

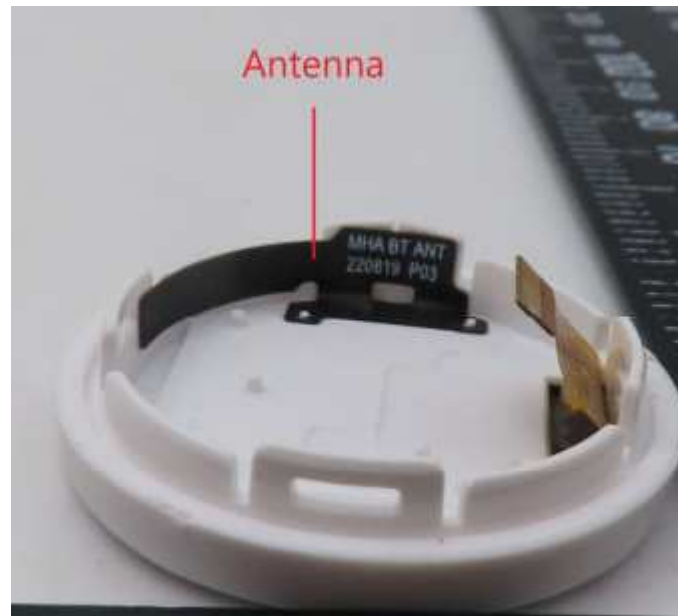
MHA antenna test result

20240223

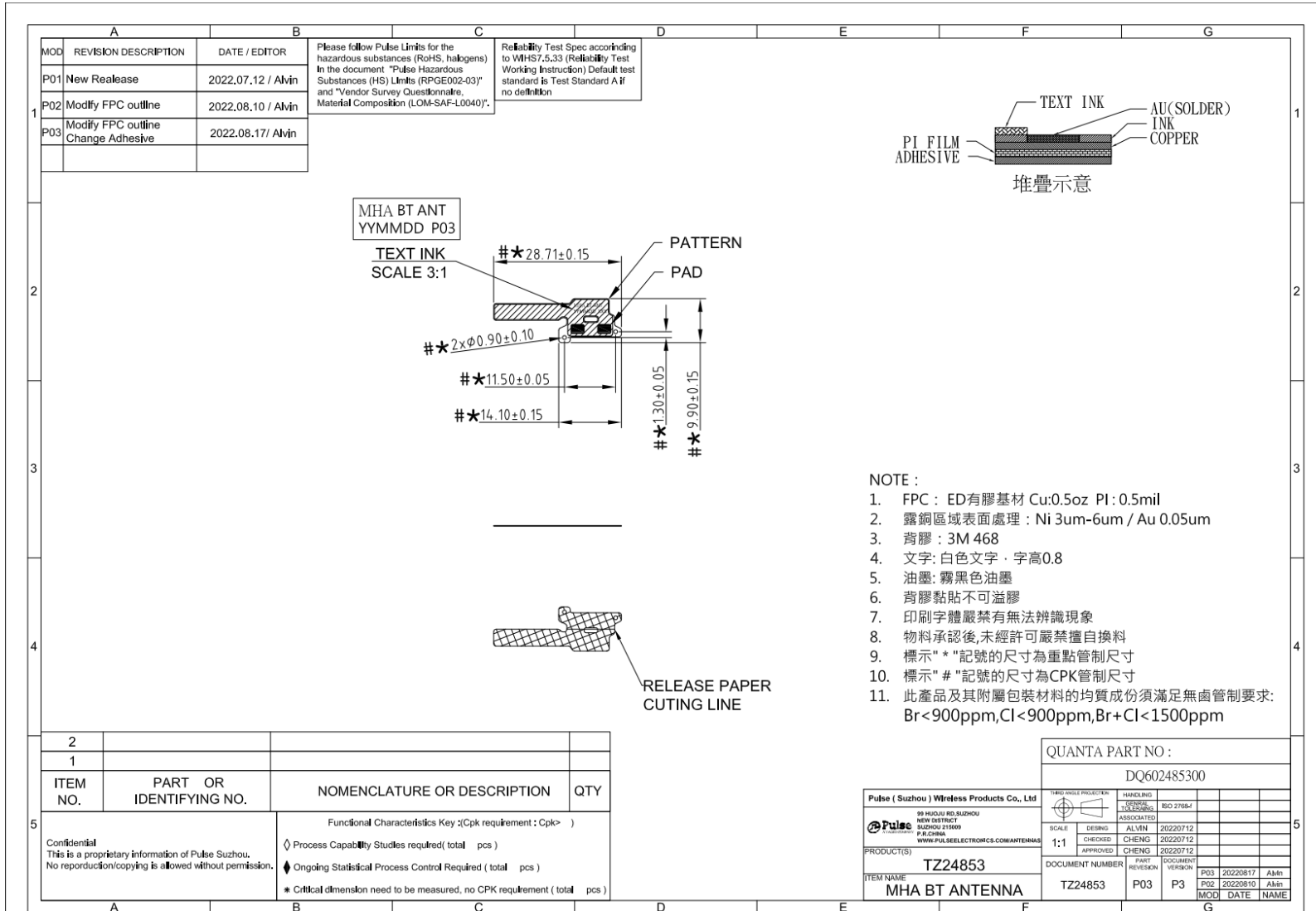


Quanta
Product Design Center

MHA Antenna Placement



MHA Antenna drawing



MHA Antenna Spec.

Antenna	Antenna Peak Gain (dBi)	Antenna Type	Brand Name/Supplier	Model Name
Bluetooth Antenna	-1.66	FPC Antenna	Pulse (Suzhou) Wireless Products Co., Ltd 99 HUOJU RD, SUZHOU, NEW DISTRICT SUZHOU 215009 P. R. CHINA	TZ24853



Test Information

Item	Description
Model Name	MHA EARPIECE
Test condition	Radiation
Test Engineer	Rod Cheng
Company	Quanta Computer Inc.
Company Address	NO.188, Wenhua 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C.)
Test Environment	ETS-Lindgren AMS-8500 Antenna Measurement System
Test Software	ETS-Lindgren EMQuest Data Acquisition and Analysis Software
Test Date	07/19/2022

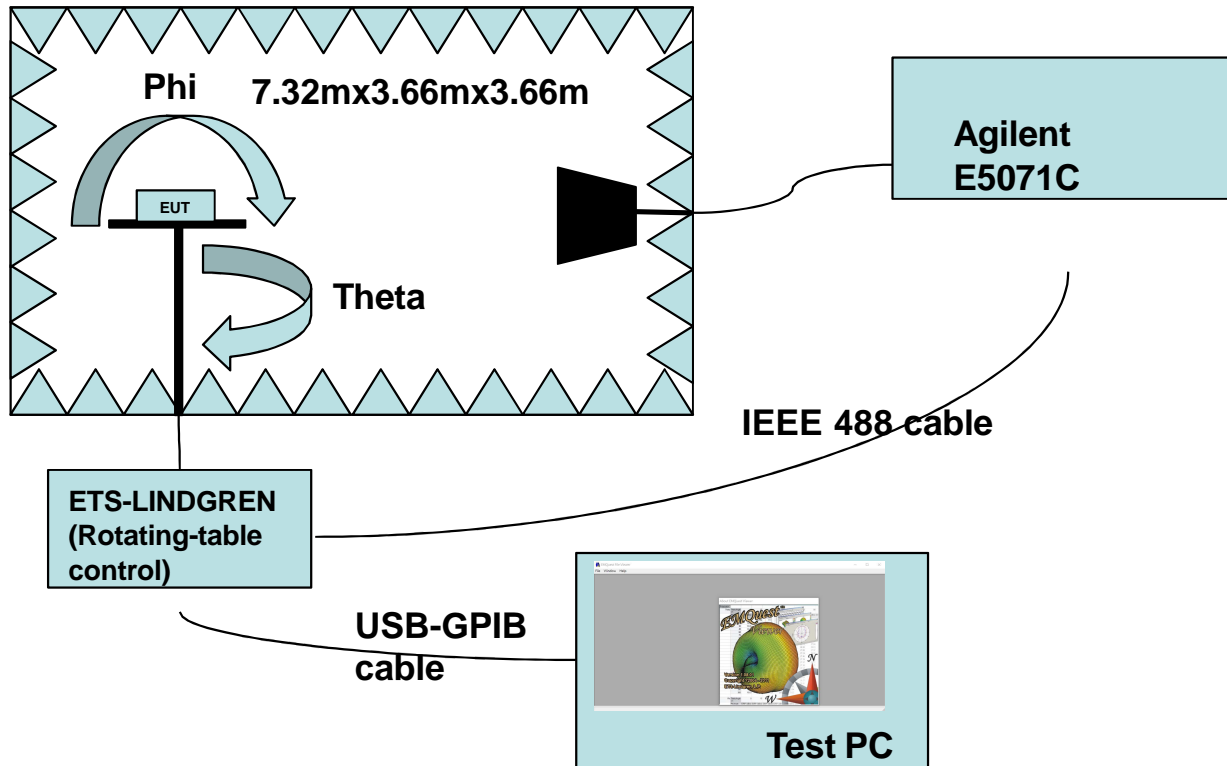


Test Information



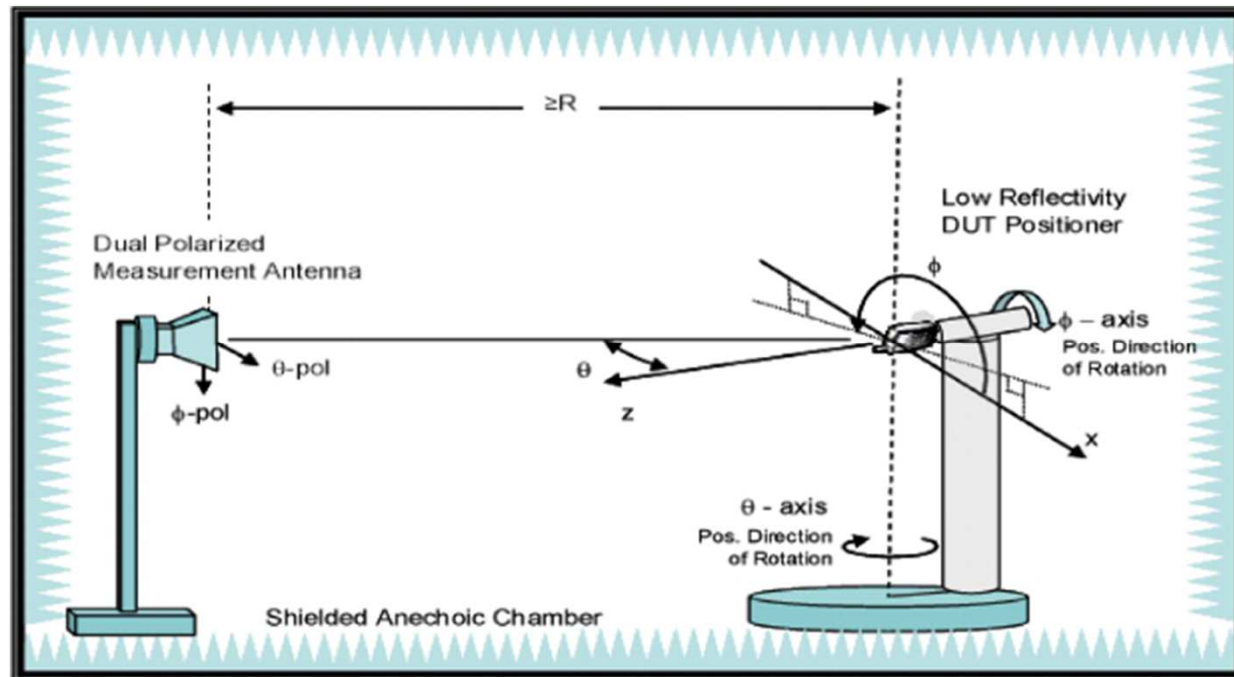
Test block diagram

ETS-LINDGREN antenna chamber



Test Configuration

ETS-Lindgren AMS-8500 antenna measurement system with a size of 7.32(L) x 3.66(W) x 3.66 (H) m^3 is used for antenna performance test, which is based on the great-circle test method defined by CTIA. The multi-axis positioning system (MAPS) rotates the DUT around two orthogonal axes for full spherical coverage.



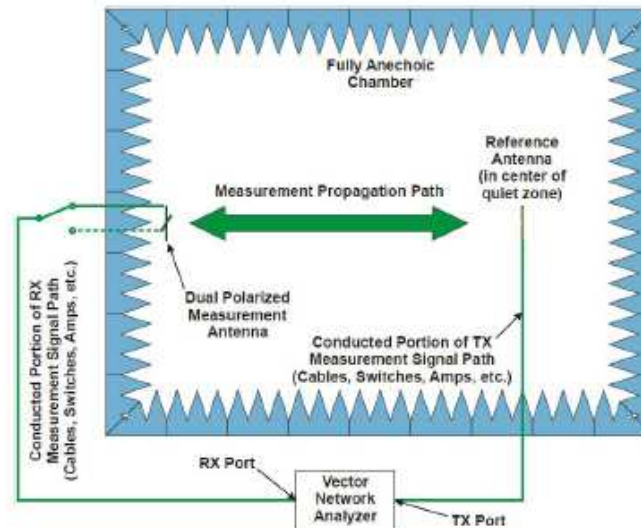
Test Equipment list

Equipment type	Model	Remark
ENA Series Network analyzer	Agilent E5071C	100KHz~8.5GHZ
Rotating table control	ETS-LINDGREN EMC Center	
Chamber	ETS-LINDGREN AMS8500	700MHz~6GHz
Horn Antenna	ETS-LINDGREN 6164-04	700MHz~6GHz
USB-GPIB cable	NI	
IEEE 488 cable	NI	



Test equipment & Calibration

Network analyzer and reference antennas are used for calibration. Path loss and cable loss for different frequency bands can be checked and calculated.



Equipment Description	Manufacture	Model No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer	Keysight	N9030A	2022/06/28	2023/06/28
Network Analyzer	Keysight	E5017C	2022/07/04	2023/07/04
Switch Control system	Keysight	3499A	2022/07/04	2023/07/04
Horn Antenna	ETS Lindgren	6164-04	2022/07/04	2023/07/04
Chamber	ETS Lindgren	ASM-8500	2022/07/10	2023/07/10

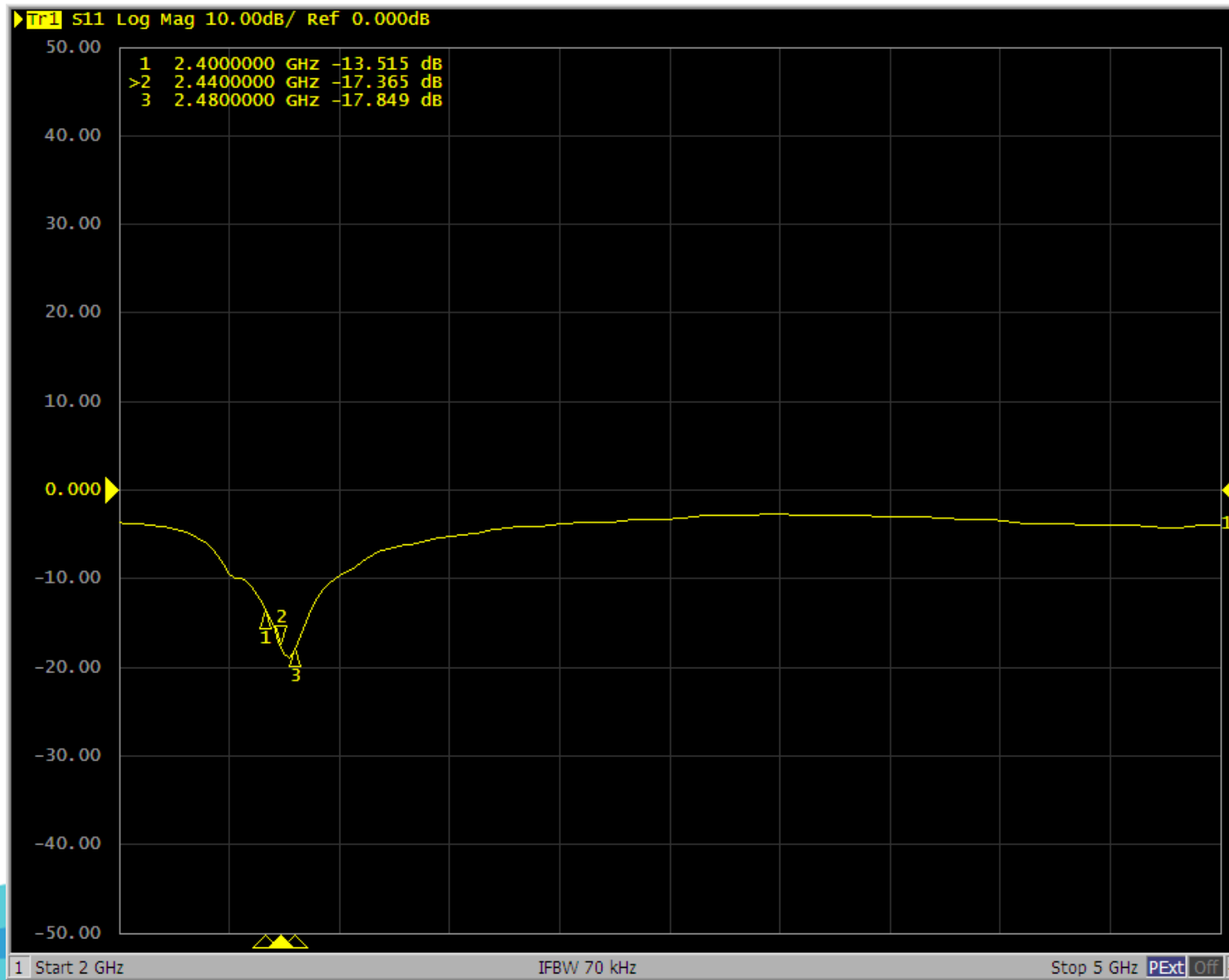


Antenna Performance

Frequency (GHz)	MHA BT Antenna
2.40	-6.99 dB(20.00%) Peak Gain:-2.32 dB
2.44	-6.35 dB(23.17%) Peak Gain:-2.44 dB
2.48	-6.89 dB(20.46%) Peak Gain:-1.66 dB

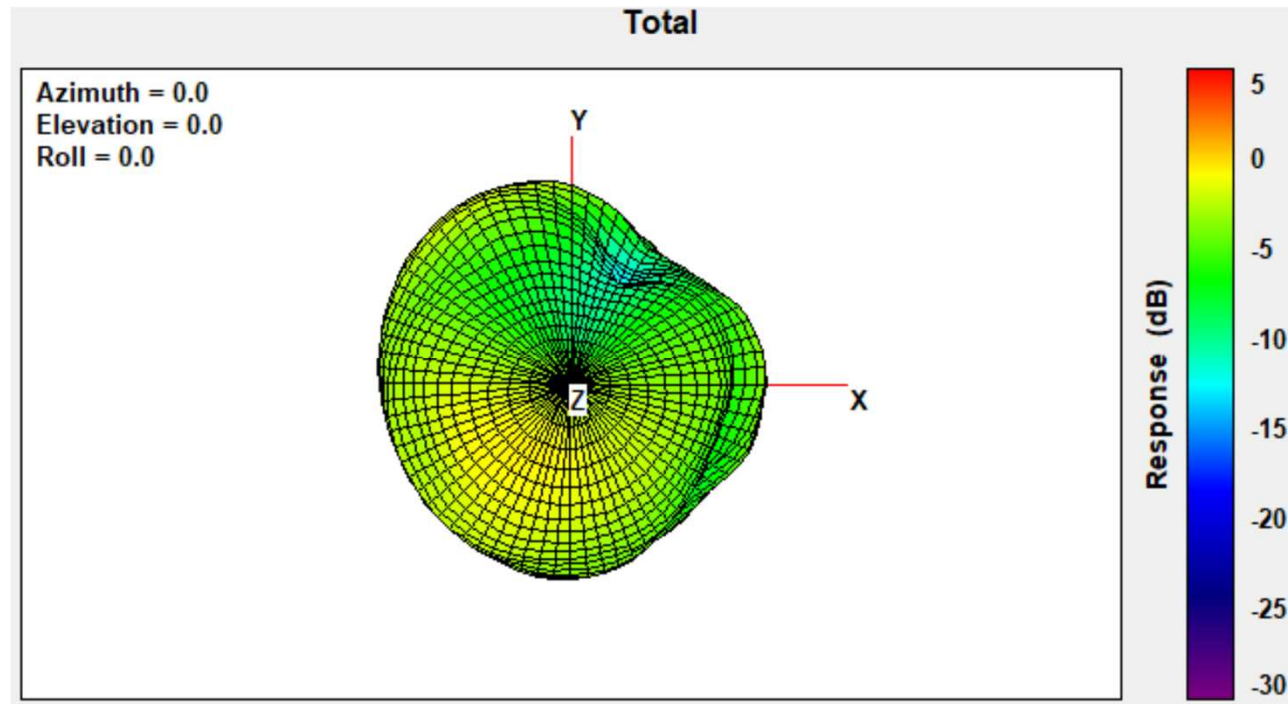


Return Loss



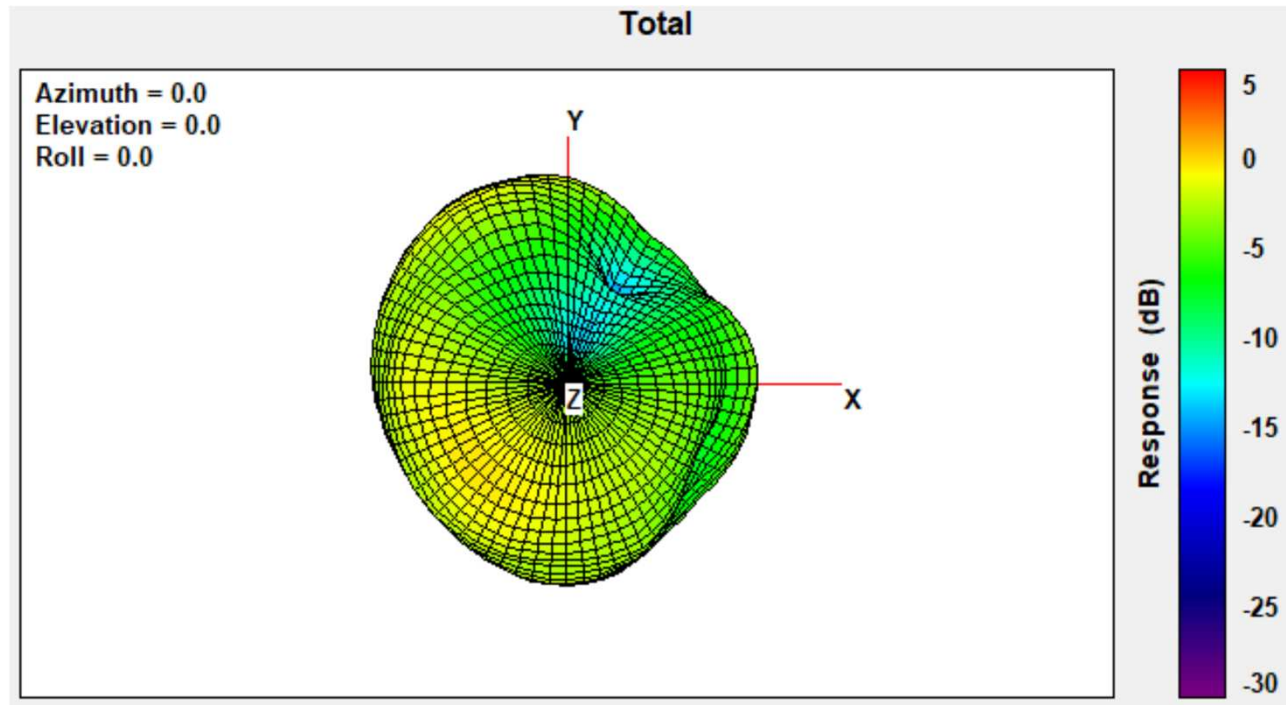
Antenna Radiated pattern

2.40 GHz



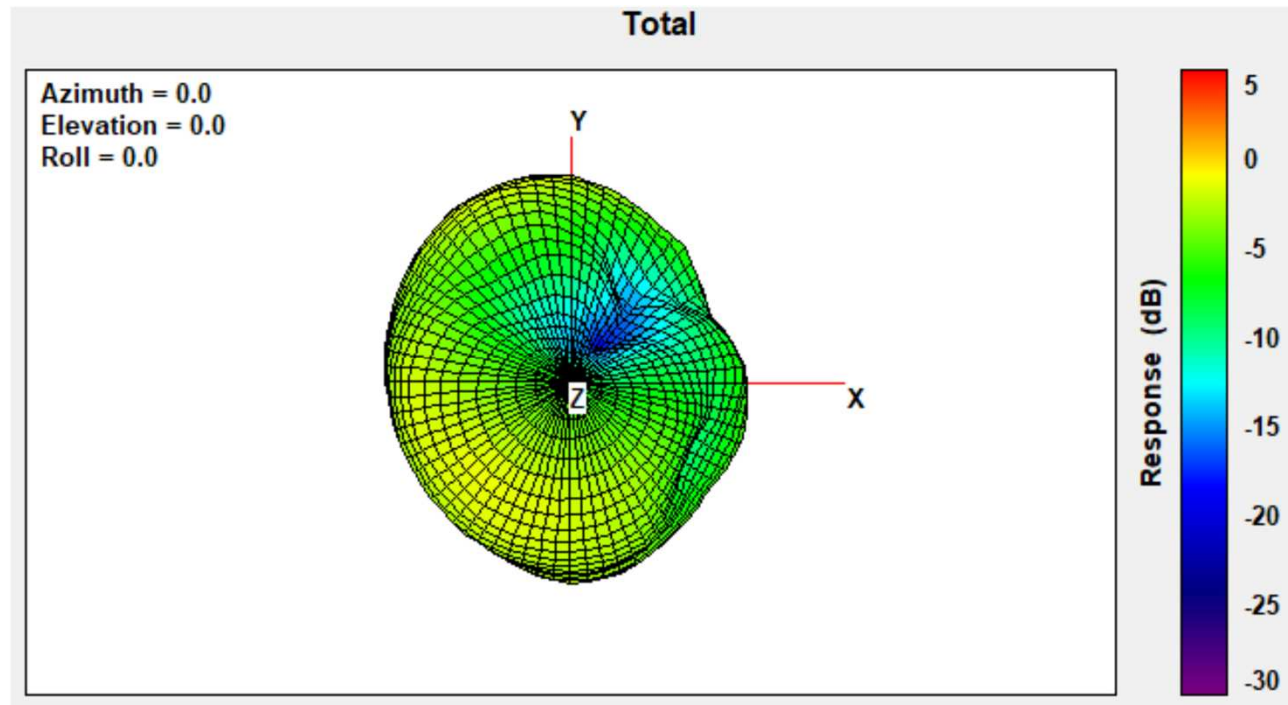
Antenna Radiated pattern

2.44 GHz



Antenna Radiated pattern

2.48 GHz



Test setup and Produce

1. Fix the DUT on the dielectric support structure and connect the feeding cable to the antenna used for test.
2. Set measurement parameters such as frequency range and sample angle.
3. Perform test and then get far-field data. (radiation pattern, gain, efficiency)
4. Repeat test procedure for other antenna.

