

Anritsu Advancing beyond

Spectrum Monitor Module

For Remote RF Signal Monitoring

MS27100A

9 kHz to 6 GHz



Introduction

The Anritsu platform of spectrum monitors provide high performance real-time monitoring of the radio spectrum. Designed to be stable over time under continuous operation, the MS27100A spectrum monitor module provides superior sweep speeds, high dynamic range, and low spurious levels for fast and accurate measurements. Applications include monitoring for interference, white space analysis, unlicensed transmission discovery, and signal coverage. The MS27100A spectrum monitor module is available as a single RF input port instrument with wired Ethernet for remote interface and USB ports for connecting accessories. The MS27100A can also be expanded to six RF input ports with an optional multiplexer accessory.

Remote Spectrum Monitor Highlights

- Sweep rates up to 24 GHz/s
- Integrated web server to view, control, and conduct measurements via a web browser (Chrome or Firefox)
- Remote firmware updates
- Watchdog timer to insure long-term stability for remotely deployed monitors
- Low spurious signals for accurate signal discovery
- 20 MHz IF bandwidth
- Low power consumption <11 watts
- Integrated GPS receiver for monitoring location and time synchronization applications
- Gigabit Ethernet available for high speed communications
- Measurements: occupied bandwidth, channel power
- Interference analysis: spectrogram and signal strength
- Dynamic range: >106 dB normalized to 1 Hz BW
- DANL: < -150 dBm referenced to 1 Hz BW, preamp On
- Phase noise: -98 dBc/Hz @ 10 kHz offset at 1 GHz
- Frequency accuracy: < ± 1.5 ppm, < ± 50 ppb with GPS High Accuracy Mode
- IQ block mode and streaming with time stamping for TDOA applications
- Remote control via SCPI commands
- Vision™ software optional for automated spectrum measurements, setting alarms, and geo-locating signal sources
- AeroShield drone detection and tracking

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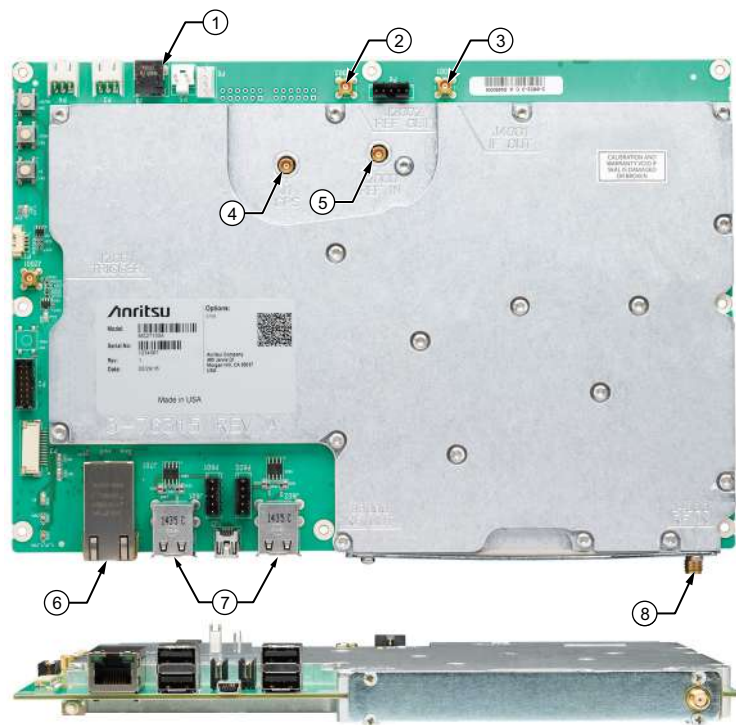
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Definitions

Warm-Up Time	All specifications and characteristics apply under the following conditions, unless otherwise stated: After 10 minutes of warm-up time, where the instrument is left in the on state.
Temperature Range	Over the 23 °C ±5 °C temperature range.
Typical Performance	Typical specifications in parenthesis () describe performance that will be met by a minimum of 80% of all products. They do not include guard bands and are not warranted. Typical specifications that are not in parenthesis are not tested and not warranted. They are generally representative of the nominal characteristic performance.
Uncertainty	A coverage factor of k = 2 is applied to the measurement uncertainties to facilitate comparison with other industry monitors. All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

Connectors



MS27100A

- 1 External Power, 11.0 to 14.5 VDC, 11 W, 5.5 mm Barrel Connector
 - 2 10 MHz Reference Output, MCX(f)
 - 3 IF Output, MCX(f)
 - 4 GPS Antenna Input, MCX(f)
 - 5 10 MHz Reference Input, +10 dBm max, +5 VDC max, MCX(f)
 - 6 Gbit Ethernet, RJ45 connector
 - 7 USB Type A (4)
 - 8 RF Input, SMA(f), 50Ω
RF In Damage Level: +30 dBm peak, ±50 VDC maximum continuous input (≥ 10 dB attenuation, > 100 MHz)
- Note: Other connectors and controls are not supported in this model.

Remote Spectrum Monitor

Frequency		Frequency Range	9 kHz to 6 GHz (tunable to 0 Hz)	
		Frequency Span	10 Hz to 6 GHz	
		Tuning Resolution	1 Hz	
		Frequency Reference Accuracy	±1.5 ppm (25 °C ± 25 °C) ±1.0 ppm/year aging, < ±50 ppb with GPS on	
Sweep Speed	Typical (full span FFT mode)			
	10 kHz RBW	5 GHz/s		
	30 kHz RBW	12 GHz/s		
	3 MHz RBW	24 GHz/s		
Bandwidth		Resolution Bandwidth (RBW)	10 Hz to 3 MHz in 1–3 sequence (–3 dB bandwidth)	
		Video Bandwidth (VBW)	10 Hz to 3 MHz in 1–3 sequence (–3 dB bandwidth) (auto or manually selectable)	
Spectral Purity		SSB Phase Noise @ 1 GHz	(–98 dBc/Hz) @ 10 kHz offset (–98 dBc/Hz) @ 100 kHz offset	
Amplitude Ranges		Dynamic Range	> 106 dB (2.4 GHz), 2/3 (TOI-DANL) in 1 Hz RBW	
		Measurement Range	DANL to Maximum Continuous Input	
		Reference Level Range	–150 dBm to +30 dBm	
		Attenuator Range	0 dB to 50 dB in 5 dB steps	
		Amplitude Units	Log Scale Modes: dBm, dBμV	
		Maximum Continuous Input	without Option 406 (RF Input to MS27100A)	with Option 406 (RF Input to multiplexer)
100 MHz to 6 GHz, ≥ 10 dB attenuation			+30 dBm ^a , ±50 VDC	+20 dBm ^b , ±50 VDC
300 kHz to 6 GHz, < 10 dB attenuation			+10 dBm ^a , ±50 VDC	+10 dBm ^b , ±50 VDC
9 kHz to 6 GHz, preamp on			–10 dBm, ±50 VDC	–10 dBm, ±50 VDC
			a. For lower frequencies, derate maximum continuous input by 6 dB per decade b. For lower frequencies, derate maximum continuous input by 4 dB per decade	
Amplitude Accuracy		Attenuation ≤ 40 dB, preamp off for frequencies less than 100 kHz		
		9 kHz to 100 kHz	± 2.5 dB	
		> 100 kHz to 6 GHz	± 1.5 dB	
Displayed Average Noise Level (DANL)		RBW normalized to 1 Hz, 0 dB attenuation		
		Preamp Off, Reference Level –20 dBm		Preamp On, Reference Level –50 dBm
		Max (dBm)	Typical (dBm)	Max (dBm)
		Typical (dBm)		Typical (dBm)
10 MHz to 3.3 GHz		–145	–150	–162
> 3.3 GHz to 4.1 GHz		–140	–145	–159
> 4.1 GHz to 5 GHz		–138	–143	–156
> 5 GHz to 6 GHz		–128	–136	–146
Spurs	Typical			
	Residual Spurious	< –80 dBm) RF input terminated, 0 dB input attenuation, preamp off, > 10 MHz < –95 dBm) RF input terminated, 0 dB input attenuation, preamp on, > 10 MHz < –88 dBm) RF input terminated, 0 dB input attenuation, preamp on, 16 MHz to 18 MHz		
	Input-Related Spurious	< –60 dBc, 0 dB attenuation, –30 dBm input, carrier offset > 5 MHz		
	Exceptions	< –60 dBc, input = 4140 MHz		
Second Harmonic Distortion		Typical; 0 dB attenuation, –30 dBm input		
		50 MHz	(–50 dBc)	
		> 50 MHz to 200 MHz	< –60 dBc	
		> 200 MHz to 3000 MHz	< –60 dBc	
Third-Order Intercept (TOI)		Typical; preamp off, –20 dBm tones 100 kHz apart, 0 dB attenuation, reference level –20 dBm		
		800 MHz	(+7 dBm)	
		2400 MHz	(+17 dBm)	
		200 to 2200 MHz	+10 dBm	
		> 2.2 GHz to 5.0 GHz	+8 dBm	
		> 5.0 GHz to 6.0 GHz	+14 dBm	

Remote Spectrum Monitor (continued)

VSWR		< 2.5:1 typical				
Signal Processing						
Data Types		I/Q time series: 8, 10, 16 or 24 bit resolution Spectrum trace: 100 to 4000 points				
Data Transfer Modes		I/Q time series or spectrum trace in streaming or block mode				
I/Q Data Streaming Rate		Gapless on 100Base-T network, Up to 2.6 MHz signal bandwidth				
I/Q Data Time Stamp Resolution		8.7 ns				
I/Q Recording Time Typical						
Signal Bandwidth	Output Data Rate		I/Q Bit Resolution			
	MSPS	24 bits	16 bits	10 bits	8 bits	
20 MHz	76.25 / 3	1.3 s	2.5 s	3.8 s	5 s	
13.3 MHz	76.25 / 4	1.7 s	3.4 s	5 s	6.7 s	
6.67 MHz	76.25 / 8	3.4 s	6.7 s	10.1 s	13.4 s	
2.67 MHz	76.25 / 20	8.4 s	16.8 s	25.2 s	33.6 s	
1.33 MHz	76.25 / 40	16.8 s	33.6 s	50.4 s	1.12 min	
667 kHz	76.25 / 80	33.6 s	1.12 min	1.68 min	2.24 min	
267 kHz	76.25 / 200	1.4 min	2.8 min	4.2 min	5.6 min	
133 kHz	76.25 / 400	2.8 min	5.6 min	8.39 min	11.19 min	
66.7 kHz	76.25 / 800	5.6 min	11.19 min	16.79 min	22.38 min	
26.7 kHz	76.25 / 2000	13.99 min	27.98 min	41.97 min	55.96 min	
13.3 kHz	76.25 / 4000	27.98 min	55.96 min	1.4 h	1.87 h	
6.67 kHz	76.25 / 8000	55.96 min	1.87 h	2.8 h	3.73 h	
2.67 kHz	76.25 / 20000	2.33 h	4.66 h	6.99 h	9.33 h	
1.33 kHz	76.25 / 40000	4.66 h	9.33 h	13.99 h	18.65 h	

General Specifications

Setup Parameters

System Status	Temperature, Serial Number, Firmware Version, Options Installed, Self Test, Application Self Test, GPS
System Options	Name, Date and Time, Reset (Factory Defaults, Master Reset, Update Firmware)
Directory Management	Sort Method (Name/Type/Date), Ascend/Descend, Internal/USB, Copy
Internal Trace/Setup Memory	4 GB internal memory available for storing files
Mode Switching	Automatically stores/recalls most recently used setup parameters in the mode

Warranty

Instrument	Standard three-year warranty
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Environmental

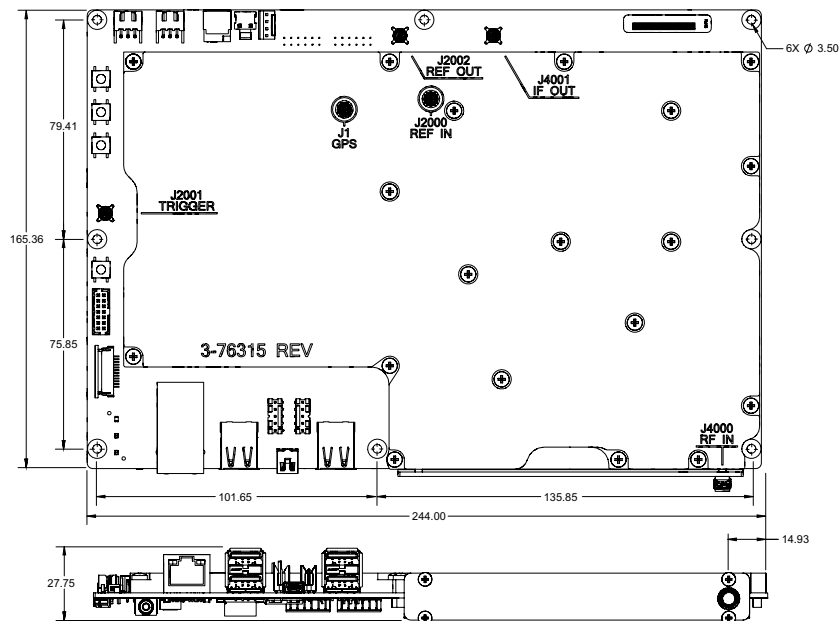
Operating Temperature Range	0 °C to 50 °C
Storage Temperature Range	-40 °C to 71 °C
Maximum Relative Humidity	95 % RH at 30 °C, non-condensing
Vibration, Sinusoidal	5 Hz to 55 Hz
Vibration, Random	10 Hz to 500 Hz
Half Sine Shock	30 g _n
Altitude	4600 meters, operating and non-operating
Explosive Atmosphere	MIL-PRF-28800F, Section 4.5.6.3 MIL-STD-810G, Method 511.5, Procedure 1

ESD

RF Input Pin	Withstands up to ±4 kV
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Mechanical

Weight	0.93 kg (2.05 lb) without packaging
Dimensions (mm)	



Ordering Information

Standard Hardware



Model Number	Description
MS27100A	Spectrum Monitor Module with 1 RF IN Port (requires one frequency option)
Option Number	Description
MS27100A-0128	Vector Signal Analysis Enabled (use with MX280005A)
MS27100A-0706	9 kHz to 6 GHz Frequency Range
MS27100A-0406	Enables USB Interface to 6-port RF multiplexer (requires 2000-1894-R)
MS27100A-0400	Vision Monitor Enabled
MS27100A-0401	Vision Locate Enabled (requires Option 400 above)
MS27100A-0407	Vision High-Speed Port Scanner Enabled
MS27100A-0486	Vision Coverage Mapping (requires Option 407)
MS27100A-0098	Standard Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate.
MS27100A-0099	Premium Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate, test report, and uncertainty data.

Accessories

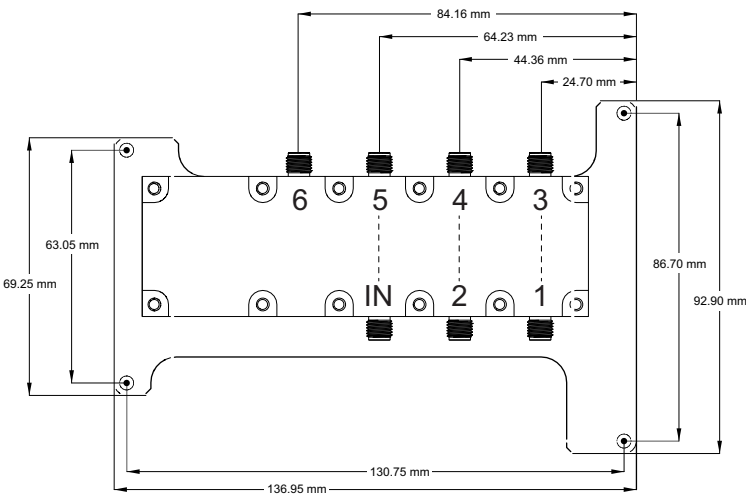
Accessory	Description
	40-187-R AC/DC Power Supply, 1 m, 12 VDC Output (included with instrument)

Accessory	Description
	3-67367 USB-A to HC5 5-pin header cable, 30 cm (requires software Option 406)

2000-1894-R

An optional six-to-one multiplexer that is controlled via a USB-A to 5-pin connection (accessory 3-67367) to the MS27100A Spectrum Monitor Module. Switch insertion loss correction is linked to the MS27100A through this USB interface. All specifications typical.

Frequency	9 kHz to 6 GHz
Insertion Loss	2 dB at 1 GHz 5 dB at 6 GHz
Antenna Port Isolation	> 40 dB < 3 GHz > 30 dB ≥ 3 GHz
DC Power	5 VDC via USB
Weight	0.18 kg (0.40 lb)



Connectors	RF Antenna Inputs, SMA(f) (x6) 5-pin connector (connects to the MS27100A with the included 30 cm USB-A to HC5 5-pin header cable) RF Output SMA(f) (connects to MS27100A RF In, RF cable NOT included)
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