



Anritsu envision : ensure

Remote Spectrum Monitors

For Remote RF Signal Monitoring

MS27103A

9 kHz to 6 GHz



Introduction

The MS27103A provides 12 RF Input ports as a standard configuration (24 RF Input ports are available with Option 424). This model is typically used with three or six sector BTS architectures, with multiple carriers per sector. A high speed switch is placed in the monitor to provide measurement capability for each RF input. A greater than 30 dB isolation is provided between each RF Input port to assure the integrity of the measurement.

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 and 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: -99 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



MS27103A Remote Spectrum Monitor
(front and rear sides shown)

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Definitions

All specifications and characteristics apply under the following conditions, unless otherwise stated:

Warm-Up Time	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.

Remote Spectrum Monitor

Frequency		Frequency Range	9 kHz to 6 GHz (tunable to 0 Hz)		
		Tuning Resolution	1 Hz		
		Frequency Reference	Accuracy: ± 1.5 ppm ($25\text{ }^\circ\text{C} \pm 25\text{ }^\circ\text{C}$) ± 1.0 ppm/year aging < ± 50 ppb with GPS on		
		Frequency Span	10 Hz to 6 GHz		
Sweep Speed		Typical (full span FTT 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	(-99 dBc/Hz) @ 10 kHz offset (-100 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 +30 dBm (≥ 100 MHz) DANL to +10 dBm (< 100 MHz)		
		Reference Level Range	-150 dBm to +30 dBm		
		Attenuator Range	0 dB to 50 dB in 5 dB steps		
		Maximum Continuous Input	(100 MHz to 6 GHz) +30 dBm, ≥ 10 dB attenuation, ± 50 VDC +10 dBm, < 10 dB attenuation, ± 50 VDC -10 dBm, preamp on, ± 50 VDC		
		Amplitude Units	Log Scale Modes: dBm		
Amplitude Accuracy		Attenuation ≤ 40 dB, preamp off for frequencies less than 100 kHz			
			Option 424 (24 Ports)		
		Port 1 (dB)	Ports 2 to 12 (dB, typical)	Port 13 (dB)	Ports 14 to 24 (dB, typical)
		9 kHz to 5 GHz	± 2.5	± 2.5	± 3.0
		> 5 GHz to 6 GHz	± 3.0	± 3.0	± 3.5
Displayed Average Noise Level (DANL)		RBW normalized to 1 Hz, 0 dB attenuation (Port 1 is specified. All other ports are typical and within 1 dB of the specified values)			
		Preamp Off, Reference Level -20 dBm		Preamp On, Reference Level -50 dBm	
		Port 1 (dBm)	Typical (dBm)	Port 1 (dBm)	Typical (dBm)
		10 MHz to 3.3 GHz	-140	-157	-160
		> 3.3 GHz to 4.1 GHz	-133	-152	-155
		> 4.1 GHz to 5 GHz	-130	-148	-152
		> 5 GHz to 6 GHz	-115	-133	-141
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		
		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				
Antenna Port Isolation					
	Typical				
≤ 3 GHz	> 40 dB				
> 3 GHz	> 30 dB				
I/Q Recording Time Typical					
	Output Data Rate	I/Q Bit Resolution			
Signal Bandwidth	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

Connectors

RF In	12 SMA(f) ports, 50 Ω 24 SMA(f) ports, 50 Ω (optional)
RF In Damage Level	+30 dBm peak, ± 50 VDC maximum continuous input (≥ 10 dB attenuation)
External Power	11 W, -48 VDC (110/220 VAC optional)
Ethernet	One RJ45 connector for Gbit LAN (ruggedized and weatherproof), 2nd port optional for daisy chaining.
USB	Two USB Type A connectors
External Reference Input	BNC(f)
GPS	SMA(f)

Electromagnetic Compatibility

European Union	CE Mark, EMC Directive 2004/108/EC
Interference	EN 61326-1
Emissions	EN 55011
Immunity	EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-11
Low Voltage Directive	2006/95/EC
Australia and New Zealand	C-tick N274

Safety

Safety Class	EN 61010-1 Class 1
Product Safety	IEC 60950-1 when used with Anritsu company supplied power supply

Warranty

Instrument	Standard three-year warranty
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Environmental

Operating Temperature	-10 $^{\circ}\text{C}$ to $+55$ $^{\circ}\text{C}$
Maximum Humidity	95 % RH (non-condensing) at 40 $^{\circ}\text{C}$
Shock	MIL-PRF-28800F Class 2
Storage	-51 $^{\circ}\text{C}$ to $+70$ $^{\circ}\text{C}$
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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Size and Weight

Size	480 mm x 90 mm x 300 mm (18.9 in x 3.5 in x 11.8 in)
Weight	12-port: 3.9 kg (8.9 lb) 24-port: 4.5 kg (9.9 lb)

Ordering Information

Standard Hardware

Model Number	Description
MS27103A-0706	12 SMA(f) Input Ports

Hardware Options

Option Number	Description
MS27103A-424	Expands Input Ports to 24 SMA(f)
MS27103A-110	110/220 VAC Power Supply
MS27103A-412	Two Ethernet Ports

Software Options

Option Number	Description
MS27103A-400	Vision Monitor Enabled
MS27103A-401	Vision Locate Enabled (requires Option 400 above)

Standard Accessories (included with instrument)

Part Number	Description
2000-1371-R	Ethernet Cable, 2.13 m (7 ft)
2000-1528-R	GPS Antenna, SMA(m) with 5 m (15 ft) cable, 3 dBi gain, requires 5 VDC

Optional Accessories

Miscellaneous Accessories

Part Number	Description
760-287-R	Large Transit Case with Wheels and Handle