Anritsu envision : ensure

Remote Spectrum Monitors

For Remote RF Signal Monitoring

MS27101A

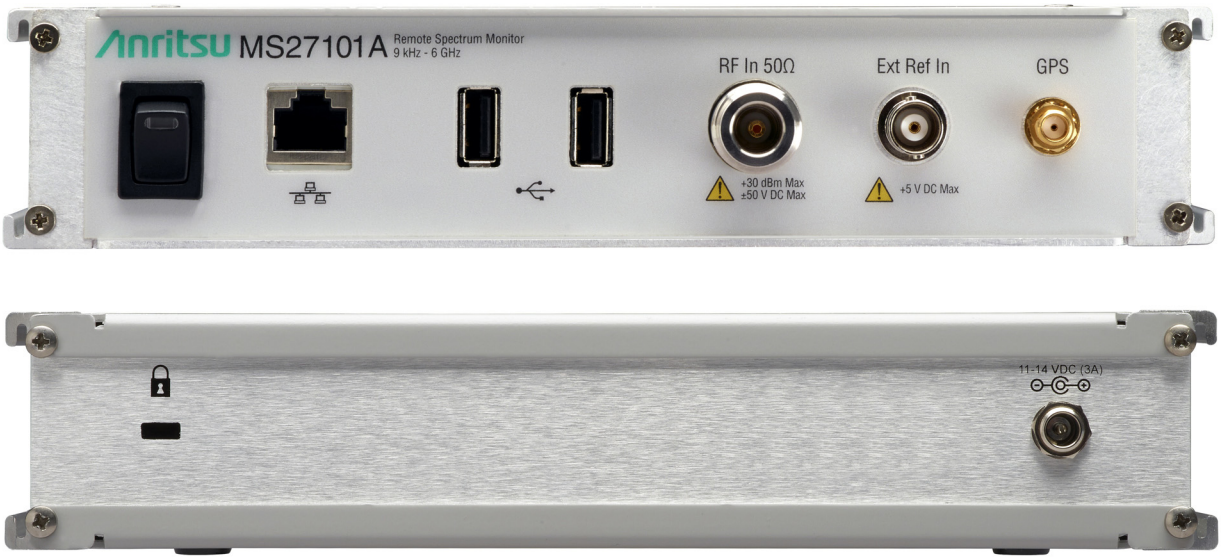
9 kHz to 6 GHz

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 MS27101A 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 MS27101A is available as a single port RF-IN instrument with USB and Ethernet interfaces.

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



MS27101A 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 °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	(–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 +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

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 MHz to 18 MHz
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

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	One type N, female port, 50 Ω
RF In Damage Level	+30 dBm peak, ±50 VDC maximum continuous input (≥ 10 dB attenuation)
External Power	11 W, 5.5 mm barrel connector, 11 to 14 VDC
External Reference In	10 MHz, +10 dBm max, +5 VDC max, BNC(f)
Ethernet	1 RJ45 connector
USB	2 Type A interface connectors
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	0 °C to 55 °C
Maximum Humidity	95 % RH (non-condensing) at 30 °C
Shock	MIL-PRF-28800F Class 2
Storage	–40 °C to +71 °C
Altitude	4600 meters, operating and non-operating

ESD

RF Input Pin	Withstands up to ±4 kV

Size and Weight

Size	216 mm x 45 mm x 368 mm (8.5 in x 1.75 in x 14.5 in)
Weight	2.78 kg (6.2 lb)

Ordering Information

Standard Hardware

Model Number	Description
MS27101A	Spectrum Monitor with 1 RF IN Port (requires one frequency option)

Hardware Options

Option Number	Description
MS27101A-0706	9 kHz to 6 GHz Frequency Range, Option 706
MS27101A-0001	Rack Mount Kit

Software Options

Option Number	Description
MS27101A-0400	Vision Monitor Enabled
MS27101A-0401	Vision Locate Enabled (requires Option 400 above)

Standard Accessories (included with instrument)

Part Number	Description
40-187-R	AC-DC Adapter

Optional Accessories

Part Number	Description
760-288-R	Transit Case
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

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• **United States**

Anritsu Company
1155 East Collins Blvd, Suite 100
Richardson, TX 75081, U.S.A.
Toll Free: 1-800-267-4878
Phone: +1-972-644-1777
Fax: +1-972-671-1877

• **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 Electrônica 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.
Av. Ejército Nacional No. 579 Piso 9, Col. Granada
11520 México, D.F., México
Phone: +52-55-1101-2370
Fax: +52-55-5254-3147

• **United Kingdom**

Anritsu EMEA Ltd.
200 Capability Green
Luton, Bedfordshire LU1 3LU
United Kingdom
Phone: +44-1582-433280
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: +39-06-509-9711
Fax: +39-06-502-2425

• **Sweden**

Anritsu AB
Kistagången 20B
164 40 KISTA, Sweden
Phone: +46-8-534-707-00
Fax: +46-8-534-707-30

• **Finland**

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

• **Denmark**

Anritsu A/S
Kay Fiskers Plads 9
2300 Copenhagen S, Denmark
Phone: +45-7211-2200
Fax: +45-7211-2210

• **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
Edificio Cuzco IV, Po. de la Castellana, 141, Pta. 8
28046, Madrid, Spain
Phone: +34-915-726-761
Fax: +34-915-726-621

• **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
2nd & 3rd Floor, #837/1, Binnamangla 1st Stage
Indiranagar, 100ft Road, Bangalore - 560038, India
Phone: +91-80-4058-1300
Fax: +91-80-4058-1301

• **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.
27th Floor, Tower A
New Caohejing International Business Center
No. 391 Gui Ping Road Shanghai, Xu Hui Di District
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: +81-46-296-1221
Fax: +81-46-296-1238

• **Korea**

Anritsu Corporation, Ltd.
5FL, 235 Pangyoyeok-ro, Bundang-gu, Seongnam-si
Gyeonggi-do, 13494 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

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