

Anritsu envision : ensure

Remote Spectrum Monitor

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: -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
- AeroShield drone detection and tracking



MS27102A Remote Spectrum Monitor

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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. 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 ($25^\circ\text{C} \pm 25^\circ\text{C}$) ± 1.0 ppm/year aging < ± 50 ppb with GPS on	
		Frequency Span	10 Hz to 6 GHz	
Sweep Speed	Typical (full span 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 at 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, dB μ V	
		Maximum Continuous Input	without Option 402, 404, or 406	with Option 402, 404, or 406
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 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
> 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
				–165
				–162
				–160
				–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) 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

Multiple RF Input Ports (Option 402, 404, and 406) (provides two, four, or six RF input ports)**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



MS27102A Remote Spectrum Monitor, rear panel connectors with Option 406

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, four, or six type N, female ports, 50 Ω (Option 402, 404, or 406)
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)

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

Environmental

	MIL-PRF-28800F Class 2
Operating Temperature Range	-40 °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

ESD

RF Input Pin	Withstands up to ± 4 kV
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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)

Warranty

Instrument	Standard three-year warranty
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Ordering Information

	Model Number	Description
	MS27102A	Spectrum Monitor with 1 RF IN Port (requires one frequency option)
	Option Number	Description
	MS27102A-0706	9 kHz to 6 GHz Frequency Range
	MS27102A-0402	2 RF IN Ports (2 front RF-In ports)
	MS27102A-0404	4 RF IN Ports (2 front RF-In ports with 2 RF-in rear ports)
	MS27102A-0406	6 RF IN Ports (2 front RF-In ports with 4 RF-in rear ports)
	MS27102A-0400	Vision Monitor Enabled
	MS27102A-0401	Vision Locate Enabled (requires Option 400 above)
	MS27102A-0407	Vision High-Speed Port Scanner Enabled
	MS27102A-0479	Vision AM Demodulation/FM Deviation
	MS27102A-0485	Vision Spectrum Occupancy (requires Option 400)

MS27102A-0486	Vision Coverage Mapping (requires Option 407)
MS27102A-0482	AeroShield RF Drone Detection and Tracking

Accessories

Accessory	Description	Accessory	Description
	40-187-R AC/DC Power Supply, 1 m, 12 VDC Output (included with instrument)		2000-1371-R Ethernet Cable, 2.13 m (7 ft) (included with instrument)
	2000-1528-R Magnet Mount GPS Antenna, SMA(m) with 5 m (16.4 ft) cable, requires 5 VDC (included with instrument)		2100-32-R Power Adapter (included with instrument)
	760-285-R Large Transit Case with Wheels and Handle		

Training at Anritsu

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• 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.
700 Silver Seven Road, Suite 120
Kanata, Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

• 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, Bâtiment Iris 1- Silic 612,
91140 Villebon-sur-Yvette, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

• 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.
Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

List Revision Date: 20200602

• Sweden

Anritsu AB
Isafjordsgatan 32C
164 40 Kista, Sweden
Phone: +46-8-534-707-00

• Finland

Anritsu AB
Teknobulevardi 3-5
FI-01530 Vantaa, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

• Denmark

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

• Russia

Anritsu EMEA Ltd.
Representation Office in Russia
Tverskaya str. 16/2, bld. 1, 7th floor
Moscow 125009, Russia
Phone: +7-495-363-1694
Fax: +7-495-935-8962

• 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

• United Arab Emirates

Anritsu EMEA Ltd.
Dubai Liaison Office
902 Aurora Tower
P O Box: 500311 - Dubai Internet City
Dubai, United Arab Emirates
Phone: +971-4-3758479
Fax: +971-4-4249036

• India

Anritsu India Private Limited
6th Floor, Indiqueb 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.
11 Chang Charn Road, #04-01, Shriro House
Singapore 159640
Phone: +65-6282-2400
Fax: +65-6282-2533

• 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.
5FL, 235 Pangyoyeok-ro
Bundang-gu, Seongnam-si
Gyeonggi-do 13494, South Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

• 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