ECW526
Antenna DVT Test Report

Customer	EnGenius
Project	ECW526
Project Description	2.4G antenna *2 5G antenna *2 6G antenna *2 BLE antenna *1
Date	2024/04/10
Prepared by	Daniel
Checked	Tony
Report Version	A02

Address: No. 500&520, Fusing 3rd Rd., Hwa-Ya Technology Park Kuei-Shan Dist., Taoyuan City 33383,

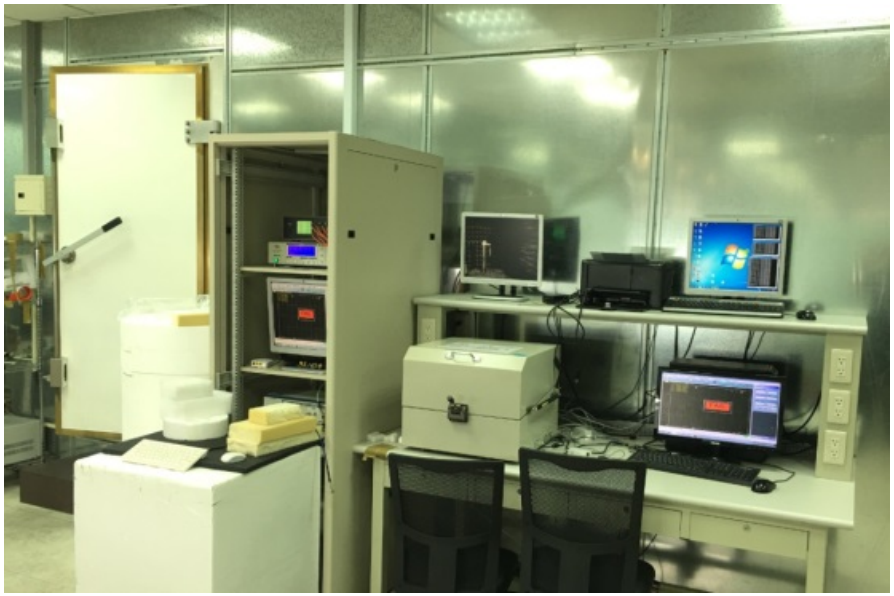
Executive Summary

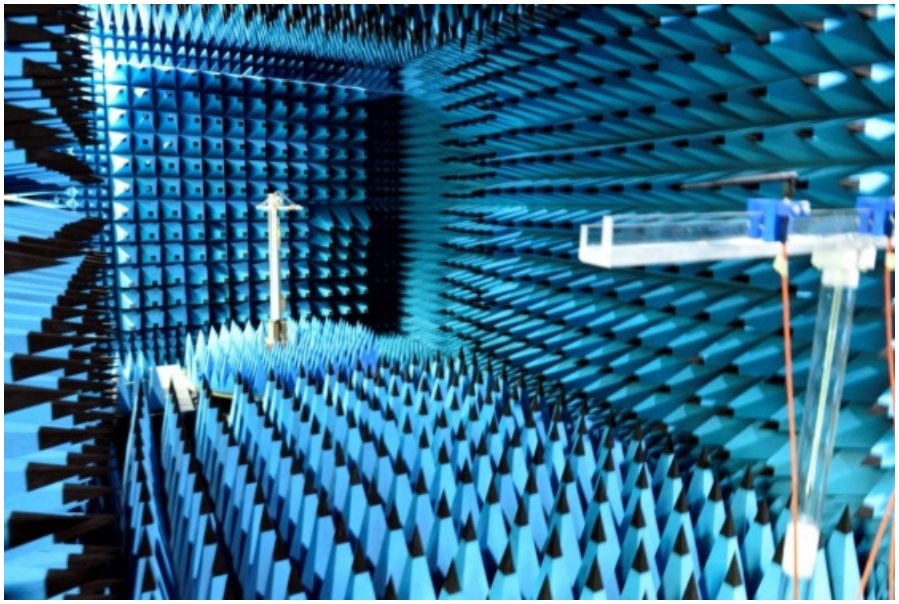
- **Agenda**
  - Antenna Development Resource
  - Antenna Testing Set Up
  - Placement and Specification
  - S11 & Isolation
  - Radiation Pattern
  - Efficiency and Gain

Antenna Development Resource

3D Anechoic Chamber - BWANT

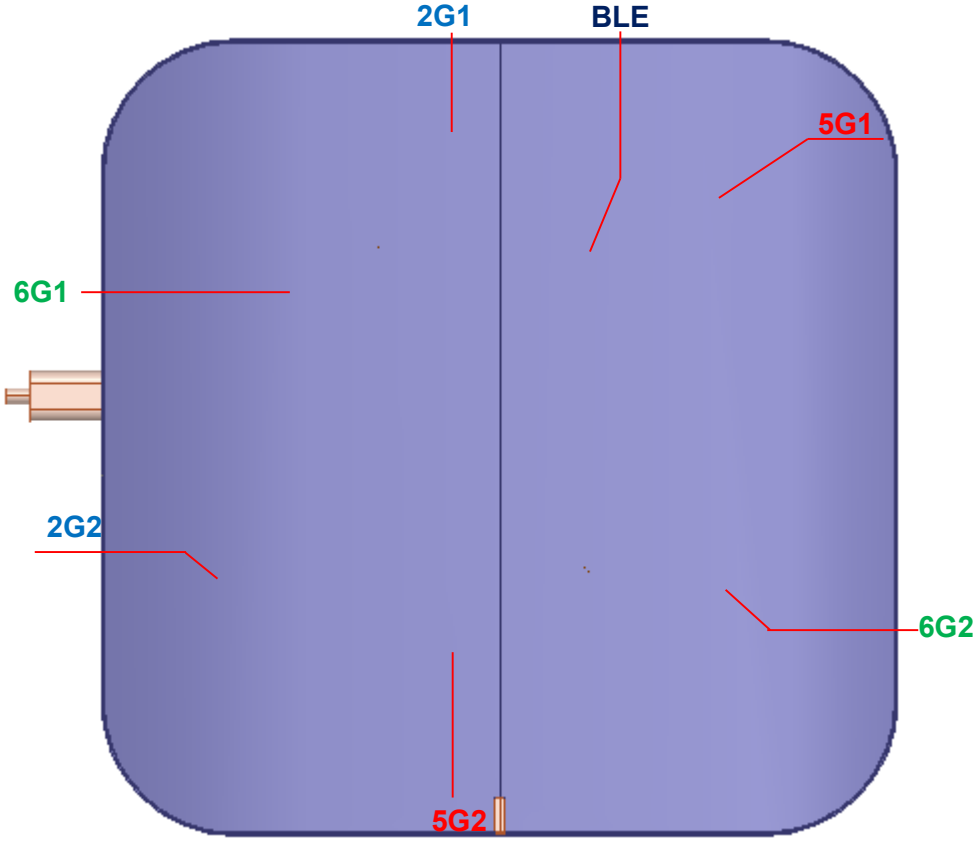
- Size: 7.32M(L)x3.66M(W)X3.66M(H)
- Testing range from 400MHz to 7GHz
- Chamber Isolation : 10KHz to 10GHz >100dB (NSA 94-106)
- Calibration antenna : BWANT SD650 /SD740 /SD900 /SD1150 /SD1575 /SD1800 /SD2140 /SD2450 /SD3200 /SD3600 /SD4550 /SD5400 /HA-0508
- Calibration date: 2022/10/27
- Test software : BWANT 3D Passive





3D Anechoic Chamber

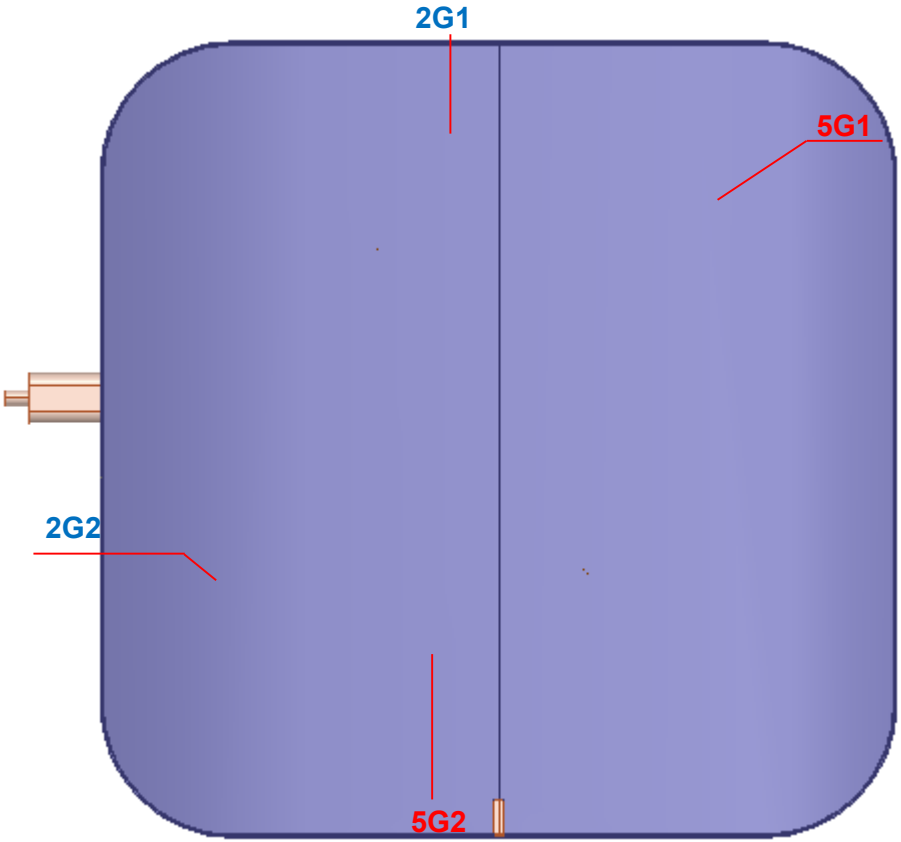
Placement and specification



Ant No.	Operating Band	Gain (dBi)	Efficiency (%)	Ant type	Material	Feeding	Dimension
2G1~2G2	2400MHz ~ 2500 MHz	4.0~4.4	66.5~69.7	PIFA	Metal	Cable	33.5*5.3*9.5 mm^3
5G1~5G2	5150MHz ~ 5895 MHz	4.6~5.6	60.3~69.1	PIFA	Metal	Cable	21*5*10 mm^3
6G1~6G2	5925MHz ~ 7125 MHz	4.4~5.6	65.3~69.2	Alford loop	PCB	Cable	25*25*0.8 mm^3
BLE	2400MHz ~ 2500 MHz	3.0~3.2	61.3~67.4	Dipole	PCB	Cable	51*6.5*0.4 mm^3

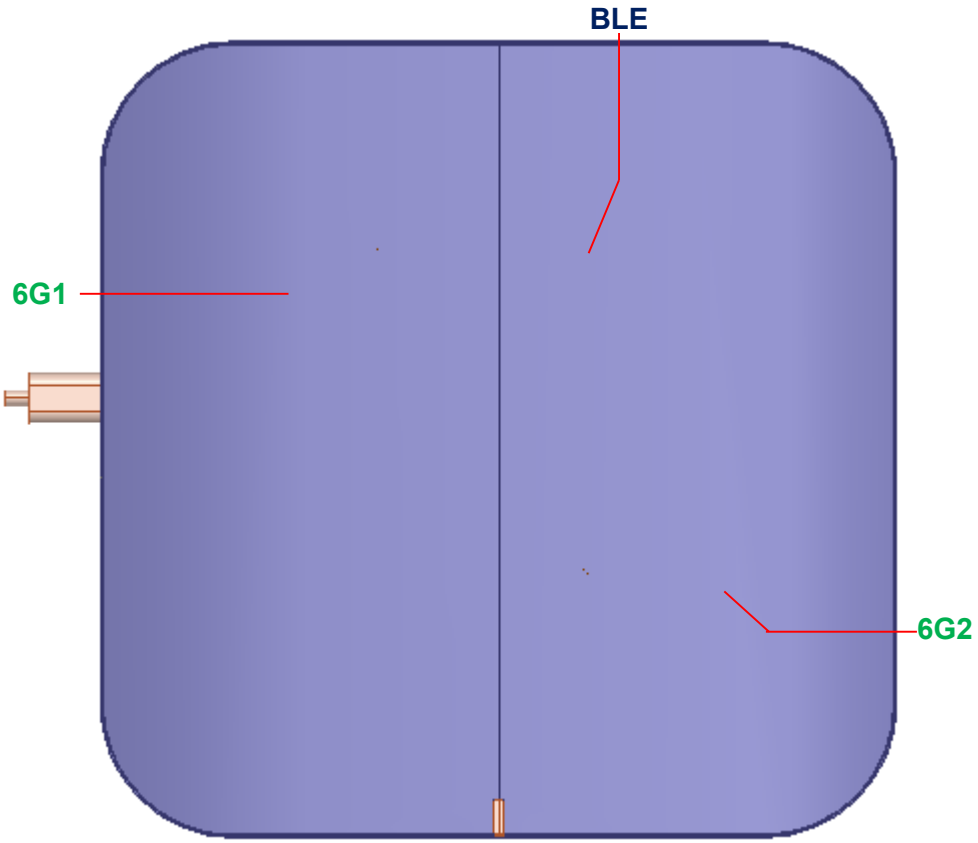
Placement and specification

Radio_1 Ant.1~2	
Wi-Fi Frequency	2400~2500MHz
Return Loss	-10dB
Antenna Type	Pifa
Material	Metal
Feeding	Cable
Radio_2 Ant.3~4	
Wi-Fi Frequency	5150~5895MHz
Return Loss	-10dB
Antenna Type	Pifa
Material	Metal
Feeding	Cable
Ant.1	
Brand Name :	Enrack
P/N	7102A1222000
Ant.2	
Brand Name :	Enrack
P/N	7102A1223000
Ant.3	
Brand Name :	Enrack
P/N	7102A1224000
Ant.4	
Brand Name :	Enrack
P/N	7102A1225000



Placement and specification

Radio_3 Ant.5~6	
Wi-Fi Frequency	5925~7125MHz
Return Loss	-10dB
Antenna Type	Alford Loop
Material	FR4
Feeding	Cable
Ant.5	
Brand Name :	AWAN
P/N	7102A0952000
Ant.6	
Brand Name :	AWAN
P/N	7102A0951000
BLE/Zigbee Ant.7	
Wi-Fi Frequency	2400~2500MHz
Return Loss	-10dB
Antenna Type	Dipole
Material	FR4
Feeding	Cable
Brand Name :	AWAN
P/N	7102A0953000



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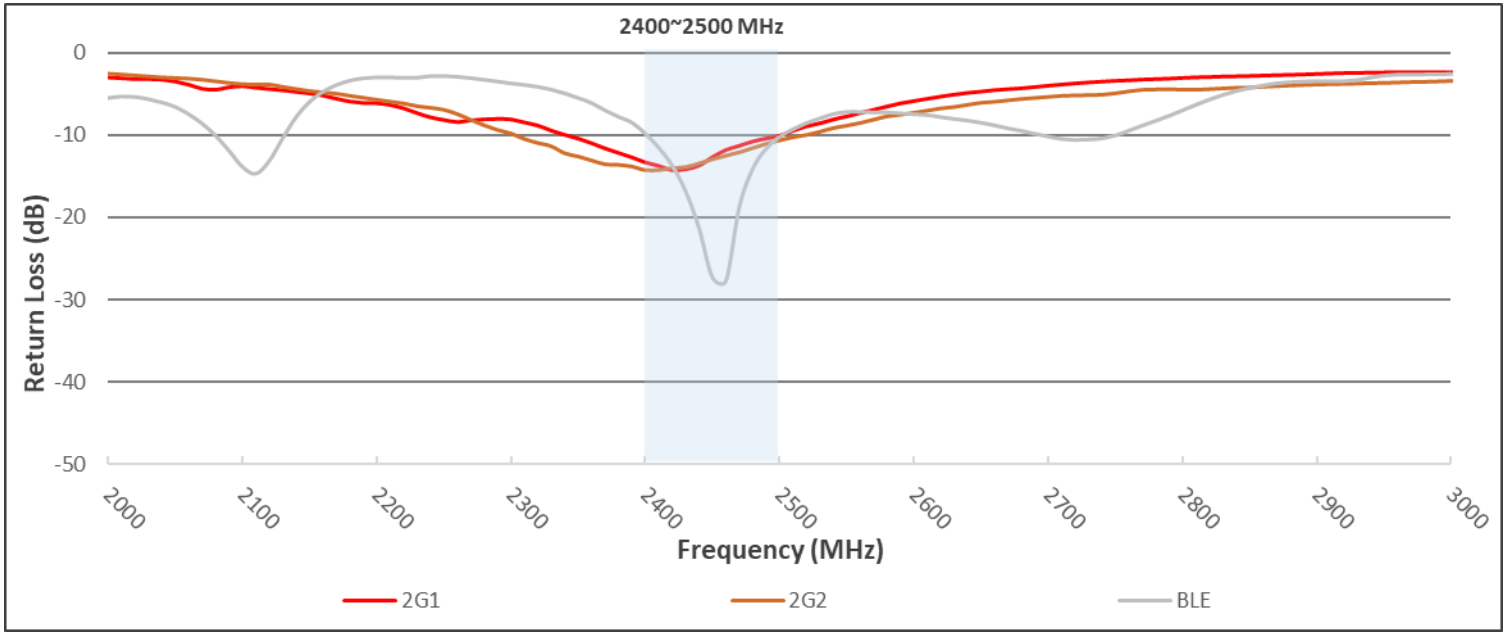
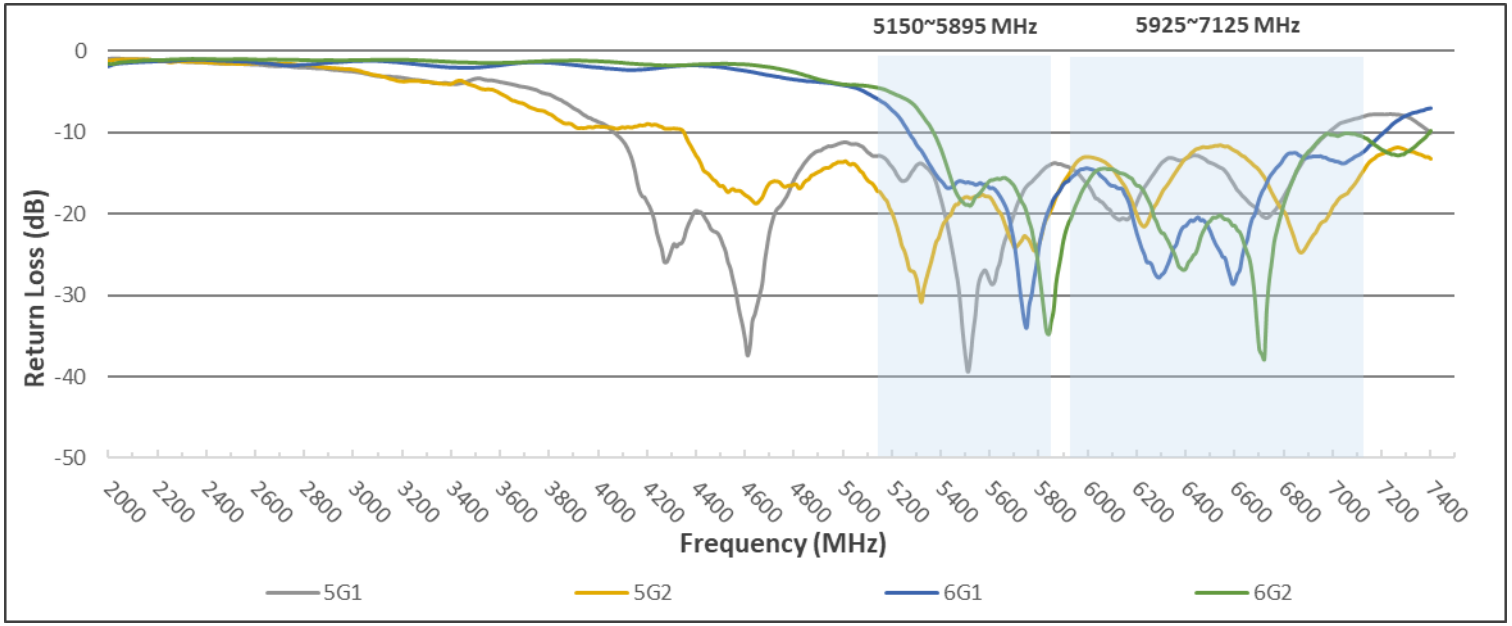


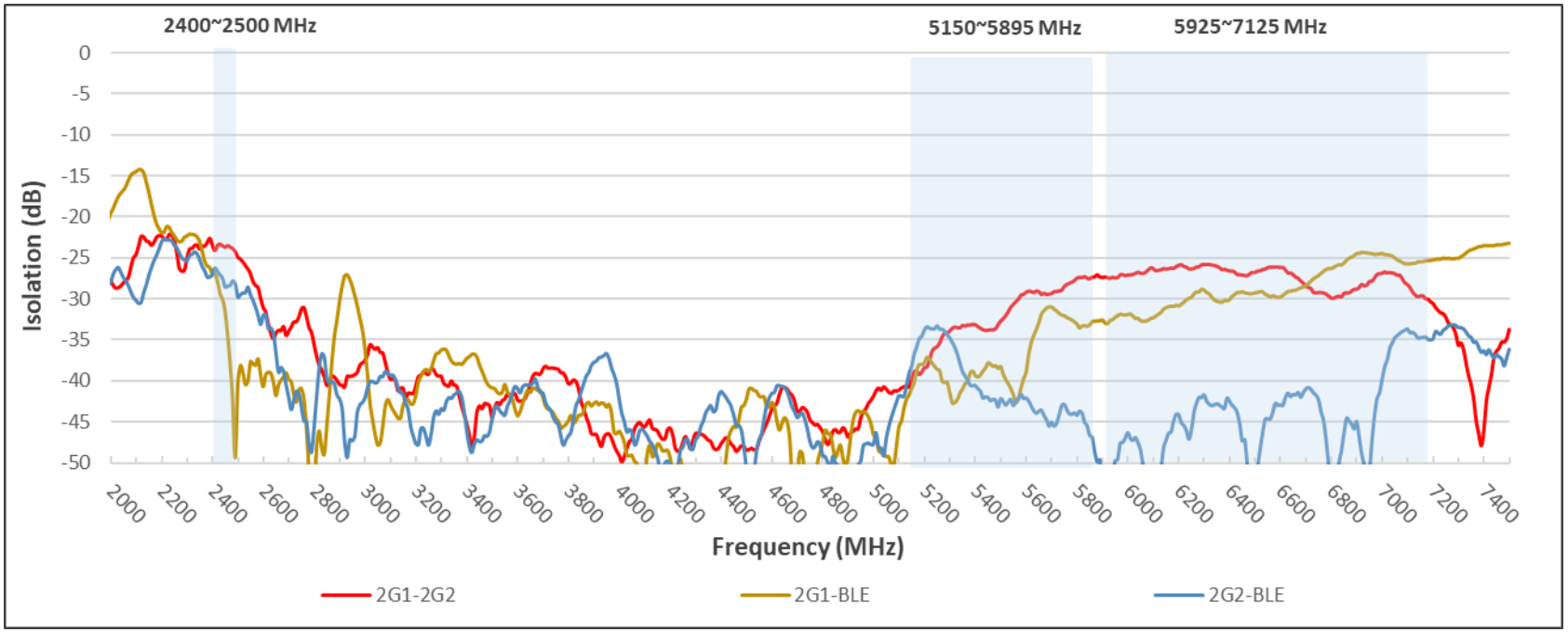
S11			
Freq. (MHz)	2G1	2G2	BLE
2400	-13.37	-14.23	-10.16
2450	-12.73	-12.92	-27.28
2500	-10.13	-10.61	-10.15

S-Parameter



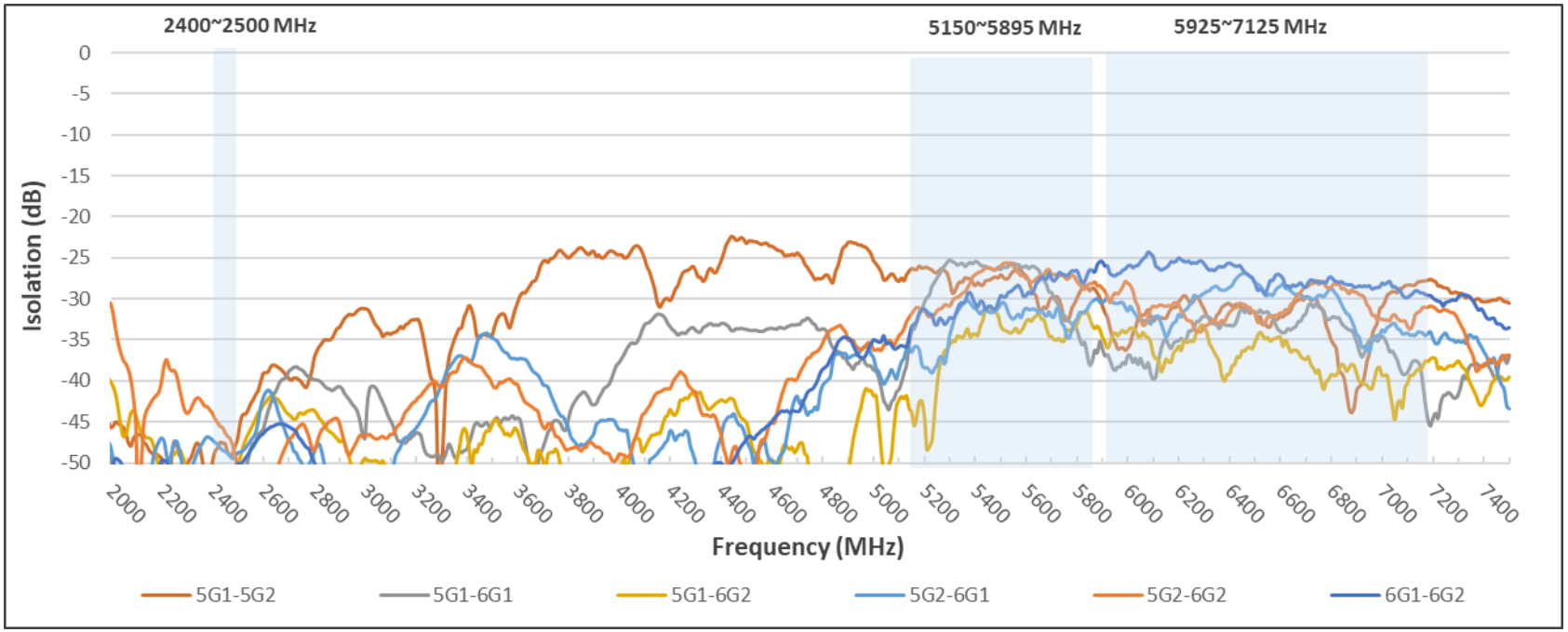
S11				
Freq. (MHz)	5G1	5G2	6G1	6G2
5150	-12.79	-17.31		
5500	-37.46	-17.94		
5850	-13.82	-19.46		
5895	-13.98	-16.18		
5925			-15.09	-18.95
6500			-22.19	-20.84
7125			-11.56	-11.05

Isolation



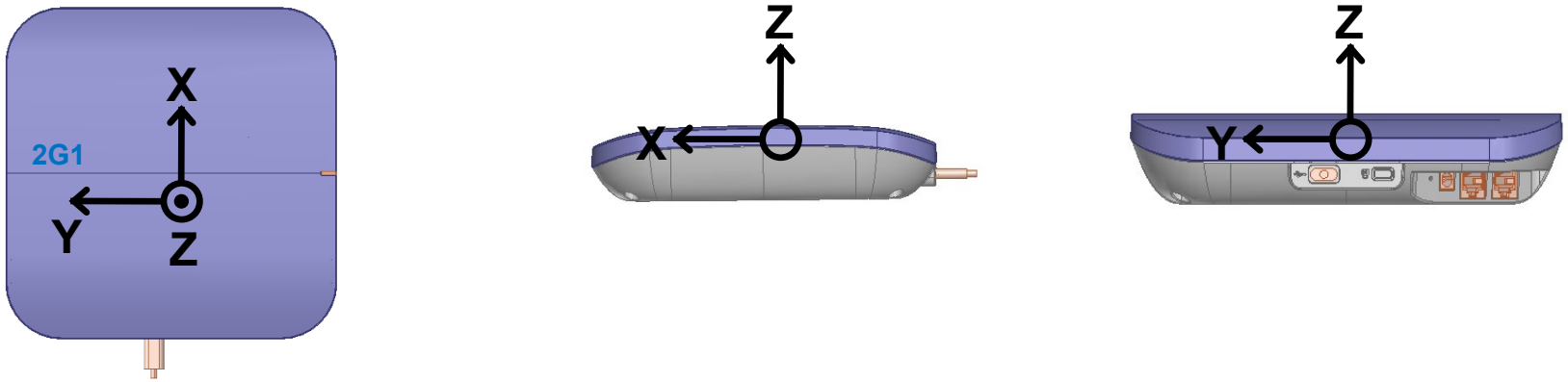
Isolation			
Freq. (MHz)	2G1-2G2	2G1-BLE	2G2-BLE
2400	-23.49	-26.91	-27.09
2450	-23.75	-31.42	-28.58
2500	-24.95	-40.48	-29.84

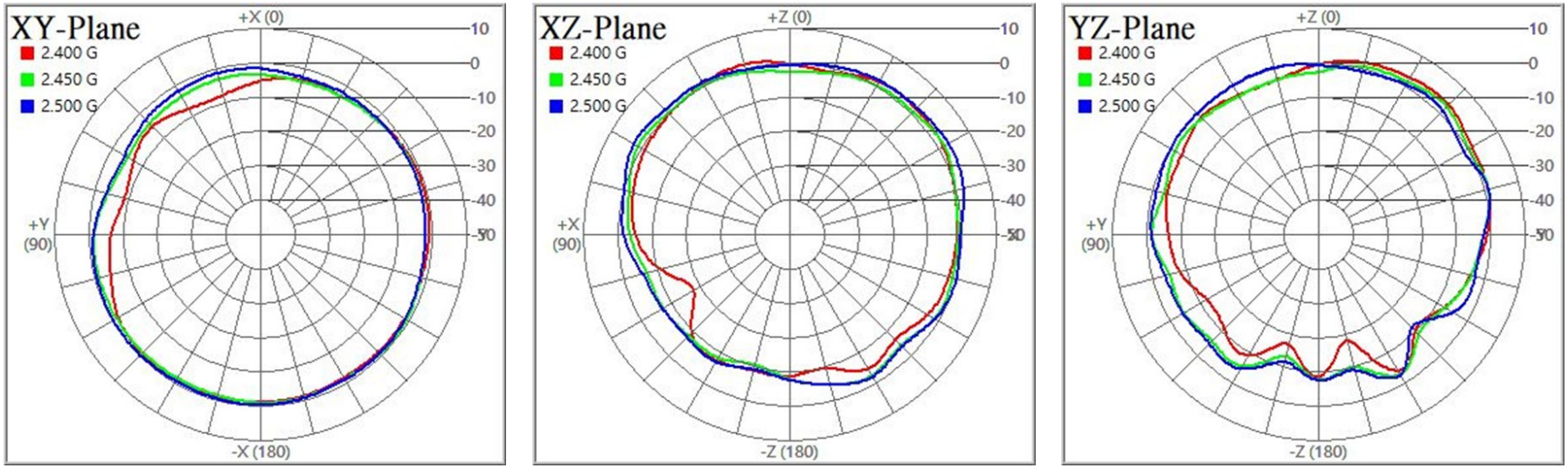
Isolation



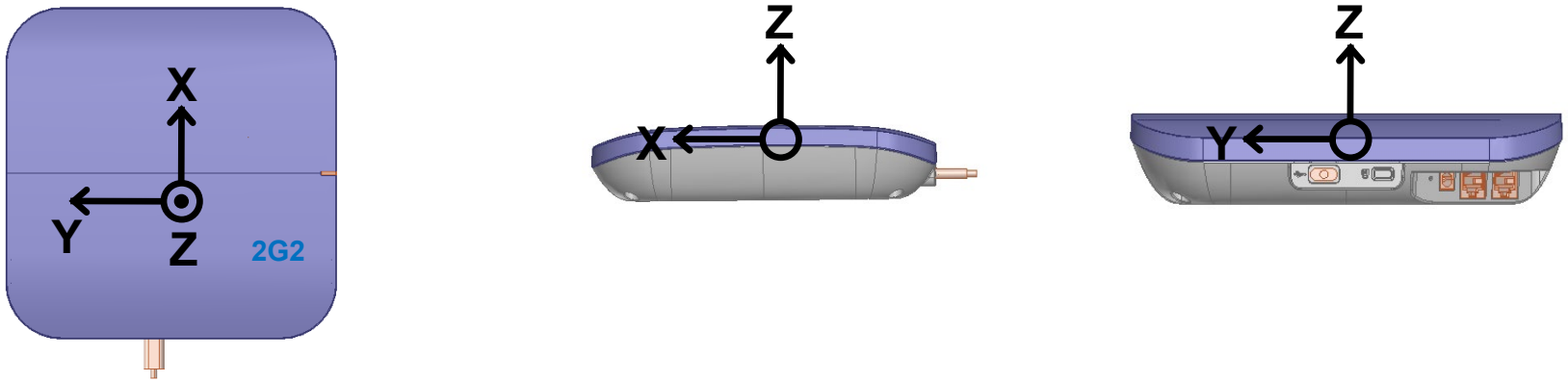
Isolation						
Freq. (MHz)	5G1-5G2	6G1-6G2	5G1-6G1	5G1-6G2	5G2-6G1	5G2-6G2
5150	-26.27		-33.95	-43.90	-36.48	-31.78
5500	-27.05		-26.42	-33.36	-30.65	-26.00
5850	-28.98		-38.11	-32.40	-30.64	-28.15
5895	-30.88		-36.10	-34.71	-30.43	-28.73
5925		-27.16	-38.73	-34.18	-30.49	-29.27
6500		-27.97	-31.69	-35.31	-28.04	-31.58
7125		-29.22	-38.27	-38.74	-34.04	-31.47

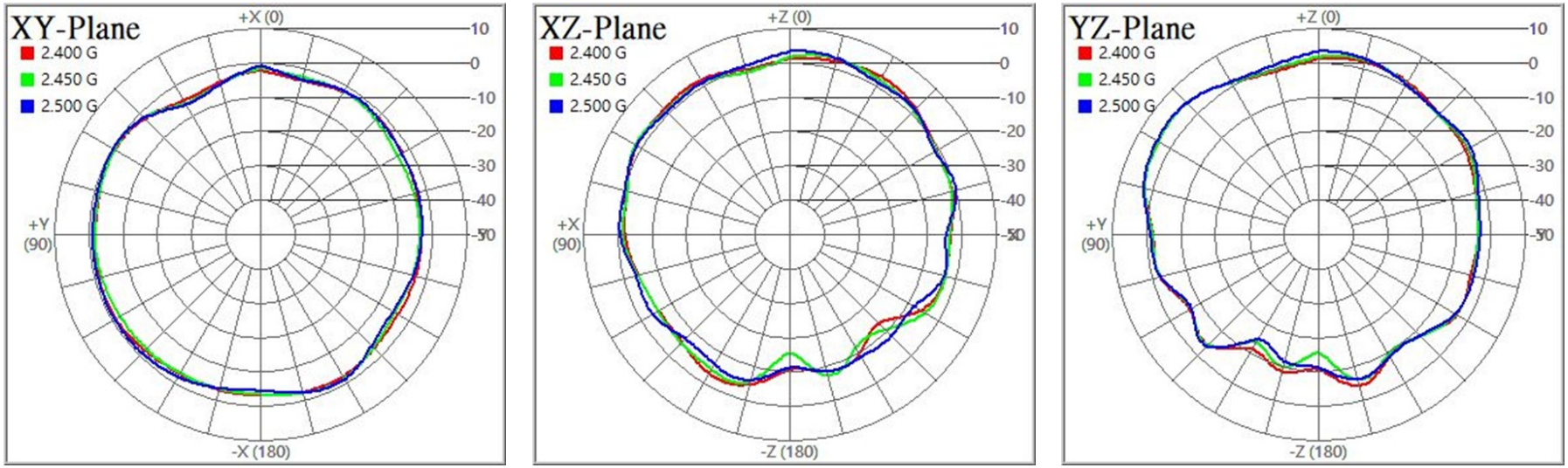
2D Radiation Pattern – 2G1 @ 2.45GHz



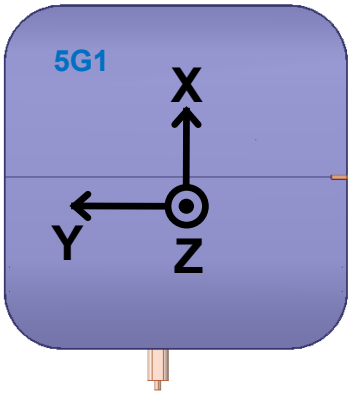


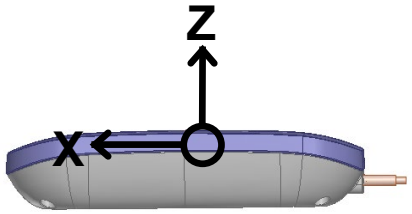
2D Radiation Pattern – 2G2 @ 2.45GHz

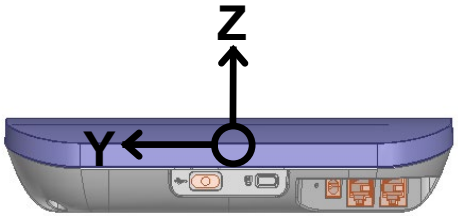


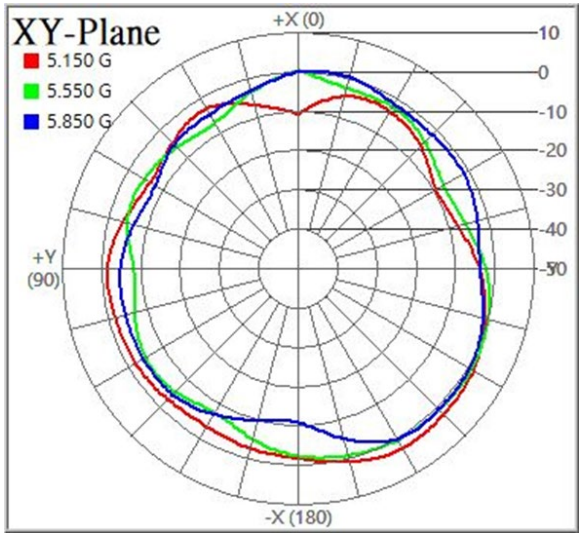


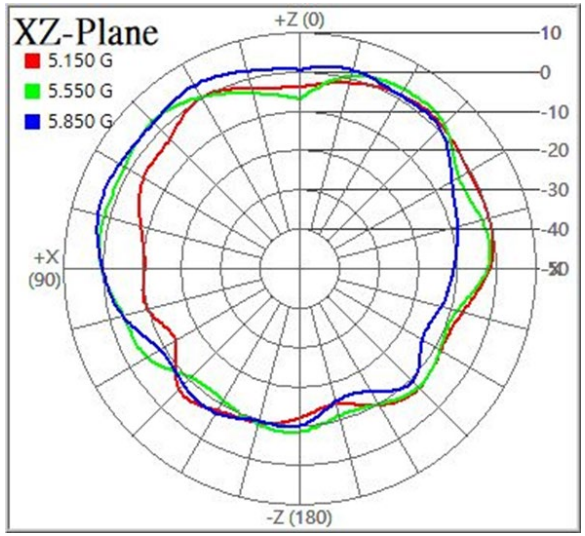
2D Radiation Pattern – 5G1 @ 5.55GHz

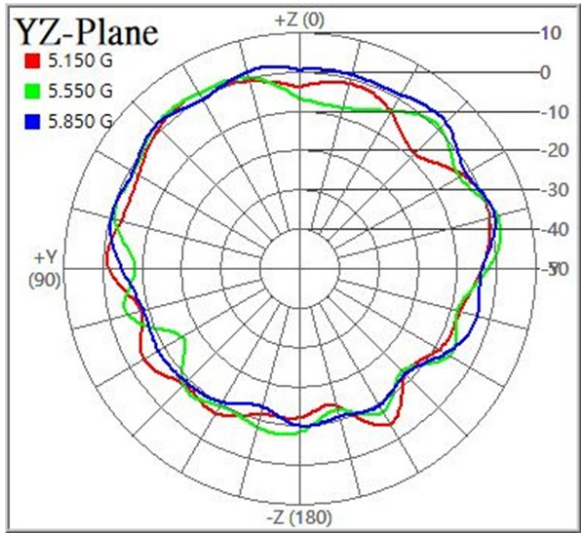




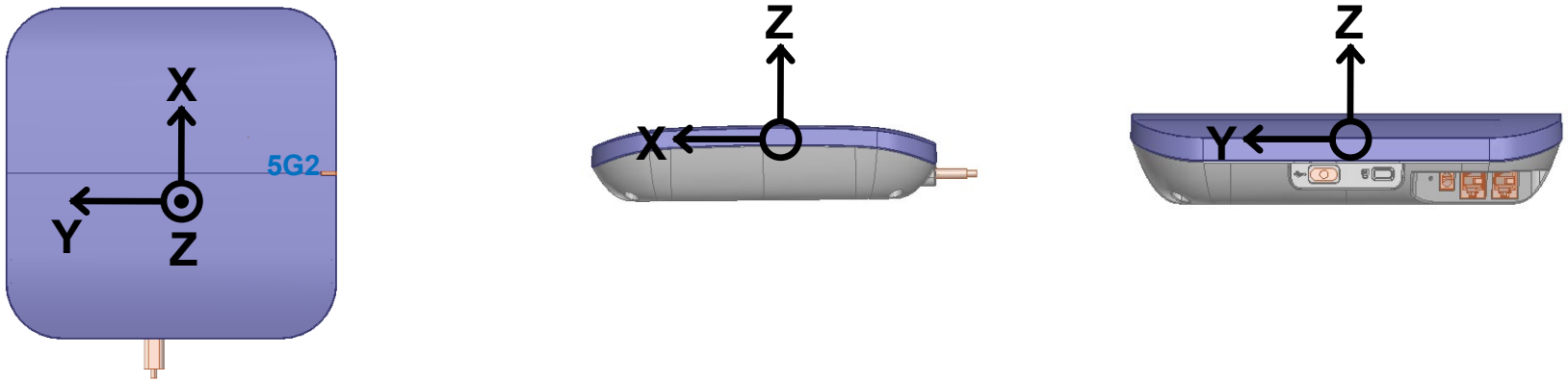


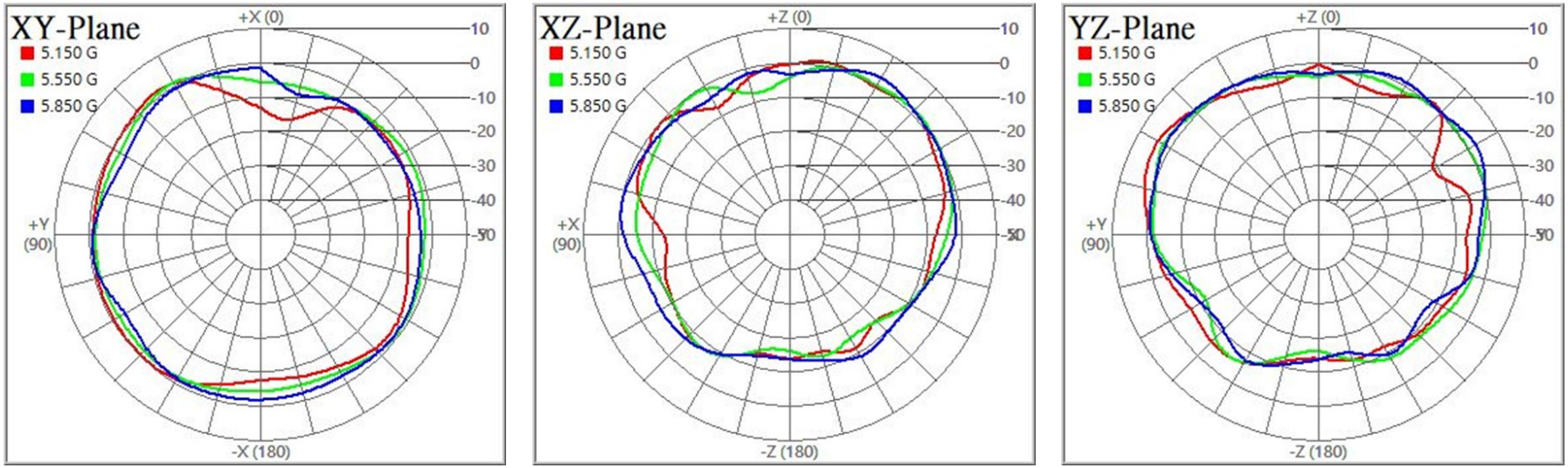




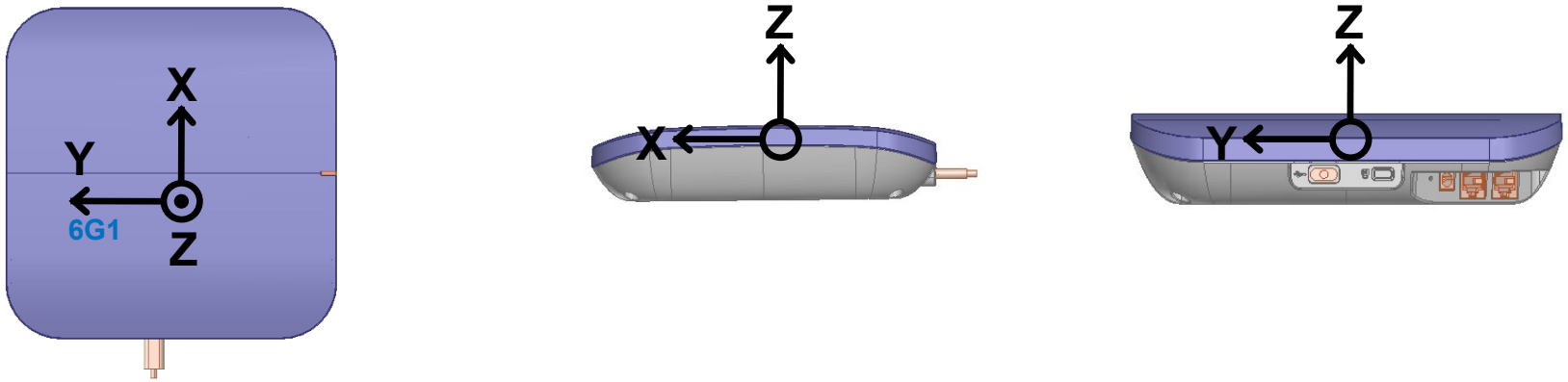


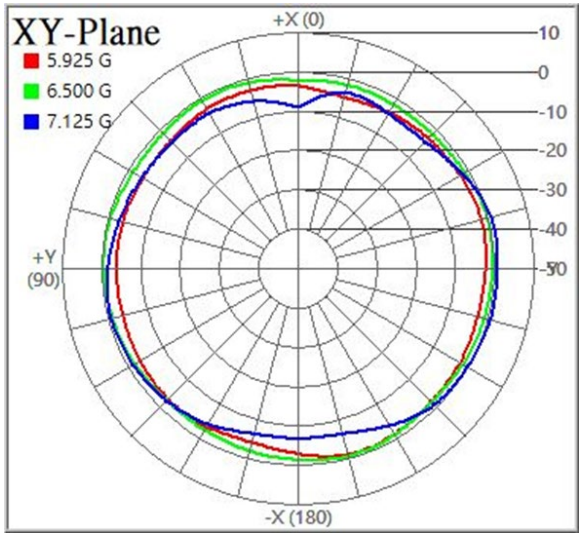
2D Radiation Pattern – 5G2 @ 5.55GHz

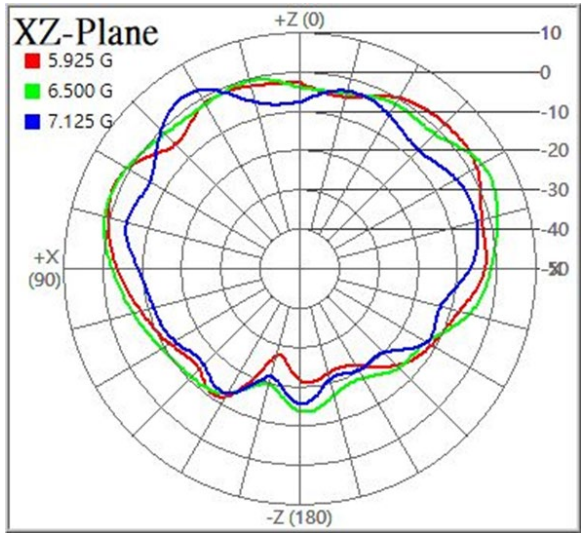


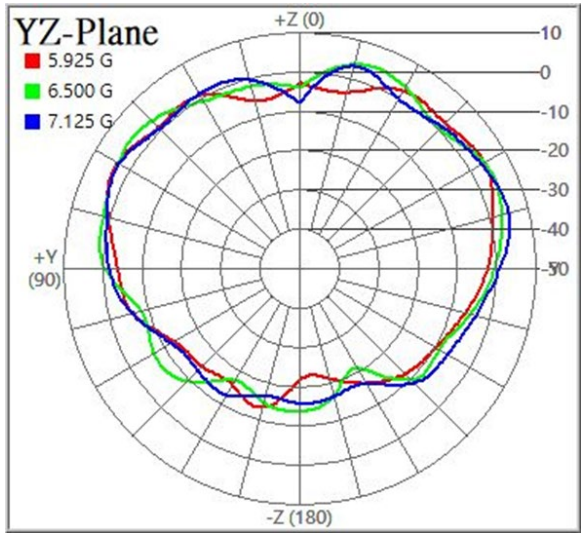


2D Radiation Pattern – 6G1 @ 6.5GHz

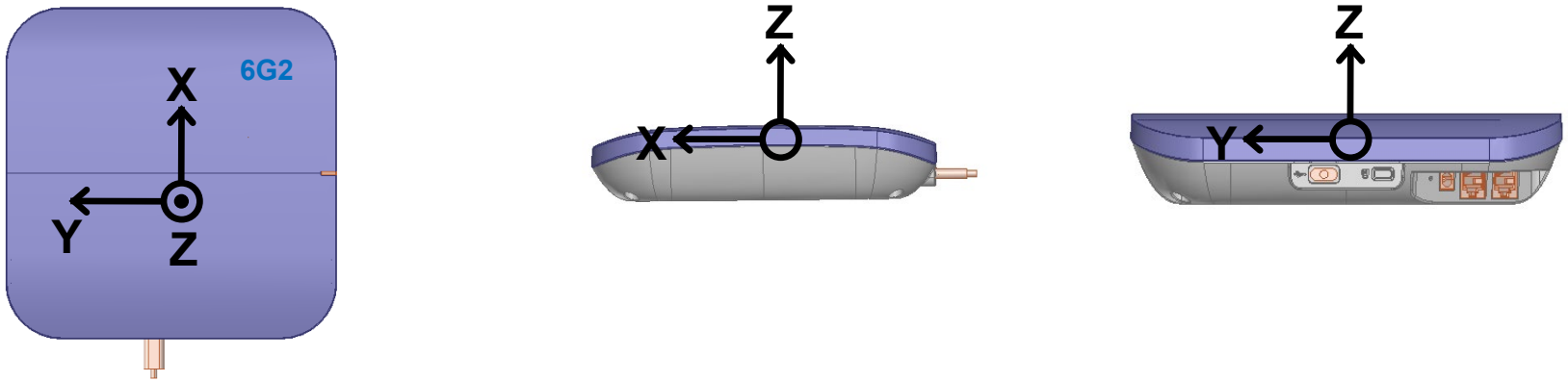


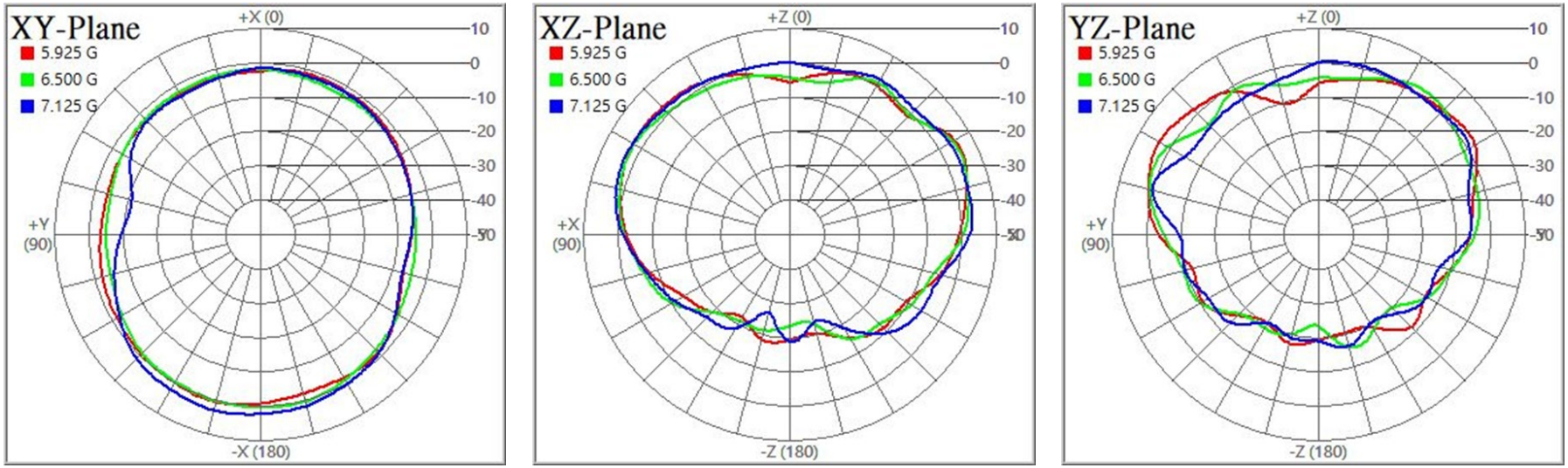




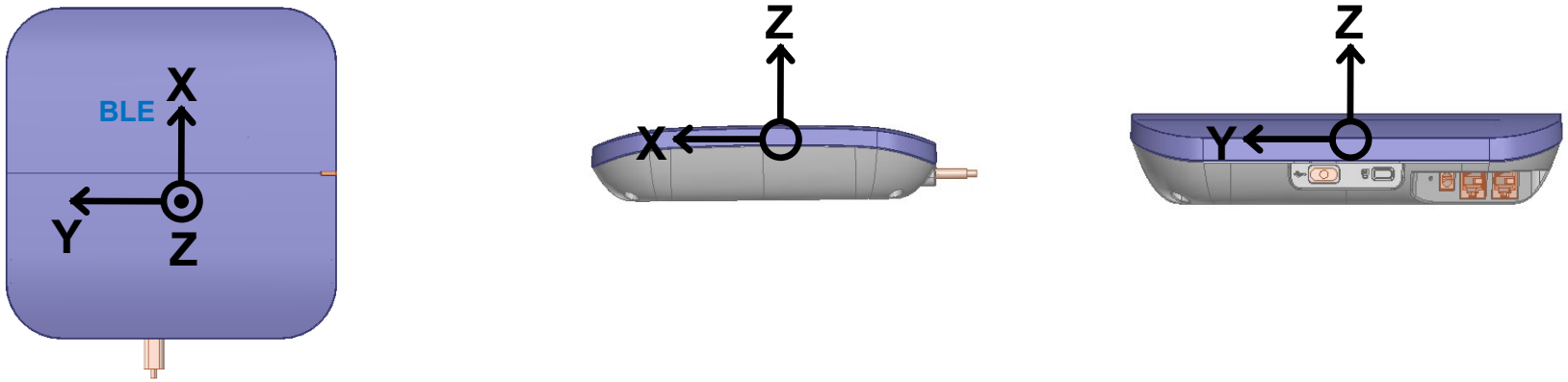


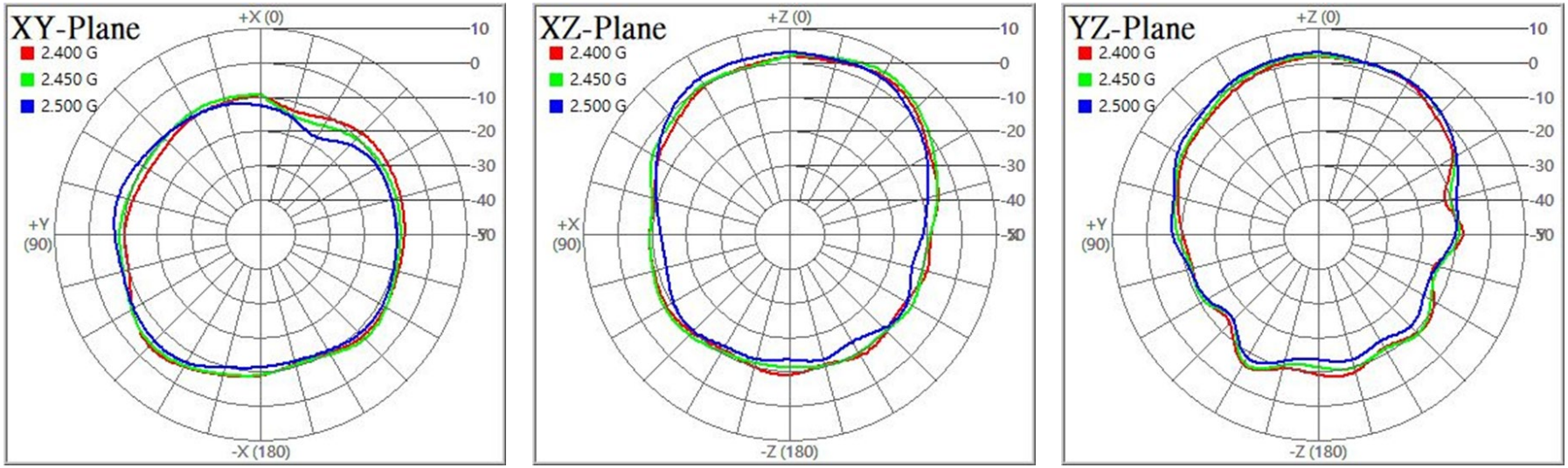
2D Radiation Pattern – 6G2 @ 6.5GHz



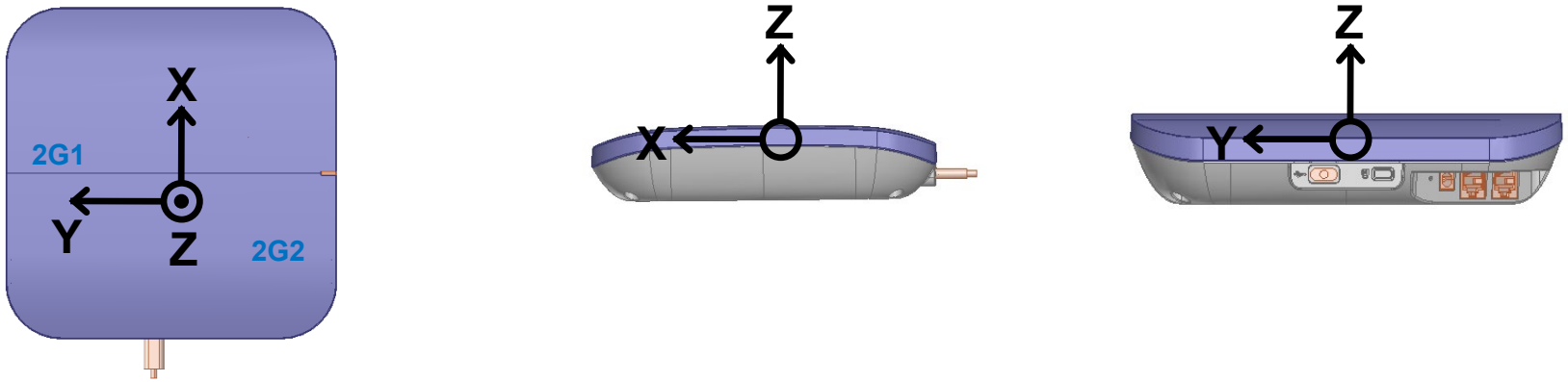


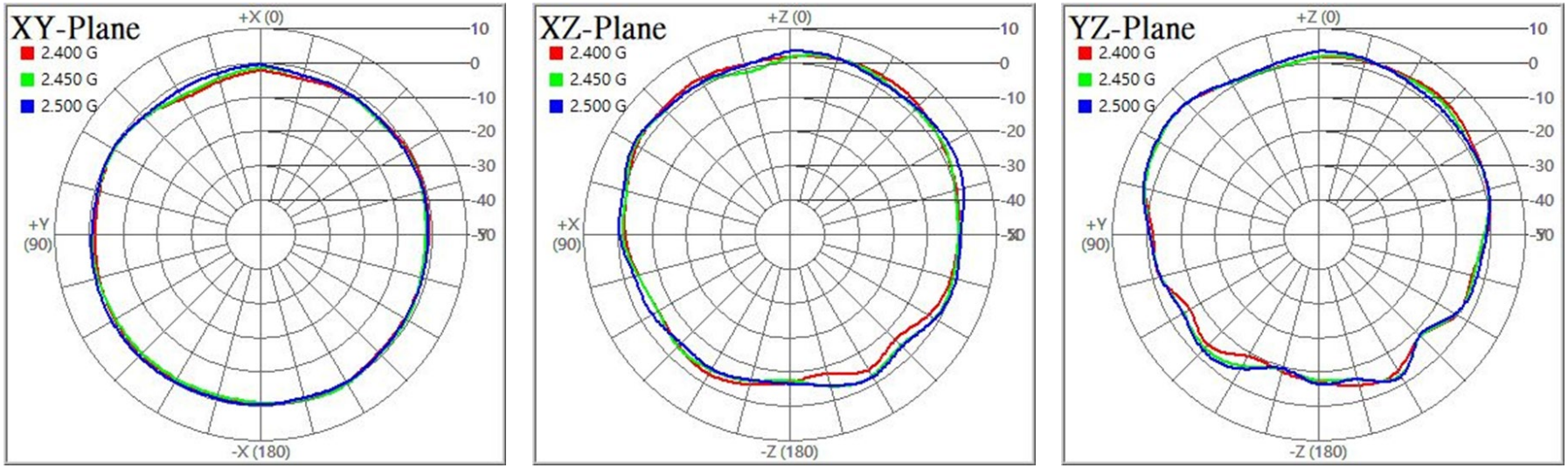
2D Radiation Pattern – BLE @ 2.45GHz



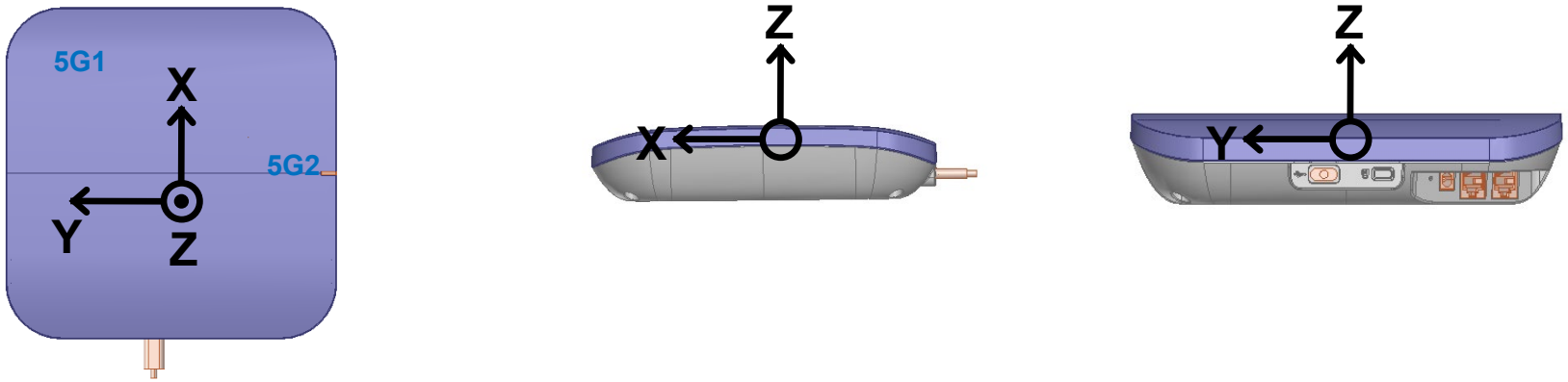


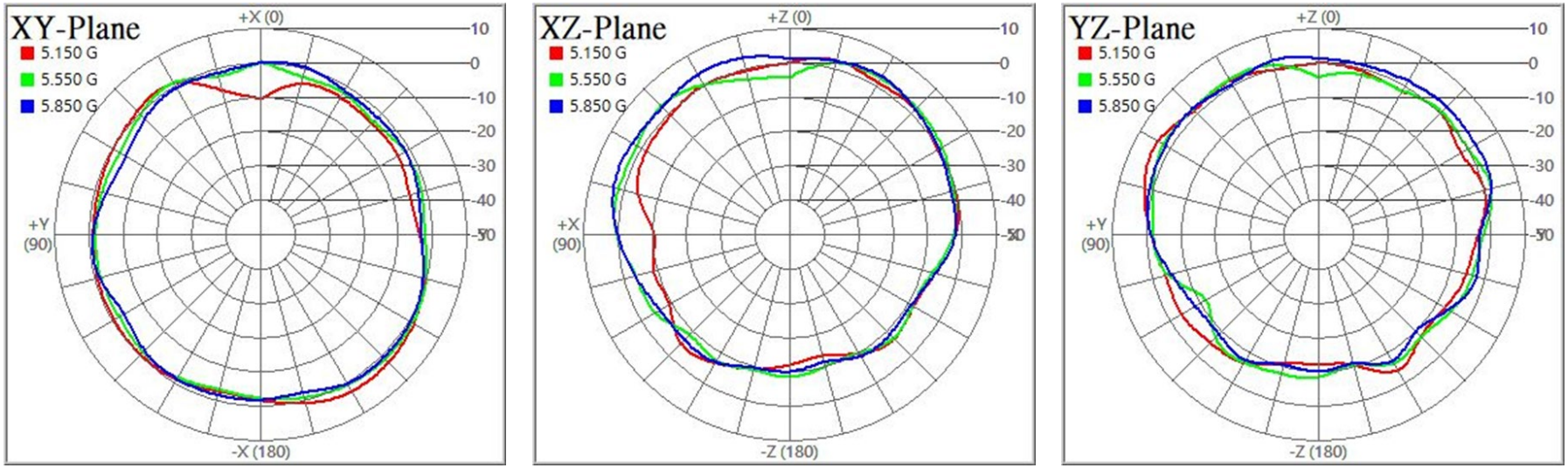
Combine pattern – 2G @ 2.45 GHz



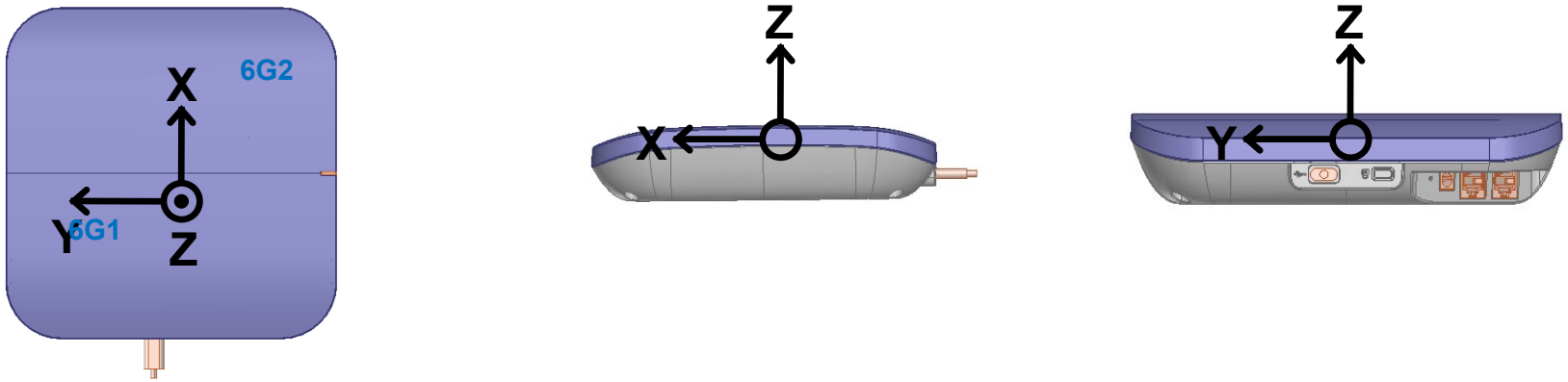


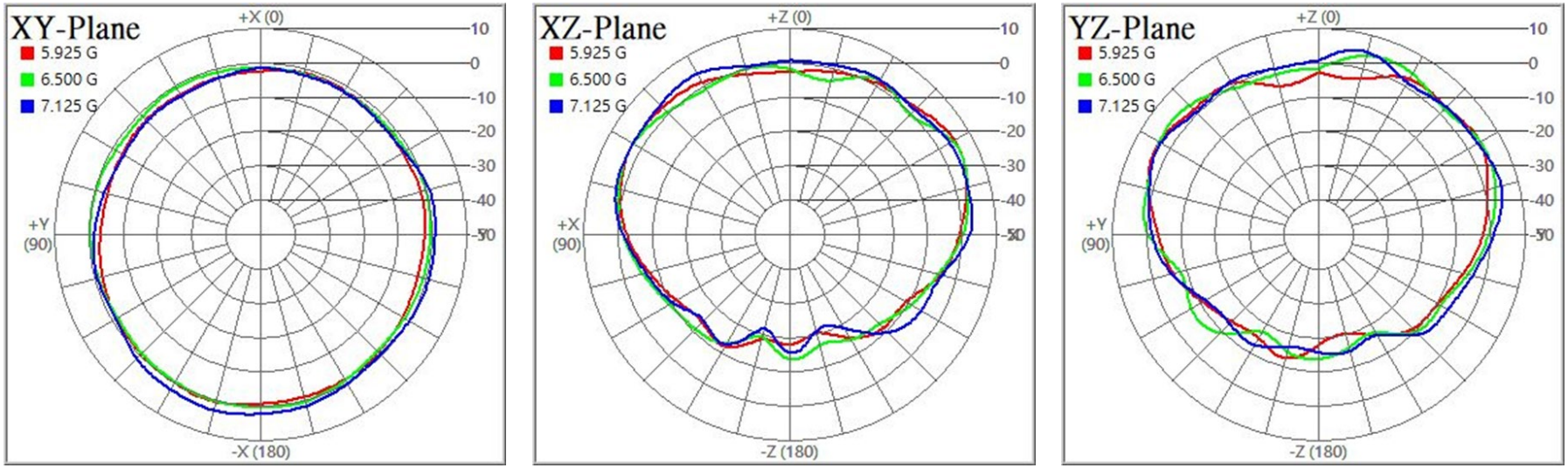
Combine pattern – 5G @ 5.55 GHz





Combine pattern – 6G @ 6.5 GHz





Antenna Efficiency and Gain

Antenna Performance				
Freq. (MHz)	2G1		2G2	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
2400	66.5	4.4	67.2	4.2
2450	68.1	4.3	69.8	4.2
2500	69.7	4.0	69.7	4.3

Antenna Performance		
Freq. (MHz)	BLE	
	Efficiency (%)	Peak Gain (dBi)
2400	61.3	3.1
2450	62.5	3.2
2500	67.4	3.0

Antenna Performance				
Freq. (MHz)	5G1		5G2	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
5150	64.0	5.5	60.3	5.0
5500	61.9	4.6	65.5	4.6
5850	68.5	5.6	67.8	5.2
5895	67.5	5.3	69.1	4.9

Antenna Performance				
Freq. (MHz)	6G1		6G2	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
5925	68.2	5.0	69.2	5.6
6500	68.8	4.7	67.3	4.4
7125	65.3	5.1	66.7	4.7