Millimeter Wave Measurement System
Datasheet | Millimeter Measurement System
Part No. RTH-5G-1000 (version 1A)

Testing Existing and Upcoming Technologies

FREQUENCY RANGE

<table>
<thead>
<tr>
<th>Supports Millimeter Wave Frequencies and Bandwidths</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 to 26.5 GHz</td>
</tr>
<tr>
<td>26.5 to 40 GHz</td>
</tr>
<tr>
<td>33 to 50 GHz</td>
</tr>
<tr>
<td>40 to 60 GHz</td>
</tr>
<tr>
<td>50 to 67 GHz</td>
</tr>
<tr>
<td>50 to 75 GHz</td>
</tr>
</tbody>
</table>

CUSTOM PROBE CONFIGURATION

In order to optimize the measurement time, the number of measurement probes dedicated to a bandwidth can be optimized. A minimum of 2 measurement probes is required to cover H and V polarizations but up to 12 probes on the ring positioner can be used.

MEASUREMENT TIME (with 2 measurement probes)

| 10 frequencies, 22.5° sampling | ~ 4.5 min |
| 10 frequencies, 10° sampling    | ~ 16.5 min|
| 100 frequencies, 22.5° sampling | ~ 5.5 min |
| 100 frequencies, 10° sampling   | ~ 19 min  |

TYPICAL DYNAMIC RANGE

| 20 – 40 GHz | 55 dB |
| 40 – 67 GHz | 50 dB |

Typical cross polar level that can be measured < -30 dB

PEAK GAIN ACCURACY

| 20 - 35 GHz | ± 0.9 dB |
| 35 - 50 GHz | ± 0.9 dB |
| 50 - 67 GHz | ± 0.9 dB |

Peak Gain repeatability ± 0.3 dB
System Specifications

**ELECTRICAL**

<table>
<thead>
<tr>
<th>Electrical (VAC)</th>
<th>110-240 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Hz)</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Amps</td>
<td>10 A (220V) / 16 A (110V)</td>
</tr>
<tr>
<td>Plug type</td>
<td>Type F/F (CEE 7/7) or NEMA 5-15</td>
</tr>
<tr>
<td>Shield material</td>
<td>Aluminium plate</td>
</tr>
<tr>
<td>External connections</td>
<td>HDMI(F)+ C14 (IEC 60320) + USB</td>
</tr>
</tbody>
</table>

**MECHANICAL**

<table>
<thead>
<tr>
<th>Positioners (Theta and Phi)</th>
<th>0-180° or/and 0-360° Rotation 0.01° Position resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Aluminium Profile</td>
</tr>
<tr>
<td>Mast + interface</td>
<td>PVC, Polystyren / Rohacell®51, equipped with Slip Ring Custom mast &amp; interface are available</td>
</tr>
<tr>
<td>Total overall mass</td>
<td>Around 430 kg (without VNA)</td>
</tr>
<tr>
<td>Shield material</td>
<td>Aluminium</td>
</tr>
<tr>
<td>External dimensions</td>
<td>See Aside</td>
</tr>
</tbody>
</table>

**DUT SPECIFICATIONS**

<table>
<thead>
<tr>
<th>DUT max. mass*</th>
<th>10 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum DUT size</td>
<td>45 cm</td>
</tr>
</tbody>
</table>

*Centered load

*All dimensions are in millimeter and provided in this document for informational purposes only
Ethertronics presents the **Ethertronics® ETH-5G-1000 Millimeter Measurement System**, a cost effective, compact and flexible solution for testing antennas/devices at mmWave Frequencies.

**Self-Contained Movable System**
Compact and portable, the Ethertronics® ETH 5G-1000 frees up space in laboratories and production environments, can be easily installed into new or existing construction, and can be relocated within a test facility via its movable chassis. As a self-contained test solution, the system integrates its Gigahertz Control Unit, Measurement PC and Vector Network Analyzer/Radiocom tester.

**Accurate and Cost Effective Far-Field Measurement System**
The Ethertronics® ETH-5G-1000 includes a distributed axis positioning system, consisting of:
- Azimuth mast rotator for rotating the DUT about the Phi axis,
- Theta ring positioner for elevating the measurement Horns around the DUT.

Each measurement bandwidth is covered by dedicated RF paths (High Performance RF cables, rectangular waveguides, measurement Horns...).

The fully anechoic enclosure provides a shielded environment over a very wide frequency range (from 18 GHz to 75 GHz) and insures some stable measurement results.

**MAIN FEATURES**
- Technology
  - Far-field / Spherical Measurement Capabilities (Passive and Active)
    - Gain
    - Directivity
    - Efficiency
    - Beamwidth
    - Cross polar discrimination
    - Sidelobe levels
    - 3D radiation pattern
    - Radiation pattern in any polarization
    - TRP, TIS, EIRP and EIS

**Frequency range:**
- 18 GHz to 75 GHz

**Max. Size of DUT:**
- 45 cm

**Max. Mass of DUT:**
- 10 kg on the mast

**Typical dynamic range:**
- 50 dB

*A simplified design, meticulously scrutinized for detail and precision, incorporating the use of high-quality components to maximize performance and ease of use.*
Testing Existing and Upcoming Technologies

The Ethertronics® ETH-5G-1000 is a flexible turn-key solution, suitable for all testing needs for mm-wave system development and validation.

The ETH-5G-1000 supports multiple combinations of mmWave frequencies with scalability to cover existing and forthcoming 5G mmWave frequencies and bandwidths (18-26.5 GHz, 26.5-40 GHz, 33 to 50 GHz, 50 to 67 GHz).

The ETH-5G-1000 is supplied with the complete Ethertronics Software Suite:

- Ethertronics Antenna Measurement (Measurement Control, Data Acquisition)
- Ethertronics Antenna Viewer (Post-processing and tabular/graphical data output).

### SYSTEM CONFIGURATION

| Software                  | Ethertronics Antenna Measurement (Measurement Control, Data Acquisition)  
|                          | Ethertronics Antenna Viewer (Post-processing and tabular/graphical data output)  
| Equipment                | Autonomous Millimeter Measurement System, including:  
|                          | • Complete frame equipped with mechanical positioners and sliding doors, rubberized absorbers  
|                          | • RF path assembled (RF Cables, Waveguides, Measurement Horns, Amplification stage, Switches….)  
|                          | • Integrated Gigahertz Control Unit  
|                          | • Integrated Computer (Windows 10)  
|                          | • (Optional) Vector Network Analyzer  
| Accessories              | Reference Horns  
|                          | (Optional) Mast adaptation part  
| Services                 | Installation  
|                          | Training  
|                          | Warranty  
|                          | (Optional) Post warranty service plans  

Screenshots of the Ethertronics Software

Aside: Ethertronics Antenna Measurement (Measurement Control, Data Acquisition)

Below: Ethertronics Antenna Viewer (Post-processing)
**Standard System Components**

- **Rectangular Horn Antenna**
  Dedicated to 1 polar/1 frequency bandwidth

- **Sliding door**
  Allows easy access to the center of the system, in order to position the DUT.

- **Half sphere support interface (Ø 300 mm)**
  Includes dedicated notch to position the DUT (tablet/phone type) in vertical/horizontal position.

- **PVC Mast**
  The height is easy to adjust in order to center the DUT in the middle of the rotating ring.

- **Vector Network Analyzer**
  Placed in the bottom part of the frame, alongside the Integrated GigaHertzControl Unit and the PC Measurement.

- **Steerable lifting wheels**, for optimal stability during measurements, that still allows quick relocation within the Test Facility.