

Antenna Gain Test Report

Project No.: 4791102838

Project Name: Wireless Device

Antenna material: PCB antenna

Antenna type: Monopole

Antenna Size: 12.738mm*8.988mm

Test Date: 2023.12.6

Project Engineer: Kebo Zhang
Kebo Zhang

Test Engineer: Burt Hu
Burt Hu

Test Standards: ANSI/IEEE std 149-2021

Issued Date: 2023.12.7

Test Lab: UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch

Lab Address: Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	2023.12.7	Initial Issue	\
V1	2024.07.03	Removed Antenna Vendor's name and address	Burt Hu

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Table of Contents

1	Test Equipment Information	4
2	Setup block diagram	5
3	Test Temperature and Humidity	6
4	CALIBRATION AND UNCERTAINTY	7
4.1	MEASURING INSTRUMENT CALIBRATION.....	7
4.2	MEASUREMENT UNCERTAINTY	7
5	Test Step Flow	8
6	Test Result	9
7	Test Result	16

1 Test Equipment Information

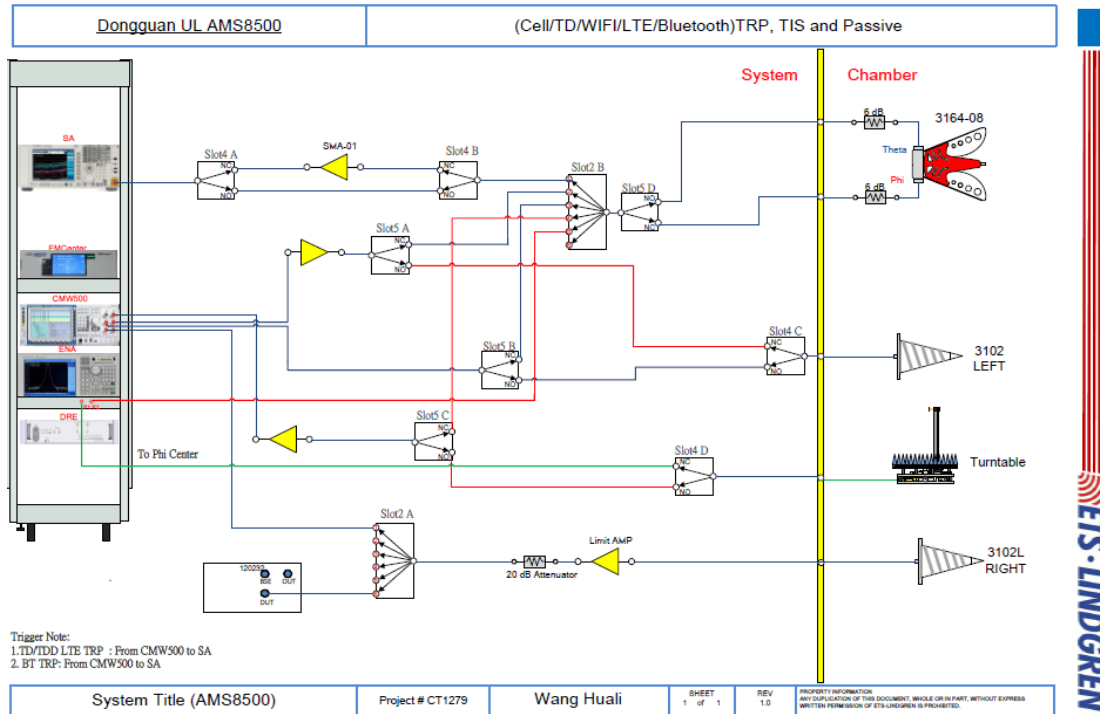
Equipment	Manufacturer	Mode No.	Serial No.	Cal date	Cal Due
Test Chamber	ETS-Lindgren	8500	/	/	/
Test Software	ETS-Lindgren	EMQuest V1.12	1496	/	/
Network Analyzer	Keysight	E5071C	MY46524531	2023.10.12	2024.10.11
EXA Singal Analyzer	Keysight	N9010A	MY55150514	2023.10.12	2024.10.11

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2 Setup block diagram



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3 Test Temperature and Humidity

Temperature: 22.3°C

Humidity: 60.1%

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4 CALIBRATION AND UNCERTAINTY

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognize national standards.

4.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty	
	2400-2500 MHz	5150-5825 MHz
Gain	0.82 dB	0.82 dB
Efficiency	0.82 dB	0.82 dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2$.

5 Test Step Flow

- 1) Maintain the test ambient temperature of 23 ± 2 C, the instrument is powered on and preheated for more than 30 minutes;
- 2) Turn on the darkroom power supply, connect the test cable, and set up the sample according to the standard;
- 3) Outline sets the test content objectives and conducts calibration tests;
- 4) Run the software, when the test is completed, export the corresponding test diagram and test data, and save to the corresponding directory.

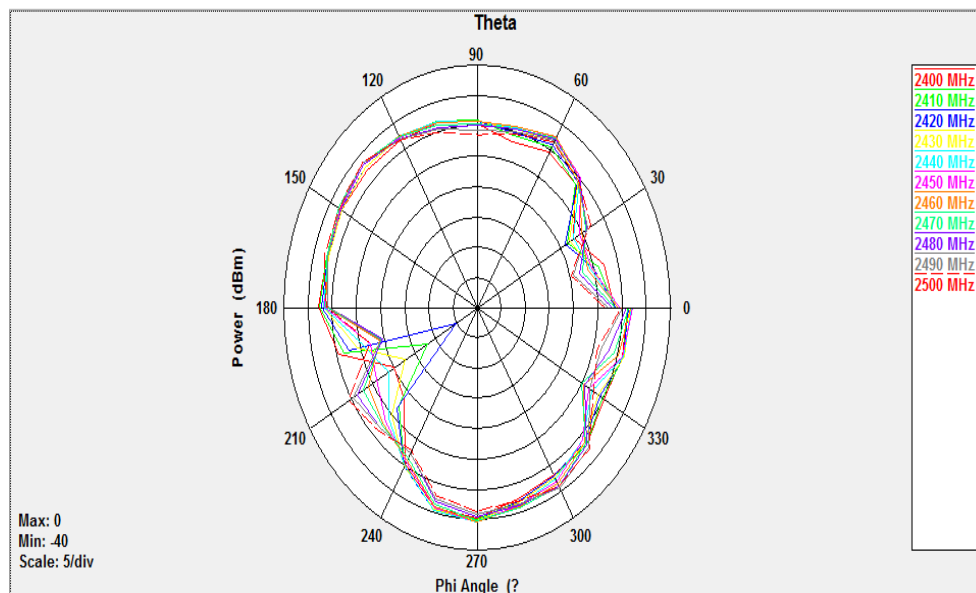
6 Test Result

2.4G

Frequency (MHz)	Efficiency (%)	Gain (dBi)
2400	53.24	3.30
2410	53.03	3.19
2420	53.79	3.29
2430	55.91	3.52
2440	57.26	3.60
2450	59.13	3.77
2460	59.73	3.78
2470	60.23	3.80
2480	61.36	3.99
2490	61.82	3.98
2500	63.96	4.13

Polarization Pattern Photos

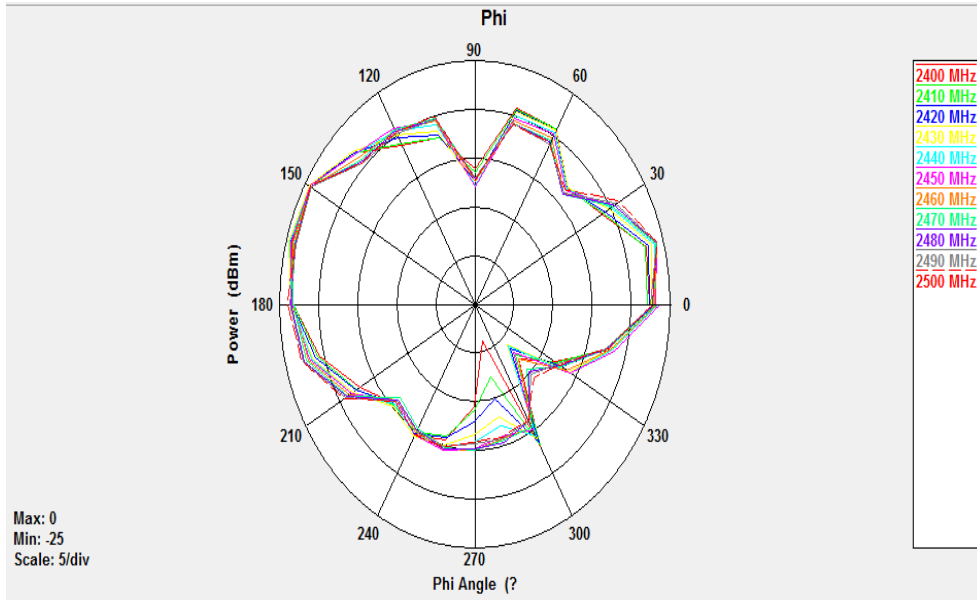
Theta Polarization(Theta Angle=90°)



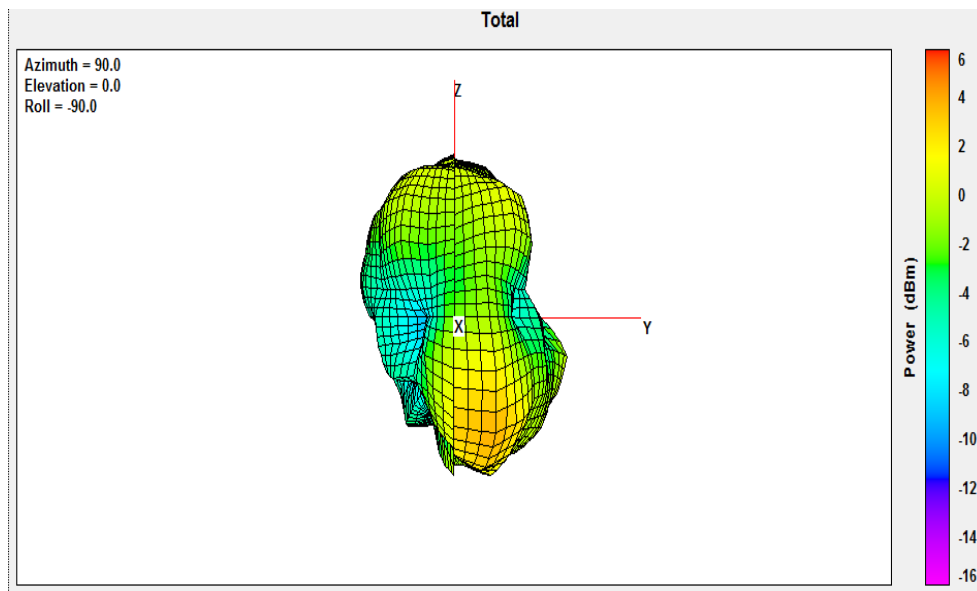
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Phi Polarization(Theta Angle=90°)

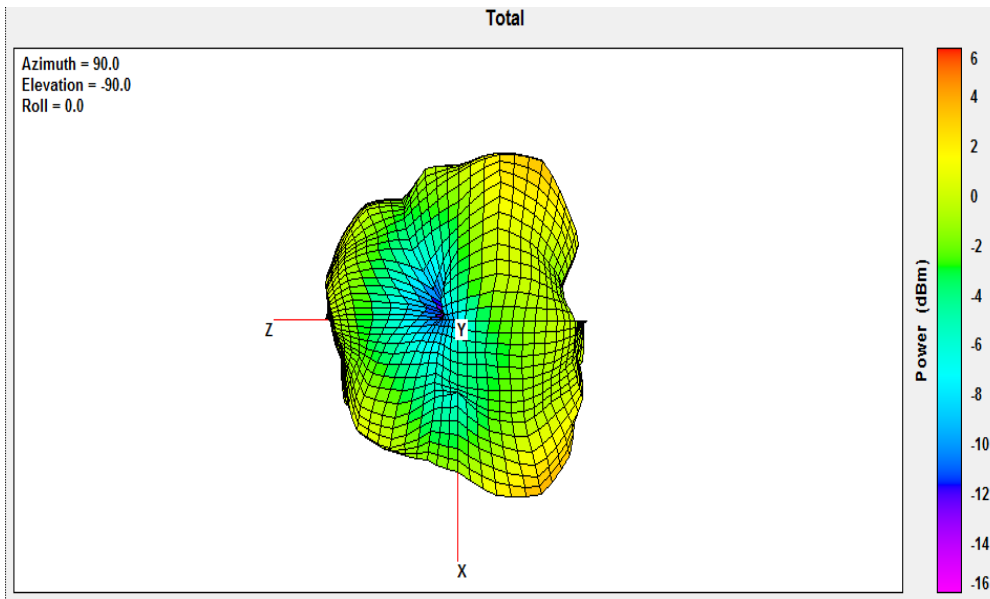
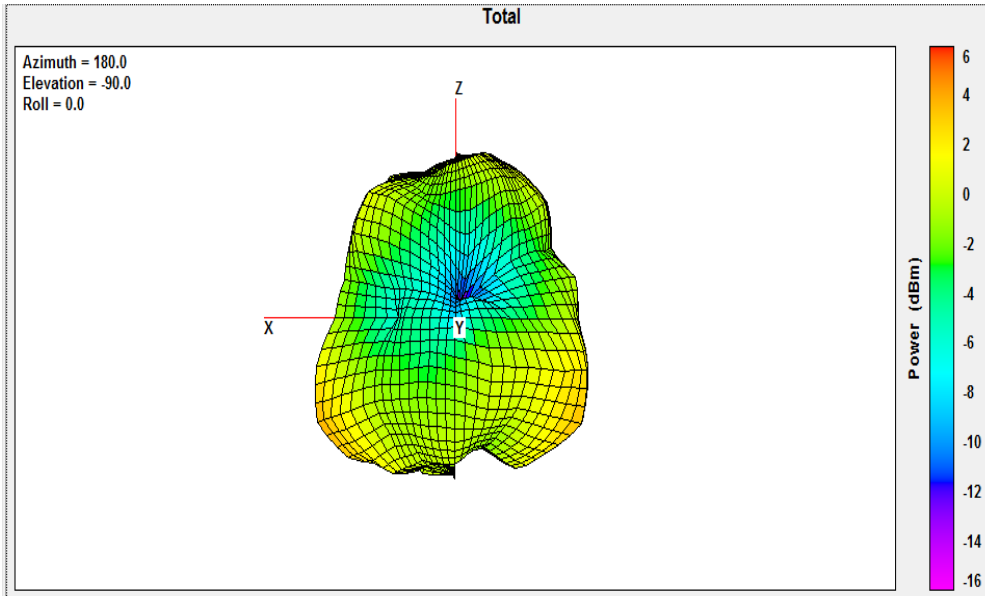


Total 3D Plot(Fre.2500MHz)



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5G

Frequency (MHz)	Efficiency (%)	Gain (dBi)	Frequency (MHz)	Efficiency (%)	Gain (dBi)
5150	48.15	3.80	5510	57.97	4.42
5160	47.68	3.79	5520	57.58	4.40
5170	47.17	3.85	5530	58.95	4.51
5180	48.24	4.03	5540	58.83	4.46
5190	48.34	4.07	5550	58.46	4.38
5200	49.75	4.31	5560	57.77	4.32
5210	50.16	4.38	5570	57.08	4.22
5220	49.63	4.33	5580	57.59	4.22
5230	49.98	4.33	5590	58.39	4.25
5240	49.82	4.35	5600	59.63	4.36
5250	50.39	4.33	5610	59.74	4.28
5260	51.45	4.52	5620	59.34	4.18
5270	52.14	4.53	5630	59.19	4.14
5280	53.15	4.77	5640	57.98	4.10
5290	53.02	4.73	5650	58.41	4.15
5300	52.97	4.64	5660	58.83	4.14
5310	52.49	4.65	5670	59.28	4.20
5320	52.70	4.61	5680	60.47	4.29
5330	54.00	4.69	5690	59.96	4.12
5340	55.33	4.61	5700	60.30	4.11
5350	56.34	4.56	5710	60.12	3.95
5360	55.65	4.54	5720	60.02	3.85
5370	56.11	4.49	5730	60.68	3.95
5380	57.28	4.54	5740	60.25	3.95
5390	56.94	4.36	5750	61.13	4.14
5400	57.65	4.31	5760	60.51	4.11
5410	56.78	4.06	5770	60.43	4.20
5420	55.98	3.87	5780	61.07	4.21
5430	57.27	4.02	5790	60.68	4.14

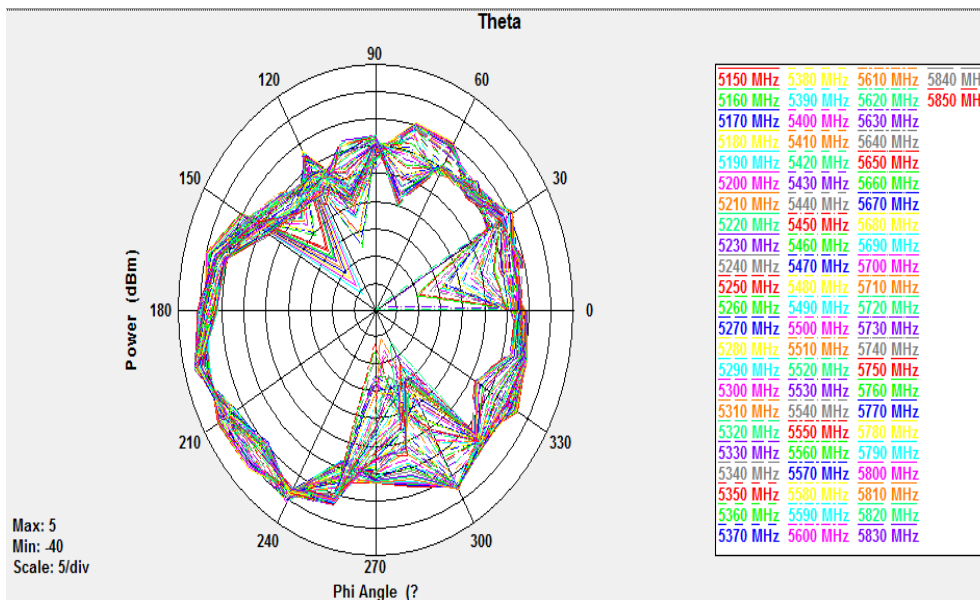
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5440	57.18	3.99	5800	60.80	4.26
5450	58.61	4.17	5810	61.09	4.06
5460	59.62	4.28	5820	61.03	4.18
5470	59.46	4.35	5830	60.51	4.10
5480	59.77	4.42	5840	59.86	4.03
5490	58.72	4.35	5850	60.14	4.11
5500	57.55	4.38			

Polarization Pattern Photos

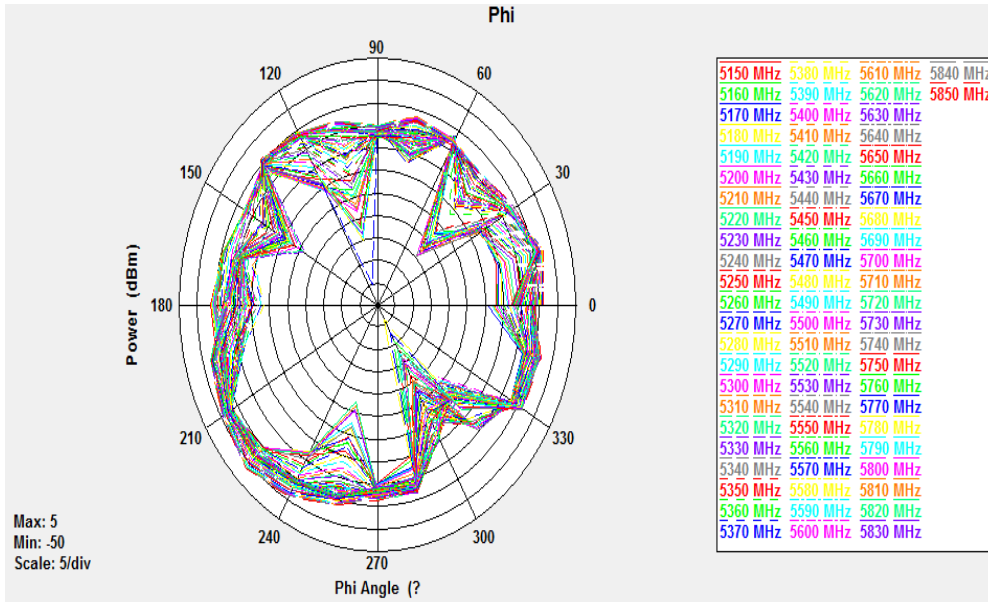
Theta Polarization(Theta Angle=90°)



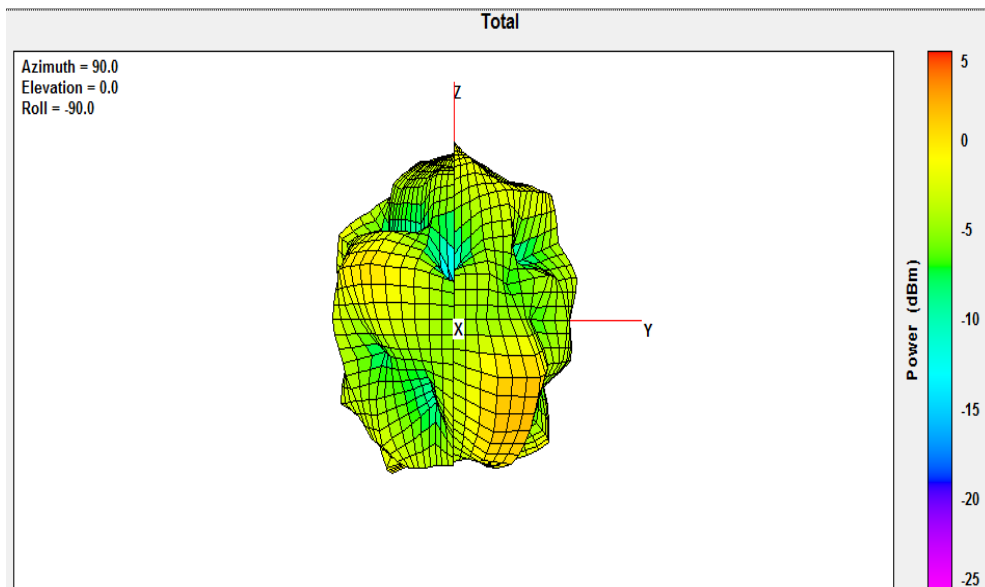
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Phi Polarization(Theta Angle=90°)

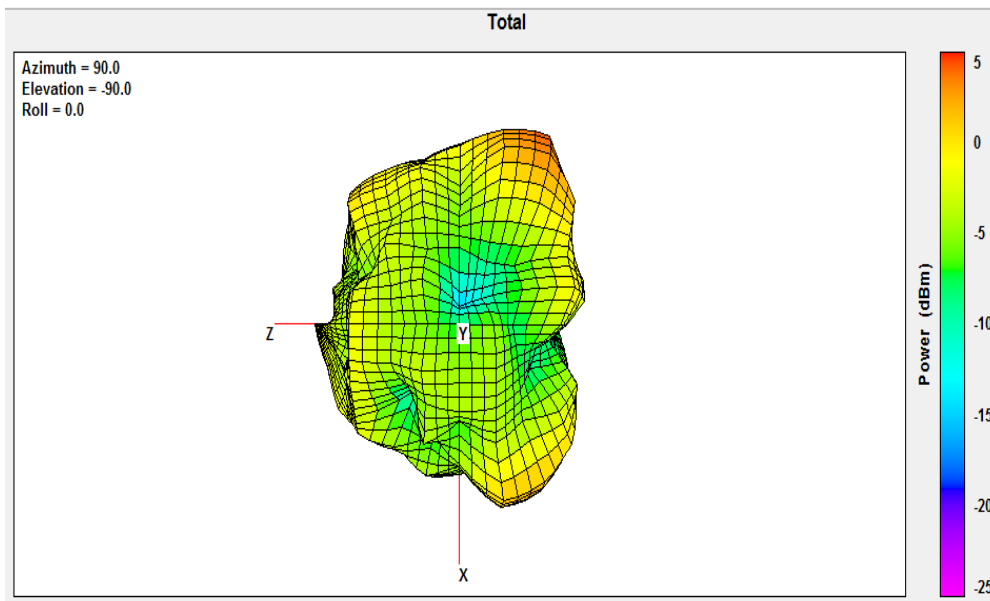
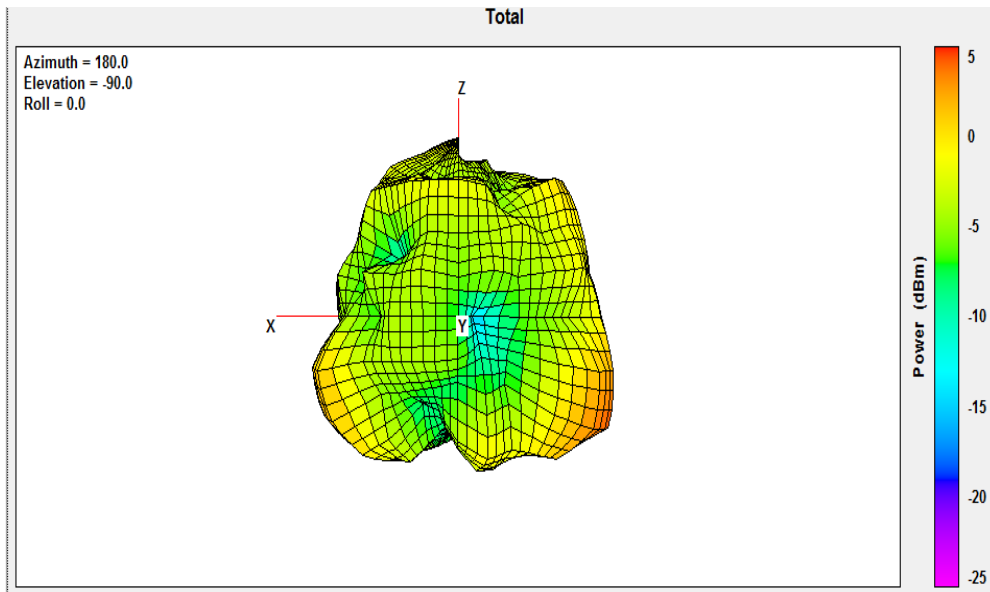


Total 3D Plot(Fre.5280MHz)



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7 Test Result

Referred to 4791102838_OTA setup photo.

END OF REPORT

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