

Anritsu Advancing beyond

Power Meters and Power Sensors

ML2430A CW Power Meter
 MA2400A/B/D and MA2400xA
 Power Sensors



Introduction

Anritsu offers the world's most comprehensive range of power meters. The ML2490A series has the performance required for narrow, fast rising-edge pulse power measurements (for example, radar). The ML2430A series of power meters are designed for CW applications, offering a combination of accuracy, speed, and flexibility in a low-cost package.

Also available are seven different families of power sensors with frequency coverage up to 50 GHz and dynamic range up to 90 dB. Most Anritsu power sensors can work in either pulsed/modulated or CW mode (the ML2490A series meters offer both modes). In choosing a power sensor, several factors must be considered, including: frequency range, dynamic range, and the modulation type. The rise time of the sensor should also be chosen to match the rise time of the modulation.

PowerSuite

PowerSuite is free software available for the ML2430A-series power meters. This software is used to continuously view measurement traces on the PC in real-time or to archive data and plots for future analysis. PowerSuite runs on a standard PC running Windows® 95 or higher, via GPIB or RS232.

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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 are not tested and are not warranted. They are generally representative of the nominal characteristic performance.
Uncertainty	A coverage factor of K=2 is applied to the measurement uncertainties.
Calibration Cycle	Recommended calibration cycle is 12 months.
	All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

Power Meter General Specifications

ML2430A Series

Display	Monochrome LCD, with backlight and adjust-able contrast
Display Resolution in Readout Mode	0.1 dB to 0.001 dB Linear power units, 3 to 6 digits, 1 to 3 digits selectable to right of decimal, nW to W Voltage, 1 to 2 digits selectable to right of decimal
Display Resolution in Profile Mode	0.01 dB
Time Measurement Resolution	Profile and P vs. T modes: 200 pixels display resolution For a 1 ms Profile window, cursor resolution on the display is 5 μ s
Measurement Hold	Hold, Max, Min
Measurements	Average, Min, Max
Power Statistics	—
Voltage Measurement range	0.00 to 20.00 V nominal
Display units (Lin) Display units (Log)	Watt, %, Volts, dBm, dB, dB μ V, dBmV, dB μ r
Display Range	-199.99 dB to +199.99 dB
Measurement Gates	1
Markers	2
Limit Lines	Fixed value high and low limits with audible, rear panel TTL output, and/or visible Pass/Fail alarm indication Failure indication can latch for transient failure detection
Offset Range	-199.99 dB to +199.99 dB (Fixed value or frequency dependent table)
Military Compliance	MIL-T-28800F, class 3
Non-Volatile RAM Battery	Lithium (10 year life)
Battery Option	> 6 hr usable with 3000 mAh (NiMH) battery
DC Power Requirements	12 to 24 VDC, Reverse protected to -40 V Maximum input 30 V
AC Power Requirements	85 VAC to 240 VAC 47 Hz to 400 Hz, \pm 0% Fluctuation 40 VA Maximum No AC mains connection to measurement circuits
Operating Temperature	0 $^{\circ}$ C to 40 $^{\circ}$ C
Operating Elevation	4,600 m (per W31P4Q-18-007)
Environment	For indoor use only Pollution Degree 2
Storage Temperature	-40 $^{\circ}$ C to 70 $^{\circ}$ C
Moisture	Splash and rain resistant, 95% humidity non-condensing
Dimensions	223 mm x 150 mm x 390 mm
Weight	3 kg (excluding battery option)
Warranty	Power meters have a standard 3 year warranty. Power sensors have a standard 1 year warranty.
Measurement Display Readout (Numerical)	2
Measurement Display Profile (Graph)	Power vs. Time graphic of readout data or Profile of Peak power for analysis of repetitive pulse or transient waveforms
Source Sweep	Single channel power sweep or frequency sweep
Peaking Meter	\pm 5 dB range CW (Readout mode) only
Amplifier Range	Dynamic range covered by five overlapping amplifier ranges: R1, R2, R3, R4, and R5. Universal Sensor MA2481/82D ranges 1 to 6.
Range Hold	Auto or Manual (current range or selectable 1 through 5).
Grounding Post	Used as safety ground when operating from DC or battery power.

Power Meter Performance Specifications

	ML2430A Series
Number of Input Signals	1 (ML2437A) 2 (ML2438A)
Frequency Range	100 kHz to 50 GHz (sensor dependent)
Dynamic Range Continuous or Peak	-70 to +20 dBm (dependent on sensor, external coupler, or attenuator)
Nominal Video BW	100 kHz (Profile mode)
Sampling Rate	31.25 kS/s
System Rise-time (10% to 90% at +10 dBm)	N/A
Rise-time Measurement Dynamic Range	N/A
Overshoot (Pulse/Modulated Mode)	N/A

Accuracy (Defined by uncertainty calculations with relevant sensor and source match conditions)

	ML2430A Series			
Instrumentation Accuracy	< 0.5%	CW Mode: < 0.5% (± 0.02 dB absolute Accuracy, ± 0.04 dB Relative Accuracy) Pulse/Modulated Mode: < 0.8% Nominal range 7, 8		
Equivalent Noise Power (512 Moving Average) ^a		MA2491A	MA2472	MA24002A
	Range 1	2 μ W	0.5 μ W	N/A
	Range 2	100 nW	50 nW	0.5 nW
	Range 3	2 nW	0.8 nW	8 μ W
	Range 4	1 nW	0.2 nW	2 μ W
	Range 5 (CW Mode)	0.5 nW	50 pW	0.5 nW
	Range 7	15 μ W	5 μ W	N/A
	Range 8	5 μ W	1 μ W	N/A
	Range 9 (Pulse Mode)	2 μ W	0.5 μ W	N/A

a. Equivalent Noise Power is RSS of Zero Set, Zero Drift, and noise. Zero Set and Drift are measured over one hour after a one hour warm-up at constant ambient temperature. Noise is measured over five minutes over 512 averaging after one hour warm-up at constant ambient temperature.

Averaging

	ML2430A Series
Type	Auto (Moving), Manual (Moving, Repeat)
Range	1 to 512
Low-level Averaging	Low, Medium, and High settings apply post average low-pass filter to improve visibility at high display resolution.

Triggering	
ML2430A Series	
Source	Internal, External (TTL or RF Blanking), GPIB, Manual, or Continuous.
Trigger Modes	Manual Single power value set to cover entire measurement dynamic range of sensor. Auto Automatically sets trigger level for signal over measurement dynamic range.
Nominal Internal Trigger Bandwidth	N/A
Arming Sources	Sets the trigger arming, unless the trigger source is set to EXTTTL When ARMING is set to Blanking ON, only samples taken when the rear panel Digital Input BNC is active will be averaged in the measurement.
Frame Arming Time Range	N/A
Internal Trigger Dynamic Range	-15 dBm to +20 dBm (all diode sensors, selectable to -25 dBm)
Internal Trigger Level Accuracy (typical)	1 dB
Internal Trigger Settable Resolution	0.1 dB
Trigger Time Resolution Uncertainty	N/A
Trigger Delay Range	0 ms to 999 ms
External Trigger Range	TTL rising or falling edge (BNC input)
Pre-trigger Range	N/A
Trigger Delay Settable Resolution	0.5% of display period or 100 ns
Trigger Delay Uncertainty	N/A
Trigger/Display Capture Range	Profile mode: 10 ms to 7 s P v T mode: 1 m to 24 hrs
Trigger Capture Time Settable Resolution	N/A
Trigger Point Display (on-screen)	On-screen indicator/message

Reference Calibrator

ML2430A Series	
Reference Calibrator Power	1 mW
Power Accuracy (Traceable to National Standards)	± 1.2% per year
Frequency	50 MHz (nominal)
Frequency Accuracy	< 1%
VSWR	< 1.12
Connector Type	N female
Impedance	Nominal input impedance is 50 ohms

Power Sensor Performance Specifications

Sensor	Frequency Range	CW Dynamic Range (dBm)	SWR ¹	Rise Time ² (ms)	Sensor Linearity ³	RF Connector ⁴
Standard Diode Sensors						
MA2472D	10 MHz to 18 GHz	-70 to +20 CW mode (ML243xA, Profile mode) -37 to +20 ML2490A, Pulse/Mod mode)	< 1.17; 10 MHz to 50 MHz ⁵ < 1.90; 10 MHz to 50 MHz < 1.17; 50 MHz to 150 MHz < 1.12; 150 MHz to 2 GHz < 1.22; 2 GHz to 12.4 GHz < 1.25; 12.4 GHz to 18 GHz < 1.35; 18 GHz to 32 GHz < 1.50; 32 GHz to 40 GHz < 1.63; 40 GHz to 50 GHz	< 0.004	< 1.8%, ≤18 GHz < 2.5%, ≤40 GHz < 3.5%, ≤50 GHz for MA2475D ⁶	N(m)
MA2473D	10 MHz to 32 GHz					K(m)
MA2474D	10 MHz to 40 GHz					K(m)
MA2475D	10 MHz to 50 GHz					V(m)

Temperature accuracy: < 1% < 40 GHz, < 1.5% < 50 GHz, 5 °C to 50 °C

High Accuracy Diode Sensors

MA2442D	10 MHz to 18 GHz	-67 to +20 CW mode -40 to +20 (ML243xA, Profile mode) -34 to +20 ML2490A, Pulse/Mod mode)	< 1.17; 10 MHz to 150 MHz < 1.08; 150 MHz to 2 GHz < 1.16; 2 GHz to 12.4 GHz < 1.21; 12.4 GHz to 18 GHz < 1.29; 18 GHz to 32 GHz < 1.44; 32 GHz to 40 GHz < 1.50; 40 GHz to 50 GHz	< 0.004	< 1.8%, ≤18 GHz < 2.5%, ≤40 GHz < 3.5%, ≤50 GHz for MA2445D ⁷	N(m)
MA2444D	10 MHz to 40 GHz					K(m)
MA2445D	10 MHz to 50 GHz					V(m)

Temperature accuracy: < 1% < 40 GHz, < 1.5% < 50 GHz, 5 °C to 50 °C

Universal Power Sensors

MA2481D	10 MHz to 6 GHz	-60 to +20	< 1.17; 10 MHz to 150 MHz < 1.12; 150 MHz to 2 GHz < 1.22; 2 GHz to 6GHz < 1.22; 6 GHz to 12.4 GHz < 1.25; 12.4 GHz to 18 GHz	< 0.004 with option 1 only	< 3%, ≤6 GHz < 3%, ≤18 GHz (1.8% CW with option 1)	N(m)
MA2482D	10 MHz to 18 GHz					

Option 01 Adds fast CW mode to Universal Power Sensors for high speed measurements of CW signal plus TDMA and pulse measurements.

Temperature accuracy: < 1%, 15 °C to 35 °C

Wideband Sensors

MA2490A ⁸	50 MHz to 8 GHz	CW Mode: -60 to +20 Pulse/Modulated Mode: -30 to +20 (with ML2490A)	< 1.17; 50 MHz to 150 MHz < 1.12; 150 MHz to 2.5 GHz < 1.22; 2.5 GHz to 8 GHz < 1.22; 8 GHz to 12.4 GHz < 1.25; 12.4 GHz to 18 GHz	< 18 ns	< 7% 50 MHz to 300 MHz < 3.5% 300 MHz to 8 GHz	N(m)
MA2491A ⁸	50 MHz to 18 GHz					

Temperature accuracy: < 1% 10 °C to 45 °C

Pulse Sensor

MA2411B	300 MHz to 40 GHz	-20 to +20 dBm	< 1.15; 300 MHz to 2.5 GHz < 1.35; 2.5 GHz to 26 GHz < 1.50; 26 GHz to 40 GHz	< 8 ns typical 12 ns maximum	< 4.5% 300 MHz to 18 GHz < 7% 18 GHz to 40 GHz	K(m)
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Temperature accuracy: < 2% 10 °C to 45 °C

Thermal Sensor

MA24002A	10 MHz to 18 GHz	-30 dBm to +20 dBm	< 1.90; 10 MHz to 50 MHz < 1.17; 50 MHz to 150 MHz < 1.10; 150 MHz to 2 GHz < 1.15; 2 GHz to 12.4 GHz < 1.20; 12.4 GHz to 18 GHz < 1.25; 18 GHz to 32 GHz < 1.30; 32 GHz to 40 GHz < 1.40; 40 GHz to 50 GHz	< 15	1.8% < 18 GHz ⁹ 2.0% < 40 GHz ⁹ 2.5% < 50 GHz ⁹	N(m)
MA24004A	10 MHz to 40 GHz					K(m)
MA24005A	10 MHz to 50 GHz					V(m)

Temperature accuracy: < 1% < 30 GHz < +10 dBm, < 1.5% ≥30 GHz ≥ +10 dBm

Power Sensor Performance Specification Table Footnotes

<ol style="list-style-type: none"> Nominal input impedance is 50 ohms. 0.0 dBm, room temperature with standard 1.5m sensor cable. Sensor linearity specifications are ± value. Each MA2400A/D Series sensor incorporates precision RF connectors with hexagon coupling nut for attachment by industry standard torque wrench. MA2472D only. MA2475D Linearity applicable from -70 to +15 dBm. Add 1% for power levels > +15 dBm 	<ol style="list-style-type: none"> MA2445D Linearity applicable from -67 to +15 dBm. Add 1% for power levels > +15 dBm MA2490/1A and MA2411B sensors must be used with ML2490A series power meters. MA24005D Linearity applicable from -30 to +15 dBm. Add 1% for power levels > +15 dBm (Power Sensor cable, 2000-1537-R, is supplied as standard with the power meter.)
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Power Sensor Measurement Accuracy

Power measurement accuracy can be split into several parts. The table below shows how the measurement uncertainty is composed for several power sensors. The source is presumed to be a 16 GHz, 12.0 dBm signal with a source SWR of 1.5:1.

The uncertainties can be calculated as an RSS term as each parameter is independent. Alternatively they can be added together for a worst-case analysis.

	MA2440D	MA2491A	MA2470D
Instrumentation Accuracy	0.50%	0.50%	0.50%
Sensor Linearity	1.80%	3.50%	1.80%
Noise, 512 Average	0.00%	0.00%	0.00%
Zero Set and Drift	0.00%	0.00%	0.00%
Mismatch Uncertainty	3.84%	4.49%	4.49%
Sensor Cal Factor Uncertainty	0.79%	1.59%	0.84%
Reference Power Uncertainty	1.20%	1.20%	1.20%
Reference to Sensor Mismatch Uncertainty	0.23%	0.31%	0.23%
Temperature Linearity	1.00%	1.00%	1.00%
RSS, Room Temp	4.51%	6.06%	5.09%
Sum of Uncertainties, Room Temp	8.36%	11.59%	9.06%
RSS	4.62%	6.14%	5.18%
Sum of Uncertainties	9.36%	12.59%	10.06%

Instrumentation accuracy

0.5% of the overall uncertainty budget and describes the linear voltage measurement accuracy of the power meter.

Sensor linearity

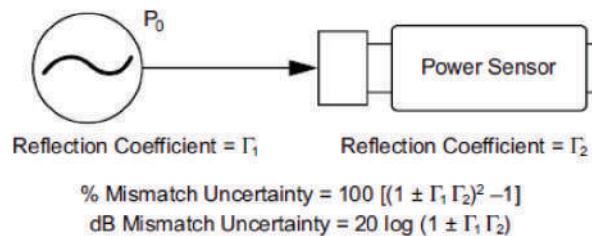
Describes the relative response over the dynamic range of the sensor, and is included when the sensor is measuring power levels relative to the 0 dBm calibrator reference level. Temperature linearity is included when operating the sensor at other than room temperature.

Noise, Zero Set and Drift

Measured on the lowest power range of the power sensor. Different power sensors have different noise characteristics. Reduce noise by averaging.

Mismatch uncertainty

Typically the largest component of the uncertainty budget - caused by the different impedances of the device under test and the sensor. To help resolve this issue, the sensor has been designed to have a good return loss over a wide frequency range, typically achieving significantly better results than the specification. In many cases the major contributing factor is the match of the source under test.



Mismatch is calculated in either dB or percentage terms from the source's and sensor's respective reflection coefficients.

The source match of the device under test can be improved by the use of precision attenuators with good return loss or by the use of external leveling with a high directivity coupler or splitter.

Connector damage has significant accuracy and repeatability effects, and is also the most common cause of sensor damage. Every MA2400A/D Series includes a hex nut connection for application of a calibrated torque wrench. Torque wrenches assure compliance with the quality requirement and result in consistent measurements.

Sensor calibration factor uncertainty

Identifies the accuracy of the sensor's calibration relative to a recognized standard for absolute power level. Anritsu power sensors are calibrated for accurate measurements per NIST (National Institute of Standards and Technology) traceability standards. Sensor calibration factor uncertainty is included in accuracy calculations for any absolute power measurement (in dBm or Watts) and for relative power measurements if the signals are different frequencies. Reference power uncertainty specifies the maximum possible output drift of the power meter's 50 MHz, 0.0 dBm power reference between calibration intervals. Reference power uncertainty and reference to sensor mismatch uncertainty do not generally impact relative power measurements. See the Anritsu website (www.anritsu.com) for more information and tool to calculate measurement uncertainties.

System Configuration

ML2430A Series	
Save/Recall	10 storage registers plus RESET default settings
Secure Mode	Wipes non-volatile memory on power up when active.

Interfaces

ML2430A Series	
Remote Monitoring	Yes
Modem Compatibility	Yes
GPIB (IEEE-488.2, IEC-625)	> 600 readings/second (per input channel) Emulation of Anritsu ML4803, Agilent 436, 437, and 438
External Video Output	N/A
Parallel Printer Port	Compatible with Deskjet 540 and 340 Models (other 500 Series and 300 Series and later are typically compatible). Canon BJC 80.
Ethernet (10/100 BaseT LAN)	N/A
RS232	Supports software download, instrument control, and modem dial-out. 1200, 2400, 4800, 9600, 19200, 38400, 57600 Baud rates are supported.
Cal Factor Voltage Input (BNC)	Operating Modes: Display voltage reading on selected channel Voltage proportional to frequency for sensor calibration factor compensation Blanking Input -TTL levels only Selectable positive or negative polarity Input Range: 0 V to 20 V Resolution: 0.5 mV Control: Adjustable voltage to frequency relationship
External Trigger (BNC)	TTL, maximum frequency of 800 kHz
Analog Output (BNC)	Two outputs configurable to Log or Lin Operating Modes: Selectable channel adjusted for calibration factors and other power reading correction settings Pass/Fail: Selectable TTL High or Low Channel output: Near real time analog Uncalibrated AC Modulation Output: Output 1 only Dwell Output: Output 2 only Output Range: -5.0 V to +5.0 V Resolution: 0.1 mV

Ordering Information

Power Meters & Sensors Selection Guide

Choose the power meter and power sensor for your measurement application.

Power Sensors	Standard Diode	(High Accuracy) Diode	Universal	Wideband	Pulse	Thermal
Model Number	MA2470D Series	MA2440D Series	MA2480D Series	MA249XA Series	MA2411B	MA2400xA
Power Measurement	Average (RMS)	Average (RMS)	Average (RMS)	Average (RMS), Peak	Average (RMS), Peak	Average (RMS)
Measurement Application (Examples)	CW, GMSK, GFSK, 8PSK	CW, GMSK	CW, GMSK, GFSK, 8PSK, QPSK, QAM	CW, GMSK, 8PSK, QPSK, QAM	Pulse, QAM	Any Modulation
	TDMA, FDMA, IS136	TDMA, FDMA	TDMA, FDMA, CDMA, OFDM, Radar	TDMA, FDMA, CDMA, OFDM, Radar	Radar, OFDM	Any Access Scheme
Compatible Power Meters	ML24xxA/B	ML24xxA/B	ML24xxA/B	ML2480A	ML2480A	ML24xxA/B

Power Meter Models

- ML2437A CW Power Meter, Single Input
- ML2438A CW Power Meter, Dual Input

ML2430A Series

- ML2400A-05 Front Bail Handle
- ML2400A-06 Rear Mount Input A on ML2437A
- ML2400A-07 Rear Input A and Reference on ML2437A
- ML2400A-08 Rear Mount Inputs A, B and Reference on ML2438A
- ML2400A-09 Rear Mount Inputs A and B on ML2438A
- 2000-1603 NiMH Battery
- 2000-996-R Desktop Battery Charger with Power Supply
- 2000-1534-R Desktop Battery Charger (for use in Japan only)
- 2000-1545 Bulkhead Adapter
- 10585-00001 Hard Copy Operation and Programming Manuals
- 10585-00003 Hard Copy Maintenance Manual
- ML2400A-98 Calibration to ISO 17025 and/or ANSI/NCSL Z540
- ML2400A-99 Premium Calibration
- Options 5 2400-82, and 2400-83 are mutually exclusive for any given ML2430A.
- Options 6, 7, 8 and 9 Mutually exclusive for any given ML2430A unit.
- Pulse/Modulated performance Only specified with 1.5 m sensor cable length.
- ANSI/NCSL Z540

Standard Accessories (all models)

- PowerSuite ML243xA only
- PowerXpert USB Power Sensors only
- Power Cord For destination country
- 1.5 m Sensor Cord One per meter input
- Certificate of Calibration (Also included with sensors)

Power Sensor Models

- MA2472D Standard diode sensor (10 MHz to 18 GHz, -70 dBm to 20 dBm)
- MA2473D Standard diode sensor (10 MHz to 32 GHz, -70 dBm to 20 dBm)
- MA2474D Standard diode sensor (10 MHz to 40 GHz, -70 dBm to 20 dBm)
- MA2475D Standard diode sensor (10 MHz to 50 GHz, -70 dBm to 20 dBm)
- MA2442D High accuracy diode sensor (10 MHz to 18 GHz, -67 dBm to 20 dBm)
- MA2444D High accuracy diode sensor (10 MHz to 40 GHz, -67 dBm to 20 dBm)
- MA2445D High accuracy diode sensor (10 MHz to 50 GHz, -67 dBm to 20 dBm)
- MA2481D Universal sensor (10 MHz to 6 GHz, -60 dBm to 20 dBm)
- MA2482D Universal sensor (10 MHz to 18 GHz, -60 dBm to 20 dBm)
- MA2490A Wideband sensor (50 MHz to 8 GHz, -60 dBm to 20 dBm)
- MA2491A Wideband sensor (50 MHz to 18 GHz, -60 dBm to 20 dBm)
- MA2411B Pulse Sensor (300 MHz to 40 GHz, -20 dBm to 20 dBm)
- MA24002A Thermal Sensor (10 MHz to 18 GHz, -30 dBm to 20 dBm)
- MA24004A Thermal Sensor (10 MHz to 40 GHz, -30 dBm to 20 dBm)
- MA24005A Thermal Sensor (10 MHz to 50 GHz, -30 dBm to 20 dBm)

General Options and Accessories

Peak and pulse sensor performance is specified with the standard sensor cable (2000-1537-R) and performance may degrade with longer cables.

760-209	Hard-side Transit Case
D41310	Soft Carry Case with Shoulder Strap
2000-1535	Front Panel Cover
2000-1536-R	0.3 m Sensor Cable
2000-1537-R	1.5 m Sensor Cable
2000-1538-R	3 m Sensor Cable
2000-1539-R	5 m Sensor Cable
2000-1540-R	10 m Sensor Cable
2000-1541-R	30 m Sensor Cable
2000-1542-R	50 m Sensor Cable
2000-1543-R	100 m Sensor Cable
2000-1544	RS-232 Bootload Cable
2400-82	Rack Mount, Single Unit
2400-83	Rack Mount, Side-by-Side
	(Options 5, 2400-82, and 2400-83 are mutually exclusive)
MA2400/97	Option 97, Accredited Calibration (For MA24XXA, MA24XXB, or MA24XXD Sensors)
MA2400/98	Option 98, Standard Calibration (For MA24XXA, MA24XXB, or MA24XXD Sensors)
MA2400/99	Option 99, Premium Calibration (For MA24XXA, MA24XXB, or MA24XXD Sensors)
MA24000-097	Option 97, Accredited Calibration (For MA2400XA Thermal Sensors)
MA24000-098	Option 98, Standard Calibration (For MA2400XA Thermal Sensors)
MA24000-099	Option 99, Premium Calibration (For MA2400XA Thermal Sensors)

1. Peak and pulse sensor performance is specified with the standard sensor cable (2000-1537-R) and performance may degrade with longer cables.

See your Anritsu Representative or Components catalogue for available Attenuators, Limiters, Coaxial adapters, Waveguide-to-Coaxial Adapters, Splitters & Dividers, Loads, Bridges, Open/Shorts, and Calibrated Torque Wrenches.

Software upgrades, LabView drivers, and additional literature can be downloaded from the Anritsu web site at <https://www.anritsu.com/en-US>

Regulatory Compliance

European Union	EMC 2014/30/EU, EN 61326-1:2013 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 & 2015/863
United Kingdom	EMC SI 2016/1091; BS EN 55011 & BS 61000-4-2/3/4/5/6/8/11 Consumer Protection (Safety) SI 2016/1101; BS EN 61010-1:2010 Environmental Protection SI 2012/3032;2011/65/EU & 2015/863
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-REM-A21+-0004
Canada	ICES-1(A)/NMB-1(A)

Anritsu Advancing beyond

• 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.
Americas Sales and Support**
450 Century Parkway, Suite 190,
Allen, TX 75013, U.S.A.
Phone: +1-800-Anritsu (1-800-267-4878)

• 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 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, Immeuble Goyave,
91140 VILLEBON SUR YVETTE, France
Phone: +33-1-60-92-15-50

• 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.
Spaces Eur Arte, Viale dell'Arte 25, 00144 Roma, Italy
Phone: +39-6-509-9711

List Revision Date: 20230901

• Sweden

Anritsu AB
Kistagången 20 B, 2 tr, 164 40 Kista, Sweden
Phone: +46-8-534-707-00

• Finland

Anritsu AB
Technopolis Aviapolis, Teknobulevardi 3-5 (D208.5),
FI-01530 Vantaa, Finland
Phone: +358-20-741-8100

• Denmark

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

• 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

• Austria

Anritsu EMEA GmbH
Am Belvedere 10, A-1100 Vienna, Austria
Phone: +43-(0)1-717-28-710

• United Arab Emirates

**Anritsu EMEA Ltd.
Anritsu A/S**
Office No. 164, Building 17, Dubai Internet City
P. O. Box - 501901, Dubai, United Arab Emirates
Phone: +971-4-3758479

• 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.
1 Jalan Kilang Timor, #07-04/06 Pacific Tech Centre
Singapore 159303
Phone: +65-6282-2400
Fax: +65-6282-2533

• Vietnam

Anritsu Company Limited
16th Floor, Peakview Tower, 36 Hoang Cau Street,
O Cho Dua Ward, Dong Da District, Hanoi, Vietnam
Phone: +84-24-3201-2730

• 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.
8F, A TOWER, 20, Gwacheondaero 7-gil, Gwacheon-si,
Gyeonggi-do, 13840, Republic of Korea
Phone: +82-2-6259-7300
Fax: +82-2-6259-7301

• 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