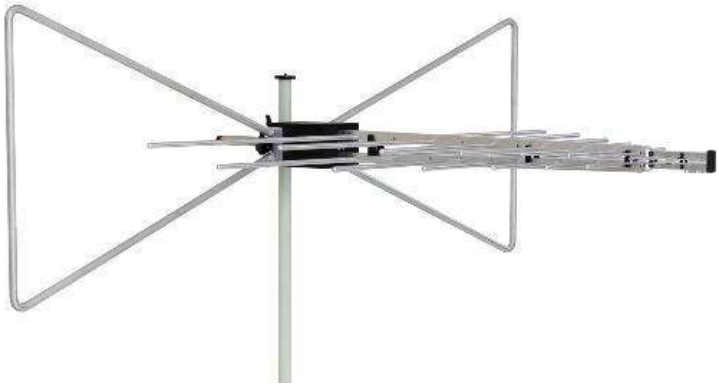
30 MHz – 6000 MHz Hybrid Measurement Antenna

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.

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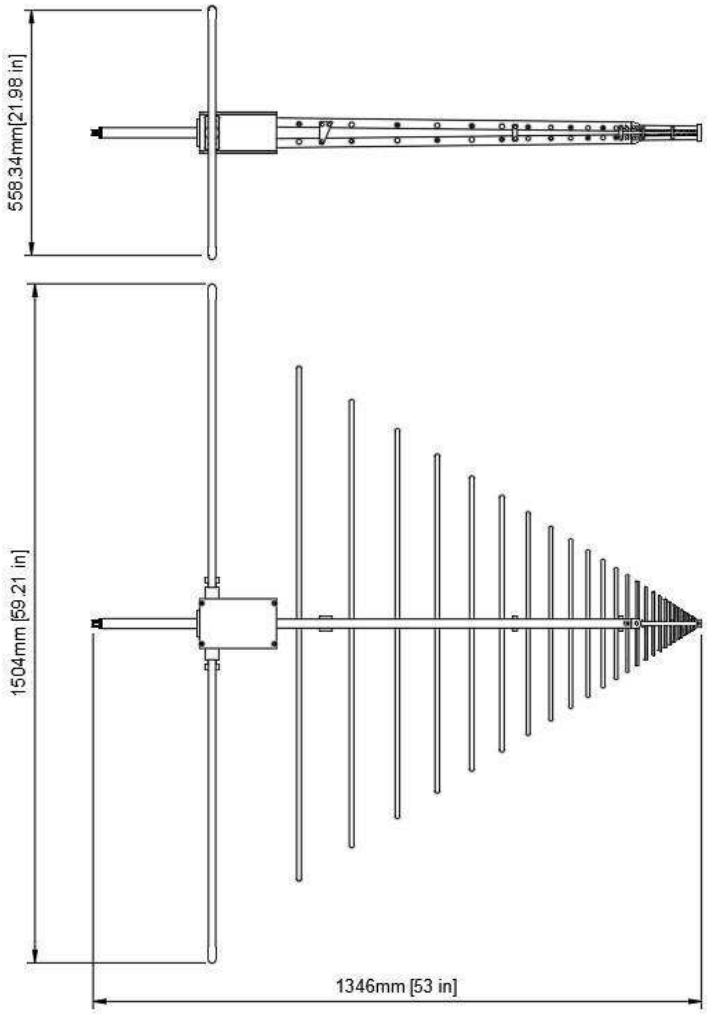
3 Technical Specifications

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 Ω
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 (10m, ref. to Antenna Center)	Antenna Factor (10m, ref. to Antenna Center)	Isotropic Gain (3m, ref. to Antenna Center)	Antenna Factor (3m, ref. to Antenna Center)	Isotropic Gain (1m, ref to Antenna Tip)	Antenna Factor (1m, ref to Antenna 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

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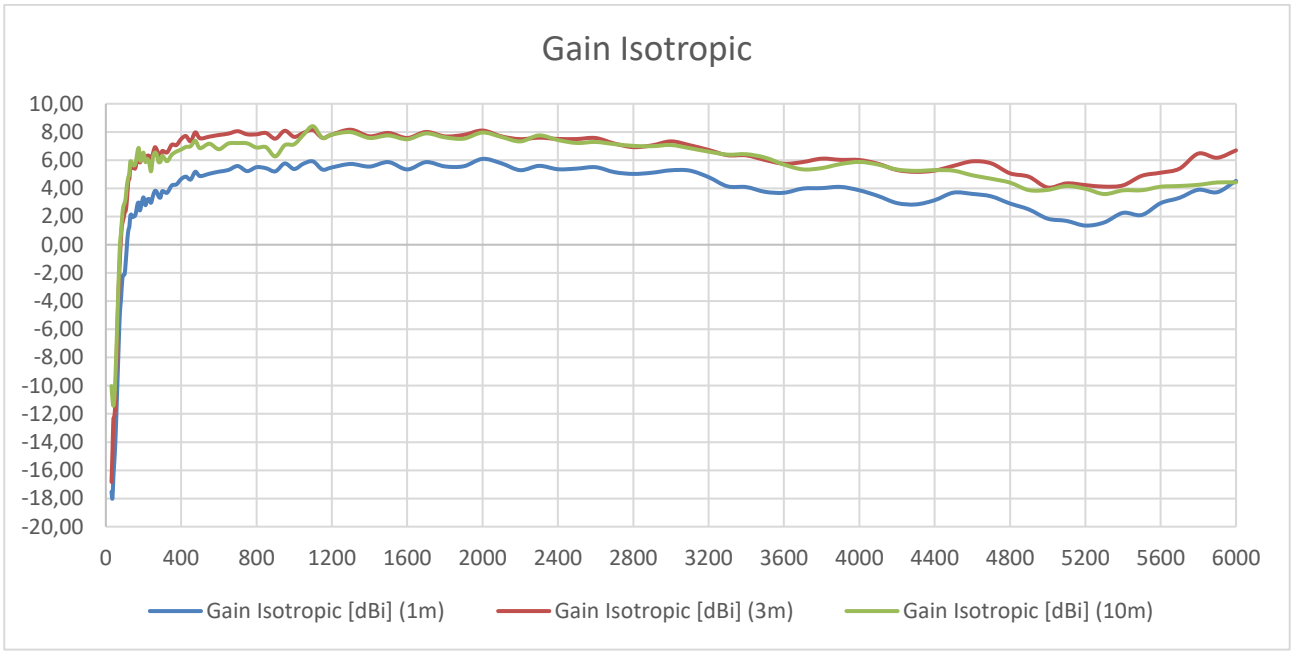
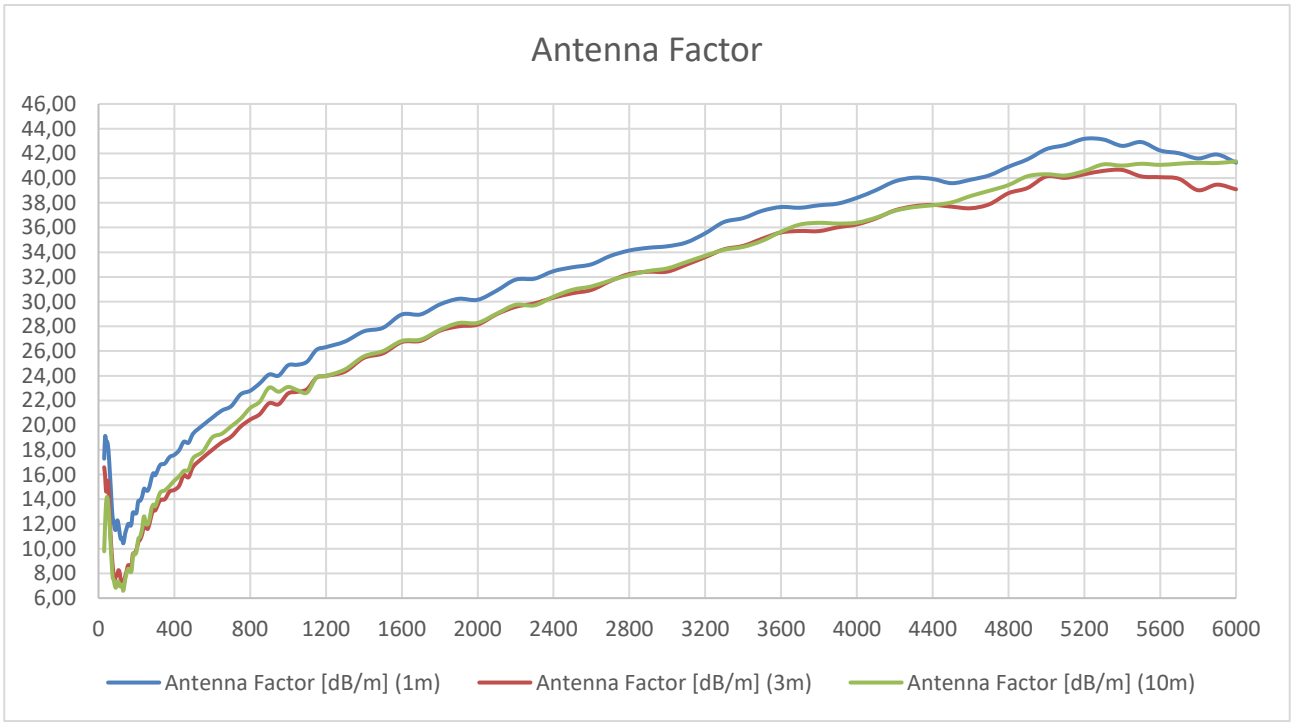
Frequency	Isotropic Gain (10m, ref. to Antenna Center)	Antenna Factor (10m, ref. to Antenna Center)	Isotropic Gain (3m, ref. to Antenna Center)	Antenna Factor (3m, ref. to Antenna Center)	Isotropic Gain (1m, ref to Antenna Tip)	Antenna Factor (1m, ref to Antenna Tip)
MHz	dBi	dB/m	dBi	dB/m	dBi	dB/m
700	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	7.81	22.83	7.94	22.70	5.75	24.89
1100	8.41	22.64	8.14	22.91	5.91	25.14
1150	7.57	23.86	7.58	23.85	5.33	26.10
1200	7.81	23.99	7.81	23.99	5.48	26.32
1300	7.99	24.51	8.16	24.34	5.73	26.77
1400	7.57	25.57	7.69	25.45	5.54	27.60
1500	7.75	25.99	7.93	25.81	5.86	27.88
1600	7.48	26.82	7.57	26.73	5.34	28.96
1700	7.90	26.93	8.00	26.83	5.86	28.97
1800	7.62	27.71	7.69	27.64	5.56	29.77
1900	7.52	28.27	7.79	28.00	5.56	30.23
2000	7.96	28.28	8.10	28.14	6.09	30.15
2100	7.64	29.02	7.68	28.98	5.77	30.89
2200	7.33	29.74	7.49	29.58	5.29	31.78
2300	7.75	29.70	7.59	29.86	5.59	31.86
2400	7.42	30.40	7.50	30.32	5.35	32.47
2500	7.22	30.96	7.50	30.68	5.40	32.78
2600	7.29	31.23	7.57	30.95	5.50	33.02
2700	7.14	31.71	7.18	31.67	5.15	33.70
2800	7.01	32.15	6.92	32.24	5.02	34.14
2900	6.99	32.48	7.05	32.42	5.11	34.36
3000	7.07	32.69	7.33	32.43	5.28	34.48
3100	6.85	33.20	7.06	32.99	5.26	34.79
3200	6.60	33.72	6.72	33.60	4.79	35.53
3300	6.39	34.20	6.35	34.24	4.14	36.45
3400	6.42	34.43	6.34	34.51	4.09	36.76
3500	6.18	34.92	6.01	35.09	3.75	37.35
3600	5.69	35.66	5.75	35.60	3.69	37.66
3700	5.34	36.24	5.86	35.72	3.98	37.60
3800	5.44	36.38	6.11	35.71	4.02	37.80
3900	5.72	36.32	6.02	36.02	4.10	37.94
4000	5.87	36.39	6.01	36.25	3.86	38.40
4100	5.69	36.79	5.74	36.74	3.46	39.02
4200	5.33	37.35	5.30	37.38	2.95	39.73
4300	5.24	37.65	5.17	37.72	2.86	40.03
4400	5.29	37.80	5.26	37.83	3.16	39.93
4500	5.25	38.03	5.59	37.69	3.69	39.59
4600	4.92	38.55	5.91	37.56	3.60	39.87
4700	4.68	38.98	5.77	37.89	3.43	40.23
4800	4.40	39.44	5.06	38.78	2.92	40.92
4900	3.87	40.15	4.82	39.20	2.50	41.52
5000	3.89	40.31	4.06	40.14	1.85	42.35
5100	4.16	40.21	4.35	40.02	1.69	42.68
5200	3.97	40.57	4.23	40.31	1.36	43.18
5300	3.60	41.11	4.12	40.59	1.58	43.13
5400	3.86	41.01	4.21	40.66	2.26	42.61
5500	3.87	41.16	4.89	40.14	2.11	42.92
5600	4.11	41.07	5.11	40.07	2.95	42.23
5700	4.17	41.17	5.40	39.94	3.33	42.01
5800	4.25	41.24	6.47	39.02	3.90	41.59
5900	4.42	41.22	6.17	39.47	3.73	41.91
6000	4.42	41.36	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

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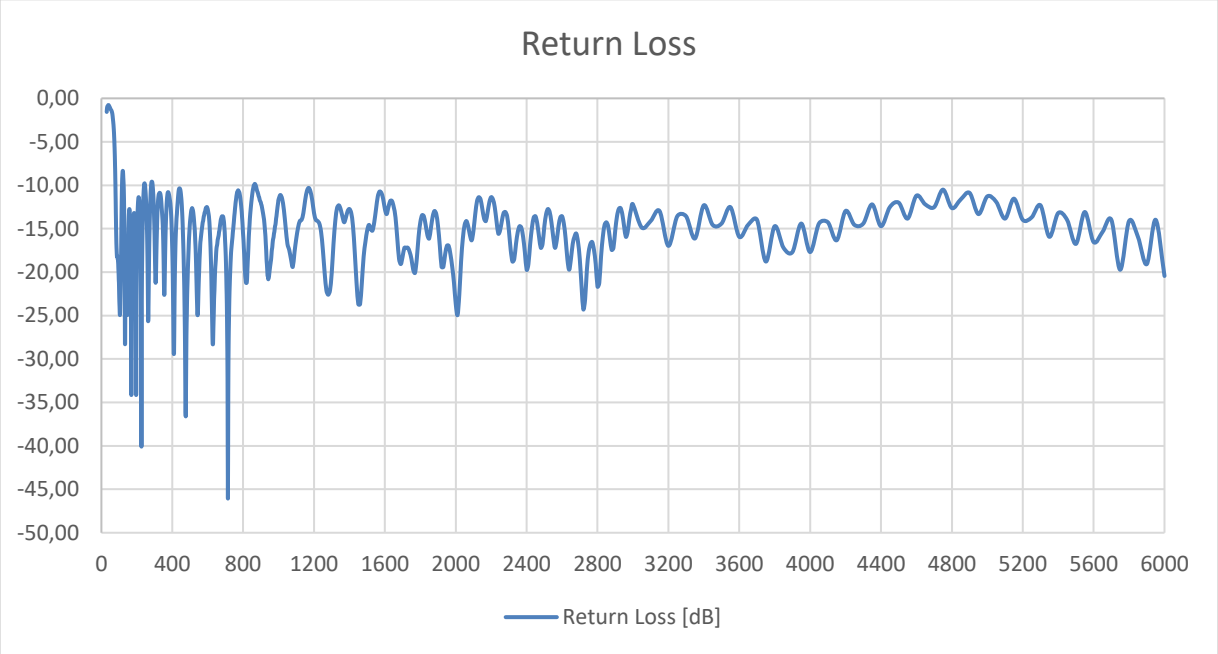
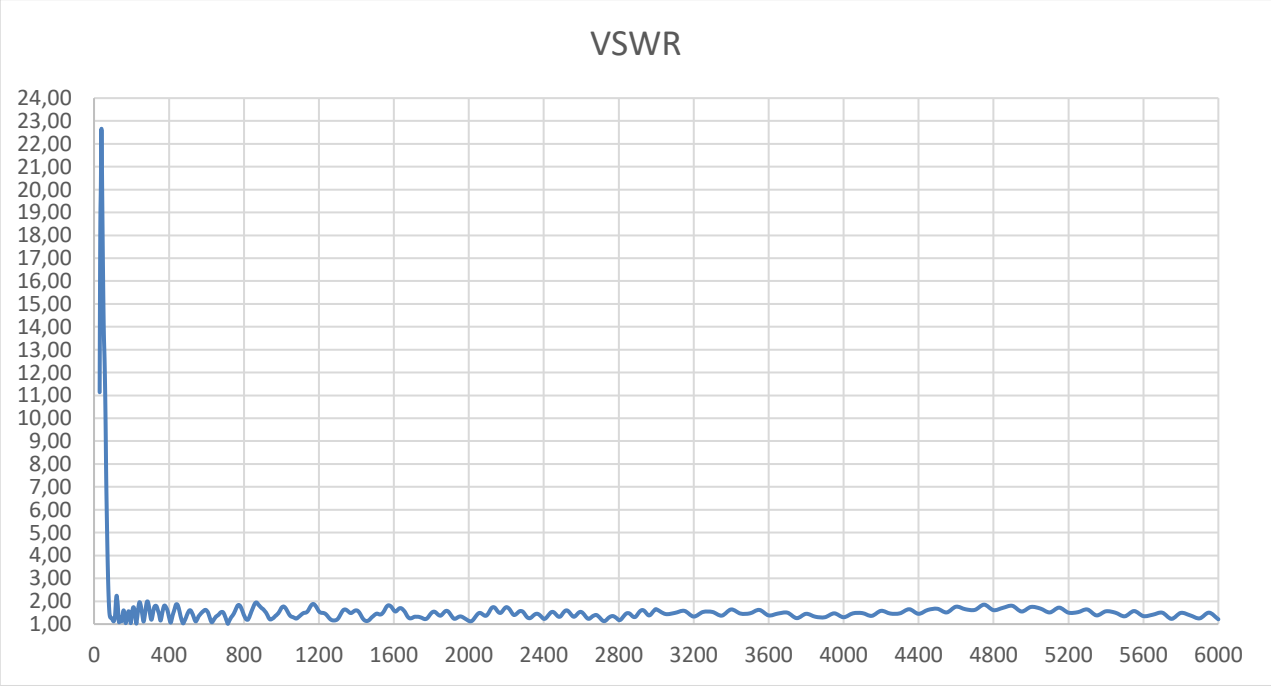
5 TBMA12 Return Loss / VSWR



TBMA12, S11, 30 MHz … 6000 MHz



TBMA12, VSWR, 30 MHz … 6000 MHz

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

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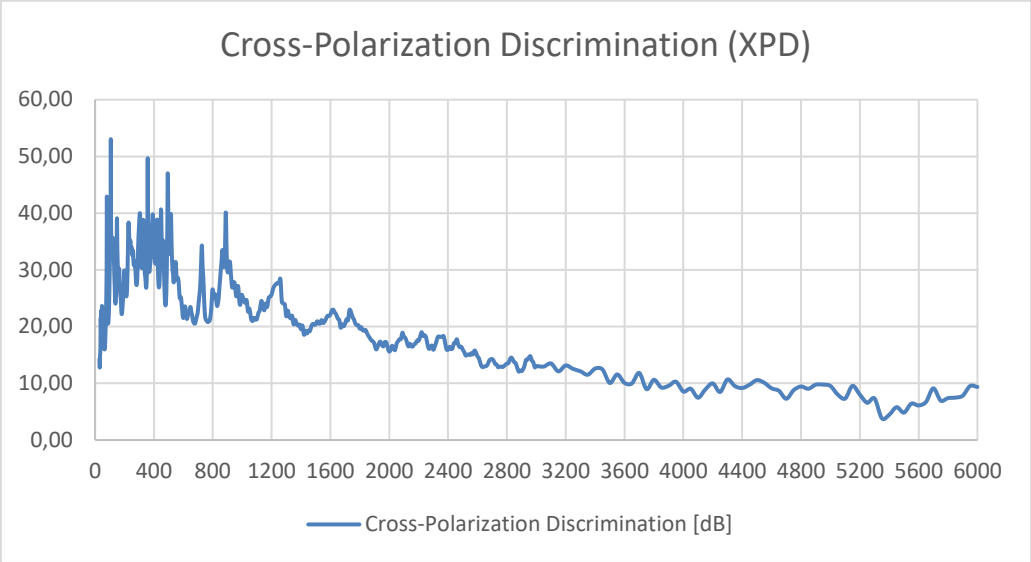
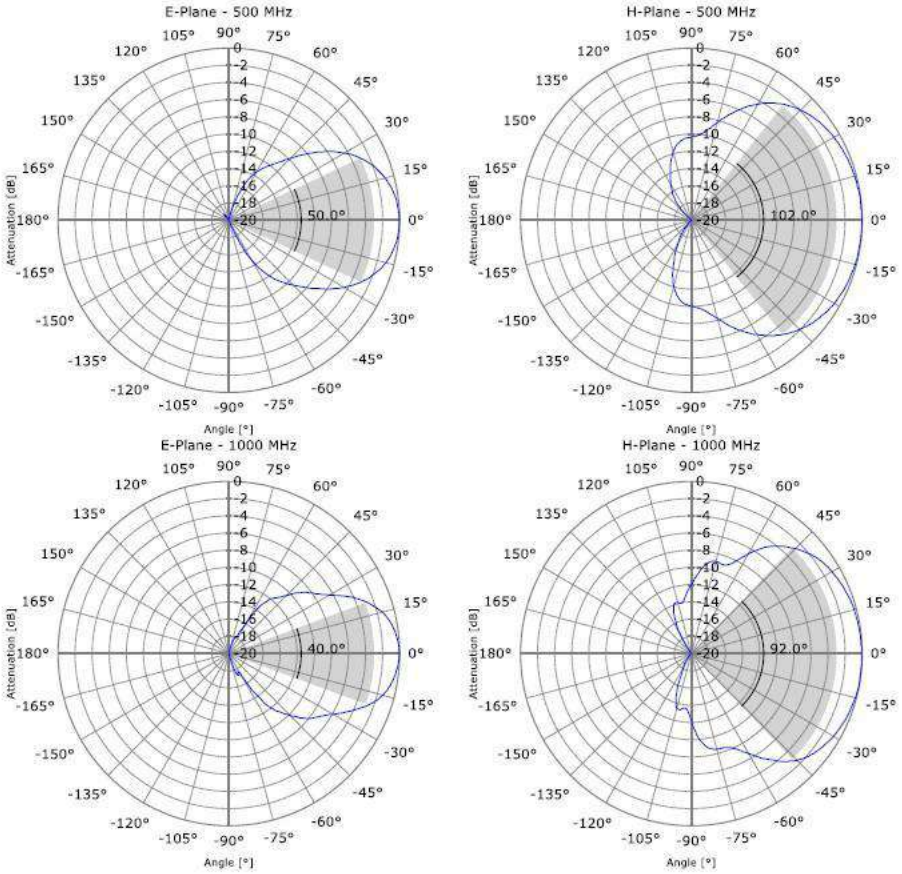
6 TBMA12 Cross-Polarization Discrimination



7 TBMA12 Directional Plots

The grey angle marks the 3dB beamwidth.



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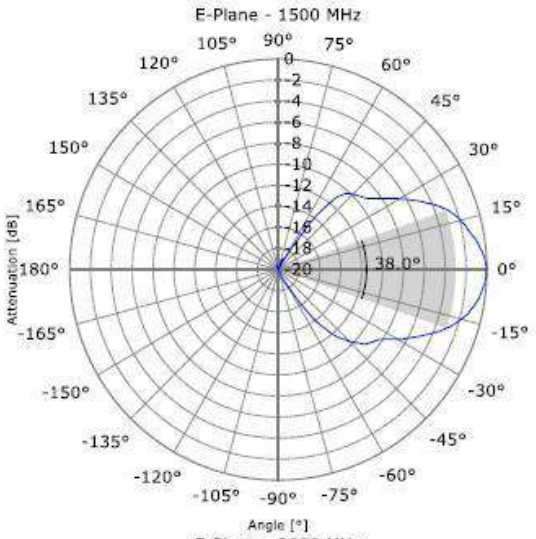

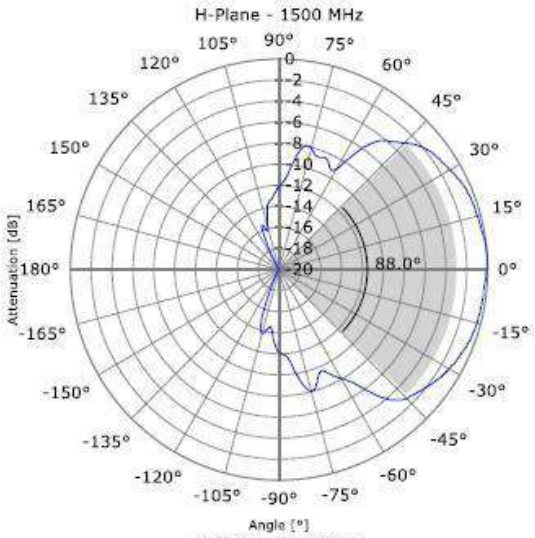

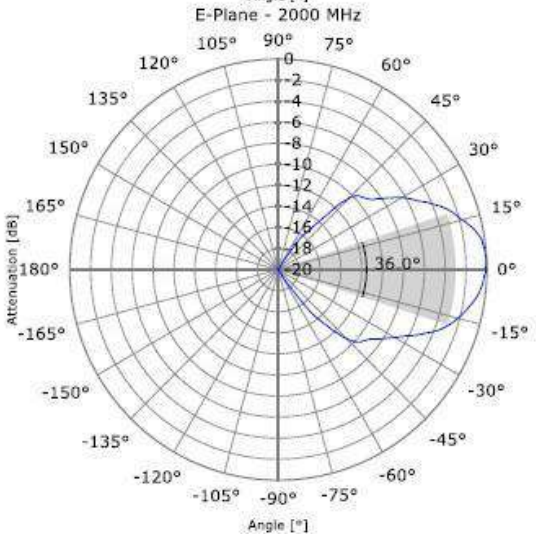

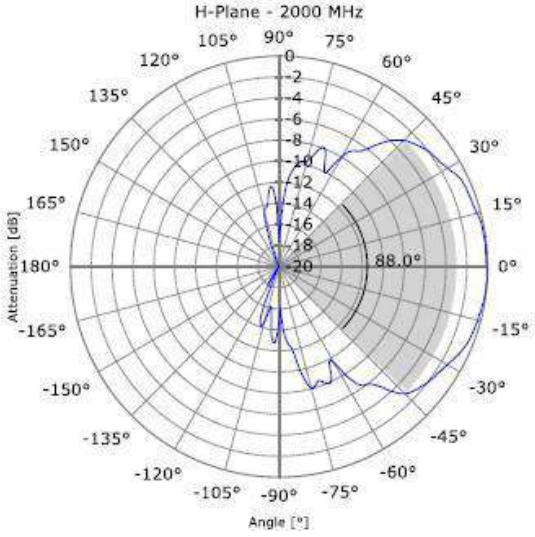

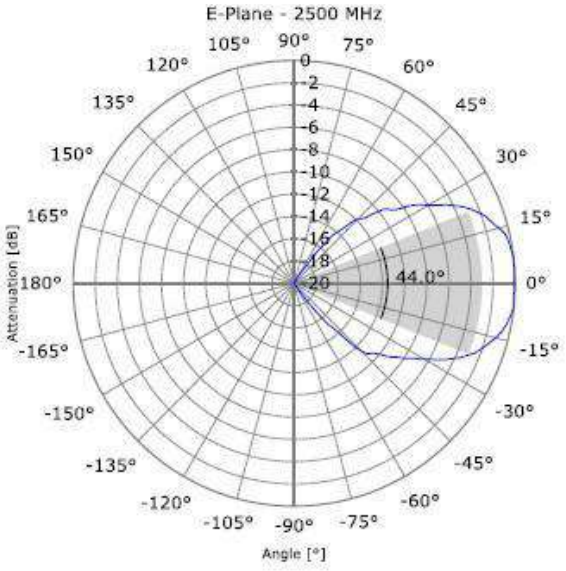

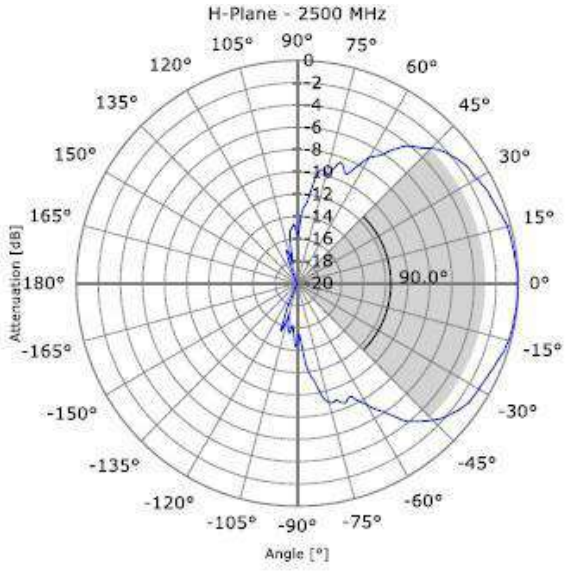

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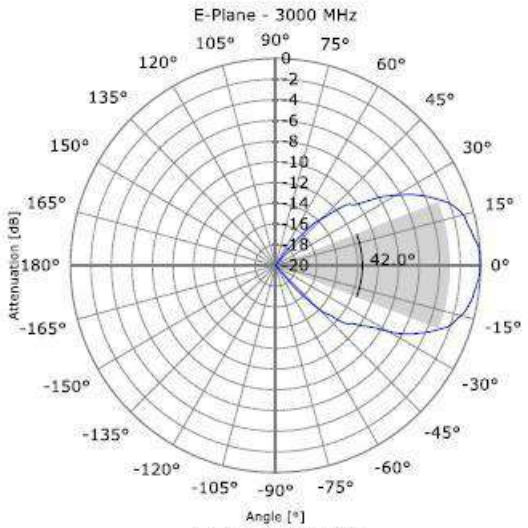

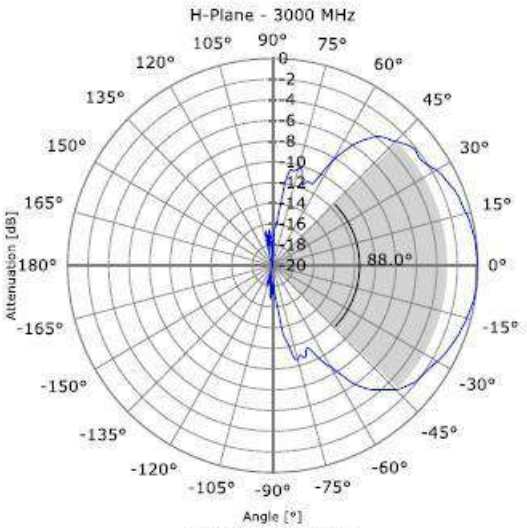

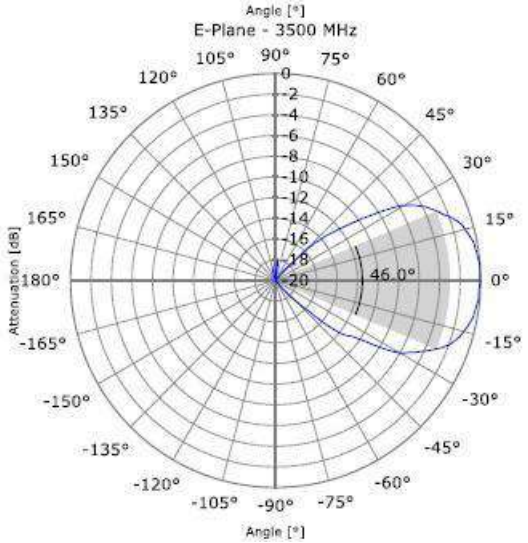

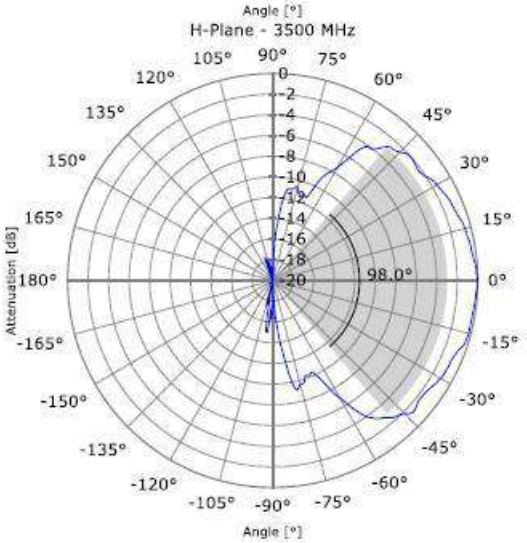

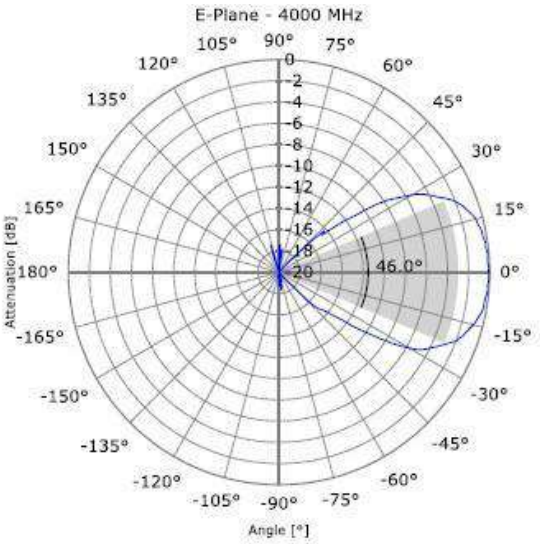

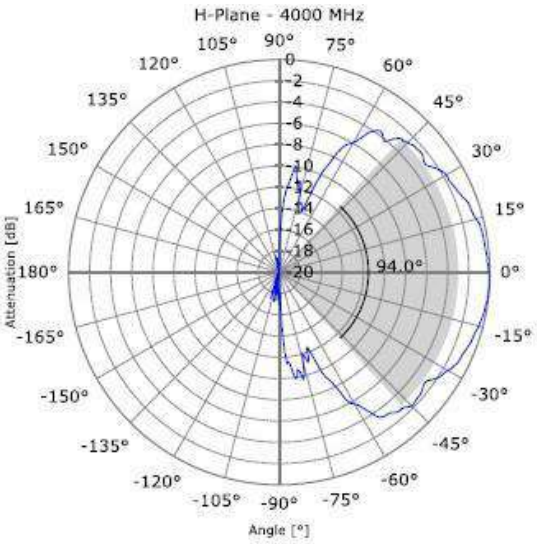

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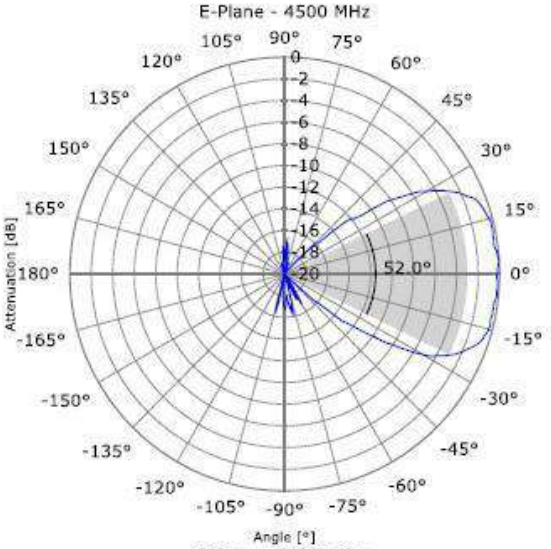

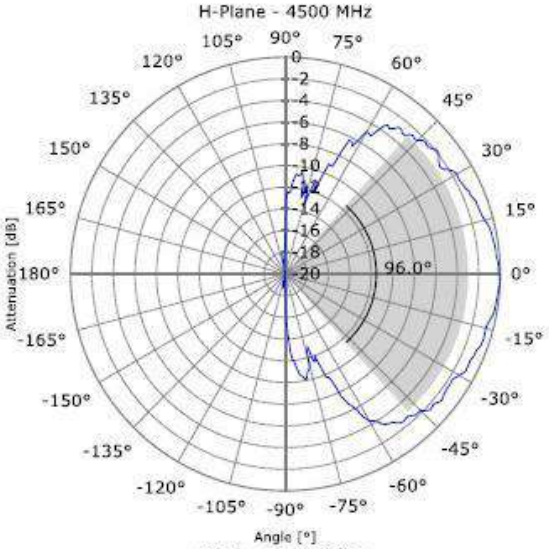

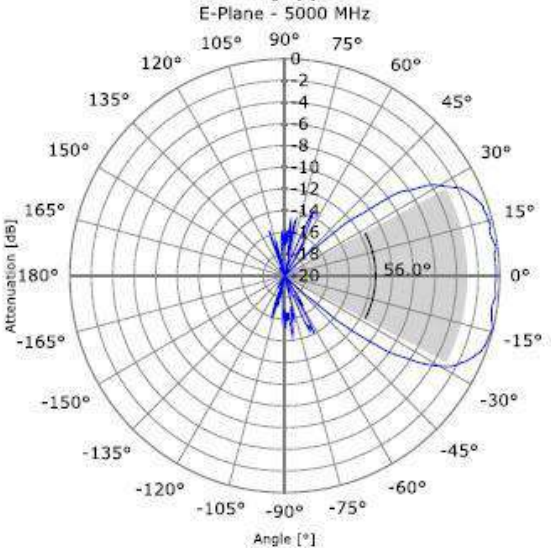

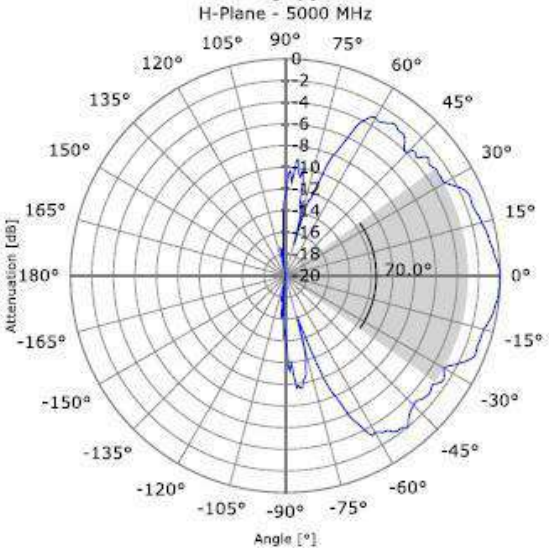

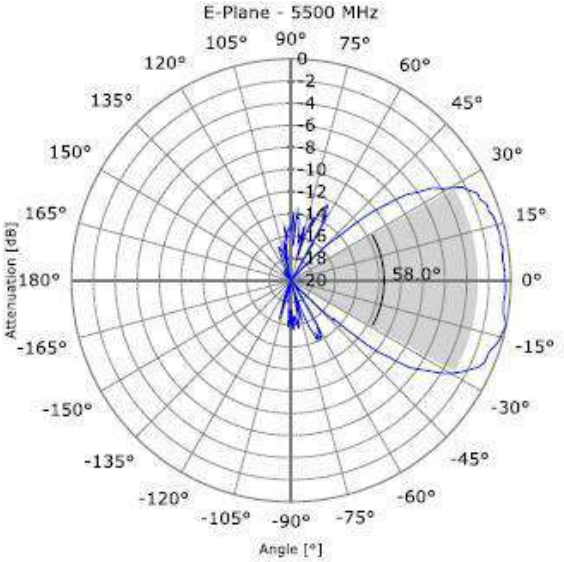

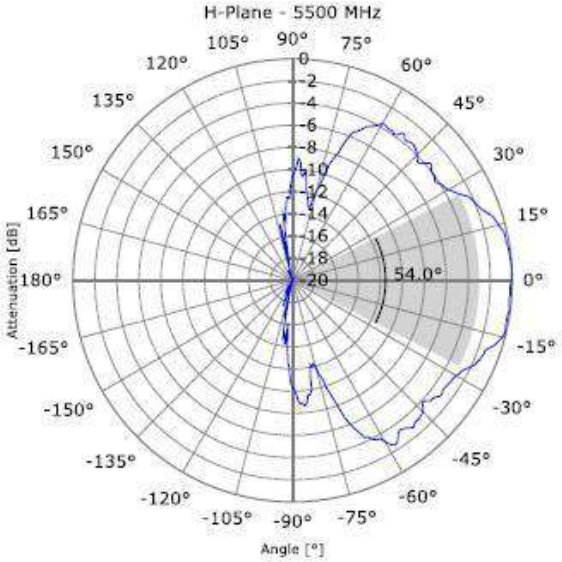

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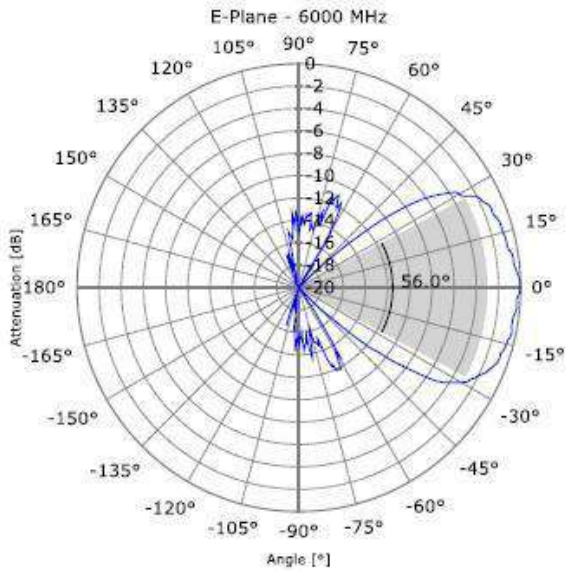

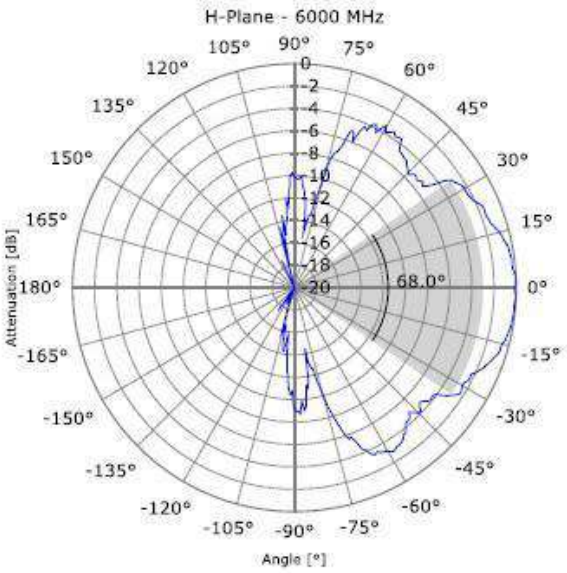

4 Optional Tripods and mounting brackets

TBMA12 on TBTP5 tripod; using TBMA8-PAT mounting bracket

30 MHz – 6000 MHz Hybrid Measurement Antenna

5 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

6 History

Version	Date	Author	Changes
V1.0	23.04.2026	Mayerhofer	Creation of the document