



Dudley

Antenna Test Report

Date : Nov. 18, 2022
Prepared by : Stella Sun



Outline

- Test Information
- Test Configuration
- Test Setup & Procedure
- Test Equipment & Calibration
- Antenna Specification
- Antenna Structure & Placement
- Return Loss & Isolation
- Radiation Pattern
- Peak Gain & Efficiency

Test Information

Item	Description
Brand Name	Sercomm
Equipment	Set Top Box
Test Location	1F, No. 26, Xinghai Street, Suzhou Industrial Park, Jiangsu, China
Test Condition	Radiation
Test Engineer	Stella Sun
Test Environment	ETS-Lindgren AMS-8923 Antenna Measurement Chamber
Test Date	Oct. 21, 2022 ~ Nov. 2, 2022

Test Configuration

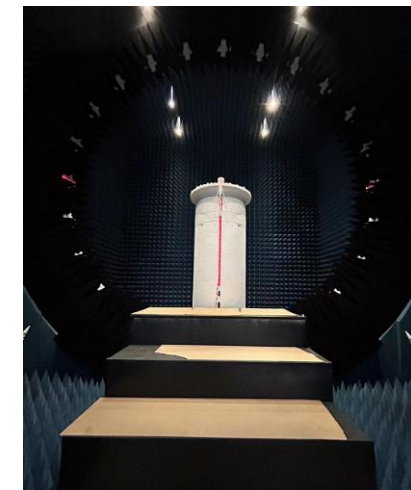
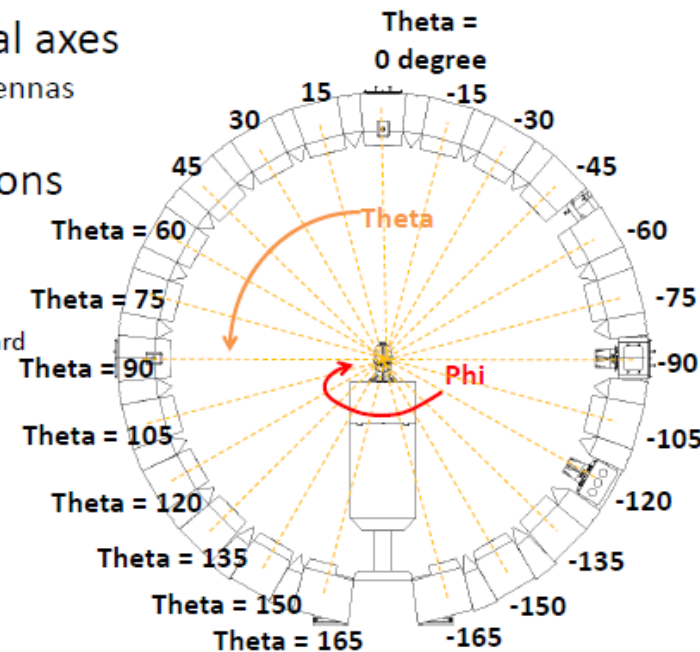
ETS-Lindgren AMS-8923 antenna measurement system with a size of $4.9(L) \times 4.9(W) \times 4.9(H)$ m³ is a high speed, multi-antenna array test system designed for fully compliant radiated wireless antenna measurements. It includes a multi-antenna array ring that houses a system of dual-polarized antennas. With a switch control box integrated on the ring, the test system provides fast switching between antennas for high speed testing. Its centralized system configuration supports easy maintenance and superior reliability.

Locate the two rotational axes

- Theta – the ring, multiple antennas
- Phi – the turntable

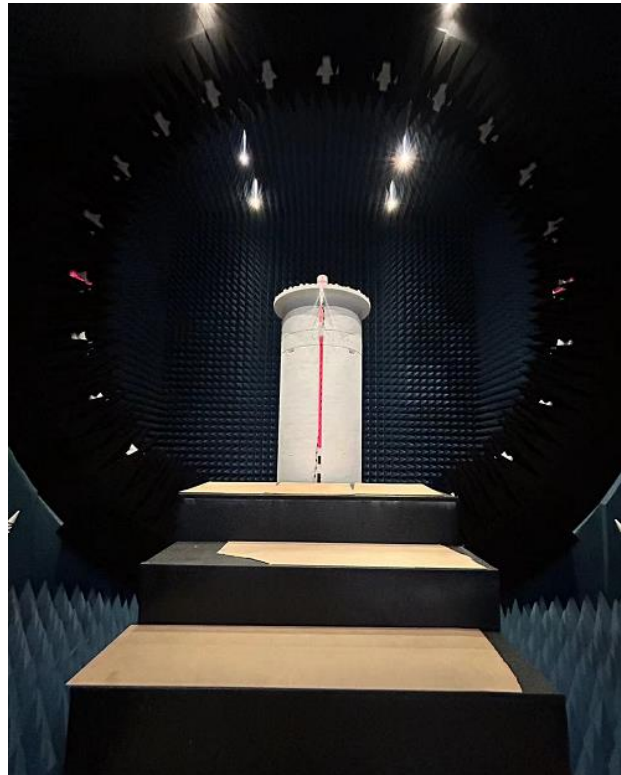
Define X, Y and Z directions

- X → Theta = 90 degree
- Y → Theta rotational axis
 - Use right-hand-rule
 - Then, theta axis is coming outward
- Z → Theta = 0 degree
 - Or phi rotational axis



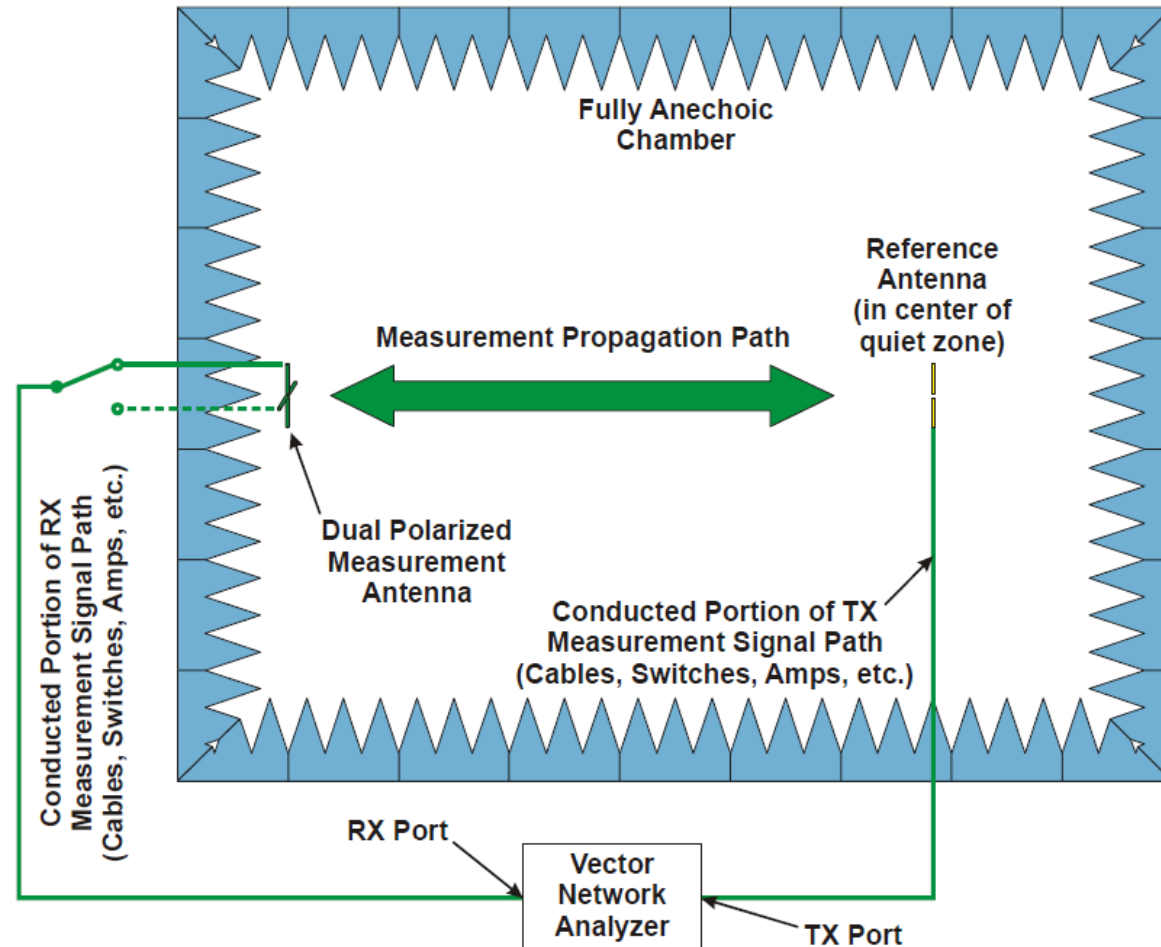
Test Setup & Procedure

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



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.



Test Equipment & Calibration

Instrument	Brand	Characteristics	Model No.	Serial No.	Calibration Due Date
Precision Sleeve Dipole	ETS-Lindgren	600 MHz ~ 800 MHz	3126-700	00218044	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	800 MHz ~ 900 MHz	3126-800	00218047	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	900 MHz ~ 1000 MHz	3126-900	00218062	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	1400 MHz ~ 1700 MHz	3126-1550	00218061	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	1700 MHz ~ 2000 MHz	3126-1850	00218064	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	1935 MHz ~ 2365 MHz	3126-2150	00218068	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	2250 MHz ~ 2750 MHz	3126-2500	00218048	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	3000 MHz ~ 4000 MHz	3126-3500	00239652	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	4000 MHz ~ 5000 MHz	3126-4500	00239796	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	5000 MHz ~ 6000 MHz	3126-5500	00218065	Feb. 23, 2023
Precision Sleeve Dipole	ETS-Lindgren	6000 MHz ~ 7200 MHz	3126-6500	00235488	Feb. 23, 2023
EMQuest Antenna Measurement Software	ETS-Lindgren	Control chamber system	EMQ-100	1596	Non-Calibration Required

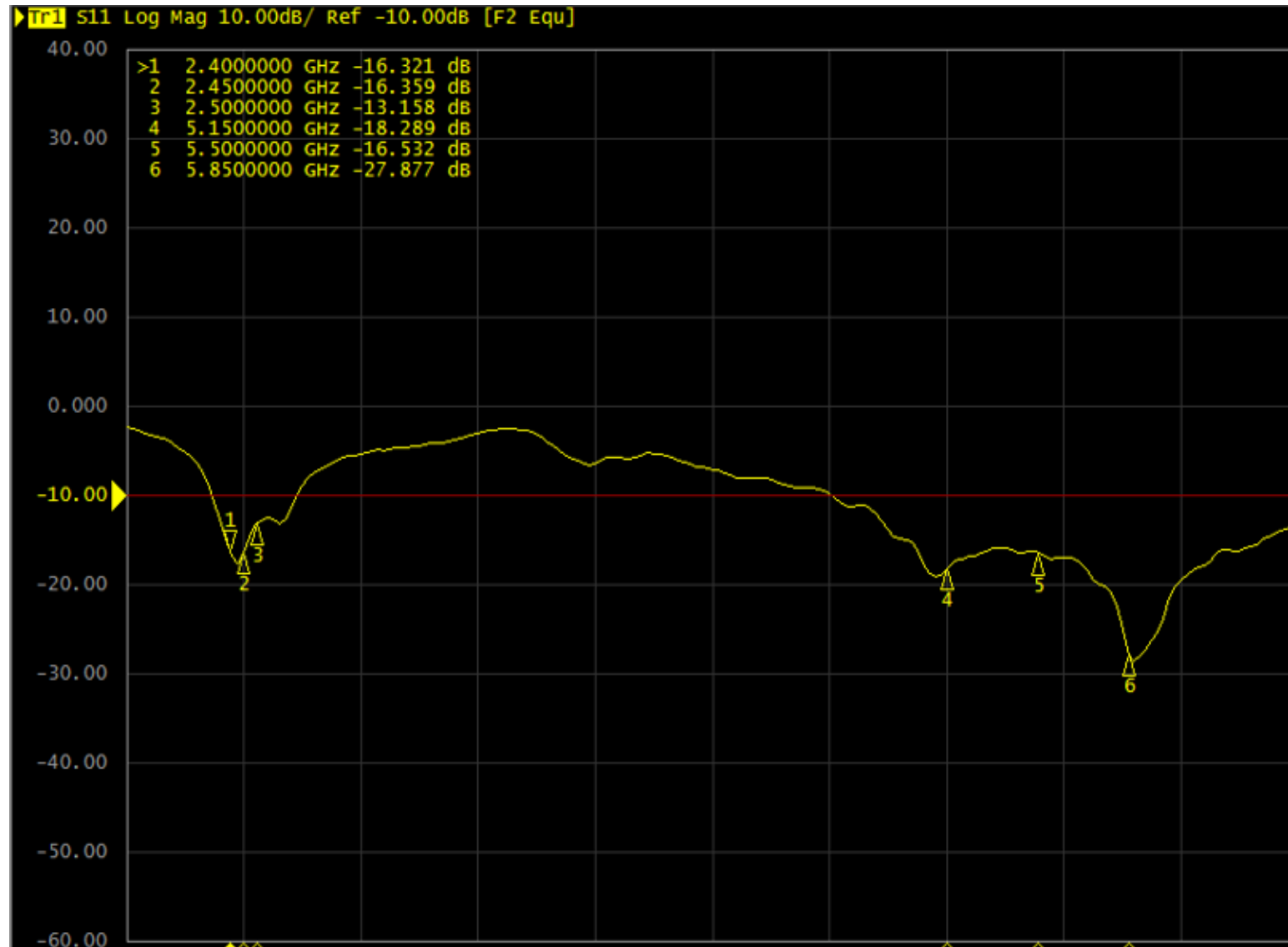
Antenna Specification

Antenna Specification	Comply	Note
Peak Gain : > 2dBi (WiFi 2G) Peak Gain : > 2dBi (WiFi 5G) Peak Gain : > 2dBi (BT)	Yes	WiFi 2G : > 2.3dBi WiFi 5G : > 2.6dBi BT : > 2.1dBi
Efficiency : > 50% (WiFi 2G) Efficiency : > 50% (WiFi 5G) Efficiency : > 50% (BT)	Yes	WiFi 2G : > 68% WiFi 5G : > 55% WiFi 6G : > 63%
Isolation : > 20dB (WiFi 2G)	Yes	
Isolation : > 20dB (WiFi 5G)	Yes	
Isolation : > 20dB (WiFi 2G and BT)	Yes	

Antenna Structure & Placement

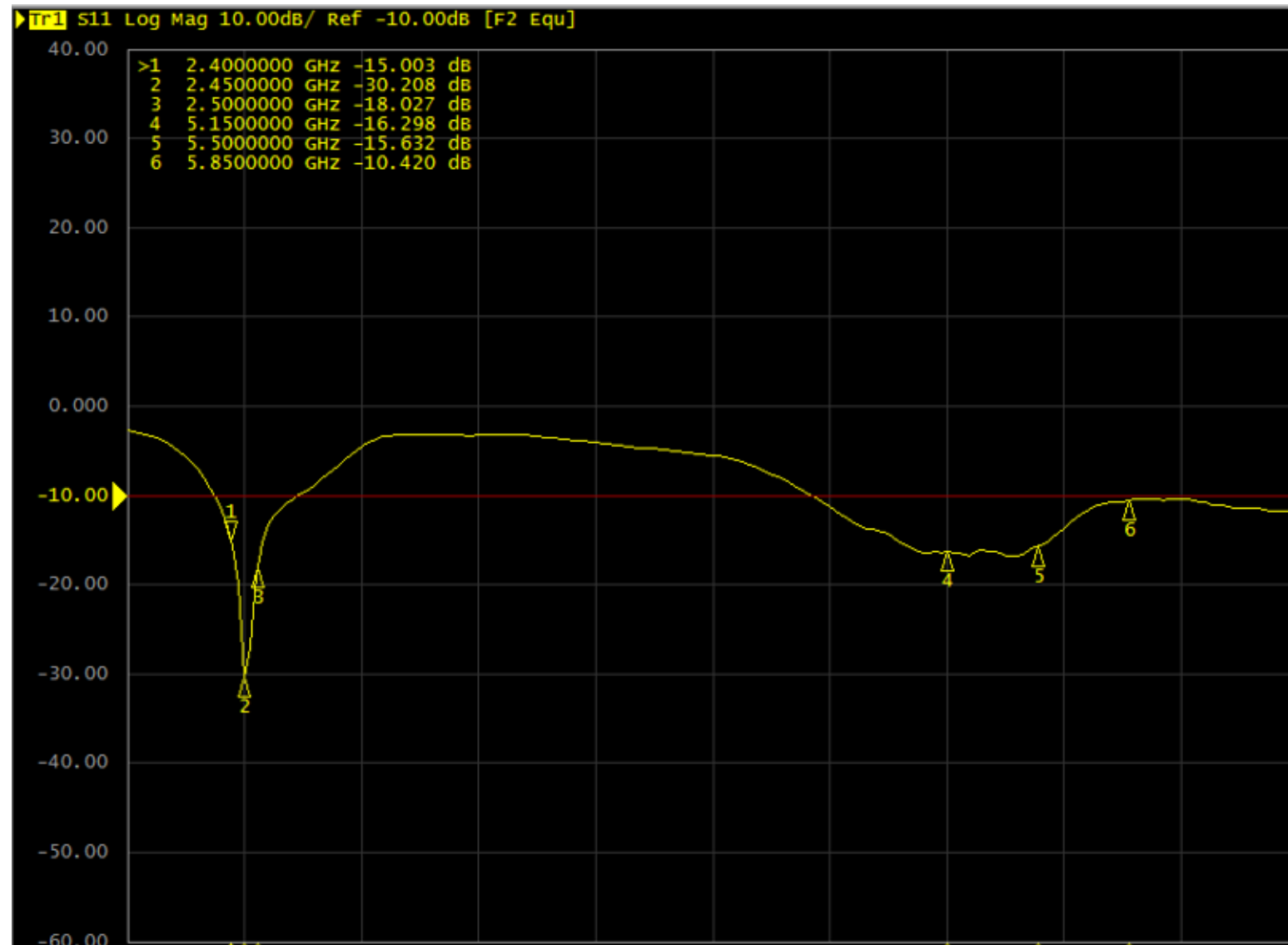
Antenna No.	Operating Frequency	Type	Material	Feeding	Size
Ant 1	WiFi 2.4G/5G	Dipole	PCB	Cable	43 x 10 x 0.4 mm ³
Ant 2	WiFi 2.4G/5G	PIFA	Metal	Trace	26.3 x 5 x 9.4 mm ³
Ant 3	BT	PIFA	Metal	Trace	26.3 x 5 x 9.4 mm ³

Return Loss – Ant 1



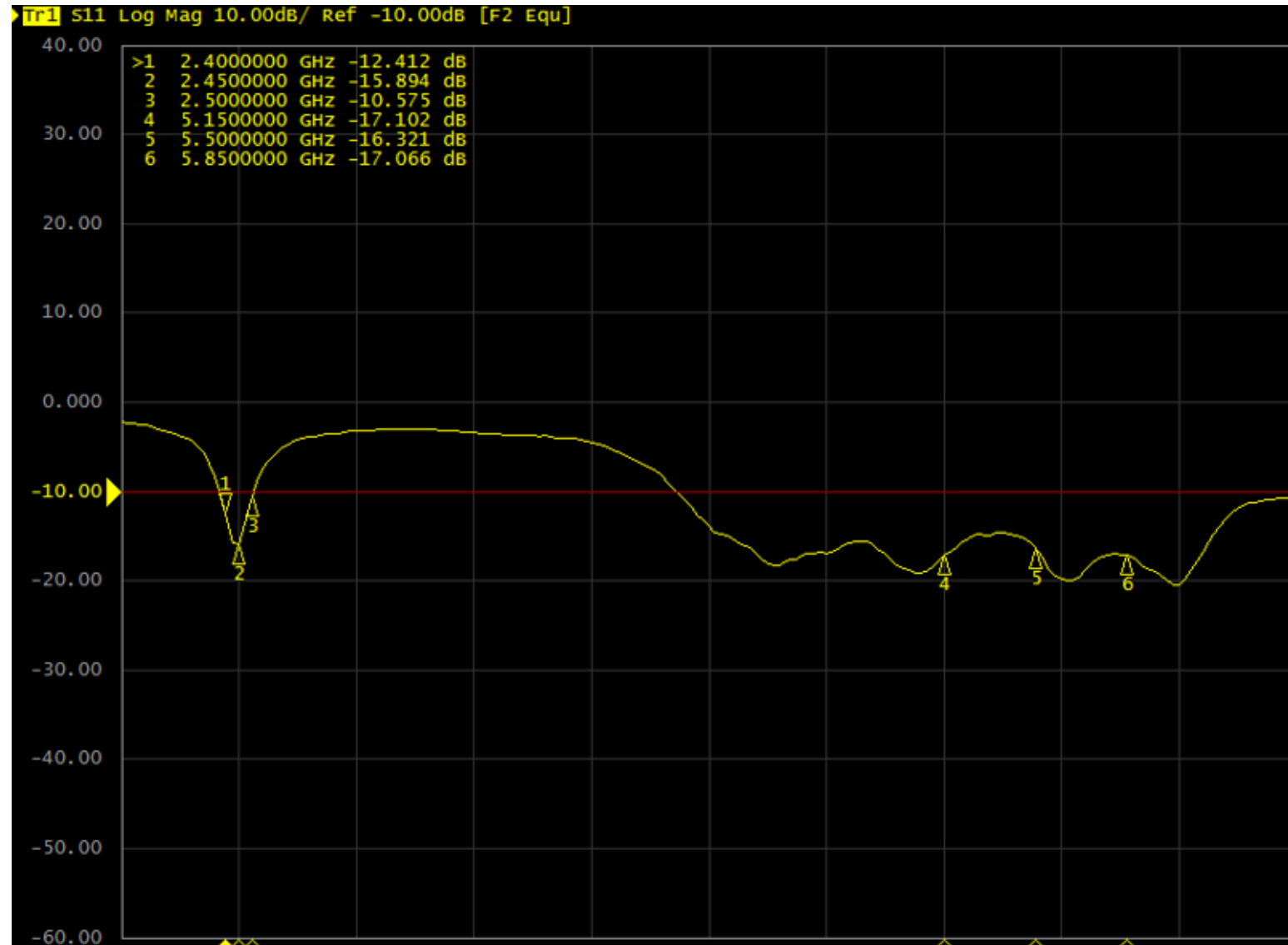
Spec : $RL \geq 10\text{dB}$

Return Loss – Ant 2



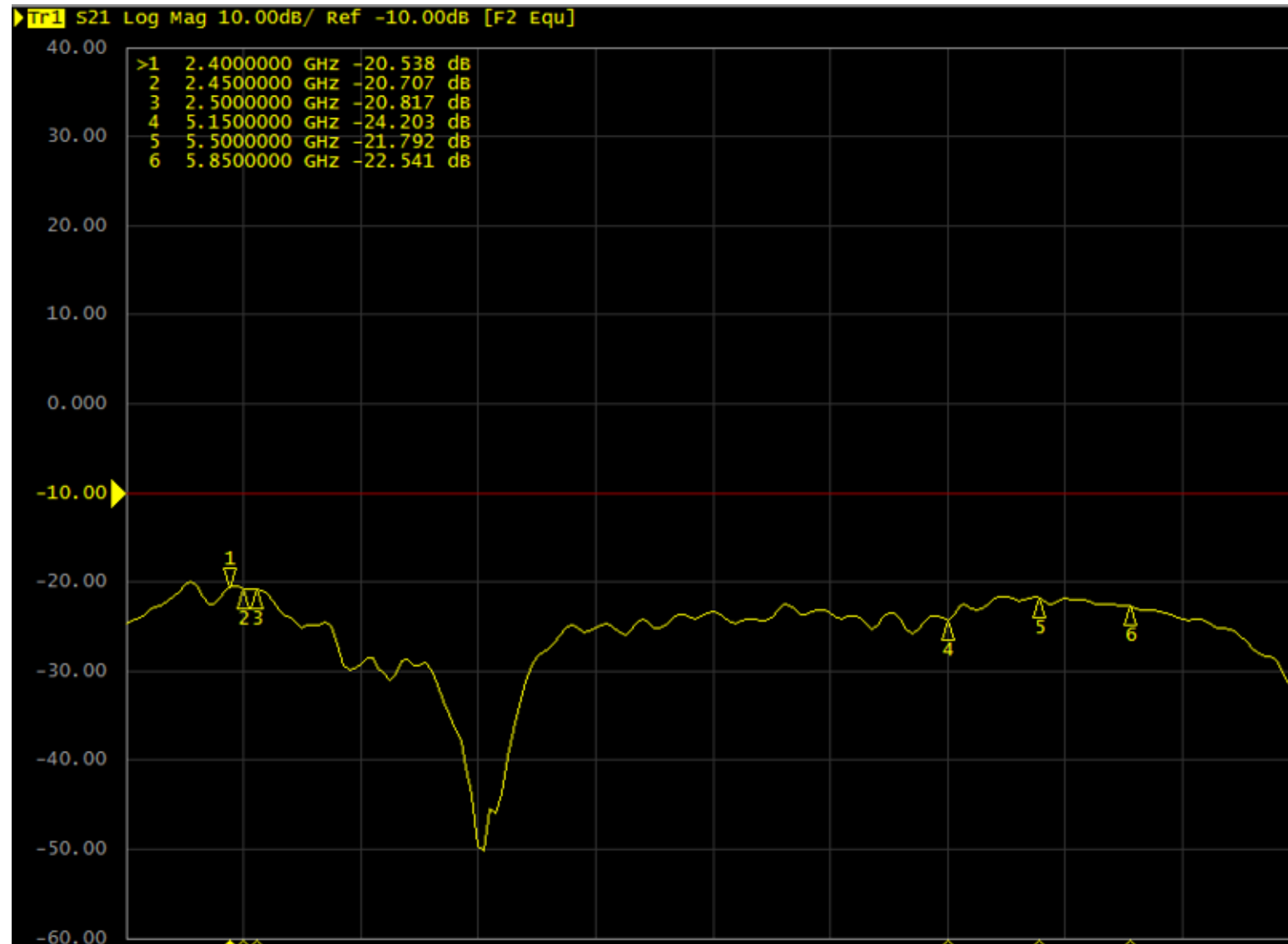
Spec : RL $\geq$ 10dB

Return Loss – Ant 3



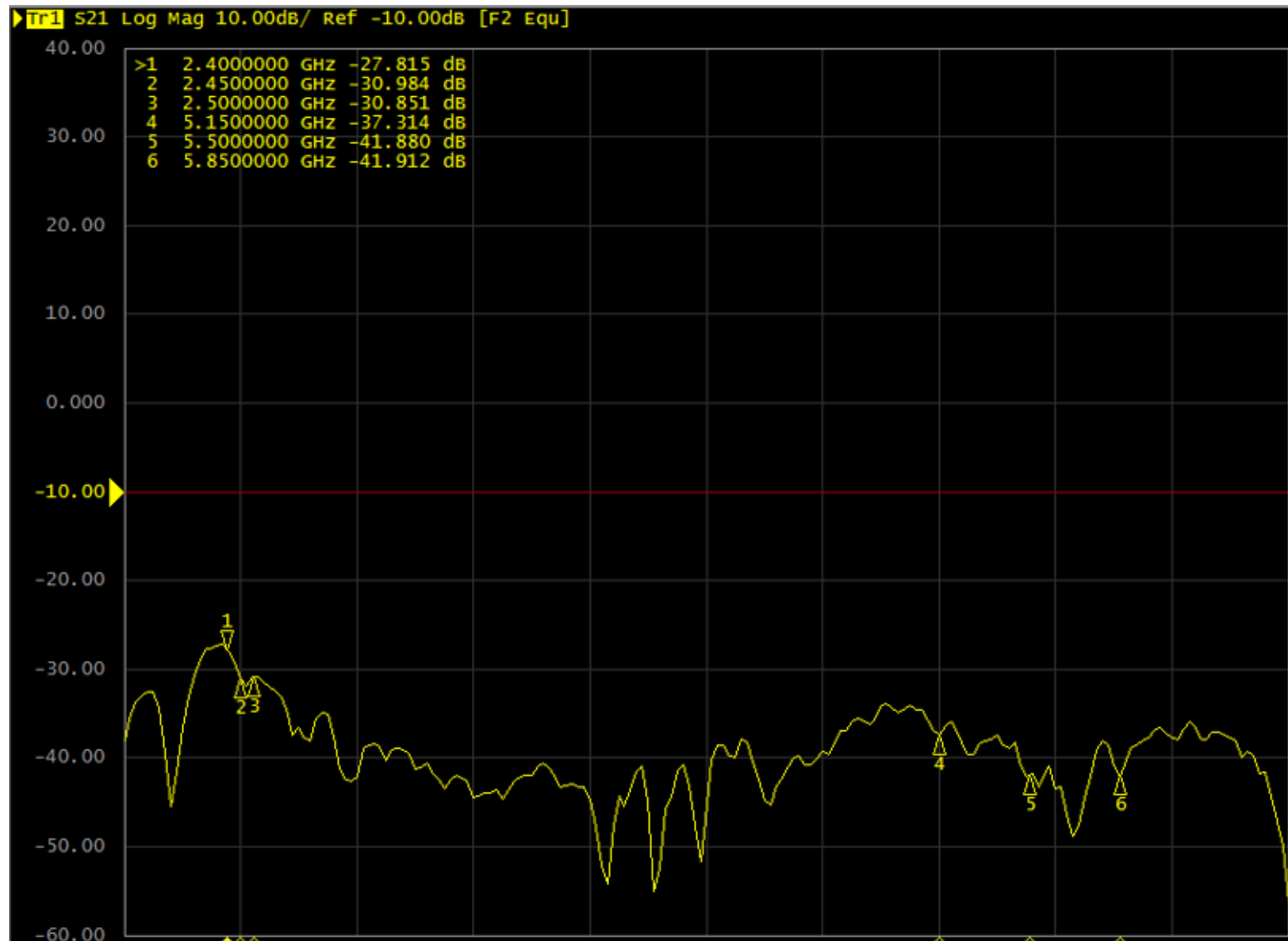
Spec : $RL \geq 10\text{dB}$

Isolation – Ant 1 & Ant 2



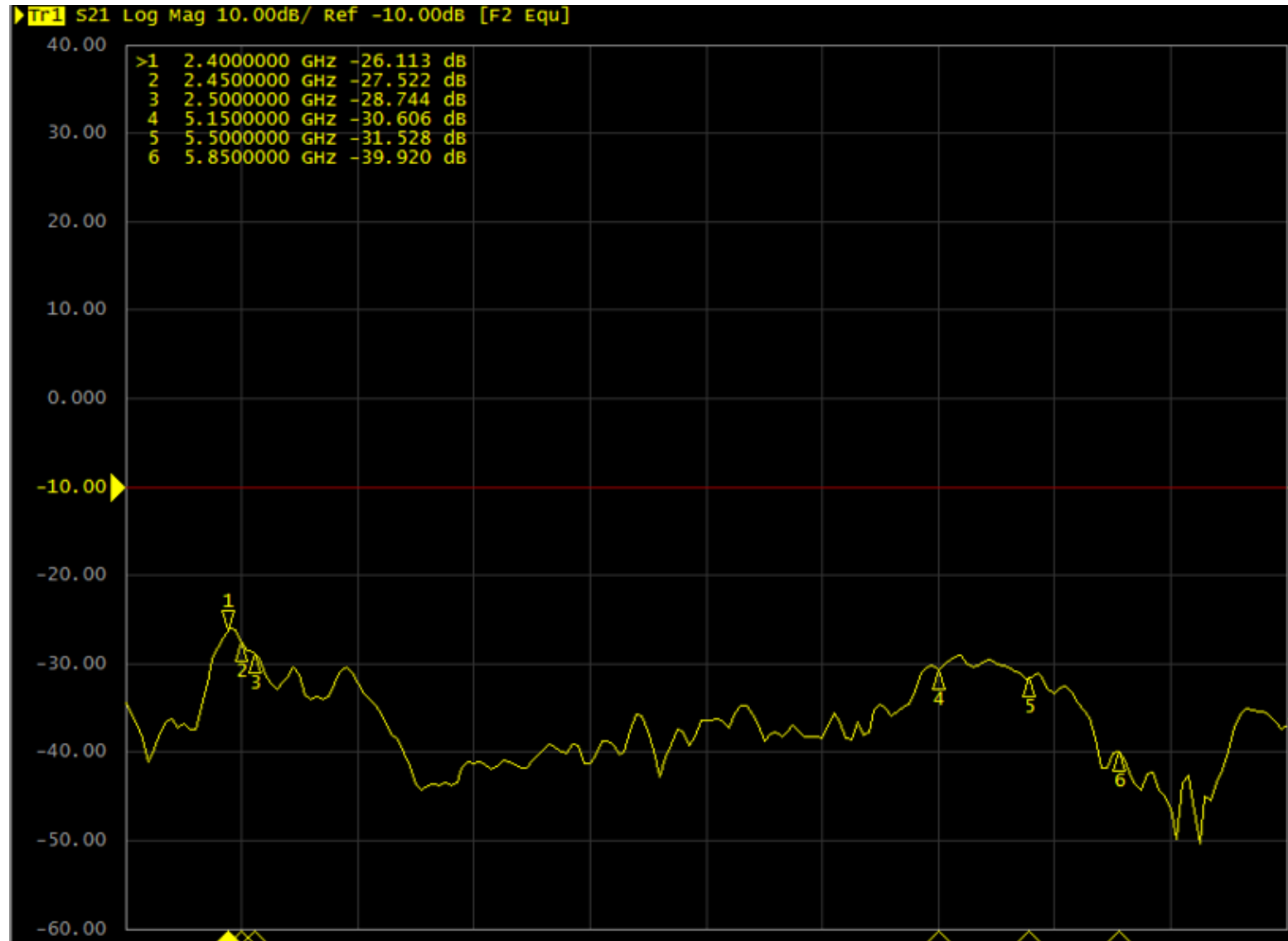
**Spec : Isolation
≥ 20dB**

Isolation – Ant 1 & Ant 3



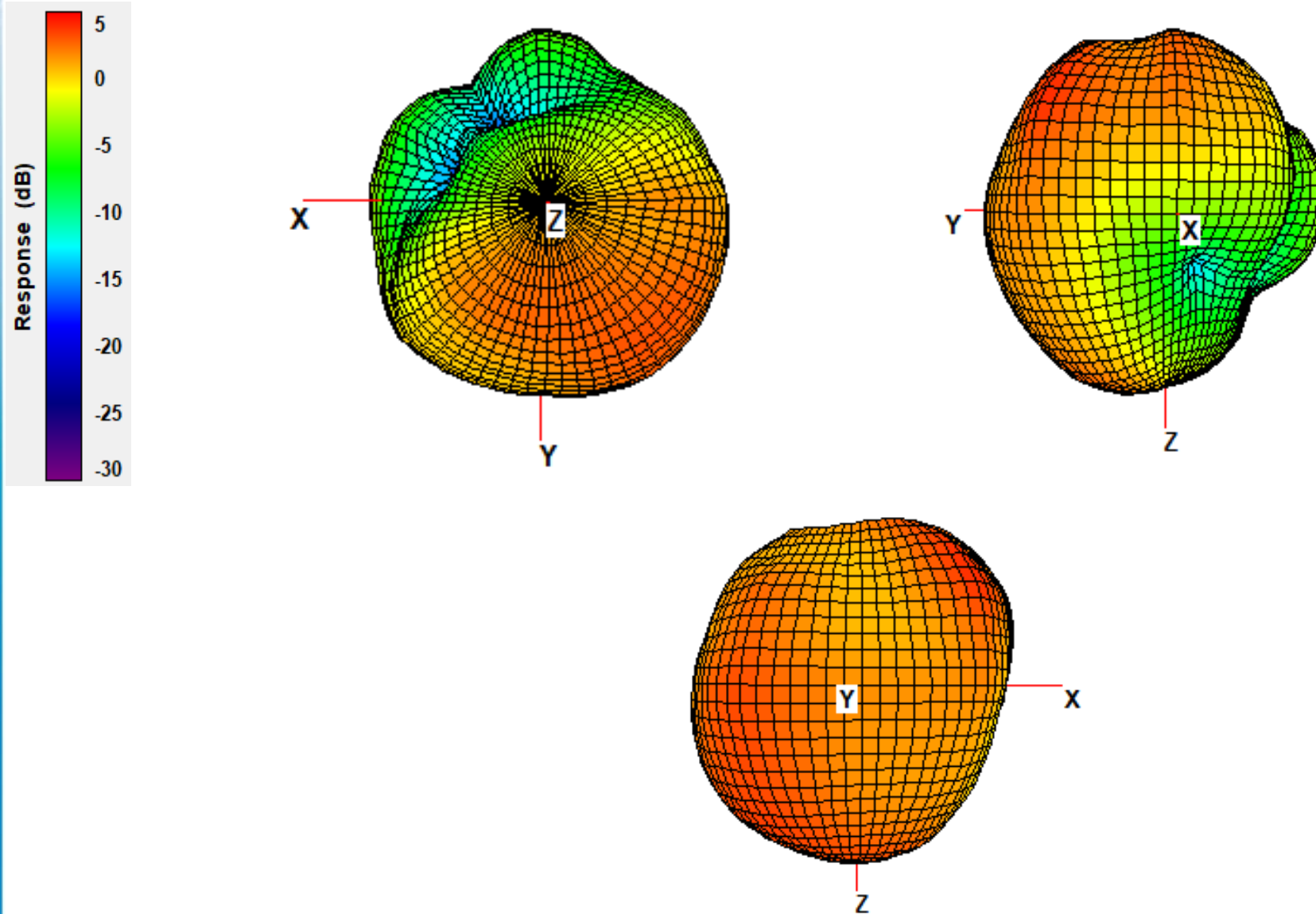
**Spec : Isolation
≥ 20dB**

Isolation – Ant 2 & Ant 3

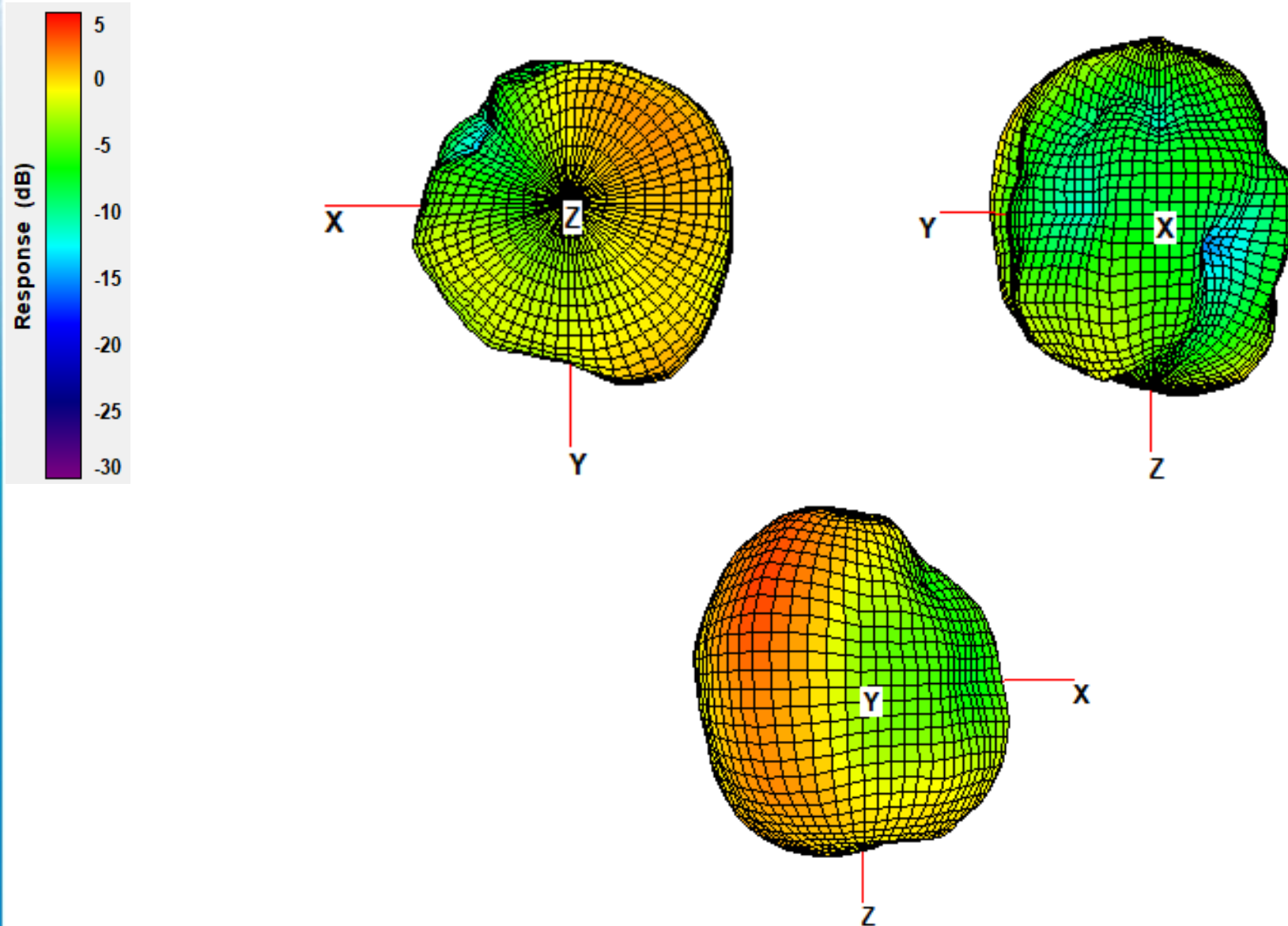


**Spec : Isolation
≥ 20dB**

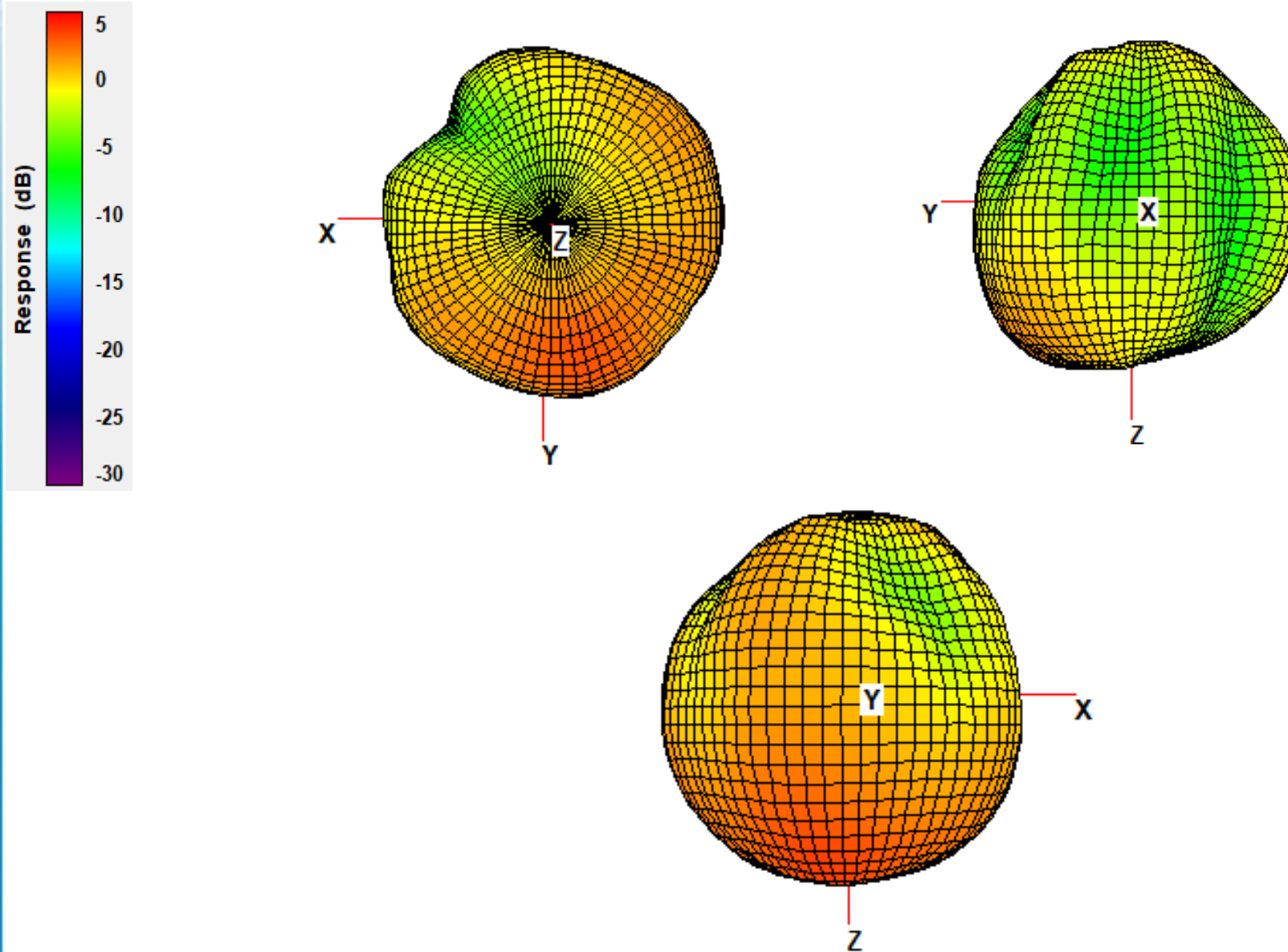
3D Radiation Pattern – Ant 1, WiFi 2G/5G @2450MHz



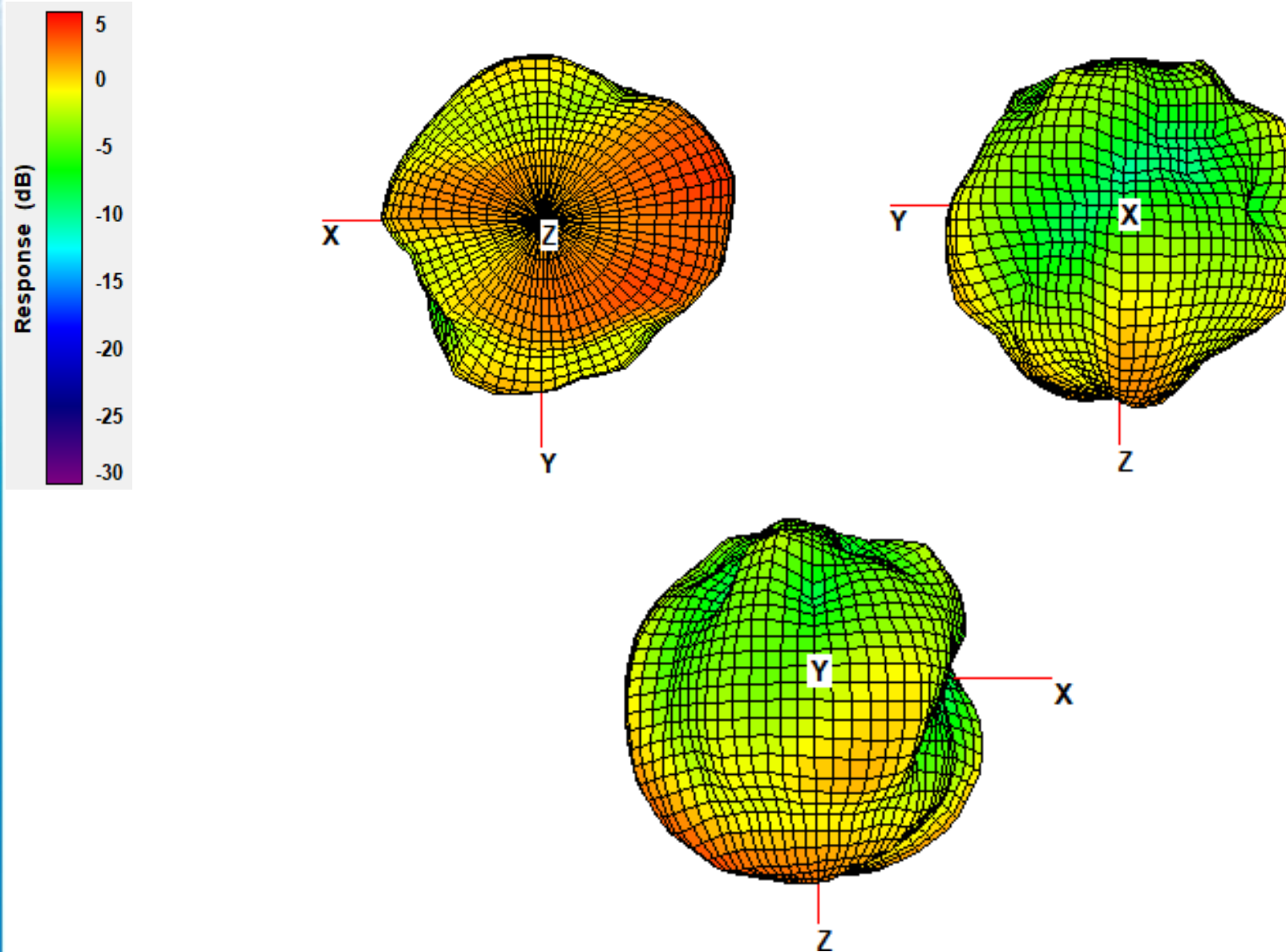
3D Radiation Pattern – Ant 1, WiFi 2G/5G @5500MHz



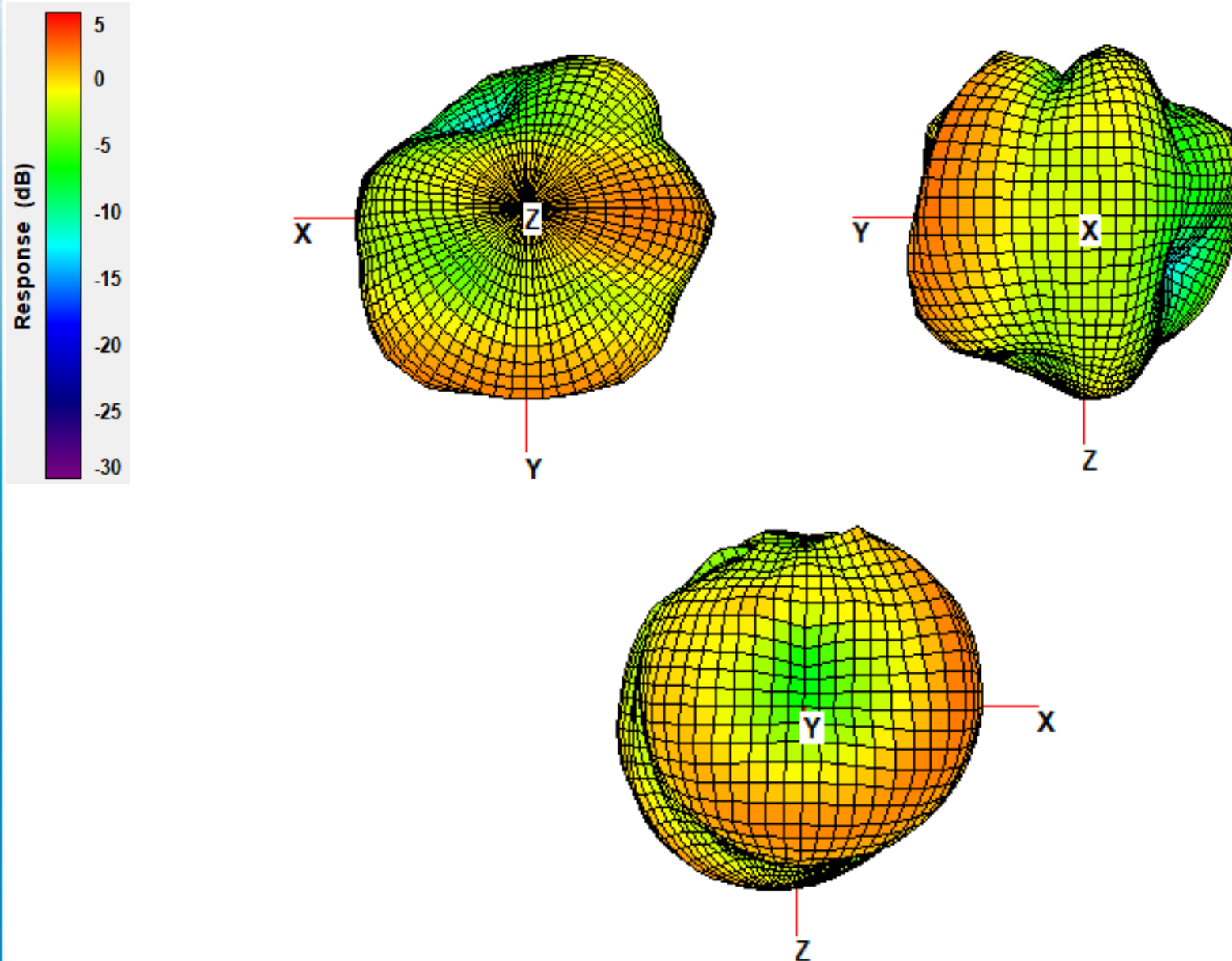
3D Radiation Pattern – Ant 2, WiFi 2G/5G @2450MHz



3D Radiation Pattern – Ant 2, WiFi 2G/5G @5500MHz



3D Radiation Pattern – Ant 3, BT @2450MHz



Peak Gain & Efficiency

Ant 1 (WiFi 2.4G/5G)		
Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	3.6	68.5
2450 MHz	4.0	70.2
2500 MHz	3.5	68.7
5150 MHz	2.6	56.6
5550 MHz	3.6	58.2
5850 MHz	3.6	55.4

Ant 2 (WiFi 2.4G/5G)		
Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	2.3	68.5
2450 MHz	3.1	70.5
2500 MHz	3.1	70.4
5150 MHz	3.8	60.5
5550 MHz	3.7	60.2
5850 MHz	3.0	55.4

Ant 3 (BT)		
Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	2.3	63.3
2450 MHz	2.6	67.0
2500 MHz	2.1	62.7

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