

Anritsu envision : ensure

Remote Spectrum Monitors

For Remote RF Signal Monitoring

MS27101A

9 kHz to 6 GHz



MS27101A

Specifications

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: -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



MS27101A Spectrum Monitor

MS27101A

Table of Contents

Definitions.	3
Remote Spectrum Monitor.	4
General Specifications	6
Ordering Information	7

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

MS27101A

Specifications

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 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) 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
		> 3.3 GHz to 4.1 GHz	–140	–145
		> 4.1 GHz to 5 GHz	–138	–143
		> 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	

SpecificationsMS27101A

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

MS27101A

Specifications

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 50 °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)

SpecificationsMS27101A

Ordering Information

Standard Hardware		
	Model Number	Description
	MS27101A-0706	1 RF IN Port
Hardware Options		
	Option Number	Description
	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

Training at Anritsu

Anritsu has designed courses to help you stay up to date with technologies important to your job. For available training courses, visit: www.anritsu.com/training



• 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 Eletrônica Ltda.

Praça Amadeu Amaral, 27 - 1 Andar
01327-010 Bela Vista, São Paulo, 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

Kistagångan 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
P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suite 701, 7th Floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

• 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, Shiro 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 Pangyoeyeok-ro, Bundang-gu
Seongnam-si
Gyeonggi-do, 463-400 Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

• Australia

Anritsu Pty Ltd.

Unit 21/270 Ferntree Gully Road
Notting Hill, Victoria, 3168, 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

List Revision Date: 20150420

Anritsu envision : ensure

Remote Spectrum Monitors

For Remote RF Signal Monitoring

MS27102A

9 kHz to 6 GHz



MS27102A

Specifications

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

MS27102A

Table of Contents

Definitions.....	3
Remote Spectrum Monitor.....	4
Two RF Input Ports (Option 402).....	5
General Specifications.....	6
Ordering Information.....	7

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

MS27102A

Specifications

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			
Amplitude Units	–10 dBm, preamp on, ±50 VDC				
	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			

Specifications

MS27102A

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			

MS27102A

Specifications

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)

SpecificationsMS27102A

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

Anritsu has designed courses to help you stay up to date with technologies important to your job. For available training courses, visit: www.anritsu.com/training



• 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 Eletrônica Ltda.

Praça Amadeu Amaral, 27 - 1 Andar
01327-010 Bela Vista, São Paulo, 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

Kistagångan 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

P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suite 701, 7th Floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

• 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, Shiro 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 Pangyoeyeok-ro, Bundang-gu
Seongnam-si
Gyeonggi-do, 463-400 Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

• Australia

Anritsu Pty Ltd.

Unit 21/270 Ferntree Gully Road
Notting Hill, Victoria, 3168, 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

List Revision Date: 20150420

Anritsu envision : ensure

Remote Spectrum Monitors

For Remote RF Signal Monitoring

MS27103A

9 kHz to 6 GHz



MS27103A

Specifications

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: -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



MS27103A Remote Spectrum Monitor
(front and rear sides shown, Option 110 replaces screw terminal with 3-pin AC line receptacle)

SpecificationsMS27103A

Table of Contents

Definitions.3
Remote Spectrum Monitor.4
General Specifications6
Ordering Information7

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

MS27103A

Specifications

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	(–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 +22 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)			
		+22 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				
		Port 1 (dB)	Ports 2 to 12 (dB, typical)	Option 424 (24 Ports) 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			

SpecificationsMS27103A

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

MS27103A

Specifications

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	+22 dBm peak, ±50 VDC maximum continuous input (≥ 10 dB attenuation)	
External Power	11 W, ±20 VDC to ±70 VDC (110/220 VAC optional)	
Ethernet	One RJ45 connector for Gbit LAN, 2nd port optional for daisy chaining.	
USB	Two USB Type A connectors	
External Reference In	10 MHz, +10 dBm max, +5 VDC max, 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	RCM	
Korea	KCC	
Safety		
Safety Class	EN 61010-1 Class 1	
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	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)	

SpecificationsMS27103A

Ordering Information

Standard Hardware	Model Number	Description
	MS27103A-0706	12 SMA(f) Input Ports
Hardware Options	Option Number	Description
	MS27103A-0424	Expands Input Ports to 24 SMA(f)
	MS27103A-0110	110/220 VAC Power Supply
	MS27103A-0412	Two Ethernet Ports
Software Options	Option Number	Description
	MS27103A-0400	Vision Monitor Enabled
	MS27103A-0401	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	Part Number	Description
	760-287-R	Large Transit Case with Wheels and Handle



Training at Anritsu

Anritsu has designed courses to help you stay up to date with technologies important to your job. For available training courses, visit: www.anritsu.com/training



• 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 Eletrônica Ltda.

Praça Amadeu Amaral, 27 - 1 Andar
01327-010 Bela Vista, São Paulo, 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

Kistagångan 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
P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suite 701, 7th Floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

• 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, Shiro 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 Pangyoeyeok-ro, Bundang-gu
Seongnam-si
Gyeonggi-do, 463-400 Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

• Australia

Anritsu Pty Ltd.

Unit 21/270 Ferntree Gully Road
Notting Hill, Victoria, 3168, 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

List Revision Date: 20150420