Anritsu envision : ensure

Remote Spectrum Monitors

For Remote RF Signal Monitoring

MS27102A

9 kHz to 6 GHz

Introduction

The Anritsu platform of spectrum monitors provides high performance real-time monitoring of the radio spectrum. Designed to be stable over time under continuous operation, the MS27102A monitor 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 MS27102A features an IP67 rated outdoor enclosure designed for remote operations in the harshest of environments. The MS27102A is available as a single port RF-IN instrument with an option for two ports that enable the use of multiple antennas.

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
- 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 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

MS27102A Remote Spectrum Monitor

Table of Contents

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. 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 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	(–99 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 +30 dBm (≥ 100 MHz), without Option 402 installed DANL to +22 dBm (≥ 100 MHz), with Option 402 installed 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, without Option 402 installed +22 dBm, ≥ 10 dB attenuation, ±50 VDC, with Option 402 installed +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

9 kHz to 6.0 GHz	± 2.5 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)
10 MHz to 3.3 GHz	–145	–150	–162	–165
> 3.3 GHz to 4.1 GHz	–140	–145	–159	–162
> 4.1 GHz to 5 GHz	–138	–143	–156	–160
> 5 GHz to 6 GHz	–128	–136	–146	–154

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) for 16 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

	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

Two RF Input Ports (Option 402)

Amplitude Accuracy Attenuation ≤ 40 dB, preamp off for frequencies less than 100 kHz

9 kHz to 5 GHz	± 2.5 dB
> 5 GHz to 6.0 GHz	± 3 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)
10 MHz to 3.3 GHz	–140	–147	–157	–162
> 3.3 GHz to 4.1 GHz	–135	–142	–152	–158
> 4.1 GHz to 5 GHz	–133	–139	–151	–157
> 5 GHz to 6 GHz	–117	–129	–137	–147

Antenna Port Isolation Typical

≤ 3 GHz	> 40 dB
> 3 GHz	> 30 dB

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	One type N, female port, 50 Ω Two type N, female ports, 50 Ω (optional)
RF In Damage Level	+30 dBm peak, ±50 VDC +22 dBm peak, ±50 VDC (when 2 RF In ports are used - Option 402) maximum continuous input (≥ 10 dB attenuation)
External Power	11 W, 11 V to 24 V, 3-pin IP67 power connector
Ethernet	1 RJ45 connector for Gbit LAN (ruggedized and weatherproof)
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	RCM
Korea	KCC

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

Environmental

Operating Temperature	–40 °C to +55 °C
Maximum Humidity	95 % RH (non-condensing) at 30 °C
Shock	MIL-PRF-28800F Class 2
Storage	–51 °C to +71 °C
Altitude	4600 meters, operating and non-operating

ESD

RF Input Pin	Withstands up to ±4 kV

Size and Weight

Size	310 mm x 102 mm x 310 mm (12.2 in x 4.0 in x 12.2 in)
Weight	6.87 kg (15.2 lb)

Ordering Information

Standard Hardware

Model Number	Description
MS27102A-0706	1 RF IN Port

Hardware Options

Option Number	Description
MS27102A-0402	2 RF IN Ports, Option 402

Software Options

Option Number	Description
MS27102A-0400	Vision Monitor Enabled
MS27102A-0401	Vision Locate Enabled (requires Option 400 above)

Standard Accessories (included with instrument)

Part Number	Description
40-187-R	AC-DC Adapter
2100-32-R	Power Adapter
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

Part Number	Description
760-285-R	Large Transit Case with Wheels and Handle

Training at Anritsu

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List Revision Date: 20150420