Anritsu Advancing beyond

# Field Master™

## Handheld RF Spectrum Analyzer

# MS2070A

9 kHz to 3 GHz

## Introduction

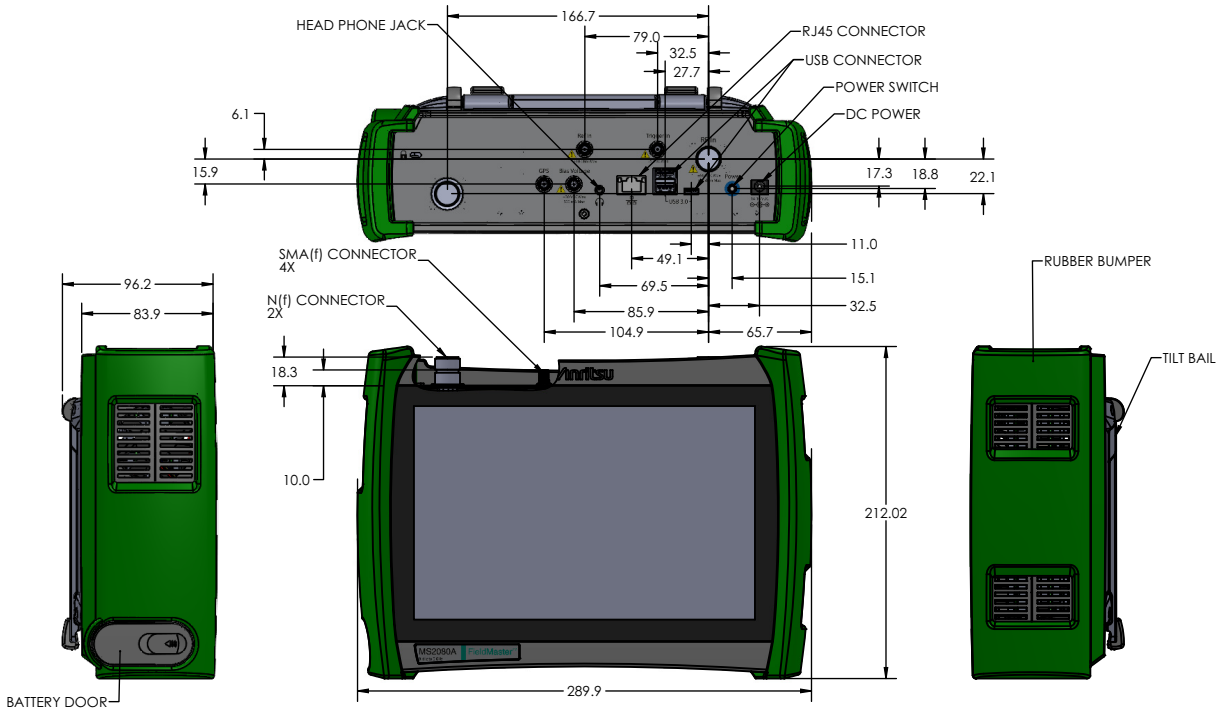
The Field Master MS2070A spectrum analyzer is the latest field portable RF spectrum analyzer from Anritsu. Building on over 20 years of experience in developing handheld instruments, the MS2070A offers an unmatched combination of affordable features and performance in a standard spectrum analyzer. Designed for field technicians who need a reliable instrument with specifications and tools necessary to perform routine spectrum monitoring and interference hunting in the crowded sub 3 GHz spectrum, all delivered in a robust case including a 10.1-inches multi-touch screen to ease the setup and results analysis.

## Instrument Highlights

- Modulation Bandwidth: 20 MHz standard
- Dynamic Range: > 105 dB Typical
- DANL: –167 dBm Typical with Preamp On
- Resolution Bandwidth (RBW): 1 Hz up to 5 MHz
- Level Accuracy: ±1 dB
- Sweep Speed 32 GHz/s

## Capabilities and Functional Highlights

- AM/FM Audio Demodulation
- Carrier-to-Interference
- Field Strength
- Occupied Bandwidth
- Channel Power
- Adjacent Channel Power
- Spectral Emission Mask
- High Accuracy Power Meter Measurements
- Signal Strength and RSSI
- Coverage Mapping
- Trace Recording/Playback
- Interference Finder
- Spectrogram Display
- IP52 Environmental Protection in Soft Case
- Built-in PDF Report Generator
- Multi-language Support
- 10.1-inches Multi-touch Screen
- USB 3.0 Ports
- Optional Wi-Fi Interface
- Ethernet and USBTMC Remote Control Interface




MS2070A

All dimensions in mm

## Table of Contents

Definitions . . . 3
Standard Spectrum Analyzer Features . . . 4
Spectrum Analyzer Performance . . . 5
Wi-Fi (Option 5) . . . 6
Preamplifier (Option 8) . . . 6
High Accuracy Power Meter (Option 19) . . . 6
Interference Finder and AM/FM Audio Demodulation (Option 24) . . . 7
GNSS Receiver (Option 31) . . . 7
Coverage Mapping (Option 431) . . . 7
AM/FM Modulation Measurement (Option 509) . . . 8
General Specifications . . . 9
Remote Interface Software . . . 10
Programmable Remote Control . . . 10
Ordering Information – Instrument Options . . . 10
Standard Accessories . . . 11
Related Manuals . . . 11
USB Power Sensors . . . 11
Optional Accessories . . . 12

## Definitions

| | |
|---|---|
| Specifications | All specifications and characteristics apply under the following conditions, unless stated otherwise:<br>• After 10 minutes of warm-up time, where the instrument is left in the ON state<br>• When using the internal 10 MHz reference signal |
| Typical Performance | Typical specifications are not tested and are not warranted. They are generally representative of characteristic performance. |
| Nominal Performance | Nominal specifications are design parameters; they are not tested and are not warranted. |
| Calibration Cycle | Calibration is within the recommended 12 month period |
| | All specifications in this data sheet are subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com |

## Standard Spectrum Analyzer Features

### Smart Measurements

| | |
|---|---|
| Field Strength | Measures field strength (dBm/m$^2$, dBW/m$^2$, dBV/m, dBmV/m, dBµV/m, V/m, W/m$^2$, W/cm$^2$, A/m) with antenna gain vs. frequency plot |
| Channel Power | Measures the total power and power spectral density within a specified bandwidth |
| Occupied Bandwidth | Measures the 99 % to 1 % power channel of a signal |
| Adjacent Channel Power | Measures the channel power of the adjacent channel |
| Spectral Emission Mask | Standards based limits for wireless emissions |
| Carrier-to-Interference (C/I) | Measures the ratio of power (dB) in an RF carrier to the interference power in the channel. |

### Setup Parameters

| | |
|---|---|
| Frequency | Center/Start/Stop, Frequency Step, Frequency Offset, Gestures |
| Span | Span (Manual/Increment 1, 2, 5), Full Span, Last Span, Zero Span |
| Amplitude | Reference Level (Manual/Auto and Offset), Scale/Division, Y-Axis Unit (dBm, dBW, dBV, dBmV, dBµV, dBA, V, W, A), Attenuation (Auto/Manual), Attenuation Level, Field Strength, Gestures |
| Bandwidth | RBW/VBW (Auto/Manual), VBW Type (Linear/Logarithmic), RBW:VBW Ratio, SPAN:RBW Ratio |
| Sweep | Single/Continuous, Restart, Sweep Once, Sweep to N, Auto/Manual Time |

### Spectrogram

| | |
|---|---|
| Number of Lines | 142 |
| Trace Time/Position Cursor | Up to six Cursors (display historical trace data by trace position or time) |
| Cursor State | Active, Hold/View, Blank |
| Color Setup | Color Scale Top/Bottom Range, Reference Hue, Preset Setup |

### Trace Functions

| | |
|---|---|
| Traces | Up to six Traces |
| Trace Type | Clear/Write, Average (2 to 1000), Max Hold, Min Hold, Rolling Average, Rolling Max Hold, Rolling Min Hold |
| Trace Math | T1-T2, T2-T1 (when T5 and T6 are selected) |
| Trace Mode | Active, Hold/View, Blank |
| Detector Type per Trace | Peak, RMS/Avg, Negative, Sample, Normal |
| Trace Record | Record live samples with manual tagging to internal or external storage |
| Trace Playback | Play recorded samples from internal or external storage; set playback interval |
| CSV Logging | Record live or playback traces in CSV format for post processing |

### Trigger Functions (zero span only)

| | |
|---|---|
| Sources | Free Run, Video, External |
| Settings | Level, Delay, Holdoff, Periodic, Slope (Rising/Falling), Hysteresis |

### Marker Functions

| | |
|---|---|
| Markers | Up to 12 Markers |
| Marker Measurements | Amplitude, Frequency (swept spectrum display)<br>Amplitude, Time (Zero Span) |
| Marker Mode | Normal, Delta, Fixed |
| Delta Marker | Relative to any Normal or Fixed Marker |
| Marker Function | None, Noise, Frequency Counter (1 Hz, 100 mHz, 10 mHz, 1 mHz resolutions), Quasi-Peak (per CISPR 16-1-1) |
| Marker Trace | Assign Marker to any Trace |
| Peak Search | Peak Search, Next Peak, Next Peak Left, Next Peak Right, Next Point Left, Next Point Right |
| Peak Search Setup | Peak Threshold, Peak Excursion |
| Marker | Mkr → Center, Mkr → Ref Level |
| Marker Table | Up to 12 Markers Showing Marker, Mode, Function, Trace, Frequency, Amplitude, Delta Frequency & Offset |

### Limit Line Functions

| | |
|---|---|
| Limit Setup | Upper/Lower, Limit On/Off, Limit Alarm On/Off, Set Default Limit Line, Absolute/Relative |
| Limit Line Edit | Frequency, Amplitude, Add Point, Add Vertical, Delete Point, Next Point Left/Right |
| Limit Line Move | Center, X-Offset (Hz), Left, Right, Y-Offset, Up, Down, To Marker 1, Marker 1 Offset (dB) |
| Limit Line Envelope | Select Envelope (Upper/Lower), Set Envelope, Envelope Points (2-41), Amplitude Offset, Shape (Square/Slope) |

## Spectrum Analyzer Performance

**Frequency** (usable to 0 Hz)

| | |
|---|---|
| MS2070A-0703 | 9 kHz to 3 GHz (Option 703) |
| Tuning Resolution | 1 Hz |
| Span | 10 Hz to max frequency, Zero Span |
| Frequency Reference | Internal, GNSS, External |
| Internal Frequency Reference | Standard TCXO:<br>Aging: ±1.0 x $10^{-6}$ per year<br>Accuracy: ±2.8 x $10^{-7}$ (-10 °C ± 55°C) plus aging<br>(see "GNSS Receiver (Option 31)" for improved accuracy) |
| External Frequency Reference | 10 MHz, -10 dBm to +10 dBm |

**Bandwidth**

| | |
|---|---|
| Analysis Bandwidth | 20 MHz (standard) |
| Resolution Bandwidth (RBW) | 1 Hz to 3 MHz, 1 Hz to 5 MHz in zero span |
| Video Bandwidth (VBW) | 1 Hz to 3 MHz, 1 Hz to 5 MHz in zero span |
| RBW Selectivity | 4:1 nominal (–60 dB / –3 dB) |
| CISPR Bandwidth | Resolution bandwidth when using Quasi-Peak marker function: 200 Hz, 9 kHz, and 120 kHz |
| VBW/Average Type | Linear/Log |

**Sweep**

| | |
|---|---|
| Manual Sweep | Maximum sweep time is 3600 s (1 hour) |
| Sweep Points | 10 to 10,001 (1001 in zero span) |
| Sweep Rate (non-zero span) | 32 GHz/s |

**Zero Span**

| | |
|---|---|
| Sweep Time | 60 ns to 3600 s in zero span |
| Sweep Time Accuracy | ±2 % in zero span |

**Spectral Purity – SSB Phase Noise**

| | SSB Phase Noise | |
|---|---|---|
| Offset from 1 GHz RF Input | Maximum | Typical |
| 10 kHz | –93 dBc/Hz | –94 dBc/Hz |
| 100 kHz | –95 dBc/Hz | –97 dBc/Hz |
| 1 MHz | –120 dBc/Hz | –123 dBc/Hz |

**Spurs** (Preamplifier (Option 8)

| | |
|---|---|
| Residual Spurious | < –105 dBm (RF input terminated, 0 dB input attenuation, > 10 MHz, preamp On)<br>< –94 dBm (RF input terminated, 0 dB input attenuation, 10 MHz to 3 GHz, preamp Off) |
| Input-Related Spurious | < –70 dBc (0 dB attenuation, –30 dBm input) |
| Exceptions, typical | < –68 dBc @ 700 MHz to 3300 MHz with 2086 MHz Input<br>< –65 dBc @ 2*(F1 –1484) MHz, where 3140 MHz < F1 < 3580 MHz<br>< –68 dBc @ F1 – 2086 MHz where 2100 MHz < F1 < 4970 MHz |
| Local-Oscillator Related Spurious | < –60 dBc nominal for offsets > 1 MHz |

**Amplitude Ranges**

| | |
|---|---|
| Dynamic Range | 105 dB typical at 1 GHz, 2/3 (TOI-DANL) in 1 Hz RBW |
| Measurement Range | DANL to +30 dBm |
| Display Range | 1 to 15 dB/div in 1 dB steps, ten divisions displayed |
| Reference Level Range | –150 dBm to +30 dBm |
| Attenuator Resolution | 0 to 50 dB, 5 dB steps |
| Reference Level Offset | 99.9 dB external loss to 99.9 dB external gain |
| Maximum Continuous Input | +30 dBm CW, ±50 VDC (≥ 10 dB attenuation)<br>+23 dBm CW, ±50 VDC (< 10 dB attenuation)<br>+10 dBm CW, ±50 VDC (preamp On) |
| Damage Level | 5 W (+37 dBm) |

**Amplitude Accuracy** (≥ 10 dB attenuation, –50 dBm ≤ input signal ≤ –10 dBm, 1 kHz RBW, auto-coupled, excluding effects of VSWR, noise, and spurs)

| | 20 °C to 30 °C (after 30 minute warm-up) | | –10 °C to 55 °C (after 60 minute warm-up) | |
|---|---|---|---|---|
| Frequency Range | Maximum | Typical | Maximum | Typical |
| 9 kHz to 3 GHz[a] | ±1.00 dB | ±0.5 dB | ±2.0 dB | ±0.5 dB |

a. Values below 100 kHz are with preamp off

**Displayed Average Noise Level (DANL)** (RMS detection, VBW/Avg type = Log, reference level = –20 dBm for preamp Off and –50 dBm for preamp On, auto attenuation On, normalized to 1 Hz RBW). Preamplifier (Option 8).

| | Preamp = On | | Preamp = Off | |
|---|---|---|---|---|
| Frequency Range | Maximum | Typical | Maximum | Typical |
| 10 MHz to 2 GHz | –161 dBm | –167 dBm | –142 dBm | –150 dBm |
| > 2 GHz to 3 GHz | –160 dBm | –165 dBm | –140 dBm | –146 dBm |

**Third-Order Intercept (TOI)** (–20 dBm tones 100 kHz apart, 0 dB input attenuation, preamp Off, reference level –20 dBm)

| | |
|---|---|
| 1 GHz | +7 dBm, Typical |
| 2 GHz | +11 dBm, Typical |
| 3 GHz | +14 dBm, Typical |

**Second Harmonic Distortion** (0 dB input attenuation, –30 dBm input, preamp Off)

| | |
|---|---|
| 50 MHz | –65 dBc maximum |
| > 50 MHz to 1.5 GHz | –70 dBc, typical |

**VSWR** (≥ 10 dB input attenuation)

| | |
|---|---|
| 9 kHz to 2.0 GHz | 1.5:1 typical |
| 2 GHz to 3.0 GHz | 1.8:1 typical |

## Wi-Fi (Option 5)

| | |
|---|---|
| **Wireless Standard** | 802.11a/b/g/n/ac |

## Preamplifier (Option 8)

| | |
|---|---|
| **Frequency Range** | 9 kHz to 3 GHz |

## High Accuracy Power Meter (Option 19) (requires external USB power sensor, sold separately)

| | | | | |
|---|---|---|---|---|
| Amplitude | Maximum Display, Minimum Display, External Gain, External Loss, Relative Power On/Off, Units (dBm, W) | | | |
| Setup | # of Running Averages, Max Hold, Measuring Mode (Continuous/Single), Run/Hold, Sensor Info | | | |
| Zero/Cal | Zero, Cal Frequency, Signal Standard | | | |
| Limits | Limit On/Off, Upper/Lower Limit, Alarm On/Off | | | |
| Power Sensor Model | MA24106A | MA24108A/18A/26A | MA24208A/18A | MA24330A/40A/50A |
| Description | High Accuracy RF Power Sensor | Microwave USB Power Sensor | Microwave Universal USB Power Sensor | Microwave CW USB Power Sensor |
| Frequency Range | 50 MHz to 6 GHz | 10 MHz to 8/18/26 GHz | 10 MHz to 8/18 GHz | 10 MHz to 33/40/50 GHz |
| Connector | Type N(m), 50 Ω | Type N(m), 50 Ω (8/18 GHz)<br>Type K(m), 50 Ω (26 GHz) | Type N(m), 50 Ω | Type K(m), 50 Ω (33/40 GHz)<br>Type V(m), 50 Ω (50 GHz) |
| Dynamic Range | –40 dBm to +23 dBm (0.1 µW to 200 mW) | –40 dBm to +20 dBm (0.1 µW to 100 mW) | –60 dBm to +20 dBm (1 nW to 100 mW) | –70 dBm to +20 dBm (0.1 nW to 100 mW) |
| Measurand | True-RMS | True-RMS, Slot Power, Burst Average Power | True-RMS, Slot Power, Burst Average Power | Average Power |
| Measurement Uncertainty | ±0.16 dB[a] | ±0.18 dB[b] | ±0.17 dB[c] | ±0.17 dB[d] |
| Data sheet (for complete specifications) | 11410-00424 | 11410-00504 | 11410-00841 | 11410-00906 |

Notes:
a. Total RSS measurement uncertainty (0 °C to 50 °C) for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.
b. Expanded uncertainty with K=2 for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.
c. Power uncertainty expressed with two sigma confidence level for CW measurement after zero operation. Includes calibration factor and linearity over temperature uncertainties, but not the effects of mismatch, zero set and drift, or noise.
d. Includes linearity over temperature uncertainties, but not the effects of calibration factor, mismatch, zero set and drift, and noise.

## Interference Finder and AM/FM Audio Demodulation (Option 24) (requires GNSS Receiver (Option 31))

The interference finder option is available in normal spectrum analyzer mode. This option requires a directional antenna sold separately.

### Supported Measurements

Interference Finding Audio Tone
AM/FM Audio Demodulation
Interference Triangulation Mapping (recommended InterferenceHunter™ MA2700A)
Interference Polar Plot (requires InterferenceHunter MA2700A)

### Interference Finder Audio Tone

| | |
|---|---|
| Setup | Integration Bandwidth, Power Limit, MAX/MIN Level, Volume |
| Audio Tone | 20 Hz to 20 kHz (Tone pitch and volume changes with detected signal strength) |

### AM/FM Audio Demodulation

| | |
|---|---|
| Demod Frequency | Full range of instrument |
| Audio Demodulation | AM, USB, LSB, Wideband FM, Narrowband FM |
| Markers | Selectable demodulation marker (1 to 12) |
| Audio | Toggle On/Off |
| Volume | Set 0% to 100% |
| Record Audio | Record audio up to 100,000 s (dependent on instrument memory) |
| Squelch Level | –120 dBm to +30 dBm (set RF level threshold to break audio silence, supports log and linear units) |

### Interference Map Triangulation (recommended for use with InterferenceHunter MA2700A handle and requires directional antenna, sold separately. If not using MA2700A, Option 31, GNSS and antenna are required)

| | |
|---|---|
| Triangulation | Triangulates on source of interference location using eCompass and digital maps displayed on screen |
| Manual Setup | Manual entry of compass bearing values |

### Interference Polar Plot (requires InterferenceHunter MA2700A handle and directional antenna, sold separately)

| | |
|---|---|
| Signal Strength Radar Plot | 360° radar plot of single frequency signal strength centered on current GNSS location |

## GNSS Receiver (Option 31) (Requires GPS antenna, sold separately)

| | |
|---|---|
| Supported Satellite Systems | GNSS (includes combinations of GPS, GLONASS, Galileo, BeiDou) |
| Setup | On/Off, Antenna Voltage 3.3 V/5.0 V, GPS/GNSS Info |
| GNSS Time/Location Indicator | UTC Time, Latitude, Longitude, and Altitude on display (UTC Time and Altitude on GNSS Info display) |
| High Frequency Accuracy | < ±2.5 x $10^{-8}$ with GNSS On, three minutes after satellite lock in selected mode (GNSS antenna connected) |
| Connector | SMA(f) |

## Coverage Mapping (Option 431)

### Spectrum Analyzer Measurements

| | |
|---|---|
| Channel Power | Plots channel power in dBm, dBW, dBV, dBmV, dBµV, dBA, V, W, A |
| Spectral Density | Plots spectral density in dBm/Hz, dBW/Hz, dBV/Hz, dBmV/Hz, dBµV/Hz, dBA/Hz, V/Hz, W/Hz, A/Hz |
| RSSI | Plots received signal strength indicator in dBm, dBW, dBV, dBmV, dBµV, dBA, V, W, A |
| Field Strength | Plots field strength in dBm/$m^2$, dBW/$m^2$, dBV/m, dBmV/m, dBµV/m, dBA/m, V/m, W/$m^2$, W/$cm^2$, A/$m^2$ |
| Power Flux Density | Plots power flux density in dBm/$m^2$/Hz, dBW/$m^2$/Hz, dBV/m/Hz, dBmV/m/Hz, dBµV/m/Hz, dBA/m/Hz, V/m/Hz, W/$m^2$/Hz, W/$cm^2$/Hz, A/m/Hz |

### Spectrum Analyzer Measurement Setup

| | |
|---|---|
| Map Type | Indoor: PNG or JPEG<br>Outdoor: OpenStreetMap® (downloaded direct from Internet to instrument or using external PC software) |
| Frequency (Excluding RSSI) | Center/Start/Stop, Frequency Step, Frequency Offset |
| Span (Excluding RSSI) | Span (Manual/Increment 1, 2, 5), Full Span, Last Span, Zero Span |
| Amplitude | Reference Level (Manual/Auto and Offset), Scale/Division, Y-Axis Unit, Preamp (on/off), Attenuation (Auto/Manual), Field Strength |
| Bandwidth | RBW/VBW (Auto/Manual), VBW Type (Linear/Logarithmic), RBW:VBW Ratio, SPAN:RBW Ratio |
| Mapping Colors | Customizable Amplitude Range Thresholds for Each Color<br>Blue (Excellent), Green (Very Good), Yellow (Good), Orange (Fair), Pink (Poor) |
| Point Distance or Time Setup | Repeat Type: Time (1 s to 60 s) or Distance (1 m to 10,000 m), Distance Units: Meters or Feet |
| Save | Indoor: Setup, Measurement File (fmspa), PNG<br>Outdoor: Setup, KML Points, PNG, Tab Delimited |
| Recall | Setup, KML Points File, Measurement File (fmspa) |

## AM/FM Modulation Measurement (Option 509)

### AM Measurements

| | |
|---|---|
| AM Depth | 0% to 100%, ±2% accuracy, typical |
| AM Bandwidth | 20 kHz |
| AM Standards | Standard AM, Upper/Lower Sideband suppressed carrier |
| SINAD | 0 to 60 dB, nominal based on 1kHz modulating tone |
| THD | -60 dB, using up to 10 harmonics of 1 kHz modulating tone |
| Demodulated AM Spectrum | Frequency Scale, 0 to 24 kHz |
| Audio Time Domain | 5 s or auto zoomed |
| Graphs | Audio Spectrum (Log AM depth percentage vs frequency), RF Spectrum<br>Audio Time Domain (Linear AM depth percentage vs time), Audio Results |
| Audio Results | Signal Power (dBm), Carrier Frequency, RMS Depth, (Peak-to-peak)/2 Depth,<br>Peak Positive/Peak Negative Depth, SINAD (dB), Upper/Lower AM Depth, THD (dB) |
| Setup | Demodulation Frequency, Demodulation Marker (on/off), Marker Tracked (1 to 12), Zoomed Time Graph (on/off), Modulation (AM, USB, LSB), Audio (on/off), Volume (on/off), Record Duration (1 to 100000 S), Record, Squelch Level (-120 to 30 dBm) |

### FM Measurements

| | |
|---|---|
| FM Bandwidth | 96 kHz (wide) |
| FM Deviation | Up to 75 kHz with 2% accuracy, ±1 kHz typical |
| SINAD | 0 to 60 dB, nominal based on 1 kHz modulating tone |
| THD | -75 to 0 dB, using up to 10 harmonics of 1 kHz modulating tone |
| Demodulated FM Spectrum | Wideband: 96 kHz full span, 20 kHz zoomed<br>Narrowband: 25 kHz, 24 kHz (audio spectrum)<br>12.5 kHz, 14 kHz (audio spectrum)<br>6.25 kHz, 6 kHz (audio spectrum) |
| Audio Time Domain | 5 s or auto zoomed |
| Graphs | Audio Spectrum (Log FM deviation vs frequency), RF Spectrum<br>Audio Time Domain (Linear FM deviation vs time), Audio Results |
| Audio Results | Signal Power (Hz), Carrier Frequency, RMS FM deviation, (Peak-to-peak)/2 Deviation, SINAD, Total Harmonic Distortion (THD) Peak Positive/Negative Deviation |
| Setup | Demodulation Frequency, Demodulation Marker (on/off), Marker Tracked (1 to 12), Zoomed Audio Graph (on/off), Zoomed Time Graph (on/off), Modulation (FM Narrowband (6.25, 12.5, 25 kHz), FM Wideband), Audio (on/off), Volume (on/off), Record Duration (1 to 100000 S), Record, Squelch Level (-120 to 30 dBm) |

## General Specifications

### Setup and File Parameters

| | |
|---|---|
| Date and Time | Date and Time settings, Time Zone settings, Time synced to Internet/GNSS |
| Language | English, Spanish, Chinese-simplified, Japanese, French, Korean |
| Display | Brightness adjustment, Auto screen dimming shutoff timer (On/Off), Color schemes (Default, Light, Black & White, Night Vision) |
| Screen Shot Settings | Image capture size, Image header/footer |
| Option Configuration | Enable options using file (USB) |
| GNSS (GPS) | see "GNSS Receiver (Option 31)" on page 7 |
| Ethernet | Ethernet (IP4 & IP6 formats), Type (DHCP, Static) |
| Reset | Factory Reset, Delete All User Files, Delete System Files, Master Reset, Diagnostics |
| Diagnostics | Self Test, Service Tools, exportable event and system error logs |
| Save/Recall | Measurement Setup, Screenshot Image (PNG), Export Measurement data (DAT, TXT, CSV), Location |
| File Management | Save, Copy, Paste, Delete, Create New Folder, Set File Name and File Type, Rename |

### Report Generator

| | |
|---|---|
| PDF Reports | Creates detailed measurement reports on the instrument |
| Report Contents | Free form text fields to identify and locate the site of measurements, company logo image instrument screen captures and site photographs |
| Report Format | PDF and HTML |

### Connectors

| | |
|---|---|
| RF In | Type N(f), 50 Ω |
| GPS | SMA(f) |
| External Power | 5.5 mm barrel connector, 14 to 16 VDC |
| Ethernet Interface | RJ45 connector for Ethernet 10/100/1000 Mbps (connect to PC or LAN for remote access) |
| USB Interface | Two USB 3 Type A (supports file transfer)<br>One USB 3 Type C (USBTMC) |
| Headset Jack | 3.5 mm headset jack |
| External Reference In | SMA(f), 50 Ω |
| External Trigger In | SMA(f), 50 Ω, TTL-compatible levels |
| DC Bias Voltage | SMA(f), Setup: On/Off, Voltage, Trip Reset<br>Voltage Range: +1 V to +34 V, Resolution: 0.1 V |

### Display and Keyboard

| | |
|---|---|
| Display | 10.1-inches capacitive touchscreen, 1280 x 800 resolution |
| Shortcuts | Maximum of five user-configured measurement setup shortcuts |
| Screen Strength | IK08 (protected against a five joule impact) |
| Keyboard | Common alphanumeric/symbolic keys and customizable EZ keyboard |
| Touch Gestures | Pinch to zoom x (span), Drag in x (center frequency, markers, limit line points) |
| Toolbar | System menu, application menu, camera icon, USB eject icon, software update icon, local host icon, lock status (touchscreen), notification icon, Wi-Fi icon, GNSS icon, battery percentage icon, time and date |

### Battery

| | |
|---|---|
| Type | Li-ion |
| Internal Battery | Three hours operation, typical |
| Charging Temperature Limit | 0 °C to +45 °C, relative humidity ≤ 80 % |
| Nominal Capacity | 8400 mAh |
| Nominal Energy | 94 Wh |
| External Battery Accessory | Six hours operation, typical (with an accessory battery contained in soft carrying case) |

### 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<br>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-3(A)/NMB-3(A) |
| United States | FCC ID: SQG-60SIPT |

| | | |
|---|---|---|
| **Environmental** | | MIL-PRF-28800F Class 2 |
| | Operating Temperature Range | –10°C to 55°C |
| | Storage Temperature Range | –51°C to 71°C |
| | Maximum Relative Humidity | 95 % RH at 30°C, non-condensing |
| | Vibration, Sinusoidal | 5 Hz to 55 Hz |
| | Vibration, Random | 10 Hz to 500 Hz |
| | Half Sine Shock | 30 $g_n$ |
| | Altitude | 4600 meters, operating and non-operating |
| | Explosive Atmosphere | MIL-PRF-28800F Section 4.5.6.3<br>MIL-STD-810G, Method 511.5, Procedure 1 |
| | Ingress Protection Rating | Complies with IP52 when installed in soft carrying case |
| **Warranty** | Duration | Standard three-year warranty<br>One-year warranty on battery |
| **Size and Weight** | Size | 290 mm x 212 mm x 96 mm (11.4 in x 8.3 in x 3.7 in) |
| | Weight | MS2070A-0703: 3.8 kg (8.39 lb) |

## Remote Interface Software

| | |
|---|---|
| | Free MS2070A software download from www.anritsu.com |
| Functionality | Full instrument graphical user interface control from a PC with simulated hardware support for on-screen measurement analysis |
| Interfaces | Ethernet, WLAN (Option 5) |

## Programmable Remote Control

| | |
|---|---|
| Functionality | Full instrument programming control (except power On/Off) via Ethernet and Wi-Fi (Option 5), and USBTMC<br>See the instrument Programming Manual for details |
| Programming Language | Standard Commands for Programmable Instruments (SCPI) |
| Interfaces | Ethernet, WLAN (Option 5), USBTMC (USB C port) |

## Ordering Information – Instrument Options

| Part Number | Description |
|---|---|
| MS2070A | Field Master Spectrum Analyzer |
| **Options** | |
| MS2070A-0703 | 9 kHz to 3 GHz Spectrum Analyzer (required) |
| MS2070A-0005 | Wi-Fi |
| MS2070A-0008 | Preamplifier |
| MS2070A-0019* | High Accuracy Power Meter (requires compatible USB power sensor, sold separately) |
| MS2070A-0024* | Interference Finder (requires GNSS Receiver Option MS2080A-0031and directional antenna, sold separately) |
| MS2070A-0031* | GNSS Receiver (requires GPS antenna, sold separately) |
| MS2070A-0431* | Coverage Mapping (requires GNSS Receiver Option MS2070A-0031) |
| MS2090A-0509* | AM/FM Modulation Measurement |
| MS2070A-0703-0097 | Accredited Calibration to ISO17025 and ANSI/NCSL Z540-1 |
| MS2070A-0703-0098 | Standard Calibration to ISO17025 and ANSI/NCSL Z540-1 |
| MS2070A-0703-0099 | Premium Calibration to ISO17025 and ANSI/NCSL Z540-1 plus test data |
| *** Time-Limited Options** | Options marked with an asterisk are offered as a 90-day time limited option by ordering as a -9xxx series option. For example, MS2070A-9431 is the 90-day time limited option for coverage mapping Measurements. The option start time begins when the user first activates the option. |
| **Supported Software** | MX280007A Mobile InterferenceHunter™<br>MS2070A PC Remote User Interface |

## Standard Accessories (included with instrument)

| Accessory | Description |
|---|---|
|  | 2000-2071-R<br>MS2070A Soft Case |
| | Certificate of Calibration and Conformance |
|  | 633-79<br>Li-ion Battery, 94 Wh |
|  | 40-204-R<br>AC/DC Power Adapter (Field Master Series) |

| Accessory | Description |
|---|---|
|  | 2000-1371-R<br>Ethernet Cable, 2 m |
|  | 2000-1859-R<br>USB Cable, USB 3.0 Type-A to Type-C, 1 m |
|  | 806-442-R<br>SMA(m) to BNC(m) cable, 1 m |
|  | 2000-2054-R<br>SMA(m) to BNC(f) Adapter (qty 3) |

## Related Manuals (available at www.anritsu.com)

| Part Number | Description |
|---|---|
| 10100-00069 | Product Information, Compliance, and Safety |
| 10580-00483 | Field Master™ User Guide |
| 10580-00495 | Field Master Programming Manual |
| 10580-00447 | Field Master Series Spectrum Analyzer Measurement Guide<br>Interference Finder (Option 24, requires Option 31)<br>Coverage Mapping (Option 431)<br>AM/FM Modulation Measurement (Option 509) |
| 10580-00492 | Field Master Series High Accuracy Power Meter Measurement Guide (Option 19) |

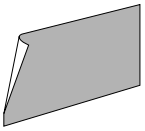
## USB Power Sensors (for complete ordering information, see the respective data sheets of each sensor)

| Accessory | Description |
|---|---|
|  | MA24330A<br>Microwave CW USB Power Sensor, 10 MHz to 33 GHz, +20 dBm |
| | MA24340A<br>Microwave CW USB Power Sensor, 10 MHz to 40 GHz, +20 dBm |
| | MA24350A<br>Microwave CW USB Power Sensor, 10 MHz to 50 GHz, +20 dBm |
|  | MA24208A<br>Microwave Universal USB Power Sensor, 10 MHz to 8 GHz, +20 dBm to –60 dBm |
| | MA24218A<br>Microwave Universal USB Power Sensor, 10 MHz to 18 GHz, +20 dBm to –60 dBm |
|  | MA24106A<br>High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +23 dBm to –40 dBm |

| Accessory | Description |
|---|---|
|  | MA24108A<br>Microwave USB Power Sensor, 10 MHz to 8 GHz, +20 dBm to –40 dBm |
| | MA24118A<br>Microwave USB Power Sensor, 10 MHz to 18 GHz, +20 dBm to –40 dBm |
| | MA24126A<br>Microwave USB Power Sensor, 10 MHz to 26 GHz, +20 dBm to –40 dBm |
|  | MA25100A<br>RF Power Indicator |

## Optional Accessories

### Miscellaneous Accessories

| Accessory | Description |
|---|---|
|  | 67135<br>Anritsu Backpack (for Handheld Instrument and PC) |
|  | 40-207-R<br>Automotive DC/DC Power Adapter |
|  | 2000-2048-R<br>Screen Protector |
|  | MA2700A<br>Handheld Interference Hunter (For full specifications, refer to the MA2700A Technical Data Sheet 11410-00692) |
|  | 2000-1689-R<br>EMI Near-Field Probe Kit (For full specifications, refer to the Near-Field Probe Set User Guide 10580-00347) |
|  | 2000-1884-R<br>PIM Hunter™ Test Probe (For full specifications, refer to the 2000-1884-R Technical Data Sheet 11410-00999) |

| Accessory | Description |
|---|---|
|  | 760-243-R<br>Large Transit Case with Wheels and Handle<br>56 cm x 45.5 cm x 26.5 cm (22.07" x 17.92" x 10.42") |
|  | 2000-1374-R<br>External Dual Charger for Li-Ion Batteries |
|  | 2000-2074-R<br>Extended Power Pack with Cable |
|  | 2000-2053-R<br>Shoulder Harness |
|  | 12N50-75B<br>Matching Pad, DC to 3 GHz, 50 Ω to 75 Ω |

### GPS Antennas (active)

| Accessory | Description |
|---|---|
|  | 2000-1528-R<br>Magnet Mount, SMA (m) with 5 m (16.4 ft) cable, requires 5 VDC |
|  | 2000-1652-R<br>Magnet Mount, SMA (m) with 0.3 m (1 ft) cable, requires 3.3 VDC or 5 VDC |

| Accessory | Description |
|---|---|
|  | 2000-1760-R<br>Miniature Antenna, SMA (m), requires 2.5 VDC to 3.7 VDC |

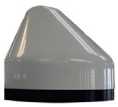
## Portable Antennas

| Accessory | Description |
|---|---|
|  | 2000-1200-R<br>806 MHz to 866 MHz, SMA(m), 50 Ω |
|  | 2000-1473-R<br>870 MHz to 960 MHz, SMA(m), 50 Ω |
|  | 2000-1035-R<br>896 MHz to 941 MHz, SMA(m), 50 Ω (1/2 wave) |
|  | 2000-1030-R<br>1710 MHz to 1880 MHz, SMA(m), 50 Ω (1/2 wave) |
|  | 2000-1474-R<br>1710 MHz to 1880 MHz with knuckle elbow (1/2 wave) |
|  | 2000-1031-R<br>1850 MHz to 1990 MHz, SMA(m), 50 Ω (1/2 wave) |

| Accessory | Description |
|---|---|
|  | 2000-1475-R<br>1920 MHz to 1980 MHz and 2110 MHz to 2170 MHz, SMA(m), 50 Ω |
|  | 2000-1032-R<br>2400 MHz to 2500 MHz, SMA(m), 50 Ω (1/2 wave) |
|  | 2000-1751-R<br>698 MHz to 960 MHz, 1710 MHz to 2100 MHz, 2500 MHz to 2700 MHz, SMA(m), 2 dB, typical, 50 Ω |
|  | 2000-1361-R<br>2400 MHz to 2500 MHz, 5000 MHz to 6000 MHz, SMA(m), 50 Ω |
|  | 2000-1636-R<br>Antenna Kit (Consists of: 2000-1030-R, 2000-1031-R, 2000-1032-R, 2000-1200-R, 2000-1035-R, 2000-1361-R, and carrying pouch) |

## Mag Mount and Broadband Antennas

| Accessory | Description |
|---|---|
|  | 2000-2141-R<br>20 MHz to 21000 MHz, N(f), 50 Ω |
|  | 2000-1645-R<br>694 MHz to 894 MHz, 3 dBi peak gain<br>1700 MHz to 2700 MHz, 3 dBi peak gain, N(m), 50 Ω, 10 ft |
|  | 2000-1646-R<br>750 MHz to 1250 MHz, 3 dBi peak gain,<br>1650 MHz to 2000 MHz, 5 dBi peak gain,<br>2100 MHz to 2700 MHz, 5 dBi peak gain, N(m), 50 Ω, 10 ft |

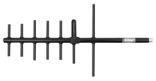
| Accessory | Description |
|---|---|
|  | 2000-1648-R<br>1700 MHz to 6000 MHz, 3 dBi peak gain, N(m), 50 Ω, 10 ft |
|  | 2000-1946-R<br>Cable 1: 617 MHz to 960 MHz, 3 dBi peak gain, 1710 MHz to 3700 MHz, 4 dBi peak gain, N(m), 50 Ω, 10 ft<br>Cable 2: 3000 MHz to 6000 MHz, 5 dBi peak gain, N(m), 50 Ω, 10 ft<br>Cable 3: GPS 26 dB gain, SMA(m), 50 Ω, 10 ft |
|  | 2000-1647-R<br>Cable 1: 698 MHz to 1200 MHz, 2 dBi peak gain, 1700 MHz to 2700 MHz, 5 dBi peak gain, N(m), 50 Ω, 10 ft<br>Cable 2: 3000 MHz to 6000 MHz, 5 dBi peak gain, N(m), 50 Ω, 10 ft<br>Cable 3: GPS 26 dB gain, SMA(m), 50 Ω, 10 ft |

**Bandpass Filters**

| Accessory | Description |
|---|---|
| | 1030-114-R<br>806 MHz to 869 MHz, N(m) to SMA(f), 50 Ω |
| | 1030-109-R<br>824 MHz to 849 MHz, N(m) to SMA(f), 50 Ω |
| | 1030-110-R<br>880 MHz to 915 MHz, N(m) to SMA(f), 50 Ω |
| | 1030-111-R<br>1850 MHz to 1910 MHz, N(m) to SMA(f), 50 Ω |
| | 1030-112-R<br>2400 MHz to 2484 MHz, N(m) to SMA(f), 50 Ω |
| | 1030-105-R<br>890 MHz to 915 MHz, N(m) to N(f), 50 Ω |
| | 1030-106-R<br>1710 MHz to 1790 MHz, N(m) to N(f), 50 Ω |
| | 1030-107-R<br>1910 MHz to 1990 MHz, N(m) to N(f), 50 Ω |
|  | 1030-149-R<br>High Pass, 150 MHz, N(m) to N(f), 50 Ω |
| | 1030-150-R<br>High Pass, 400 MHz, N(m) to N(f), 50 Ω |
| | 1030-151-R<br>High Pass, 700 MHz, N(m) to N(f), 50 Ω |
| | 1030-152-R<br>Low Pass, 200 MHz, N(m) to N(f), 50 Ω |
| | 1030-153-R<br>Low Pass, 550 MHz, N(m) to N(f), 50 Ω |
| | 1030-155-R<br>2500 MHz to 2700 MHz, N(m) to N(f), 50 Ω |
| | 1030-178-R<br>1920 MHz to 1980 MHz, N(m) to N(f), 50 Ω |
| | 1030-179-R<br>777 MHz to 798 MHz, N(m) to N(f), 50 Ω |
| | 1030-180-R<br>2500 MHz to 2570 MHz, N(m) to N(f), 50 Ω |

| Accessory | Description |
|---|---|
| | 2000-1734-R<br>699 MHz to 715 MHz, N(m) and N(f), 50 Ω |
| | 2000-1735-R<br>776 MHz to 788 MHz, N(m) and N(f), 50 Ω |
| | 2000-1736-R<br>815 MHz to 850 MHz, N(m) and N(f), 50 Ω |
| | 2000-1737-R<br>1711 MHz to 1756 MHz, N(m) and N(f), 50 Ω |
| | 2000-1738-R<br>1850 MHz to 1910 MHz, N(m) and N(f), 50 Ω |
|  | 2000-1739-R<br>880 MHz to 915 MHz, N(m) and N(f), 50 Ω |
| | 2000-1740-R<br>1710 MHz to 1785 MHz, N(m) and N(f), 50 Ω |
| | 2000-1741-R<br>1920 MHz to 1980 MHz, N(m) and N(f), 50 Ω |
| | 2000-1742-R<br>832 MHz to 862 MHz, N(m) and N(f), 50 Ω |
| | 2000-1743-R<br>2500 MHz to 2570 MHz, N(m) and N(f), 50 Ω |
| | 2000-1799-R<br>2305 MHz to 2320 MHz, N(m) and N(f), 50 Ω |
|  | 2000-1684-R<br>791 MHz to 821 MHz, N(m) to N(f), 50 Ω |

## Directional Antennas

| Accessory | Description |
|---|---|
|  | 2000-1411-R<br>824 MHz to 896 MHz, N(f), 12.3 dBi, Yagi |
|  | 2000-1412-R<br>885 MHz to 975 MHz, N(f), 12.6 dBi, Yagi |
|  | 2000-1413-R<br>1710 MHz to 1880 MHz, N(f), 12.3 dBi. Yagi |
|  | 2000-1414-R<br>1850 MHz to 1990 MHz, N(f), 11.4 dBi, Yagi |
|  | 2000-1415-R<br>2400 MHz to 2500 MHz, N(f), 14.1 dBi, Yagi |
|  | 2000-1416-R<br>1920 MHz to 2170 MHz, N(f), 14.3 dBi, Yagi |
|  | 2000-1659-R<br>698 MHz to 787 MHz, N(f), 10.1 dBi, Yagi |
|  | 2000-1660-R<br>1425 MHz to 1535 MHz, N(f), 14.3 dBi, Yagi |
|  | 2000-1715-R<br>698 MHz to 2500 MHz, N(f), gain of 2 dBi to 10 dBi, typical |
|  | 2000-2107-R<br>Log Periodic, 20 MHz to 8.5 GHz |

| Accessory | Description |
|---|---|
|  | 2000-1726-R<br>2500 MHz to 2700 MHz, N(f), 14.1 dBi, Yagi |
|  | 2000-1747-R<br>Log Periodic, 300 MHz to 7000 MHz, N(f), 5.1 dBi, typical |
|  | 2000-1748-R<br>Log Periodic, 1 GHz to 18 GHz, N(f), 6 dBi, typical |
|  | 2000-1777-R<br>9 kHz to 20 MHz, N(f)<br>(requires port extender 2000-1798-R when used with MA2700A) |
|  | 2000-1778-R<br>20 MHz to 200 MHz, N(f)<br>(requires port extender 2000-1798-R when used with MA2700A) |
|  | 2000-1779-R<br>200 MHz to 500 MHz, N(f)<br>(requires port extender 2000-1798-R when used with MA2700A) |
|  | 2000-1812-R<br>Portable Yagi Antenna, 450 MHz to 512 MHz, N(f), 7.1 dBi |
|  | 2000-1825-R<br>Portable Yagi Antenna, 380 MHz to 430 MHz, N(f), 7.1 dBi |
|  | 2000-1798-R<br>Port Extender, DC to 6 GHz |

## Adapters

| Accessory | Description |
|---|---|
|  | 1091-26-R<br>SMA(m) to N(m), DC to 18 GHz, 50 Ω |
|  | 1091-27-R<br>SMA(f) to N(m), DC to 18 GHz, 50 Ω |
|  | 1091-80-R<br>SMA(m) to N(f), DC to 18 GHz, 50 Ω |
|  | 1091-81-R<br>SMA(f) to N(f), DC to 18 GHz, 50 Ω |
|  | 1091-172-R<br>BNC(f) to N(m), DC to 1.3 GHz, 50 Ω |
|  | 1091-417-R<br>N(m) to QMA(f), DC to 6 GHz, 50 Ω |
|  | 1091-418-R<br>N(m) to QMA(m), DC to 18 GHz, 50 Ω |

| Accessory | Description |
|---|---|
|  | 510-102-R<br>N(m) to N(m), DC to 11 GHz, 50 Ω, 90 degrees right angle |
|  | 510-90-R<br>7/16 DIN(f) to N(m), DC to 7.5 GHz, 50 Ω |
|  | 510-91-R<br>7/16 DIN(f) to N(f), DC to 7.5 GHz, 50 Ω |
|  | 510-92-R<br>7/16 DIN(m) to N(m), DC to 7.5 GHz, 50 Ω |
|  | 510-93-R<br>7/16 DIN(m) to N(f), DC to 7.5 GHz, 50 Ω |
|  | 510-96-R<br>7/16 DIN(m) to 7/16 DIN (m), DC to 7.5 GHz, 50 Ω |
|  | 510-97-R<br>7/16 DIN(f) to 7/16 DIN (f), DC to 7.5 GHz, 50 Ω |

## Precision Adapters

| Accessory | Description |
|---|---|
|  | 34NN50A<br>N(m) to N(m), DC to 18 GHz, 50 Ω |

| Accessory | Description |
|---|---|
|  | 34NFNF50<br>N(f) to N(f), DC to 18 GHz, 50 Ω |

## Attenuators

| Accessory | Description |
|---|---|
|  | 1010-121-R<br>40 dB, 100 W, DC to18 GHz, N(f) to N(m), Uni-directional |
|  | 3-1010-122<br>20 dB, 5 W, DC to 12.4 GHz, N(m) to N(f) |
|  | 3-1010-123<br>30 dB, 50 W, DC to 8.5 GHz, N(m) to N(f) |
|  | 3-1010-124<br>40 dB, 100 W, DC to 8.5 GHz, N(f) to N(m), Uni-directional |

| Accessory | Description |
|---|---|
|  | 42N50-20<br>20 dB, 5 W, DC to 18 GHz, N(m) to N(f) |
|  | 42N50A-30<br>30 dB, 50 W, DC to 18 GHz, N(m) to N(f) |
|  | 1010-127-R<br>30 dB, 150 W, DC to 3 GHz, N(m) to N(f) |
|  | 1010-128-R<br>40 dB, 150 W, DC to 3 GHz, N(m) to N(f) |

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

**• Canada**
**Anritsu Electronics Ltd.**
**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

**• 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.**
11 Chang Charn Road, #04-01, Shriro House
Singapore 159640
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.**
5FL, 235 Pangyoyeok-ro, Bundang-gu, Seongnam-si,
Gyeonggi-do 13494, South Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

**• Australia**
**Anritsu Pty. Ltd.**
Unit 20, 21-35 Ricketts Road,
Mount Waverley, Victoria 3149, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

**• Taiwan**
**Anritsu Company Inc.**
7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817



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