



ENGENHARIA DE RADIOFREQUÊNCIA

Datasheet Técnico

Antena painel MIMO APTM Banda C

Modelo: APTM

Categoria: Telecomunicações e MIMO

Fonte: Estado não informado

Revisão/Data: não declarada · não declarada

Publicação: versão 1.2



VALIDAÇÃO ON-LINE

EFTX-DS-TELECOM-MIMO-APT-M-BANDA-C

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Painéis MIMO direcionais com polarização H/V

Descrição geral

A série APTM foi desenvolvida para aplicações de telemetria e enlaces direcionais que exigem alto desempenho elétrico, repetibilidade de fabricação e integração mecânica compacta. A família contempla configurações com diferentes ganhos e larguras de feixe, mantendo polarização H/V impedância nominal de 50 ohms e excelente adaptação em toda a banda de operação.



Dados gerais da família

Parâmetro	Especificação
Aplicação	Telemetria / enlaces direcionais
Polarização	H / V ou Slant +- 45 graus
Impedância nominal	50 Ω
Conector padrão	N fêmea
Faixa de Frequência	Banda C – 5090MHz - 5250MHz
Configuração MIMO	2x2 (opcional conforme arquitetura do sistema)
VSWR	< 1.10 em toda a banda de operação
IM3	< -153 dBc
Peso máximo	12 kg
Material / construção	Refletor em alumínio / Radome em fibra de vidro de alta resistência

Modelos

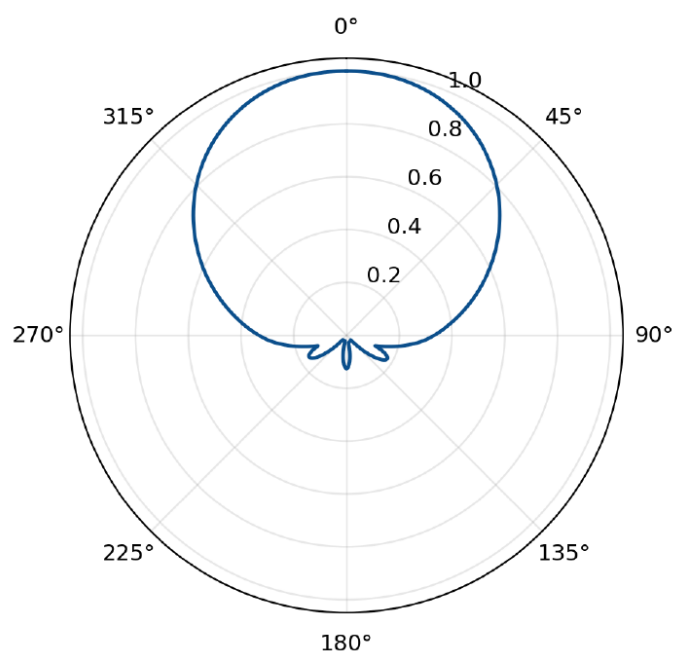
Modelo	Ganho nominal	HPBW H	HPBW V	Observação
APTM-12-110-18	12 dBi	110°	18°	Azimuth, elevação e tabelas dedicadas
APTM-16-90-7	16 dBi	90°	7°	Azimuth, elevação e tabelas dedicadas
APTM-19-20-20	19 dBi	20°	20°	Azimuth, elevação e tabelas dedicadas

APT-12-110-18

Diagrama de azimute



Azimute



Parâmetros da configuração

ÂNGULO DE MEIA POTÊNCIA HORIZONTAL

111.00°

GANHO

10.57 dBd

FRENTE/COSTAS

18.00 dB

RIPPLE

5.86 dB

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Tabela de azimute



Tabela completa - Azimute

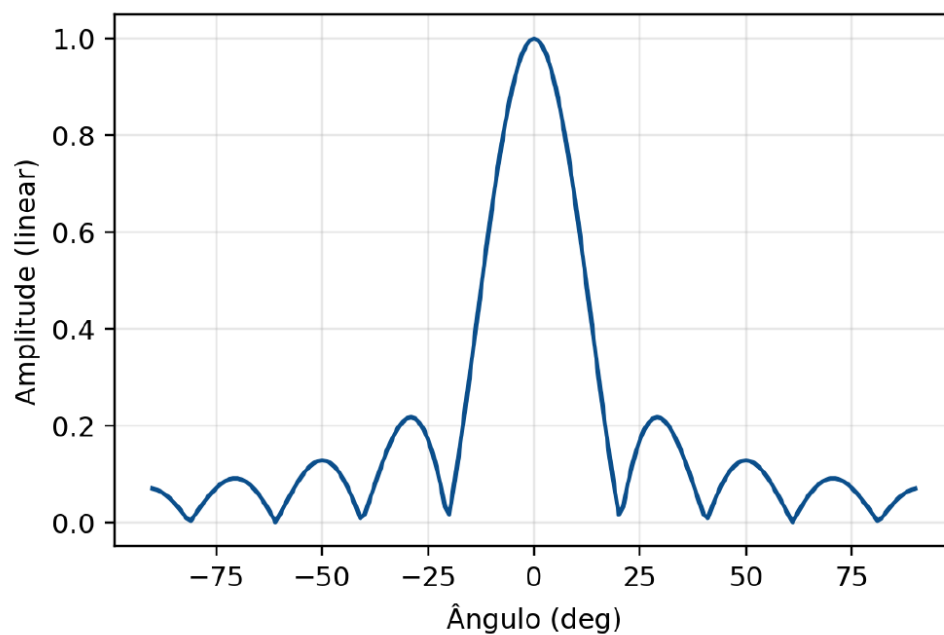
Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB
0°	1.0000	0.00	73°	0.5096	5.86	146°	0.0250	32.03	219°	0.0220	33.16	292°	0.5652	4.96
1°	1.0000	0.00	74°	0.4986	6.05	147°	0.0253	31.92	220°	0.0220	33.13	293°	0.5763	4.79
2°	0.9999	0.00	75°	0.4876	6.24	148°	0.0257	31.82	221°	0.0257	31.81	294°	0.5875	4.62
3°	0.9996	0.00	76°	0.4766	6.44	149°	0.0260	31.71	222°	0.0334	29.53	295°	0.5986	4.46
4°	0.9993	0.01	77°	0.4657	6.64	150°	0.0263	31.61	223°	0.0418	27.58	296°	0.6097	4.30
5°	0.9988	0.01	78°	0.4549	6.84	151°	0.0265	31.52	224°	0.0508	25.88	297°	0.6207	4.14
6°	0.9981	0.02	79°	0.4441	7.05	152°	0.0268	31.43	225°	0.0603	24.40	298°	0.6317	3.99
7°	0.9973	0.02	80°	0.4334	7.26	153°	0.0271	31.34	226°	0.0701	23.09	299°	0.6427	3.84
8°	0.9963	0.03	81°	0.4228	7.48	154°	0.0273	31.26	227°	0.0801	21.93	300°	0.6536	3.69
9°	0.9951	0.04	82°	0.4123	7.70	155°	0.0276	31.19	228°	0.0901	20.91	301°	0.6645	3.55
10°	0.9937	0.05	83°	0.4019	7.92	156°	0.0278	31.12	229°	0.0999	20.01	302°	0.6753	3.41
11°	0.9921	0.07	84°	0.3916	8.14	157°	0.0280	31.06	230°	0.1096	19.21	303°	0.6860	3.27
12°	0.9904	0.08	85°	0.3814	8.37	158°	0.0282	31.00	231°	0.1187	18.51	304°	0.6966	3.14
13°	0.9884	0.10	86°	0.3713	8.61	159°	0.0283	30.96	232°	0.1274	17.90	305°	0.7071	3.01
14°	0.9862	0.12	87°	0.3613	8.84	160°	0.0285	30.91	233°	0.1353	17.37	306°	0.7175	2.88
15°	0.9838	0.14	88°	0.3514	9.08	161°	0.0286	30.88	234°	0.1425	16.92	307°	0.7278	2.76
16°	0.9811	0.17	89°	0.3416	9.33	162°	0.0287	30.85	235°	0.1487	16.55	308°	0.7380	2.64
17°	0.9783	0.19	90°	0.3320	9.58	163°	0.0287	30.83	236°	0.1540	16.25	309°	0.7481	2.52
18°	0.9752	0.22	91°	0.3225	9.83	164°	0.0288	30.81	237°	0.1581	16.02	310°	0.7580	2.41
19°	0.9719	0.25	92°	0.3132	10.08	165°	0.0289	30.78	238°	0.1612	15.85	311°	0.7678	2.29
20°	0.9683	0.28	93°	0.3034	10.36	166°	0.0368	28.68	239°	0.1630	15.76	312°	0.7775	2.19
21°	0.9646	0.31	94°	0.2930	10.66	167°	0.0452	26.89	240°	0.1636	15.72	313°	0.7870	2.08
22°	0.9606	0.35	95°	0.2821	10.99	168°	0.0540	25.35	241°	0.1630	15.76	314°	0.7963	1.98
23°	0.9563	0.39	96°	0.2707	11.35	169°	0.0629	24.02	242°	0.1612	15.85	315°	0.8055	1.88
24°	0.9518	0.43	97°	0.2590	11.73	170°	0.0719	22.86	243°	0.1581	16.02	316°	0.8145	1.78
25°	0.9471	0.47	98°	0.2471	12.14	171°	0.0807	21.86	244°	0.1540	16.25	317°	0.8234	1.69
26°	0.9422	0.52	99°	0.2350	12.58	172°	0.0891	21.00	245°	0.1487	16.55	318°	0.8320	1.60
27°	0.9370	0.57	100°	0.2230	13.03	173°	0.0970	20.27	246°	0.1425	16.92	319°	0.8405	1.51
28°	0.9315	0.62	101°	0.2110	13.51	174°	0.1042	19.65	247°	0.1353	17.37	320°	0.8488	1.42
29°	0.9259	0.67	102°	0.1992	14.02	175°	0.1105	19.13	248°	0.1274	17.90	321°	0.8568	1.34
30°	0.9200	0.72	103°	0.1875	14.54	176°	0.1159	18.72	249°	0.1187	18.51	322°	0.8647	1.26
31°	0.9139	0.78	104°	0.1761	15.09	177°	0.1202	18.40	250°	0.1155	18.75	323°	0.8724	1.19
32°	0.9075	0.84	105°	0.1650	15.65	178°	0.1233	18.18	251°	0.1245	18.10	324°	0.8798	1.11
33°	0.9009	0.91	106°	0.1542	16.24	179°	0.1253	18.04	252°	0.1340	17.46	325°	0.8871	1.04
34°	0.8941	0.97	107°	0.1439	16.84	180°	0.1259	18.00	253°	0.1439	16.84	326°	0.8941	0.97
35°	0.8871	1.04	108°	0.1340	17.46	181°	0.1253	18.04	254°	0.1542	16.24	327°	0.9009	0.91
36°	0.8798	1.11	109°	0.1245	18.10	182°	0.1233	18.18	255°	0.1650	15.65	328°	0.9075	0.84
37°	0.8724	1.19	110°	0.1155	18.75	183°	0.1202	18.40	256°	0.1761	15.09	329°	0.9139	0.78
38°	0.8647	1.26	111°	0.1237	18.15	184°	0.1159	18.72	257°	0.1875	14.54	330°	0.9200	0.72
39°	0.8568	1.34	112°	0.1340	17.46	185°	0.1105	19.13	258°	0.1992	14.02	331°	0.9259	0.67
40°	0.8488	1.42	113°	0.1436	16.86	186°	0.1042	19.65	259°	0.2110	13.51	332°	0.9315	0.62
41°	0.8405	1.51	114°	0.1522	16.35	187°	0.0970	20.27	260°	0.2230	13.03	333°	0.9370	0.57
42°	0.8320	1.60	115°	0.1597	15.93	188°	0.0891	21.00	261°	0.2350	12.58	334°	0.9422	0.52
43°	0.8234	1.69	116°	0.1661	15.59	189°	0.0807	21.86	262°	0.2471	12.14	335°	0.9471	0.47
44°	0.8145	1.78	117°	0.1712	15.33	190°	0.0719	22.86	263°	0.2590	11.73	336°	0.9518	0.43
45°	0.8055	1.88	118°	0.1748	15.15	191°	0.0629	24.02	264°	0.2707	11.35	337°	0.9563	0.39
46°	0.7963	1.98	119°	0.1771	15.04	192°	0.0540	25.35	265°	0.2821	10.99	338°	0.9606	0.35
47°	0.7870	2.08	120°	0.1778	15.00	193°	0.0452	26.89	266°	0.2930	10.66	339°	0.9646	0.31
48°	0.7775	2.19	121°	0.1771	15.04	194°	0.0368	28.68	267°	0.3034	10.36	340°	0.9683	0.28
49°	0.7678	2.29	122°	0.1748	15.15	195°	0.0289	30.78	268°	0.3132	10.08	341°	0.9719	0.25
50°	0.7580	2.41	123°	0.1712	15.33	196°	0.0226	32.93	269°	0.3225	9.83	342°	0.9752	0.22
51°	0.7481	2.52	124°	0.1661	15.59	197°	0.0224	33.00	270°	0.3320	9.58	343°	0.9783	0.19
52°	0.7380	2.64	125°	0.1597	15.93	198°	0.0222	33.06	271°	0.3416	9.33	344°	0.9811	0.17
53°	0.7278	2.76	126°	0.1522	16.35	199°	0.0221	33.12	272°	0.3514	9.08	345°	0.9838	0.14
54°	0.7175	2.88	127°	0.1436	16.86	200°	0.0219	33.18	273°	0.3613	8.84	346°	0.9862	0.12
55°	0.7071	3.01	128°	0.1340	17.46	201°	0.0218	33.22	274°	0.3713	8.61	347°	0.9884	0.10
56°	0.6966	3.14	129°	0.1237	18.15	202°	0.0217	33.26	275°	0.3814	8.37	348°	0.9904	0.08
57°	0.6860	3.27	130°	0.1129	18.95	203°	0.0216	33.30	276°	0.3916	8.14	349°	0.9921	0.07
58°	0.6753	3.41	131°	0.1016	19.86	204°	0.0216	33.33	277°	0.4019	7.92	350°	0.9937	0.05
59°	0.6645	3.55	132°	0.0901	20.91	205°	0.0215	33.35	278°	0.4123	7.70	351°	0.9951	0.04
60°	0.6536	3.69	133°	0.0785	22.10	206°	0.0215	33.37	279°	0.4228	7.48	352°	0.9963	0.03
61°	0.6427	3.84	134°	0.0672	23.45	207°	0.0214	33.37	280°	0.4334	7.26	353°	0.9973	0.02
62°	0.6317	3.99	135°	0.0562	25.00	208°	0.0214	33.38	281°	0.4441	7.05	354°	0.9981	0.02
63°	0.6207	4.14	136°	0.0458	26.78	209°	0.0214	33.38	282°	0.4549	6.84	355°	0.9988	0.01
64°	0.6097	4.30	137°	0.0361	28.85	210°	0.0215	33.37	283°	0.4657	6.64	356°	0.9993	0.01
65°	0.5986	4.46	138°	0.0273	31.28	211°	0.0215	33.36	284°	0.4766	6.44	357°	0.9996	0.00
66°	0.5875	4.62	139°	0.0228	32.83	212°	0.0215	33.34	285°	0.4876	6.24	358°	0.9999	0.00
67°	0.5763	4.79	140°	0.0231	32.72	213°	0.0216	33.32	286°	0.4986	6.05	359°	1.0000	0.00
68°	0.5652	4.96	141°	0.0234	32.61	214°	0.0216	33.30	287°	0.5096	5.86	360°	1.0000	0.00
69°	0.5540	5.13	142°	0.0237	32.49	215°	0.0217	33.28	288°	0.5207	5.67			
70°	0.5429	5.31	143°	0.0241	32.37	216°	0.0218	33.25	289°	0.5318	5.49			
71°	0.5318	5.49	144°	0.0244	32.26	217°	0.0218	33.22	290°	0.5429	5.31			
72°	0.5207	5.67	145°	0.0247	32.14	218°	0.0219	33.19	291°	0.5540	5.13			

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Diagrama de elevação



Elevação



Parâmetros da configuração

ELEMENTOS VERTICAIS

1

ÂNGULO DE MEIA POTÊNCIA VERTICAL

19.00°

GANHO

10.57 dBd

PRIMEIRO NULO

20.00°

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Tabela de elevação



Tabela completa - Elevação

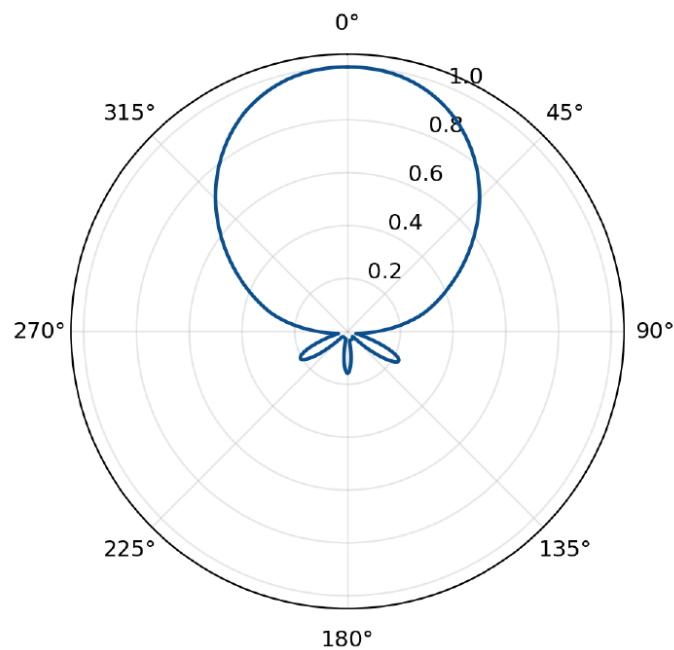
Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB
-90.0°	0.0701	23.09	-54.0°	0.1054	19.55	-18.0°	0.1261	17.99	18.0°	0.1261	17.99	54.0°	0.1054	19.55
-89.5°	0.0688	23.24	-53.5°	0.1102	19.16	-17.5°	0.1564	16.11	18.5°	0.0975	20.22	54.5°	0.0995	20.04
-89.0°	0.0676	23.40	-53.0°	0.1150	18.79	-17.0°	0.1868	14.57	19.0°	0.0689	23.23	55.0°	0.0936	20.57
-88.5°	0.0655	23.68	-52.5°	0.1186	18.52	-16.5°	0.2185	13.21	19.5°	0.0424	27.45	55.5°	0.0868	21.22
-88.0°	0.0634	23.96	-52.0°	0.1222	18.26	-16.0°	0.2503	12.03	20.0°	0.0159	35.96	56.0°	0.0801	21.93
-87.5°	0.0605	24.37	-51.5°	0.1245	18.10	-15.5°	0.2831	10.96	20.5°	0.0242	32.34	56.5°	0.0726	22.78
-87.0°	0.0575	24.80	-51.0°	0.1268	17.94	-15.0°	0.3159	10.01	21.0°	0.0324	29.79	57.0°	0.0651	23.72
-86.5°	0.0539	25.37	-50.5°	0.1276	17.89	-14.5°	0.3494	9.13	21.5°	0.0540	25.35	57.5°	0.0572	24.86
-86.0°	0.0502	25.99	-50.0°	0.1284	17.83	-14.0°	0.3829	8.34	22.0°	0.0756	22.43	58.0°	0.0492	26.16
-85.5°	0.0458	26.78	-49.5°	0.1277	17.88	-13.5°	0.4166	7.61	22.5°	0.0944	20.50	58.5°	0.0409	27.76
-85.0°	0.0415	27.65	-49.0°	0.1269	17.93	-13.0°	0.4503	6.93	23.0°	0.1133	18.92	59.0°	0.0326	29.72
-84.5°	0.0365	28.76	-48.5°	0.1246	18.09	-12.5°	0.4838	6.31	23.5°	0.1293	17.77	59.5°	0.0243	32.30
-84.0°	0.0315	30.03	-48.0°	0.1223	18.25	-12.0°	0.5173	5.73	24.0°	0.1452	16.76	60.0°	0.0159	35.99
-83.5°	0.0260	31.69	-47.5°	0.1185	18.53	-11.5°	0.5501	5.19	24.5°	0.1583	16.01	60.5°	0.0083	41.62
-83.0°	0.0206	33.74	-47.0°	0.1146	18.82	-11.0°	0.5830	4.69	25.0°	0.1713	15.32	61.0°	0.0007	62.73
-82.5°	0.0147	36.66	-46.5°	0.1091	19.24	-10.5°	0.6148	4.23	25.5°	0.1814	14.83	61.5°	0.0088	41.16
-82.0°	0.0088	41.07	-46.0°	0.1037	19.69	-10.0°	0.6466	3.79	26.0°	0.1915	14.36	62.0°	0.0168	35.51
-81.5°	0.0061	44.28	-45.5°	0.0967	20.29	-9.5°	0.6768	3.39	26.5°	0.1986	14.04	62.5°	0.0243	32.27
-81.0°	0.0034	49.42	-45.0°	0.0898	20.94	-9.0°	0.7071	3.01	27.0°	0.2057	13.73	63.0°	0.0319	29.92
-80.5°	0.0096	40.35	-44.5°	0.0814	21.79	-8.5°	0.7355	2.67	27.5°	0.2100	13.56	63.5°	0.0389	28.21
-80.0°	0.0158	36.02	-44.0°	0.0730	22.73	-8.0°	0.7638	2.34	28.0°	0.2142	13.38	64.0°	0.0458	26.78
-79.5°	0.0220	33.15	-43.5°	0.0634	23.96	-7.5°	0.7898	2.05	28.5°	0.2157	13.32	64.5°	0.0520	25.67
-79.0°	0.0282	31.00	-43.0°	0.0537	25.39	-7.0°	0.8159	1.77	29.0°	0.2172	13.26	65.0°	0.0582	24.69
-78.5°	0.0342	29.32	-42.5°	0.0430	27.34	-6.5°	0.8392	1.52	29.5°	0.2161	13.31	65.5°	0.0636	23.93
-78.0°	0.0402	27.91	-42.0°	0.0322	29.84	-6.0°	0.8626	1.28	30.0°	0.2150	13.35	66.0°	0.0689	23.23
-77.5°	0.0459	26.77	-41.5°	0.0205	33.75	-5.5°	0.8830	1.08	30.5°	0.2115	13.49	66.5°	0.0733	22.70
-77.0°	0.0516	25.75	-41.0°	0.0088	41.06	-5.0°	0.9033	0.88	31.0°	0.2080	13.64	67.0°	0.0776	22.20
-76.5°	0.0568	24.92	-40.5°	0.0124	38.15	-4.5°	0.9204	0.72	31.5°	0.2022	13.88	67.5°	0.0810	21.83
-76.0°	0.0620	24.16	-40.0°	0.0159	35.97	-4.0°	0.9375	0.56	32.0°	0.1965	14.13	68.0°	0.0843	21.48
-75.5°	0.0665	23.54	-39.5°	0.0287	30.84	-3.5°	0.9510	0.44	32.5°	0.1889	14.48	68.5°	0.0865	21.26
-75.0°	0.0711	22.96	-39.0°	0.0415	27.63	-3.0°	0.9645	0.31	33.0°	0.1813	14.83	69.0°	0.0888	21.03
-74.5°	0.0750	22.50	-38.5°	0.0545	25.27	-2.5°	0.9743	0.23	33.5°	0.1720	15.29	69.5°	0.0899	20.93
-74.0°	0.0788	22.06	-38.0°	0.0675	23.42	-2.0°	0.9841	0.14	34.0°	0.1627	15.77	70.0°	0.0910	20.82
-73.5°	0.0819	21.74	-37.5°	0.0803	21.90	-1.5°	0.9901	0.09	34.5°	0.1521	16.36	70.5°	0.0911	20.81
-73.0°	0.0849	21.43	-37.0°	0.0932	20.61	-1.0°	0.9960	0.03	35.0°	0.1414	16.99	71.0°	0.0911	20.81
-72.5°	0.0869	21.22	-36.5°	0.1056	19.52	-0.5°	0.9980	0.02	35.5°	0.1297	17.74	71.5°	0.0900	20.91
-72.0°	0.0890	21.01	-36.0°	0.1180	18.56	0.0°	1.0000	0.00	36.0°	0.1180	18.56	72.0°	0.0890	21.01
-71.5°	0.0900	20.91	-35.5°	0.1297	17.74	0.5°	0.9980	0.02	36.5°	0.1056	19.52	72.5°	0.0869	21.22
-71.0°	0.0911	20.81	-35.0°	0.1414	16.99	1.0°	0.9960	0.03	37.0°	0.0932	20.61	73.0°	0.0849	21.43
-70.5°	0.0911	20.81	-34.5°	0.1521	16.36	1.5°	0.9901	0.09	37.5°	0.0803	21.90	73.5°	0.0819	21.74
-70.0°	0.0910	20.82	-34.0°	0.1627	15.77	2.0°	0.9841	0.14	38.0°	0.0675	23.42	74.0°	0.0788	22.06
-69.5°	0.0899	20.93	-33.5°	0.1720	15.29	2.5°	0.9743	0.23	38.5°	0.0545	25.27	74.5°	0.0750	22.50
-69.0°	0.0888	21.03	-33.0°	0.1813	14.83	3.0°	0.9645	0.31	39.0°	0.0415	27.63	75.0°	0.0711	22.96
-68.5°	0.0865	21.26	-32.5°	0.1889	14.48	3.5°	0.9510	0.44	39.5°	0.0287	30.84	75.5°	0.0665	23.54
-68.0°	0.0843	21.48	-32.0°	0.1965	14.13	4.0°	0.9375	0.56	40.0°	0.0159	35.97	76.0°	0.0620	24.16
-67.5°	0.0810	21.83	-31.5°	0.2022	13.88	4.5°	0.9204	0.72	40.5°	0.0124	38.15	76.5°	0.0568	24.92
-67.0°	0.0776	22.20	-31.0°	0.2080	13.64	5.0°	0.9033	0.88	41.0°	0.0088	41.06	77.0°	0.0516	25.75
-66.5°	0.0733	22.70	-30.5°	0.2115	13.49	5.5°	0.8830	1.08	41.5°	0.0205	33.75	77.5°	0.0459	26.77
-66.0°	0.0689	23.23	-30.0°	0.2150	13.35	6.0°	0.8626	1.28	42.0°	0.0322	29.84	78.0°	0.0402	27.91
-65.5°	0.0636	23.93	-29.5°	0.2161	13.31	6.5°	0.8392	1.52	42.5°	0.0430	27.34	78.5°	0.0342	29.32
-65.0°	0.0582	24.69	-29.0°	0.2172	13.26	7.0°	0.8159	1.77	43.0°	0.0537	25.39	79.0°	0.0282	31.00
-64.5°	0.0520	25.67	-28.5°	0.2157	13.32	7.5°	0.7898	2.05	43.5°	0.0634	23.96	79.5°	0.0220	33.15
-64.0°	0.0458	26.78	-28.0°	0.2142	13.38	8.0°	0.7638	2.34	44.0°	0.0730	22.73	80.0°	0.0158	36.02
-63.5°	0.0389	28.21	-27.5°	0.2100	13.56	8.5°	0.7355	2.67	44.5°	0.0814	21.79	80.5°	0.0096	40.35
-63.0°	0.0319	29.92	-27.0°	0.2057	13.73	9.0°	0.7071	3.01	45.0°	0.0898	20.94	81.0°	0.0034	49.42
-62.5°	0.0243	32.27	-26.5°	0.1986	14.04	9.5°	0.6768	3.39	45.5°	0.0967	20.29	81.5°	0.0061	44.28
-62.0°	0.0168	35.51	-26.0°	0.1915	14.36	10.0°	0.6466	3.79	46.0°	0.1037	19.69	82.0°	0.0088	41.07
-61.5°	0.0088	41.16	-25.5°	0.1814	14.83	10.5°	0.6148	4.23	46.5°	0.1091	19.24	82.5°	0.0147	36.66
-61.0°	0.0007	62.73	-25.0°	0.1713	15.32	11.0°	0.5830	4.69	47.0°	0.1146	18.82	83.0°	0.0206	33.74
-60.5°	0.0083	41.62	-24.5°	0.1583	16.01	11.5°	0.5501	5.19	47.5°	0.1185	18.53	83.5°	0.0260	31.69
-60.0°	0.0159	35.99	-24.0°	0.1452	16.76	12.0°	0.5173	5.73	48.0°	0.1223	18.25	84.0°	0.0315	30.03
-59.5°	0.0243	32.30	-23.5°	0.1293	17.77	12.5°	0.4838	6.31	48.5°	0.1246	18.09	84.5°	0.0365	28.76
-59.0°	0.0326	29.72	-23.0°	0.1133	18.92	13.0°	0.4503	6.93	49.0°	0.1269	17.93	85.0°	0.0415	27.65
-58.5°	0.0409	27.76	-22.5°	0.0944	20.50	13.5°	0.4166	7.61	49.5°	0.1277	17.88	85.5°	0.0458	26.78
-58.0°	0.0492	26.16	-22.0°	0.0756	22.43	14.0°	0.3829	8.34	50.0°	0.1284	17.83	86.0°	0.0502	25.99
-57.5°	0.0572	24.86	-21.5°	0.0540	25.35	14.5°	0.3494	9.13	50.5°	0.1276	17.89	86.5°	0.0539	25.37
-57.0°	0.0651	23.72	-21.0°	0.0324	29.79	15.0°	0.3159	10.01	51.0°	0.1268	17.94	87.0°	0.0575	24.80
-56.5°	0.0726	22.78	-20.5°	0.0242	32.34	15.5°	0.2831	10.96	51.5°	0.1245	18.10	87.5°	0.0605	24.37
-56.0°	0.0801	21.93	-20.0°	0.0159	35.96	16.0°	0.2503	12.03	52.0°	0.1222	18.26	88.0°	0.0634	23.96
-55.5°	0.0868	21.22	-19.5°	0.0424	27.45	16.5°	0.2185	13.21	52.5°	0.1186	18.52	88.5°	0.0655	23.68
-55.0°	0.0936	20.57	-19.0°	0.0689	23.23	17.0°	0.1868	14.57	53.0°	0.1150	18.79	89.0°	0.0676	23.40
-54.5°	0.0995	20.04	-18.5°	0.0975	20.22	17.5°	0.1564	16.11	53.5°	0.1102	19.16	89.5°	0.0688	23.24

APT-16-90-7

Diagrama de azimute



Azimute



Parâmetros da configuração

ÂNGULO DE MEIA POTÊNCIA HORIZONTAL

91.00°

GANHO

15.49 dBd

FRENTE/COSTAS

16.00 dB

RIPPLE

5.92 dB

APTM-16-90-7

Tabela de azimute



Tabela completa - Azimute

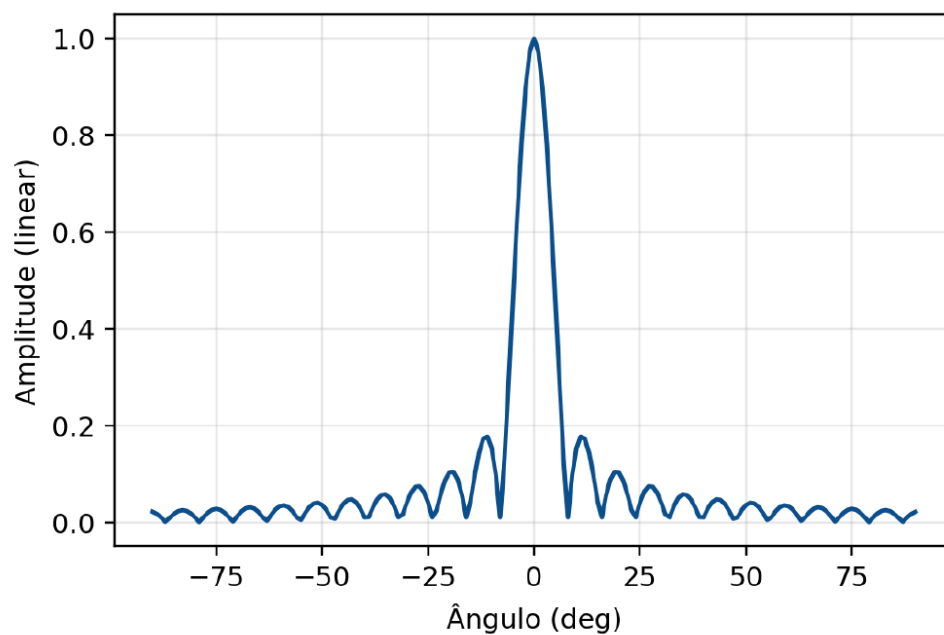
Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB
0°	1.0000	0.00	73°	0.3395	9.38	146°	0.0315	30.03	219°	0.0277	31.16	292°	0.4008	7.94
1°	1.0000	0.00	74°	0.3278	9.69	147°	0.0319	29.92	220°	0.0278	31.13	293°	0.4135	7.67
2°	0.9998	0.00	75°	0.3163	10.00	148°	0.0323	29.82	221°	0.0279	31.10	294°	0.4264	7.40
3°	0.9994	0.01	76°	0.3046	10.33	149°	0.0327	29.71	222°	0.0279	31.08	295°	0.4394	7.14
4°	0.9988	0.01	77°	0.2918	10.70	150°	0.0331	29.61	223°	0.0280	31.05	296°	0.4525	6.89
5°	0.9980	0.02	78°	0.2783	11.11	151°	0.0334	29.52	224°	0.0281	31.03	297°	0.4657	6.64
6°	0.9970	0.03	79°	0.2642	11.56	152°	0.0338	29.43	225°	0.0387	28.25	298°	0.4790	6.39
7°	0.9956	0.04	80°	0.2497	12.05	153°	0.0341	29.34	226°	0.0514	25.78	299°	0.4924	6.15
8°	0.9940	0.05	81°	0.2350	12.58	154°	0.0344	29.26	227°	0.0653	23.71	300°	0.5059	5.92
9°	0.9921	0.07	82°	0.2203	13.14	155°	0.0347	29.19	228°	0.0800	21.94	301°	0.5194	5.69
10°	0.9899	0.09	83°	0.2057	13.73	156°	0.0350	29.12	229°	0.0952	20.43	302°	0.5330	5.47
11°	0.9874	0.11	84°	0.1914	14.36	157°	0.0352	29.06	230°	0.1106	19.13	303°	0.5466	5.25
12°	0.9846	0.13	85°	0.1773	15.02	158°	0.0355	29.00	231°	0.1258	18.01	304°	0.5602	5.03
13°	0.9814	0.16	86°	0.1638	15.71	159°	0.0357	28.96	232°	0.1405	17.04	305°	0.5738	4.82
14°	0.9780	0.19	87°	0.1508	16.43	160°	0.0358	28.91	233°	0.1544	16.23	306°	0.5875	4.62
15°	0.9741	0.23	88°	0.1383	17.18	161°	0.0360	28.88	234°	0.1671	15.54	307°	0.6010	4.42
16°	0.9700	0.26	89°	0.1265	17.96	162°	0.0361	28.85	235°	0.1784	14.97	308°	0.6146	4.23
17°	0.9654	0.31	90°	0.1155	18.75	163°	0.0362	28.83	236°	0.1880	14.51	309°	0.6281	4.04
18°	0.9606	0.35	91°	0.1051	19.57	164°	0.0362	28.81	237°	0.1958	14.17	310°	0.6415	3.86
19°	0.9553	0.40	92°	0.0955	20.40	165°	0.0363	28.81	238°	0.2014	13.92	311°	0.6548	3.68
20°	0.9498	0.45	93°	0.0866	21.25	166°	0.0363	28.81	239°	0.2048	13.77	312°	0.6681	3.50
21°	0.9438	0.50	94°	0.0785	22.10	167°	0.0362	28.82	240°	0.2060	13.72	313°	0.6812	3.33
22°	0.9376	0.56	95°	0.0712	22.95	168°	0.0366	28.04	241°	0.2048	13.77	314°	0.6942	3.17
23°	0.9309	0.62	96°	0.0646	23.80	169°	0.0521	25.66	242°	0.2014	13.92	315°	0.7071	3.01
24°	0.9239	0.69	97°	0.0587	24.62	170°	0.0655	23.68	243°	0.1958	14.17	316°	0.7198	2.86
25°	0.9166	0.76	98°	0.0536	25.42	171°	0.0792	22.02	244°	0.1880	14.51	317°	0.7324	2.71
26°	0.9089	0.83	99°	0.0491	26.18	172°	0.0930	20.63	245°	0.1784	14.97	318°	0.7448	2.56
27°	0.9009	0.91	100°	0.0452	26.89	173°	0.1063	19.47	246°	0.1671	15.54	319°	0.7569	2.42
28°	0.8926	0.99	101°	0.0420	27.54	174°	0.1189	18.50	247°	0.1544	16.23	320°	0.7689	2.28
29°	0.8839	1.07	102°	0.0393	28.11	175°	0.1302	17.71	248°	0.1405	17.04	321°	0.7807	2.15
30°	0.8749	1.16	103°	0.0371	28.61	176°	0.1399	17.08	249°	0.1258	18.01	322°	0.7922	2.02
31°	0.8656	1.25	104°	0.0351	29.09	177°	0.1479	16.60	250°	0.1106	19.13	323°	0.8035	1.90
32°	0.8560	1.35	105°	0.0332	29.58	178°	0.1537	16.27	251°	0.0952	20.43	324°	0.8145	1.78
33°	0.8460	1.45	106°	0.0441	27.10	179°	0.1573	16.07	252°	0.0800	21.94	325°	0.8253	1.67
34°	0.8358	1.56	107°	0.0591	24.57	180°	0.1585	16.00	253°	0.0653	23.71	326°	0.8358	1.56
35°	0.8253	1.67	108°	0.0753	22.46	181°	0.1573	16.07	254°	0.0514	25.78	327°	0.8460	1.45
36°	0.8145	1.78	109°	0.0925	20.68	182°	0.1537	16.27	255°	0.0387	28.25	328°	0.8560	1.35
37°	0.8035	1.90	110°	0.1102	19.16	183°	0.1479	16.60	256°	0.0351	29.09	329°	0.8656	1.25
38°	0.7922	2.02	111°	0.1279	17.86	184°	0.1399	17.08	257°	0.0371	28.61	330°	0.8749	1.16
39°	0.7807	2.15	112°	0.1452	16.76	185°	0.1302	17.71	258°	0.0393	28.11	331°	0.8839	1.07
40°	0.7689	2.28	113°	0.1616	15.83	186°	0.1189	18.50	259°	0.0420	27.54	332°	0.8926	0.99
41°	0.7569	2.42	114°	0.1769	15.05	187°	0.1063	19.47	260°	0.0452	26.89	333°	0.9009	0.91
42°	0.7448	2.56	115°	0.1905	14.40	188°	0.0930	20.63	261°	0.0491	26.18	334°	0.9089	0.83
43°	0.7324	2.71	116°	0.2021	13.89	189°	0.0792	22.02	262°	0.0536	25.42	335°	0.9166	0.76
44°	0.7198	2.86	117°	0.2114	13.50	190°	0.0655	23.68	263°	0.0587	24.62	336°	0.9239	0.69
45°	0.7071	3.01	118°	0.2183	13.22	191°	0.0521	25.66	264°	0.0646	23.80	337°	0.9309	0.62
46°	0.6942	3.17	119°	0.2225	13.05	192°	0.0366	28.04	265°	0.0712	22.95	338°	0.9376	0.56
47°	0.6812	3.33	120°	0.2239	13.00	193°	0.0292	30.69	266°	0.0785	22.10	339°	0.9438	0.50
48°	0.6681	3.50	121°	0.2225	13.05	194°	0.0289	30.77	267°	0.0866	21.25	340°	0.9498	0.45
49°	0.6548	3.68	122°	0.2183	13.22	195°	0.0287	30.85	268°	0.0955	20.40	341°	0.9553	0.40
50°	0.6415	3.86	123°	0.2114	13.50	196°	0.0284	30.93	269°	0.1051	19.57	342°	0.9606	0.35
51°	0.6281	4.04	124°	0.2021	13.89	197°	0.0282	31.00	270°	0.1155	18.75	343°	0.9654	0.31
52°	0.6146	4.23	125°	0.1905	14.40	198°	0.0280	31.06	271°	0.1265	17.96	344°	0.9700	0.26
53°	0.6010	4.42	126°	0.1769	15.05	199°	0.0278	31.12	272°	0.1383	17.18	345°	0.9741	0.23
54°	0.5875	4.62	127°	0.1616	15.83	200°	0.0276	31.18	273°	0.1508	16.43	346°	0.9780	0.19
55°	0.5738	4.82	128°	0.1452	16.76	201°	0.0275	31.22	274°	0.1638	15.71	347°	0.9814	0.16
56°	0.5602	5.03	129°	0.1279	17.86	202°	0.0273	31.26	275°	0.1773	15.02	348°	0.9846	0.13
57°	0.5466	5.25	130°	0.1102	19.16	203°	0.0272	31.30	276°	0.1914	14.36	349°	0.9874	0.11
58°	0.5330	5.47	131°	0.0925	20.68	204°	0.0271	31.33	277°	0.2057	13.73	350°	0.9899	0.09
59°	0.5194	5.69	132°	0.0753	22.46	205°	0.0271	31.35	278°	0.2203	13.14	351°	0.9921	0.07
60°	0.5059	5.92	133°	0.0591	24.57	206°	0.0270	31.37	279°	0.2350	12.58	352°	0.9940	0.05
61°	0.4924	6.15	134°	0.0441	27.10	207°	0.0270	31.37	280°	0.2497	12.05	353°	0.9956	0.04
62°	0.4790	6.39	135°	0.0309	30.19	208°	0.0270	31.38	281°	0.2642	11.56	354°	0.9970	0.03
63°	0.4657	6.64	136°	0.0277	31.16	209°	0.0270	31.38	282°	0.2783	11.11	355°	0.9980	0.02
64°	0.4525	6.89	137°	0.0280	31.06	210°	0.0270	31.37	283°	0.2918	10.70	356°	0.9988	0.01
65°	0.4394	7.14	138°	0.0284	30.95	211°	0.0270	31.36	284°	0.3046	10.33	357°	0.9994	0.01
66°	0.4264	7.40	139°	0.0287	30.83	212°	0.0271	31.34	285°	0.3163	10.00	358°	0.9998	0.00
67°	0.4135	7.67	140°	0.0291	30.72	213°	0.0272	31.32	286°	0.3278	9.69	359°	1.0000	0.00
68°	0.4008	7.94	141°	0.0295	30.61	214°	0.0272	31.30	287°	0.3395	9.38	360°	1.0000	0.00
69°	0.3882	8.22	142°	0.0299	30.49	215°	0.0273	31.28	288°	0.3514	9.08			
70°	0.3757	8.50	143°	0.0303	30.37	216°	0.0274	31.25	289°	0.3635	8.79			
71°	0.3635	8.79	144°	0.0307	30.26	217°	0.0275	31.22	290°	0.3757	8.50			
72°	0.3514	9.08	145°	0.0311	30.14	218°	0.0276	31.19	291°	0.3882	8.22			

APT-16-90-7

Diagrama de elevação



Elevação



Parâmetros da configuração

ELEMENTOS VERTICAIS

1

ÂNGULO DE MEIA POTÊNCIA VERTICAL

7.48°

GANHO

15.49 dBd

PRIMEIRO NULO

8.00°

APTM-16-90-7

Tabela de elevação



Tabela completa - Elevação

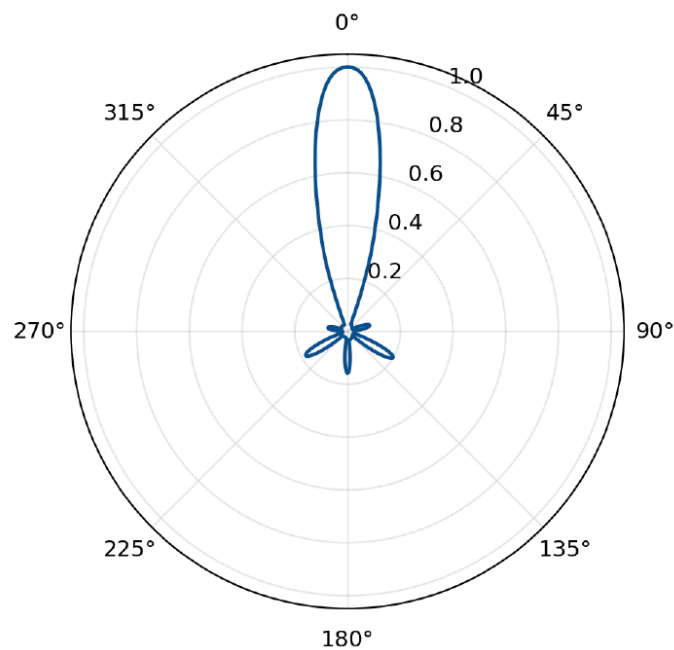
Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB
-90.0°	0.0216	33.31	-54.0°	0.0191	34.40	-18.0°	0.0879	21.12	18.0°	0.0879	21.12	54.0°	0.0191	34.40
-89.5°	0.0193	34.27	-53.5°	0.0250	32.04	-17.5°	0.0718	22.88	18.5°	0.0959	20.36	54.5°	0.0118	38.53
-89.0°	0.0171	35.35	-53.0°	0.0310	30.18	-17.0°	0.0556	25.09	19.0°	0.1038	19.67	55.0°	0.0046	46.67
-88.5°	0.0134	37.43	-52.5°	0.0347	29.19	-16.5°	0.0329	29.66	19.5°	0.1033	19.72	55.5°	0.0073	42.73
-88.0°	0.0098	40.19	-52.0°	0.0384	28.30	-16.0°	0.0101	39.93	20.0°	0.1028	19.76	56.0°	0.0100	40.03
-87.5°	0.0053	45.55	-51.5°	0.0393	28.12	-15.5°	0.0267	31.48	20.5°	0.0946	20.48	56.5°	0.0163	35.78
-87.0°	0.0008	62.22	-51.0°	0.0401	27.94	-15.0°	0.0432	27.28	21.0°	0.0865	21.26	57.0°	0.0225	32.94
-86.5°	0.0047	46.61	-50.5°	0.0377	28.46	-14.5°	0.0701	23.09	21.5°	0.0727	22.77	57.5°	0.0269	31.41
-86.0°	0.0086	41.34	-50.0°	0.0354	29.02	-14.0°	0.0969	20.27	22.0°	0.0589	24.60	58.0°	0.0312	30.11
-85.5°	0.0127	37.94	-49.5°	0.0302	30.41	-13.5°	0.1198	18.43	22.5°	0.0419	27.57	58.5°	0.0330	29.63
-85.0°	0.0168	35.50	-49.0°	0.0249	32.07	-13.0°	0.1426	16.92	23.0°	0.0248	32.10	59.0°	0.0348	29.16
-84.5°	0.0197	34.13	-48.5°	0.0175	35.16	-12.5°	0.1572	16.07	23.5°	0.0175	35.16	59.5°	0.0339	29.40
-84.0°	0.0225	32.94	-48.0°	0.0100	40.00	-12.0°	0.1718	15.30	24.0°	0.0101	39.94	60.0°	0.0330	29.64
-83.5°	0.0237	32.50	-47.5°	0.0086	41.34	-11.5°	0.1744	15.17	24.5°	0.0254	31.91	60.5°	0.0295	30.60
-83.0°	0.0249	32.08	-47.0°	0.0071	42.94	-11.0°	0.1771	15.04	25.0°	0.0407	27.81	61.0°	0.0261	31.67
-82.5°	0.0241	32.35	-46.5°	0.0155	36.19	-10.5°	0.1650	15.65	25.5°	0.0518	25.72	61.5°	0.0208	33.65
-82.0°	0.0233	32.64	-46.0°	0.0239	32.44	-10.0°	0.1530	16.31	26.0°	0.0628	24.04	62.0°	0.0155	36.22
-81.5°	0.0207	33.67	-45.5°	0.0307	30.26	-9.5°	0.1250	18.06	26.5°	0.0684	23.30	62.5°	0.0091	40.81
-81.0°	0.0181	34.85	-45.0°	0.0375	28.51	-9.0°	0.0971	20.26	27.0°	0.0739	22.63	63.0°	0.0028	51.14
-80.5°	0.0140	37.10	-44.5°	0.0417	27.60	-8.5°	0.0536	25.42	27.5°	0.0735	22.68	63.5°	0.0064	43.94
-80.0°	0.0098	40.14	-44.0°	0.0459	26.77	-8.0°	0.0101	39.92	28.0°	0.0731	22.73	64.0°	0.0099	40.06
-79.5°	0.0050	46.01	-43.5°	0.0465	26.64	-7.5°	0.0681	23.34	28.5°	0.0672	23.46	64.5°	0.0153	36.29
-79.0°	0.0002	75.41	-43.0°	0.0472	26.52	-7.0°	0.1261	17.99	29.0°	0.0613	24.25	65.0°	0.0207	33.67
-78.5°	0.0053	45.53	-42.5°	0.0442	27.10	-6.5°	0.2068	13.69	29.5°	0.0512	25.82	65.5°	0.0244	32.27
-78.0°	0.0104	39.65	-42.0°	0.0411	27.72	-6.0°	0.2876	10.82	30.0°	0.0410	27.74	66.0°	0.0280	31.06
-77.5°	0.0148	36.57	-41.5°	0.0346	29.21	-5.5°	0.3737	8.55	30.5°	0.0285	30.91	66.5°	0.0294	30.64
-77.0°	0.0193	34.30	-41.0°	0.0282	31.01	-5.0°	0.4599	6.75	31.0°	0.0159	35.97	67.0°	0.0308	30.24
-76.5°	0.0223	33.04	-40.5°	0.0191	34.38	-4.5°	0.5443	5.28	31.5°	0.0130	37.73	67.5°	0.0297	30.53
-76.0°	0.0253	31.93	-40.0°	0.0100	39.97	-4.0°	0.6287	4.03	32.0°	0.0101	39.95	68.0°	0.0287	30.84
-75.5°	0.0264	31.56	-39.5°	0.0103	39.72	-3.5°	0.7039	3.05	32.5°	0.0215	33.35	68.5°	0.0255	31.87
-75.0°	0.0275	31.20	-39.0°	0.0106	39.47	-3.0°	0.7792	2.17	33.0°	0.0329	29.65	69.0°	0.0223	33.03
-74.5°	0.0265	31.54	-38.5°	0.0206	33.70	-2.5°	0.8385	1.53	33.5°	0.0412	27.70	69.5°	0.0175	35.15
-74.0°	0.0254	31.89	-38.0°	0.0307	30.27	-2.0°	0.8979	0.94	34.0°	0.0495	26.11	70.0°	0.0127	37.96
-73.5°	0.0224	33.01	-37.5°	0.0388	28.23	-1.5°	0.9359	0.58	34.5°	0.0535	25.43	70.5°	0.0270	43.11
-73.0°	0.0193	34.30	-37.0°	0.0469	26.58	-1.0°	0.9739	0.23	35.0°	0.0576	24.80	71.0°	0.0013	57.55
-72.5°	0.0146	36.72	-36.5°	0.0517	25.73	-0.5°	0.9869	0.11	35.5°	0.0570	24.88	71.5°	0.0056	45.02
-72.0°	0.0099	40.10	-36.0°	0.0565	24.96	0.0°	1.0000	0.00	36.0°	0.0565	24.96	72.0°	0.0099	40.10
-71.5°	0.0056	45.02	-35.5°	0.0570	24.88	0.5°	0.9869	0.11	36.5°	0.0517	25.73	72.5°	0.0146	36.72
-71.0°	0.0013	57.55	-35.0°	0.0576	24.80	1.0°	0.9739	0.23	37.0°	0.0469	26.58	73.0°	0.0193	34.30
-70.5°	0.0070	43.11	-34.5°	0.0535	25.43	1.5°	0.9359	0.58	37.5°	0.0388	28.23	73.5°	0.0224	33.01
-70.0°	0.0127	37.96	-34.0°	0.0495	26.11	2.0°	0.8979	0.94	38.0°	0.0307	30.27	74.0°	0.0254	31.89
-69.5°	0.0175	35.15	-33.5°	0.0412	27.70	2.5°	0.8385	1.53	38.5°	0.0206	33.70	74.5°	0.0265	31.54
-69.0°	0.0223	33.03	-33.0°	0.0329	29.65	3.0°	0.7792	2.17	39.0°	0.0106	39.47	75.0°	0.0275	31.20
-68.5°	0.0255	31.87	-32.5°	0.0215	33.35	3.5°	0.7039	3.05	39.5°	0.0103	39.72	75.5°	0.0264	31.56
-68.0°	0.0287	30.84	-32.0°	0.0101	39.95	4.0°	0.6287	4.03	40.0°	0.0100	39.97	76.0°	0.0253	31.93
-67.5°	0.0297	30.53	-31.5°	0.0130	37.73	4.5°	0.5443	5.28	40.5°	0.0191	34.38	76.5°	0.0223	33.04
-67.0°	0.0308	30.24	-31.0°	0.0159	35.97	5.0°	0.4599	6.75	41.0°	0.0282	31.01	77.0°	0.0193	34.30
-66.5°	0.0294	30.64	-30.5°	0.0285	30.91	5.5°	0.3737	8.55	41.5°	0.0346	29.21	77.5°	0.0148	36.57
-66.0°	0.0280	31.06	-30.0°	0.0410	27.74	6.0°	0.2876	10.82	42.0°	0.0411	27.72	78.0°	0.0104	39.65
-65.5°	0.0244	32.27	-29.5°	0.0512	25.82	6.5°	0.2068	13.69	42.5°	0.0442	27.10	78.5°	0.0053	45.53
-65.0°	0.0207	33.67	-29.0°	0.0613	24.25	7.0°	0.1261	17.99	43.0°	0.0472	26.52	79.0°	0.0002	75.41
-64.5°	0.0153	36.29	-28.5°	0.0672	23.46	7.5°	0.0681	23.34	43.5°	0.0465	26.64	79.5°	0.0050	46.01
-64.0°	0.0099	40.06	-28.0°	0.0731	22.73	8.0°	0.0101	39.92	44.0°	0.0459	26.77	80.0°	0.0098	40.14
-63.5°	0.0064	43.94	-27.5°	0.0735	22.68	8.5°	0.0536	25.42	44.5°	0.0417	27.60	80.5°	0.0140	37.10
-63.0°	0.0028	51.14	-27.0°	0.0739	22.63	9.0°	0.0971	20.26	45.0°	0.0375	28.51	81.0°	0.0181	34.85
-62.5°	0.0091	40.81	-26.5°	0.0684	23.30	9.5°	0.1250	18.06	45.5°	0.0307	30.26	81.5°	0.0207	33.67
-62.0°	0.0155	36.22	-26.0°	0.0628	24.04	10.0°	0.1530	16.31	46.0°	0.0239	32.44	82.0°	0.0233	32.64
-61.5°	0.0208	33.65	-25.5°	0.0518	25.72	10.5°	0.1650	15.65	46.5°	0.0155	36.19	82.5°	0.0241	32.35
-61.0°	0.0261	31.67	-25.0°	0.0407	27.81	11.0°	0.1771	15.04	47.0°	0.0071	42.94	83.0°	0.0249	32.08
-60.5°	0.0295	30.60	-24.5°	0.0254	31.91	11.5°	0.1744	15.17	47.5°	0.0086	41.34	83.5°	0.0237	32.50
-60.0°	0.0330	29.64	-24.0°	0.0101	39.94	12.0°	0.1718	15.30	48.0°	0.0100	40.00	84.0°	0.0225	32.94
-59.5°	0.0339	29.40	-23.5°	0.0175	35.16	12.5°	0.1572	16.07	48.5°	0.0175	35.16	84.5°	0.0197	34.13
-59.0°	0.0348	29.16	-23.0°	0.0248	32.10	13.0°	0.1426	16.92	49.0°	0.0249	32.07	85.0°	0.0168	35.50
-58.5°	0.0330	29.63	-22.5°	0.0419	27.57	13.5°	0.1198	18.43	49.5°	0.0302	30.41	85.5°	0.0127	37.94
-58.0°	0.0312	30.11	-22.0°	0.0589	24.60	14.0°	0.0969	20.27	50.0°	0.0354	29.02	86.0°	0.0086	41.34
-57.5°	0.0269	31.41	-21.5°	0.0727	22.77	14.5°	0.0701	23.09	50.5°	0.0377	28.46	86.5°	0.0047	46.61
-57.0°	0.0225	32.94	-21.0°	0.0865	21.26	15.0°	0.0432	27.28	51.0°	0.0401	27.94	87.0°	0.0008	62.22
-56.5°	0.0163	35.78	-20.5°	0.0946	20.48	15.5°	0.0267	31.48	51.5°	0.0393	28.12	87.5°	0.0053	45.55
-56.0°	0.0100	40.03	-20.0°	0.1028	19.76	16.0°	0.0101	39.93	52.0°	0.0384	28.30	88.0°	0.0098	40.19
-55.5°	0.0073	42.73	-19.5°	0.1033	19.72	16.5°	0.0329	29.66	52.5°	0.0347	29.19	88.5°	0.0134	37.43
-55.0°	0.0046	46.67	-19.0°	0.1038	19.67	17.0°	0.0556	25.09	53.0°	0.0310	30.18	89.0°	0.0171	35.35
-54.5°	0.0118	38.53	-18.5°	0.0959	20.36	17.5°	0.0718	22.88	53.5°	0.0250	32.04	89.5°	0.0193	34.27

APT-19-20-20

Diagrama de azimute



Azimute



Parâmetros da configuração

ÂNGULO DE MEIA POTÊNCIA HORIZONTAL

21.00°

GANHO

17.50 dBd

FRENTE/COSTAS

16.00 dB

RIPPLE

5.58 dB

APTM-19-20-20

Tabela de azimute



Tabela completa - Azimute

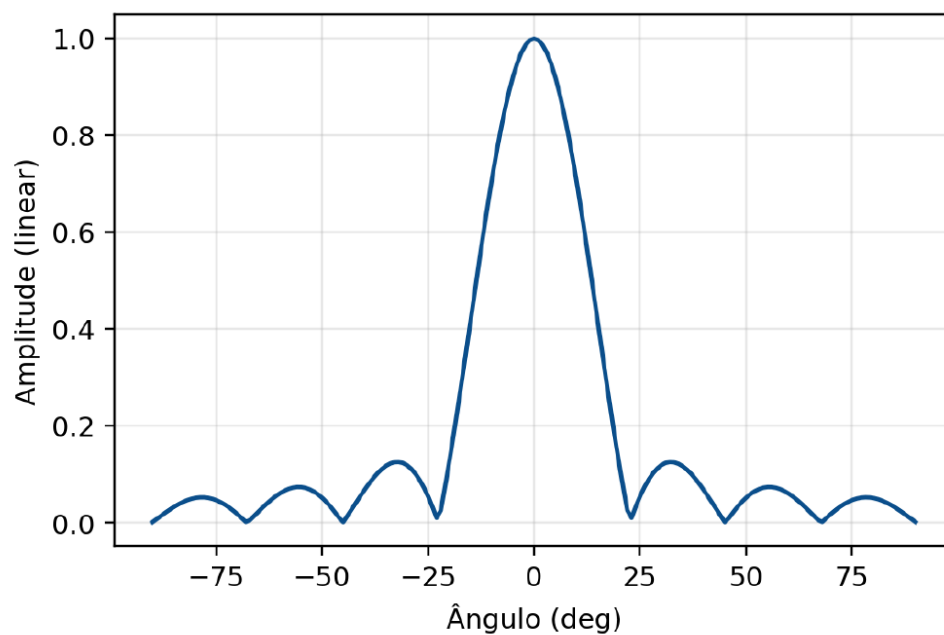
Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB
0°	1.0000	0.00	73°	0.0885	21.26	146°	0.0281	31.03	219°	0.0247	32.16	292°	0.0280	31.06
1°	0.9985	0.01	74°	0.0877	21.14	147°	0.0284	30.92	220°	0.0247	32.13	293°	0.0239	32.42
2°	0.9921	0.07	75°	0.0876	21.15	148°	0.0288	30.82	221°	0.0248	32.10	294°	0.0243	32.29
3°	0.9797	0.18	76°	0.0862	21.29	149°	0.0291	30.71	222°	0.0249	32.08	295°	0.0247	32.15
4°	0.9606	0.35	77°	0.0835	21.56	150°	0.0295	30.61	223°	0.0250	32.05	296°	0.0250	32.03
5°	0.9343	0.59	78°	0.0798	21.96	151°	0.0298	30.52	224°	0.0250	32.03	297°	0.0254	31.90
6°	0.9009	0.91	79°	0.0749	22.51	152°	0.0301	30.43	225°	0.0251	32.01	298°	0.0258	31.78
7°	0.8608	1.30	80°	0.0692	23.20	153°	0.0304	30.34	226°	0.0251	31.99	299°	0.0261	31.67
8°	0.8145	1.78	81°	0.0627	24.05	154°	0.0307	30.26	227°	0.0252	31.98	300°	0.0264	31.57
9°	0.7630	2.35	82°	0.0557	25.08	155°	0.0309	30.19	228°	0.0361	28.85	301°	0.0267	31.46
10°	0.7071	3.01	83°	0.0484	26.31	156°	0.0312	30.12	229°	0.0505	25.94	302°	0.0270	31.37
11°	0.6482	3.77	84°	0.0409	27.77	157°	0.0314	30.06	230°	0.0663	23.57	303°	0.0273	31.28
12°	0.5875	4.62	85°	0.0335	29.50	158°	0.0316	30.00	231°	0.0830	21.62	304°	0.0275	31.20
13°	0.5262	5.58	86°	0.0264	31.57	159°	0.0318	29.96	232°	0.0999	20.01	305°	0.0278	31.13
14°	0.4657	6.64	87°	0.0232	32.69	160°	0.0319	29.91	233°	0.1166	18.66	306°	0.0280	31.06
15°	0.4071	7.81	88°	0.0233	32.64	161°	0.0321	29.88	234°	0.1325	17.56	307°	0.0282	31.00
16°	0.3514	9.08	89°	0.0235	32.59	162°	0.0322	29.85	235°	0.1469	16.66	308°	0.0284	30.95
17°	0.2983	10.51	90°	0.0236	32.55	163°	0.0323	29.83	236°	0.1595	15.94	309°	0.0285	30.90
18°	0.2350	12.58	91°	0.0237	32.51	164°	0.0323	29.81	237°	0.1698	15.40	310°	0.0286	30.86
19°	0.1705	15.37	92°	0.0238	32.49	165°	0.0323	29.81	238°	0.1773	15.02	311°	0.0287	30.83
20°	0.1155	18.75	93°	0.0238	32.46	166°	0.0323	29.81	239°	0.1820	14.80	312°	0.0288	30.80
21°	0.0748	22.53	94°	0.0239	32.45	167°	0.0323	29.82	240°	0.1836	14.72	313°	0.0289	30.78
22°	0.0491	26.18	95°	0.0239	32.44	168°	0.0322	29.83	241°	0.1820	14.80	314°	0.0289	30.77
23°	0.0361	28.85	96°	0.0239	32.43	169°	0.0322	29.85	242°	0.1773	15.02	315°	0.0290	30.76
24°	0.0294	30.62	97°	0.0239	32.43	170°	0.0321	29.88	243°	0.1698	15.40	316°	0.0290	30.76
25°	0.0292	30.69	98°	0.0239	32.44	171°	0.0449	26.96	244°	0.1595	15.94	317°	0.0290	30.76
26°	0.0289	30.77	99°	0.0239	32.45	172°	0.0616	24.21	245°	0.1469	16.66	318°	0.0289	30.77
27°	0.0287	30.85	100°	0.0238	32.46	173°	0.0792	22.02	246°	0.1325	17.56	319°	0.0289	30.79
28°	0.0284	30.94	101°	0.0238	32.48	174°	0.0969	20.28	247°	0.1166	18.66	320°	0.0288	30.80
29°	0.0281	31.04	102°	0.0237	32.51	175°	0.1136	18.89	248°	0.0999	20.01	321°	0.0287	30.83
30°	0.0277	31.14	103°	0.0236	32.53	176°	0.1287	17.81	249°	0.0830	21.62	322°	0.0287	30.85
31°	0.0274	31.25	104°	0.0235	32.56	177°	0.1412	17.00	250°	0.0663	23.57	323°	0.0286	30.88
32°	0.0270	31.36	105°	0.0234	32.60	178°	0.1506	16.44	251°	0.0505	25.94	324°	0.0285	30.92
33°	0.0267	31.48	106°	0.0233	32.63	179°	0.1565	16.11	252°	0.0361	28.85	325°	0.0283	30.95
34°	0.0263	31.61	107°	0.0232	32.67	180°	0.1585	16.00	253°	0.0236	32.54	326°	0.0282	30.99
35°	0.0259	31.73	108°	0.0292	30.69	181°	0.1565	16.11	254°	0.0208	33.65	327°	0.0281	31.03
36°	0.0255	31.87	109°	0.0443	27.06	182°	0.1506	16.44	255°	0.0205	33.77	328°	0.0280	31.07
37°	0.0251	32.00	110°	0.0616	24.21	183°	0.1412	17.00	256°	0.0202	33.88	329°	0.0278	31.11
38°	0.0247	32.14	111°	0.0803	21.91	184°	0.1287	17.81	257°	0.0200	33.99	330°	0.0277	31.15
39°	0.0243	32.28	112°	0.0998	20.02	185°	0.1136	18.89	258°	0.0197	34.10	331°	0.0276	31.19
40°	0.0239	32.43	113°	0.1192	18.47	186°	0.0969	20.28	259°	0.0195	34.20	332°	0.0275	31.23
41°	0.0235	32.57	114°	0.1379	17.21	187°	0.0792	22.02	260°	0.0193	34.30	333°	0.0273	31.26
42°	0.0231	32.71	115°	0.1552	16.18	188°	0.0616	24.21	261°	0.0191	34.39	334°	0.0272	31.30
43°	0.0228	32.85	116°	0.1703	15.38	189°	0.0449	26.96	262°	0.0189	34.48	335°	0.0271	31.33
44°	0.0224	33.00	117°	0.1827	14.76	190°	0.0298	30.51	263°	0.0187	34.55	336°	0.0270	31.09
45°	0.0220	33.14	118°	0.1919	14.34	191°	0.0266	31.51	264°	0.0186	34.62	337°	0.0361	28.85
46°	0.0217	33.27	119°	0.1976	14.08	192°	0.0263	31.60	265°	0.0184	34.68	338°	0.0491	26.18
47°	0.0214	33.40	120°	0.1995	14.00	193°	0.0260	31.69	266°	0.0183	34.73	339°	0.0748	22.53
48°	0.0211	33.53	121°	0.1976	14.08	194°	0.0258	31.77	267°	0.0183	34.77	340°	0.1155	18.75
49°	0.0208	33.65	122°	0.1919	14.34	195°	0.0255	31.85	268°	0.0189	34.48	341°	0.1705	15.37
50°	0.0205	33.77	123°	0.1827	14.76	196°	0.0253	31.93	269°	0.0245	32.23	342°	0.2350	12.58
51°	0.0202	33.87	124°	0.1703	15.38	197°	0.0251	32.00	270°	0.0304	30.35	343°	0.2983	10.51
52°	0.0200	33.97	125°	0.1552	16.18	198°	0.0249	32.06	271°	0.0365	28.75	344°	0.3514	9.08
53°	0.0198	34.06	126°	0.1379	17.21	199°	0.0248	32.12	272°	0.0427	27.40	345°	0.4071	7.81
54°	0.0196	34.14	127°	0.1192	18.47	200°	0.0246	32.18	273°	0.0487	26.25	346°	0.4657	6.64
55°	0.0195	34.22	128°	0.0998	20.02	201°	0.0245	32.22	274°	0.0544	25.28	347°	0.5262	5.58
56°	0.0193	34.28	129°	0.0803	21.91	202°	0.0244	32.26	275°	0.0597	24.47	348°	0.5875	4.62
57°	0.0192	34.33	130°	0.0616	24.21	203°	0.0243	32.30	276°	0.0644	23.82	349°	0.6482	3.77
58°	0.0191	34.37	131°	0.0443	27.06	204°	0.0242	32.33	277°	0.0684	23.29	350°	0.7071	3.01
59°	0.0191	34.39	132°	0.0292	30.69	205°	0.0241	32.35	278°	0.0716	22.90	351°	0.7630	2.35
60°	0.0190	34.41	133°	0.0238	32.46	206°	0.0241	32.37	279°	0.0739	22.63	352°	0.8145	1.78
61°	0.0190	34.42	134°	0.0241	32.36	207°	0.0241	32.37	280°	0.0752	22.48	353°	0.8608	1.30
62°	0.0211	33.52	135°	0.0244	32.26	208°	0.0240	32.38	281°	0.0755	22.44	354°	0.9009	0.91
63°	0.0278	31.12	136°	0.0247	32.16	209°	0.0241	32.38	282°	0.0748	22.52	355°	0.9343	0.59
64°	0.0350	29.13	137°	0.0250	32.06	210°	0.0241	32.37	283°	0.0731	22.72	356°	0.9606	0.35
65°	0.0424	27.45	138°	0.0253	31.95	211°	0.0241	32.36	284°	0.0704	23.04	357°	0.9797	0.18
66°	0.0499	26.04	139°	0.0256	31.83	212°	0.0241	32.34	285°	0.0669	23.49	358°	0.9921	0.07
67°	0.0572	24.86	140°	0.0259	31.72	213°	0.0242	32.32	286°	0.0626	24.06	359°	0.9985	0.01
68°	0.0641	23.86	141°	0.0263	31.61	214°	0.0243	32.30	287°	0.0577	24.78	360°	1.0000	0.00
69°	0.0704	23.05	142°	0.0266	31.49	215°	0.0243	32.28	288°	0.0522	25.65			
70°	0.0760	22.39	143°	0.0270	31.37	216°	0.0244	32.25	289°	0.0463	26.68			
71°	0.0806	21.87	144°	0.0274	31.26	217°	0.0245	32.22	290°	0.0402	27.91			
72°	0.0842	21.50	145°	0.0277	31.14	218°	0.0246	32.19	291°	0.0341	29.36			

APT-19-20-20

Diagrama de elevação



Elevação



Parâmetros da configuração

ELEMENTOS VERTICAIS

1

ÂNGULO DE MEIA POTÊNCIA VERTICAL

20.00°

GANHO

17.50 dBd

PRIMEIRO NULO

22.00°

APTM-19-20-20

Tabela de elevação



Tabela completa - Elevação

Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB	Ângulo	E/Emax	Aten. dB
-90.0°	0.0020	54.15	-54.0°	0.0727	22.76	-18.0°	0.2374	12.49	18.0°	0.2374	12.49	54.0°	0.0727	22.76
-89.5°	0.0052	45.67	-53.5°	0.0713	22.94	-17.5°	0.2667	11.48	18.5°	0.2090	13.60	54.5°	0.0735	22.68
-89.0°	0.0085	41.46	-53.0°	0.0698	23.13	-17.0°	0.2961	10.57	19.0°	0.1805	14.87	55.0°	0.0742	22.59
-88.5°	0.0117	38.65	-52.5°	0.0675	23.41	-16.5°	0.3260	9.73	19.5°	0.1533	16.29	55.5°	0.0742	22.59
-88.0°	0.0149	36.52	-52.0°	0.0653	23.70	-16.0°	0.3560	8.97	20.0°	0.1261	17.99	56.0°	0.0743	22.58
-87.5°	0.0181	34.85	-51.5°	0.0623	24.10	-15.5°	0.3863	8.26	20.5°	0.1003	19.98	56.5°	0.0736	22.67
-87.0°	0.0213	33.45	-51.0°	0.0594	24.53	-15.0°	0.4166	7.61	21.0°	0.0745	22.56	57.0°	0.0729	22.75
-86.5°	0.0243	32.29	-50.5°	0.0557	25.08	-14.5°	0.4469	7.00	21.5°	0.0503	25.97	57.5°	0.0715	22.91
-86.0°	0.0273	31.27	-50.0°	0.0520	25.67	-14.0°	0.4772	6.43	22.0°	0.0262	31.65	58.0°	0.0701	23.08
-85.5°	0.0301	30.41	-49.5°	0.0477	26.43	-13.5°	0.5072	5.90	22.5°	0.0184	34.69	58.5°	0.0682	23.33
-85.0°	0.0330	29.63	-49.0°	0.0434	27.25	-13.0°	0.5372	5.40	23.0°	0.0107	39.43	59.0°	0.0662	23.59
-84.5°	0.0356	28.98	-48.5°	0.0384	28.30	-12.5°	0.5665	4.94	23.5°	0.0224	32.98	59.5°	0.0636	23.93
-84.0°	0.0381	28.37	-48.0°	0.0335	29.50	-12.0°	0.5959	4.50	24.0°	0.0342	29.33	60.0°	0.0611	24.28
-83.5°	0.0404	27.87	-47.5°	0.0280	31.05	-11.5°	0.6243	4.09	24.5°	0.0447	27.00	60.5°	0.0580	24.72
-83.0°	0.0427	27.40	-47.0°	0.0225	32.94	-11.0°	0.6528	3.70	25.0°	0.0552	25.17	61.0°	0.0550	25.19
-82.5°	0.0446	27.02	-46.5°	0.0166	35.60	-10.5°	0.6799	3.35	25.5°	0.0643	23.83	61.5°	0.0515	25.76
-82.0°	0.0465	26.65	-46.0°	0.0107	39.44	-10.0°	0.7071	3.01	26.0°	0.0735	22.68	62.0°	0.0481	26.36
-81.5°	0.0480	26.38	-45.5°	0.0063	44.00	-9.5°	0.7327	2.70	26.5°	0.0813	21.80	62.5°	0.0443	27.08
-81.0°	0.0495	26.11	-45.0°	0.0020	54.15	-9.0°	0.7583	2.40	27.0°	0.0891	21.00	63.0°	0.0404	27.86
-80.5°	0.0505	25.93	-44.5°	0.0085	41.37	-8.5°	0.7821	2.13	27.5°	0.0955	20.40	63.5°	0.0364	28.79
-80.0°	0.0516	25.75	-44.0°	0.0151	36.41	-8.0°	0.8059	1.87	28.0°	0.1019	19.83	64.0°	0.0323	29.82
-79.5°	0.0522	25.65	-43.5°	0.0219	33.21	-7.5°	0.8275	1.64	28.5°	0.1070	19.41	64.5°	0.0280	31.05
-79.0°	0.0527	25.56	-43.0°	0.0286	30.88	-7.0°	0.8492	1.42	29.0°	0.1120	19.02	65.0°	0.0238	32.49
-78.5°	0.0528	25.55	-42.5°	0.0354	29.03	-6.5°	0.8685	1.22	29.5°	0.1156	18.74	65.5°	0.0194	34.25
-78.0°	0.0529	25.53	-42.0°	0.0421	27.51	-6.0°	0.8878	1.03	30.0°	0.1193	18.47	66.0°	0.0150	36.46
-77.5°	0.0524	25.61	-41.5°	0.0488	26.23	-5.5°	0.9045	0.87	30.5°	0.1216	18.30	66.5°	0.0107	39.44
-77.0°	0.0520	25.68	-41.0°	0.0555	25.11	-5.0°	0.9212	0.71	31.0°	0.1239	18.14	67.0°	0.0063	44.03
-76.5°	0.0510	25.84	-40.5°	0.0620	24.16	-4.5°	0.9352	0.58	31.5°	0.1249	18.07	67.5°	0.0043	47.32
-76.0°	0.0501	26.01	-40.0°	0.0684	23.29	-4.0°	0.9492	0.45	32.0°	0.1258	18.00	68.0°	0.0023	52.70
-75.5°	0.0486	26.27	-39.5°	0.0746	22.55	-3.5°	0.9602	0.35	32.5°	0.1256	18.02	68.5°	0.0065	43.78
-75.0°	0.0471	26.54	-39.0°	0.0807	21.86	-3.0°	0.9712	0.25	33.0°	0.1253	18.04	69.0°	0.0106	39.47
-74.5°	0.0451	26.91	-38.5°	0.0863	21.28	-2.5°	0.9792	0.18	33.5°	0.1239	18.14	69.5°	0.0146	36.73
-74.0°	0.0431	27.30	-38.0°	0.0920	20.73	-2.0°	0.9871	0.11	34.0°	0.1225	18.24	70.0°	0.0185	34.65
-73.5°	0.0407	27.81	-37.5°	0.0970	20.26	-1.5°	0.9920	0.07	34.5°	0.1200	18.41	70.5°	0.0222	33.09
-73.0°	0.0382	28.36	-37.0°	0.1021	19.82	-1.0°	0.9968	0.03	35.0°	0.1176	18.60	71.0°	0.0258	31.77
-72.5°	0.0353	29.04	-36.5°	0.1064	19.46	-0.5°	0.9984	0.01	35.5°	0.1141	18.85	71.5°	0.0291	30.72
-72.0°	0.0324	29.79	-36.0°	0.1107	19.12	0.0°	1.0000	0.00	36.0°	0.1107	19.12	72.0°	0.0324	29.79
-71.5°	0.0291	30.72	-35.5°	0.1141	18.85	0.5°	0.9984	0.01	36.5°	0.1064	19.46	72.5°	0.0353	29.04
-71.0°	0.0258	31.77	-35.0°	0.1176	18.60	1.0°	0.9968	0.03	37.0°	0.1021	19.82	73.0°	0.0382	28.36
-70.5°	0.0222	33.09	-34.5°	0.1200	18.41	1.5°	0.9920	0.07	37.5°	0.0970	20.26	73.5°	0.0407	27.81
-70.0°	0.0185	34.65	-34.0°	0.1225	18.24	2.0°	0.9871	0.11	38.0°	0.0920	20.73	74.0°	0.0431	27.30
-69.5°	0.0146	36.73	-33.5°	0.1239	18.14	2.5°	0.9792	0.18	38.5°	0.0863	21.28	74.5°	0.0451	26.91
-69.0°	0.0106	39.47	-33.0°	0.1253	18.04	3.0°	0.9712	0.25	39.0°	0.0807	21.86	75.0°	0.0471	26.54
-68.5°	0.0065	43.78	-32.5°	0.1256	18.02	3.5°	0.9602	0.35	39.5°	0.0746	22.55	75.5°	0.0486	26.27
-68.0°	0.0023	52.70	-32.0°	0.1258	18.00	4.0°	0.9492	0.45	40.0°	0.0684	23.29	76.0°	0.0501	26.01
-67.5°	0.0043	47.32	-31.5°	0.1249	18.07	4.5°	0.9352	0.58	40.5°	0.0620	24.16	76.5°	0.0510	25.84
-67.0°	0.0063	44.03	-31.0°	0.1239	18.14	5.0°	0.9212	0.71	41.0°	0.0555	25.11	77.0°	0.0520	25.68
-66.5°	0.0107	39.44	-30.5°	0.1216	18.30	5.5°	0.9045	0.87	41.5°	0.0488	26.23	77.5°	0.0524	25.61
-66.0°	0.0150	36.46	-30.0°	0.1193	18.47	6.0°	0.8878	1.03	42.0°	0.0421	27.51	78.0°	0.0529	25.53
-65.5°	0.0194	34.25	-29.5°	0.1156	18.74	6.5°	0.8685	1.22	42.5°	0.0354	29.03	78.5°	0.0528	25.55
-65.0°	0.0238	32.49	-29.0°	0.1120	19.02	7.0°	0.8492	1.42	43.0°	0.0286	30.88	79.0°	0.0527	25.56
-64.5°	0.0280	31.05	-28.5°	0.1070	19.41	7.5°	0.8275	1.64	43.5°	0.0219	33.21	79.5°	0.0522	25.65
-64.0°	0.0323	29.82	-28.0°	0.1019	19.83	8.0°	0.8059	1.87	44.0°	0.0151	36.41	80.0°	0.0516	25.75
-63.5°	0.0364	28.79	-27.5°	0.0955	20.40	8.5°	0.7821	2.13	44.5°	0.0085	41.37	80.5°	0.0505	25.93
-63.0°	0.0404	27.86	-27.0°	0.0891	21.00	9.0°	0.7583	2.40	45.0°	0.0020	54.15	81.0°	0.0495	26.11
-62.5°	0.0443	27.08	-26.5°	0.0813	21.80	9.5°	0.7327	2.70	45.5°	0.0063	44.00	81.5°	0.0480	26.38
-62.0°	0.0481	26.36	-26.0°	0.0735	22.68	10.0°	0.7071	3.01	46.0°	0.0107	39.44	82.0°	0.0465	26.65
-61.5°	0.0515	25.76	-25.5°	0.0643	23.83	10.5°	0.6799	3.35	46.5°	0.0166	35.60	82.5°	0.0446	27.02
-61.0°	0.0550	25.19	-25.0°	0.0552	25.17	11.0°	0.6528	3.70	47.0°	0.0225	32.94	83.0°	0.0427	27.40
-60.5°	0.0580	24.72	-24.5°	0.0447	27.00	11.5°	0.6243	4.09	47.5°	0.0280	31.05	83.5°	0.0404	27.87
-60.0°	0.0611	24.28	-24.0°	0.0342	29.33	12.0°	0.5959	4.50	48.0°	0.0335	29.50	84.0°	0.0381	28.37
-59.5°	0.0636	23.93	-23.5°	0.0224	32.98	12.5°	0.5665	4.94	48.5°	0.0384	28.30	84.5°	0.0356	28.98
-59.0°	0.0662	23.59	-23.0°	0.0107	39.43	13.0°	0.5372	5.40	49.0°	0.0434	27.25	85.0°	0.0330	29.63
-58.5°	0.0682	23.33	-22.5°	0.0184	34.69	13.5°	0.5072	5.90	49.5°	0.0477	26.43	85.5°	0.0301	30.41
-58.0°	0.0701	23.08	-22.0°	0.0262	31.65	14.0°	0.4772	6.43	50.0°	0.0520	25.67	86.0°	0.0273	31.27
-57.5°	0.0715	22.91	-21.5°	0.0503	25.97	14.5°	0.4469	7.00	50.5°	0.0557	25.08	86.5°	0.0243	32.29
-57.0°	0.0729	22.75	-21.0°	0.0745	22.56	15.0°	0.4166	7.61	51.0°	0.0594	24.53	87.0°	0.0213	33.45
-56.5°	0.0736	22.67	-20.5°	0.1003	19.98	15.5°	0.3863	8.26	51.5°	0.0623	24.10	87.5°	0.0181	34.85
-56.0°	0.0743	22.58	-20.0°	0.1261	17.99	16.0°	0.3560	8.97	52.0°	0.0653	23.70	88.0°	0.0149	36.52
-55.5°	0.0742	22.59	-19.5°	0.1533	16.29	16.5°	0.3260	9.73	52.5°	0.0675	23.41	88.5°	0.0117	38.65
-55.0°	0.0742	22.59	-19.0°	0.1805	14.87	17.0°	0.2961	10.57	53.0°	0.0698	23.13	89.0°	0.0085	41.46
-54.5°	0.0735	22.68	-18.5°	0.2090	13.60	17.5°	0.2667	11.48	53.5°	0.0713	22.94	89.5°	0.0052	45.67