



Antenna Test Report

REPORT NO.	A231001
APPLICANT	: Tesla, Inc.
MANUFACTURER	: Tesla, Inc.
EQUIPMENT	: Antenna on PCB
MODEL NAME	: 1755080
DATE OF RECEIPT	: January 6, 2023
DATE OF TEST	: January 6, 2023
ISSUE DATE	: January 17, 2023

Tested by:

Neil Kao

We, SPORTON INTERNATIONAL (USA) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (USA) INC., the test report shall not be reproduced except in full.

The declared product specification for EUT presented in this report is provided by the manufacturer / applicant, and the manufacturer / applicant takes all the responsibilities for the accuracy of product specification.

SPORTON INTERNATIONAL (USA) INC.



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUE DATE
A231001	1.0	Initial issue of report	January 17, 2023



1. Test Laboratory

Test Site	Sporton International Inc. ☐ EMC & Wireless Communications Laboratory ☐ Wensan Laboratory ☒ Sporton International (USA) inc.
Address	Sporton International (USA) inc.: 1175 Montague Expressway, Milpitas, CA 95035 USA
Chamber	Sporton International (USA) inc.: ☐ OTA01-CA ☒ OTA02-CA

☒ : The chamber(s) used to perform the test.



2. Client Information

2.1 Applicant

Company Name	Tesla, Inc.
Address	3500 DEER CREEK ROAD, PALO ALTO, CA 94304
Contact Person	Viraj Andrabadu Kurundu Patabendige

2.2 Manufacturer

Company Name	Tesla, Inc.
Address	3500 DEER CREEK ROAD, PALO ALTO, CA 94304
Contact Person	Viraj Andrabadu Kurundu Patabendige

3. Equipment Under test(EUT) Information

3.1 Description of EUT

Product Feature & Specification	
EUT Type	Antenna on PCB
Brand Name	Tesla, Inc.
Model Name	1755080
Antenna Type	PCB Antenna

4. Measurement Environment

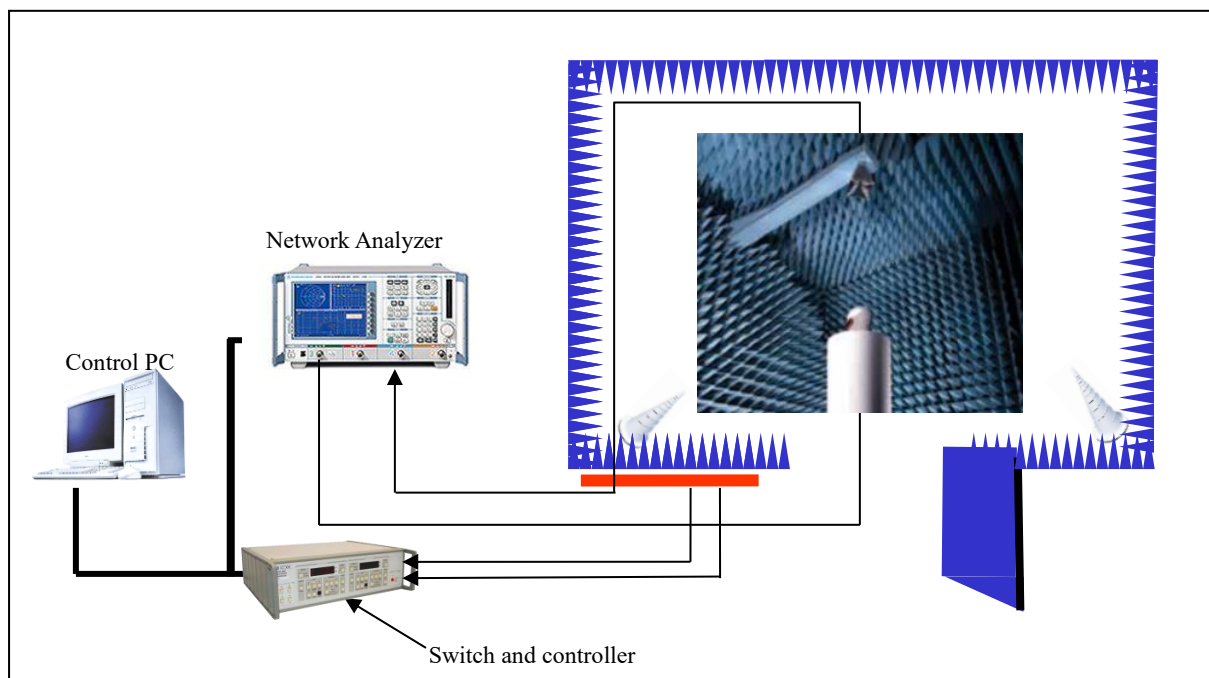
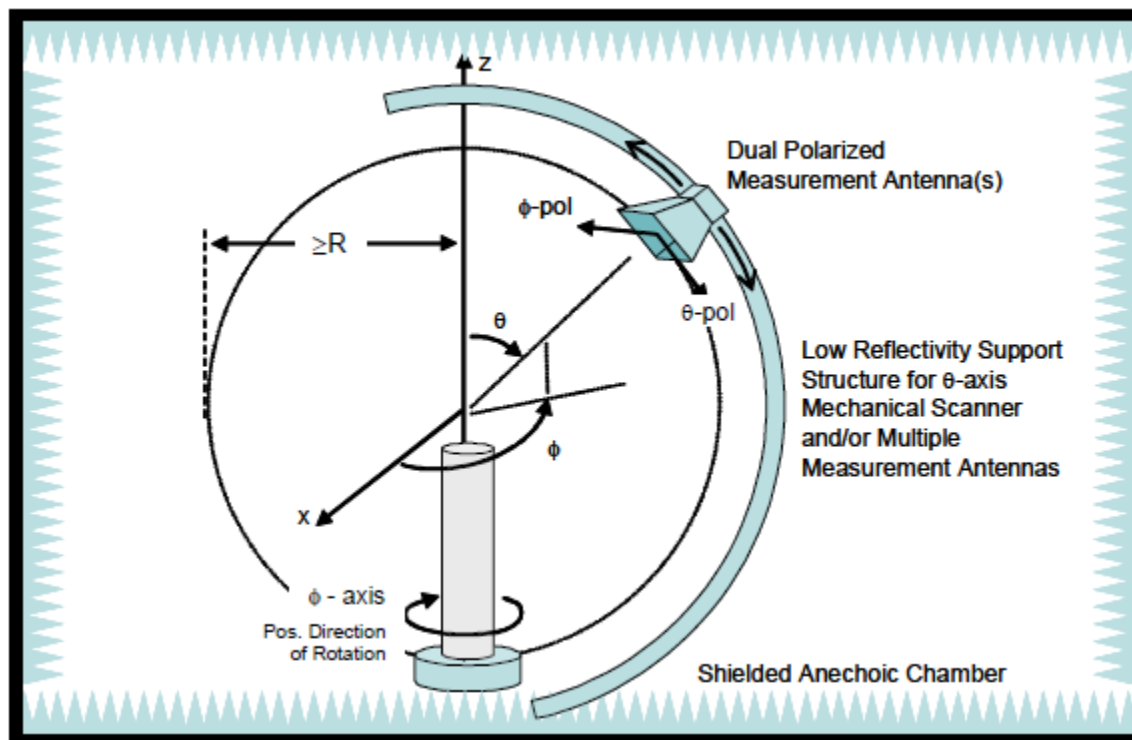
Ambient Condition

Temperature (°C) :	25°C +/- 5°C	Humidity (%) :	<60%
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Test Equipment List

Name	Manufacturer	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
ENA Series Network Analyzer	R&S	ZVB8	100110	2022/09/02	2023/09/01
RF Switch	ETS-Lindgren	EMCenter	N/A	NCR	NCR
Multi-Axis Positioner Controller	ETS-Lindgren	2090	N/A	NCR	NCR
Medium-Duty Positioner	ETS-Lindgren	2015	N/A	NCR	NCR
Measurement Horn Antenna	EMCO	3164-08	N/A	NCR	NCR
Test software	ETS-Lindgren	EMQuest	1296	NCR	NCR

Passive measurement setup





5. Summary of Test Results

5.1 Declaration

Declaration of Conformity:
The judgment of conformity in the report is based on the measurement results excluding the measurement uncertainty.
Comments and Explanations:
None

5.2 Abbreviations and Definitions

Please note the following abbreviations in this section:

FS = Free Space

5.3 Summary Table

Frequency (MHz)	Ant. Port Input Pwr. (dBm)	Total Radiated Power (dBm)	Gain (dBi)	Directivity (dBi)	Efficiency (dB)	Efficiency (%)
2402.00	0.00	-1.22	4.19	5.41	-1.22	75.53
2412.00	0.00	-1.15	4.09	5.24	-1.15	76.70
2437.00	0.00	-1.08	3.99	5.07	-1.08	78.03
2441.00	0.00	-1.01	3.95	4.96	-1.01	79.16
2462.00	0.00	-0.94	3.77	4.71	-0.94	80.56
2472.00	0.00	-0.90	3.89	4.79	-0.90	81.30
2480.00	0.00	-0.77	4.19	4.96	-0.77	83.77
5180.00	0.00	-3.08	3.05	6.13	-3.08	49.20
5220.00	0.00	-3.12	4.09	7.22	-3.12	48.70
5240.00	0.00	-3.10	4.52	7.63	-3.10	48.92
5260.00	0.00	-3.33	4.20	7.53	-3.33	46.47
5300.00	0.00	-3.31	4.34	7.65	-3.31	46.63
5320.00	0.00	-3.21	4.70	7.91	-3.21	47.75
5500.00	0.00	-2.30	3.42	5.72	-2.30	58.84
5600.00	0.00	-2.07	2.82	4.89	-2.07	62.14
5700.00	0.00	-2.52	2.65	5.18	-2.52	55.92
5745.00	0.00	-2.85	2.61	5.46	-2.85	51.92
5785.00	0.00	-2.90	3.02	5.93	-2.90	51.23
5805.00	0.00	-2.96	3.39	6.35	-2.96	50.57
5825.00	0.00	-2.93	2.94	5.87	-2.93	50.95

6. Description for EUT Testing Position

Placed and fixed it as shown below.

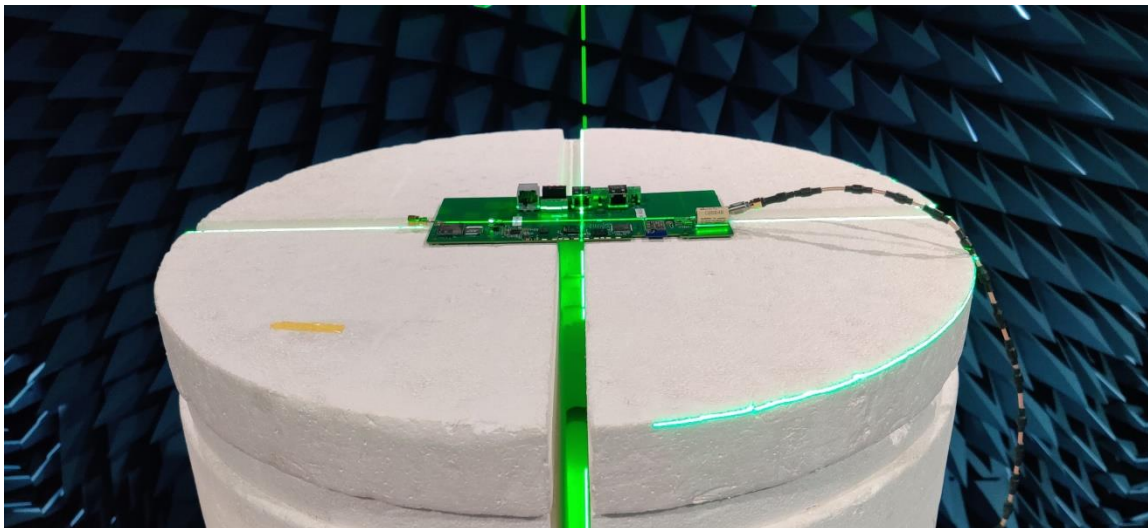
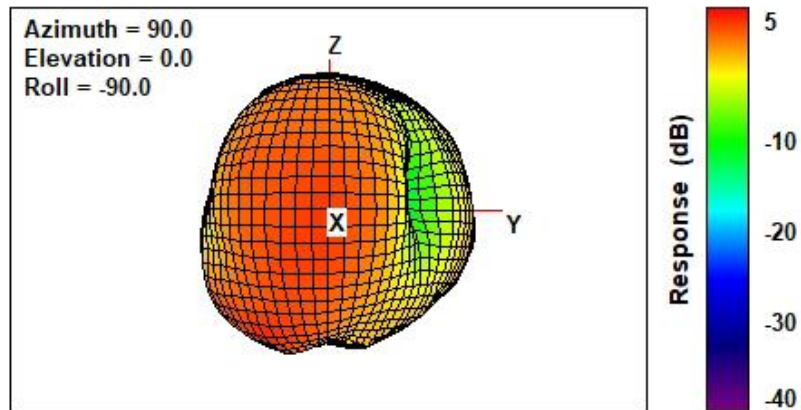


Figure 6-1 Test Position Free Space

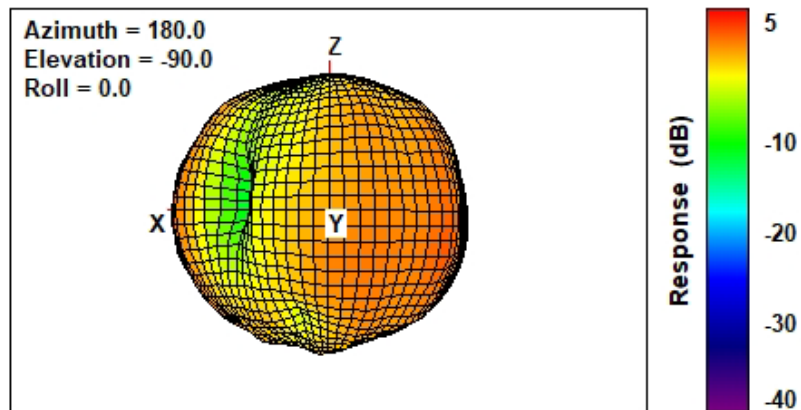


Appendix A 3D pattern

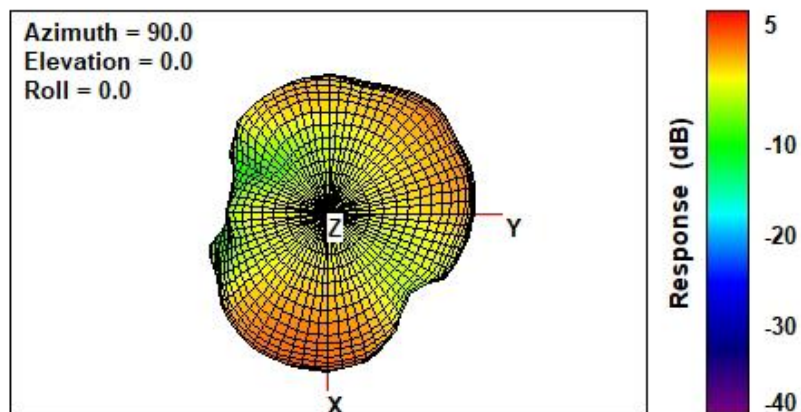
Total - 2402 MHz



Total - 2402 MHz

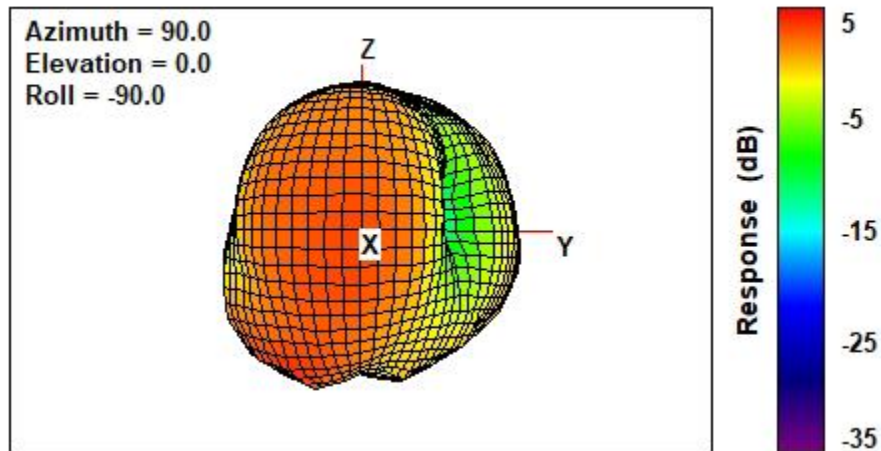


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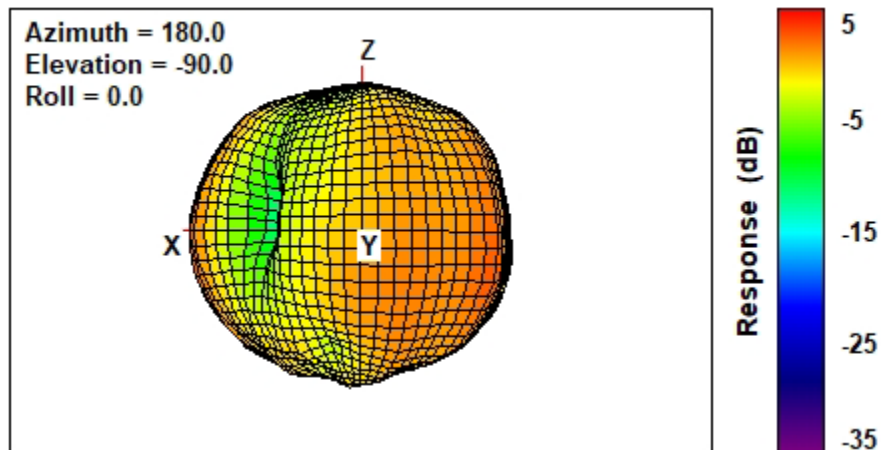


Frequency 2402 MHz

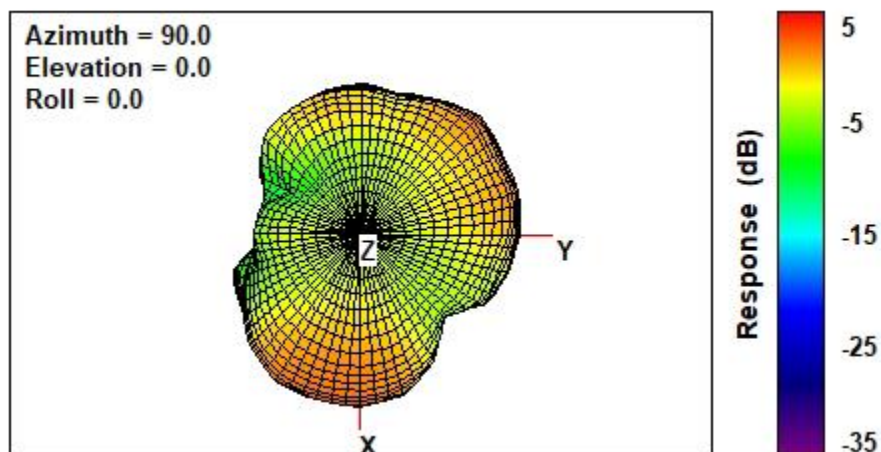
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Total - 2412 MHz

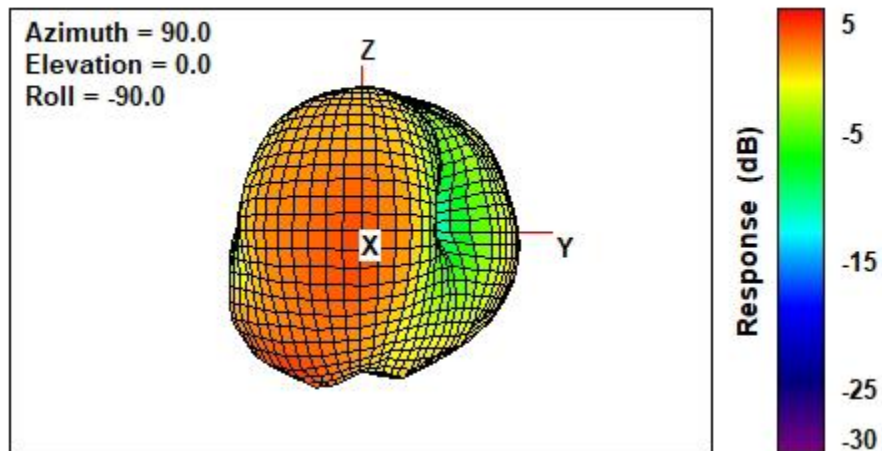


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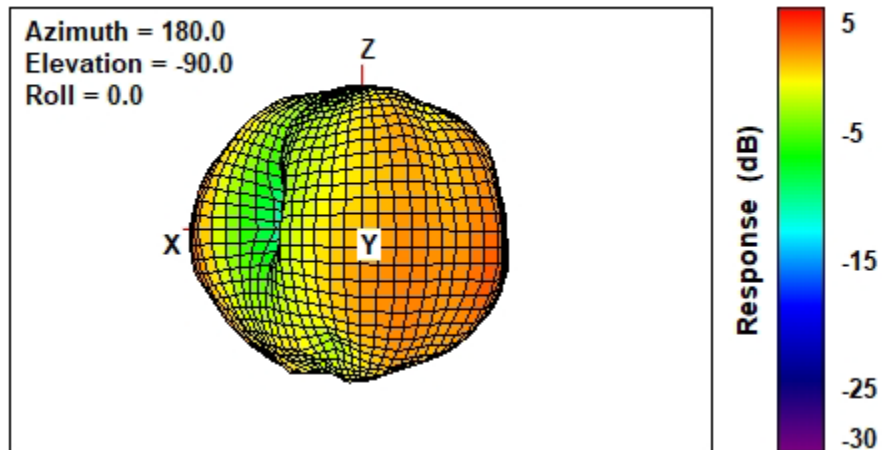


Frequency 2412 MHz

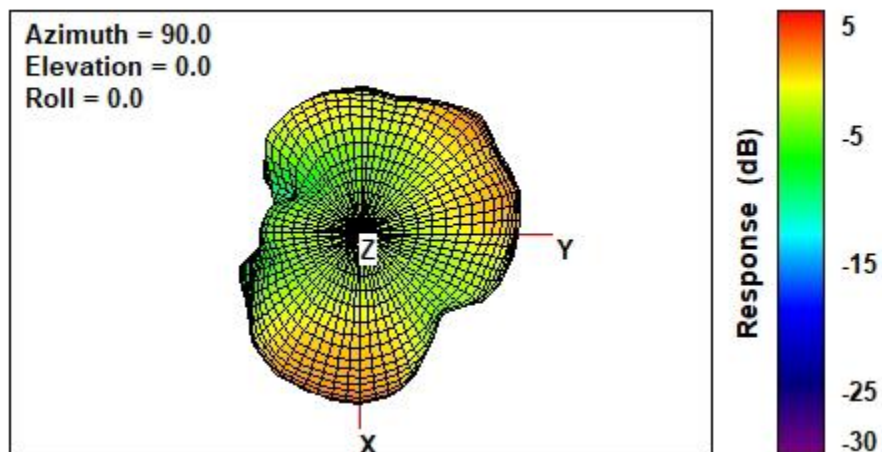
Total - 2437 MHz



Total - 2437 MHz

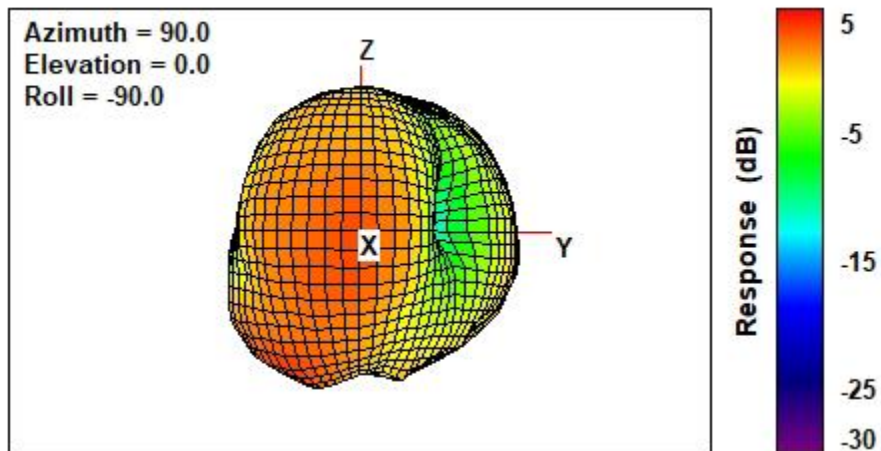


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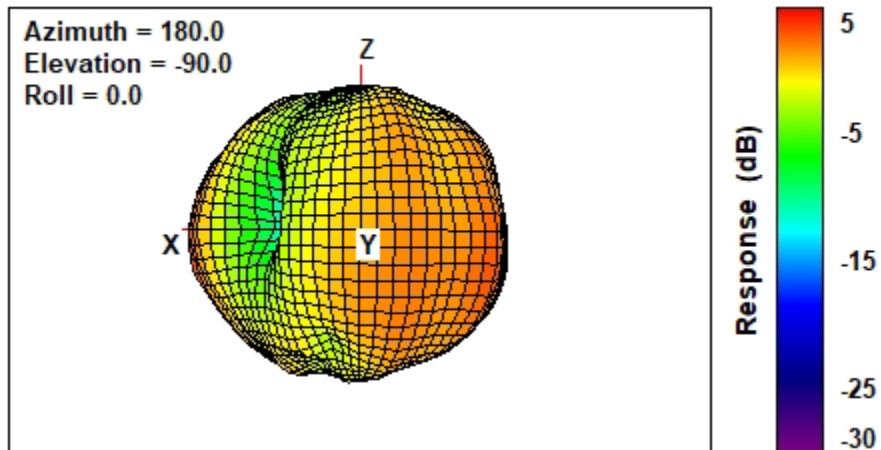


Frequency 2437 MHz

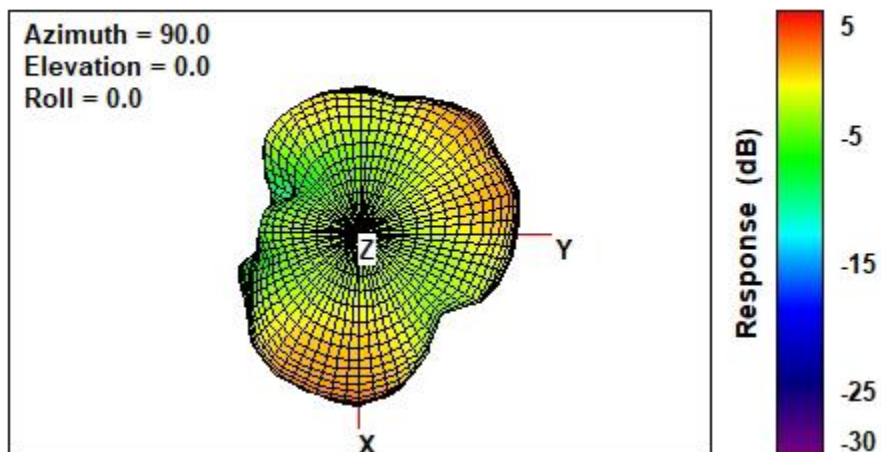
Total - 2441 MHz



Total - 2441 MHz

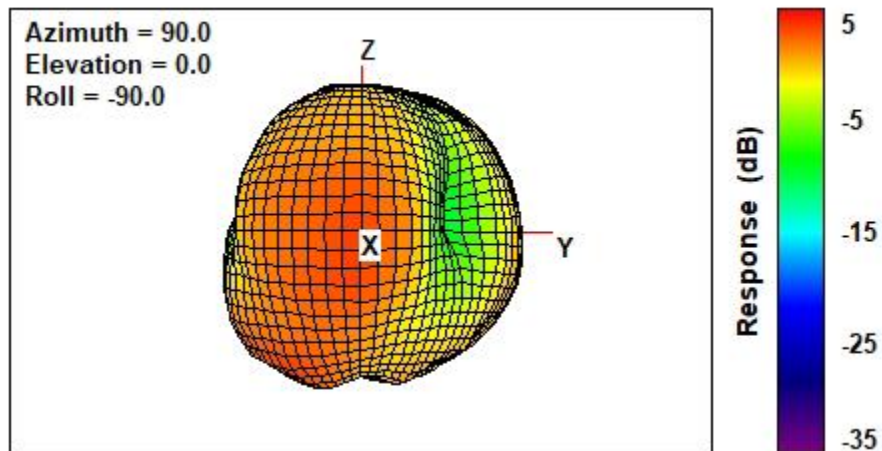


Total - 2441 MHz

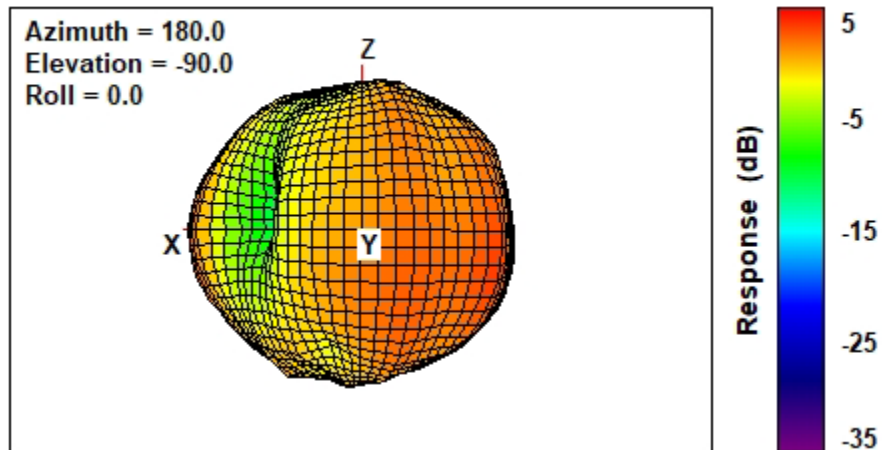


Frequency 2441 MHz

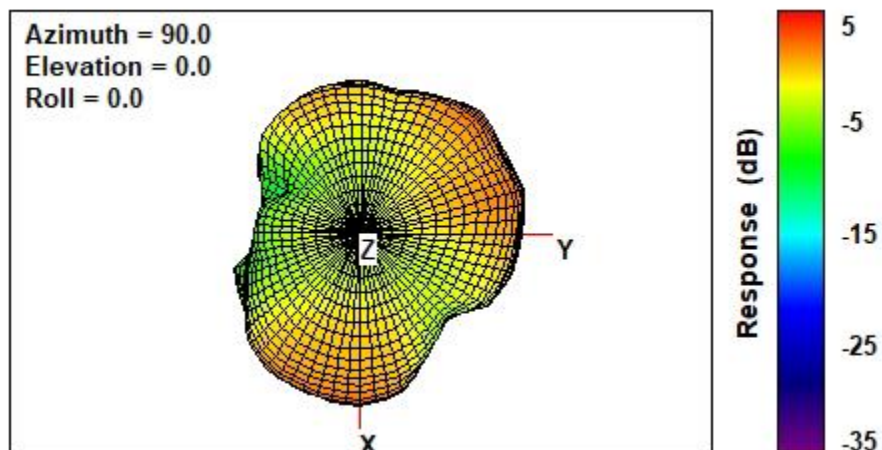
Total - 2462 MHz



Total - 2462 MHz

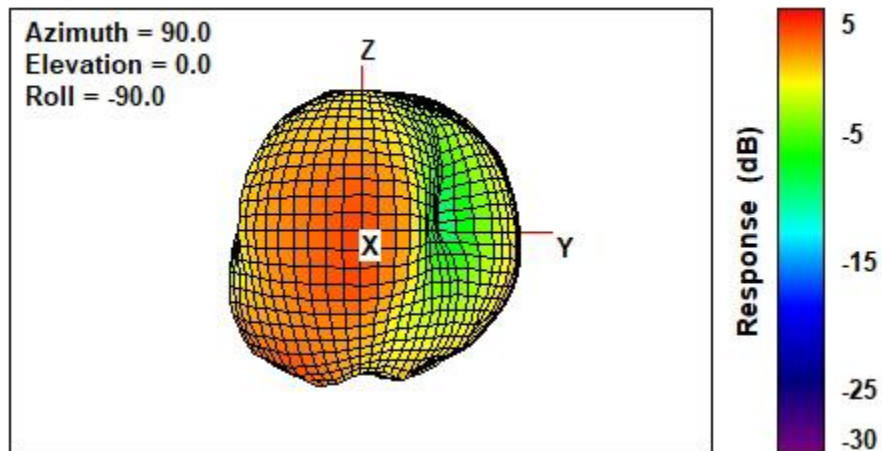


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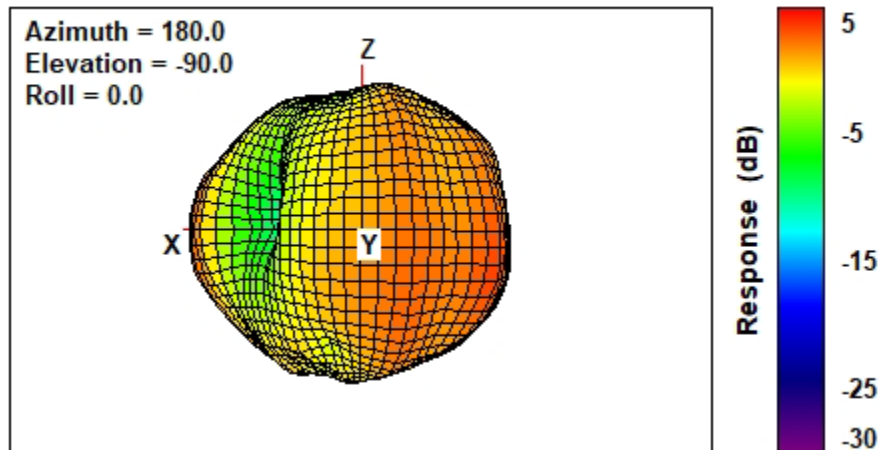


Frequency 2462 MHz

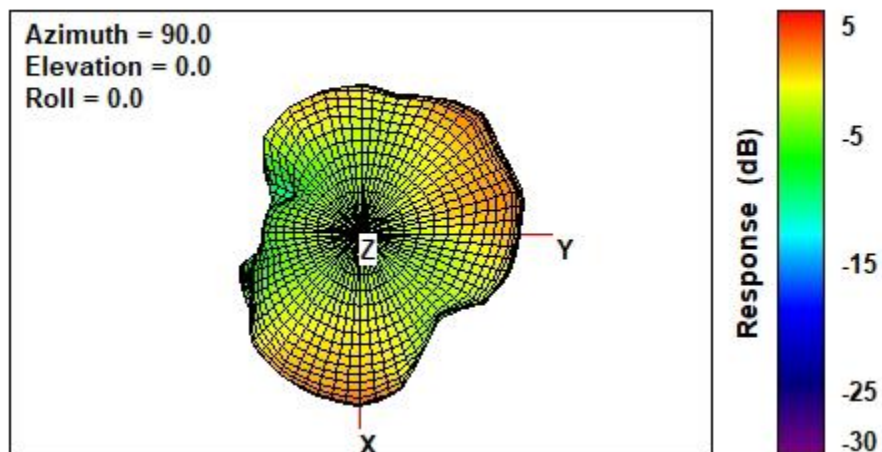
Total - 2472 MHz



Total - 2472 MHz

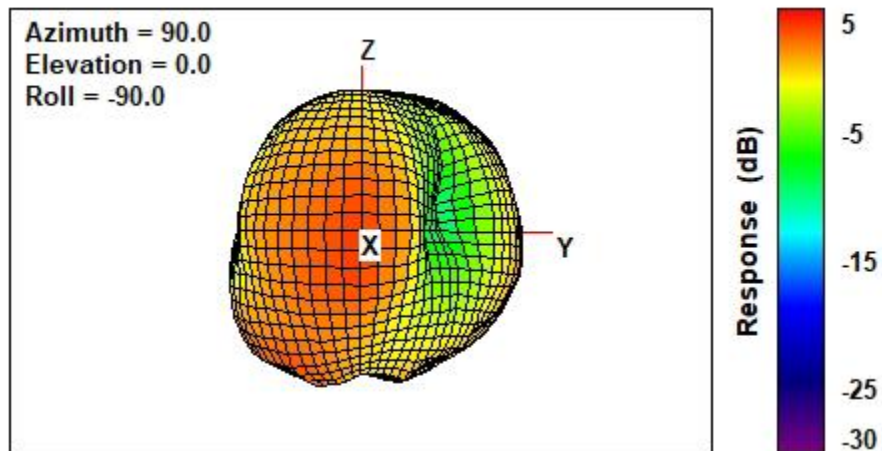


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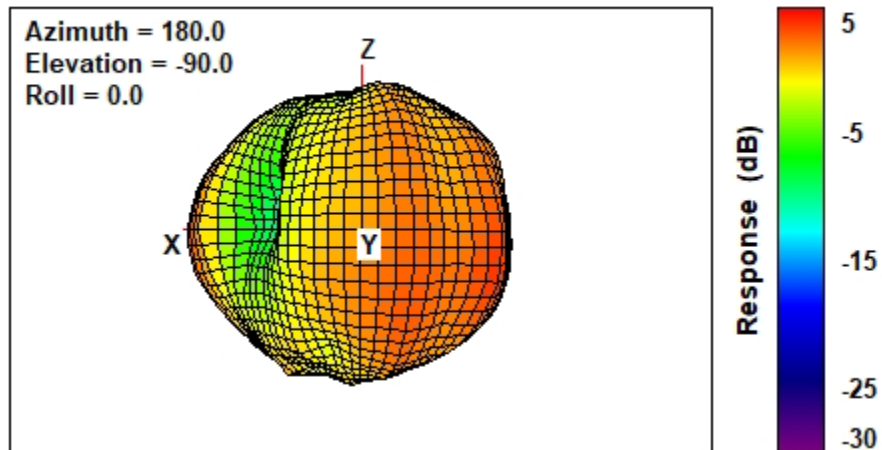


Frequency 2472 MHz

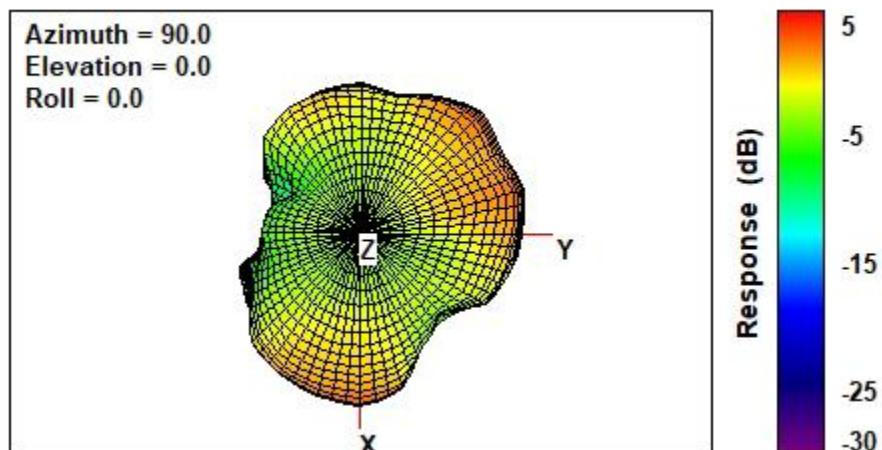
Total - 2480 MHz



Total - 2480 MHz

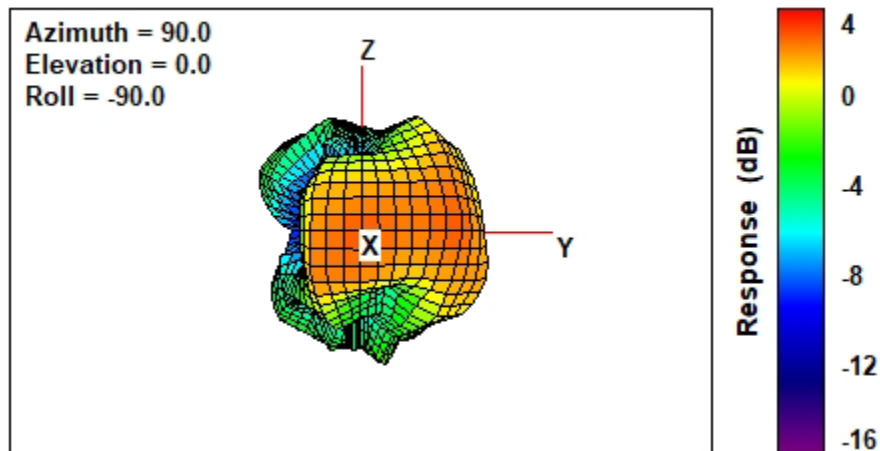


Total - 2480 MHz

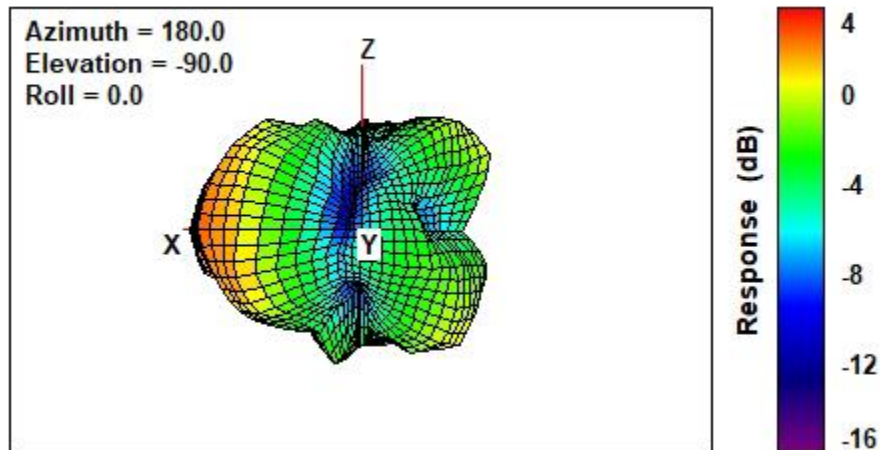


Frequency 2480 MHz

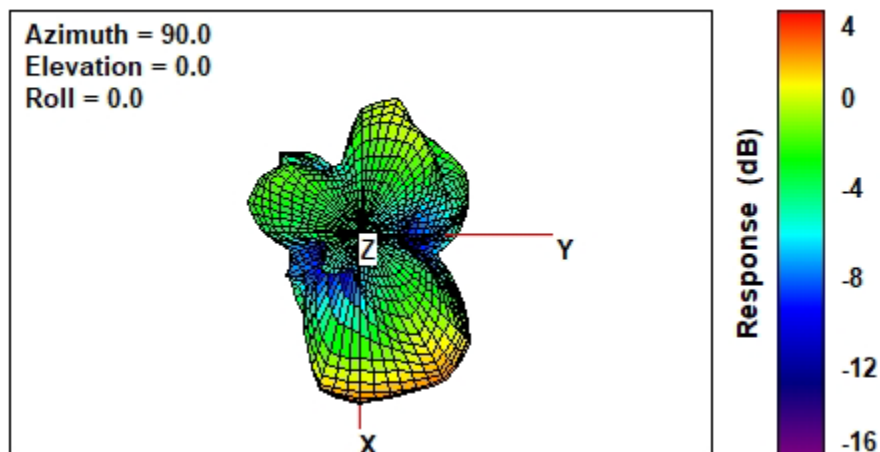
Total - 5180 MHz



Total - 5180 MHz

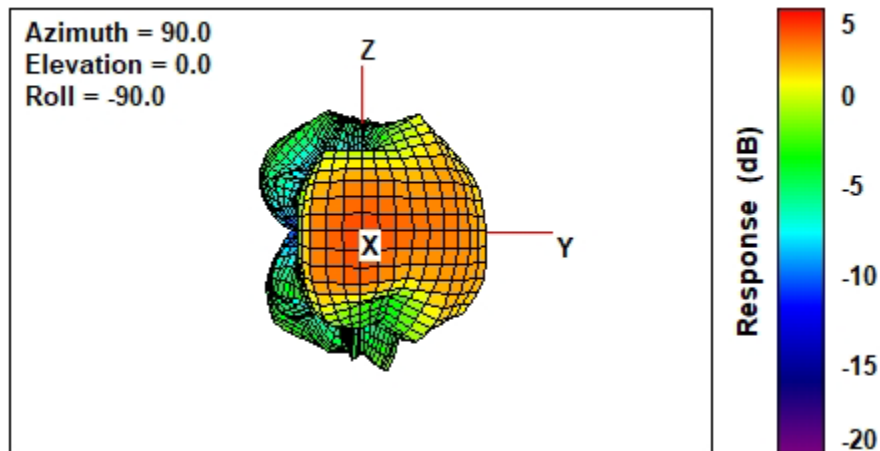


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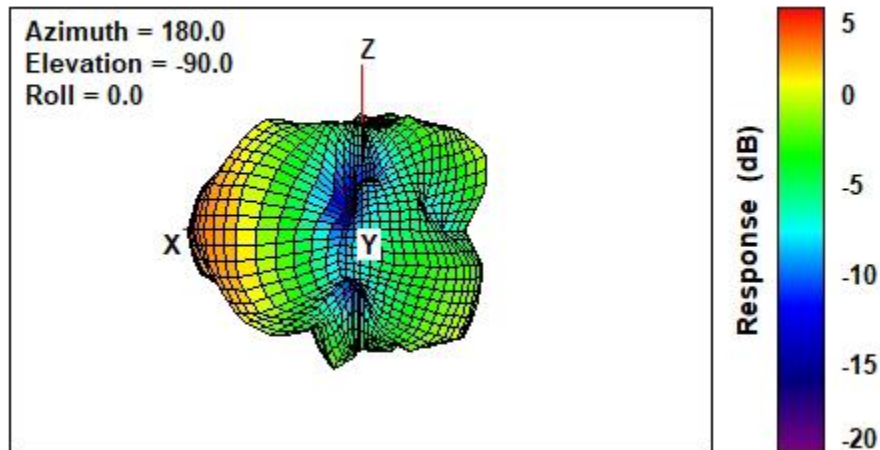


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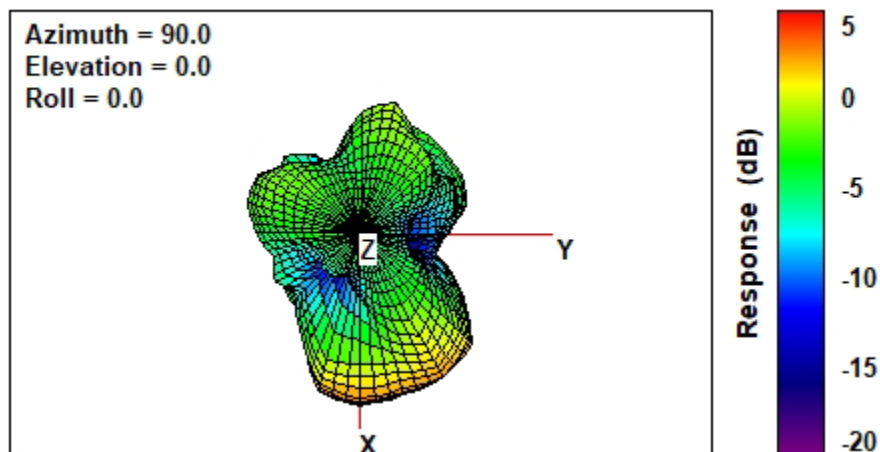
Total - 5220 MHz



Total - 5220 MHz

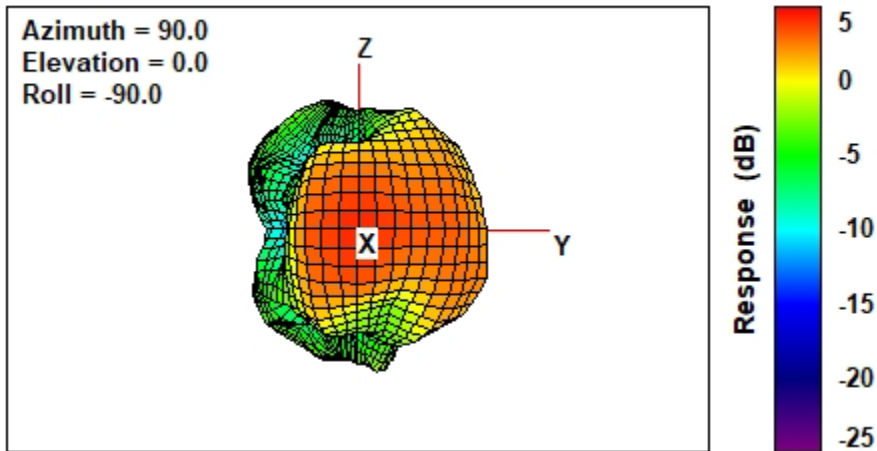


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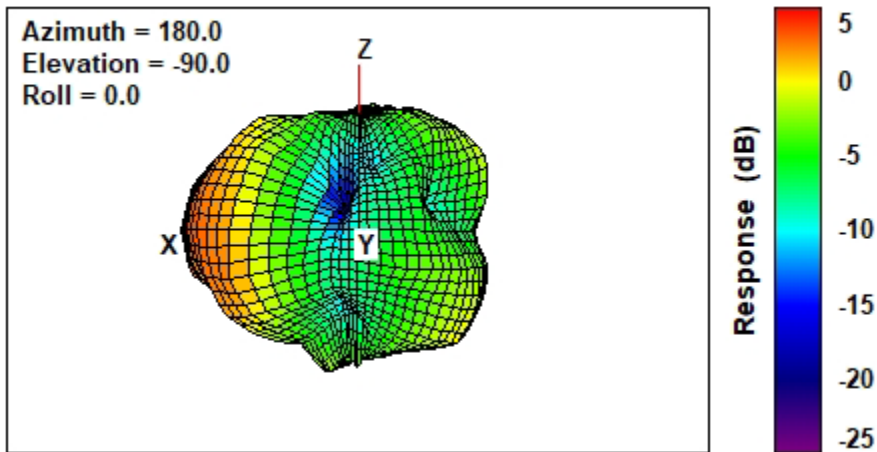


Frequency 5220 MHz

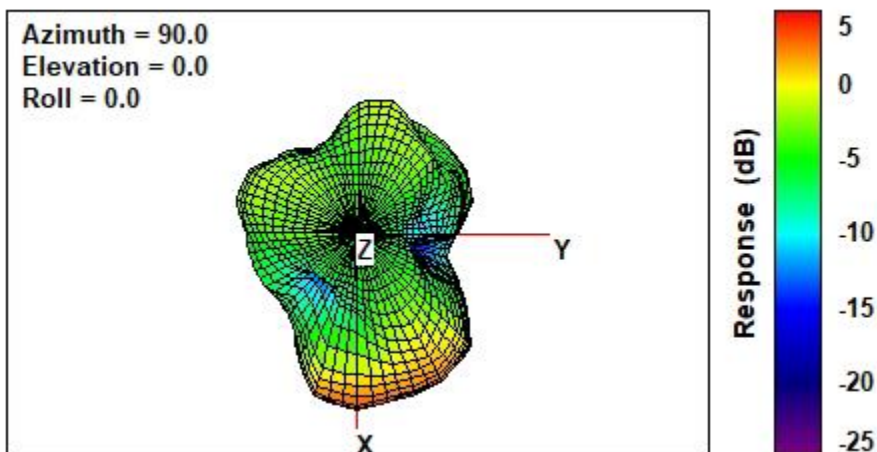
Total - 5240 MHz



Total - 5240 MHz

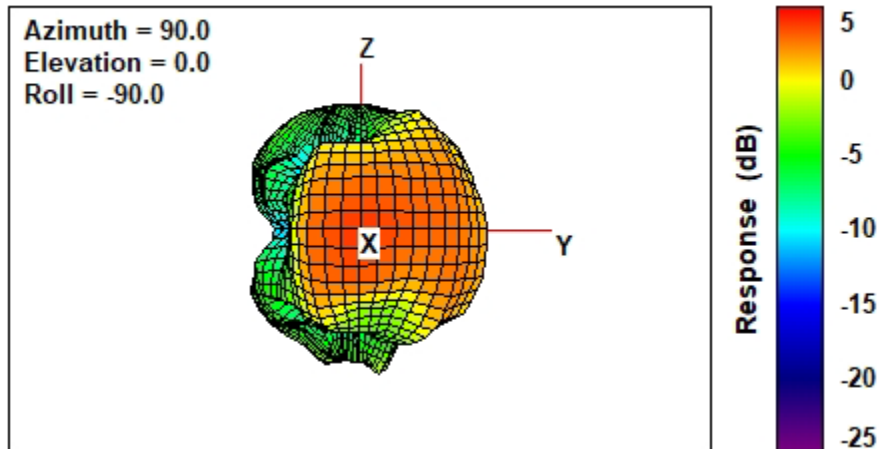


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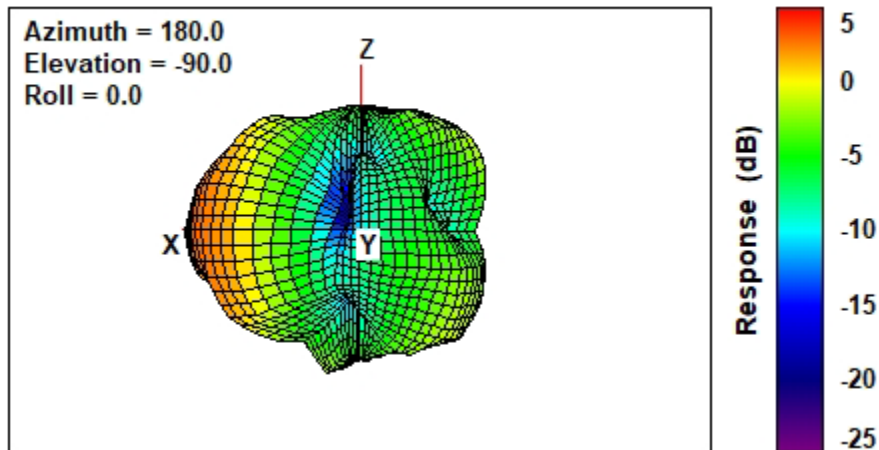


Frequency 5240 MHz

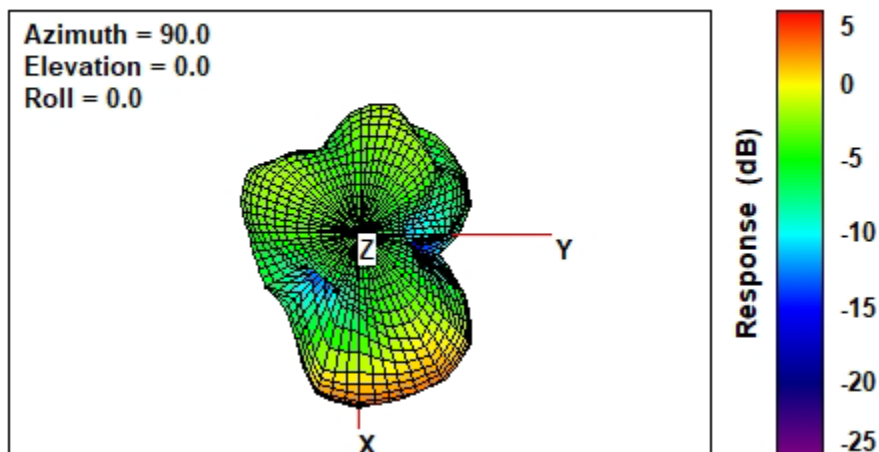
Total - 5260 MHz



Total - 5260 MHz

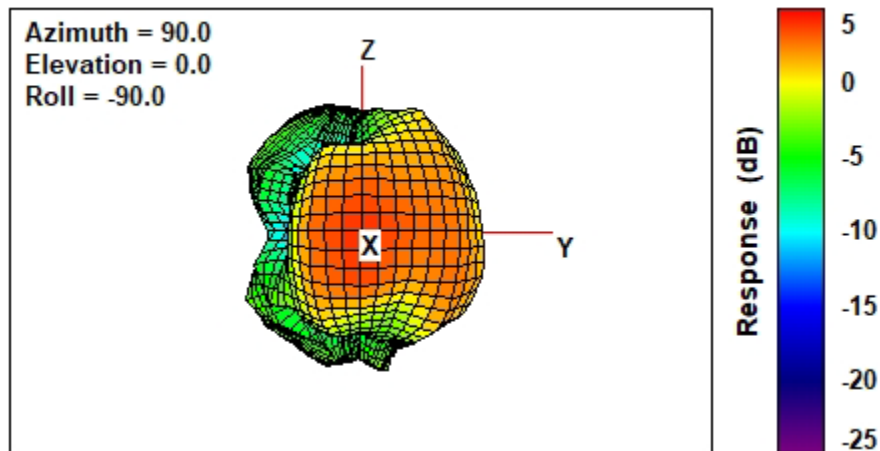


Total - 5260 MHz

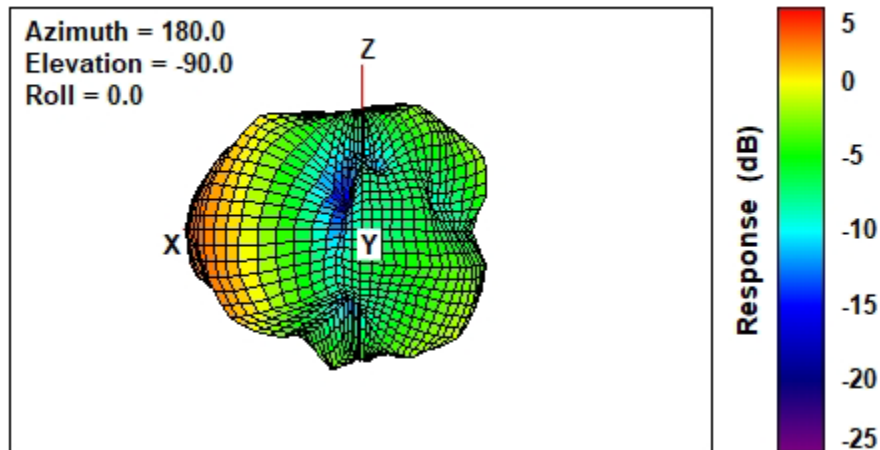


Frequency 5260 MHz

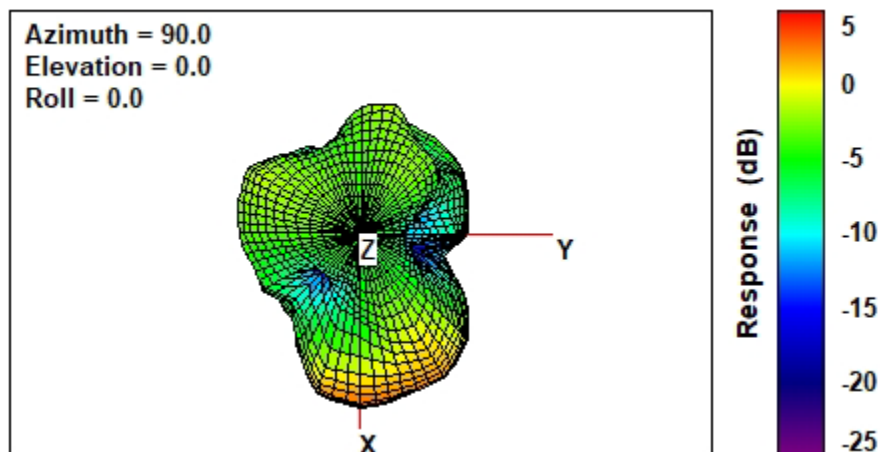
Total - 5300 MHz



Total - 5300 MHz

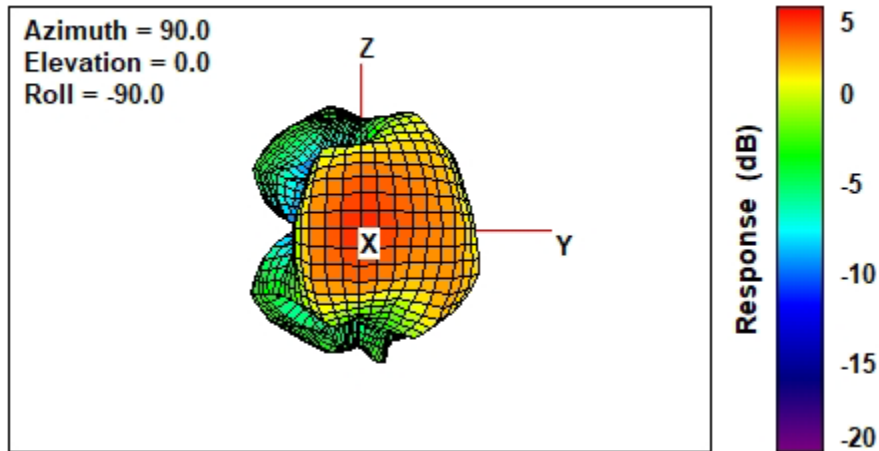


Total - 5300 MHz

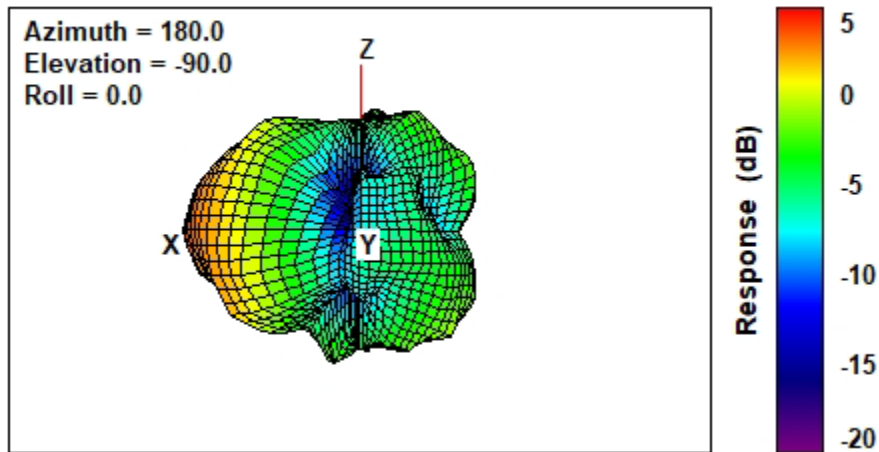


Frequency 5300 MHz

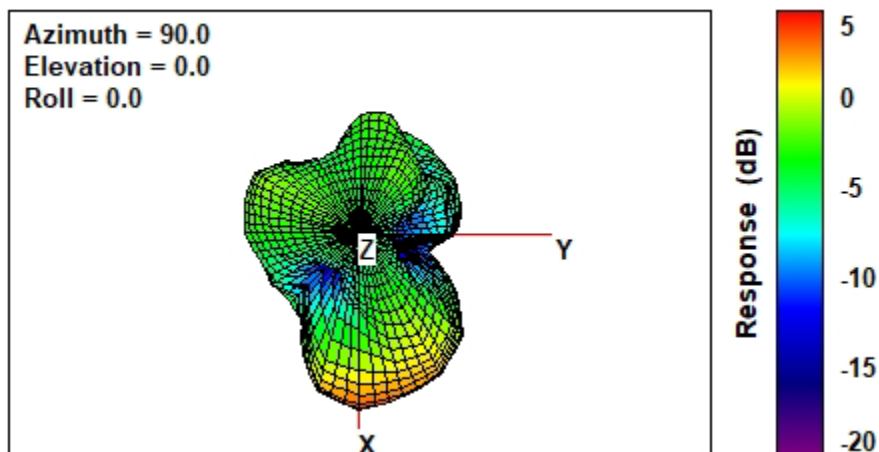
Total - 5320 MHz



Total - 5320 MHz

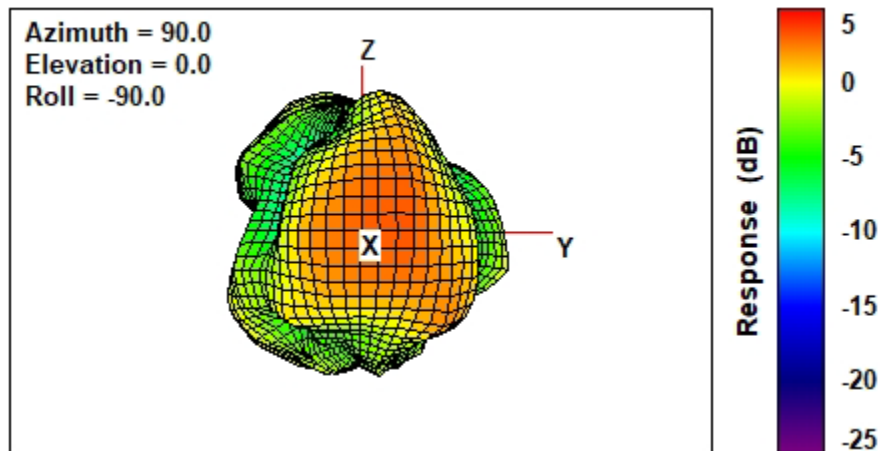


Total - 5320 MHz

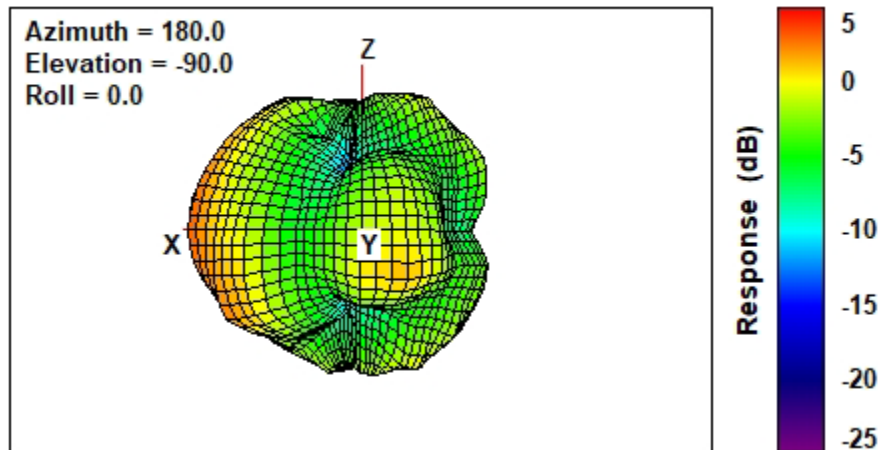


Frequency 5320 MHz

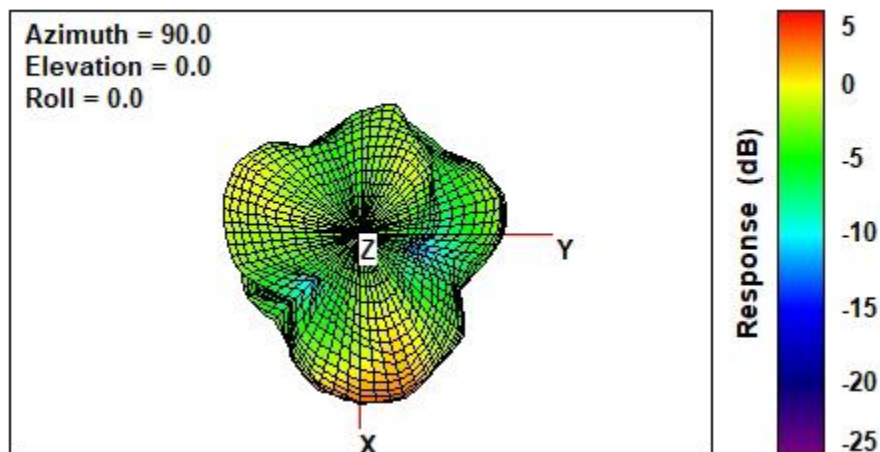
Total - 5500 MHz



Total - 5500 MHz

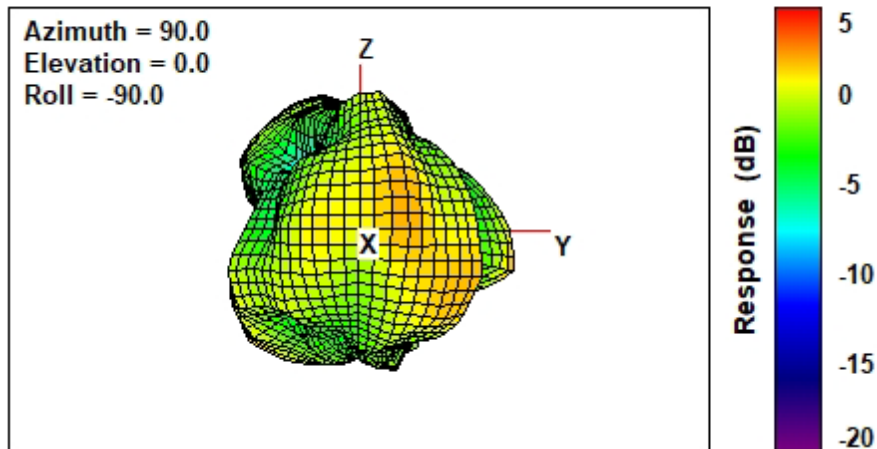


Total - 5500 MHz

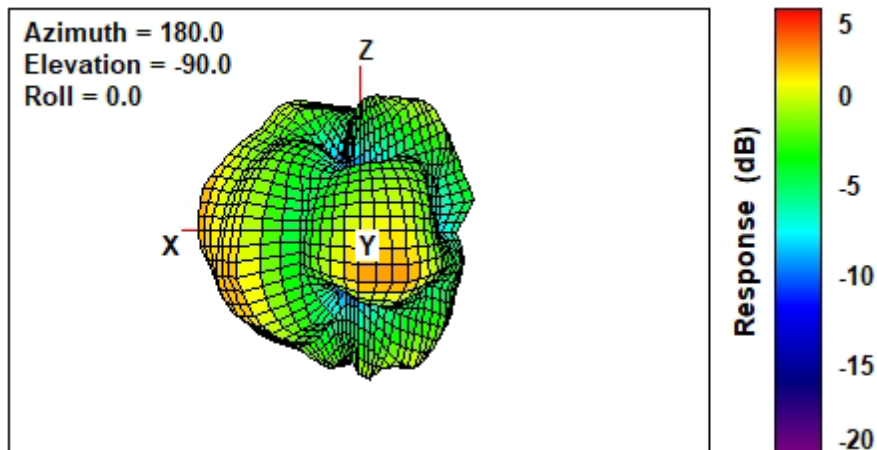


Frequency 5500 MHz

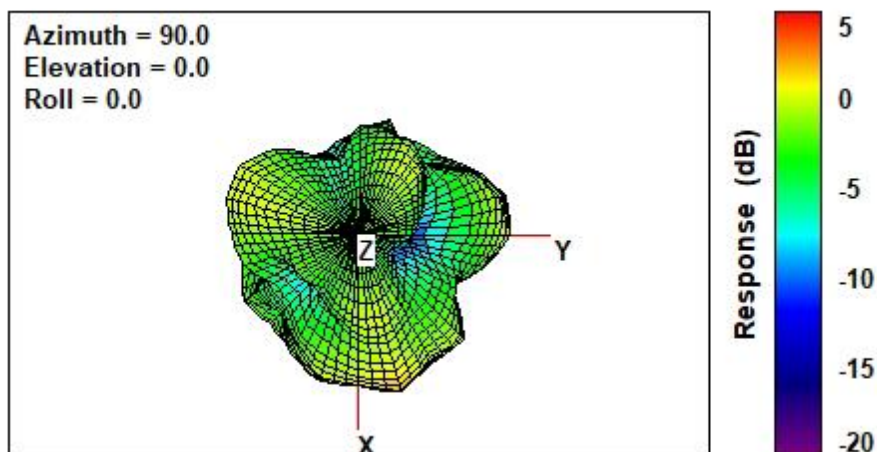
Total - 5600 MHz



Total - 5600 MHz



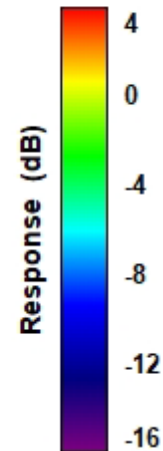
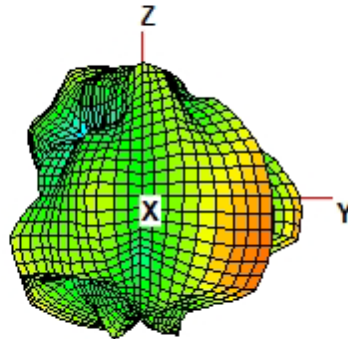
Total - 5600 MHz



Frequency 5600 MHz

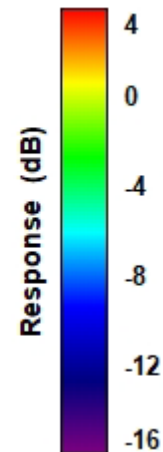
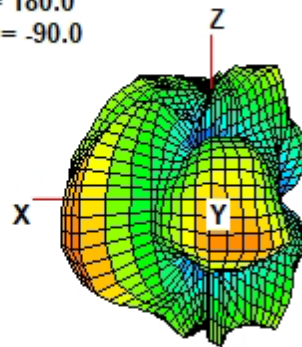
Total - 5700 MHz

Azimuth = 90.0
Elevation = 0.0
Roll = -90.0



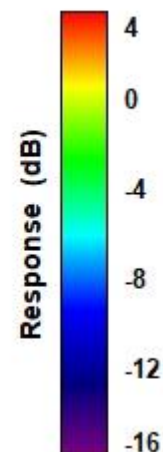
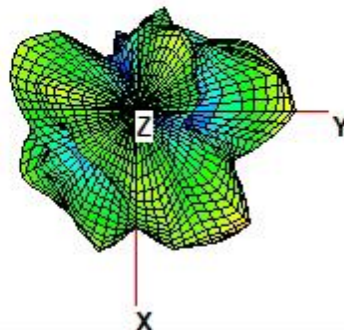
Total - 5700 MHz

Azimuth = 180.0
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Roll = 0.0



Total - 5700 MHz

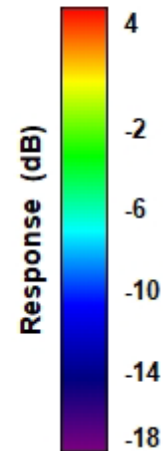
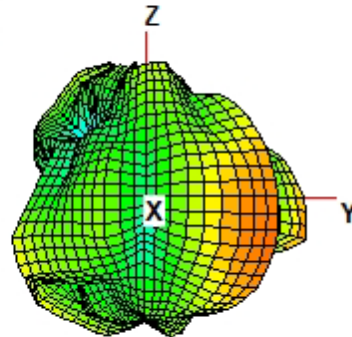
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Elevation = 0.0
Roll = 0.0



Frequency 5700 MHz

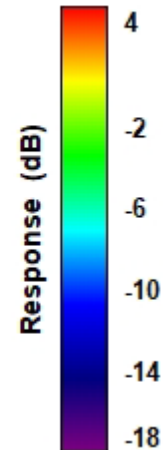
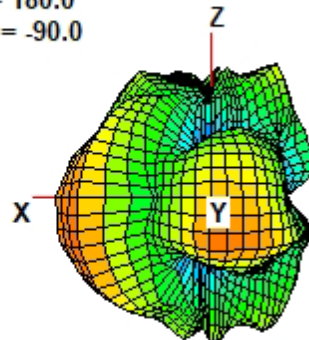
Total - 5745 MHz

Azimuth = 90.0
Elevation = 0.0
Roll = -90.0



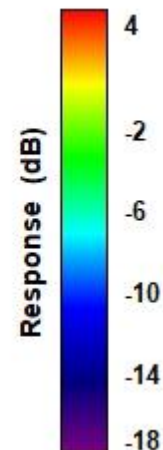
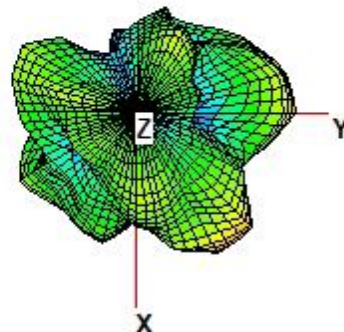
Total - 5745 MHz

Azimuth = 180.0
Elevation = -90.0
Roll = 0.0



Total - 5745 MHz

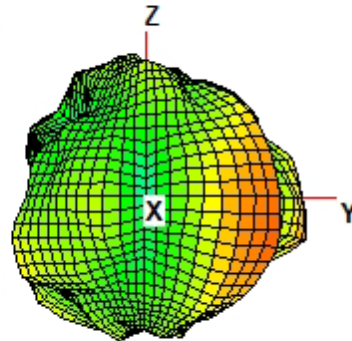
Azimuth = 90.0
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Roll = 0.0



Frequency 5745 MHz

Total - 5805 MHz

Azimuth = 90.0
Elevation = 0.0
Roll = -90.0

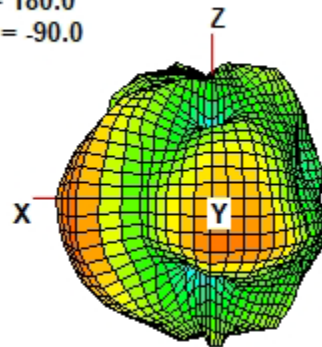


Response (dB)

5
0
-5
-10
-15
-20
-25

Total - 5805 MHz

Azimuth = 180.0
Elevation = -90.0
Roll = 0.0

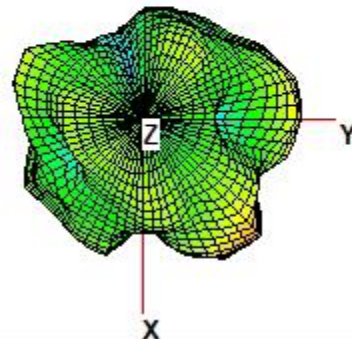


Response (dB)

5
0
-5
-10
-15
-20
-25

Total - 5805 MHz

Azimuth = 90.0
Elevation = 0.0
Roll = 0.0

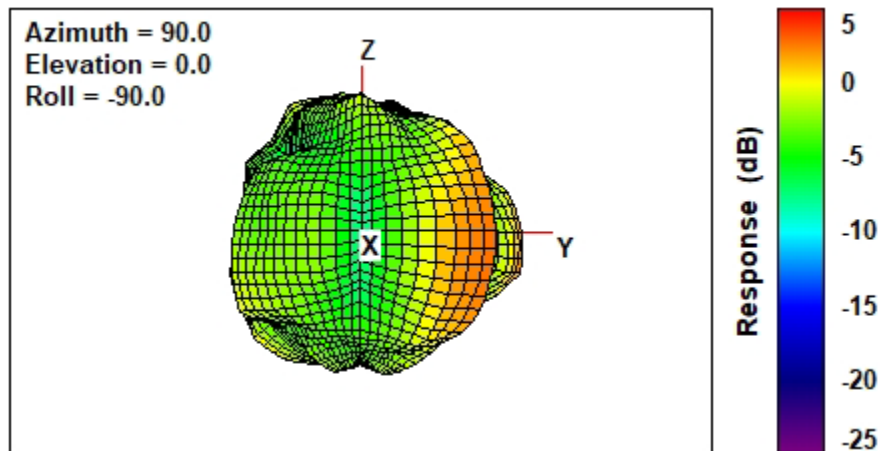


Response (dB)

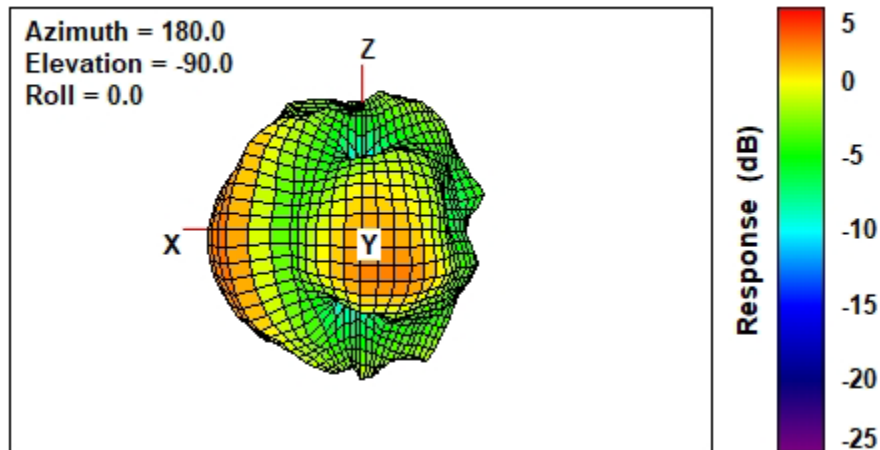
5
0
-5
-10
-15
-20
-25

Frequency 5805 MHz

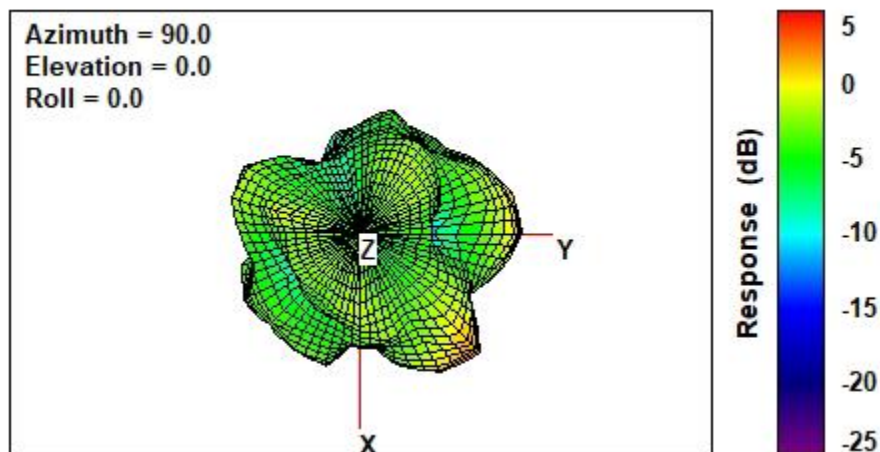
Total - 5825 MHz



Total - 5825 MHz



Total - 5825 MHz



Frequency 5825 MHz