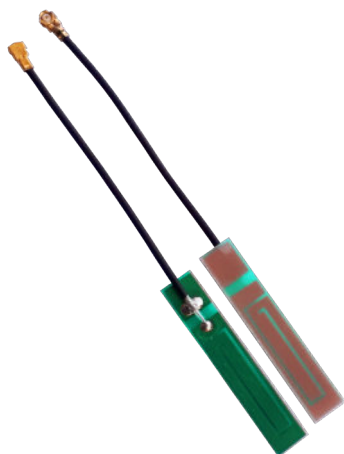




Echo 35

2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA



Key Features

- Wide Bandwidth Antenna
- Designed for embedded applications

General Description

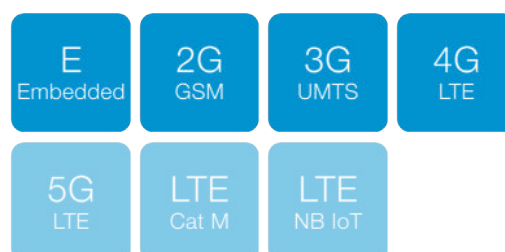
The Echo 35 is a embedded wideband PCB antenna with a good peak gain performance.

The wideband allows for a migration plan from one technology to another; 2G to 3G to 4G to 5G, or simply the choice to select a technology depending on usage.

Typically supplied with a uFL/ IPEX connector and a short tail of cable. Alternative cable lengths and connectors can be supplied for small volume requirements.

Additional Considerations

- Small format design for applications with limited space
- Meets all EU compliance criteria for electronic goods





Echo 35

2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Electrical Specification

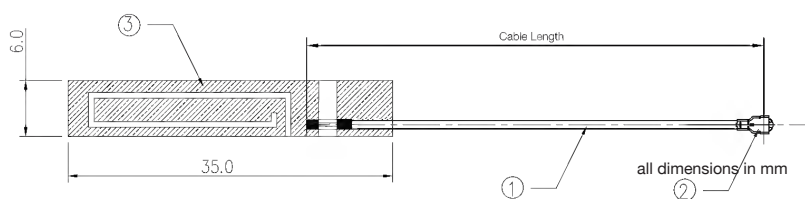
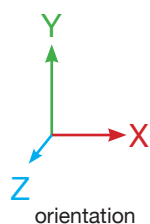
Impedance:	50 Ohms
Polarization:	Linear
Ground Plane Independent:	Yes
Max Input Power:	10 W

Environmental Specification

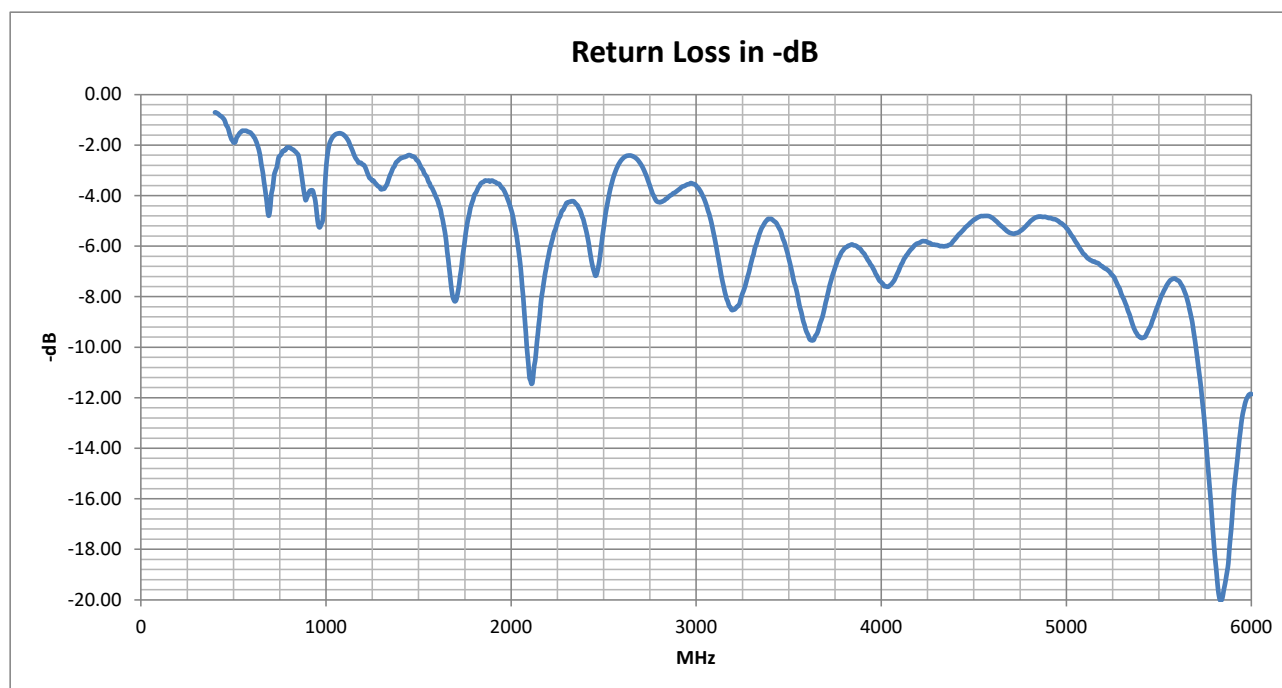
Storage/Operating Temperature range:	-30 °C to +75 °C
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Mechanical Specification

Dimensions:	35 mm x 6 mm x 0.5 mm (without cable and connector)
Weight:	3 g
Cable:	1.13 mm coax
Connector:	UFL/IPEX
Mounting method:	Designed for embedded use



Return Loss tested with 280mm of cable

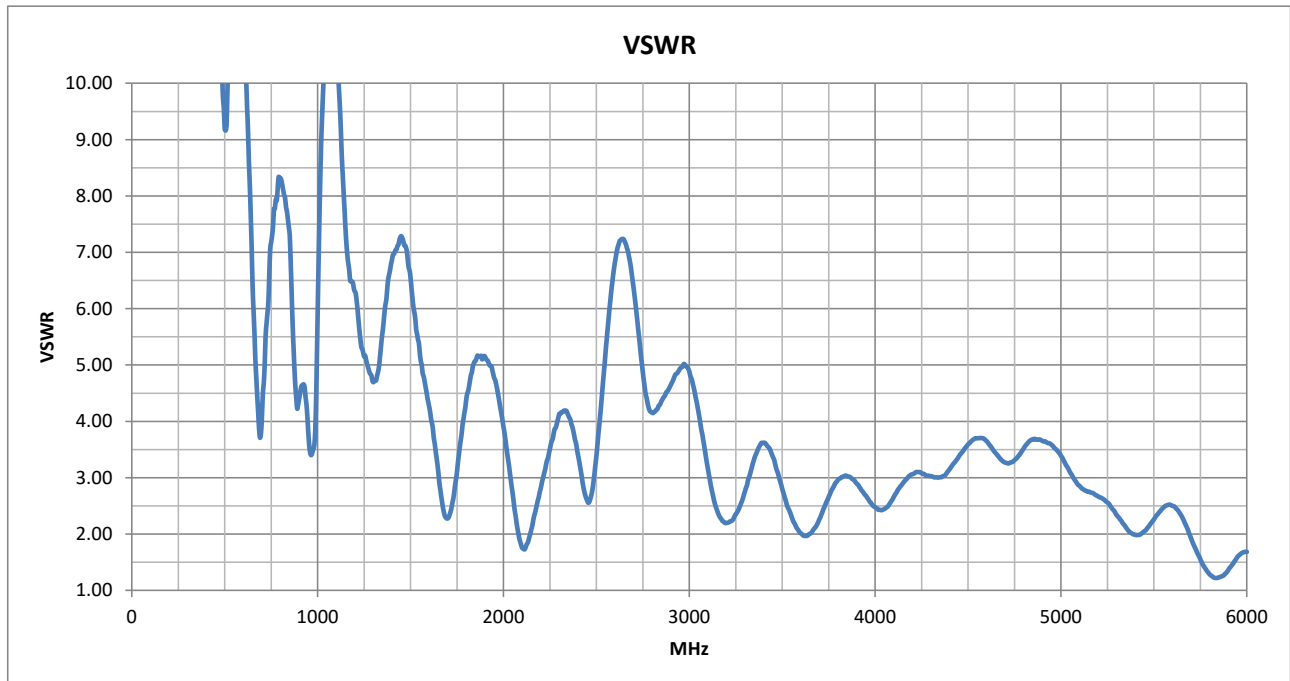




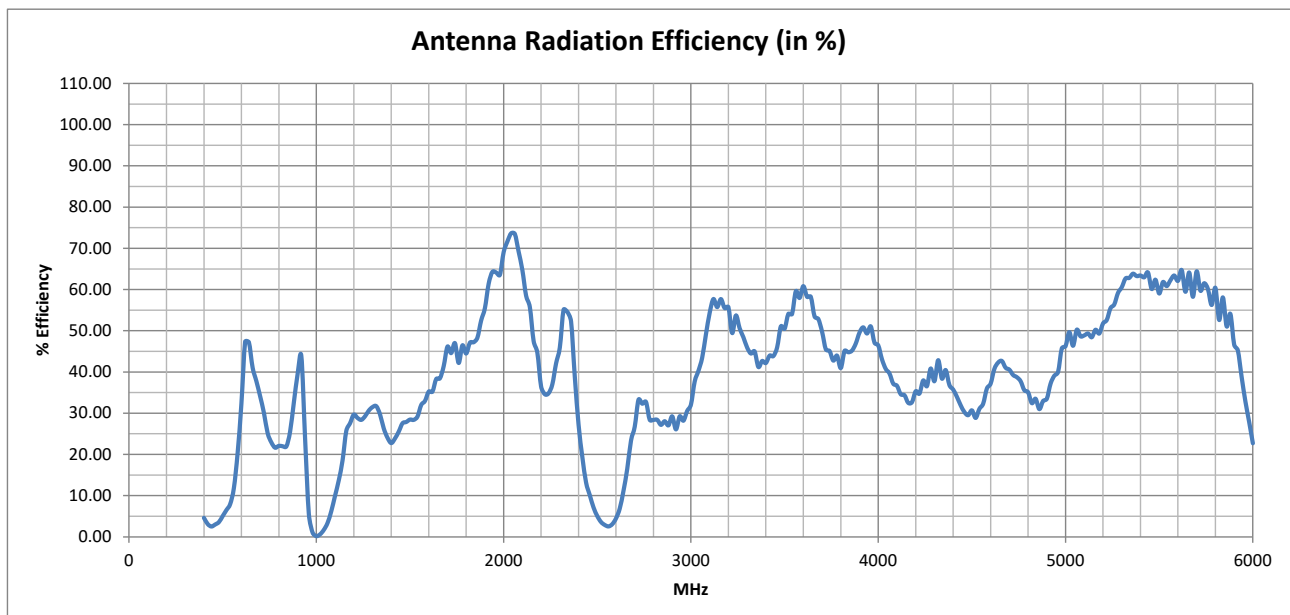
Echo 35

2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

VSWR tested with 280mm of cable



Radiation Efficiency tested with 280mm of cable





Echo 35

2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

LTE/5G Band Coverage

LTE, CAT-M/5G Bands	NB-IoT Band	Regional Coverage	Uplink	Downlink	Avg Efficiency % over band	Max VSWR over Band
1/n1	B1	Europe / Asia	1920-1980 MHz	2110-2170 MHz	63.32 / 54.22	5.04 / 2.38
2/n2	B2	North America/Latin America/Caribbean	1850-1910 MHz	1930-1990 MHz	52.97 / 64.46	5.17 / 4.99
3/n3	B3	Europe/Africa/Asia/Oceania	1710-1785 MHz	1805-1880 MHz	45.13 / 47.19	4.05 / 5.17
4	B4	North America/Latin America/Caribbean	1710-1755 MHz	2110-2155 MHz	44.96 / 56.61	3.27 / 2.15
5/n5	B5	Country Specific	824-849 MHz	869-894 MHz	23.14 / 32.52	8.02 / 5.76
7/n7		Latin America/Europe/Asia +	2500-2570 MHz	2620-2690 MHz	3.43 / 16.93	5.99 / 7.24
8/n8	B8	Europe / Asia +	880-915 MHz	925-960 MHz	38.63 / 24.44	4.64 / 4.66
11	B11	Country Specific	1427.9-1447.9 MHz	1475.9-1495.9 MHz	25.65 / 27.95	7.29 / 7.09
12/n12	B12	North America/Caribbean +	699-716 MHz	729-746 MHz	34.00 / 26.07	5.51 / 7.18
13/n13	B13	North America/Caribbean +	777-787 MHz	746-756 MHz	22.21 / 24.04	8.34 / 7.46
14/n14	B14	Country Specific	788-798 MHz	758-768 MHz	21.85 / 23.24	8.34 / 7.77
17	B17	North America/Caribbean +	704-716 MHz	734.746 MHz	32.12 / 26.07	5.51 / 7.18
18/n18	B18	Country Specific	815-830 MHz	860-875 MHz	22.00 / 29.06	8.10 / 6.29
19	B19	Country Specific	830-845 MHz	875-890 MHz	23.14 / 32.52	7.80 / 4.95
20/n20	B20	Europe/Africa +	832-862 MHz	791-821 MHz	25.50 / 21.90	7.80 / 8.34
21		Country Specific	1447.9-1462.9 MHz	1495.9-1510.9 MHz	26.98 / 28.23	7.29 / 6.68
25/n25	B25	Country Specific	1850-1915 MHz	1525-1559 MHz	52.97 / 29.85	5.17 / 5.84
26/n26	B26	Country Specific	814-849 MHz	859-894 MHz	22.88 / 29.87	8.19 / 6.82
28/n28	B28	Latin America/Europe/Asia +	703-748 MHz	758-803 MHz	26.07 / 22.75	7.18 / 8.34
29/n29		Country Specific	-	717-728 MHz	29.81	5.93
30/n30		Country Specific	2305-2315 MHz	2350-2360 MHz	50.50 / 53.41	4.17 / 4.10
31	B31	Country Specific	452.5-457.5 MHz	462.5-467.5 MHz	2.76 / 3.29	17.52 / 14.56
32		Country Specific	-	1452-1496 MHz	27.34	7.29
38/n38		Europe +	2570-2620 MHz		4.25	7.14
39/n39		Country Specific	1880-1920 MHz		56.44	5.16
40/n40		Asia +	2300-2400 MHz		45.64	4.19
41/n41		Country Specific	2496-2690 MHz		9.45	7.24
42		Country Specific	3400-3600 MHz		51.26	3.62
43		Country Specific	3600-3800 MHz		50.14	2.96
46/n46		Country Specific	5150-5925 MHz		57.90	2.75
48/n48		Country Specific	3550-3700 MHz		56.10	2.31
65/n65		Country Specific	1920-2010 MHz	2110-2200 MHz	65.66 / 51.26	5.04 / 2.81
66/n66	B66	Country Specific	1710-1780 MHz	2110-2200 MHz	45.26 / 51.26	3.95 / 2.81
71/n71	B71	Country Specific	663-698 MHz	617-652 MHz	37.63 / 41.96	5.57 / 10.09

Table data for bands as detailed in 3GPP TS 36.101 & 38.101

● Usable Band

○ Adequate in good signal area

✗ Not Usable



5G Extended Table for Band Coverage

LTE/5G Band	NB-IoT Band	Uplink	Downlink	Avg Efficiency % over band	Max VSWR over Band
n24		1626.5 – 1660.5 MHz	1525 – 1559 MHz	37.33 / 29.85	3.71 / 5.84
n34		2010 – 2025 MHz		71.42	3.69
n47		5855 – 5925 MHz		48.98	1.47
n50		1432 – 1517 MHz		26.94	7.29
n51		1427 – 1432 MHz		24.70	7.14
n53		2483.5 – 2495 MHz		6.09	3.24
n67		738 – 758 MHz		26.07	7.46
n70	B70	1695 – 1710 MHz	1995 – 2020 MHz	44.03 / 68.06	2.34 / 4.01
n74		1427 – 1470 MHz	1475 – 1518 MHz	26.20 / 28.06	7.29 / 7.09
n75		1432 – 1517 MHz		26.94	7.29
n76		1427 – 1432 MHz		24.70	7.14
n77		3300 – 4200 MHz		46.01	3.62
n78		3300 – 3800 MHz		48.99	3.62
n79		4400 – 5000 MHz		36.21	3.71
n80		1710 – 1785 MHz		45.13	4.05
n81		880 – 915 MHz		38.63	4.64
n82		832 – 862 MHz		25.50	7.80
n83		703 – 748 MHz		28.08	7.18
n84		1920 – 1980 MHz		63.32	5.04
n85	B85	698 – 716 MHz	728 – 746 MHz	34.00 / 26.07	5.51 / 7.18
n86		1710 – 1780 MHz		45.26	3.95
n89		824 – 849 MHz		23.14	8.02
n90		2496 – 2690 MHz		9.45	7.24
n91		832 – 862 MHz	1427 – 1432 MHz	25.50 / 24.70	7.80 / 7.14
n92		832 – 862 MHz	1432 – 1517 MHz	25.50 / 26.94	7.80 / 7.29
n93		880 – 915 MHz	1427 – 1432 MHz	38.63 / 24.70	4.64 / 7.14
n94		880 – 915 MHz	1432 – 1517 MHz	38.63 / 26.94	4.64 / 7.29
n95		2010 – 2025 MHz		71.42	3.69
n96		5925 – 7125 MHz		not measured	
n97		2300 – 2400 MHz		45.64	4.19
n98		1880 – 1920 MHz		56.44	5.16
n99		1626.5 – 1660.5 MHz		37.33	3.71

Table data for bands as detailed in 3GPP TS 38.101

● Usable Band

○ Adequate in good signal area

✗ Not Usable



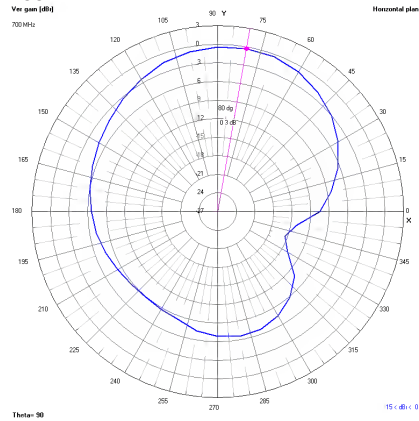


Echo 35

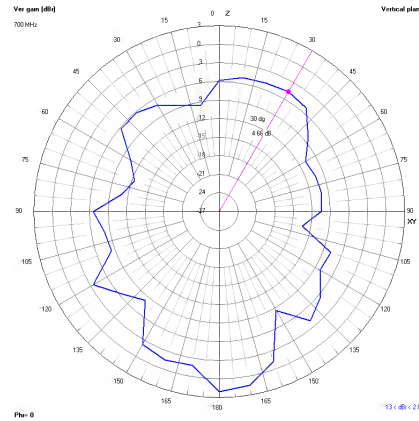
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

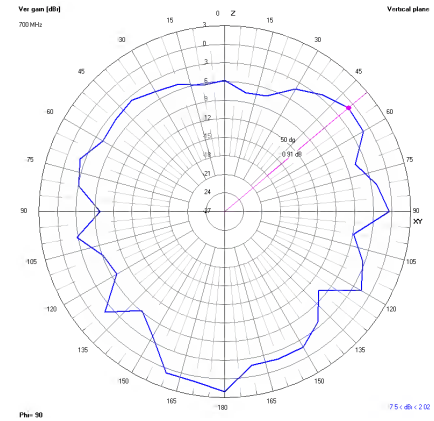
700 MHz XY



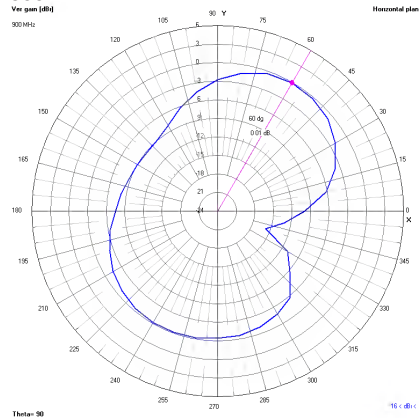
XZ



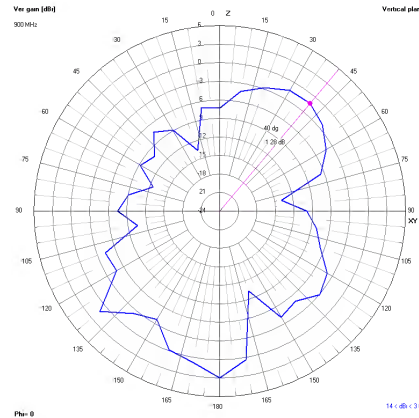
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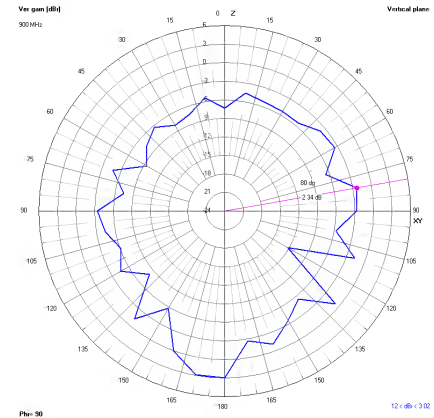
900 MHz XY



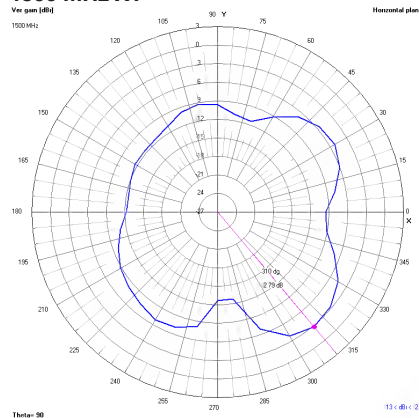
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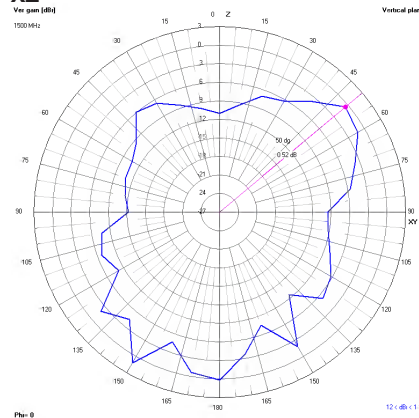
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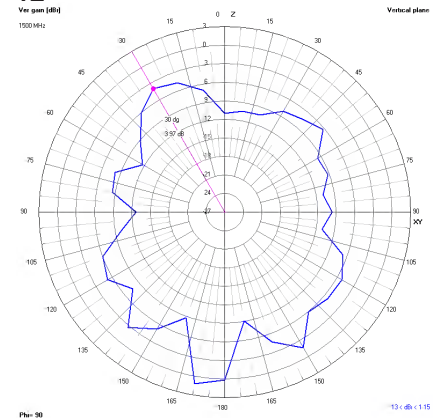
1500 MHz XY



XZ



YZ



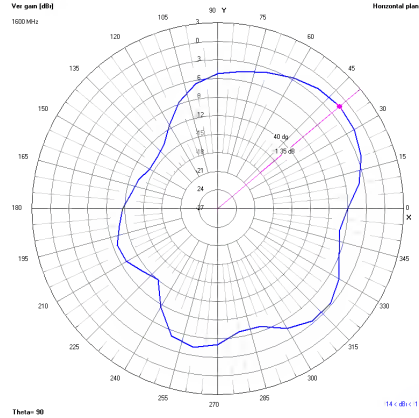


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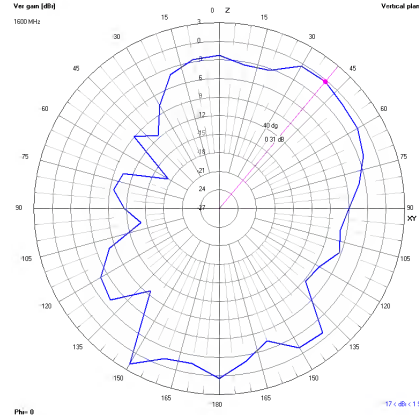
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

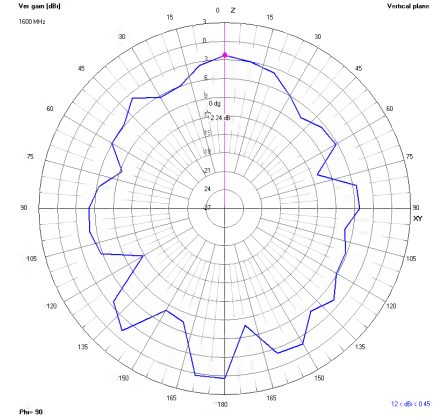
1600 MHz XY



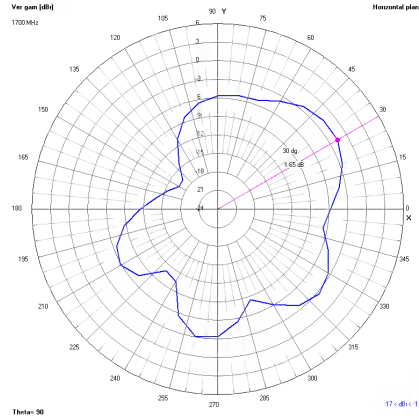
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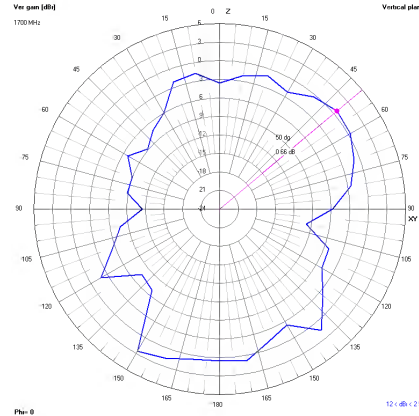
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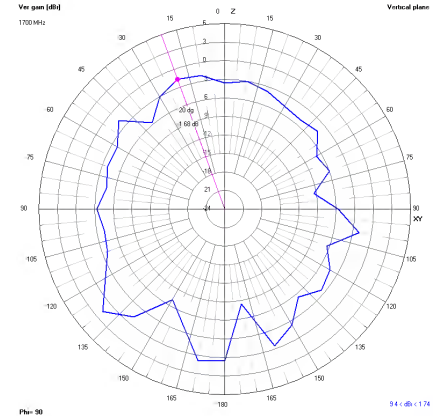
1700 MHz XY



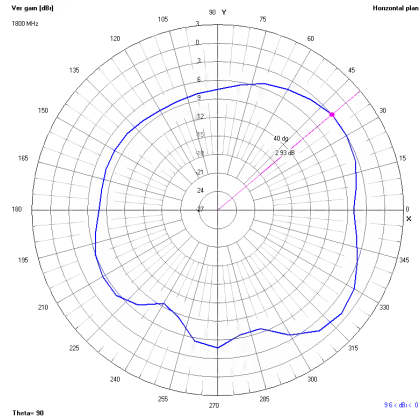
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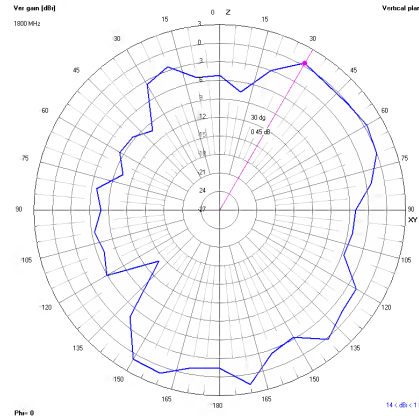
YZ



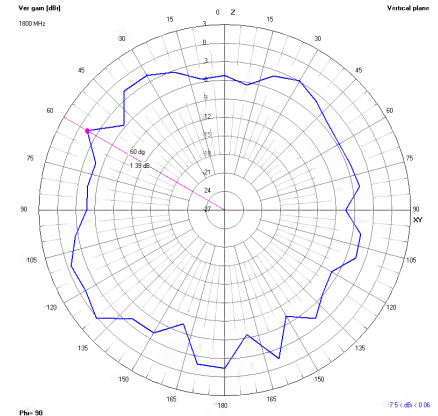
1800 MHz XY



XZ



YZ



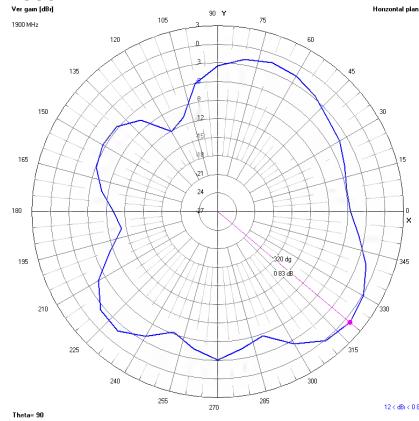


Echo 35

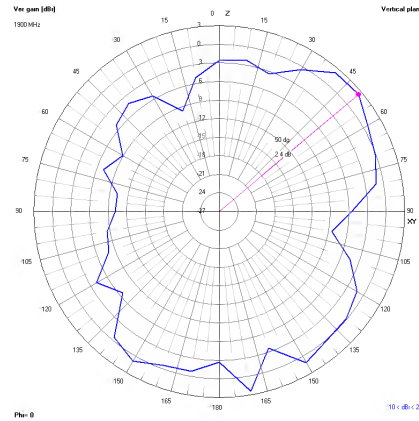
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

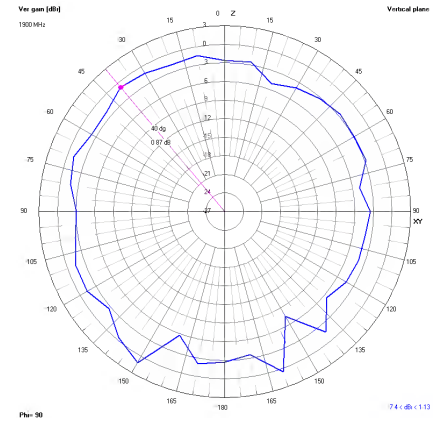
1900 MHz XY



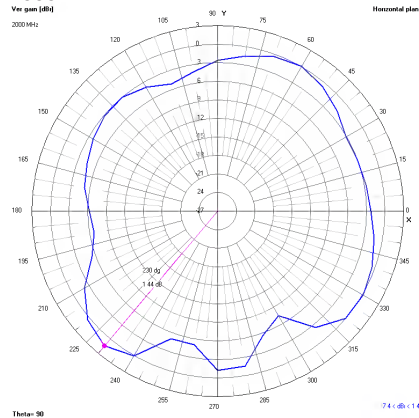
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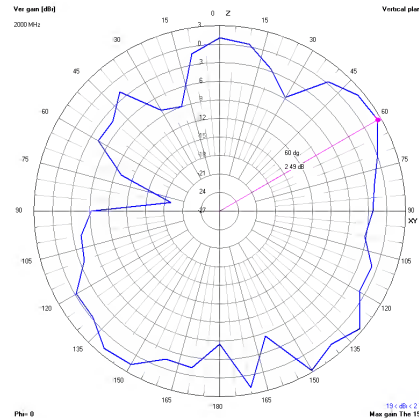
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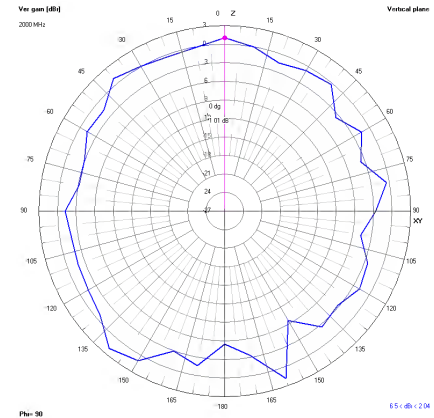
2000 MHz XY



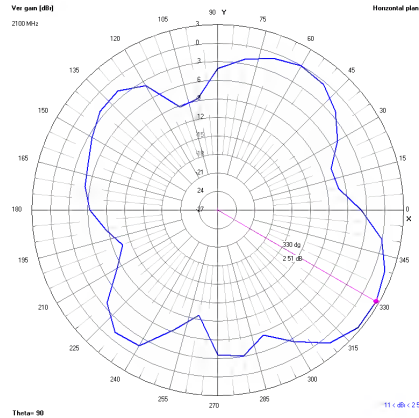
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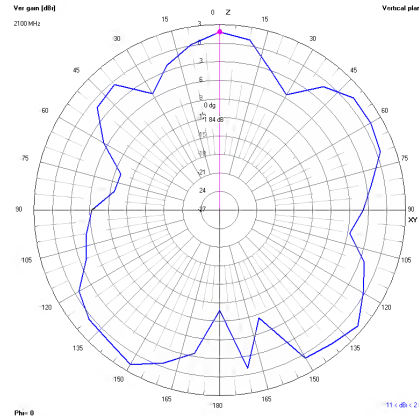
YZ



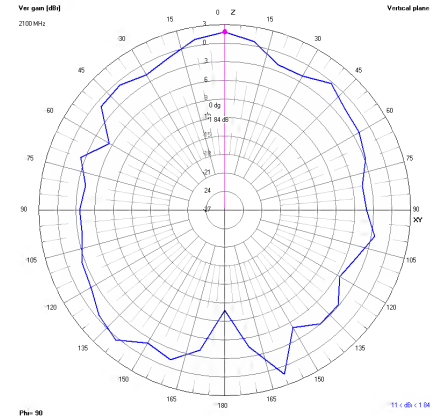
2100 MHz XY



XZ



YZ



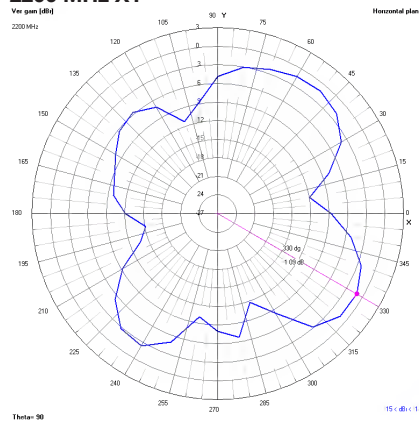


Echo 35

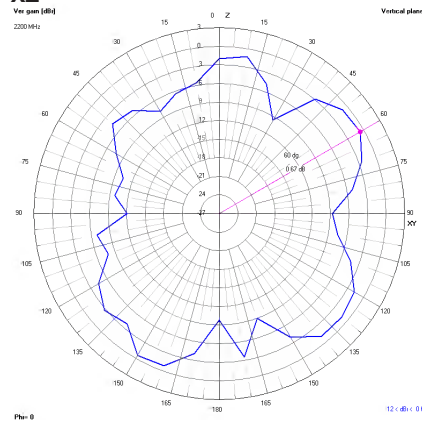
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

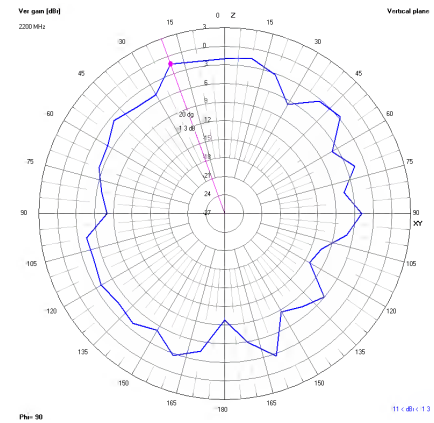
2200 MHz XY



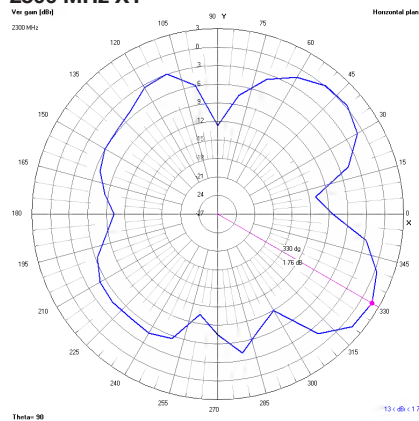
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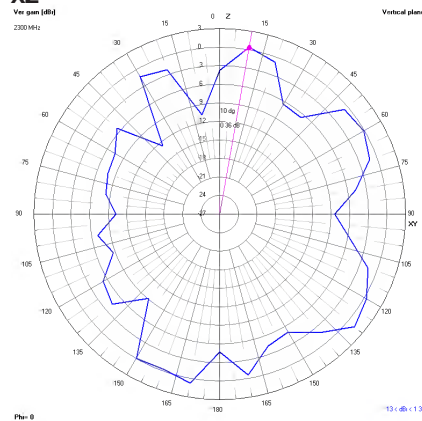
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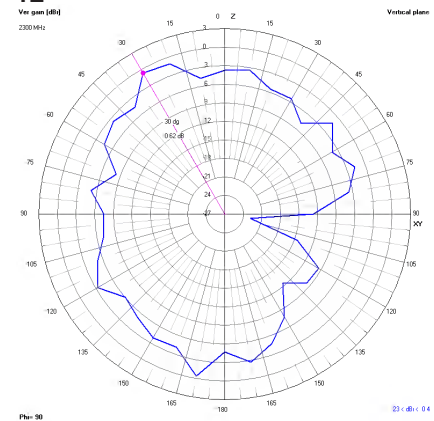
2300 MHz XY



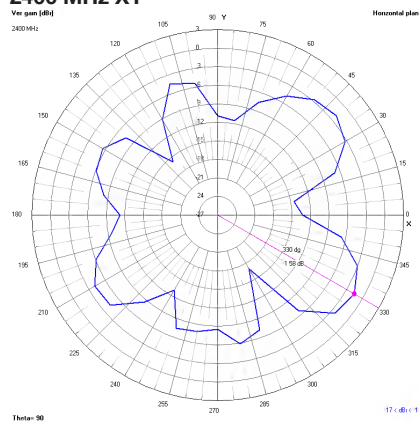
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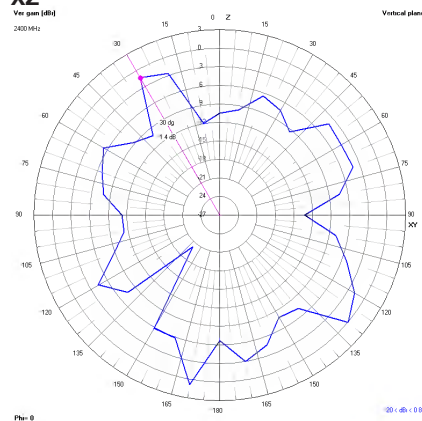
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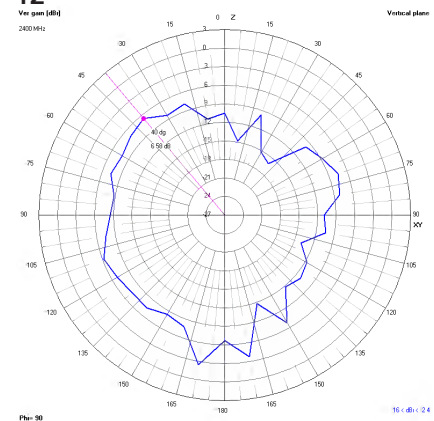
2400 MHz XY



XZ



YZ



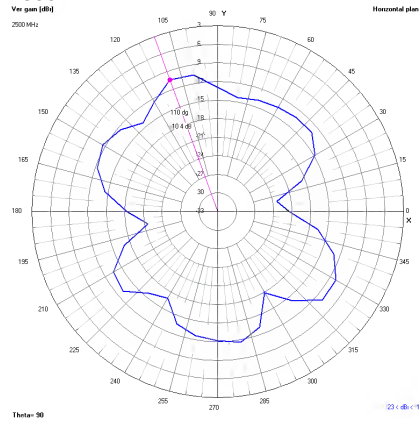


Echo 35

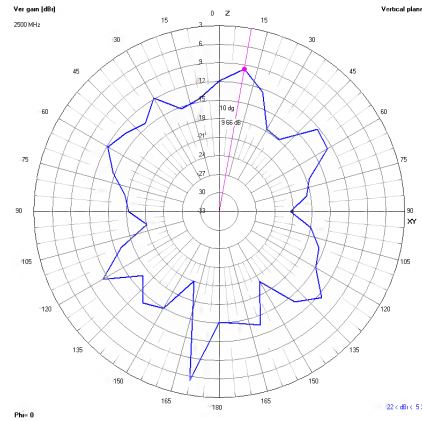
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

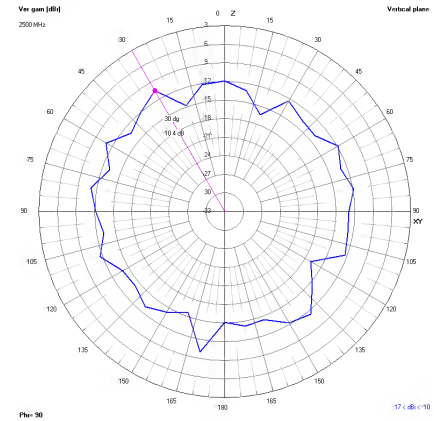
2500 MHz XY



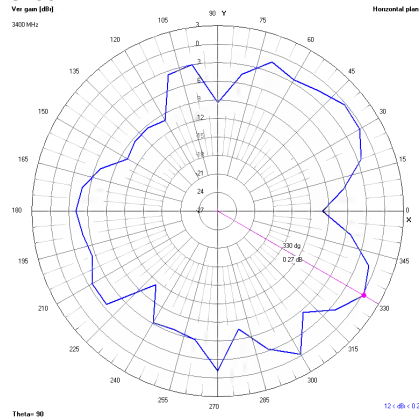
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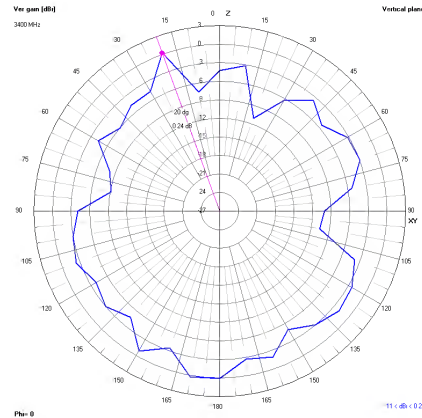
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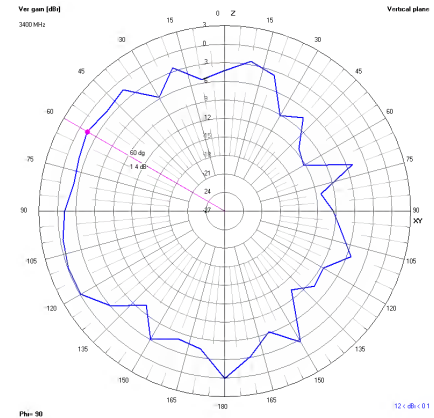
3400 MHz XY



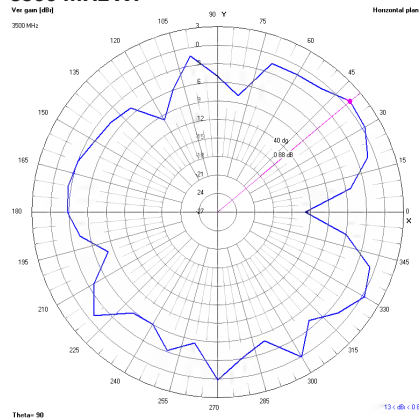
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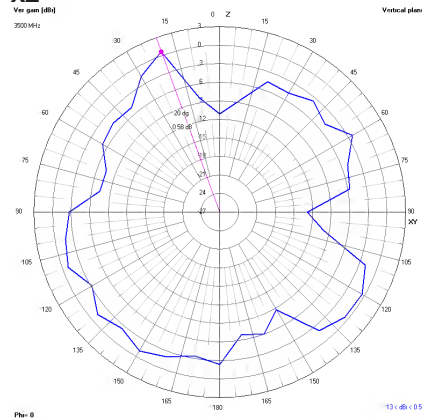
YZ



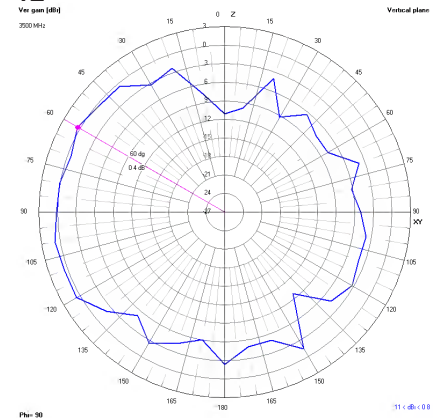
3500 MHz XY



XZ



YZ



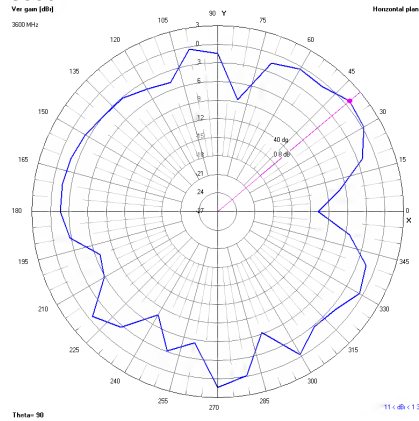


Echo 35

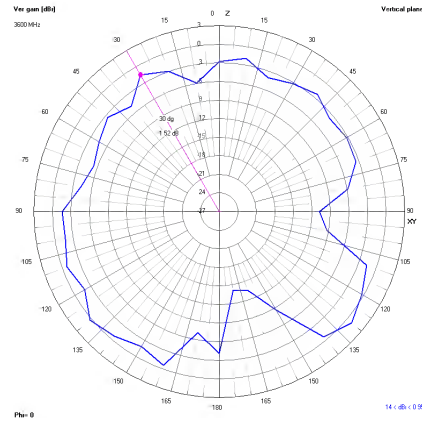
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

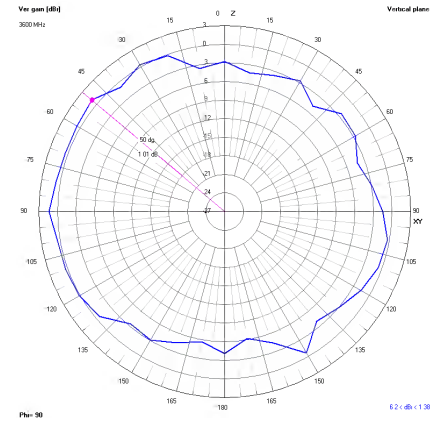
3600 MHz XY



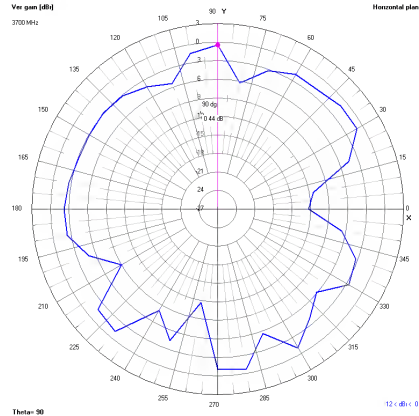
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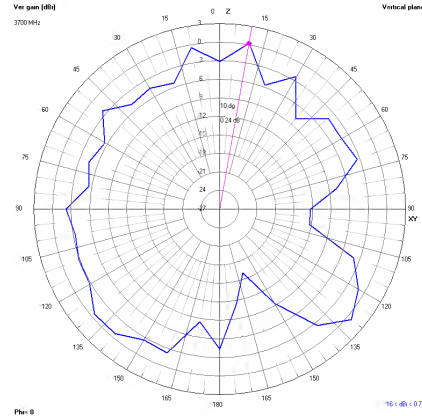
YZ



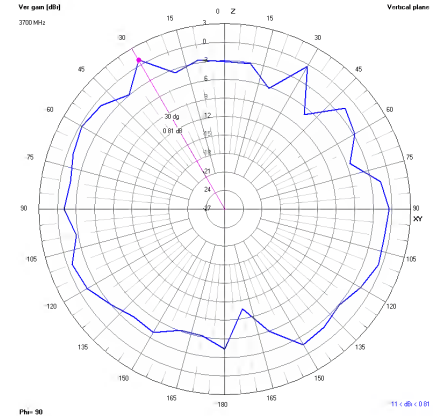
3700 MHz XY



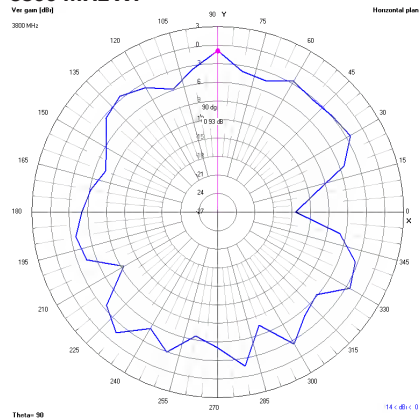
XZ



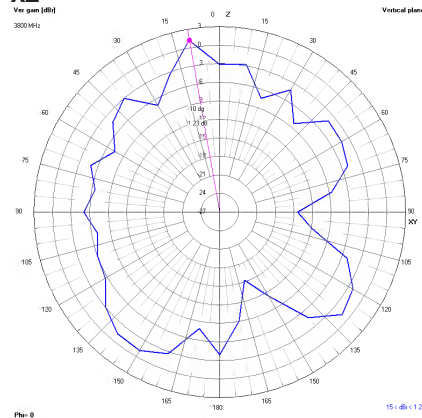
YZ



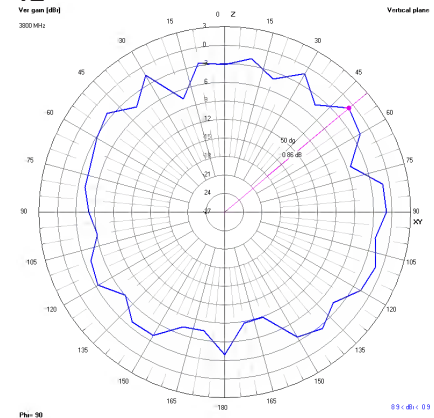
3800 MHz XY



XZ



YZ



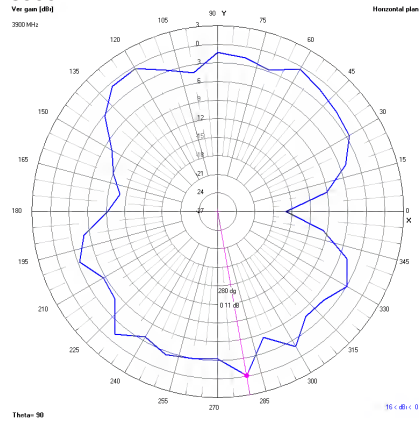


Echo 35

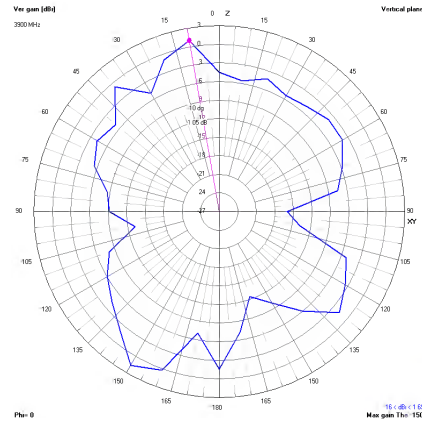
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

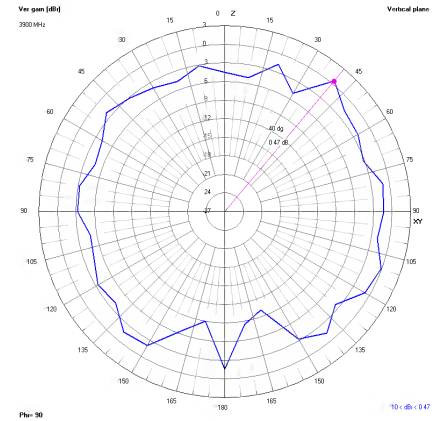
3900 MHz XY



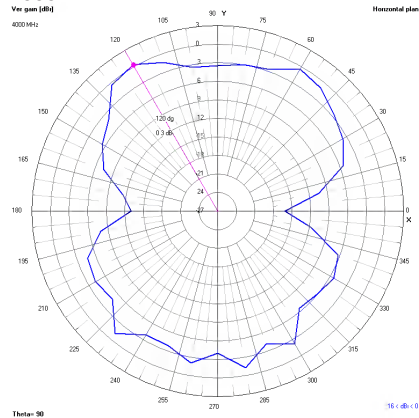
XZ



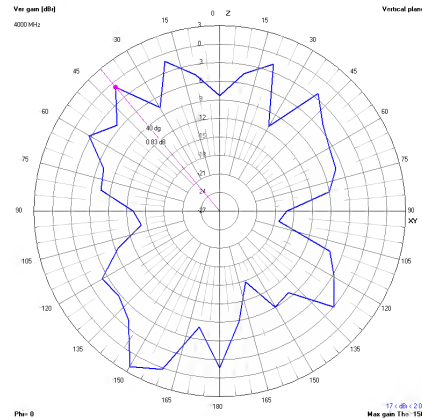
YZ



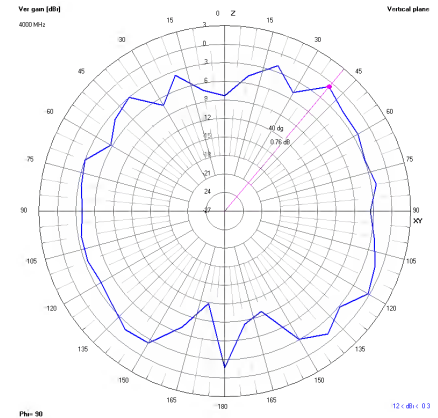
4000 MHz XY



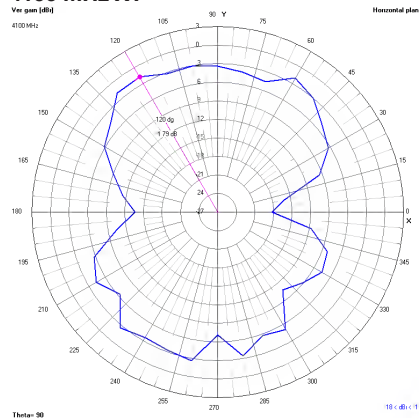
XZ



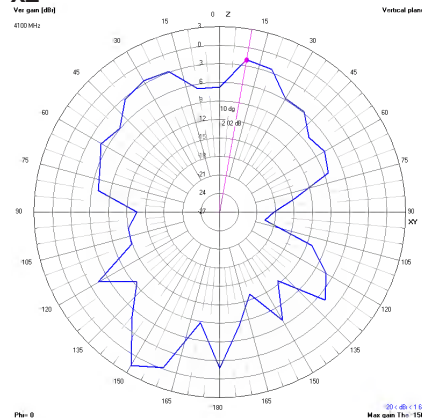
YZ



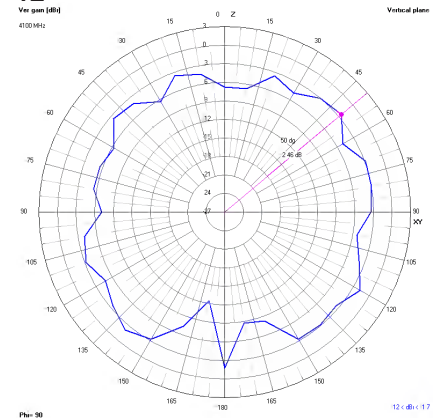
4100 MHz XY



XZ



YZ



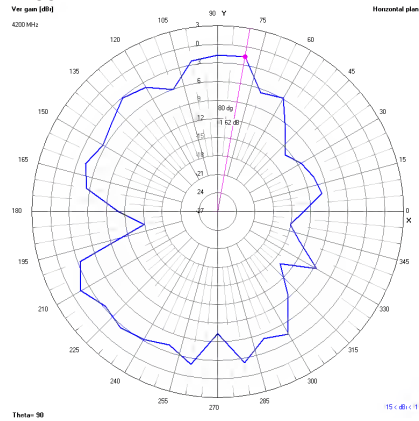


Echo 35

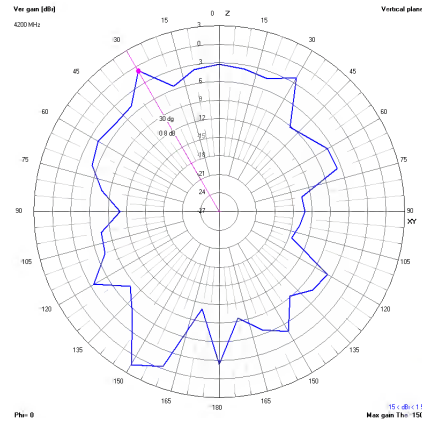
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

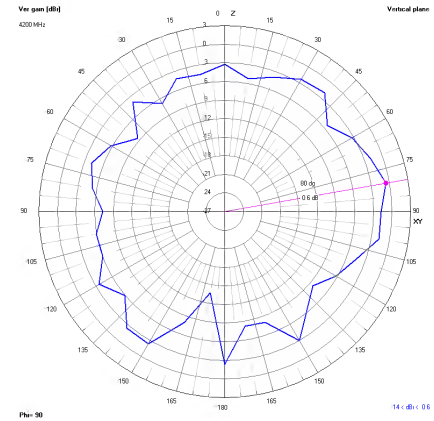
4200 MHz XY



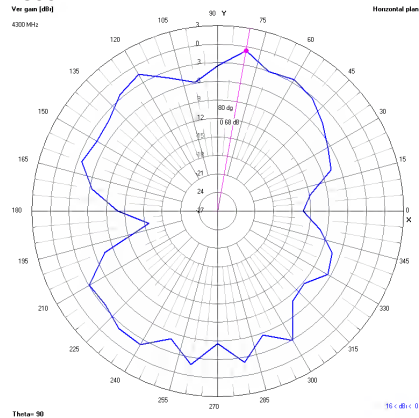
XZ



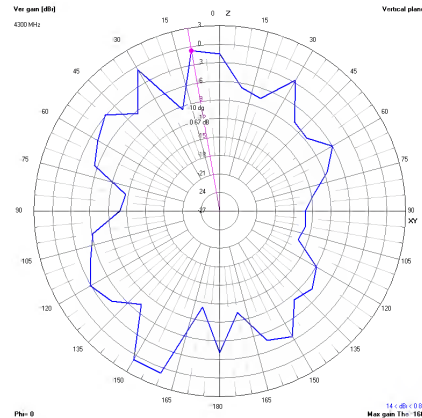
YZ



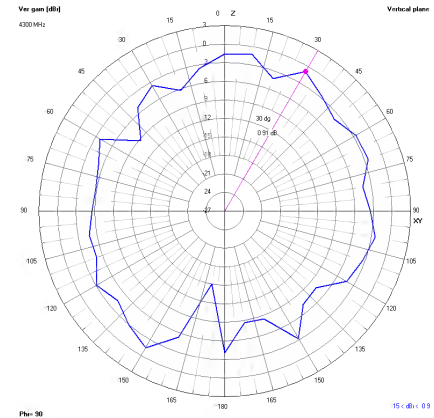
4300 MHz XY



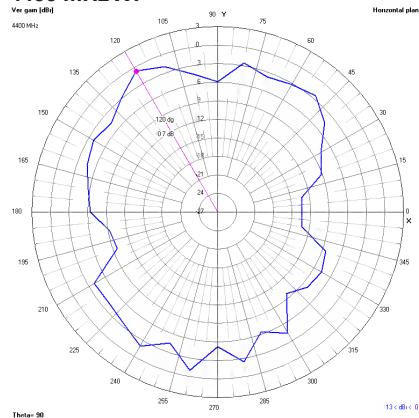
XZ



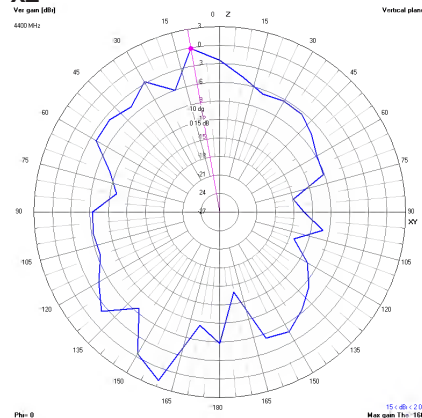
YZ



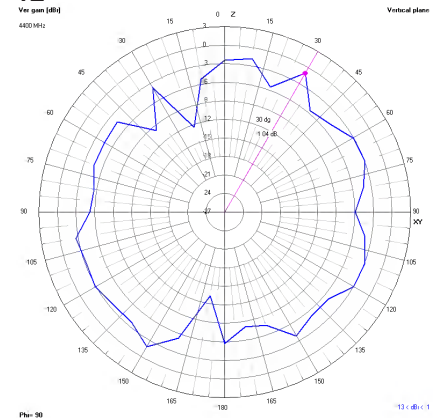
4400 MHz XY



XZ



YZ



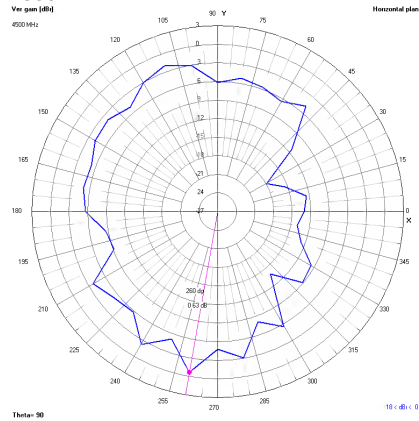


Echo 35

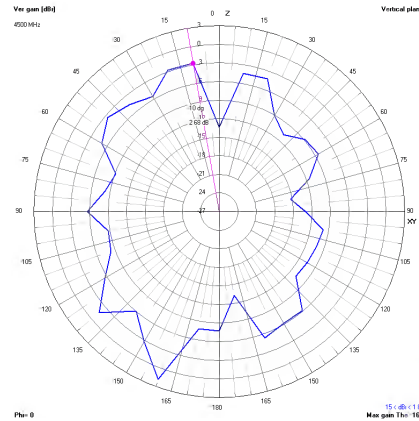
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

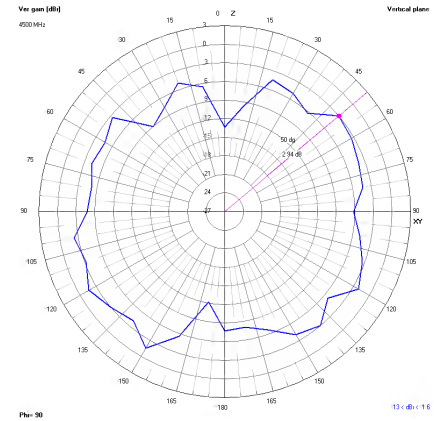
4500 MHz XY



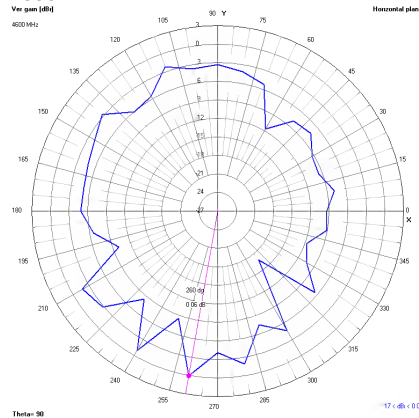
XZ



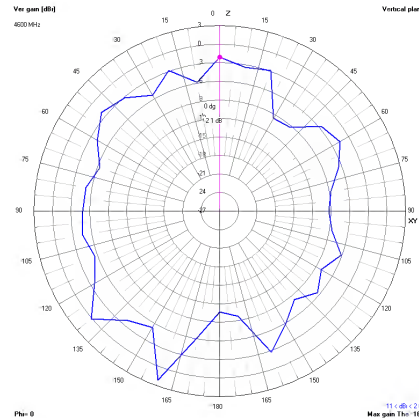
YZ



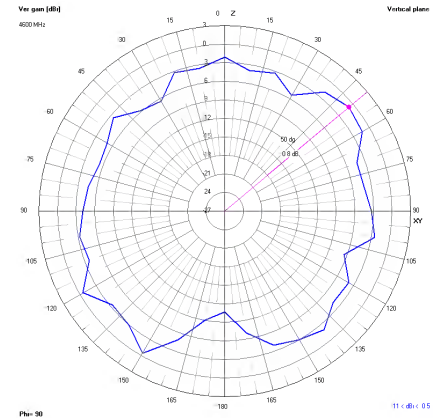
4600 MHz XY



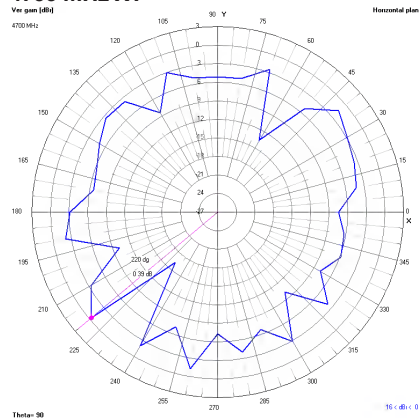
XZ



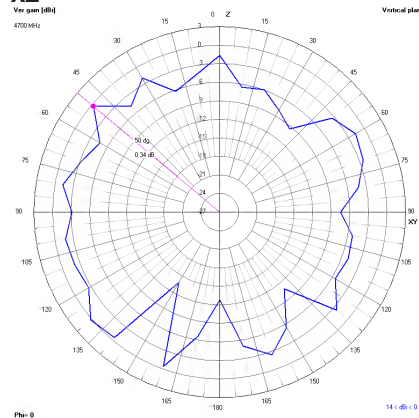
YZ



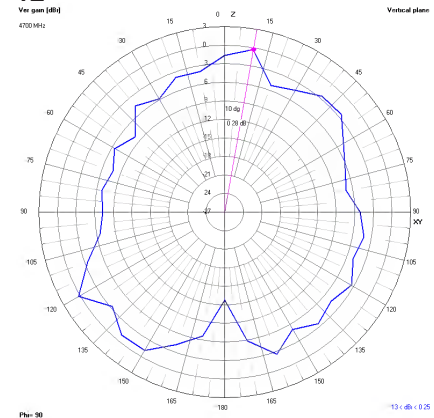
4700 MHz XY



XZ



YZ



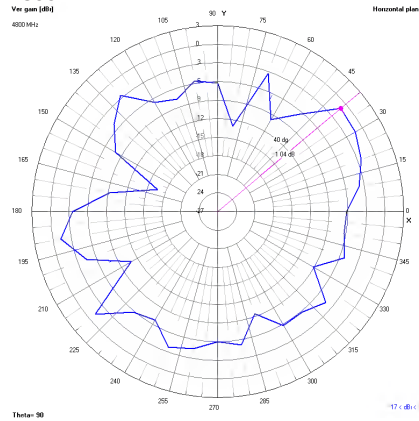


Echo 35

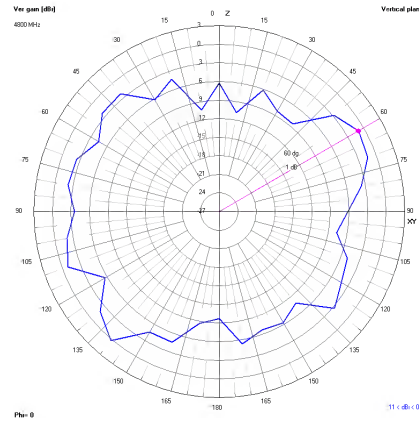
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

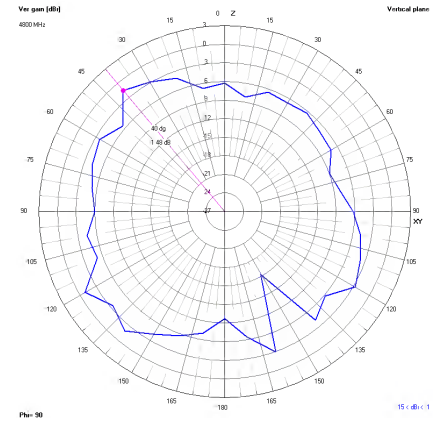
4800 MHz XY



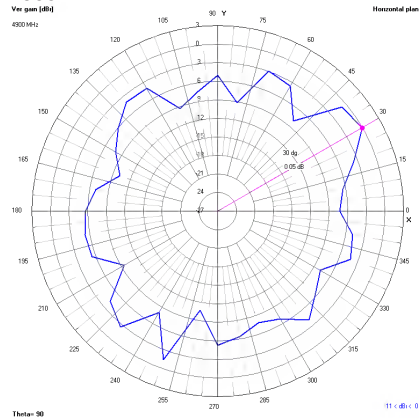
XZ



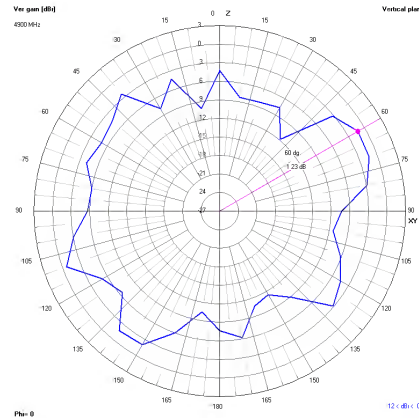
YZ



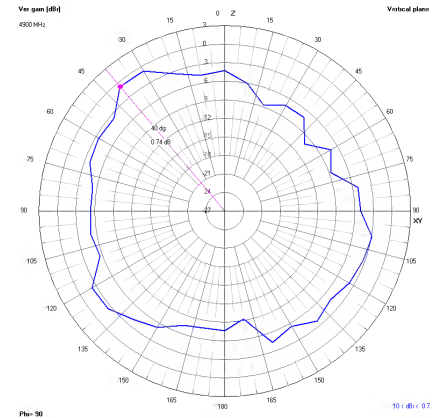
4900 MHz XY



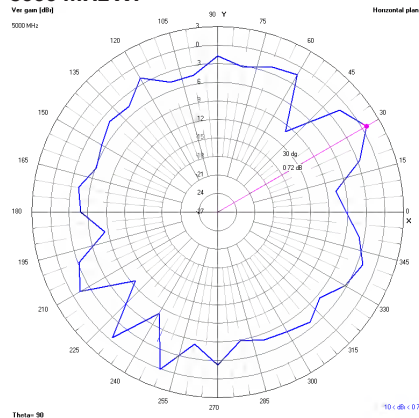
XZ



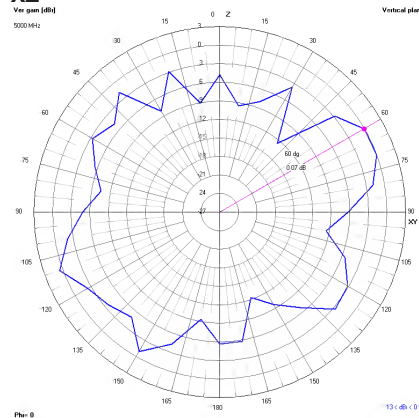
YZ



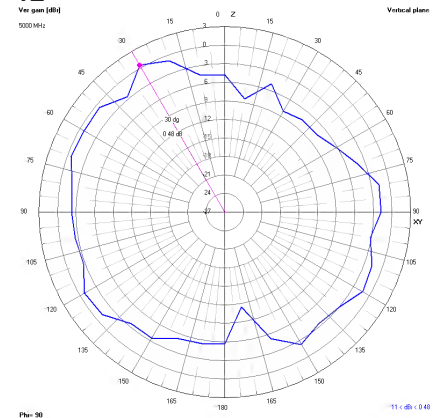
5000 MHz XY



XZ



YZ



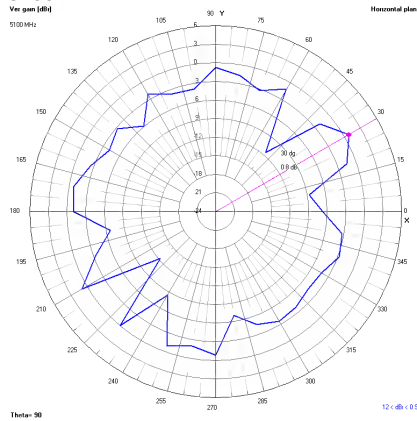


Echo 35

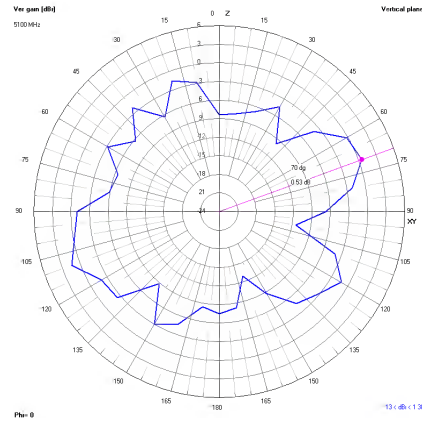
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

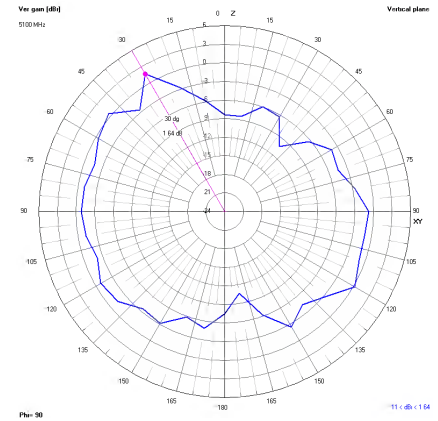
5100 MHz XY



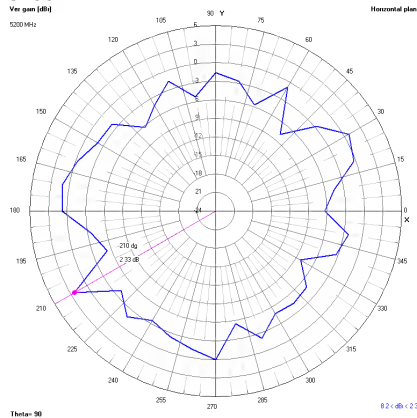
XZ



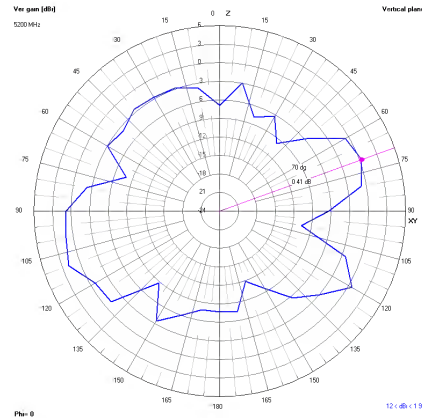
YZ



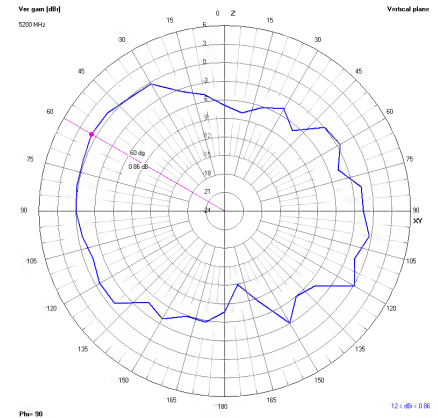
5200 MHz XY



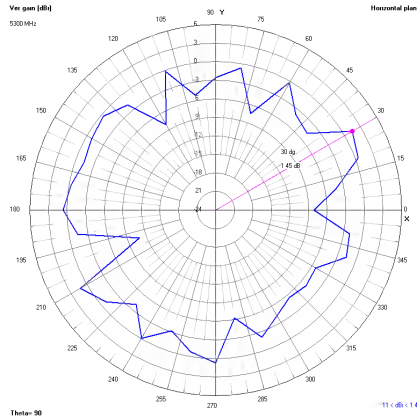
XZ



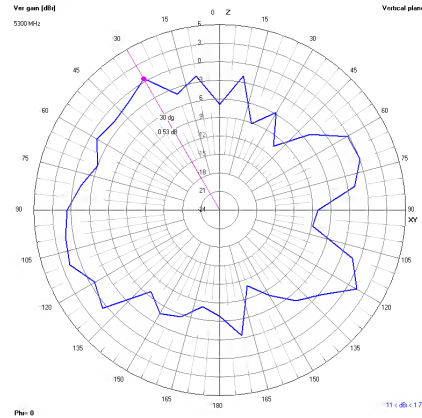
YZ



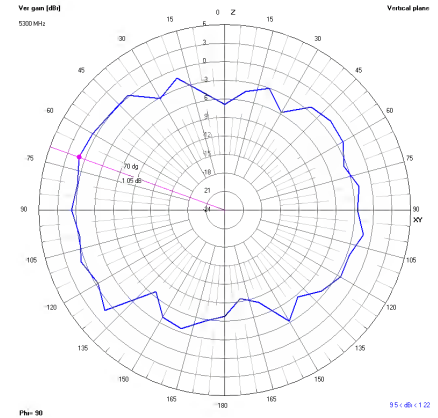
5300 MHz XY



XZ



YZ



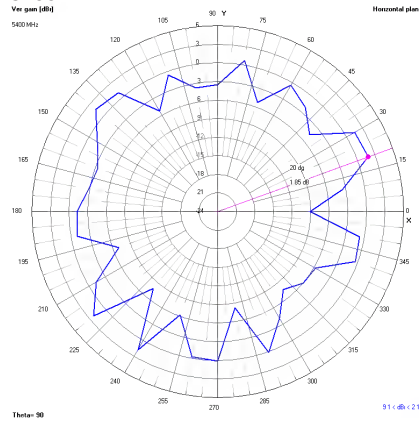


Echo 35

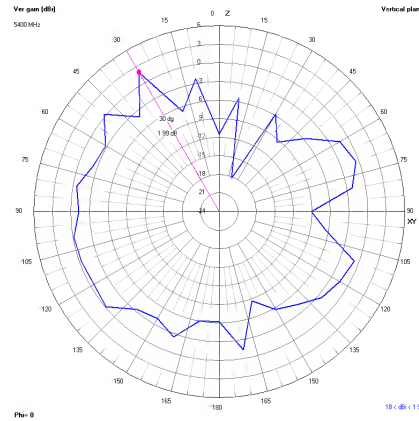
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

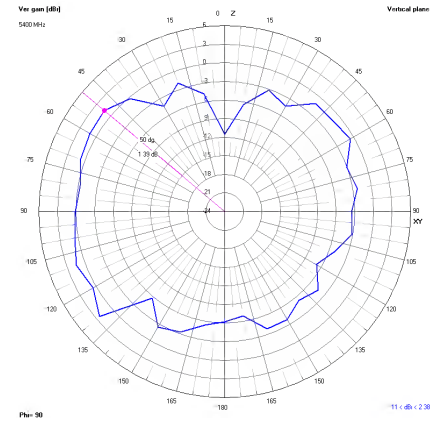
5400 MHz XY



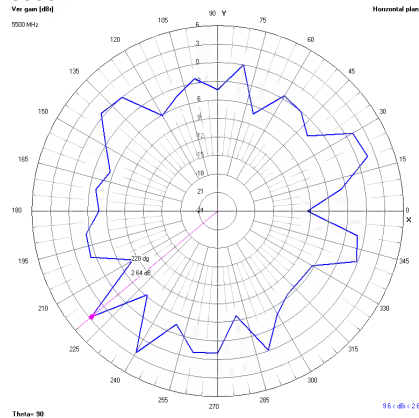
XZ



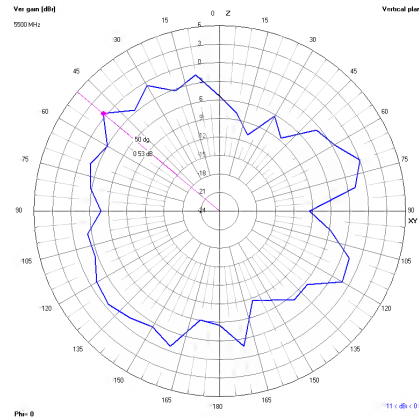
YZ



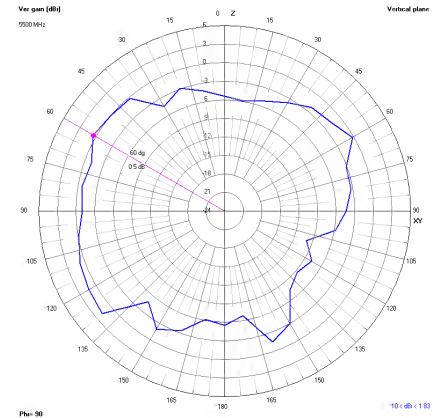
5500 MHz XY



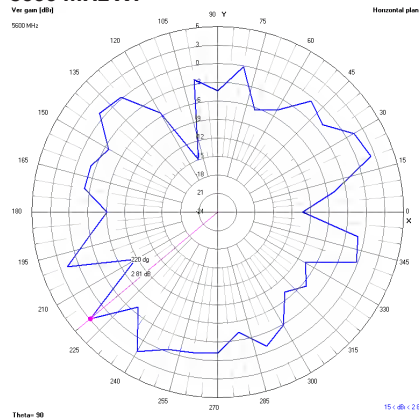
XZ



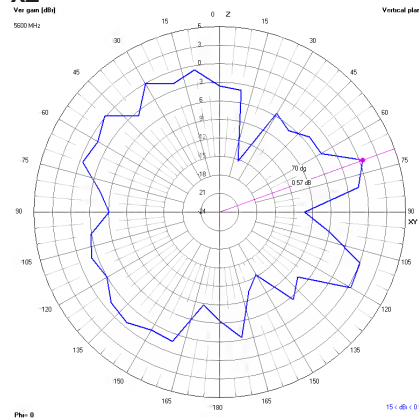
YZ



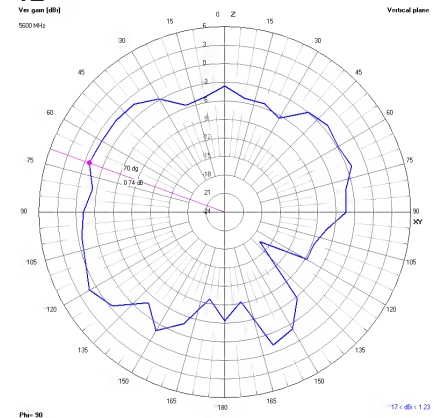
5600 MHz XY



XZ



YZ



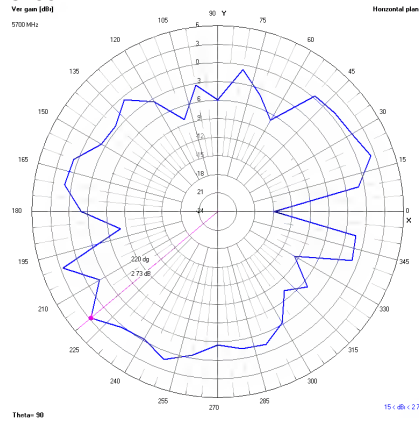


Echo 35

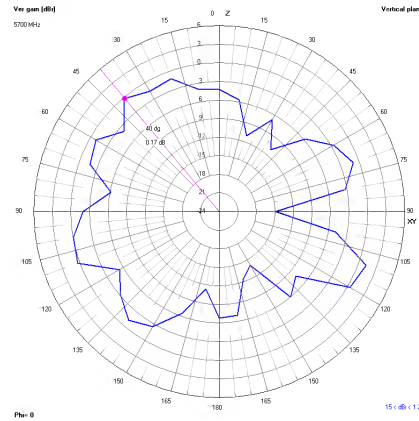
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

Radiation Plots tested with 280 mm cable

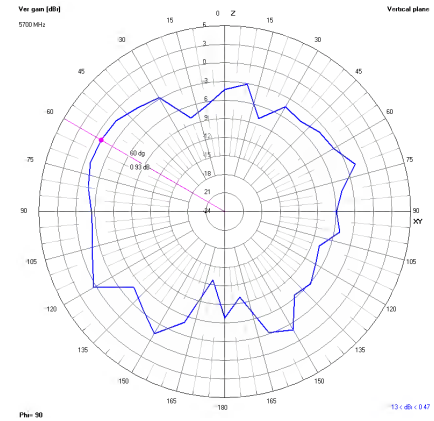
5700 MHz XY



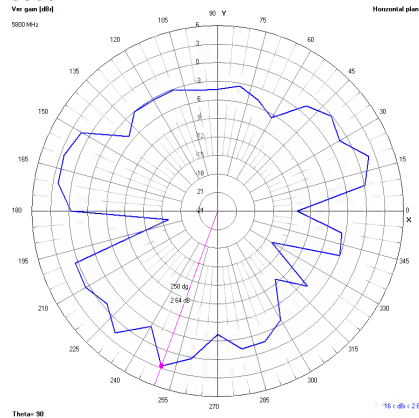
XZ



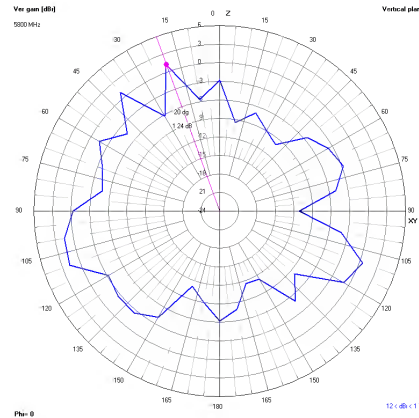
YZ



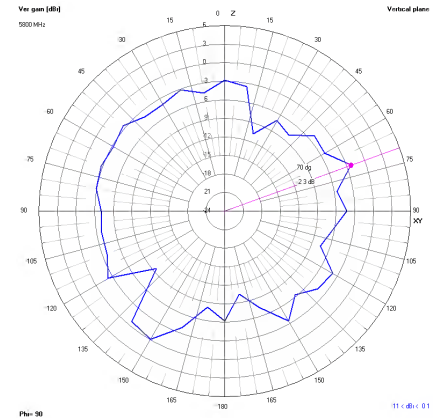
5800 MHz XY



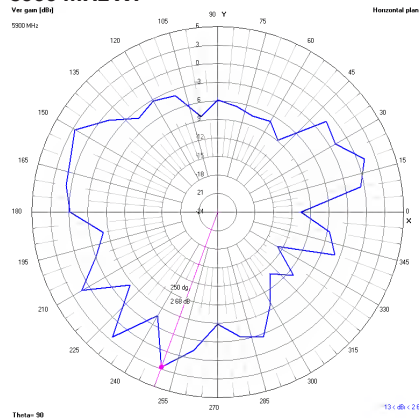
XZ



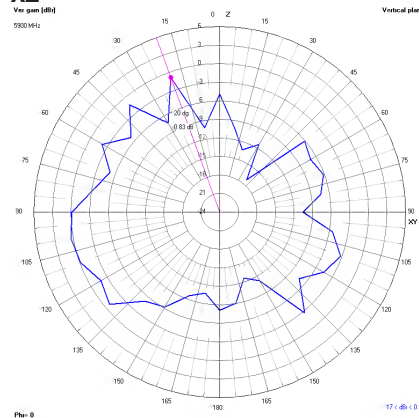
YZ



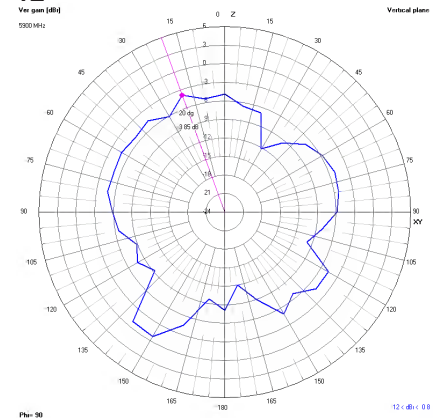
5900 MHz XY



XZ



YZ



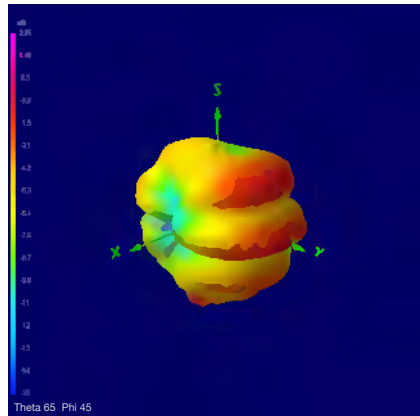


Echo 35

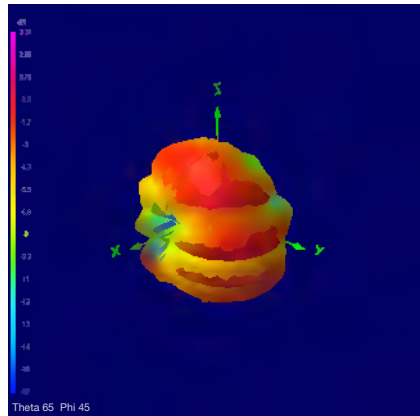
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

3D Radiation Plots tested with 280 mm cable

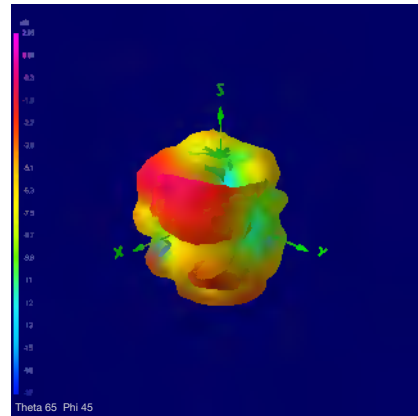
700 MHz



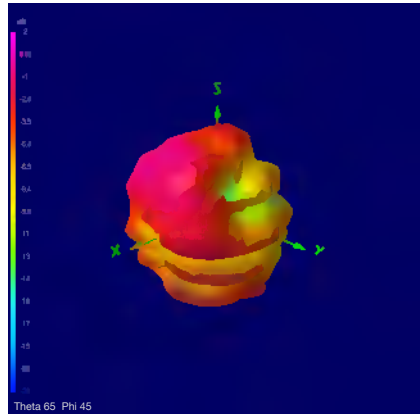
900 MHz



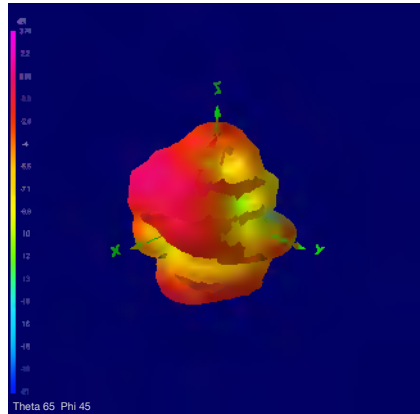
1500 MHz



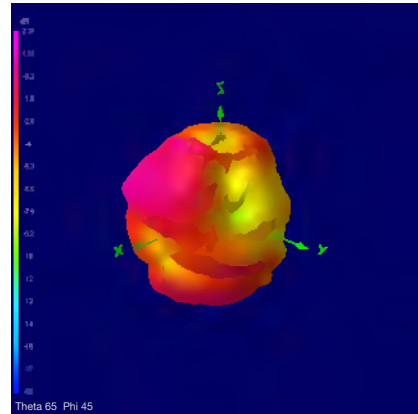
1600 MHz



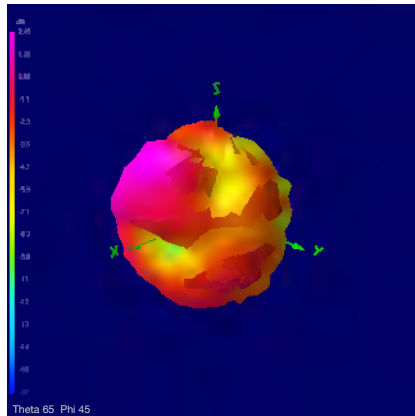
1700 MHz



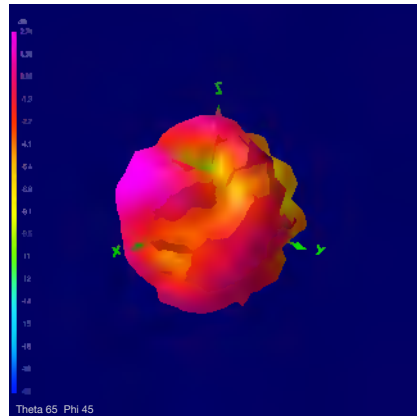
1800 MHz



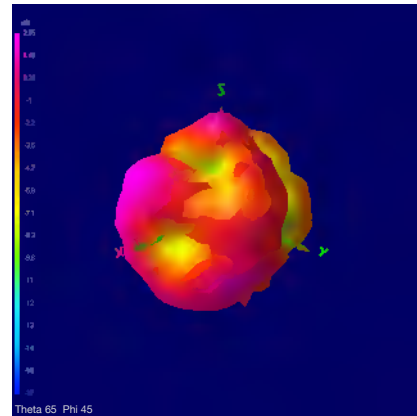
1900 MHz



2000 MHz



2100 MHz



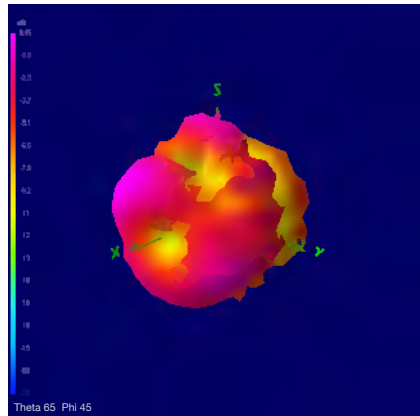


Echo 35

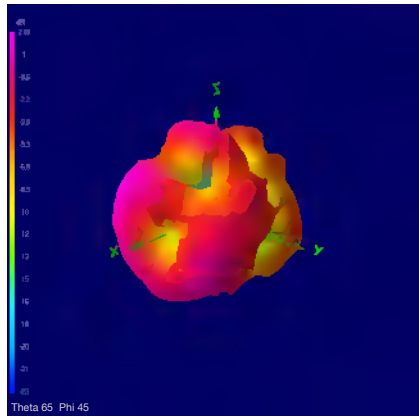
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

3D Radiation Plots tested with 280 mm cable

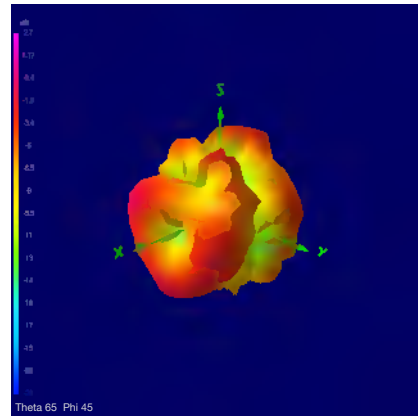
2200 MHz



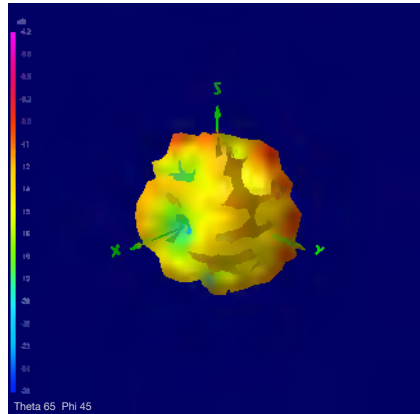
2300 MHz



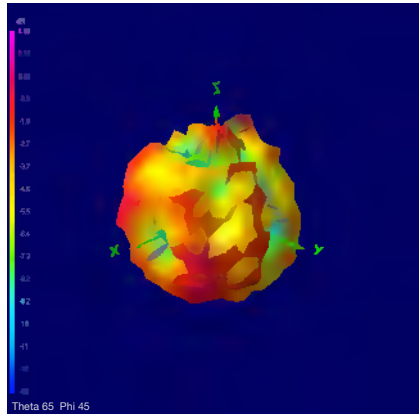
2400 MHz



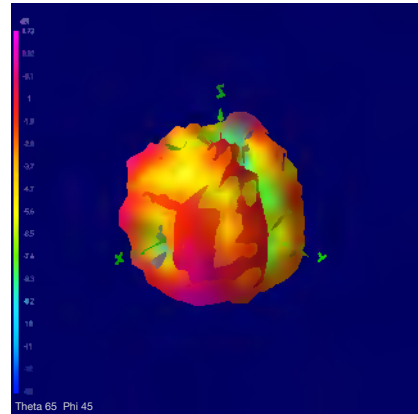
2500 MHz



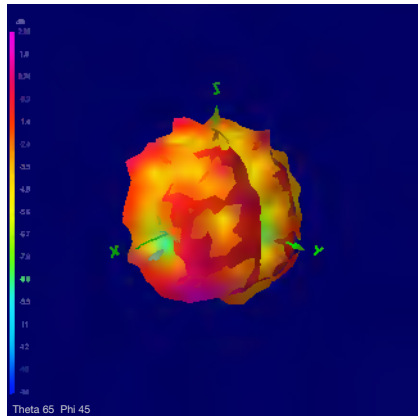
3400 MHz



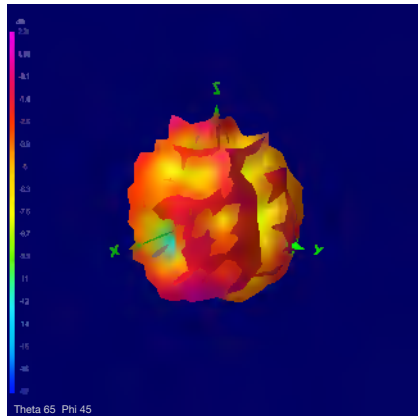
3500 MHz



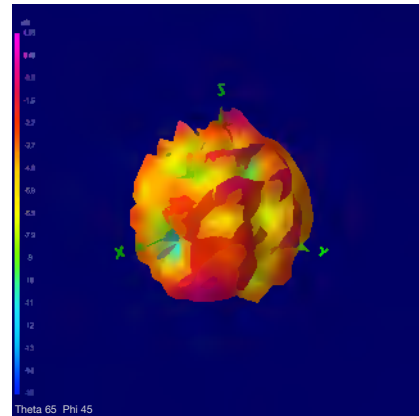
3600 MHz



3700 MHz



3800 MHz



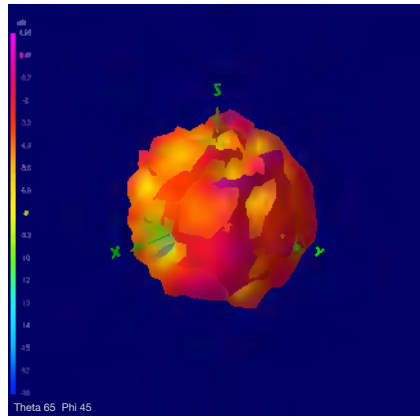


Echo 35

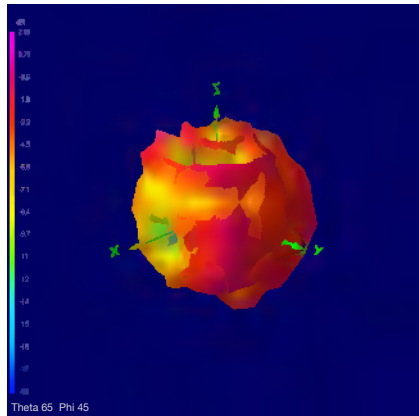
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

3D Radiation Plots tested with 280 mm cable

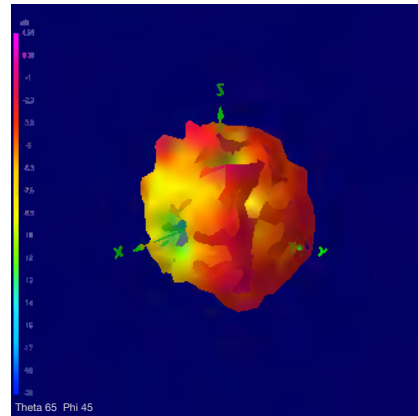
3900 MHz



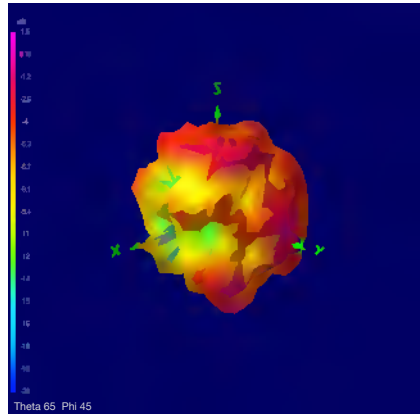
4000 MHz



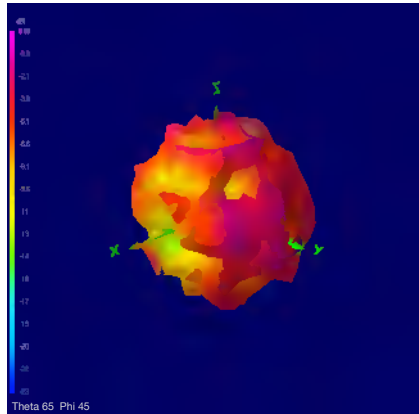
4100 MHz



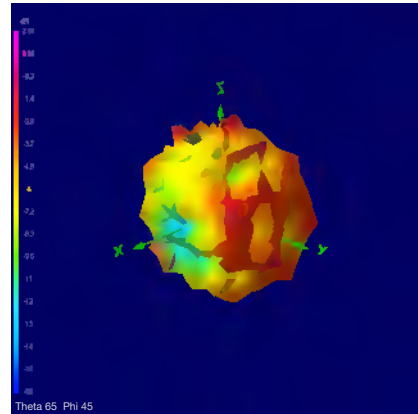
4200 MHz



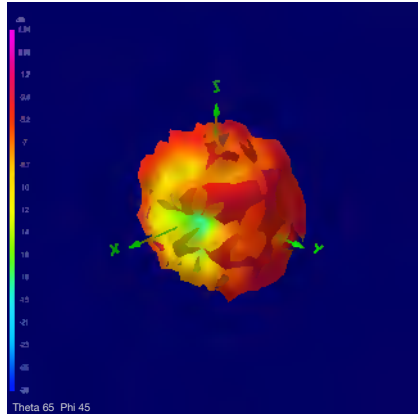
4300 MHz



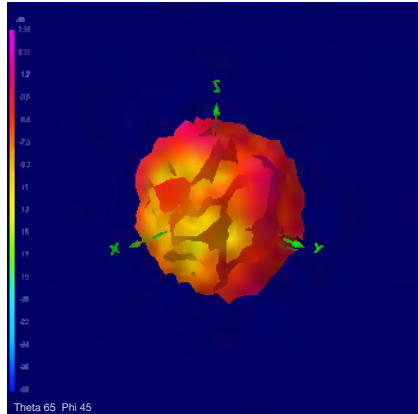
4400 MHz



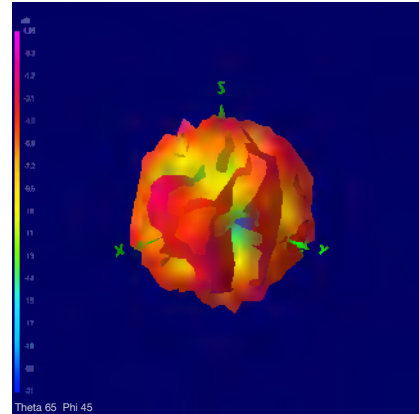
4500 MHz



4600 MHz



4700 MHz



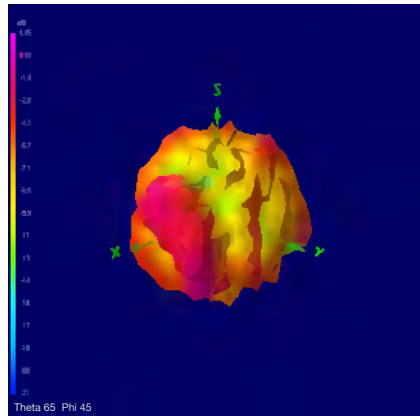


Echo 35

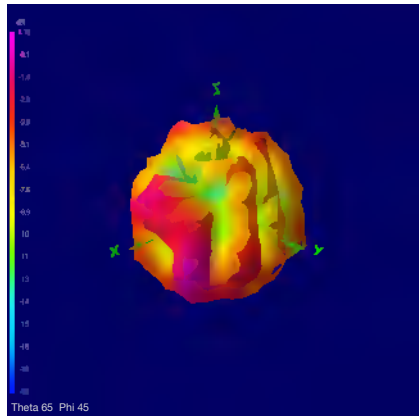
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

3D Radiation Plots tested with 280 mm cable

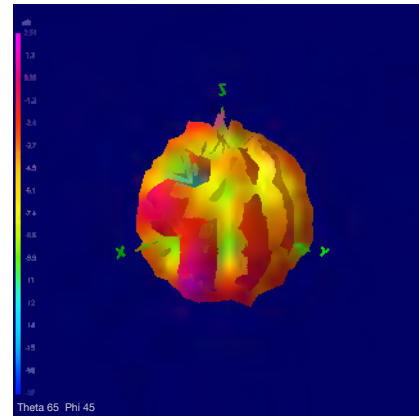
4800 MHz



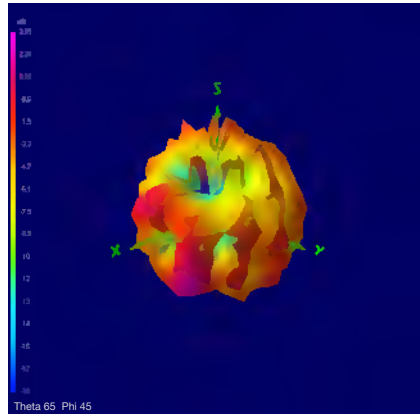
4900 MHz



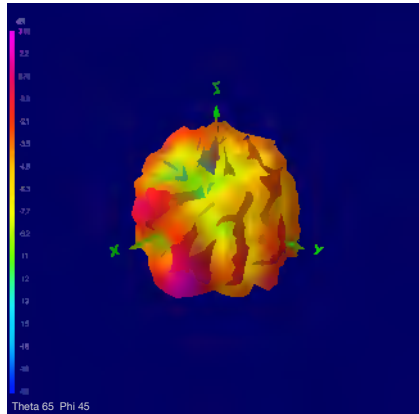
5000 MHz



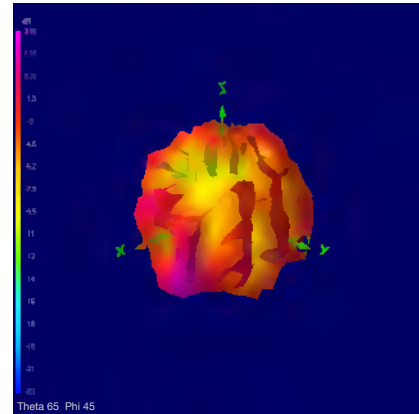
5100 MHz



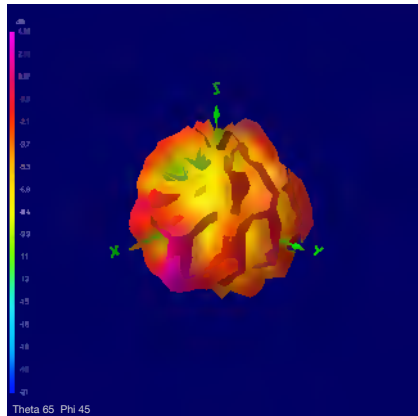
5200 MHz



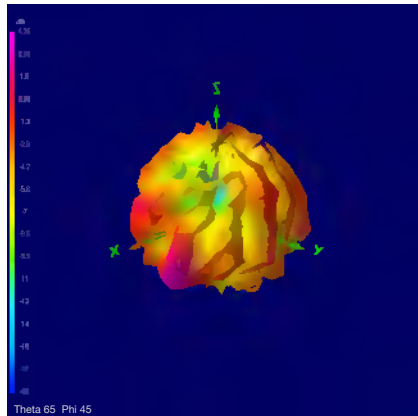
5300 MHz



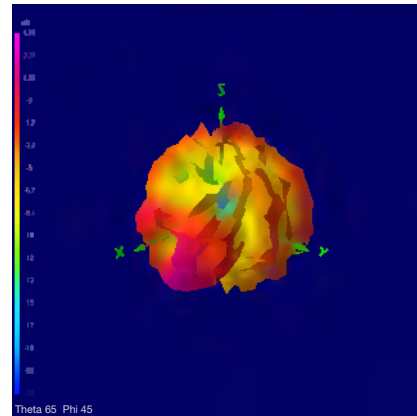
5400 MHz



5500 MHz



5600 MHz



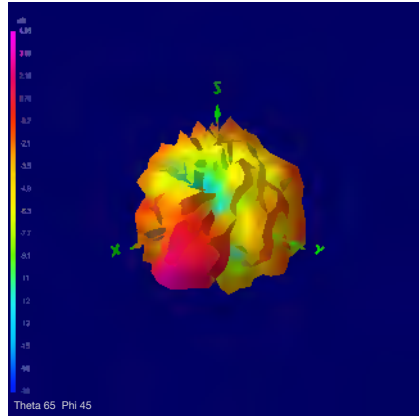


Echo 35

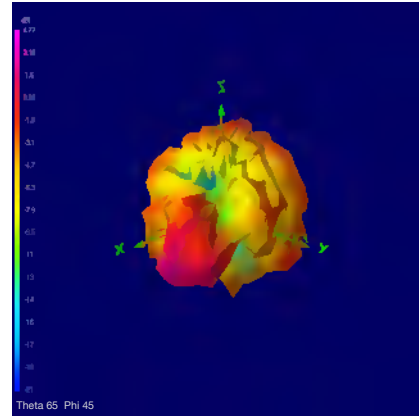
2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA

3D Radiation Plots tested with 280 mm cable

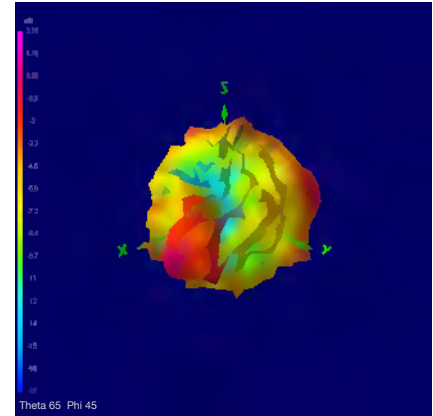
5700 MHz



5800 MHz



5900 MHz



Ordering Details

Part Number	Description
ECHO35/0.1M/IPEX/S/S/17	2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA IPEX CONNECTOR 100mm CABLE
ECHO35/175mm/IPEX/S/S/17	2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA IPEX CONNECTOR 175mm CABLE
ECHO35/280mm/IPEX/S/S/17	2G/3G/4G/(5G) SMALL PCB EMBEDDED ANTENNA IPEX CONNECTOR 280mm CABLE