ElectroMagnetic Field Measurements
Isotropic EMF Antennas

2000-1800-R
9 kHz to 300 MHz, H-Field

2000-1792-R
30 MHz to 3 GHz, E-Field

2000-1791-R
700 MHz to 6 GHz, E-Field
Introduction

Anritsu’s EMF Measurements are designed to be easy to use while providing the user with numerous automated features that enable them to do their job quickly and more efficiently. Electromagnetic field measurements (EMF, Option 444) are available on the following Anritsu handheld instruments:1

- Spectrum Master™: MS2711E, MS2712E, MS2713E, MS2720T
- Cell Master™: MT8212E and MT8213E
- LMR Master™: S412E
- Site Master™: S332E and S362E

In order to conduct EMF measurements, an Anritsu isotropic antenna is required. Anritsu offers three isotropic antennas covering a frequency range from 9 kHz up to 6 GHz. Refer to your instrument data sheet for compatible models and additional related options and accessories.

Isotropic Antenna Highlights

- Each antenna contains a tri-axis sensor with an integrated RF switch device, microcontroller and memory. Each of the three sensors is situated orthogonally inside the antenna housing to transmit and receive a spherical radiation pattern. In this way, all radiation at the antenna’s geographical position is measured, regardless of direction of arrival.

- Each isotropic antenna is characterized over its entire frequency range. The antenna factors are stored in the antenna’s memory and automatically downloaded into the Spectrum Analyzer once the antenna USB cable is inserted.

- The RF switch, microcontroller, and memory inside the antenna are controlled by firmware in the Spectrum Analyzer via a USB cable. The microcontroller operates the RF switch, controlling which probe is active. Once all three probes are switched, a composite RMS calculation is made. The memory inside the antenna is used to store parameters associated with that particular antenna. This includes serial number, date of compliance testing, antenna frequency range, and antenna factors.

Dimensions

![Isotropic Antennas Dimensions Diagram]
Definitions

Typical Specifications

Typical specifications are not tested and not warranted. They are generally representative of characteristic performance.

All specifications subject to change without notice. For the most current data sheet, please visit www.anritsu.com
The 2000-1800-R isotropic antenna is a tri-axis H-Field sensor with an integrated RF switch. The RF switch is controlled by the analyzer via a USB port.

### Electrical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor</td>
<td>Three axis sensor with scanned axes, H-Field</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>9 kHz to 300 MHz</td>
</tr>
<tr>
<td>1 dB Compression Point at Output</td>
<td>118 dBµV typical</td>
</tr>
<tr>
<td>Decoupling of the axis</td>
<td>&gt; 20 dB typical</td>
</tr>
<tr>
<td>VSWR</td>
<td>&lt; 1.5 (20 kHz to 50 MHz) typical</td>
</tr>
<tr>
<td>RF Connector</td>
<td>N-Connector Male, 50 Ω</td>
</tr>
<tr>
<td>Supply and Control</td>
<td>USB connection to Anritsu Handheld Instrument</td>
</tr>
</tbody>
</table>

### Mechanical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Color</td>
<td>Body: B-39047, Light Gray</td>
</tr>
<tr>
<td>Handle</td>
<td>Black</td>
</tr>
<tr>
<td>Weight</td>
<td>850 g</td>
</tr>
<tr>
<td>Environmental Conditions</td>
<td>-10 °C to +50 °C, IP54</td>
</tr>
<tr>
<td>Mechanical Compliance</td>
<td>Operating: 7M3 (IEC 60721-3)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>550 mm x 146 mm</td>
</tr>
</tbody>
</table>

### Plots (all plots typical)

- [VSWR at N-Connector](#)
- [Electric Antenna Factor](#)
- [Magnetic Antenna Factor](#)
The 2000-1792-R isotropic antenna is a tri-axis E-Field sensor with an integrated RF switch. The RF switch is controlled by the analyzer via a USB port.

### Electrical Characteristics
- **Sensor**: Three axis sensor with scanned axes, E-Field
- **Frequency Range**: 30 MHz to 3 GHz
- **Typical 3D Isotropy**:
  - < ±1.5 dB (300 MHz to 1 GHz)
  - < ±2.3 dB (1 GHz to 3 GHz)
- **Dynamic Range (1 kHz RBW)**:
  - 0.1 mV/m to 200 V/m typical
  - 25 μV at 900 MHz
  - 35 μV at 1800 MHz
  - 50 μV at 3000 MHz
- **Maximum Field Strength**: 500 V/m (destruction limit)
- **Switching Time**: < 10 μs
- **RF Connector**: N-Connector Male, 50Ω
- **Supply and Control**: USB connection to Anritsu Handheld Instrument

### Mechanical Characteristics
- **Radome Material**: ABS
- **Color**:
  - Body: B-39047, Light Gray
  - Handle: B-39042, Dark Gray
- **Weight**: 800 g
- **Climatic Compliance**: Operating: 7K3 (IEC 60721-3)
- **Mechanical Compliance**: Operating: 7M3 (IEC 60792-3)
- **Temperature Range**: Operating: -25 °C, +70 °C
- **Humidity**: 100 % at +40 °C for up to 96 hours
- **Dimensions**: 450 mm x 150 mm
The 2000-1791-R isotropic antenna is a tri-axis E-Field sensor with an integrated RF switch. The RF switch is controlled by the analyzer via a USB port.

### Electrical Characteristics

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<tbody>
<tr>
<td>Sensor</td>
<td>Three axis sensor with scanned axes, E-Field</td>
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<tr>
<td>Frequency Range</td>
<td>700 MHz to 6 GHz</td>
</tr>
<tr>
<td>Typical 3D Isotropy</td>
<td>≤ ± 2 dB (0.7 GHz to 2 GHz)</td>
</tr>
<tr>
<td></td>
<td>≤ ± 2.5 dB (2 GHz to 3.6 GHz)</td>
</tr>
<tr>
<td></td>
<td>≤ ± 3.5 dB (3.6 GHz to 6 GHz)</td>
</tr>
<tr>
<td>Dynamic Range (1 kHz RBW)</td>
<td>0.2 mV/m to 200 V/m (typical)</td>
</tr>
<tr>
<td>Maximum Field Strength</td>
<td>500 V/m (destruction limit)</td>
</tr>
<tr>
<td>Switching Time</td>
<td>&lt; 10 μs</td>
</tr>
<tr>
<td>RF Connector</td>
<td>N-Connector Male, 50 Ω</td>
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<td>Humidity</td>
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<tr>
<td>Dimensions</td>
<td>320 mm x 87 mm</td>
</tr>
</tbody>
</table>
## Technical Data

### Isotropic Antennas

<table>
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<tr>
<th>Part Number</th>
<th>Description</th>
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<tr>
<td>2000-1800-R</td>
<td>Isotropic Antenna, 9 kHz to 300 MHz, N Connector (male), 50 Ω</td>
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<td>2000-1792-R</td>
<td>Isotropic Antenna, 30 MHz to 3 GHz, N Connector (male), 50 Ω</td>
</tr>
<tr>
<td>2000-1791-R</td>
<td>Isotropic Antenna, 700 MHz to 6 GHz N Connector (male), 50 Ω</td>
</tr>
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### Required Instrument Options and Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
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<tbody>
<tr>
<td>MS2711E-0444</td>
<td>EMF Option 444 for MS2711E</td>
</tr>
<tr>
<td>MS2712E-0444</td>
<td>EMF Option 444 for MS2712E</td>
</tr>
<tr>
<td>MS2713E-0444</td>
<td>EMF Option 444 for MS2713E</td>
</tr>
<tr>
<td>MS2720T-0444</td>
<td>EMF Option 444 for MS2720T</td>
</tr>
<tr>
<td>MT8212E-0444</td>
<td>EMF Option 444 for MT8212E</td>
</tr>
<tr>
<td>MT8213E-0444</td>
<td>EMF Option 444 for MT8213E</td>
</tr>
<tr>
<td>S412E-0444</td>
<td>EMF Option 444 for S412E</td>
</tr>
<tr>
<td>S332E-0444</td>
<td>EMF Option 444 for S332E</td>
</tr>
<tr>
<td>S362E-0444</td>
<td>EMF Option 444 for S362E</td>
</tr>
</tbody>
</table>

### Manuals

(available at [www.anritsu.com](http://www.anritsu.com))

<table>
<thead>
<tr>
<th>Part Number</th>
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<tbody>
<tr>
<td>10580-00455</td>
<td>EMF, Option 444 Measurement Guide</td>
</tr>
</tbody>
</table>
Training at Anritsu

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Data subject to change without notice.
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