

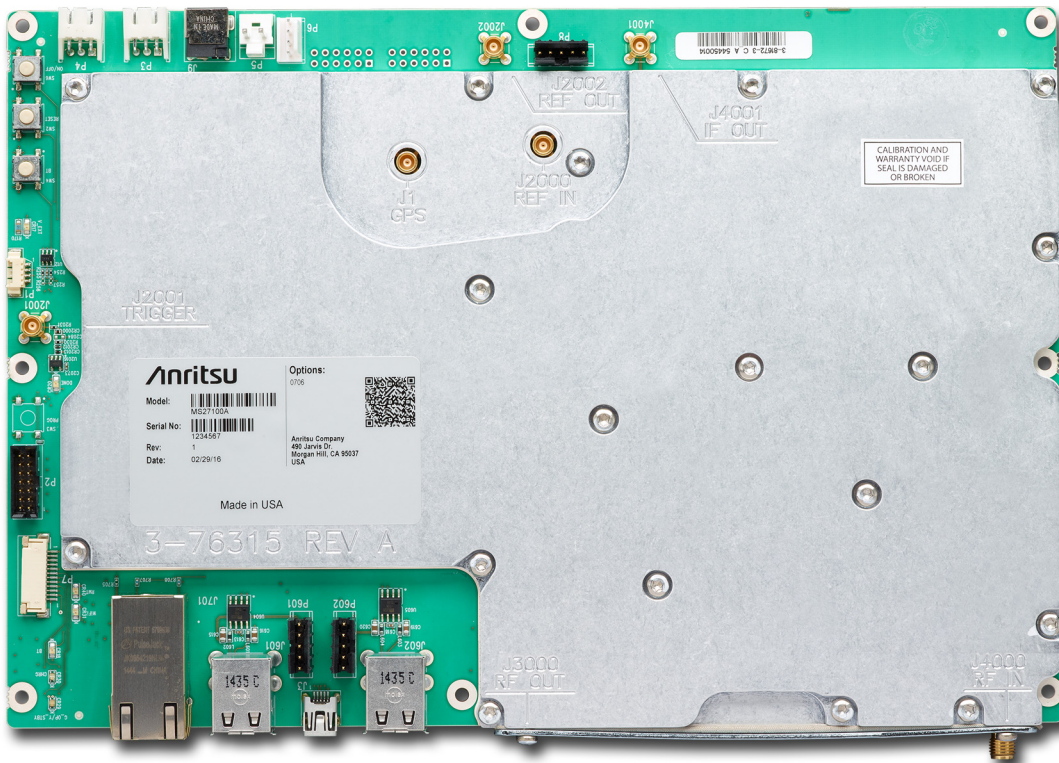
**Anritsu** envision : ensure

# Spectrum Monitor Module

For Remote RF Signal Monitoring

## MS27100A

9 kHz to 6 GHz



## Introduction

The Anritsu platform of spectrum monitors provide high performance real-time monitoring of the radio spectrum. Designed to be stable over time under continuous operation, the MS27100A spectrum monitor module 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 MS27100A spectrum monitor module is available as a single RF input port instrument with wired Ethernet for remote interface and USB ports for connecting accessories. The MS27100A can also be expanded to six RF input ports with an optional multiplexer accessory.

## 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
- DANL: < -150 dBm referenced to 1 Hz BW, preamp On
- 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 TDOA applications
- Remote control via SCPI commands
- Vision™ software optional for automated spectrum measurements, setting alarms, and geo-locating signal sources
- SpectraVision software optional for TETRA and Satellite measurements and Channel scanning
- AeroShield drone detection and tracking

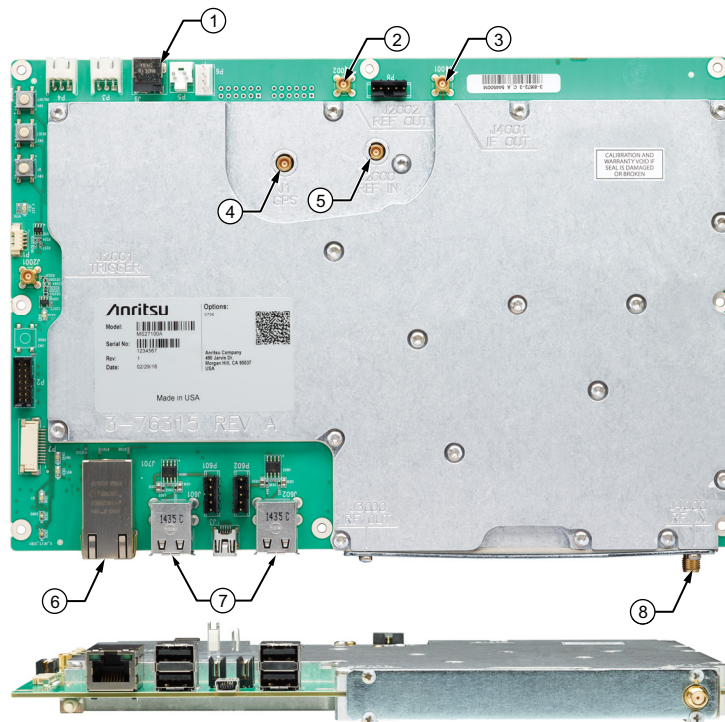
Table of Contents

Definitions..... 3  
 Connectors..... 3  
 Remote Spectrum Monitor..... 4  
 General Specifications..... 6  
 Ordering Information..... 7  
 Ordering Information..... 8

Definitions

	All specifications and characteristics apply under the following conditions, unless otherwise stated: After 10 minutes of warm-up time, where the instrument is left in the on state.
Warm-Up Time	
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: <a href="http://www.anritsu.com">www.anritsu.com</a>

Connectors



MS27100A

- 1 External Power, 11.0 to 14.5 VDC, 11 W, 5.5 mm Barrel Connector
  - 2 10 MHz Reference Output, MCX(f)
  - 3 IF Output, MCX(f)
  - 4 GPS Antenna Input, MCX(f)
  - 5 10 MHz Reference Input, +10 dBm max, +5 VDC max, MCX(f)
  - 6 Gbit Ethernet, RJ45 connector
  - 7 USB Type A (4)
  - 8 RF Input, SMA(f), 50Ω  
 RF In Damage Level: +30 dBm peak, ±50 VDC maximum continuous input (≥ 10 dB attenuation, > 100 MHz)
- Note: Other connectors and controls are not supported in this model.

## Remote Spectrum Monitor

<b>Frequency</b>		Frequency Range	9 kHz to 6 GHz (tunable to 0 Hz)	
		Frequency Span	10 Hz to 6 GHz	
		Tuning Resolution	1 Hz	
		Frequency Reference Accuracy	±1.5 ppm (25 °C ± 25 °C) ±1.0 ppm/year aging, < ±50 ppb with GPS on	
<b>Sweep Speed</b>		Typical (full span FFT mode)		
		10 kHz RBW	5 GHz/s	
		30 kHz RBW	12 GHz/s	
		3 MHz RBW	24 GHz/s	
<b>Bandwidth</b>		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)	
<b>Spectral Purity</b>		SSB Phase Noise @ 1 GHz	(-98 dBc/Hz) @ 10 kHz offset (-98 dBc/Hz) @ 100 kHz offset	
<b>Amplitude Ranges</b>		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	without Option 406 (RF Input to MS27100A)	with Option 406 (RF Input to multiplexer)
		100 MHz to 6 GHz, ≥ 10 dB attenuation	+30 dBm <sup>a</sup> , ±50 VDC	+20 dBm <sup>b</sup> , ±50 VDC
		300 kHz to 6 GHz, < 10 dB attenuation	+10 dBm <sup>a</sup> , ±50 VDC	+10 dBm <sup>b</sup> , ±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
<b>Amplitude Accuracy</b>		Attenuation ≤ 40 dB, preamp off for frequencies less than 100 kHz		
		9 kHz to 100 kHz	± 2.5 dB	
		> 100 kHz to 6 GHz	± 1.5 dB	
<b>Displayed Average Noise Level (DANL)</b>		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)
		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
				–162
				–165
				–159
				–156
				–160
				–146
				–154
<b>Spurs</b>		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	
<b>Second Harmonic Distortion</b>		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	
<b>Third-Order Intercept (TOI)</b>		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 MSPS	I/Q Bit Resolution			
		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

**Warranty**

Instrument	Standard three-year warranty
------------	------------------------------

**Environmental**

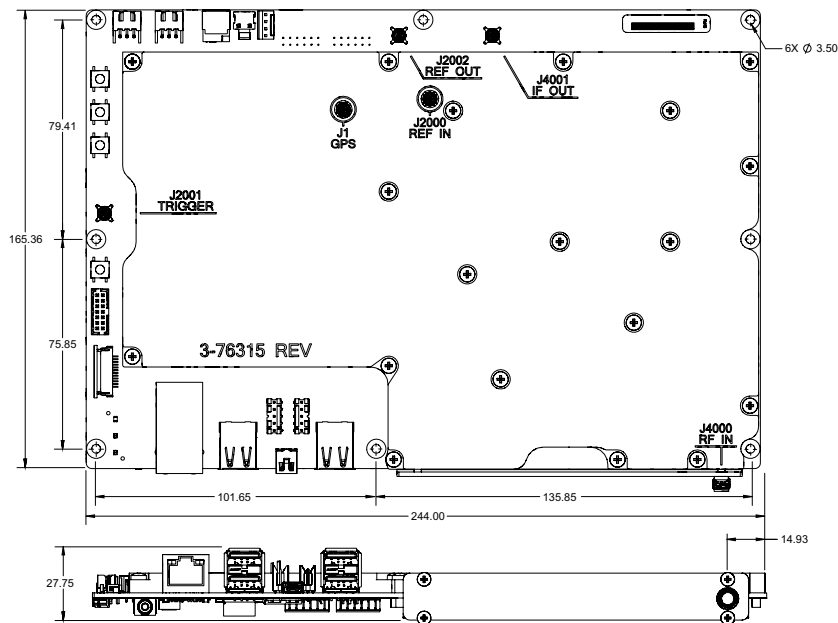
Operating Temperature Range	0 °C to 50 °C
Storage Temperature Range	-40 °C to 71 °C
Maximum Relative Humidity	95 % RH at 30 °C, non-condensing
Vibration, Sinusoidal	5 Hz to 55 Hz
Vibration, Random	10 Hz to 500 Hz
Half Sine Shock	30 g <sub>n</sub>
Altitude	4600 meters, operating and non-operating
Explosive 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
--------------	------------------------

**Mechanical**

Weight	0.93 kg (2.05 lb) without packaging
Dimensions (mm)	



Ordering Information

Standard Hardware

Model Number	Description
MS27100A	Spectrum Monitor Module with 1 RF IN Port (requires one frequency option)

Hardware Options

Option Number	Description
MS27100A-0406	Enables USB Interface to 6-port RF multiplexer (requires 2000-1894-R)
MS27100A-0706	9 kHz to 6 GHz Frequency Range

Vision Software Options

Option Number	Description
MS27100A-0400	Vision Monitor Enabled
MS27100A-0401	Vision Locate Enabled (requires Option 400 above)
MS27100A-0407	Vision High-Speed Port Scanner Enabled
MS27100A-0479	Vision AM Demodulation/FM Deviation
MS27100A-0485	Vision Spectrum Occupancy (requires Option 400)
MS27100A-0486	Vision Coverage Mapping (requires Option 407)

AeroShield Software Options

Option Number	Description
MS27100A-0482	AeroShield RF Drone Detection and Tracking

SpectraVision Software Options

Option Number	Description
MS27100A-0464	SpectraVision TETRA Enabled
MS27100A-0467	SpectraVision Scanner Enabled
MS27100A-0471	SpectraVision Satellite Enabled
MS27100A-0472	SpectraVision Signal Identification and Analysis: Basic
MS27100A-0473	SpectraVision Signal Identification and Analysis: Advanced (requires Option 472)
MS27100A-0474	SpectraVision Power Monitoring Measurement

Standard Accessories (included with instrument)

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

Optional Accessories



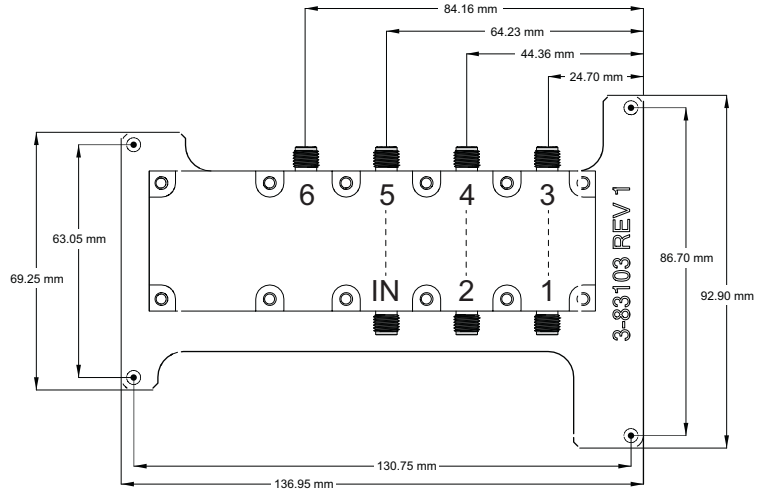
Part Number	Description
2000-1894-R	6-Port Multiplexer Module (requires software Option 406 above)
3-67367	USB-A to HC5 5-pin header cable, 30 cm (included with 2000-1894-R)

Ordering Information

2000-1894-R

An optional six-to-one multiplexer that is controlled via a USB-A to 5-pin connection to the MS27100A Spectrum Monitor Module. Switch insertion loss correction is linked to the MS27100A through this USB interface. All specifications typical.

- Frequency 9 kHz to 6 GHz
- Insertion Loss 2 dB at 1 GHz  
5 dB at 6 GHz
- Antenna Port Isolation > 40 dB < 3 GHz  
> 30 dB ≥ 3 GHz
- DC Power 5 VDC via USB
- Weight 0.18 kg (0.40 lb)



- Connectors RF Antenna Inputs, SMA(f) (x6)
- 5-pin connector (connects to the MS27100A with the included 30 cm USB-A to HC5 5-pin header cable)
- RF Output SMA(f) (connects to MS27100A RF In, RF cable NOT included)

# 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](http://www.anritsu.com/training)



## • 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 - Sao 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 L td.**  
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: 20191126

## • 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 Fairway, Arne Jacobsens Allé 7, 5th 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, Indiqube 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 Pangyoeyeok-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