BICONICAL ANTENNA

20 MHz - 300 MHz

ELECTRO-METRICS

MODEL EM-6913

SERIAL NO: 187

ELECTRO-METRICS CORPORATION

231 Enterprise Road, Johnstown, New York 12095
Phone: (518) 762-2600       Fax: (518) 762-2812

EMAIL: info@emihq.com       WEB: http://www.electro-metrics.com

MANUAL REV. NO: EM6913-0317   ISSUE DATE: MARCH 22, 2017
This Model EM-6913 Biconical Antenna is warranted for a period of 12 months (USA only) from date of shipment against defective materials and workmanship. This warranty is limited to the repair of or replacement of defective parts and is void if unauthorized repair or modification is attempted. Repairs for damage due to misuse or abnormal operating conditions will be performed at the factory and will be billed at our commercial hourly rates. Our estimate will be provided before the work is started.
DESCRIPTION AND USE ELECTRO-METRICS
MODEL EM-6913 HIGH FIELD BICONICAL ANTENNA

1.0 Description

The EM-6913 High Field Biconical Antenna is used to generate high levels of EM Fields from 20 to 300 MHz for use in Radiated Immunity testing.

The biconical elements are made from heliarc tack welded aluminum rods. The 4 to 1 ratio balun network is fabricated from TRE thermoplastics and specially machined brass and aluminum support and contact parts. The bifilar inductors of the balun are wound in precision machined cuts to provide high barrier insulation between windings while simultaneously providing good coupling between bifilar windings.

Each antenna is individually calibrated during manufacturing, at 1, 3, and 10 meters with the calibration data included in the manual as Gain and Antenna Factors vs Frequency. Since slight variations in the testing environment can affect the field characteristics about an antenna, it is recommended that a field strength meter be used to accurately determine the field strength in the region under test.

NOTE: The EM-6913 High Field Biconical antenna is intended primarily for use as a transmitting antenna. When used as a receiving antenna, for best calibration accuracy below 30 MHz, it is recommended that an Electro-Metrics X-J950 removable balun be added in line.

2.0 Specifications

2.1 Electrical

Frequency Range: 20 to 300 MHz.

Input Impedance: Calibrated in a 50Ω system.

Connector: Type N (Female).

Power Input Capability: 1 kW long term average power.
2 kW short duration average power.

Average Balun VSWR: 2.5:1 or less.

2.2 Mechanical

Length: 1335 mm (52.5 inches) tip-to-tip.

Diameter: 520 mm (20.5 inches) maximum.

Weight: 3.2 kg (7 lbs).
Approximate Power Requirements Vs Frequency
For Field Strengths At 1 Meter Spacing

Electro-Metrics Model EM-6913 High Field Biconical Antenna

(Maximum Power 1 kW, Peak Power 2 kW)

<table>
<thead>
<tr>
<th>Freq. (MHz)</th>
<th>Typical Antenna Factor</th>
<th>Typical Gain Num.</th>
<th>Typical Gain dBi</th>
<th>1 V/m Power (W) Required</th>
<th>10 V/m Power (W) Required</th>
<th>20 V/m Power (W) Required</th>
<th>100 V/m Power (W) Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>11.5</td>
<td>0.03</td>
<td>-15.2</td>
<td>1.12</td>
<td>111.6</td>
<td>446.5</td>
<td>****</td>
</tr>
<tr>
<td>30</td>
<td>13.0</td>
<td>0.05</td>
<td>-13.3</td>
<td>0.71</td>
<td>71.1</td>
<td>284.4</td>
<td>****</td>
</tr>
<tr>
<td>40</td>
<td>15.0</td>
<td>0.06</td>
<td>-12.4</td>
<td>0.58</td>
<td>58.0</td>
<td>231.8</td>
<td>****</td>
</tr>
<tr>
<td>50</td>
<td>12.0</td>
<td>0.16</td>
<td>-8.0</td>
<td>0.21</td>
<td>21.1</td>
<td>84.5</td>
<td>****</td>
</tr>
<tr>
<td>60</td>
<td>10.0</td>
<td>0.37</td>
<td>-4.3</td>
<td>0.09</td>
<td>9.0</td>
<td>36.0</td>
<td>900.5</td>
</tr>
<tr>
<td>70</td>
<td>9.0</td>
<td>0.66</td>
<td>-1.8</td>
<td>0.05</td>
<td>5.0</td>
<td>20.2</td>
<td>505.0</td>
</tr>
<tr>
<td>80</td>
<td>8.0</td>
<td>1.07</td>
<td>0.3</td>
<td>0.03</td>
<td>3.1</td>
<td>12.5</td>
<td>312.3</td>
</tr>
<tr>
<td>90</td>
<td>8.9</td>
<td>1.09</td>
<td>0.4</td>
<td>0.03</td>
<td>3.1</td>
<td>12.3</td>
<td>306.6</td>
</tr>
<tr>
<td>100</td>
<td>9.6</td>
<td>1.15</td>
<td>0.6</td>
<td>0.03</td>
<td>2.9</td>
<td>11.6</td>
<td>290.4</td>
</tr>
<tr>
<td>120</td>
<td>12.8</td>
<td>0.79</td>
<td>-1.0</td>
<td>0.04</td>
<td>4.2</td>
<td>16.9</td>
<td>421.8</td>
</tr>
<tr>
<td>140</td>
<td>15.9</td>
<td>0.52</td>
<td>-2.8</td>
<td>0.06</td>
<td>6.4</td>
<td>25.4</td>
<td>635.8</td>
</tr>
<tr>
<td>160</td>
<td>16.0</td>
<td>0.67</td>
<td>-1.7</td>
<td>0.05</td>
<td>5.0</td>
<td>19.8</td>
<td>495.7</td>
</tr>
<tr>
<td>180</td>
<td>14.5</td>
<td>1.19</td>
<td>0.8</td>
<td>0.03</td>
<td>2.8</td>
<td>11.2</td>
<td>279.0</td>
</tr>
<tr>
<td>200</td>
<td>13.8</td>
<td>1.74</td>
<td>2.4</td>
<td>0.02</td>
<td>1.9</td>
<td>7.7</td>
<td>191.4</td>
</tr>
<tr>
<td>220</td>
<td>14.5</td>
<td>1.79</td>
<td>2.5</td>
<td>0.02</td>
<td>1.9</td>
<td>7.4</td>
<td>186.1</td>
</tr>
<tr>
<td>240</td>
<td>16.8</td>
<td>1.27</td>
<td>1.0</td>
<td>0.03</td>
<td>2.6</td>
<td>10.5</td>
<td>262.0</td>
</tr>
<tr>
<td>260</td>
<td>19.9</td>
<td>0.73</td>
<td>-1.4</td>
<td>0.05</td>
<td>4.6</td>
<td>18.3</td>
<td>457.4</td>
</tr>
<tr>
<td>280</td>
<td>22.6</td>
<td>0.45</td>
<td>-3.5</td>
<td>0.07</td>
<td>7.4</td>
<td>29.8</td>
<td>744.3</td>
</tr>
<tr>
<td>300</td>
<td>24.6</td>
<td>0.33</td>
<td>0-4.8</td>
<td>0.10</td>
<td>10.1</td>
<td>40.3</td>
<td>****</td>
</tr>
</tbody>
</table>

**** Not recommended

NOTE: Not recommended for use above 100 V/m.

3.0 Calibration Data

The Electro-Metrics Model EM-6913 Biconical Antenna is calibrated at 1 Meter, 3 Meter, and 10 Meter. The data is presented in tabulated form as Gain and Antenna Factors versus Frequency, Figure 1-3.

Figure 1: 1 Meter: Page 3
Figure 2: 3 Meter: Page 4
Figure 3: 10 Meter: Page 5
Figure 1

Electro-Metrics EM-6913 Biconical Antenna
Gain and Antenna Factors
At
1 Meter Calibration

Page 3A
Figure 2

Electro-Metrics EM-6913 Biconical Antenna
Gain and Antenna Factors
At
3 Meter Calibration

Page 4A
Figure 3
Electro-Metrics EM-6913 Biconical Antenna
Gain and Antenna Factors
At
10 Meter Calibration
Page 5A