

Anritsu Advancing beyond

Remote Spectrum Monitor

High-Performance RF Spectrum Monitor

MS27201A

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 Remote Spectrum Monitor (RSM). With frequency coverage up to 54 GHz, the new Remote Spectrum Monitor MS27201A completely redefines the standards for remote spectrum monitors, setting another new industry benchmark for performance and accuracy. The MS27201A 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 110 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)

Capabilities and Functional Highlights

- 5G NR FDD and TDD Analyzer
- Real-Time Spectrum Analyzer
- LTE FDD and TDD Analyzer
- Pulse Profile Measurements
- 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
- Carrier-to-Interference
- IQ Waveform Capture/Streaming
- Signal Strength and RSSI
- USB 3.0
- PC GUI application as standard for remote control
- Compatible with vision PC spectrum monitoring software application
- Built-in PDF Report Generator

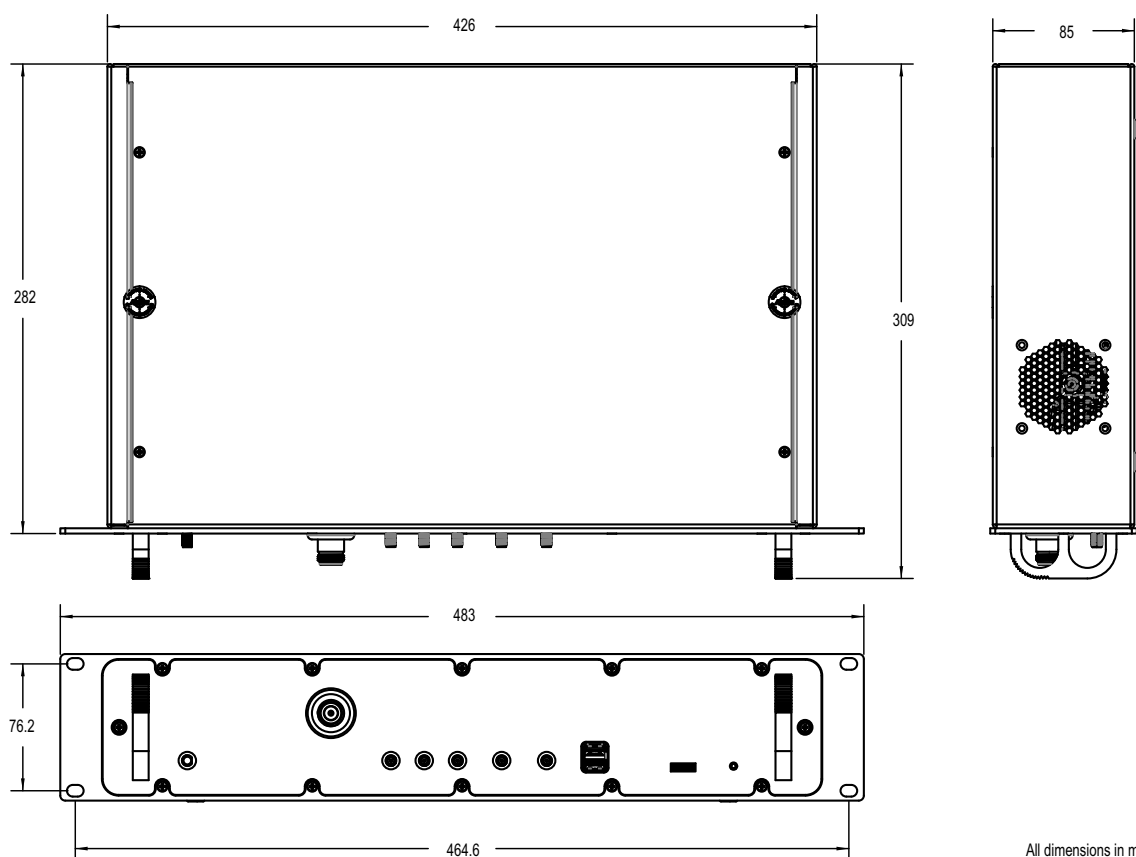


Table of Contents

Introduction	2
Definitions	3
Spectrum Analyzer Features	4
Spectrum Analyzer Performance	5
GNSS Receiver (Option 31)	7
Zero Span IF Output (Option 89)	7
Gated Sweep (Option 90)	7
IQ Waveform Capture (Option 124/126)	8
IQ Waveform Streaming (Option 125/127)	8
Real-Time Spectrum Analyzer (Option 199)	9
Pulse Analyzer (Option 421)	10
AM/FM Modulation Measurement (Option 509)	11
LTE FDD/TDD Signal Analyzer (Option 883)	12
5GNR FDD/TDD Signal Analyzer (Option 888)	14
General Specifications	15
Programmable Remote Control	16
MA25424A IQ Data Converter	16
MA25101A IQ Streaming PCIe Kit	16
Ordering Information – Instrument Options	17
Standard Accessories	18
Related Manuals	18
Optional Accessories	18

Definitions

Specifications	All specifications and characteristics apply 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 Features

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 channel power of the adjacent channel
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

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, Gestures
Bandwidth	RBW/VBW (Auto/Manual), VBW Type (Linear/Logarithmic), RBW:VBW Ratio, SPAN:RBW Ratio
Sweep	Single/Continuous, Restart, Sweep Once, Sweep to N, Auto/Manual Time, Gated Sweep (see “Gated Sweep (Option 90)” on page 7)

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, 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-8 for IQ Trigger Functions

Spectrogram

Number of Lines	142
Trace Time/Position Cursor	Up to Six Cursors (display historical trace data by trace position or time)
Color Setup	Set Color Top/Bottom Range, Set Color 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 Table	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)

Spectrum Analyzer Performance

Frequency (usable to 0 Hz)

MS27201A-0709	9 kHz to 9 GHz (Option 709)
MS27201A-0714	9 kHz to 14 GHz (Option 714)
MS27201A-0720	9 kHz to 20 GHz (Option 720)
MS27201A-0726	9 kHz to 26.5 GHz (Option 726)
MS27201A-0732	9 kHz to 32 GHz (Option 732)
MS27201A-0743	9 kHz to 43.5 GHz (Option 743)
MS27201A-0754	9 kHz to 54 GHz (Option 754)
Tuning Resolution	1 Hz
Span	10 Hz to max frequency
Frequency Reference	Internal, GNSS, External
Internal Frequency Reference	Aging: $\pm 1.0 \times 10^{-6}$ per 10 years Accuracy: $\pm 0.3 \times 10^{-6}$ ($-10^{\circ}\text{C} \pm 55^{\circ}\text{C}$) plus aging (see "GNSS Receiver (Option 31)" on page 7 for improved accuracy)
External Frequency Reference	10 MHz, 10 dBm to +10 dBm

Bandwidth

Analysis Bandwidth	20 MHz (standard) or 100 MHz (Option 104)
RTSA Bandwidth	22 MHz (standard), 110 MHz (Option 104)
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
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)	15 GHz/s typical (full span, RBW = VBW = 3 MHz)

Zero Span

Sweep Time	60 ns to 3600 s in zero span
Sweep Time Accuracy	$\pm 2\%$ in zero span

Spectral Purity – SSB Phase Noise

Offset from 1 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)	Maximum ^a	Typical
	-60 dBc	-70 dBc

a. Instrument centered on single signal, span < 1.7 GHz, 0 dB input attenuation.

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
Display Range	1 to 15 dB/div in 1 dB steps, ten divisions displayed
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 (≥ 10 dB attenuation) +23 dBm peak typical, ± 50 VDC (< 10 dB attenuation) +10 dBm peak typical, ± 50 VDC (preamp = On)

Amplitude Accuracy (10 dB attenuation, $-50 \text{ dBm} \leq \text{input signal} \leq -10 \text{ dBm}$, 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)	
	Maximum	Typical	Maximum	Typical
9 GHz and 20 GHz Instruments				
9 kHz to 14 GHz	$\pm 1.3 \text{ dB}$	$\pm 0.5 \text{ dB}$	$\pm 2.0 \text{ dB}$	$\pm 0.5 \text{ dB}$
> 14 GHz to 18 GHz	$\pm 1.3 \text{ dB}$	$\pm 0.5 \text{ dB}$	$\pm 2.0 \text{ dB}$	$\pm 0.5 \text{ dB}$
> 18 GHz to 20 GHz	–	$\pm 1.0 \text{ dB}$	–	$\pm 1.0 \text{ dB}$
(26.5 GHz to 54 GHz)				
9 kHz to 14 GHz	$\pm 1.3 \text{ dB}$	$\pm 0.5 \text{ dB}$	$\pm 2.0 \text{ dB}$	$\pm 0.5 \text{ dB}$
> 14 GHz to 20 GHz	$\pm 1.3 \text{ dB}$	$\pm 0.5 \text{ dB}$	$\pm 2.0 \text{ dB}$	$\pm 0.5 \text{ dB}$
> 20 GHz to 43.5 GHz	$\pm 1.8 \text{ dB}$	$\pm 0.5 \text{ dB}$	$\pm 2.5 \text{ dB}$	$\pm 0.5 \text{ dB}$
> 43.5 GHz to 54 GHz	$\pm 1.8 \text{ dB}$	$\pm 0.5 \text{ dB}$	$\pm 2.5 \text{ dB}$	$\pm 0.5 \text{ dB}$

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	
	Maximum	Typical	Maximum	Typical
9 GHz to 20 GHz Instruments				
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 Instruments				
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
$\geq 10 \text{ GHz}$	-75 dBc typical

VSWR ($\geq 10 \text{ dB}$ input attenuation)

$\leq 20 \text{ GHz}$	1.5:1 typical
> 20 GHz to 54 GHz	2.0:1 typical

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

Supported Satellite Systems	GNSS (includes GPS, GLONASS, Galileo, Beidou)
Setup	On/Off, Antenna Voltage 3.3 V/5.0 V, GPS/GNSS Info
Anritsu Antennas	2000-1528-R GPS antenna (requires +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 on display
High Frequency Accuracy	$< \pm 2.5 \times 10^{-8}$ with GNSS On, 3 minutes after satellite lock in selected mode (GPS antenna connected) $< \pm 5.0 \times 10^{-8}$ 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 $\leq$ 32 MHz) 300 MHz (nominal, FFT capture BW > 32 MHz, requires Option 103 or 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	$\leq$ 32 MHz; $\leq$ 110 MHz with Option 103 or 104
Rise Time	<20 ns
Connector	SMA(f), 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 μ s up to 200 ms
Power vs. Time, Display Length	100 μ s 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	110 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				Mode ^a	
		32 bit	16 bit	10 bit	8 bit	SPA	RTSA
110	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 104 up to 110 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.)

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 110 MHz bandwidth at 16-bit resolution or 100 MHz bandwidth at 32-bit resolution (requires MA25101A IQ Streaming PCIe kit and compatible PC) Stream to Bird IQC5000B at 16-bit resolution only, full bandwidth/sample rate (requires MA25424A receiver)

Real-Time Spectrum Analyzer (Option 199)

Setup Parameters

Frequency	Center/Start/Stop, Frequency Step, Frequency Offset Gestures (Drag Center Frequency (on/off), Pinch Span (on/off)) Span, Full Span (max span: 22 MHz standard, 110 MHz with Option 104)				
Amplitude	Reference Level (Manual/Auto and Offset), Scale/Division, Y-Axis Unit (dBm, dBW, dBV, dBmV, dBμV, dBA), Preamp, Attenuation (Auto/Manual), Gestures				
Bandwidth	RBW (span dependent), Auto RBW, Span:RBW Ratio				
Probability of Intercept	Analysis Bandwidth	Density Resolution	Span	RBW	POI
	20 MHz (Standard)	Normal High	22 MHz	10 MHz	2.520 μs 4.420 μs
	110 MHz (Opt. 104)	Normal High	110 MHz	40 MHz	2.055 μs 3.950 μs
Setup	Show Density (on/off), Auto Scale (on/off), Density Scale Top/Bottom (100% max), Density Res (Normal, High) Density Resolution				
Density Color	Set Color Top/Bottom Range, Auto Scale				
Persistence	Infinite or Variable from 0 to 10 s				
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 and not for spectral density graphic)
Trace Playback	Play recorded samples from internal or external storage; set playback interval (only applies to trace and not for spectral density graphic)
CSV Logging	Record live or playback traces in CSV format for post processing

Sweep Functions

Sweep	Single/Continuous, Sweep Once
-------	-------------------------------

Spectrogram

Number of Lines	142
Trace Time/Position Cursor	Up to Six Cursors (display historical trace data by trace position or time)
Cursor State	Active, Hold/View, Blank
Color Setup	Color Scale Top/Bottom Range, Reference Hue, Preset Setup

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 Setup	Peak Threshold, Peak Excursion
Marker →	Mkr → Center, Mkr → Ref Level
Marker Table	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-8 for IQ Trigger Functions

Pulse Analyzer (Option 421)

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) 60 ns, 25 MHz RBW (Option 103) 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 Table	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 visual and 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)

AM Measurements

AM Depth	0% to 100%, $\pm 2\%$ accuracy, typical
AM Bandwidth	20 kHz
AM Standards	Standard AM, Upper/Lower Sideband suppressed carrier
SINAD	0 to 60 dB, nominal based on 1 kHz 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
Graphs	Audio Spectrum (Log AM depth percentage vs frequency), RF Spectrum Audio Time Domain (Linear AM depth percentage vs time), Audio Results
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
Graphs	Audio Spectrum (Log FM deviation vs frequency), RF Spectrum Audio Time Domain (Linear FM deviation vs time), Audio Results
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)

LTE FDD/TDD Signal Analyzer (Option 883)

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, Scale/Division, Reference Level Offset	
Input Signal Range	-76 dBm to +10 dBm (≤20 GHz) -72 dBm to +10 dBm (>20 GHz)	
Sweep	Single/Continuous	
MIMO Antenna Setup	Auto, Antenna 1, 2, 3, or 4	
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	
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, 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)	
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 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)	
Setup Parameters	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)	
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 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	
Graph Displays	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)	
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, Occupied Bandwidth, Limit Test (OBW)	
Setup Parameters	OBW Power (%/dB), OBW Limit (Hz), Method (%/x dB)	
LTE Carrier Aggregation		
Measurements	Carrier, Physical-layer Cell ID (PCI), 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 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 (PDCCCH), Physical Downlink Control Channel (PDCCCH), Total Power per Resource Element and Power (dBm/watts), EVM (%)	
Setup Parameters	Antenna (Auto/1/2/3/4), Cyclic Prefix (Auto/Normal/Extended), Duplex Type (FDD/TDD), UL/DL Config (TDD only), NG (1/6, 1/2, 1, 2)	
LTE Constellation		
Measurements	Constellation Display of PBCH or PDSCH	
Setup Parameters	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), Modulation (PBCH/PDSCH), Data Format (All/QPSK/16-QAM/64-QAM/256-QAM)	

LTE UL/DL Interference

Display	Frame/Subframe power against time plus gated uplink or downlink RF spectrum on single screen
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)**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), Preamplifier
Input Signal Range	-76 dBm to +10 dBm (≤ 20 GHz) -72 dBm to +10 dBm (> 20 GHz)
Sweep	Single/Continuous, Sweep Once

5GNR Demod Summary

Multi-Beam Measurements	Physical-layer Cell ID, Beam Index, Sector ID, Cell Group, Frequency Error, Time Offset, SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), Sync and Demod Status Indicators, Beam Power (dBm)
Single-Beam Measurements	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), Sync and Demod Status Indicators, Block Measurements (PSS, SSS, PBCH, PBCH-DMRS), Average EVM, Peak EVM (@ subcarrier/symbol), Beam Power (dBm)
Views	Multi Beam (up to 64), Single Beam
Setup Parameters	SINR Threshold (dB), Duplex Type (FDD/TDD)
RSRP Accuracy	± 1.0 dB typical
Residual EVM (rms)	2.0 % typical
Frequency Error	$< \pm 2.0E-8$ + 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 Display of PBCH
Setup Parameters	Modulation (QPSK), Data Format (PBCH), Beam Select, Reference Points

5GNR UL/DL Interference

Display	Frame/Subframe power against time plus gated uplink or downlink RF spectrum on single screen
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

Setup Parameters		
Display	Display	Brightness adjustment, Auto screen dimming shutoff timer (on/off), Color schemes (Default, Light, Black on White, Night Vision), Shortcuts (Hide Shortcuts On/Off)
Date and Time	Date and Time	Date and Time settings (Automatic, Manual), Time Zone settings, Time synced to Internet/GNSS
Language	Language	English, Spanish, Chinese-simplified, Japanese, French, Korean
Display	Display	Theme: Color schemes (Default, Light, Black on White, Night Vision), Shortcuts (Hide Shortcuts On/Off)
Screenshot	Screenshot	Capture Region (Graphs Only, Entire Application), Color (Printable, Standard), Annotations (Header, Footer)
Options	Options	File naming (Automatic Timestamp, Manual), Directory
GNSS (GPS)	Options	Installed Options, Available Options, Install Options from web, Enable options using file (USB)), Save Config
Ethernet	GNSS (GPS)	See "GNSS Receiver (Option 31)" on page 7
Port Setup	Ethernet	Ethernet (IP4 & IP6 formats), Type (DHCP, Static IP)
Advanced	Port Setup	Bias Voltage On/Off, Voltage, Info, Ref/Trig: Port 0 (Ref In), Port 1 (Ref Out, Trig In)
Instrument Memory	Port Setup	Port 2 (Trig In, GPS 1 PPS Trig Out)
	Advanced	RF Safe Mode On/Off, SCPI Errors On/Off, Defaults
	Instrument Memory	8 GB of which nominally 1.5 GB is allocated to the operating system. Available memory to users is nominally 6.5 GB. Available memory is accessed by user saving of: screen images, trace files, setup files, digital maps, IQ captures, audio files and report files.
File Menu		
Save/Recall	Save/Recall	Measurement Setup, Screenshot Image (.PNG), Export Measurement data (Text, CSV), Location
File Management	File Management	Save, Copy, Paste, Delete, Create New Folder, Set File Name and File Type, Rename
Diagnostics Menu		
		Event Log (Export File), Self Test, Service (Enable Service Mode)
Tools Menu		
		IQ Streaming, Discovery Tool, PDF Reports
Report Generator		
PDF Reports	PDF Reports	Creates detailed measurement reports on the instrument
Report Contents	Report Contents	Free form text fields to identify and locate the site of measurements, company logo image
Report Format	Report Format	Cable and Antenna analyzer trace files, instrument screen captures and site photographs
		PDF and HTML
Connectors		
RF In	RF In	MS27201A-0709, -0714, -0720: Type N(f), 50 Ω
		MS27201A-0726, -0732, -743: Ruggedized Type K(m), 50 Ω
		MS27201A-0754: Ruggedized Type V(m), 50 Ω
GPS	GPS	SMA(f), 50 Ω,
External Power	External Power	5.5 mm barrel connector, 14 to 16 VDC, 5.0 A max
Ethernet Interface	Ethernet Interface	RJ45 connector for Ethernet 10/100/1000 Mbps (connect to PC or LAN for remote access)
USB Interface	USB Interface	USB 3 Type A x2
External Reference In	External Reference In	SMA(f), 50 Ω, maximum input +10 dBm
External Reference Out	External Reference Out	SMA(f), 50 Ω, 10 MHz
External Trigger	External Trigger	SMA(f), 50 Ω, TTL-compatible levels, maximum input +5 VDC
IF Out	IF Out	SMA(f), 50 Ω
DC Bias Voltage	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		
European Union	European Union	EMC 2014/30/EU, EN 61326-1:2013
		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	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	Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	South Korea	KCC-R-R-A2]-1006
Canada	Canada	ICES-3(A)/NMB-3(A)
United States	United States	FCC ID: SQG-60SIPT

Environmental		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	426 mm x 282 mm x 85 mm, (16.8 in x 11.1 in x 3.3 in)
	Weight	MS27201A-0709, -0714, -0720: 6.4 kg (14.10 lb) MS27201A-0726, -0732, -0743, -0754: 6.74 kg (14.85 lb)

Programmable Remote Control

Functionality	Full instrument programming control (except power on/off) via Ethernet connectivity. See the Programming Manual for details.
Programming Language	Standard Commands for Programmable Instruments (SCPI)
Interfaces	Ethernet

MA25424A IQ Data Converter (requires Options 124 and 125 or Options 126 and 127)

IQ Streaming (used for streaming IQ data components of a waveform from the MS27201A Data Out port to an IQC5000)	
Shipping Contents	MA25424A Module PCIe OCuLink I/O Data Cable USB 3.0 Type A to Type C Cable
Mode	Spectrum Analyzer
Input Ports	Data In (PCIe), USB (for power)
Output Port	IEEE 1284-C, 50 pin
Data Throughput	200 MSPS @ 16 bit max
Power Consumption	3.33 W (USB 3.0)
Warranty	
	Duration Standard three-year warranty
Size and Weight	
	Size 128.3 mm x 33.43 mm x 88.86 mm
	Weight 377 g (including cables)

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

IQ Streaming (used for streaming IQ data components of a waveform from the MS27201A 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**

MS27201A Remote Spectrum Monitor (Requires Option 709, 714, 720, 726, 732, 743 or 754)

Options

MS27201A-0709	Frequency Range 9 kHz to 9 GHz
MS27201A-0714	Frequency Range 9 kHz to 14 GHz
MS27201A-0720	Frequency Range 9 kHz to 20 GHz
MS27201A-0726	Frequency Range 9 kHz to 26.5 GHz
MS27201A-0732	Frequency Range 9 kHz to 32 GHz
MS27201A-0743	Frequency Range 9 kHz to 43.5 GHz
MS27201A-0754	Frequency Range 9 kHz to 54 GHz
MS27201A-0031	GNSS Receiver (Requires GNSS antenna, sold separately)
MS27201A-0089	Zero Span IF Output
MS27201A-0090	Gated Sweep
MS27201A-0104	110 MHz Analysis Bandwidth
MS27201A-0124	IQ Waveform Capture
MS27201A-0125	IQ Waveform Streaming (Requires Option 124)
MS27201A-0126	IQ Waveform Capture (Non-Export Controlled)
MS27201A-0127	IQ Waveform Streaming (Non-Export Controlled)
MS27201A-0128	Vector Signal Analysis enabled (Requires Option 124 or 126)
MS27201A-0199	Real-Time Spectrum Analysis (RTSA)
MS27201A-0400	Enable Vision Monitor
MS27201A-0401	Enable Vision Locate (Option 400 Required)
MS27201A-0407	Enable Vision High-Speed Port Scanner
MS27201A-0421	Pulse Analyzer
MS27201A-0509	AM/FM Modulation Measurements
MS27201A-0883	LTE FDD/TDD Measurements (Requires Option 31)
MS27201A-0888	5G NR FDD/TDD Measurements (Requires Option 31)
MS27201A-xxxx-0097	Accredited Calibration (xxxx is the frequency option number)
MS27201A-xxxx-0098	Standard Calibration (xxxx is the frequency option number)
MS27201A-xxxx-0099	Premium Calibration (xxxx is the frequency option number)

Supported PC Software

MX280005A	IQ Signal Master™ Vector Modulation Analysis
MX280001A	Vision™ Monitor
MS27201A	Remote User Interface

Standard Accessories (included with instrument)

Accessory	Description
	40-204-R AC/DC Power Supply
	806-442-R SMA(m) to BNC(m) cable, 1 m (qty 1)
Certificate of Calibration and Conformance	

Accessory	Description
	2000-1371-R Ethernet Cable, 2 m
	2000-2054-R SMA(m) to BNC(f) Adapter (qty 3)

Related Manuals (available at www.anritsu.com)

Part Number	Description
10100-00064	Product Information, Compliance, and Safety
10580-00480	Field Master Pro User Guide
10580-00481	Field Master Pro Programming Manual
10580-00447	Field Master Series Spectrum Analyzer Measurement Guide Zero Span IF Output (Option 89) Gated Sweep (Option 90) AM/FM Modulation Measurement (Option 509)
10580-00448	Field Master Series RTSA Measurement Guide (Option 199)
10580-00449	Field Master Series 5GNR Measurement Guide (Option 888) Gated Sweep (Option 90)
10580-00450	Field Master Series LTE Measurement Guide (Option 883) Gated Sweep (Option 90)
10580-00451	Field Master Series Pulse Analyzer Measurement Guide (Option 421)
10580-00490	Field Master Series IQ Capture/Streaming Measurement Guide (Options 124/126 and Options 125/127)

Optional Accessories

Miscellaneous Accessories		Accessory	Description
		MA25424A	I/Q Data Converter Module Includes: 2000-2030-R PCIe OCuLink I/O Data Cable 2000-1859-R USB 3.0 Type A to Type C Cable
			MA25101A IQ Streaming PCIe Kit Includes: PCIe Card with mounting hardware 2000-2030-R PCIe OCuLink I/O Data Cable
GPS Antennas (active)		Accessory	Description
		2000-1528-R	Magnet Mount, SMA(m) with 5 m (16.4 ft) cable, requires 5 VDC
		2000-1652-R	Magnet Mount, SMA(m) with 0.3 m (1 ft) cable, requires 3.3 VDC or 5 VDC
			2000-1760-R Miniature Antenna, SMA(m), requires 2.5 VDC to 3.7 VDC

Precision Adapters

Accessory	Description
	34NN50A N(m) to N(m), DC to 18 GHz, 50 Ω
	34NFN50 N(f) to N(f), DC to 18 GHz, 50 Ω

Accessory	Description
	34NMDVFN50 NMD, V(f) to N(f), DC to 18 GHz, 50 Ω
	71693-R Ruggedized K(f) to N(f), DC to 18 GHz, 50 Ω

Test Port Cables (Armored, Semi-rigid)

Accessory	Description
	3670K50A-1 K(f) to K(m), 30.48 cm
	3670K50A-2 K(f) to K(m), 60.96 cm

Fixed Attenuators

Accessory	Description
	41KB-3 DC to 26.5 GHz, 1 W, 3 dB, K(m) to K(f)
	41KB-6 DC to 26.5 GHz, 1 W, 6 dB, K(m) to K(f)
	41KB-10 DC to 26.5 GHz, 1W, 10 dB, K(m) to K(f)
	41KB-20 DC to 26.5 GHz, 1W, 20 dB, K(m) to K(f)
	41KC-3 DC to 40 GHz, 1W, 3 dB, K(m) to K(f)
	41KC-6 DC to 40 GHz, 1W, 6 dB, K(m) to K(f)

Coaxial Adapters

Accessory	Description
	34VFK50A DC to 43.5 GHz, V(f) to K(m), 50 Ω
	34VFKF50A DC to 43.5 GHz, V(f) to K(f), 50 Ω
	34VV50 DC to 65 GHz, V(m) to V(m), 50 Ω
	34VVF50 DC to 65 GHz, V(f) to V(m), 50 Ω

Accessory Description

	43KC-3 DC to 26.5 GHz, 1 W, 3 dB, K(m) to K(f)
	43KC-6 DC to 26.5 GHz, 1W, 6 dB, K(m) to K(f)
	43KC-10 DC to 26.5 GHz, 1 W, 10 dB, K(m) to K(f)
	43KC-20 DC to 26.5 GHz, 1W, 20 dB, K(m) to K(f)
	41KC-10 DC to 40 GHz, 1 W, 10 dB, K(m) to K(f)
	41KC-20 DC to 40 GHz, 1W, 20 dB, K(m) to K(f)
	2000-1880-R DC to 18 GHz, N(m) to V(f), 50 Ω
	2000-1881-R DC to 18 GHz, N(f) to V(f), 50 Ω
	K222B DC to 40 GHz, K(f) to K(f), 50 Ω
	34VVF50 DC to 65 GHz, V(f) to V(f), 50 Ω

Technical Data

Adapters Accessory	Description
	1091-26-R SMA(m) to N(m), DC to 18 GHz, 50 Ω
	1091-27-R SMA(f) to N(m), DC to 18 GHz, 50 Ω
	1091-80-R SMA(m) to N(f), DC to 18 GHz, 50 Ω
	1091-81-R SMA(f) to N(f), DC to 18 GHz, 50 Ω
	1091-172-R BNC(f) to N(m), DC to 1.3 GHz, 50 Ω
	1091-417-R N(m) to QMA(f), DC to 6 GHz, 50 Ω
	1091-418-R N(m) to QMA(m), DC to 18 GHz, 50 Ω

Remote Spectrum Monitor

Accessory	Description
	510-102-R N(m) to N(m), DC to 11 GHz, 50 Ω, 90 degrees right angle
	510-90-R 7/16 DIN(f) to N(m), DC to 7.5 GHz, 50 Ω
	510-91-R 7/16 DIN(f) to N(f), DC to 7.5 GHz, 50 Ω
	510-92-R 7/16 DIN(m) to N(m), DC to 7.5 GHz, 50 Ω
	510-93-R 7/16 DIN(m) to N(f), DC to 7.5 GHz, 50 Ω
	510-96-R 7/16 DIN(m) to 7/16 DIN (m), DC to 7.5 GHz, 50 Ω
	510-97-R 7/16 DIN(f) to 7/16 DIN (f), DC to 7.5 GHz, 50 Ω



• United States

Anritsu Americas Sales Company
450 Century Parkway, Suite 190,
Allen, TX 75013, U.S.A.
Phone: +1-800-Anritsu (1-800-267-4878)

• Canada

Anritsu Electronics Ltd.
Americas Sales and Support
450 Century Parkway, Suite 190,
Allen, TX 75013, U.S.A.
Phone: +1-800-Anritsu (1-800-267-4878)

• Brazil

Anritsu Eletronica Ltda.
Praça Amadeu Amaral, 27 - 1 Andar
01327-010 - Bela Vista - São Paulo - SP, Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

• Mexico

Anritsu Company, S.A. de C.V.
Blvd Miguel de Cervantes Saavedra #169 Piso 1,
Col. Granada, Mexico, Ciudad de Mexico,
11520, MEXICO
Phone: +52-55-4169-7104

• United Kingdom

Anritsu EMEA Ltd.
200 Capability Green,
Luton, Bedfordshire, LU1 3LU, U.K.
Phone: +44-1582-433200
Fax: +44-1582-731303

• France

Anritsu S.A.
12 avenue du Québec, Immeuble Goyave,
91140 VILLEBON SUR YVETTE, France
Phone: +33-1-60-92-15-50

• Germany

Anritsu GmbH
Nemetschek Haus, Konrad-Zuse-Platz 1,
81829 München, Germany
Phone: +49-89-442308-0
Fax: +49-89-442308-55

• Italy

Anritsu S.r.l.
Spaces Eur Arte, Viale dell'Arte 25, 00144 Roma, Italy
Phone: +39-6-509-9711

List Revision Date: 20230901

• Sweden

Anritsu AB
Kistagången 20 B, 2 tr, 164 40 Kista, Sweden
Phone: +46-8-534-707-00

• Finland

Anritsu AB
Technopolis Aviapolis, Teknobulevardi 3-5 (D208.5.),
FI-01530 Vantaa, Finland
Phone: +358-20-741-8100

• Denmark

Anritsu A/S
c/o Regus Winghouse, Ørestads Boulevard 73, 4th
floor,
2300 Copenhagen S, Denmark
Phone: +45-7211-2200

• Spain

Anritsu EMEA Ltd.
Representation Office in Spain
Paseo de la Castellana, 141.
Planta 5, Edificio Cuzco IV
28046, Madrid, Spain
Phone: +34-91-572-6761

• Austria

Anritsu EMEA GmbH
Am Belvedere 10, A-1100 Vienna, Austria
Phone: +43-(0)1-717-28-710

• United Arab Emirates

Anritsu EMEA Ltd.
Anritsu A/S
Office No. 164, Building 17, Dubai Internet City
P. O. Box - 501901, Dubai, United Arab Emirates
Phone: +971-4-3758479

• India

Anritsu India Private Limited
6th Floor, Indique ETA, No.38/4, Adjacent to EMC2,
Doddanekundi, Outer Ring Road,
Bengaluru - 560048, India
Phone: +91-80-6728-1300
Fax: +91-80-6728-1301

• Singapore

Anritsu Pte. Ltd.
1 Jalan Kilang Timor, #07-04/06 Pacific Tech Centre
Singapore 159303
Phone: +65-6282-2400
Fax: +65-6282-2533

• Vietnam

Anritsu Company Limited
16th Floor, Peakview Tower, 36 Hoang Cau Street,
O Cho Dua Ward, Dong Da District, Hanoi, Vietnam
Phone: +84-24-3201-2730

• P.R. China (Shanghai)

Anritsu (China) Co., Ltd.
Room 2701-2705, Tower A, New Caohejing
International Business Center No. 391 Gui Ping Road
Shanghai, 200233, P.R. China
Phone: +86-21-6237-0898
Fax: +86-21-6237-0899

• P.R. China (Hong Kong)

Anritsu Company Ltd.
Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong, P.R. China
Phone: +852-2301-4980
Fax: +852-2301-3545

• Japan

Anritsu Corporation
8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016
Japan
Phone: +81-46-296-6509
Fax: +81-46-225-8352

• South Korea

Anritsu Corporation, Ltd.
8F, A TOWER, 20, Gwacheondaero 7-gil, Gwacheon-si,
Gyeonggi-do, 13840, Republic of Korea
Phone: +82-2-6259-7300
Fax: +82-2-6259-7301

• Australia

Anritsu Pty. Ltd.
Unit 20, 21-35 Ricketts Road,
Mount Waverley, Victoria 3149, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

• Taiwan

Anritsu Company Inc.
7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817