Anritsu Advancing beyond

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
- 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 time difference of arrival (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, Option 110 replaces screw terminal with 3-pin AC line receptacle)

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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.
Calibration Cycle	Calibration is within the recommended 12 month period.
	All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

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 °C ± 25 °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	(–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	
100 MHz to 6 GHz, ≥ 10 dB attenuation	+22 dBm[a], ±50 VDC
300 kHz to 6 GHz, < 10 dB attenuation	+10 dBm[a], ±50 VDC
9 kHz to 6 GHz, preamp on	–10 dBm, ±50 VDC

a. 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

			Option 424 (24 Ports)
	Port 1 (dB)	Ports 2 to 12 (dB, typical)	Ports 13 to 24 (dB, typical)
9 kHz to 5 GHz	±2.5	±3.0	±3.0
> 5 GHz to 6 GHz	±3.0	±3.5	±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	–145	–157	–160
> 3.3 GHz to 4.1 GHz	–133	–138	–152	–155
> 4.1 GHz to 5 GHz	–130	–135	–148	–152
> 5 GHz to 6 GHz	–115	–123	–133	–141

Spurs

Typical

Residual Spurious	RF input terminated, 0 dB input attenuation, preamp off (< –80 dBm), 10 MHz to 4.5 GHz (< –70 dBm), >4.5 GHz to 6.0 GHz RF input terminated, 0 dB input attenuation, preamp on (< –95 dBm), 10 MHz to 5.0 GHz (< –88 dBm), 16 MHz to 18 MHz (< –85 dBm), >5.0 GHz to 6.0 GHz
Input-Related Spurious	< –60 dBc, 0 dB attenuation, –30 dBm input, carrier offset > 5 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)
External Power	11 W, ±20 VDC to ±70 VDC 2-pin spade/lug - Standard 110/220 VAC - with Option 110
Ethernet	One RJ45 connector for Gbit LAN, 2nd port optional for daisy chain
USB	Two USB Type A connectors
External Reference In	10 MHz, +10 dBm max, +5 VDC max, BNC(f)
GPS	SMA(f)
Regulatory Compliance	
European Union	EMC 2014/30/EU, EN 61326:2013, 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 applies to instruments with CE marking placed on the market after July 22, 2017
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-REM-A21-0004
Canada	ICES-1(A)/NMB-1(A)
Environmental	MIL-PRF-28800F Class 3
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
ESD	
RF Input Pin	Withstands up to ±4 kV
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)
Warranty	
Instrument	Standard three-year warranty

Ordering Information

Model Number	Description
MS27103A	Spectrum Monitor with 12 SMA(f) Input Ports (requires frequency option below)
Option Number	**Description**
MS27103A-0128	Vector Signal Analysis Enabled (use with MX280005A)
MS27103A-0706	9 kHz to 6 GHz Frequency Range
MS27103A-0110	110/220 VAC Power Supply input
MS27103A-0412	Two Ethernet Ports
MS27103A-0424	Expands Input Ports to 24 SMA(f)
MS27103A-0400	Vision Monitor Enabled
MS27103A-0401	Vision Locate Enabled (requires Option 400 above)
MS27103A-0407	Vision High-Speed Port Scanner Enabled
MS27103A-0486	Vision Coverage Mapping (requires Option 407)

Accessories

Accessory	Description
	2000-1528-R Magnet Mount, SMA(m) with 5 m (16.4 ft) cable, requires 5 VDC (included with instrument)
	760-287-R Large Transit Case with Wheels and Handle

Accessory	Description
	2000-1371-R Ethernet Cable, 2.13 m (7 ft) (included with instrument)

Training at Anritsu

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MS27103A TDS, PN: 11410-00854, Rev. U

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