

ANTENNA INFORMATION

OEM	Lenovo
ODM	LCFC
Platform model name	ThinkBook Plus G5 Station
Intel platform (ex: Yes, No or NA)	Yes
Platform type (ex: regular NB, convertible PC, AIO...etc)	regular NB
SAR minimum separation (mm)	3.33

Antenna manufacturer	Company name	HongBo
	Address	NO.8,Liuzhou Road, Yushan Industrial Park,High&New Technology Development Area,Changshu City,Jiangsu Province
Test location	Company name	HB
	Address	NO.8,Liuzhou Road, Yushan Industrial Park,High&New Technology Development Area,Changshu City,Jiangsu Province
Test Personnel	Name(Full name)	Jay.Sheng
	E-mail	shengguangjie@hb-cv.com
	Tel/Mobile	15995693789
Testing date		2024/02/23

Antenna Part number	Main	DC330023E00
	Aux	DC330023E10
Antenna type (ex: PIFA, Dipole...etc)		PIFA

Antenna Peak gain w/ cable loss (dBi)*										
	2.4GHz 2400-2483.5 MHz	5.2GHz 5150-5250MHz	5.3GHz 5250-5350MHz	5.6GHz 5470-5725MHz	5.8GHz 5725-5850MHz	5.9GHz 5850-5895MHz	6.2GHz 5925-6425MHz	6.5GHz 6425-6525MHz	6.7GHz 6525-6875MHz	7.0 GHz 6875-7125MHz
Main	0.36	1.48	2.66	3.61	3.61	2.60	3.27	3.41	3.41	2.18
Aux	0.96	0.89	1.68	1.70	1.88	0.43	2.54	2.04	2.13	1.27

Cable Assembly Part Number and Information					
	Cable PN	Cable length(mm)	Cable diameter(mm)	Impedance(ohm)	Connector type
Main	SY113L/50-048	197	1.13	50	I-pex
Aux	SY113L/50-050	418	1.13	50	I-pex

* 3D Antenna Peak Gain required being test in system basis.

Intel Reference Gain and Type

Antenna Peak gain w/ cable loss (dBi)											
Band/Frequency		2.4GHz 2400-2483.5 MHz	5.2GHz 5150-5250MHz	5.3GHz 5250-5350MHz	5.6GHz 5470-5725MHz	5.8GHz 5725-5850MHz	5.9GHz 5850-5895MHz	6.2GHz 5925-6425MHz	6.5GHz 6425-6525MHz	6.7GHz 6525-6875MHz	7.0 GHz 6875-7125MHz
Design	EU/UK	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
PIFA	For WiFi 6E and earlier	3.24	3.64	3.73	4.77	4.97	4.72	4.83	4.30	5.37	5.59
	From WiFi 7	2.95	5.11	4.55	5.15	5.13	4.45	5.02	5.02	4.96	4.96
Dipole	For WiFi 6E and earlier	2.89	2.92	3.19	4.41	4.22	4.22	4.83	4.30	4.49	5.34
	From WiFi 7	2.95	4.03	4.11	5.15	5.13	4.45	5.02	4.71	4.49	4.96
Monopole	From WiFi 7	2.83	4.57	4.44	4.95	4.95	4.43	4.87	4.91	4.91	4.79

3D Peak Antenna gain should be equal or greater than -2 dBi

If a host integrator plans to use a lower gain antenna of the same type, additional CBP(FCC)/EDT(EU) testing need to be performed while the module is installed in the host.

Revision #	Revision Details	Issued Date
Rev. 00	First Issue	

1. Document Revision History

2. Test & System Description

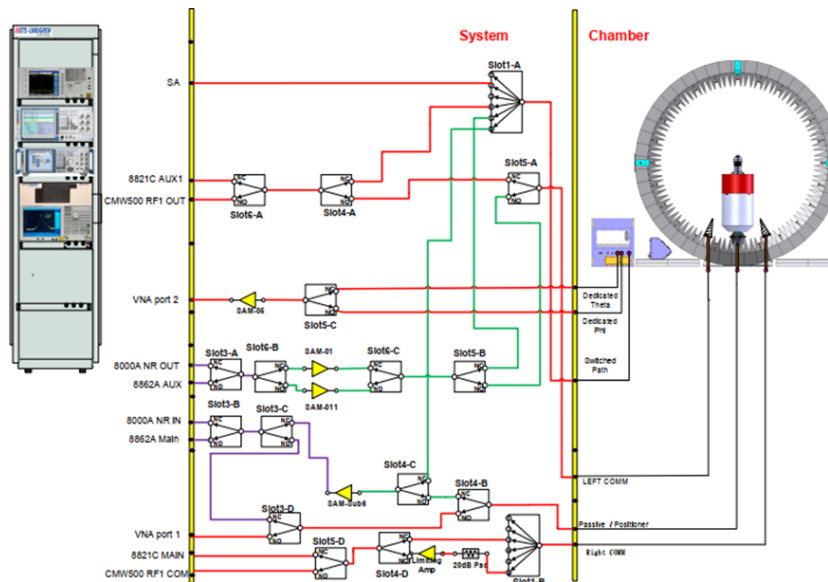
3.1 Measurement Method and System

This test report is prepared for host antenna testing under a Full Anechoic Chamber.

Test steps:

- 1). Place the notebook to be tested on the test tooling, connect the coaxial cable well, and adjust the notebook to make its center coincide with the center of the probe array ring;
- 2). Set the test frequency range and start the test. During the testing process, the multi-probe system software automatically completes the acquisition, storage and calculation of the amplitude and phase data of the antenna;
- 3). All radiation information on the sphere of the antenna, such as directivity, gain and efficiency of the antenna, can be obtained through the supporting software of the multi-probe system.

3.2 Test setup



3.3 Equipment list

ID#	Device	Type/Model	Seril#	Manufacturer	Cal.Date	Cal.Due.Date
1	Anechoic Chamber	ETS	8923	ETS-Lindgren	2023/4/16	2024/4/16
2	Network Analyzer	Agilent	E5071C	Agilent Technologist	2023/5/25	2024/5/25
3	Messurement SW	EMQuest V1.14 build 31654	/	ETS-Lindgren	N/A	N/A
4	Switch Positioning System	EMC Center	/	ETS-Lindgren	N/A	N/A
5	Spectrum Analyzer	Keysight	N9020A	Keysight	2023/5/23	2024/5/25
6	Horn Antenna	3117	157734	ETS-Lindgren	2023/4/16	2024/4/16
7	Cable 2.5m-30MHZ to 18GHZ	0500990992500KE	19.23.395	Radiall	2023/4/16	2024/4/16
8	Cable 1.2m-30MHZ to 18GHZ	UFA147A-0-0480-200200	MFR 64639223720-003	Micro-coax	2023/4/16	2024/4/16
9	Cable 1m-30MHZ to 18GHZ	UFB311A-0-0590-50U50U	E00327	Micro-coax	2023/4/16	2024/4/16

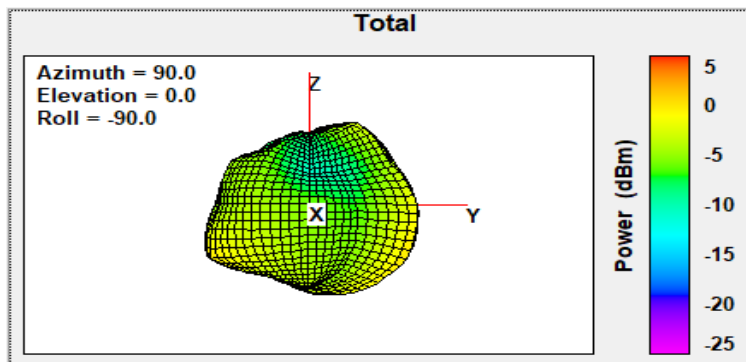
N/A: Not Applicable

3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

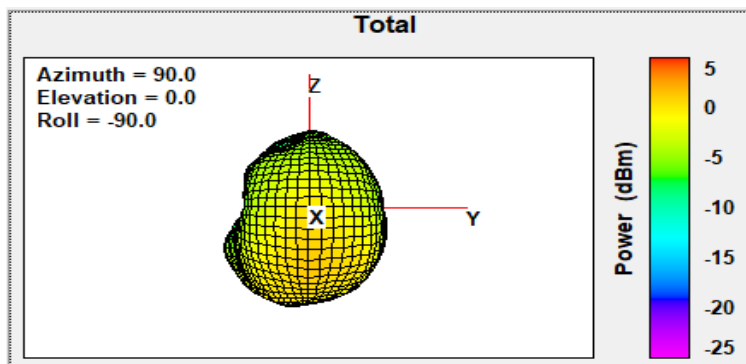
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	0.36



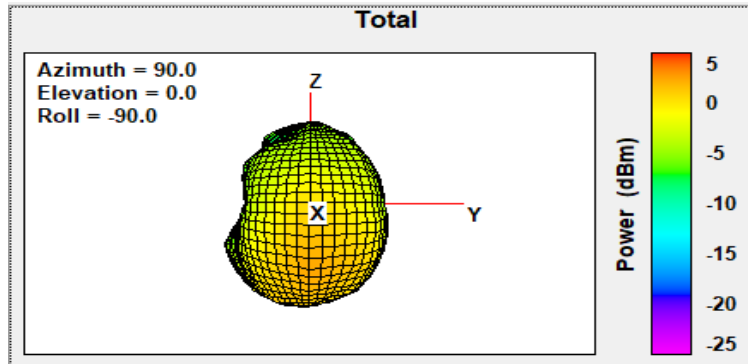
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	1.48



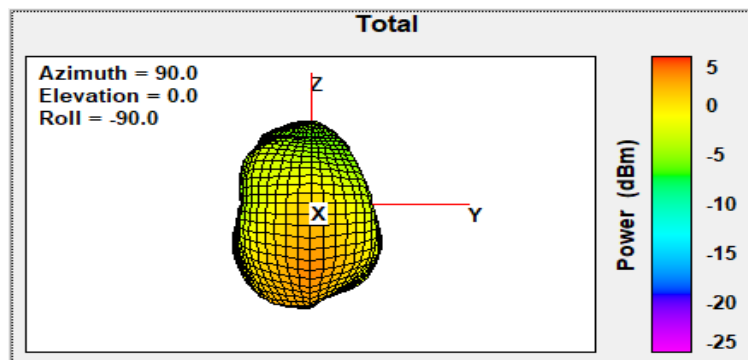
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	2.66



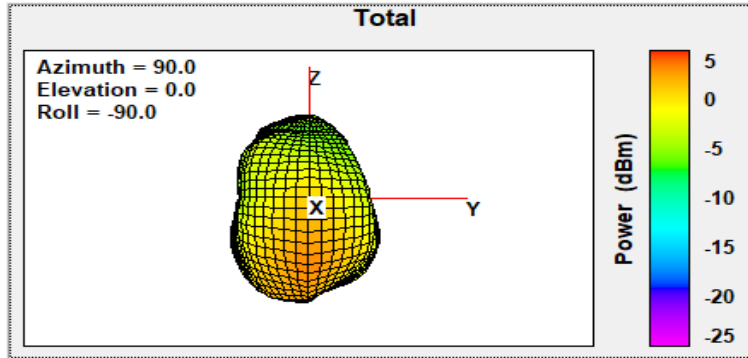
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	3.61



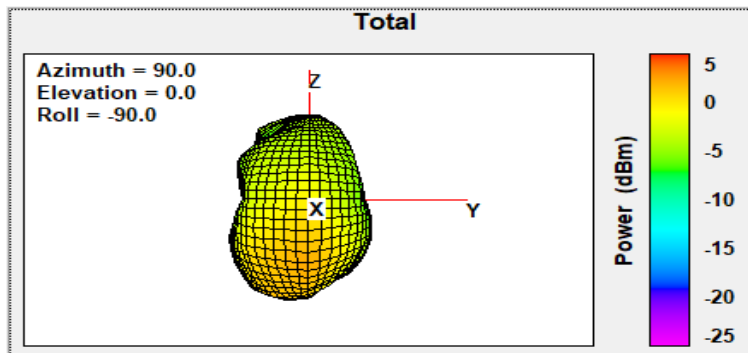
Max Antenna 3D Radiation Pattern 5725-5850 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	3.61



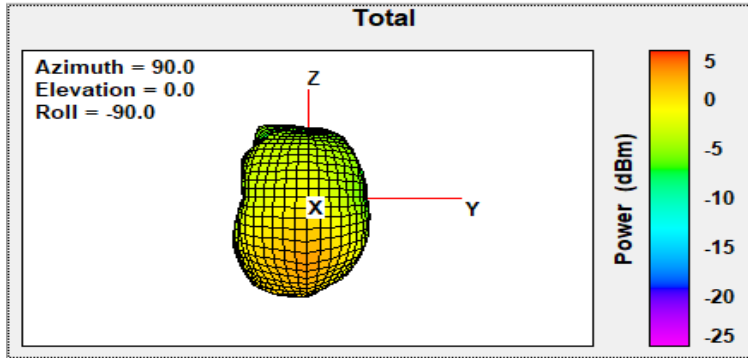
Max Antenna 3D Radiation Pattern 5850-5895 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5850-5895	2.60



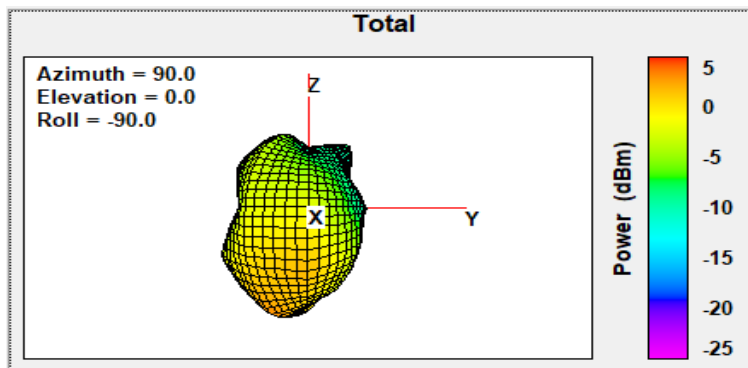
Max Antenna 3D Radiation Pattern 5925-6425 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5925-6425	3.27



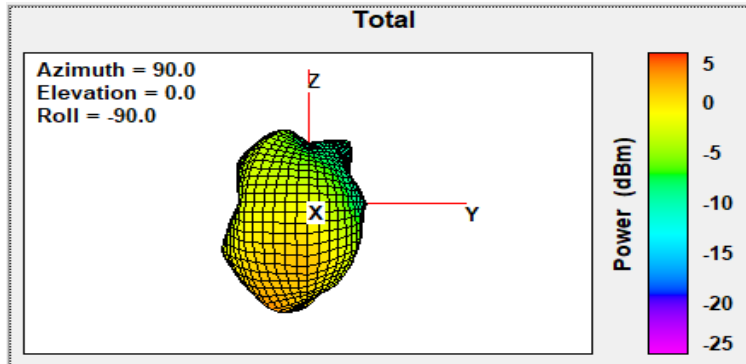
Max Antenna 3D Radiation Pattern 6425-6525 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
6425-6525	3.41



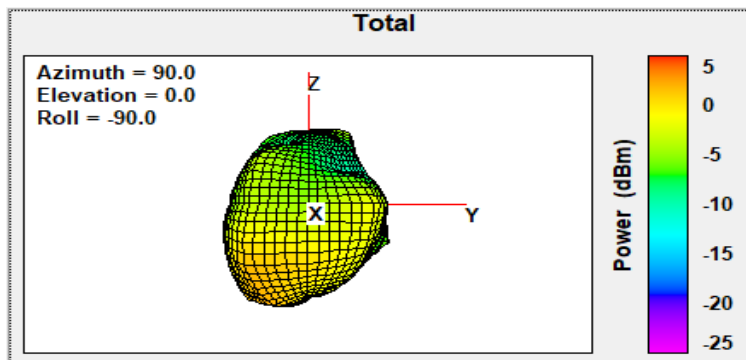
Max Antenna 3D Radiation Pattern 6525-6875 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
6525-6875	3.41



Max Antenna 3D Radiation Pattern 6875-7125 MHz

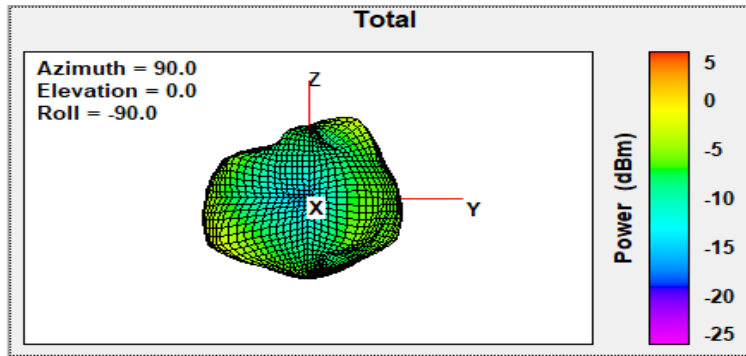
Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
6875-7125	2.18



Auxiliary Antenna

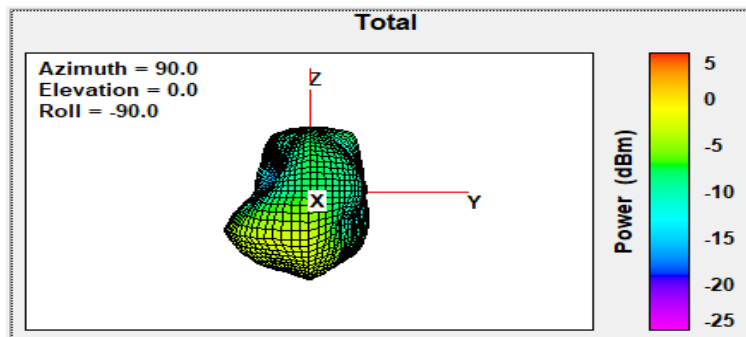
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	0.96



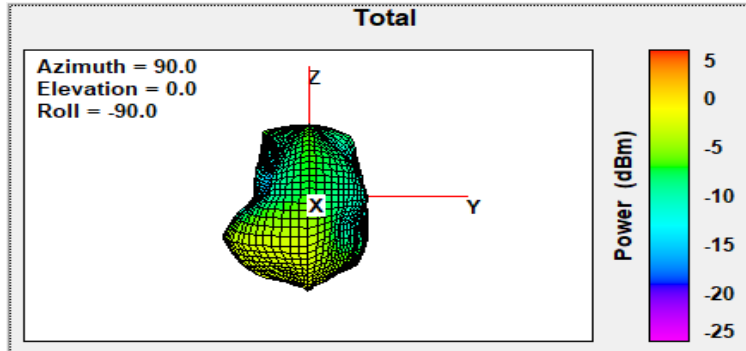
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	0.89



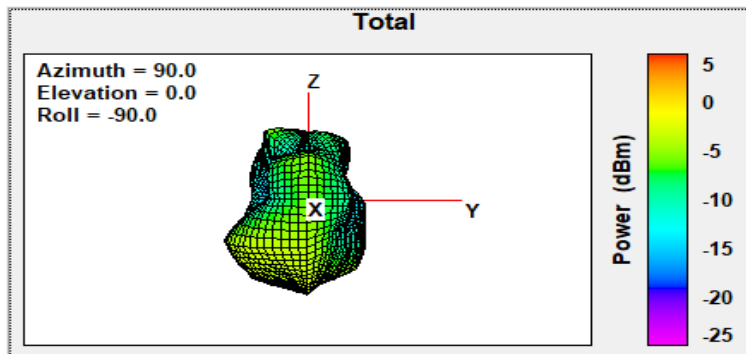
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	1.68



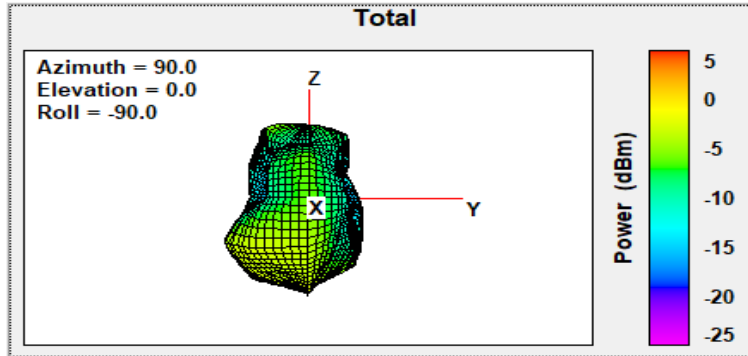
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	1.70



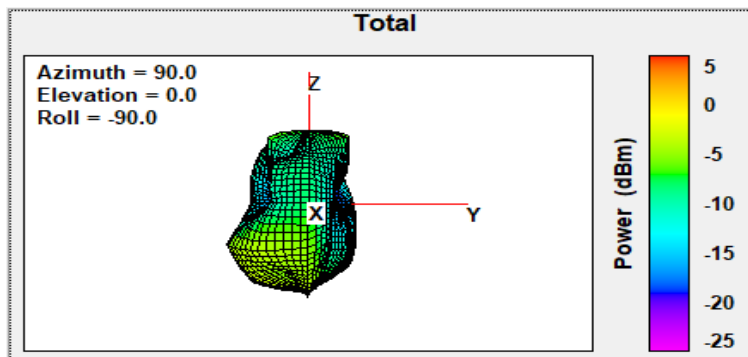
Max Antenna 3D Radiation Pattern 5725-5850 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	1.88



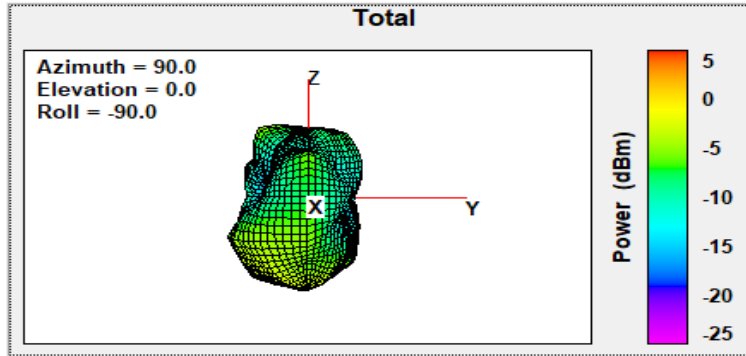
Max Antenna 3D Radiation Pattern 5850-5895 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5850-5895	0.43



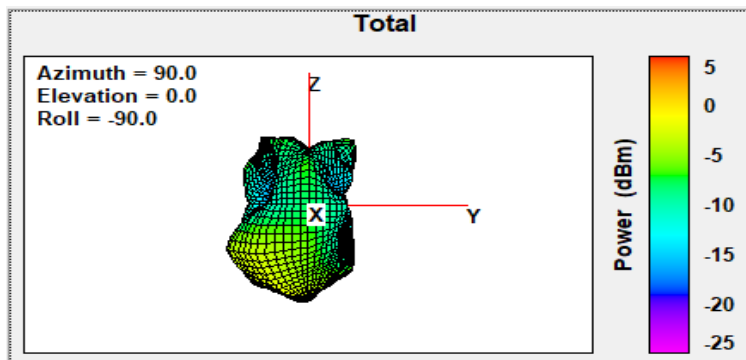
Max Antenna 3D Radiation Pattern 5925-6425 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5925-6425	2.54



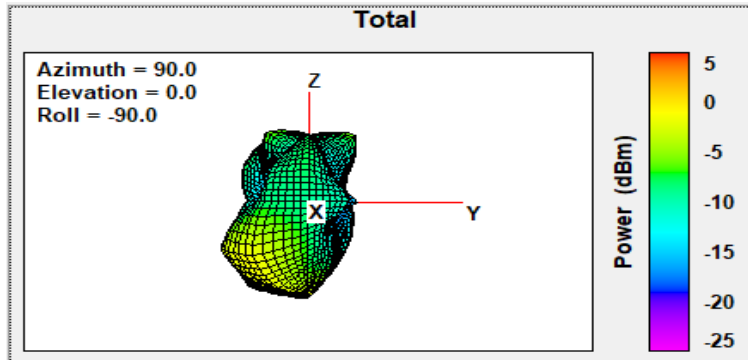
Max Antenna 3D Radiation Pattern 6425-6525 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
6425-6525	2.04



Max Antenna 3D Radiation Pattern 6525-6875 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
6525-6875	2.13



Max Antenna 3D Radiation Pattern 6875-7125 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
6875-7125	1.27

