

# 30 MHz – 6000 MHz Hybrid Measurement Antenna

## 1 Introduction

The TBMA12 is an affordable hybrid measurement antenna for radiated emission measurements. The antenna is a combination of a biconical antenna with a logarithmic periodic antenna, covering the frequency range from 30 MHz to 6 GHz.

The TBMA12 is characterized from 30 MHz to 6000 MHz and has VSWR and antenna factor values typical for hybrid measurement antennas.



## 2 Product overview

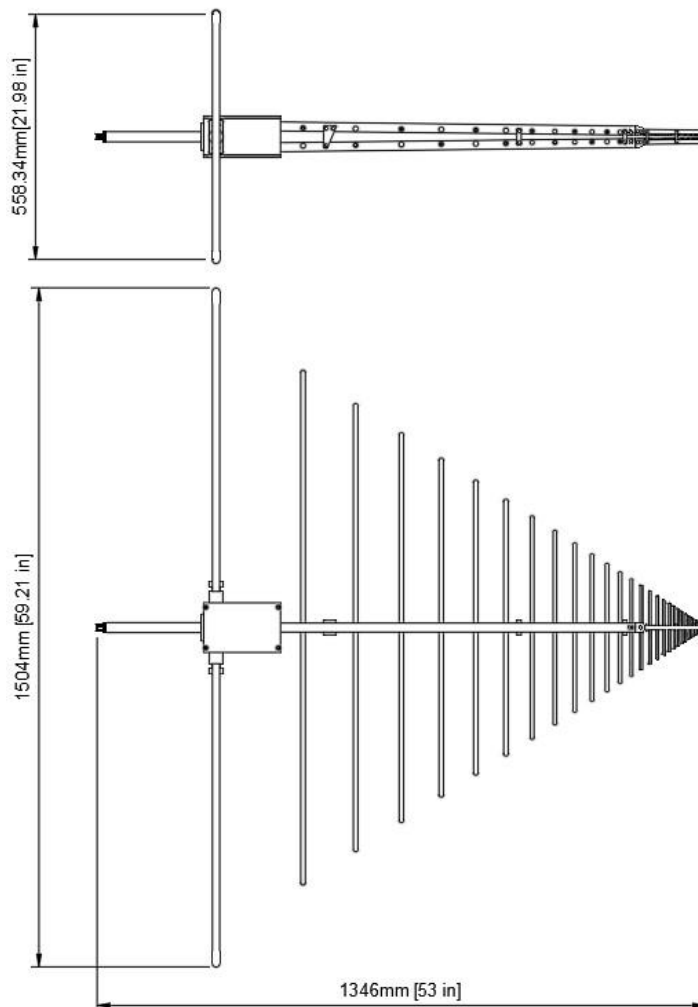
The TBMA12 is an average sized hybrid antenna, with its radiating elements and supporting booms made from aluminium. It is equipped with a standard female N-connector and comes together with two triangular bowtie elements. The antenna provides a 22mm diameter mounting shaft. A suitable fiberglass tripod, model TBTP5 and mounting adapter TBMA8-PAT are available as optional accessories.

The TBMA12 is shipped in a robust carrying case.

## 30 MHz – 6000 MHz Hybrid Measurement Antenna

### 3 Technical Specifications

|                                   |                                                        |                                    |
|-----------------------------------|--------------------------------------------------------|------------------------------------|
| Type                              | Hybrid antenna                                         |                                    |
| Frequency range                   | 30 MHz– 6000 MHz                                       |                                    |
| VSWR                              | <3 (f > 75 MHz)                                        |                                    |
| Isotropic gain at 3m spacing      | -16.83 ... 8.16 dBi                                    | biconical & log. periodic sections |
| Antenna factor at 3m spacing      | 7 ... 41 dB/m                                          | biconical & log. periodic sections |
| Average 3dB Beamwidth (E-plane)   | 47°                                                    |                                    |
| Average 3dB Beamwidth (H-plane)   | 85.7°                                                  |                                    |
| Maximum continuous input RF power | 130W                                                   |                                    |
| Nominal impedance                 | 50 $\Omega$                                            |                                    |
| RF Connector                      | N type female                                          |                                    |
| Mounting                          | 22 mm diameter mounting shaft (tube)                   |                                    |
| Mechanical Dimensions             | L x W x H: 1346mm x 1504mm x 558mm (53" x 59.2" x 22") |                                    |
| Weight                            | 6.9 kg (15.21 lbs)                                     |                                    |



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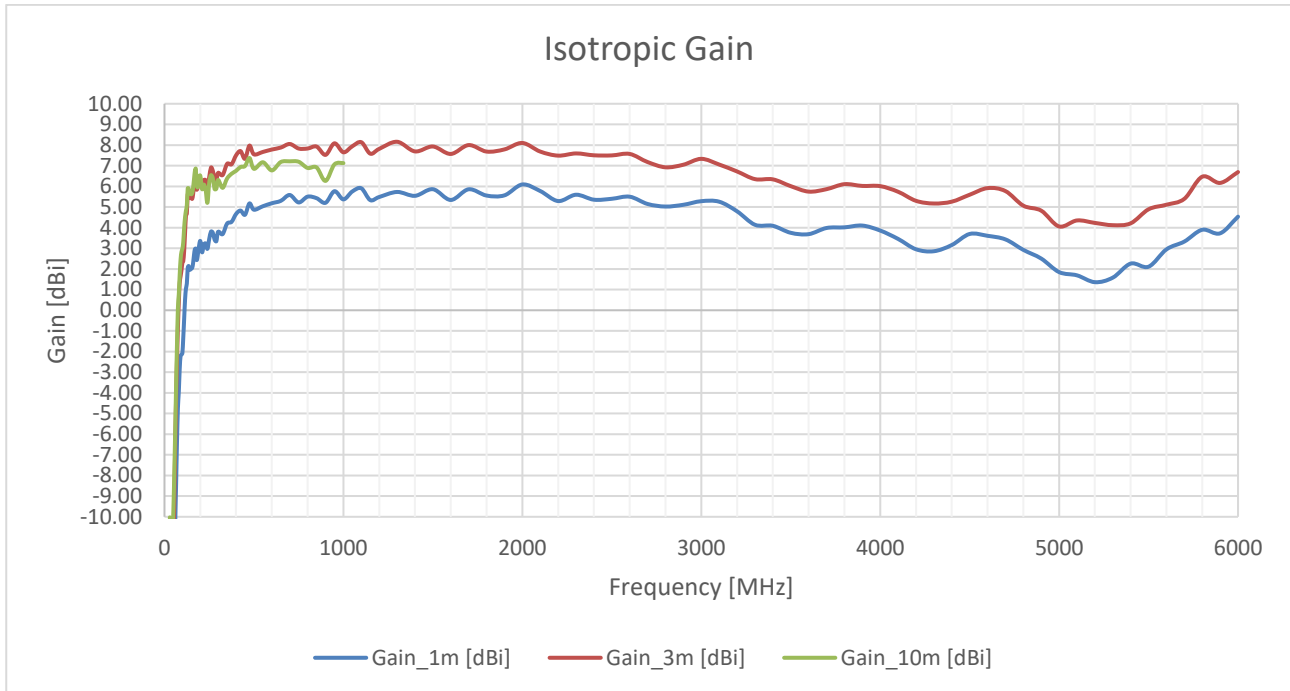
### 4 Gain & Antenna Factor versus frequency

| Frequency | Isotropic Gain<br>(10m, ref. to<br>Antenna Center) | Antenna Factor<br>(10m, ref. to<br>Antenna Center) | Isotropic Gain<br>(3m, ref. to Antenna<br>Center) | Antenna Factor<br>(3m, ref. to Antenna<br>Center) | Isotropic Gain<br>(1m, ref to Antenna<br>Tip) | Antenna Factor<br>(1m, ref to Antenna<br>Tip) |
|-----------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------|---------------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| MHz       | dBi                                                | dB/m                                               | dBi                                               | dB/m                                              | dBi                                           | dB/m                                          |
| 30        | -10.03                                             | 9.79                                               | -16.83                                            | 16.59                                             | -17.53                                        | 17.29                                         |
| 35        | -10.96                                             | 12.06                                              | -14.79                                            | 15.89                                             | -17.99                                        | 19.09                                         |
| 40        | -11.43                                             | 13.69                                              | -12.36                                            | 14.62                                             | -16.48                                        | 18.74                                         |
| 45        | -10.92                                             | 14.20                                              | -12.19                                            | 15.47                                             | -15.40                                        | 18.68                                         |
| 50        | -9.63                                              | 13.83                                              | -11.29                                            | 15.49                                             | -14.14                                        | 18.34                                         |
| 55        | -7.84                                              | 12.87                                              | -9.17                                             | 14.20                                             | -12.40                                        | 17.43                                         |
| 60        | -5.80                                              | 11.58                                              | -6.58                                             | 12.36                                             | -10.35                                        | 16.13                                         |
| 65        | -3.62                                              | 10.10                                              | -4.26                                             | 10.74                                             | -8.40                                         | 14.88                                         |
| 70        | -1.67                                              | 8.79                                               | -2.44                                             | 9.56                                              | -6.36                                         | 13.48                                         |
| 75        | 0.08                                               | 7.64                                               | -0.88                                             | 8.60                                              | -4.74                                         | 12.46                                         |
| 80        | 0.77                                               | 7.51                                               | 0.36                                              | 7.92                                              | -3.96                                         | 12.24                                         |
| 85        | 1.70                                               | 7.11                                               | 1.30                                              | 7.51                                              | -2.86                                         | 11.67                                         |
| 90        | 2.46                                               | 6.84                                               | 1.64                                              | 7.66                                              | -2.21                                         | 11.51                                         |
| 95        | 2.82                                               | 6.95                                               | 1.93                                              | 7.84                                              | -2.15                                         | 11.92                                         |
| 100       | 2.98                                               | 7.24                                               | 2.30                                              | 7.92                                              | -2.08                                         | 12.30                                         |
| 105       | 3.29                                               | 7.35                                               | 2.38                                              | 8.26                                              | -1.34                                         | 11.98                                         |
| 110       | 4.00                                               | 7.05                                               | 2.88                                              | 8.17                                              | -0.41                                         | 11.46                                         |
| 115       | 4.49                                               | 6.94                                               | 3.73                                              | 7.70                                              | 0.50                                          | 10.93                                         |
| 120       | 4.82                                               | 6.98                                               | 4.58                                              | 7.22                                              | 1.05                                          | 10.75                                         |
| 125       | 5.08                                               | 7.08                                               | 4.69                                              | 7.47                                              | 1.29                                          | 10.87                                         |
| 130       | 5.91                                               | 6.59                                               | 5.61                                              | 6.89                                              | 2.06                                          | 10.44                                         |
| 135       | 5.91                                               | 6.92                                               | 5.64                                              | 7.19                                              | 2.15                                          | 10.68                                         |
| 140       | 5.67                                               | 7.47                                               | 5.44                                              | 7.70                                              | 1.96                                          | 11.18                                         |
| 145       | 5.67                                               | 7.78                                               | 5.46                                              | 7.99                                              | 1.98                                          | 11.47                                         |
| 150       | 5.61                                               | 8.13                                               | 5.44                                              | 8.30                                              | 2.01                                          | 11.73                                         |
| 155       | 5.69                                               | 8.34                                               | 5.40                                              | 8.63                                              | 2.06                                          | 11.97                                         |
| 160       | 5.93                                               | 8.37                                               | 5.62                                              | 8.68                                              | 2.28                                          | 12.02                                         |
| 165       | 6.34                                               | 8.23                                               | 6.03                                              | 8.54                                              | 2.68                                          | 11.89                                         |
| 170       | 6.74                                               | 8.09                                               | 6.36                                              | 8.47                                              | 2.96                                          | 11.87                                         |
| 175       | 6.85                                               | 8.23                                               | 6.44                                              | 8.64                                              | 2.98                                          | 12.10                                         |
| 180       | 6.16                                               | 9.17                                               | 5.85                                              | 9.48                                              | 2.45                                          | 12.88                                         |
| 185       | 5.94                                               | 9.62                                               | 5.91                                              | 9.65                                              | 2.60                                          | 12.96                                         |
| 190       | 6.28                                               | 9.51                                               | 6.17                                              | 9.62                                              | 2.92                                          | 12.87                                         |
| 200       | 6.52                                               | 9.72                                               | 6.32                                              | 9.92                                              | 3.36                                          | 12.88                                         |
| 210       | 5.86                                               | 10.80                                              | 6.13                                              | 10.53                                             | 2.80                                          | 13.86                                         |
| 220       | 6.09                                               | 10.98                                              | 6.31                                              | 10.76                                             | 3.19                                          | 13.88                                         |
| 230       | 5.83                                               | 11.62                                              | 6.29                                              | 11.16                                             | 3.23                                          | 14.22                                         |
| 240       | 5.20                                               | 12.62                                              | 5.93                                              | 11.89                                             | 2.97                                          | 14.85                                         |
| 250       | 6.18                                               | 12.00                                              | 6.45                                              | 11.73                                             | 3.45                                          | 14.73                                         |
| 260       | 6.54                                               | 11.98                                              | 6.91                                              | 11.61                                             | 3.81                                          | 14.71                                         |
| 270       | 6.40                                               | 12.45                                              | 6.76                                              | 12.09                                             | 3.76                                          | 15.09                                         |
| 280       | 5.87                                               | 13.29                                              | 6.41                                              | 12.75                                             | 3.42                                          | 15.74                                         |
| 290       | 5.89                                               | 13.58                                              | 6.30                                              | 13.17                                             | 3.35                                          | 16.12                                         |
| 300       | 6.31                                               | 13.45                                              | 6.65                                              | 13.11                                             | 3.80                                          | 15.96                                         |
| 325       | 5.93                                               | 14.53                                              | 6.55                                              | 13.91                                             | 3.69                                          | 16.77                                         |
| 350       | 6.38                                               | 14.72                                              | 7.09                                              | 14.01                                             | 4.20                                          | 16.90                                         |
| 375       | 6.61                                               | 15.09                                              | 7.07                                              | 14.63                                             | 4.28                                          | 17.42                                         |
| 400       | 6.75                                               | 15.51                                              | 7.50                                              | 14.76                                             | 4.66                                          | 17.60                                         |
| 425       | 6.94                                               | 15.85                                              | 7.71                                              | 15.08                                             | 4.83                                          | 17.96                                         |
| 450       | 6.98                                               | 16.30                                              | 7.33                                              | 15.95                                             | 4.62                                          | 18.66                                         |
| 475       | 7.37                                               | 16.38                                              | 7.97                                              | 15.78                                             | 5.17                                          | 18.58                                         |
| 500       | 6.85                                               | 17.35                                              | 7.55                                              | 16.65                                             | 4.87                                          | 19.33                                         |
| 550       | 7.17                                               | 17.86                                              | 7.67                                              | 17.36                                             | 5.04                                          | 19.99                                         |
| 600       | 6.77                                               | 19.01                                              | 7.78                                              | 18.00                                             | 5.18                                          | 20.60                                         |
| 650       | 7.18                                               | 19.30                                              | 7.88                                              | 18.60                                             | 5.30                                          | 21.18                                         |

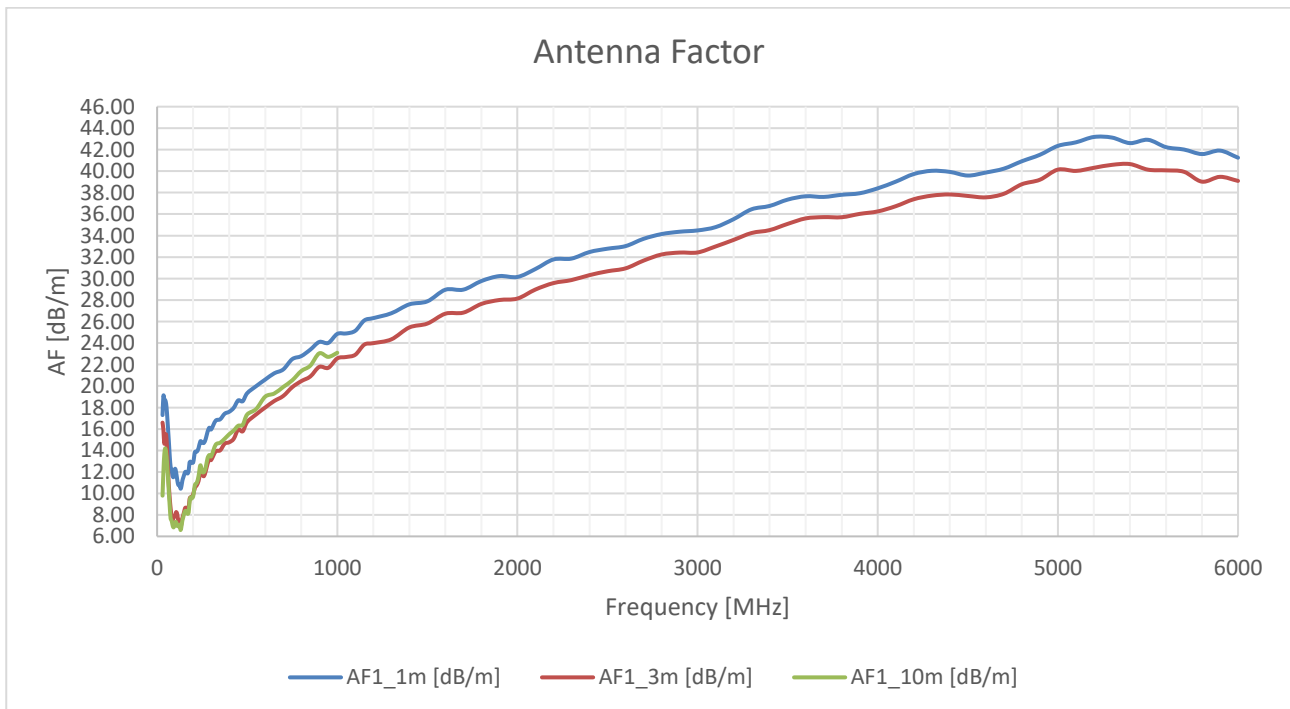
## 30 MHz – 6000 MHz Hybrid Measurement Antenna

| Frequency | Isotropic Gain<br>(10m, ref. to<br>Antenna Center) | Antenna Factor<br>(10m, ref. to<br>Antenna Center) | Isotropic Gain<br>(3m, ref. to Antenna<br>Center) | Antenna Factor<br>(3m, ref. to Antenna<br>Center) | Isotropic Gain<br>(1m, ref to Antenna<br>Tip) | Antenna Factor<br>(1m, ref to Antenna<br>Tip) |
|-----------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------|---------------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| MHz       | dBi                                                | dB/m                                               | dBi                                               | dB/m                                              | dBi                                           | dB/m                                          |
| 700       | 7.21                                               | 19.91                                              | 8.05                                              | 19.07                                             | 5.58                                          | 21.54                                         |
| 750       | 7.19                                               | 20.53                                              | 7.83                                              | 19.89                                             | 5.22                                          | 22.50                                         |
| 800       | 6.89                                               | 21.39                                              | 7.83                                              | 20.45                                             | 5.50                                          | 22.78                                         |
| 850       | 6.92                                               | 21.89                                              | 7.93                                              | 20.88                                             | 5.43                                          | 23.38                                         |
| 900       | 6.26                                               | 23.04                                              | 7.52                                              | 21.78                                             | 5.20                                          | 24.10                                         |
| 950       | 7.06                                               | 22.71                                              | 8.08                                              | 21.69                                             | 5.76                                          | 24.01                                         |
| 1000      | 7.12                                               | 23.10                                              | 7.65                                              | 22.57                                             | 5.37                                          | 24.85                                         |
| 1050      | N/A                                                | N/A                                                | 7.94                                              | 22.70                                             | 5.75                                          | 24.89                                         |
| 1100      | N/A                                                | N/A                                                | 8.14                                              | 22.91                                             | 5.91                                          | 25.14                                         |
| 1150      | N/A                                                | N/A                                                | 7.58                                              | 23.85                                             | 5.33                                          | 26.10                                         |
| 1200      | N/A                                                | N/A                                                | 7.81                                              | 23.99                                             | 5.48                                          | 26.32                                         |
| 1300      | N/A                                                | N/A                                                | 8.16                                              | 24.34                                             | 5.73                                          | 26.77                                         |
| 1400      | N/A                                                | N/A                                                | 7.69                                              | 25.45                                             | 5.54                                          | 27.60                                         |
| 1500      | N/A                                                | N/A                                                | 7.93                                              | 25.81                                             | 5.86                                          | 27.88                                         |
| 1600      | N/A                                                | N/A                                                | 7.57                                              | 26.73                                             | 5.34                                          | 28.96                                         |
| 1700      | N/A                                                | N/A                                                | 8.00                                              | 26.83                                             | 5.86                                          | 28.97                                         |
| 1800      | N/A                                                | N/A                                                | 7.69                                              | 27.64                                             | 5.56                                          | 29.77                                         |
| 1900      | N/A                                                | N/A                                                | 7.79                                              | 28.00                                             | 5.56                                          | 30.23                                         |
| 2000      | N/A                                                | N/A                                                | 8.10                                              | 28.14                                             | 6.09                                          | 30.15                                         |
| 2100      | N/A                                                | N/A                                                | 7.68                                              | 28.98                                             | 5.77                                          | 30.89                                         |
| 2200      | N/A                                                | N/A                                                | 7.49                                              | 29.58                                             | 5.29                                          | 31.78                                         |
| 2300      | N/A                                                | N/A                                                | 7.59                                              | 29.86                                             | 5.59                                          | 31.86                                         |
| 2400      | N/A                                                | N/A                                                | 7.50                                              | 30.32                                             | 5.35                                          | 32.47                                         |
| 2500      | N/A                                                | N/A                                                | 7.50                                              | 30.68                                             | 5.40                                          | 32.78                                         |
| 2600      | N/A                                                | N/A                                                | 7.57                                              | 30.95                                             | 5.50                                          | 33.02                                         |
| 2700      | N/A                                                | N/A                                                | 7.18                                              | 31.67                                             | 5.15                                          | 33.70                                         |
| 2800      | N/A                                                | N/A                                                | 6.92                                              | 32.24                                             | 5.02                                          | 34.14                                         |
| 2900      | N/A                                                | N/A                                                | 7.05                                              | 32.42                                             | 5.11                                          | 34.36                                         |
| 3000      | N/A                                                | N/A                                                | 7.33                                              | 32.43                                             | 5.28                                          | 34.48                                         |
| 3100      | N/A                                                | N/A                                                | 7.06                                              | 32.99                                             | 5.26                                          | 34.79                                         |
| 3200      | N/A                                                | N/A                                                | 6.72                                              | 33.60                                             | 4.79                                          | 35.53                                         |
| 3300      | N/A                                                | N/A                                                | 6.35                                              | 34.24                                             | 4.14                                          | 36.45                                         |
| 3400      | N/A                                                | N/A                                                | 6.34                                              | 34.51                                             | 4.09                                          | 36.76                                         |
| 3500      | N/A                                                | N/A                                                | 6.01                                              | 35.09                                             | 3.75                                          | 37.35                                         |
| 3600      | N/A                                                | N/A                                                | 5.75                                              | 35.60                                             | 3.69                                          | 37.66                                         |
| 3700      | N/A                                                | N/A                                                | 5.86                                              | 35.72                                             | 3.98                                          | 37.60                                         |
| 3800      | N/A                                                | N/A                                                | 6.11                                              | 35.71                                             | 4.02                                          | 37.80                                         |
| 3900      | N/A                                                | N/A                                                | 6.02                                              | 36.02                                             | 4.10                                          | 37.94                                         |
| 4000      | N/A                                                | N/A                                                | 6.01                                              | 36.25                                             | 3.86                                          | 38.40                                         |
| 4100      | N/A                                                | N/A                                                | 5.74                                              | 36.74                                             | 3.46                                          | 39.02                                         |
| 4200      | N/A                                                | N/A                                                | 5.30                                              | 37.38                                             | 2.95                                          | 39.73                                         |
| 4300      | N/A                                                | N/A                                                | 5.17                                              | 37.72                                             | 2.86                                          | 40.03                                         |
| 4400      | N/A                                                | N/A                                                | 5.26                                              | 37.83                                             | 3.16                                          | 39.93                                         |
| 4500      | N/A                                                | N/A                                                | 5.59                                              | 37.69                                             | 3.69                                          | 39.59                                         |
| 4600      | N/A                                                | N/A                                                | 5.91                                              | 37.56                                             | 3.60                                          | 39.87                                         |
| 4700      | N/A                                                | N/A                                                | 5.77                                              | 37.89                                             | 3.43                                          | 40.23                                         |
| 4800      | N/A                                                | N/A                                                | 5.06                                              | 38.78                                             | 2.92                                          | 40.92                                         |
| 4900      | N/A                                                | N/A                                                | 4.82                                              | 39.20                                             | 2.50                                          | 41.52                                         |
| 5000      | N/A                                                | N/A                                                | 4.06                                              | 40.14                                             | 1.85                                          | 42.35                                         |
| 5100      | N/A                                                | N/A                                                | 4.35                                              | 40.02                                             | 1.69                                          | 42.68                                         |
| 5200      | N/A                                                | N/A                                                | 4.23                                              | 40.31                                             | 1.36                                          | 43.18                                         |
| 5300      | N/A                                                | N/A                                                | 4.12                                              | 40.59                                             | 1.58                                          | 43.13                                         |
| 5400      | N/A                                                | N/A                                                | 4.21                                              | 40.66                                             | 2.26                                          | 42.61                                         |
| 5500      | N/A                                                | N/A                                                | 4.89                                              | 40.14                                             | 2.11                                          | 42.92                                         |
| 5600      | N/A                                                | N/A                                                | 5.11                                              | 40.07                                             | 2.95                                          | 42.23                                         |
| 5700      | N/A                                                | N/A                                                | 5.40                                              | 39.94                                             | 3.33                                          | 42.01                                         |
| 5800      | N/A                                                | N/A                                                | 6.47                                              | 39.02                                             | 3.90                                          | 41.59                                         |
| 5900      | N/A                                                | N/A                                                | 6.17                                              | 39.47                                             | 3.73                                          | 41.91                                         |
| 6000      | N/A                                                | N/A                                                | 6.69                                              | 39.09                                             | 4.53                                          | 41.25                                         |

## 30 MHz – 6000 MHz Hybrid Measurement Antenna



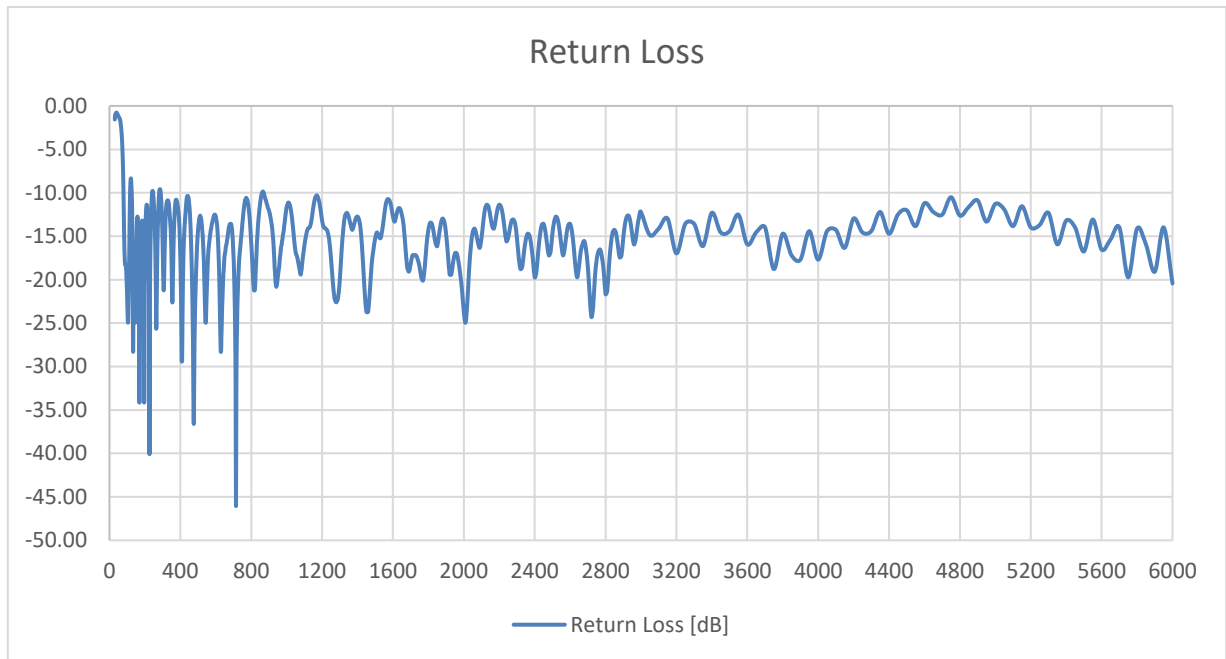
30 MHz ... 6000 MHz, Isotropic Gain of TBMA12



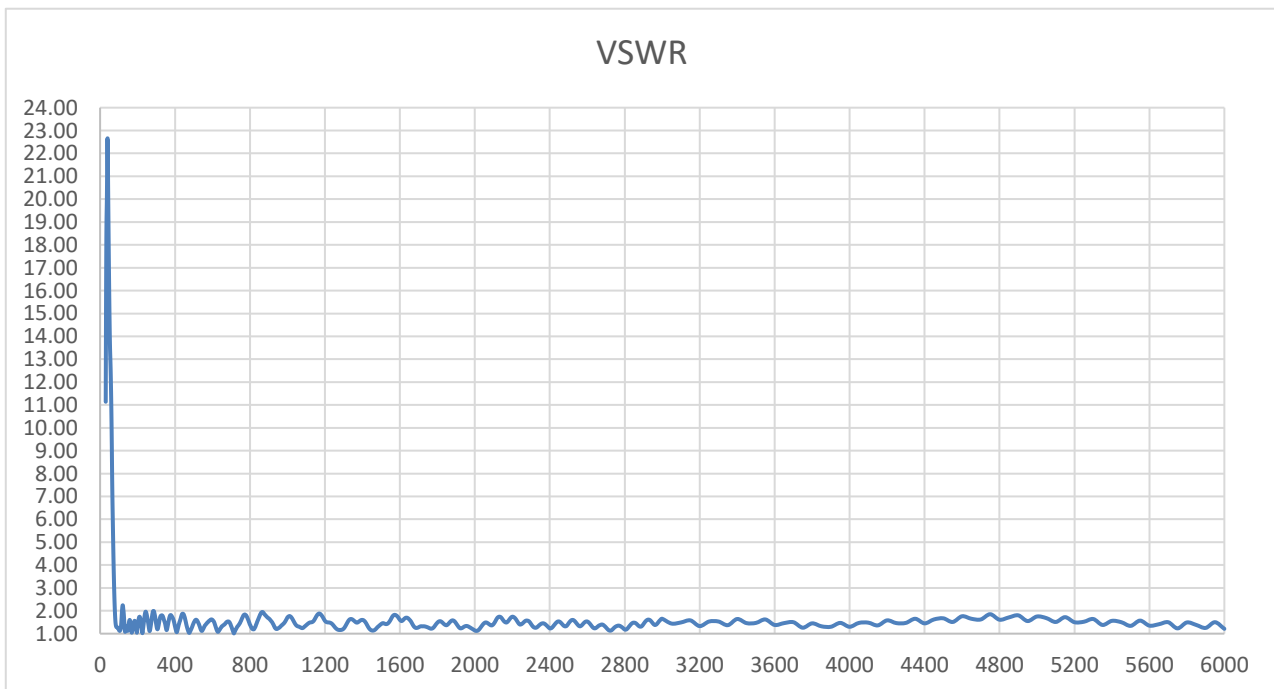
30 MHz ... 6000 MHz, Antenna Factor of TBMA12

## 30 MHz – 6000 MHz Hybrid Measurement Antenna

### 4.1 TBMA12 Return Loss / VSWR



*TBMA12, S11, 30 MHz ... 6000 MHz*

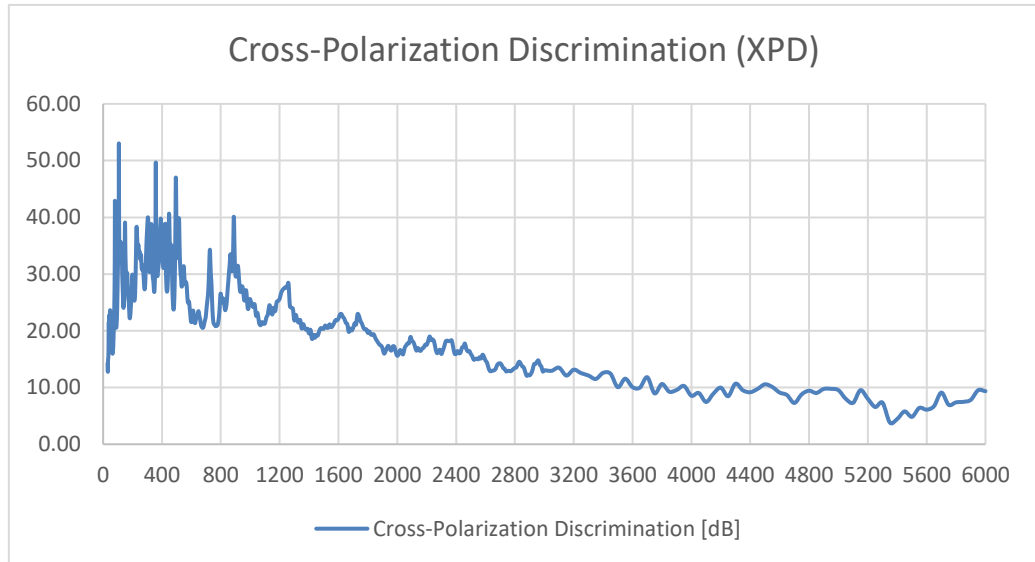


*TBMA12, VSWR, 30 MHz ... 6000 MHz*

## 30 MHz – 6000 MHz Hybrid Measurement Antenna

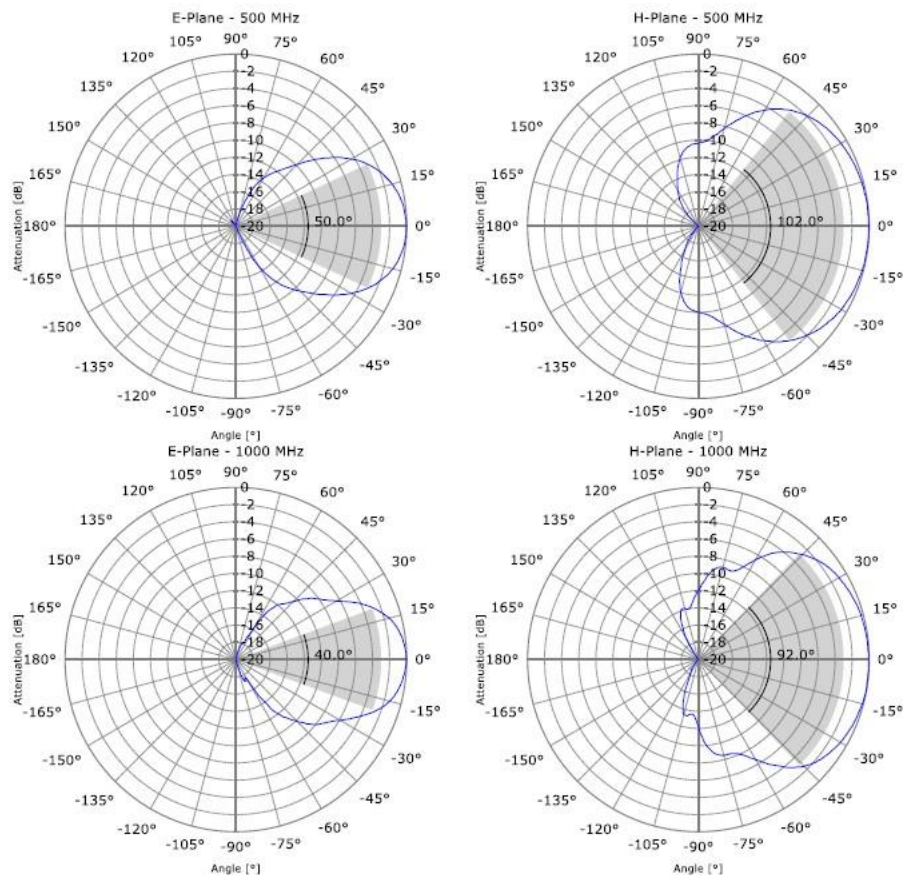
VSWR, Gain and AF in tabular form is provided on our website.

### 4.2 TBMA12 Cross-Polarization Discrimination

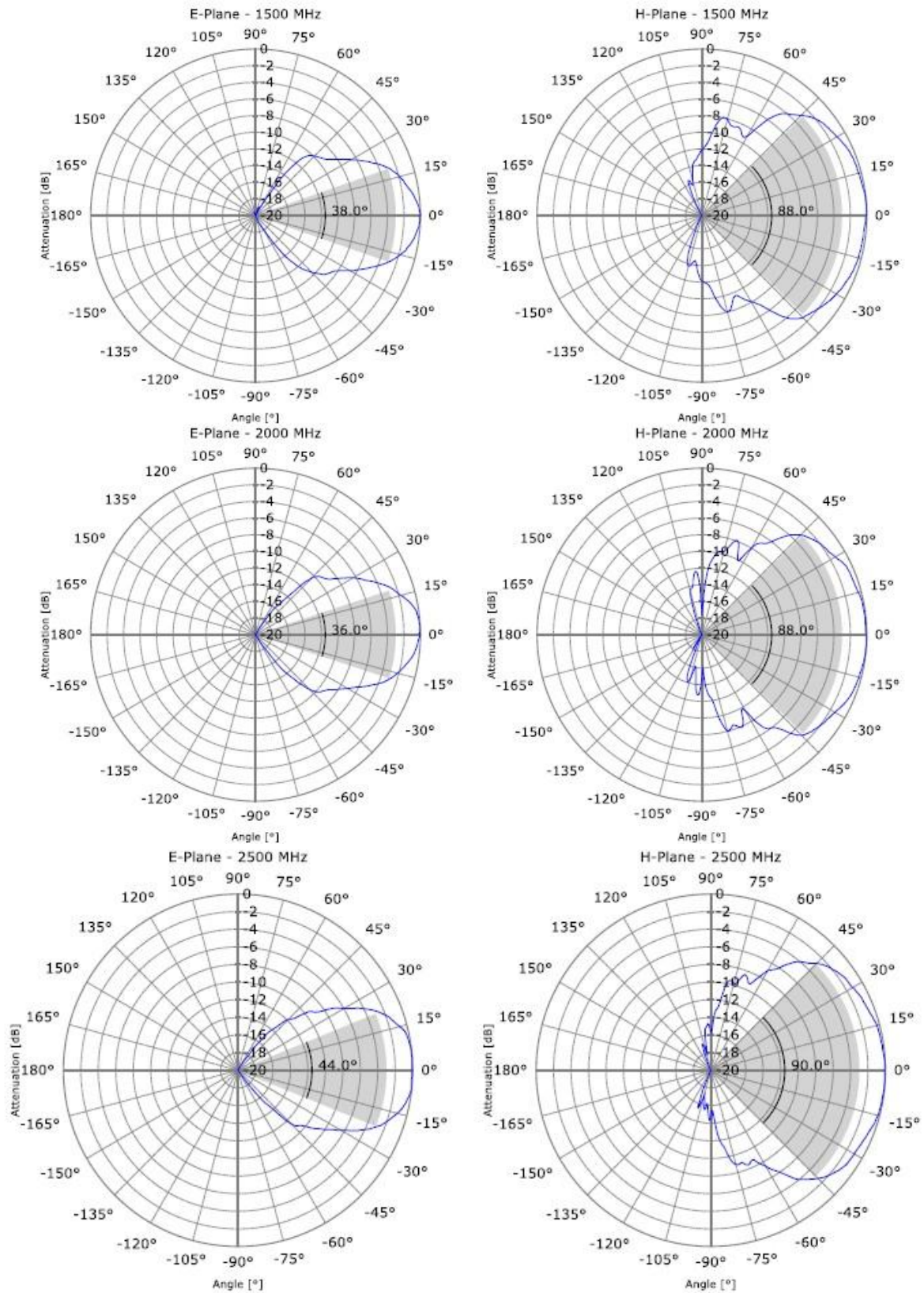


### 4.3 TBMA12 Directional Plots

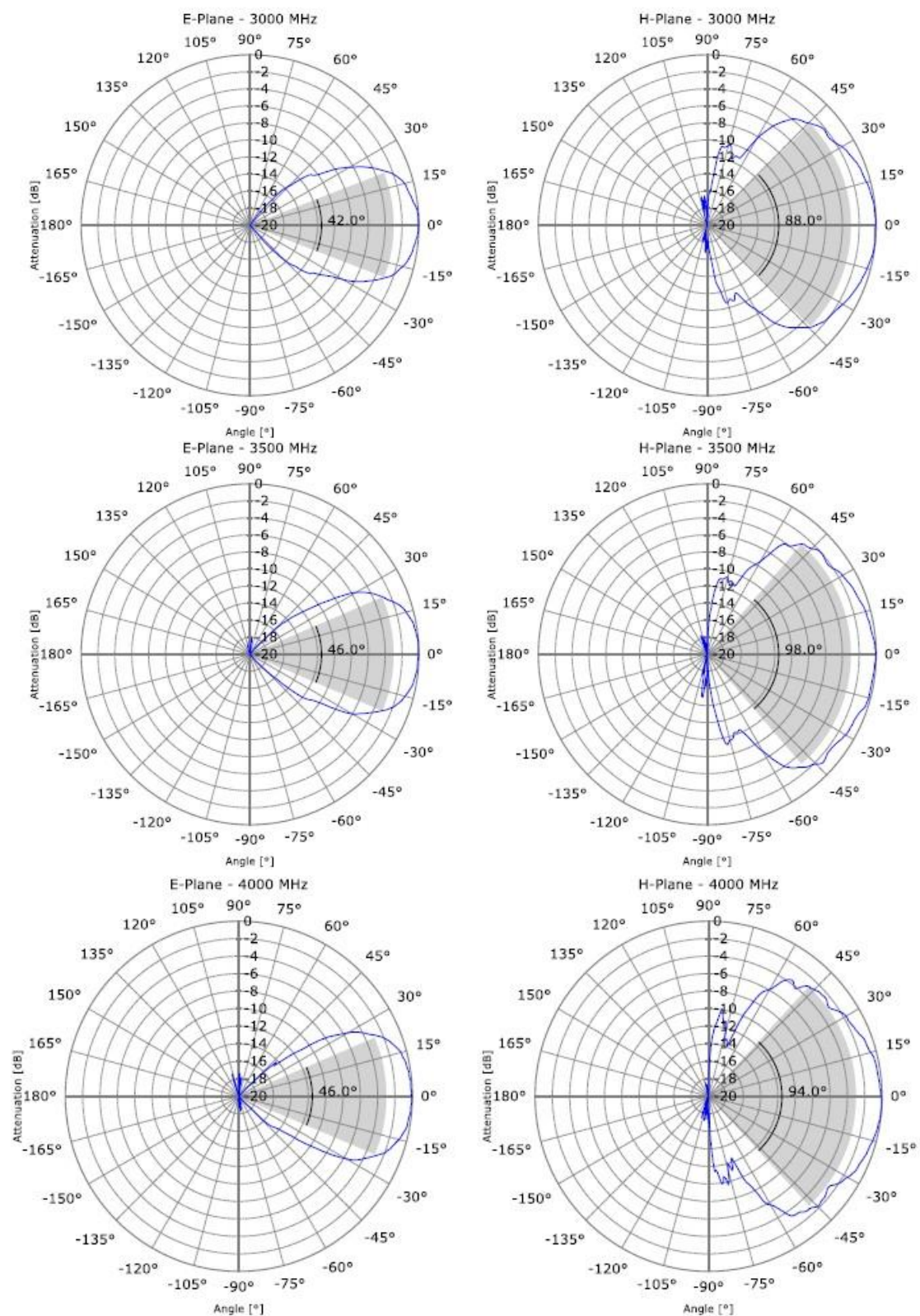
The grey angle marks the 3dB beamwidth.



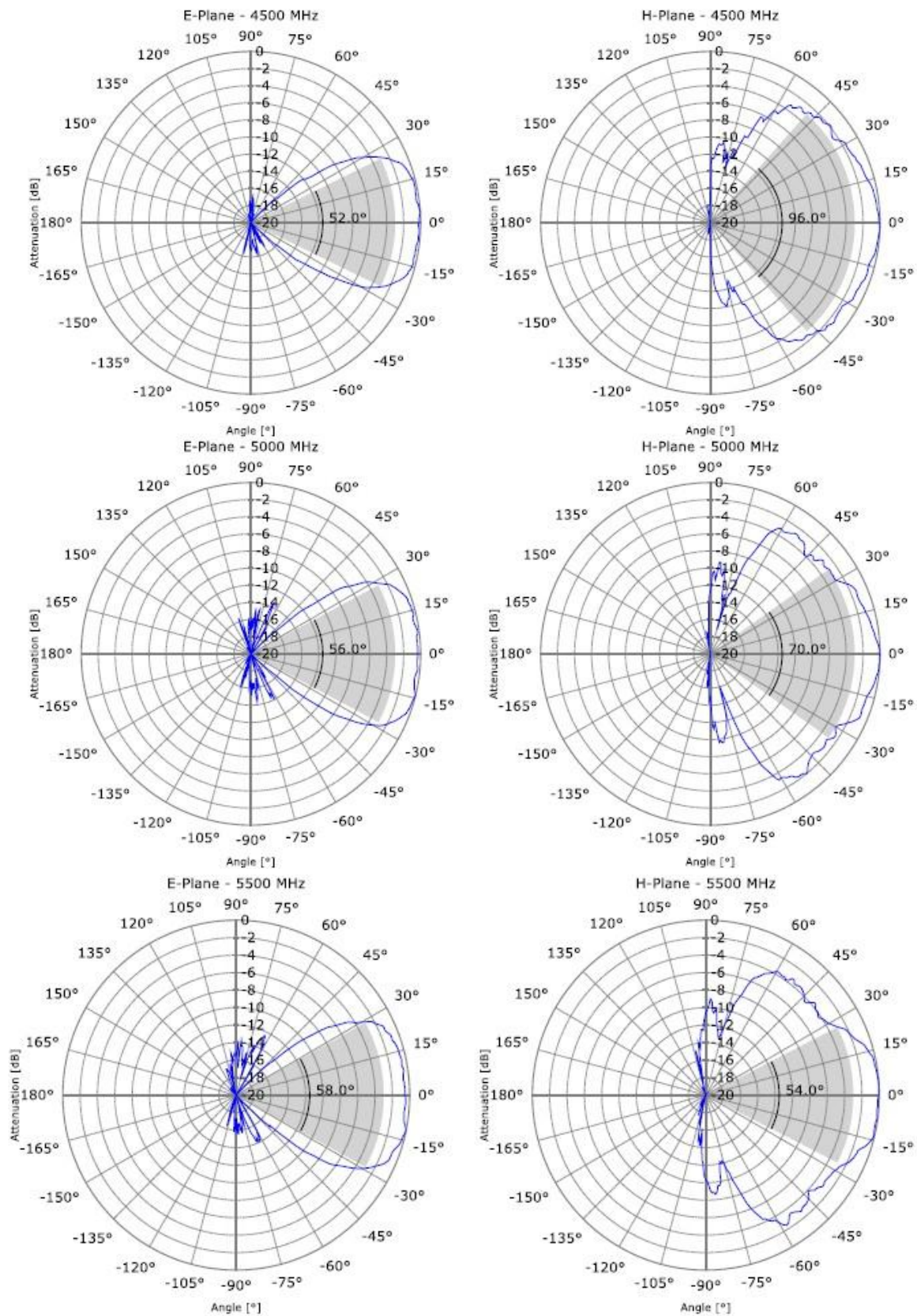
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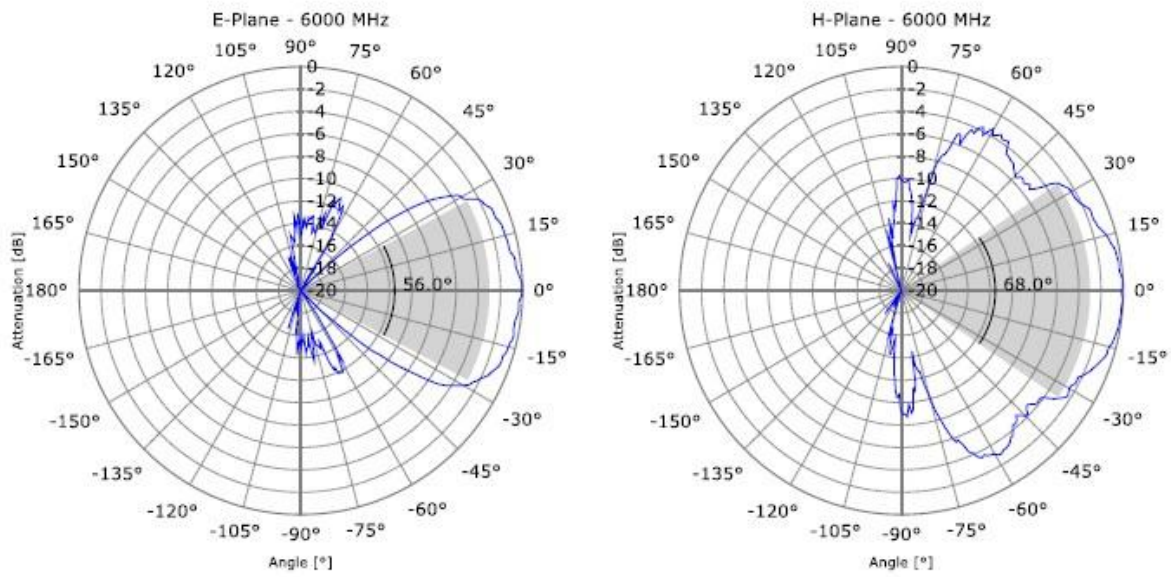
## 30 MHz – 6000 MHz Hybrid Measurement Antenna



## 30 MHz – 6000 MHz Hybrid Measurement Antenna



## 30 MHz – 6000 MHz Hybrid Measurement Antenna



### 5 Optional Tripods and mounting brackets



*TBMA12 on TBTP5 tripod; using TBMA8-PAT mounting bracket*

## 30 MHz – 6000 MHz Hybrid Measurement Antenna

### 6 Ordering Information

| Part Number | Description                                                                                                             |
|-------------|-------------------------------------------------------------------------------------------------------------------------|
| TBMA12      | 30 – 6000 MHz hybrid measurement antenna , carrying case, individual factory calibration using NIST traceable equipment |

#### Accessories

| Part Number | Description                                                                                                         |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| TBTP5       | Fiberglass tripod                                                                                                   |
| TBMA8-PAT   | Mounting bracket for TBMA12, TBMA11, TBMA8, TBMA7; for 22 mm antenna shafts, clamps sideways to 30 mm tripod shafts |

### 7 History

| Version | Date      | Author     | Changes                  |
|---------|-----------|------------|--------------------------|
| V1.0    | 23.4.2026 | Mayerhofer | Creation of the document |
| V1.1    | 22.6.2026 | Mayerhofer | Chapter 4 updated        |