelope	Select Envelope (Upper/Lower), Envelope Points (41 max), Amplitude Offset, Shape (Square/Slope), Set Envelope

Trigger Functions

Source	Free Run, Video, External1/2
Settings	Timestamps (on/off), Level, Time Interval, Delay, Holdoff, Periodic, Slope (Rising/Falling), Hysteresis
	Refer to Section "IQ Waveform Capture (Option 124/126)" on page-10 for IQ Trigger Functions

Spectrogram

Number of Lines	142
Trace Time/Position Cursor	Up to Six Cursors (return historical trace data by trace position or time)
Cursor State	Active, Hold/View, Blank
Color Setup	Auto Scale (on/off), Persistence State (Variable/Infinite), Persistence (0 to 10 s), Reset Persistence, Acquisition Time, Color Scale Top/Bottom, Reference Hue

Secure Data (Option 7)

For highly secure data handling requirements, this software option prevents the storing of measurement setup or data information onto any internal file storage location. Instead, setup and measurement information is stored ONLY to the external USB memory location. A simple factory preset prepares the Field Master for transportation while the USB memory remains behind in the secure environment. The Microwave Spectrum Monitor Module (MSMM) cannot be switched between secure and non-secure operation by the user once configured for secure data operation. With this option enabled, the user can also choose to blank the frequency, amplitude and bandwidth values displayed on the screen by turning on Secure Display toggle included in Advanced settings of the instrument.

Secure Communication (Option 17)

When connecting the instrument to a network, Option 17 creates a secure tunnel. Some ports will be closed, and data gets encrypted as shown in the table below. Security certificates can be loaded onto the instrument to establish a secure connection. Remote access to the MS27200A ports can be password protected. The USBTMC connection interface does not work on instruments installed with Secure Communication Option 17.

Compatible Software: Anritsu Remote and Report Tools (ARRT)
MX280007A Mobile InterferenceHunter™ (MIH)

PORT	SERVICE	DEFAULT STATE	WITH OPTION 17
21 (tcp)	ftp	Open	Closed
80 (tcp)	http	Open	Closed
111 (tcp)	rpcbind	Open	Open
443 (tcp)	https	Open	Open
8001 (tcp)	vcom-tunnel	Open	Closed
8002 (tcp)	vcom-tunnel	Closed	Open (encrypted)
9001 (tcp)	tor-orport	Open	Closed
9002 (tcp)	dynamid	Open	Closed
9003 (tcp)	tor-orport	Closed	Open (encrypted)
9004 (tcp)	dynamid	Closed	Open (encrypted)
24001 (tcp)	med-fsp-rx	Open	Closed
24002 (tcp)	med-fsp-rx	Closed	Open (encrypted)
111 (udp)	rpcbind	Open	Open
123 (udp)	ntp	Open	Open
5353 (udp)	Zeroconf	Open/Filtered	Open

Interference Finder and AM/FM Audio Demodulation (Option 24) (Spectrum Analyzer, RTSA, requires GNSS Receiver (Option 31), directional antenna recommended, sold separately)

Supported Measurements

Interference Finding Audio Tone
AM/FM Audio Demodulation
Interference Triangulation Mapping (Requires MA2700A)
Interference Polar Plot (Requires MA2700A)

Interference Finder Audio Tone (for use with directional antennas, sold separately)

Setup	Integration Bandwidth, Power Limit, MAX/MIN Level, Volume
Audio Tone	20 Hz to 20 kHz (Tone pitch and volume changes with detected signal strength)

AM/FM Audio Demodulation

Demod Frequency	Full range of instrument
Audio Demodulation	AM, USB, LSB, Wideband FM, Narrowband FM (6.25, 12.5, 25 kHz)
Demod Marker	On/Off
Markers	Selectable demodulation marker (1 to 12)
Audio	Toggle On/Off
Volume	Set 0% to 100%
Record Audio	Record audio up to 100,000 s (dependent on instrument memory)
Squelch Level	–120 dBm to +30 dBm (set RF level threshold to break audio silence, supports log and linear units)

Interference Map Triangulation (for use with InterferenceHunter handle and directional antenna, sold separately)

Triangulation	Triangulates on source of interference location using eCompass and digital maps displayed on screen
Manual Setup	Manual entry of compass bearing values for signals above 6 GHz

Interference Polar Plot (for use with InterferenceHunter handle and directional antenna, sold separately)

Signal Strength Radar Plot	360° radar plot of single frequency signal strength centered on current GNSS location

Channel Scanner (Option 27) (Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

Number of Channels	1 to 60
Frequency Range	9 kHz to 54 GHz
Frequency Accuracy	±3.0 x 10^{-7}
Measurement Range	–160 dBm to +30 dBm
Amplitude	Reference Level (Manual/Auto and Offset), Scale/Division, Preamp (On/Off), Attenuation (Auto/Manual), Y-Axis Unit (dBm, dBW, dBV, dBmV, dBµV, dBA, V, W, A), Attenuation Level, Impedance (50 Ω, 75 Ω, other), Custom IMP Loss, Field Strength
Scan	Continuous (on/off), Scan Once
Measure	View: Bar Chart, Strip Chart, Mapping, Start Measure, Select Points (on/off), Clear Points, Compare Measure on/off
Setup Parameters	Bar Chart/Strip Chart: Add Channels Signal Standard: Start Channel, Channel Step Size, Channel Span, Channel Count, Index, Dwell Time, Upper Limit, Lower Limit Frequency Range: Channel Name, Start Frequency, Channel Spacing, Channel Span, Channel Count, Index, Dwell Time, Upper Limit, Lower Limit Custom: Channel Name, Center Frequency, Channel Span, Index, Dwell Time, Upper Limit, Lower Limit Mapping: Add Channels, Map Type (Outdoor, Indorr), Map Mode (RSSI, Channel Power, Spectral Density), Repeat Type (Time, Distance), Time (1 to 60 s max), Distance, Distance Unit (Meters, Feet), Best Channel (on/off), Selected Channel (0 to 59), Mapping Device (with Option 7 only), Color Setup: Excellent, Very Good, Good, Fair, Poor

GNSS Receiver (Option 31) (Requires GNSS antenna, sold separately)

Supported Satellite Systems	GNSS (includes combinations of GPS, GLONASS, Galileo, Beidou)
Setup	On/Off, Antenna Voltage 3.3 V/5.0 V, GPS/GNSS Info
Anritsu Antennas	2000-2185-R GNSS (GPS) antenna (requires 2.7 VDC to 5 VDC) 2000-1652-R GPS antenna (requires +3.3 VDC or +5 VDC) 2000-1760-R GPS antenna (requires +2.5 VDC to +3.7 VDC)
GPS/GNSS Info	UTC Time, Latitude, Longitude, and Altitude
High Frequency Accuracy	< ± 2.5 x 10^{-8} with GNSS On, 3 minutes after satellite lock in selected mode (GPS antenna connected) < ± 5.0 x 10^{-8} 24 hour holdover accuracy, –10 °C to 55 °C ambient temperature (GPS antenna disconnected)
Connector	SMA(f), 50 Ω

Zero Span IF Output (Option 89)

Mode	Spectrum Analyzer/Zero Span only
Center Frequency	325 MHz (nominal, FFT capture BW ≤ 32 MHz) 300 MHz (nominal, FFT capture BW > 32 MHz, requires Option 104)
Output Level	–4 dBm (nominal, –20 dBm input level, 0 dB input attenuation, preamp Off, 10 MHz input frequency) Spectrum is inverted in certain input RF bands.
Reference Level	–57 dBm to +30 dBm (Preamp Off) –87 dBm to –40 dBm (Preamp On)
IF Bandwidth	≤32 MHz; ≤110 MHz with Option 104
Rise Time	<20 ns
Connector	SMP(m), 50 Ω

Gated Sweep (Option 90)

Gate Source	GNSS (GPS), External 1/2
Trigger Slope	Rising/Falling
Frame Time	1 s, 20 ms, 10 ms
Gate Delay	Up to 200 ms
Gate Length	1 µs up to 200 ms
Power vs. Time, Length	100 µs to 200 ms

IQ Waveform Capture (Option 124/126)

(Option 126 is non-export controlled and limits depth to 8 or 10 bits when bandwidth is 110 MHz)

IQ Capture

Mode	Spectrum Analyzer
Capture Mode	Single or Continuous
Trigger	Free Run, External (Rising/Falling), Interval, Level
Trigger Settings	Delay
Maximum Sample Rate[a]	200 MHz
Maximum Signal Bandwidth[a]	150 MHz
Bit Resolution	8, 10, 16, or 32-bit
Total Capture Memory	2 GB

IQ Capture Time Typical Maximum

Signal Bandwidth (MHz)	IQ Sample Rate (MSPS)	IQ Bit Resolution 32 bit	16 bit	10 bit	8 bit	Mode[a] SPA	RTSA
150	200	1.34 s	2.68 s	4.29 s	5.37 s	x	x
120	200	1.34 s	2.68 s	4.29 s	5.37 s	x	x
100	122.88	2.18 s	4.37 s	6.99 s	8.74 s	x	
80	100	2.68 s	5.37 s	8.59 s	10.74 s	x	x
74	92.16	2.91 s	5.83 s	9.32 s	11.65 s	x	
50	61.44	4.37 s	8.74 s	13.98 s	17.48 s	x	
40	50	5.37 s	10.74 s	17.18 s	21.47 s	x	x
36	46.08	5.83 s	11.65 s	18.64 s	23.3 s	x	
25	30.72	8.74 s	17.48 s	27.96 s	34.95 s	x	
20	25	10.74 s	21.47 s	34.36 s	42.95 s	x	x
18	23.04	11.65 s	23.30 s	37.28 s	46.6 s	x	
12	15.36	17.48 s	34.95 s	55.92 s	1.17 min	x	
10	12.5	21.47 s	42.95 s	1.15 min	1.43 min	x	x
6	7.68	34.95 s	1.17 min	1.86 min	2.33 min	x	
5	6.25	42.95 s	1.43 min	2.29 min	2.86 min	x	x
3	3.84	1.17 min	2.33 min	3.73 min	4.66 min	x	
2.5	3.125	1.43 min	2.86 min	4.58 min	5.73 min	x	x
1.5	1.92	2.33 min	4.66 min	7.46 min	9.32 min	x	
1.25	1.5625	2.86 min	5.73 min	9.16 min	11.45 min	x	x
0.28	0.36	12.43 min	24.86 min	39.77 min	49.71 min	x	
0.036	0.045	99.42 min	198.84 min	318.15 min	397.68 min	x	

a. Option Dependent: Standard Analysis Bandwidth up to 20 MHz, Option 103 up to 55 MHz, Option 104 up to 120 MHz and Option 105 up to 150 MHz.

IQ Waveform Streaming (Option 125/127)

(requires Option 124 or 126; Option 127 is non-export controlled and limits streams to 100 MHz BW or less.)

IQ Steaming

Bit Resolution	8, 10, 16, or 32-bit
Ethernet Port	Maximum gapless bandwidth depends on network transfer speed
USB Port	Requires USB 3.0 solid state drive. Device formatted as external file system (ext4). Maximum gapless streaming bandwidth: 8 bit: 100 MHz BW, 122.88 MSPS sample rate 10 bit: 80 MHz BW, 100 MSPS sample rate 16 bit: 50 MHz BW, 61.44 MSPS 32 bit: 25 MHz BW, 30.72 MSPS Device formatted as extensible file allocation table system (exFAT) with 32 MB allocation unit size Maximum gapless streaming bandwidth: 8 bit: 100 MHz BW, 122.88 MSPS sample rate 10 bit: 74 MHz BW, 92.16 MSPS sample rate 16 bit: 50 MHz BW, 61.44 MSPS sample rate 32 bit: 25 MHz BW, 30.72 MSPS sample rate
Data Out Port	Gapless streaming of 150 MHz bandwidth at 16-bit resolution or 100 MHz bandwidth at 32-bit resolution (requires MA25101A IQ Streaming PCIe kit and compatible PC)

Pulse Analyzer (Option 421) (Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

Pulse Measurements (in accordance with *IEEE Standard for Transitions, Pulses, and Related Waveforms* (181-2011, section 5.2.1)

Power Measurements	Average power, Peak power, Wave Average, Peak Wave Average, Pulse Average
Pulse Characteristics	Duration, Center, Tilt, Period, Off Time, Duty Factor, Frequency
First Transition Characteristics	Transition Duration, Duration Instant, Low Reference Instant, High Reference Instant, Pre Transition Overshoot, Post Transition Overshoot, Pre Transition Undershoot, Post Transition Undershoot
Second Transition Characteristics	Transition Duration, Duration Instant, Low Reference Instant, High Reference Instant
Pulse View Settings	Pulse Analyzer (enables pulse analyzer measurements above), Pulse Viewer (removes pulse analyzer measurements and enables standard marker measurements)
Rise Time	(trace averages set to 100; RBW:VBW = 1) 30 ns, 40 MHz RBW (Option 104) 100 ns, 10 MHz RBW (Standard)

DANL and dynamic range are the same as the "Spectrum Analyzer Performance".

Setup Parameters

Frequency	Center Frequency, Frequency Step, Frequency Offset
Amplitude	Reference Level (Manual/Auto and Offset), Scale/Division, Y-Axis Unit (dBm, dBW, dBV, dBmV, dBµV, dBA), Preamp On/Off, Attenuation (Auto/Manual)
Bandwidth	RBW/VBW (Auto/Manual), VBW Type (Linear/Logarithmic), RBW:VBW Ratio, SPAN:RBW Ratio
Pulse Setup	Pulse Level Type (Auto/User), Pulse Type (Positive/Negative), User TOP (S2), User BOTTOM (S1), Pulse Reference High (%), Pulse Reference Low (%), Pulse Duration Reference (0.2-99.9%), Simulation, Display

Trace Functions

Traces	Up to Six Traces
Trace Type	Clear/Write, Min Hold, Max Hold, Average, Rolling Max Hold, Rolling Min Hold, Rolling Average
Trace Mode	Active, Hold/View, Blank
Detector Type per Trace	Peak, Negative, Sample

Sweep Functions

Sweep	Single/Continuous, Restart, Sweep Once, Sweep to N, Sweep Time
Sweep Points	1001
Sweep Time	60 ns to 3600 s
Sweep Time Accuracy	±2%

Marker Functions (enabled only in Pulse Viewer)

Markers	Up to 12 Markers
Marker Measurements	Time, Amplitude
Marker Mode	Normal, Delta, Fixed
Delta Marker	Relative to any Normal or Fixed Marker
Marker Function	None, Noise
Marker Trace	Assign Marker to any Trace
Peak Search	Peak Search, Next Peak, Next Peak Left, Next Peak Right, Next Point Left, Next Point Right
Peak Search Setup	Peak Threshold, Peak Excursion
Marker →	Mkr → Center, Mkr → Ref Level
Marker Values	Up to 12 Markers Showing Marker Mode, Function, Trace, Time, Amplitude, Delta Time & Offset

Trigger Functions

Trigger Sources	Free Run, Video, External 1/2
Trigger Settings	Level, Delay, Holdoff, Periodic, Slope (Rising/Falling), Hysteresis
Trigger Jitter	20 ns

Pulse Simulation Provides measurement data of simulated pulse types

Waveform Types	Single Positive, Single Negative, Train, Double
Settings	Simulation (ON/OFF) Amplitude (High and Low), Period (0 s-3600 s), Duty Factor (0.01-1)

Pulse Display

Settings	Ref High (On/Off), Duration Ref (On/Off), Post-T Over (On/Off), Post-T Under (On/Off), Pre-T Over (On/Off), Pre-T Under (On/Off), S2 High (On/Off), S1 Low (On/Off), HRI First/Second, LRI First/Second, DI First/Second (On/Off)

AM/FM Modulation Measurement (Option 509) (Spectrum Analyzer, RTSA, IA Spectrum and IA RTSA measurements)
(Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

AM Measurements

AM Depth	0% to 100%, ±2% accuracy, typical
AM Bandwidth	20 kHz
AM Standards	Standard AM, Upper/Lower Sideband suppressed carrier
SINAD	0 to 60 dB, nominal based on 1kHz modulating tone
THD	-60 dB, using up to 10 harmonics of 1 kHz modulating tone
Demodulated AM Spectrum	Frequency Scale, 0 to 24 kHz
Audio Time Domain	5 s or auto zoomed
Audio Results	Signal Power (dBm), Carrier Frequency, RMS Depth, (Peak-to-peak)/2 Depth, Peak Positive/Peak Negative Depth, SINAD (dB), Upper/Lower AM Depth, THD (dB)
Setup	Demodulation Frequency, Demodulation Marker (on/off), Marker Tracked (1 to 12), Zoomed Time Graph (on/off), Modulation (AM, USB, LSB), Audio (on/off), Volume (on/off), Record Duration (1 to 100000 S), Record, Squelch Level (-120 to 30 dBm)

FM Measurements

FM Bandwidth	96 kHz (wide)
FM Deviation	Up to 75 kHz with 2% accuracy, ±1 kHz typical
SINAD	0 to 60 dB, nominal based on 1 kHz modulating tone
THD	-75 to 0 dB, using up to 10 harmonics of 1 kHz modulating tone
Demodulated FM Spectrum	Wideband: 96 kHz full span, 20 kHz zoomed Narrowband: 25 kHz, 24 kHz (audio spectrum) 12.5 kHz, 14 kHz (audio spectrum) 6.25 kHz, 6 kHz (audio spectrum)
Audio Time Domain	5 s or auto zoomed
Audio Results	Signal Power (Hz), Carrier Frequency, Upper/Lower Deviation, RMS FM deviation, (Peak-to-peak)/2 Deviation, SINAD, Total Harmonic Distortion (THD), Left/Right RDS deviation, Pilot Deviation
Setup	Demodulation Frequency, Demodulation Marker (on/off), Marker Tracked (1 to 12), Zoomed Audio Graph (on/off), Zoomed Time Graph (on/off), Modulation (FM Narrowband (6.25, 12.5, 25 kHz), FM Wideband), Audio (on/off), Volume (on/off), Record Duration (1 to 100000 S), Record, Squelch Level (-120 to 30 dBm)

WCDMA FDD Signal Analyzer (Option 871) (Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

General

Frequency Range	10 MHz to 54 GHz (option dependent)
Channel Bandwidth	5 MHz
Amplitude	Auto Range on/off, Reference Level (Manual/Auto), Scale/Division, Y Axis Unit, Attenuation Level (Auto/Manual), Reference Level Offset, Preamp on/off
Input Signal Range	–80 dBm to +10 dBm
Sweep	Sweep Once/Continuous, Hold (On/Off), Restart Averaging, Gated Sweep (Channel Power and OBW)

WCDMA

Demod Summary View	Primary Scrambling Code, Code Group, Frequency Error, Time Offset, Status, Count, Average, STD Deviation, Minimum, Maximum Code Domain Power: Absolute, relative and ⌂ CPICH values of Channel Power (CHP), power of common pilot channel (P-CPICH), Primary Common Control Physical Channel (P-CCPCH), Secondary Common Control Physical Channel (S-CCPCH), Paging Indicator Channel (PICH) Code Domain EVM: power of common pilot channel (P-CPICH)
Summary Table View	Carrier Frequency, Frequency error/Average frequency error, Channel Power, Occupied BW, P-CPICH EVM, P-CPICH Power, P-CCPCH Power, S-CCPCH Power, PICH Power, Scrambling Code

WCDMA Adjacent Channel Power

Upper/Lower Measurements	Channel (Main, Adjacent, Alternate) Absolute, Relative, Limit (dBm)
Setup Parameters	Channel Spacing, Main/Adjacent/Alternate Integration Bandwidth, Limit Type (Absolute/Relative), Limits (On/Off), Main/Adjacent/Alternate Channel Limit

WCDMA Channel Power

Measurements	Total Channel Power, Total Power Spectral Density (PSD), Limit Test (CH Power and PSD)
Setup Parameters	Integration Bandwidth, PSD Units (Hz/MHz), Power Limit (dBm), PSD Limit (dBm/Hz)

WCDMA Spectral Emission Mask (SEM)

Measurements	Segment, RBW, Peak Power, Peak Frequency, Mask Name, Reference Channel Power and Channel BW
Setup Parameters	Select Mask, Import Mask, Export Mask, Reference Channel Bandwidth, Auto Max Power (on/off), Manual Max Power

WCDMA Occupied Bandwidth

Measurements	Occupied BW, Total Power, Value, Limit, OBW Center Frequency, Left Edge and Right Edge
Setup Parameters	% OBW Power, X DB, OBW Limit (on/off), Method (percent/X dB)

LTE FDD/TDD Signal Analyzer (Option 883) (Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

General

Frequency Range	10 MHz to 54 GHz (option dependent)
Channel Bandwidth (MHz)	1.4, 3, 5, 10, 15, 20
Amplitude	Auto Range, Reference Level (Manual/Auto), Scale/Division, Y Axis Unit, Attenuation Level (Auto/Manual), Reference Level Offset, Pre Amp
Input Signal Range	–76 dBm to +10 dBm (≤20 GHz) –72 dBm to +10 dBm (>20 GHz)
Sweep	Single/Continuous, Hold (On/Off)
MIMO Antenna Setup	Auto, Antenna 0, 1, 2, or 3

LTE Demodulation Summary

PCI Summary Measurements	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Status of Primary Synchronization Signal (PSS), MIMO Time Alignment Error, Resource Block Power, Mobile Network Code (MNC), Mobile Country Code (MCC)
Signal Power Measurements (dBm)	Physical Broadcast Channel Power (PBCH), Sync Signal (SS), Reference Signal (RS), OFDM Symbol Transmit Power (OSTP)
Error Vector Magnitude Measurements (%)	Physical Broadcast Channel (QPSK), Physical Downlink Shared Channel (QPSK), PDSCH (16-QAM/64-QAM/256-QAM)
Demod Summary View	PCI, Sector ID, Sector ID, MNC, MCC, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Sync Status, Power (PBCH, SS, RS), EVM (PBCH(QPSK), PDSCH (QPSK, 16-QAM, 64-QAM, 256-QAM), Average EVM, Peak EVM
Time Alignment Error (TAE) View	PCI, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Sync Status, TAE between each antenna pair, Power (RS, SS), EVM (RMS, PEAK)
Resource Block Power View	PCI, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Sync Status, RB (number of active RBs, Utilization, OSTP), EVM (QPSK, 16-QAM, 64-QAM, 256-QAM)
Summary Table View	Carrier Frequency, Frequency error, Average Frequency Error, Channel Power, RS Power, Occupied BW, Physical Cell ID
Setup Parameters	Integration Bandwidth (Summary Table view only), Antenna (Auto/1/2/3/4), Cyclic Prefix (Auto/Normal/Extended), Duplex Type (FDD/TDD), UL/DL Config (TDD only), CFI (Auto/CFI1/CFI2/CFI3), DSS Detect (on/off), SSB Offset, Frequency Error Type (Summary Table view only): Current, Average, Auto Detect SSB
RS Power Accuracy	± 1.0 dB typical (RF input –50 dBm to +10 dBm)
Frequency Error	± 10 Hz + time base error (99 % confidence level)
Residual EVM (rms)	2.0 % typical (E-UTRA Test Model 3.1, RF Input –50 dBm to +10 dBm)

LTE DSS Detection

Setup Parameters	DSS Detect (On/Off), Status, PCI, Beam, SS-RSRP

LTE Multi PCI

Measurements	Multiple Physical Cell IDs, Secondary Sync Signal Power (S-SS), Reference Signal Received Power (RSRP), Reference Signal Received Quality (RSRQ), Signal to Interference and Noise Ratio (SINR), Average Error Vector Magnitude (EVM), Peak EVM, Frequency Error (Hz and PPM), Dominance (dB)
Data	PCI, SINR, RSRP, RSRQ, SS Power
Setup Parameters	Cyclic Prefix (Auto/Normal/Extended), Duplex Type (FDD/TDD), UL/DL Config (TDD only), CFI (Auto/CFI1/CFI2/CFI3), DSS Detect On/Off (Status, PCI, Beam, SS-RSRP), SSB Offset, Auto Detect SSB

LTE Channel Power

Measurements	Total Channel Power, Total Power Spectral Density (PSD), Limit Test (Power and PSD)
Setup Parameters	Integration Bandwidth, PSD Units (Hz/MHz), Power Limit (dBm), PSD Limit (dBm/Hz)
RF Channel Power Accuracy	± 1 dB typical (–50 dBm to +10 dBm)

LTE Channel Spectrum

Measurements	Occupied Bandwidth (OBW), Total Power, Reference Signal (RS) Power, Frequency Error, Limit Test (OBW)
Setup Parameters	% OBW Power (%/dB), XdB, OBW Limit (on/off) (Hz), Method (percent (%), x dB)

LTE Carrier Aggregation

Measurements	Carrier, Physical-layer Cell ID (PCI), MCC, RSRP, RSRQ, SINR, EVM (% RMS), Frequency Error (Hz), Bandwidth (BW), Center Frequency, Antennas
Setup Parameters	Carrier, Carrier Count (up to eight), Antenna (Auto/0/1/2/3), Cyclic Prefix (Auto/Normal/Extended), Duplex Type (FDD/TDD)

LTE Adjacent Channel Power

Upper/Lower Measurements	Channel (Main, Adjacent, Alternate) Absolute, Relative, Limit (dBm)
Setup Parameters	Channel Spacing, Main/Adjacent/Alternate Integration Bandwidth, Limit Type (Absolute/Relative), Limits (On/Off), Main/Adjacent/Alternate Channel Limit

LTE Spectral Emission Mask (SEM)

Measurements	Segment, RBW, Peak Power, Peak Frequency, Mask Name, Reference Channel Power and Channel BW
Setup Parameters	Select Mask, Import Mask, Export Mask, Reference Channel Bandwidth, Auto Max Power (on/off), Manual Max Power

LTE Control Channel

PCI Summary Measurements	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Status of Primary Synchronization Signal (PSS)
Power Measurements	Reference Signal (RS), P-Primary Synchronization Signal (P-SS), Secondary Synchronization Signal (S-SS), Physical Broadcast Channel (PBCH), Physical Control Format Indicator Channel (PCFICH), Physical Hybrid Automatic Repeat Request Indicator Channel (PHICH), Physical Downlink Control Channel (PDCCH), Total Power per Resource Element and Power (dBm/watts), EVM (%)
Setup Parameters	Antenna (Auto/0/1/2/3), Cyclic Prefix (Auto/Normal/Extended), Duplex Type (FDD/TDD), UL/DL Config (TDD only), NG (1/6, 1/2, 1, 2), CFI (Auto/CFI1/CFI2/CFI3)

LTE Constellation

Measurements	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Status of Primary Synchronization Signal (PSS), Constellation Data of PBCH or PDSCH
Power Measurements	Reference Signal (RS) Power, P-Primary Synchronization Signal (P-SS) Power, Secondary Synchronization Signal (S-SS) power, RMS EVM (%), Peak RMS, Physical Downlink Started Channel (PDSCH), QPSK, 16-QAM, 64-QAM, 256-QAM
Setup Parameters	Antenna (Auto/0/1/2/3), Cyclic Prefix (Auto/Normal/Extended), Duplex Type (FDD/TDD), UL/DL Config (TDD only), CFI (Auto/CFI1/CFI2/CFI3), Data Select (PBCH/PDSCH), Modulation (All/QPSK/16-QAM/64-QAM/256-QAM), Ref Points

LTE UL/DL Interference

Data	Frame/Subframe power against time plus gated uplink or downlink RF spectrum
Measurements	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Status of Primary Synchronization Signal (PSS)
Sub-Frame Power Measurements	Sub-Frame, Slot (0 and 1), Total Frame Power, Uplink and Downlink Pilot Time Slots (DwPTS and UpPTS), and Transmit Off Power
Setup Parameters	Analysis (Frame/Subframe/Slot), SSF Config (Auto/0-9/Invalid), Sub-Frame (0-9), Slot (0/1) Antenna (Auto/0/1/2/3), Gated Spec Type (Uplink, Downlink, Guard Period, All, None), Gated Duration (Frame, Coupled), Time Level Offset, Frame Start Time (Auto, Sync Once, UTC, Custom), Frame Time Offset, Cyclic Prefix (Auto/Normal/Extended), Duplex Type (FDD/TDD), UL/DL Config (TDD only), NG (1/6, 1/2, 1, 2)

5GNR FDD/TDD Signal Analyzer (Option 888) (Compatible only with SCPI commands, Anritsu Remote Tool is not supported)

General

Frequency Range	10 MHz to 54 GHz (option dependent)
Band Configuration	Manual or selectable Band #, Absolute Radio Frequency Channel Number (ARFCN), Global Synchronization Raster Channel (GSCN), Channel Bandwidth (5 MHz to 100 MHz in steps of 5 MHz), SSB Offset, Subcarrier Spacing (15, 30, 120, 240 kHz), Mapping Pattern (Auto, P1, P2), Auto SSB Detect
Auto SSB Detect	Searches 3GPP defined GSCN raster
Amplitude	Auto Range, Reference Level, Scale/Division, Reference Level Offset, Attenuation Level (Auto/Manual), Preamp
Input Signal Range	–76 dBm to +10 dBm (≤20 GHz) –72 dBm to +10 dBm (>20 GHz)
Sweep	Single/Continuous, Sweep Once

5GNR Summary

Multi-Beam Measurements	Physical-layer Cell ID, Beam Index, Sector ID, Mobile Network Code (MNC), Mobile Country Code (MCC), Cell Group, Frequency Error, Time Offset (µs), Status, SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), SS-RSSI (dB), Sync and Demod Status Indicators
Single-Beam Measurements	Physical Cell ID, Sector ID, MNC, MCC, Cell Group, Frequency Error, Time Offset, Status, SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), SS-RSSI, Sync and Demod Status Indicators, Block Measurements (PSS, SSS, PBCH, PBCH-DMRS), Average EVM, Peak EVM (@ subcarrier/symbol), Beam Power (dBm)
Summary Table View	Carrier Frequency, Frequency Error, Average Frequency Error, Channel Power, SS-RSRP (Beam), Occupied BW, Physical Cell ID, Sync and Demod Status Indicators
Views	Multi Beam (up to 64), Single Beam, Summary Table
Setup Parameters	SINR Threshold (dB), Duplex Type (FDD/TDD), GMC Offset (µs), Distance to Antenna (m), Distance Unit (m/ft)
RSRP Accuracy	± 1.0 dB typical
Residual EVM (rms)	2.0 % typical
Frequency Error	< ± 2.0E-8 + time base error, typical

5GNR Multi PCI

Measurements	Multiple Physical-layer Cell IDs, Beam Index, SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), SS-EVM (%) Beam Power (dBm)
Views	Multi PCI Beam Scanner (up to 64 beams), Table
Setup Parameters	SINR Threshold (dB), Duplex Type (FDD/TDD)

5GNR RF EIRP

Measurements	EIRP (Active, Horizontal/Vertical, Sum), Upper/Lower Limit Test
Views	Normal (RF spectrum), Quick View (summary)
Setup Parameters	Save (Horizontal/Vertical), Reset Sum, RX Antenna Gain, Distance to Antenna, Units (Meters/Feet), Upper/Lower Limit Test, RX Cable Loss

5GNR RF Occupied Bandwidth

Measurements	Occupied Bandwidth, Total Power, x dB Bandwidth, Tx Frequency Error, Limit Test
View	Normal (RF Spectrum)
Setup Parameters	Method: OBW Power (% and X dB), OBW Limit Test

5GNR RF Channel Power

Measurements	Total Channel Power, Total PSD, Limit Test
View	Normal (RF Spectrum)
Setup Parameters	Integration Bandwidth, PSD Units, Power and PSD Limit Tests
RF Channel Power Accuracy	± 1 dB typical (–76 dBm to +10 dBm)

5GNR Carrier Aggregation

Component Carriers	Up to Eight Component Carriers
PCI Measurements	Sync status (PSS), Physical-layer Cell ID (PCI), RSRP Max, EVM (% rms), Frequency Error (Hz), Time Offset
Setup Parameters	Carrier Count (up to 8), Duplex Type (FDD/TDD)

5GNR Constellation

Measurements	Constellation data of PBCH
Setup Parameters	Modulation (QPSK), Data Format (PBCH), Beam Select, Reference Points

5GNR UL/DL Interference

Data	Frame/Subframe power against time plus gated uplink or downlink RF spectrum
Measurements	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, Status of Primary Synchronization Signal (PSS), Total Frame Power
Sub-Frame Power Measurements	Sub-Frame, Slot (0 and 1)
Setup Parameters	Analysis (Frame/Subframe/Slot), Sub-Frame (0-9), Slot (0 to 15), Gated Spec Type (Uplink, Downlink, Flexible, All, None), Gated Duration (Frame, Coupled), Time Level Offset, Frame Start Time (Auto, Sync Once, UTC, UTC+3 ms, UTC-2 ms, Custom), Frame Time offset, Frame Structure (A/B1/B2/Custom), Special Slot Type (Type 1/2), Frame Setup (Frame Structure, Pattern Number, Uplink Slots Pattern 1/2, Downlink Slots Pattern 1/2, Uplink Symbols Pattern 1/2, Downlink Symbols Pattern 1/2, Trans Periodicity Pattern 1/2), Cyclic Prefix (Normal), Duplex Type (FDD/TDD)

General Specifications

Connectors

RF In	MS27200A-0709, -0714, -0720, -0726, -0732, -0743: Type K(f), 50 Ω MS27200A-0754: Type V(f), 50 Ω
GPS	SMA(f), 50 Ω
External Power	5.5 mm barrel connector, 14 to 16 VDC, 5.0 A max
Ethernet Interface	RJ45 connector for Ethernet 10/100/1000 Mbps (connect to PC or LAN for remote access)
USB Interface	Two USB 3 Type A (supports file transfer and IQ capture/streaming) One USB 3 Type C (USB-TMC) (Compatible with external USB memory device that have an integrated keypad and are FIPS compliant using AES 256-bit encryption.)
External Reference In	10 MHz, SMA(f), 50 Ω, maximum input +10 dBm
External Reference Out	SMA(f), 50 Ω, 10 MHz
External Trigger	SMA(f), 50 Ω, TTL-compatible levels, maximum input +5 VDC
IF Out	SMP(m), 50 Ω (see "Zero Span IF Output (Option 89)" on page 9)
DC Bias Voltage	SMA(f), Setup: On/Off, Voltage, Trip Reset Voltage Range: +1 V to +34 V, Resolution: 0.1 V Max Current: 1 A, Max Power: 15 W

Regulatory Compliance[1]

European Union	EMC 2014/30/EU, EN 61326-1:2021 CISPR 11/EN 55011, IEC/EN 61000-4-2/3/4/5/6/8/11 Low Voltage Directive 2014/35/EU Safety EN 61010-1:2010 RoHS Directive 2011/65/EU + 2015/863
United Kingdom	EMC SI 2016/1091; BS EN 55011 & BS 61000-4-2/3/4/5/6/8/11 Consumer Protection (Safety) SI 2016/1101; BS EN 61010-1:2010 Environmental Protection SI 2012/3032;2011/65/EU & 2015/863
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-REM-A21-0004
Canada	ICES-1(A)/NMB-1(A)

Environmental[1]

MIL-PRF-28800F Class 2

Operating Temperature Range	–10 °C to 55 °C
Storage Temperature Range	–51 °C to 71 °C
Maximum Relative Humidity	95 % RH at 30 °C, non-condensing
Vibration, Sinusoidal	5 Hz to 55 Hz
Vibration, Random	10 Hz to 500 Hz
Half Sine Shock	30 g_n
Altitude	4600 meters, operating and non-operating
Explosive Atmosphere	MIL-PRF-28800F Section 4.5.6.3 MIL-STD-810G, Method 511.5, Procedure 1

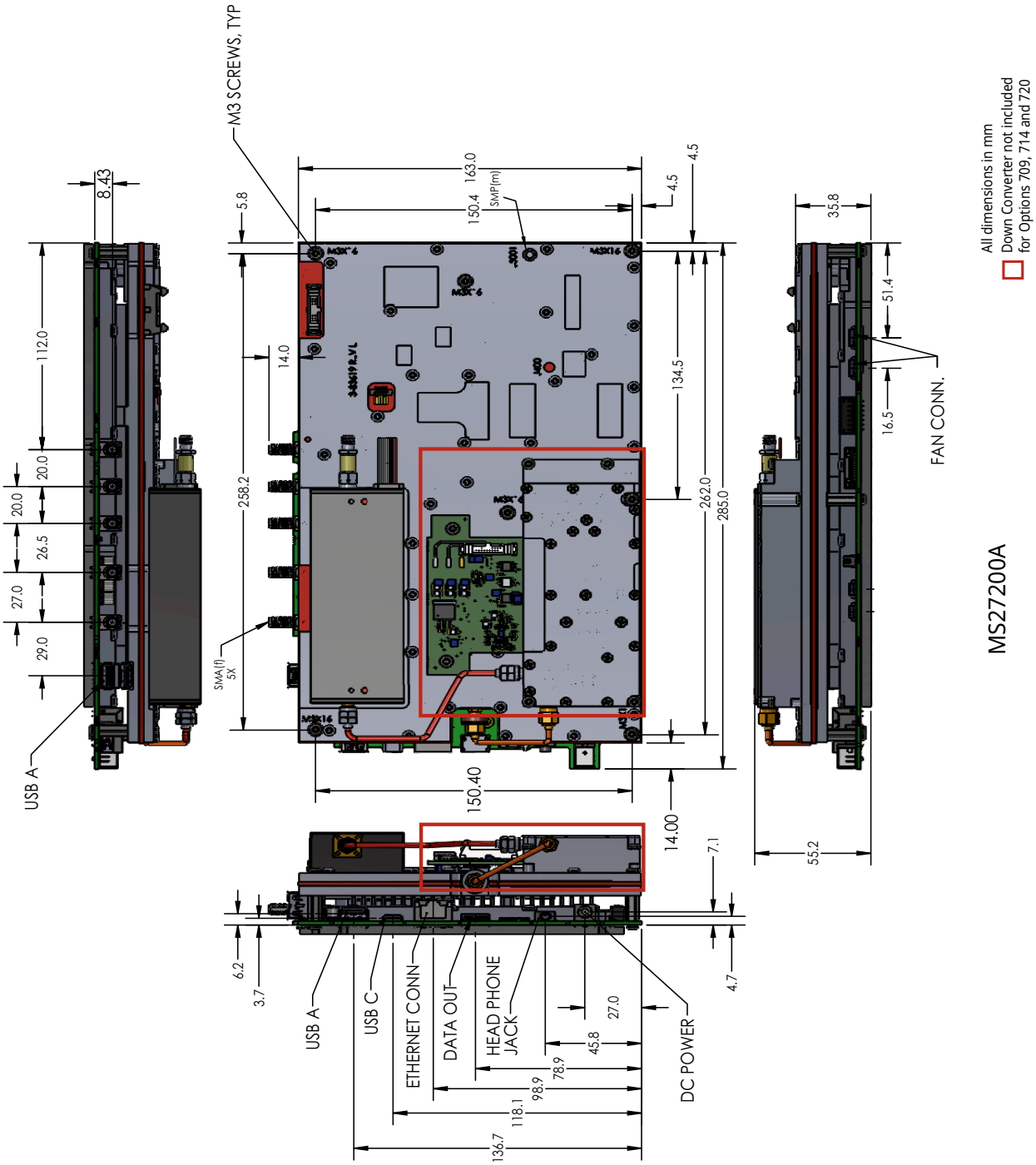
Warranty

Duration	Standard three-year warranty

Size and Weight

Size	285mm x 177mm x 55.2 mm, (11.2 in x 6.96 in x 2.17 in)
Weight	MS27200A-0709, -0714, -0720: 2.06 kg (4.60 lb) MS27200A-0726, -0732, -0743, -0754: 2.4 kg (5.35 lb)

1. Specifications apply to OEM boards enclosed in Anritsu tested chassis. It is recommended to maintain the CPU temperature below 90 °C.


All dimensions in mm
Down Converter not included for Options 709, 714 and 720
MS27200A
M3 SCREWS, TYP
8.43
112.0
20.0
20.0
26.5
27.0
29.0
USB A
5.8
258.2
14.0
SMA(f) 5X
163.0
150.4
SMP(m)
4.5
4.5
134.5
262.0
285.0
150.40
14.00
7.1
4.7
35.8
51.4
16.5
FAN CONN.
55.2
6.2
3.7
USB A
USB C
ETHERNET CONN
DATA OUT
HEAD PHONE JACK
DC POWER
27.0
45.8
78.9
98.9
118.1
136.7

Programmable Remote Control

Functionality	Programming control (except power on/off) via Ethernet connectivity. See the Programming Manual (PN:10580-00481) for details.
Programming Language	Standard Commands for Programmable Instruments (SCPI)
Interfaces	Ethernet, USBTMC (USB C port)

MA25101A IQ Streaming PCIe Kit (requires Option 125 or Option 127)

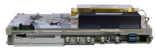
IQ Streaming (used for streaming IQ data components of a waveform from the MS27200A Data Out port to a PC)

Shipping Contents	PCIe Computer Card with mounting hardware PCIe OCuLink I/O Data Cable
Software	MX280005A IQ Signal Master™ Vector Modulation Analysis Software (download from www.anritsu.com)
Mode	Spectrum Analyzer and RTSA
Input Ports	Data In (PCIe) (use PC Ethernet for instrument control and low speed IQ data streaming)
PCIe Standard	PCIe Gen 3, 4 lanes
Data Rate	Max Peak rate: 18 Gb/s
	Typical: 6.4 Gb/s (for typical PC configuration and system overhead), 110 MHz Capture BW @ 16 bits max

Warranty

Duration	90 days warranty

Ordering Information – Instrument Options



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 Option126)
MS27200A-0199	Real-Time Spectrum Analysis (RTSA)
MS27200A-0400	Enable Vision Monitor
MS27200A-0401	Enable Vision Locate (Requires Option 400)
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-07xx-0097	Accredited Calibration to ISO17025 and ANSI/NCSL Z540-1 (xxxx is the frequency option number)
MS27200A-07xx-0098	Standard Calibration to ISO17025 and ANSI/NCSL Z540-1 (xxxx is the frequency option number)
MS27200A-07xx-0099	Premium Calibration to ISO17025 and ANSI/NCSL Z540-1 plus data (xx is the frequency option number)
Supported PC Software	
MX280005A	IQ Signal Master™ Vector Modulation Analysis
MX280001A	Vision™ Monitor
MX280007A	Mobile InterferenceHunter™

Standard Accessories (included with instrument)

Accessory	Description
	2000-2156-R SMA(m) to BNC(f) Adapter (qty 3)
	806-442-R SMA(m) to BNC(m) cable, 1 m (qty 1)
	40-204-R AC/DC Power Adapter

Accessory	Description
	2000-1371-R Ethernet Cable, 2 m
	Certificate of Calibration and Conformance

Related Manuals (available at www.anritsu.com)

Part Number	Description
10100-00064	Product Information, Compliance, and Safety
10580-00506	Microwave Spectrum Monitor Module User Guide
10580-00481	Remote Spectrum Monitor Programming Manual

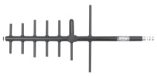
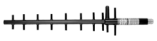
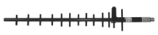
Optional Accessories

Miscellaneous Accessories

Accessory	Description
	760-261-R Large transit case (for instrument, MA2700A, Yagi/Log Periodic antennas plus minor cables and accessories)

Accessory	Description
	MA25101A IQ Streaming PCIe Kit Includes: PCIe Card with mounting hardware 2000-2030-R PCIe OCuLink I/O Data Cable

Directional Antennas

Accessory	Description
	2000-1411-R 824 MHz to 896 MHz, N(f), 12.3 dBi, Yagi
	2000-1412-R 885 MHz to 975 MHz, N(f), 12.6 dBi, Yagi
	2000-1413-R 1710 MHz to 1880 MHz, N(f), 12.3 dBi. Yagi
	2000-1414-R 1850 MHz to 1990 MHz, N(f), 11.4 dBi, Yagi
	2000-1415-R 2400 MHz to 2500 MHz, N(f), 14.1 dBi, Yagi
	2000-1416-R 1920 MHz to 2170 MHz, N(f), 14.3 dBi, Yagi
	2000-1659-R 698 MHz to 787 MHz, N(f), 10.1 dBi, Yagi
	2000-1660-R 1425 MHz to 1535 MHz, N(f), 14.3 dBi, Yagi

Accessory	Description
	2000-1726-R 2500 MHz to 2700 MHz, N(f), 14.1 dBi, Yagi
	2000-2107-R Log Periodic, 20 MHz to 8.5 GHz (requires Port Extender 2000-1798-R or bandpass filter when used with MA2700A)
	2000-1748-R Log Periodic, 1 GHz to 18 GHz, N(f), 6 dBi, typical
	2000-1777-R Portable Directional Antenna, 9 kHz to 20 MHz, N(f) (requires port extender 2000-1798-R when used with MA2700A)
	2000-1778-R Portable Directional Antenna, 20 MHz to 200 MHz, N(f) (requires port extender 2000-1798-R when used with MA2700A)
	2000-1779-R Portable Directional Antenna, 200 MHz to 500 MHz, N(f) (requires port extender 2000-1798-R when used with MA2700A)
	2000-1812-R Portable Yagi Antenna, 450 MHz to 512 MHz, N(f), 7.1 dBi
	2000-1825-R Portable Yagi Antenna, 380 MHz to 430 MHz, N(f), 7.1 dBi

InterferenceHunter™ and Accessories

Accessory	Description
	MA2700A Handheld Interference Hunter (For full specifications, refer to the MA2700A Technical Data Sheet 11410-00692
	2000-1735-R 776 MHz to 788 MHz, N(m) and N(f), 50 Ω
	2000-1736-R 815 MHz to 850 MHz, N(m) and N(f), 50 Ω
	2000-1737-R 1711 MHz to 1756 MHz, N(m) and N(f), 50 Ω
	2000-1738-R 1850 MHz to 1910 MHz, N(m) and N(f), 50 Ω
	2000-1739-R 880 MHz to 915 MHz, N(m) and N(f), 50 Ω
	2000-1740-R 1710 MHz to 1785 MHz, N(m) and N(f), 50 Ω

Accessory	Description
	2000-1734-R 699 MHz to 715 MHz, N(m) and N(f), 50 Ω
	2000-1741-R 1920 MHz to 1980 MHz, N(m) and N(f), 50 Ω
	2000-1742-R 832 MHz to 862 MHz, N(m) and N(f), 50 Ω
	2000-1743-R 2500 MHz to 2570 MHz, N(m) and N(f), 50 Ω
	2000-1798-R Port Extender, DC to 6 GHz
	2000-1799-R 2305 MHz to 2320 MHz, N(m) and N(f), 50 Ω
	2000-2147-R 3700 MHz to 3980 MHz, N(m) to N(f), 50 Ω

Broadband and GNSS (GPS) Antennas (active)

Accessory	Description
	2000-2185-R Magnet Mount, SMA(m) with 3 m (9.8 ft) cable, requires 2.7 VDC to 5 VDC
	2000-1652-R Magnet Mount, SMA(m) with 0.3 m (1 ft) cable, requires 3.3 VDC or 5 VDC

Accessory	Description
	2000-1760-R Miniature Antenna, SMA(m), requires 2.5 VDC to 3.7 VDC
	2000-2200-R 20 MHz to 21 GHz, N(f), 50 Ω Broadband antenna

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