

WLAN Tri-Band Reference Antenna Datasheet

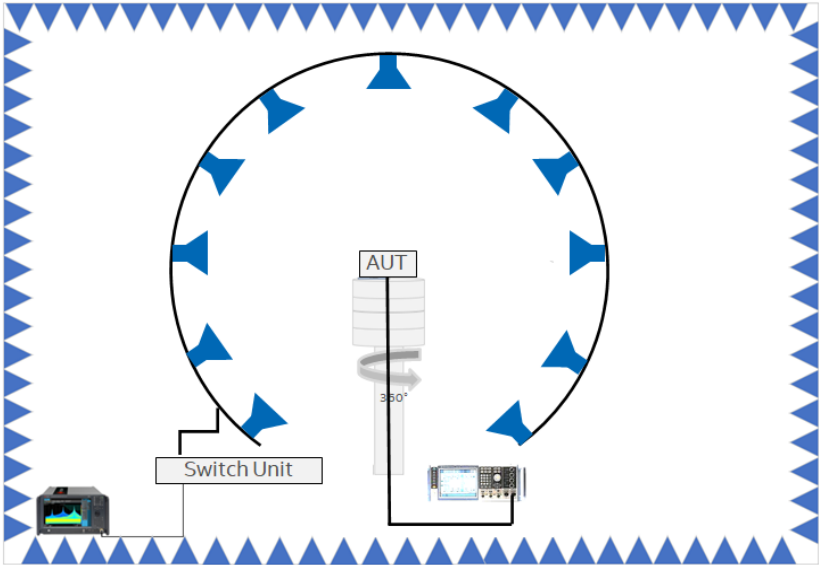
1. Measurement Method and Test System

The measurement method is based on 3D spherical measurement using a distributed axis test system shown in the figures below.

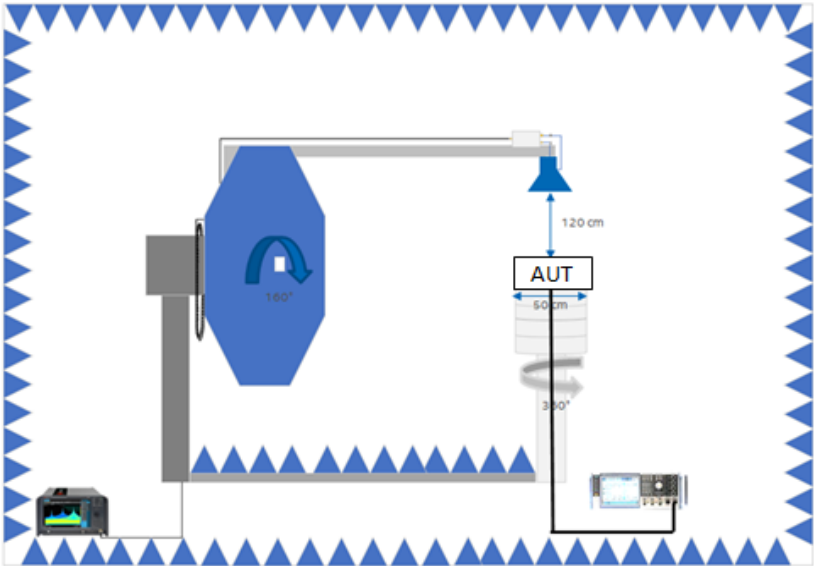
2. Test Setup & Equipment List

2.1. Test Setup

2.1.1. WiFi/BT 2.4G (2400 - 2483 MHz) and WiFi 5G (5150 - 5925 MHz)



2.1.2. WiFi 6G (5925 - 7200 MHz)



2.2. Test Equipment List

2.3. WiFi 2.4G (2400 - 2483 MHz) and WiFi 5G (5150 – 5925 MHz)

ID#	Device	Type/Model	Serial #	Manufacturer
013-000	Spherical full anechoic chamber	AMS-8923-150	5719	ETS-Lindgren
013-011	Measurement Software	EMQuest v 1.15 build 27347	1404	ETS-Lindgren
013-001	Switch & Positioning Control Platform	EMCenter	00159758	ETS-Lindgren
013-003	System Amplifier Module (0.5 - 6 GHz)	SAM-01	-	ETS-Lindgren
271-000	Signal Analyzer 9kHz – 6GHz	FSL6	102143	Rohde & Schwarz
130-000	Signal generator	SMB 100A	178217	Rohde & Schwarz

2.4. WiFi 6G (5925 - 7200 MHz)

ID#	Device	Type/Model	Serial #	Manufacturer
009-000	Spherical full anechoic chamber	WPTC	P28765-00651-001-PRB	Rohde & Schwarz
009-001	Measurement software (v11.30)	AMS32	100084	Rohde & Schwarz
152-000	Cross-polarized vivaldi antenna	TC-TA85CP	101018	Rohde & Schwarz
345-000	Switch unit + LNA	TC-ELAMP-D	1533.6350.02	Rohde & Schwarz
335-000	Positionner	NCD	173167577	Maturo
143-000	Spectrum analyser	UXA N9040B	US57212210	Keysight
130-000	Signal generator	SMB 100A	178217	Rohde & Schwarz

3. Antenna Specification

The herein test results were performed by:

Test case measurement	Test Personnel
Antenna Gain measurement below 6 GHz	A. Azize Gilbert
Antenna Gain measurement above 6 GHz	T. Andriamiharivolamena

3.1. Antenna information

Manufacturer	Type	Antenna Part number	Band	Peak Gain (dBi)	Target Peak Gain (dBi)
Intel WRF Lab	PIFA	WRF-Tri Band-Antenna	2.4GHz 2400-2483MHz	2.95	3
			5.2GHz 5.150-5.250MHz	5.11	5
			5.4GHz 5250-5470MHz	5.15	
			5.6GHz 5470-5725MHz	5.15	
			5.8GHz 5725-5925MHz	5.13	5
			6.2GHz 5925-6425MHz	5.02	
			6.5GHz 6425-6525MHz	5.02	
			6.6GHz 6525-6875MHz	4.96	
			7GHz 6875-7125MHz	4.96	

3.2. Antenna Peak Gain Table

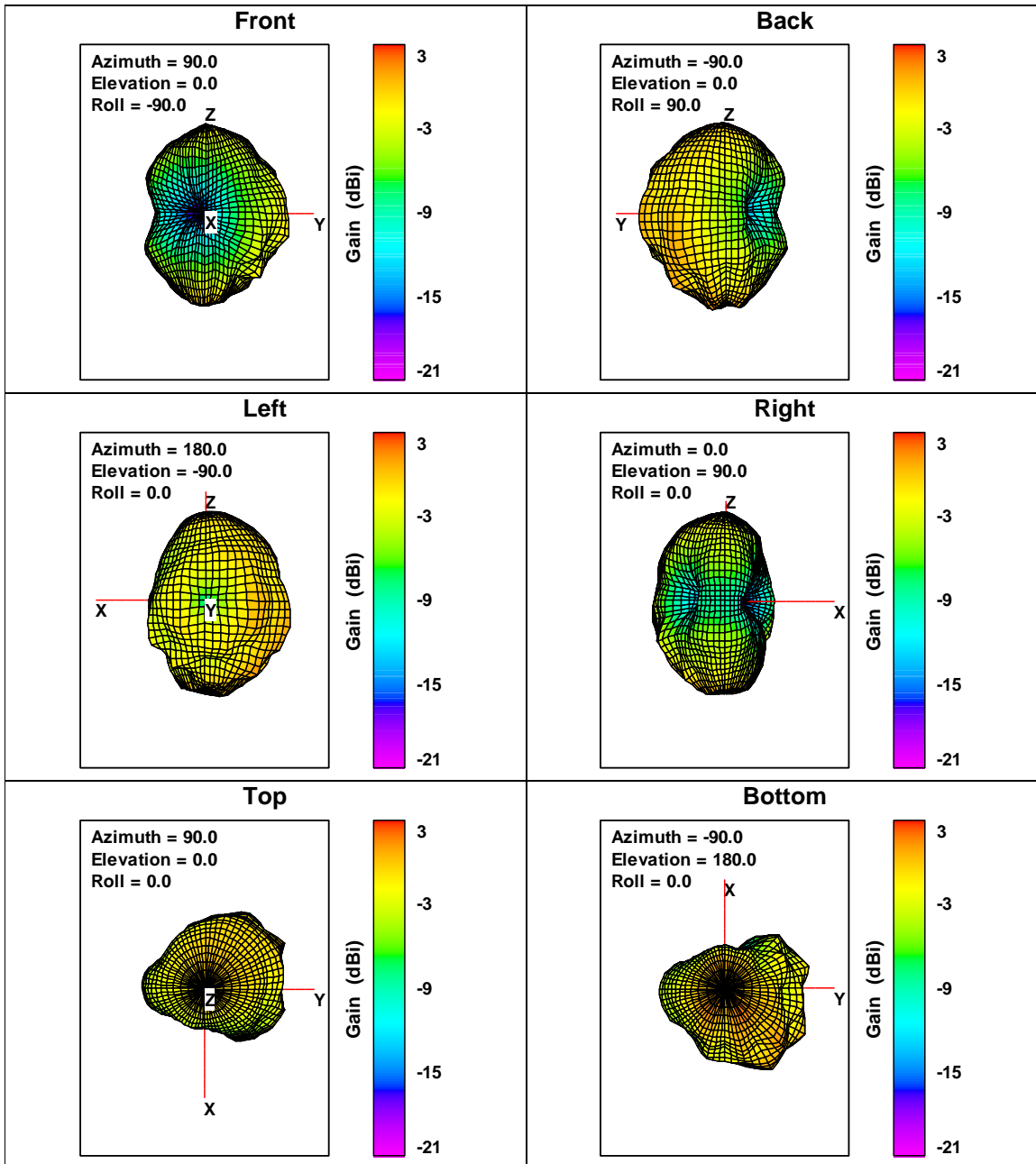
Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
2400	-2.45	0.11	2.03
2450	-2.85	1.63	2.95
2483	-2.23	1.37	2.94
5150	3.27	-2.31	4.33
5175	-7.63	4.87	5.11
5250	-5.4	4.08	4.55
5350	-4.76	3.79	4.36
5470	3.95	-1.02	5.15
5725	-6.5	4.82	5.13
5850	3.64	-3.33	4.44
5925	-10.4	4.31	4.45
6000	3.61	-0.54	5.02
6425	-7.08	4.74	5.02
6525	3.37	-0.46	4.88
6875	3.03	0.53	4.96
7125	4.38	-4.02	4.96

4. Antenna Radiation Patterns

4.1. WiFi/BT 2.4G (2400 - 2483 MHz)

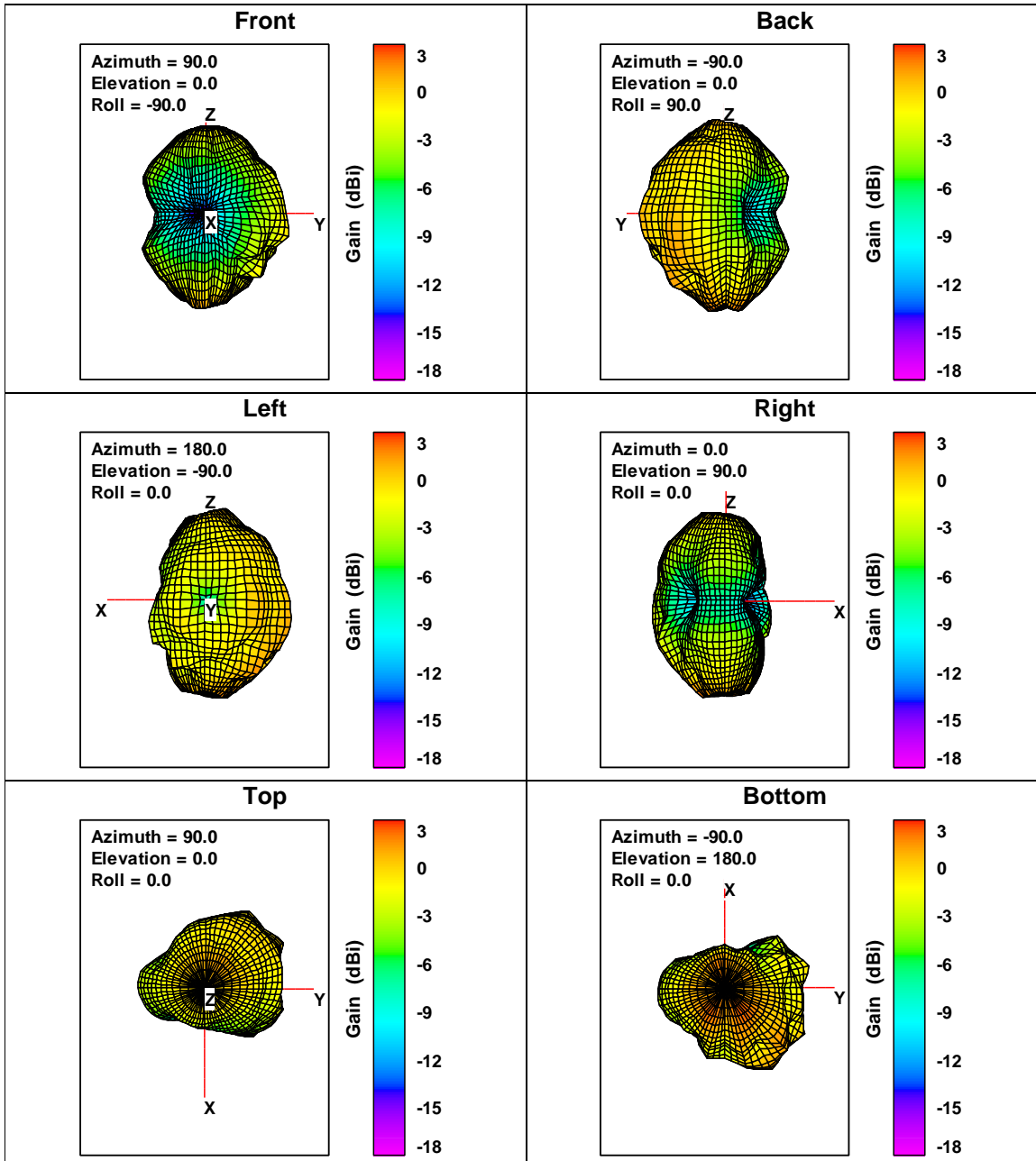
4.1.1. Antenna Pattern @2400MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
2400	-2.45	0.11	2.03



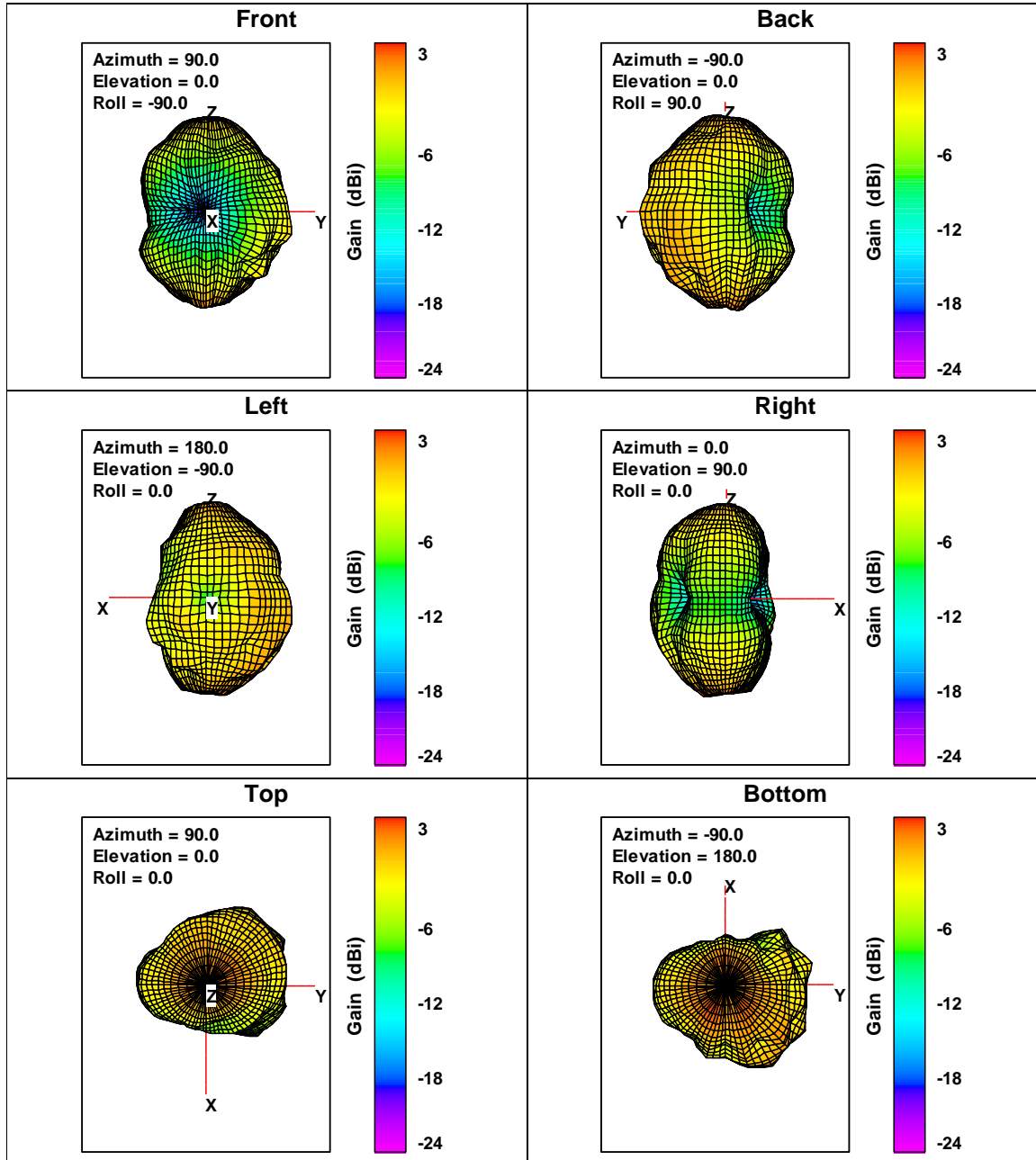
4.1.2. Antenna Pattern @2450MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
2450	-2.85	1.63	2.95



4.1.3. Antenna Pattern @2483MHz

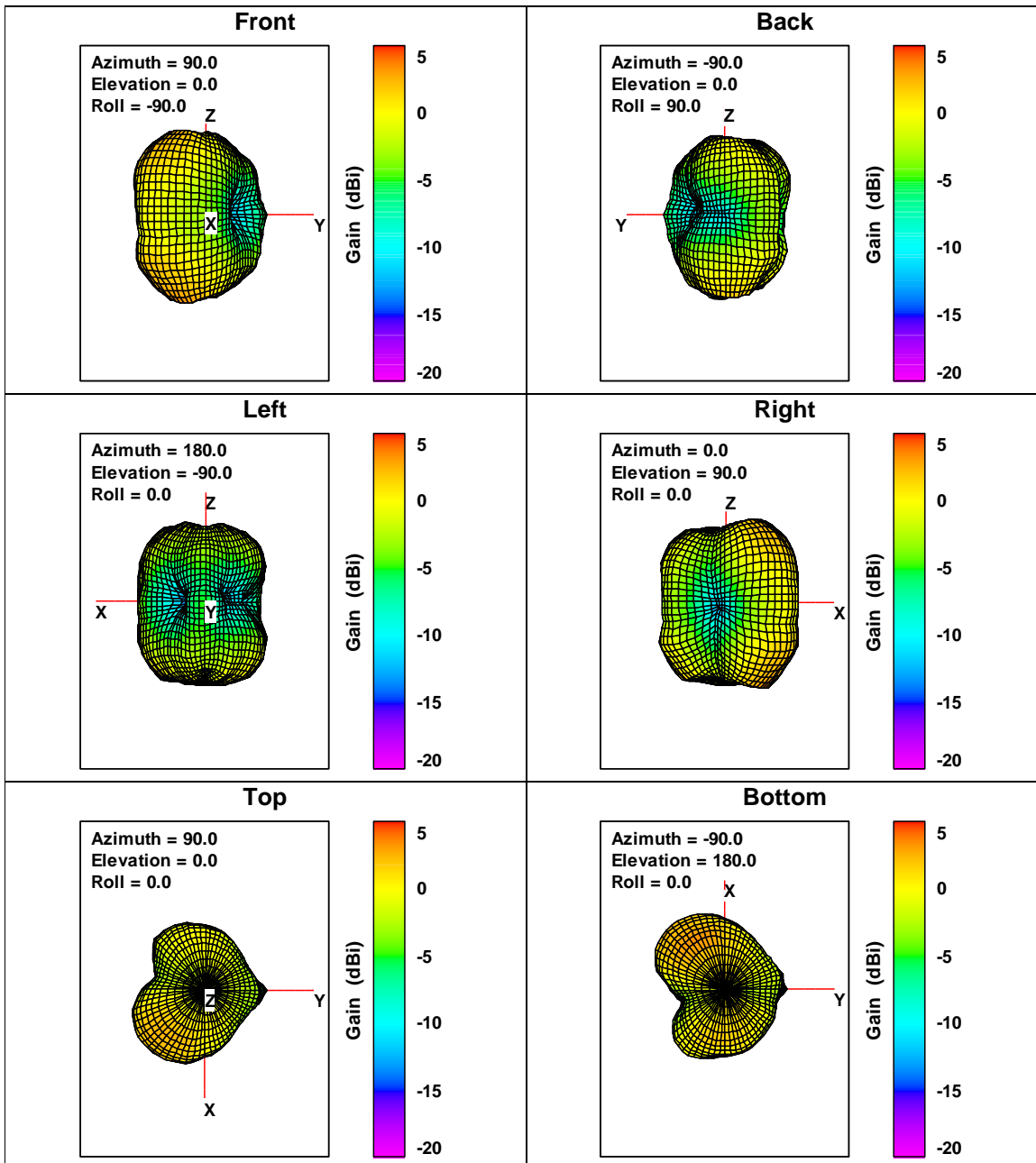
Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
2483	-2.23	1.37	2.94



4.2. WiFi 5G (5150 - 5925 MHz)

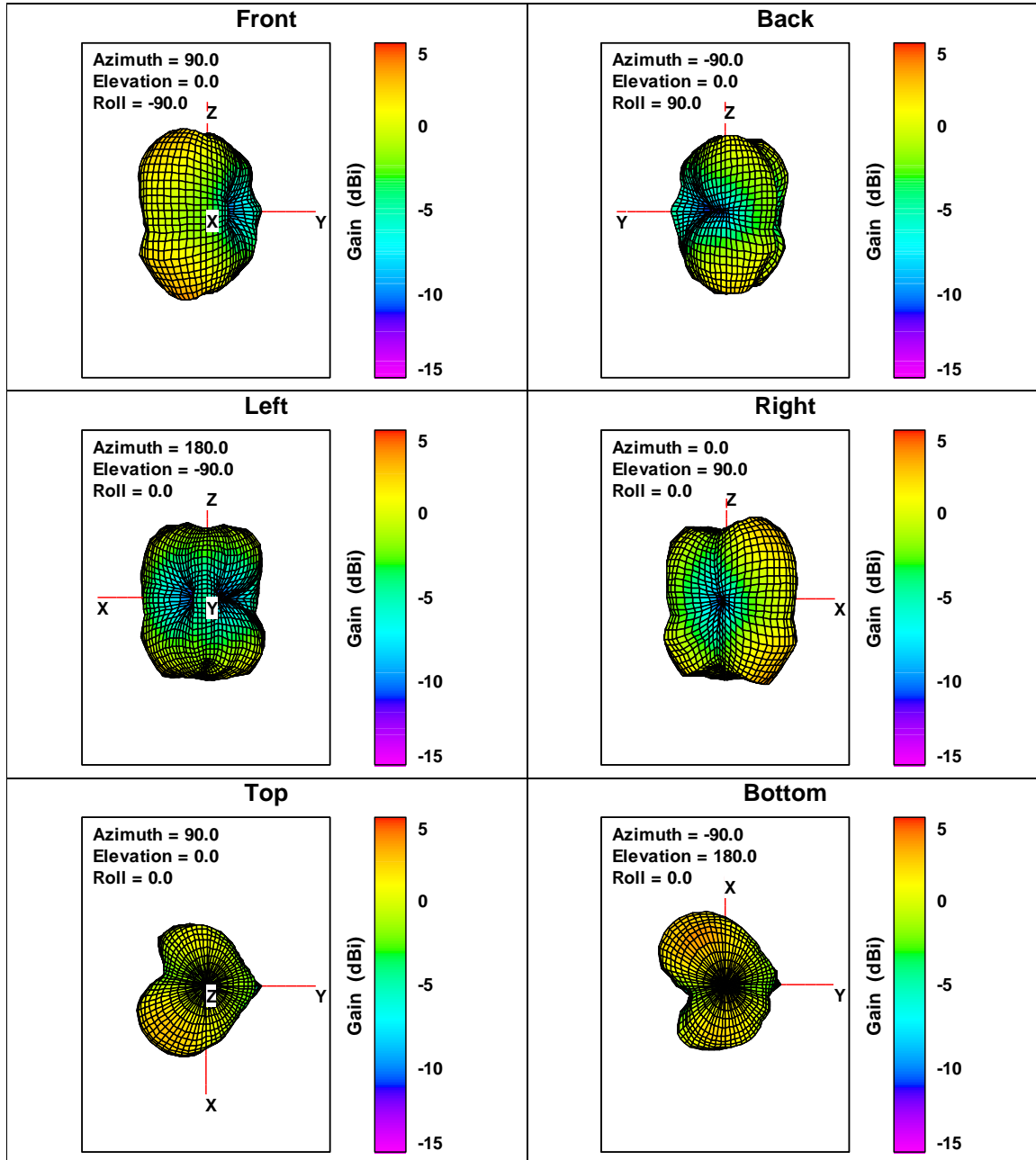
4.2.1. Antenna Pattern @5150MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5150	3.27	-2.31	4.33



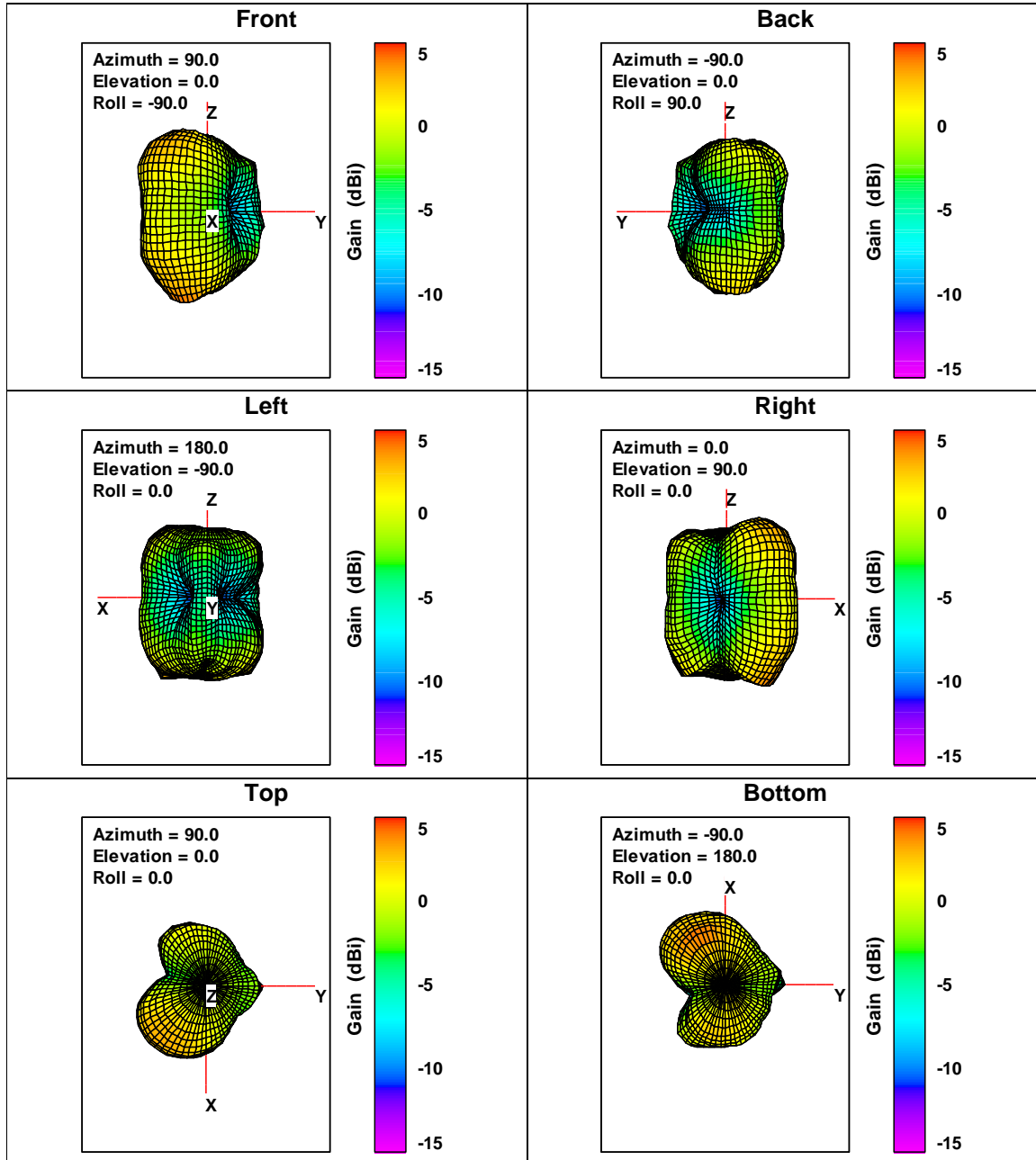
4.2.2. Antenna Pattern @5175MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5175	-7.63	4.87	5.11



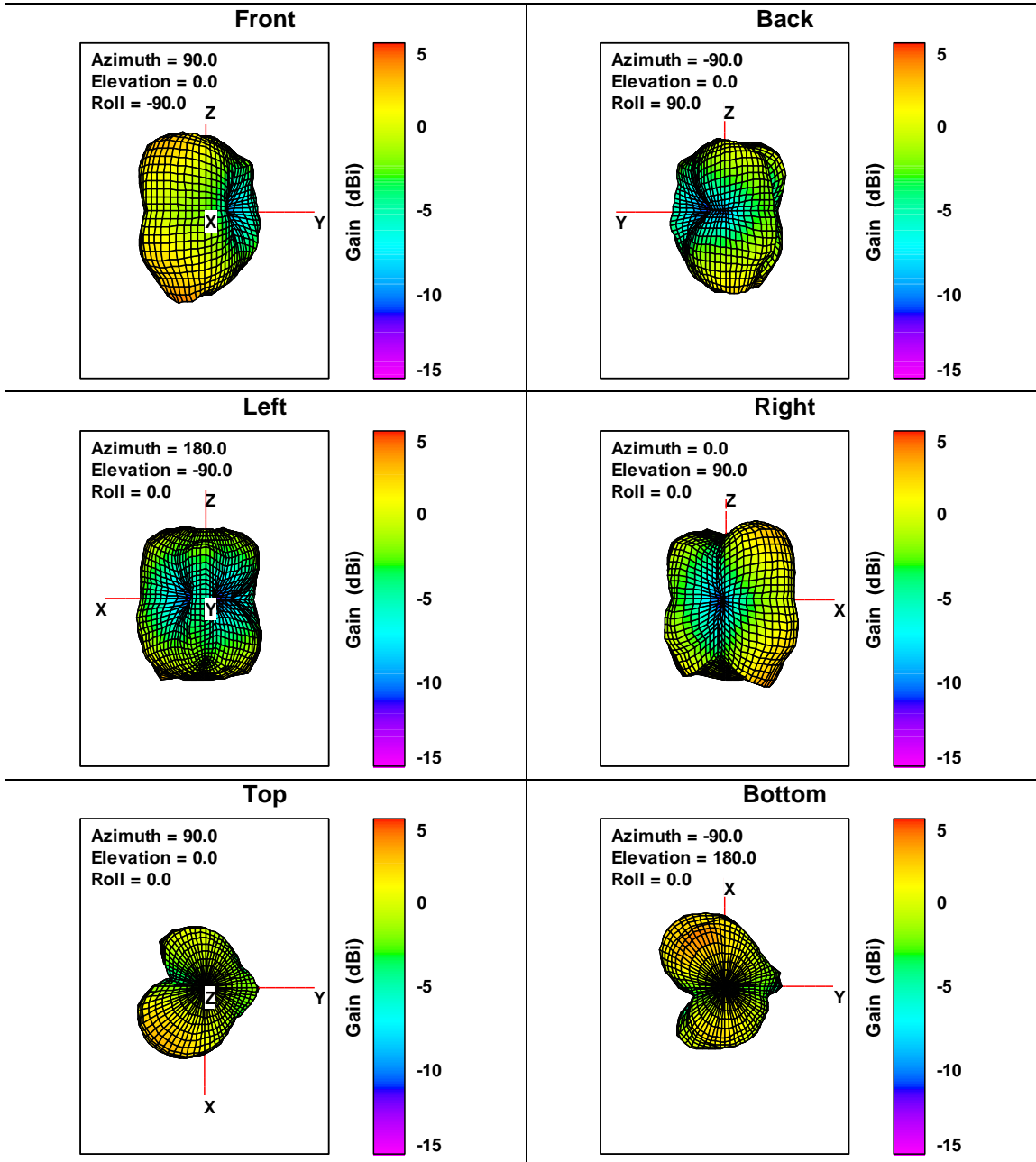
4.2.3. Antenna Pattern @5250MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5250	-5.4	4.08	4.55



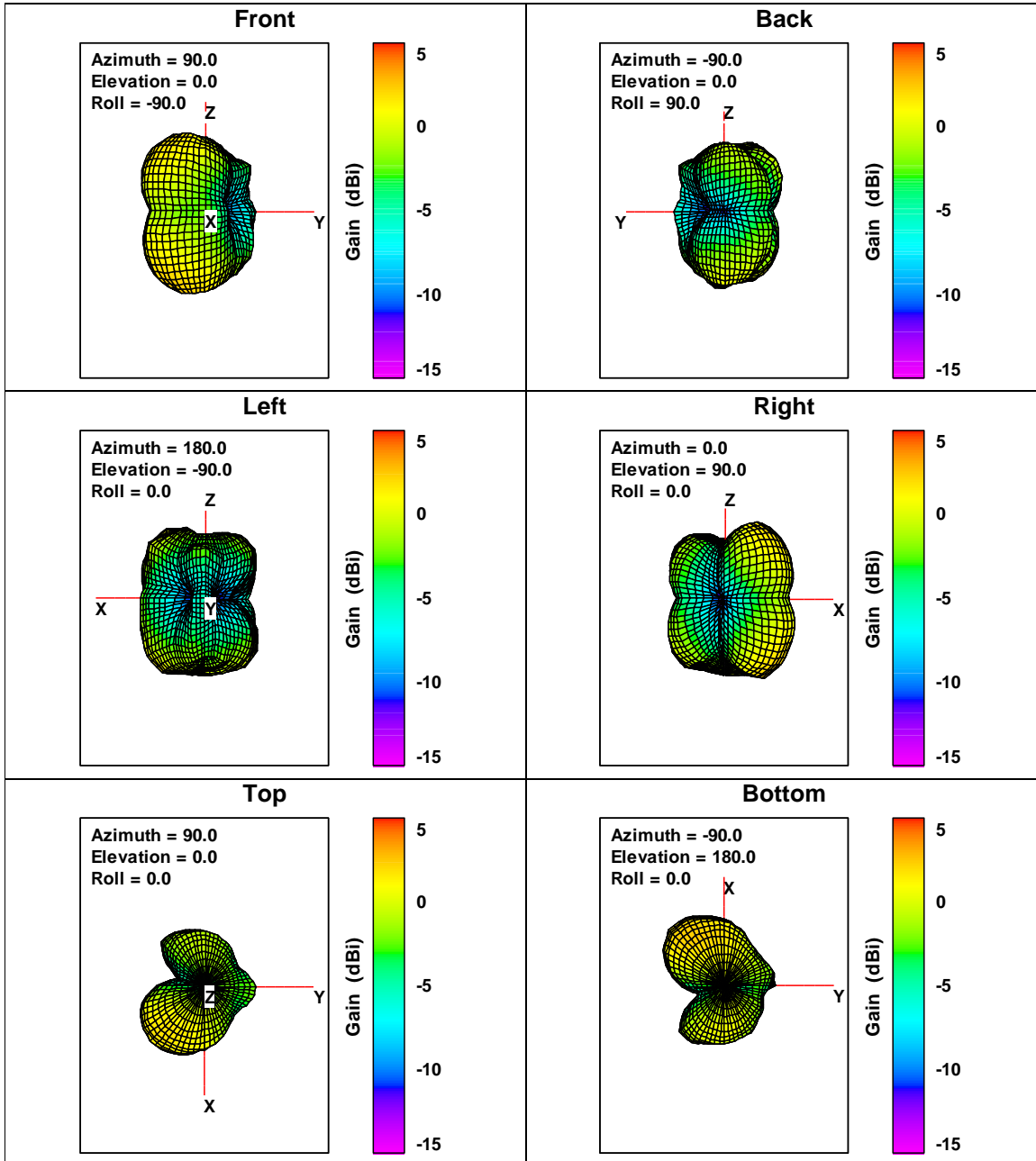
4.2.4. Antenna Pattern @5350MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5350	-4.76	3.79	4.36



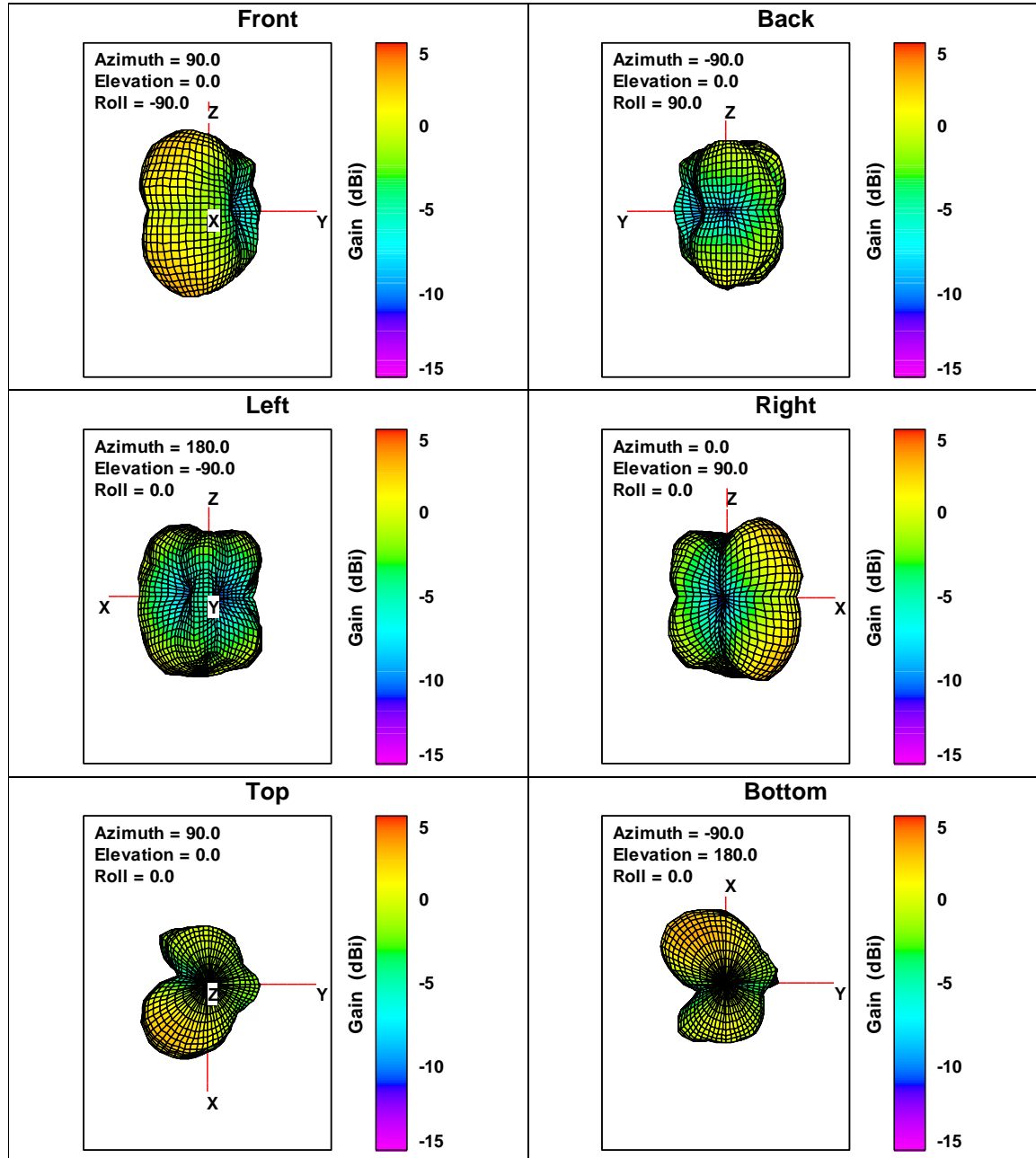
4.2.5. Antenna Pattern @5470MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5470	3.95	-1.02	5.15



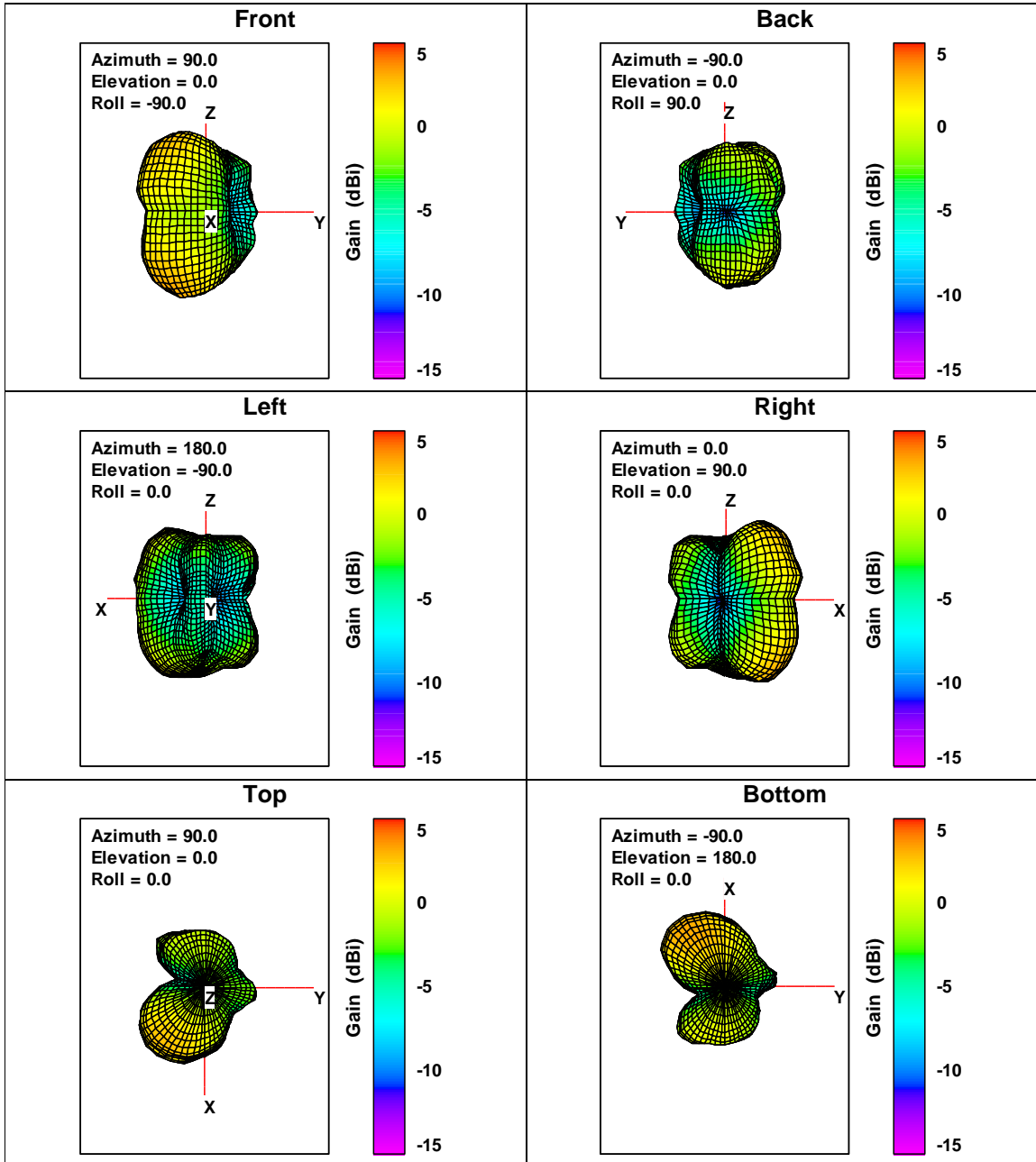
4.2.6. Antenna Pattern @5725MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5725	-6.5	4.82	5.13



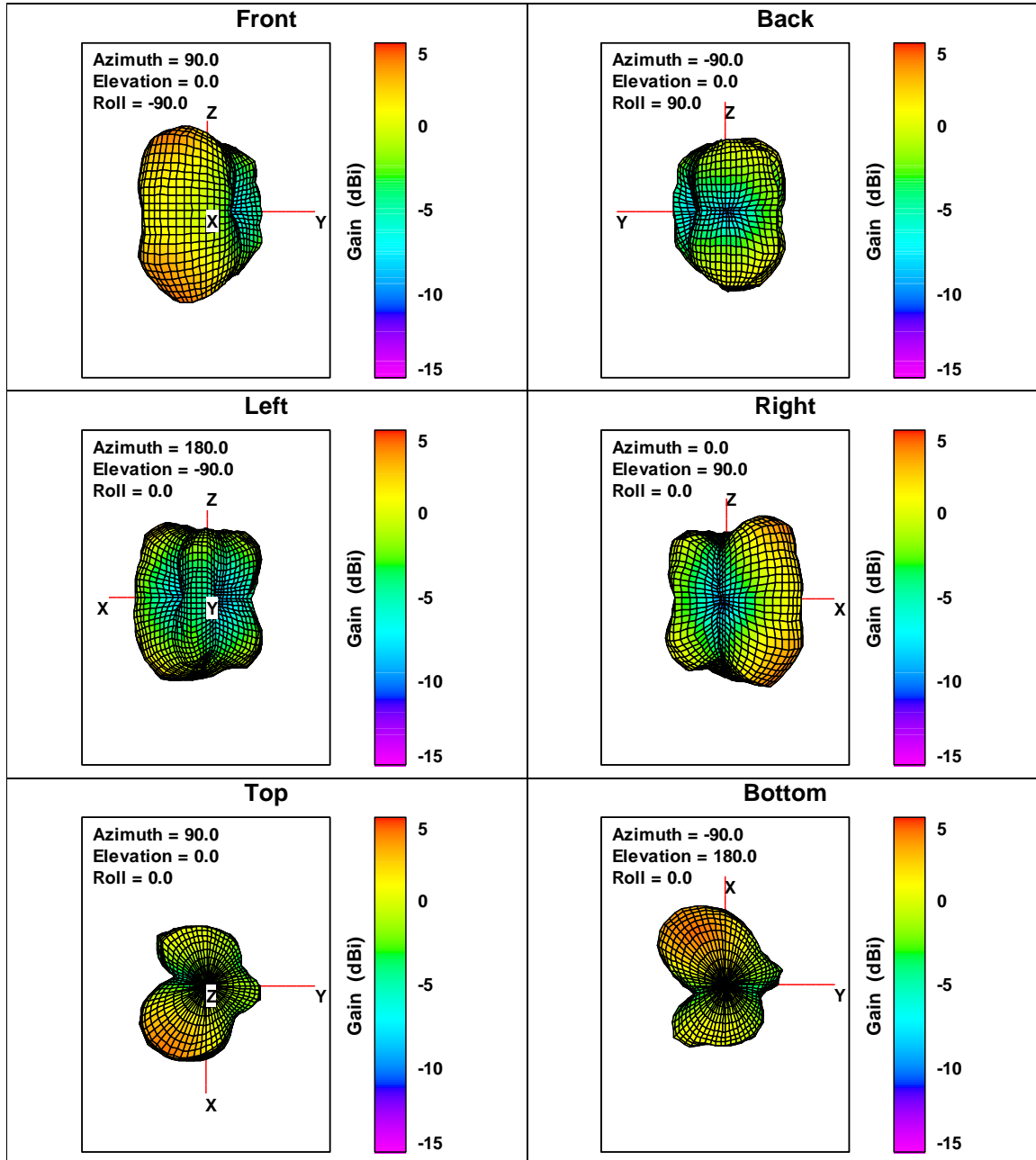
4.2.7. Antenna Pattern @5850MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5850	3.64	-3.33	4.44



4.2.8. Antenna Pattern @5925MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta)	Vertical (Phi)	Total
	(dBi)	(dBi)	(dBi)
5925	-10.4	4.31	4.45

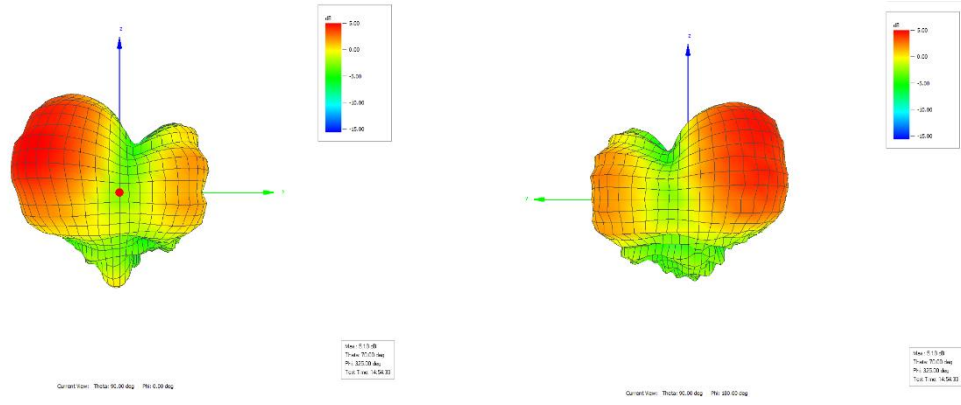


4.3. WiFi 6G (5925 - 7200 MHz)

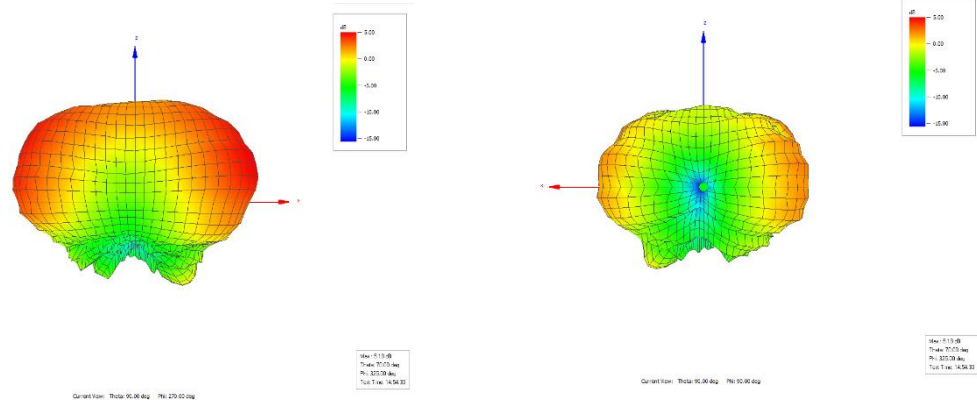
4.3.1. Antenna Pattern @6000MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta) (dBi)	Vertical (Phi) (dBi)	Total (dBi)
6000	3.61	-0.54	5.02

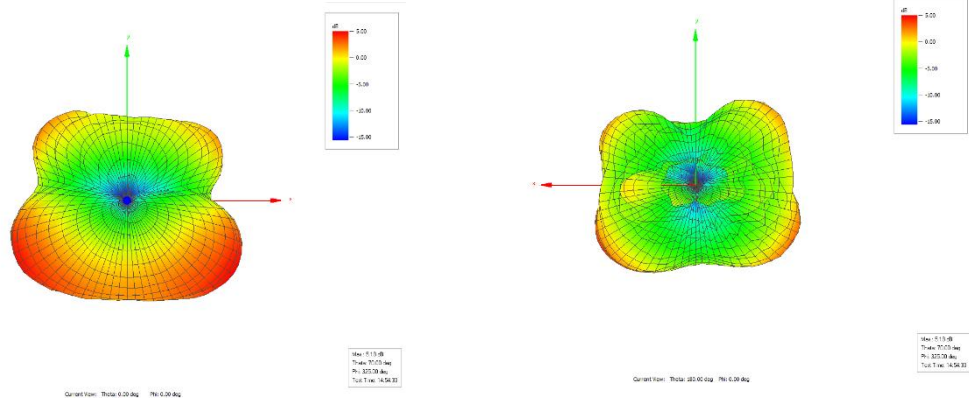
Front **Back**



Left **Right**



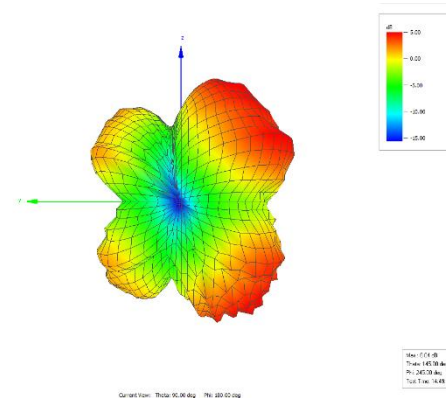
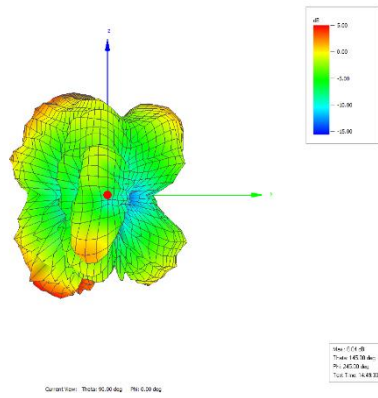
Top **Bottom**



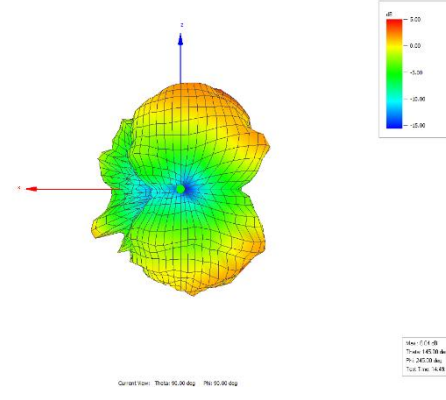
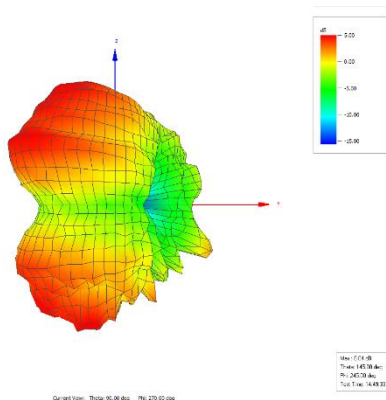
4.3.2. Antenna Pattern @6425MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta) (dBi)	Vertical (Phi) (dBi)	Total (dBi)
6425	-7.08	4.74	5.02

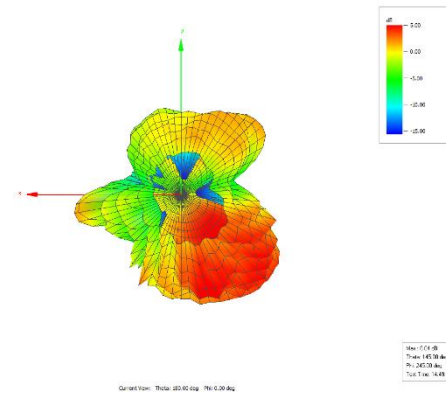
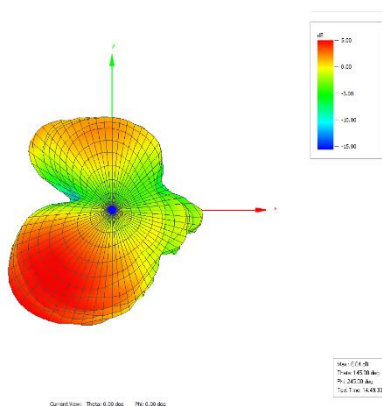
Front **Back**



Left **Right**



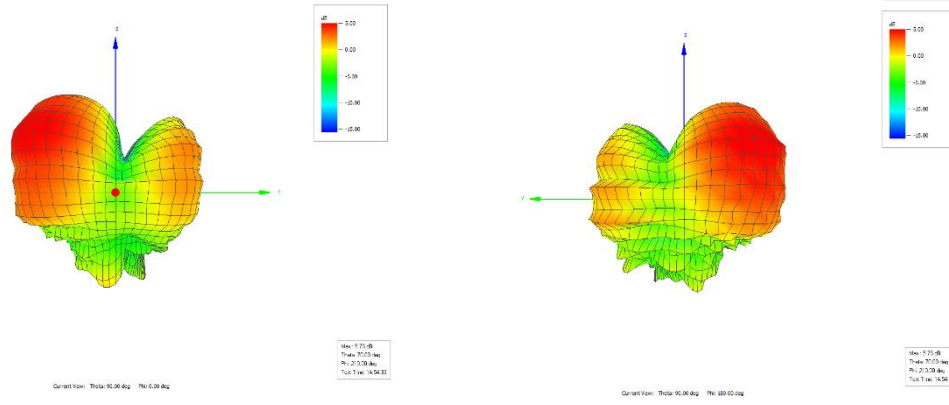
Top **Bottom**



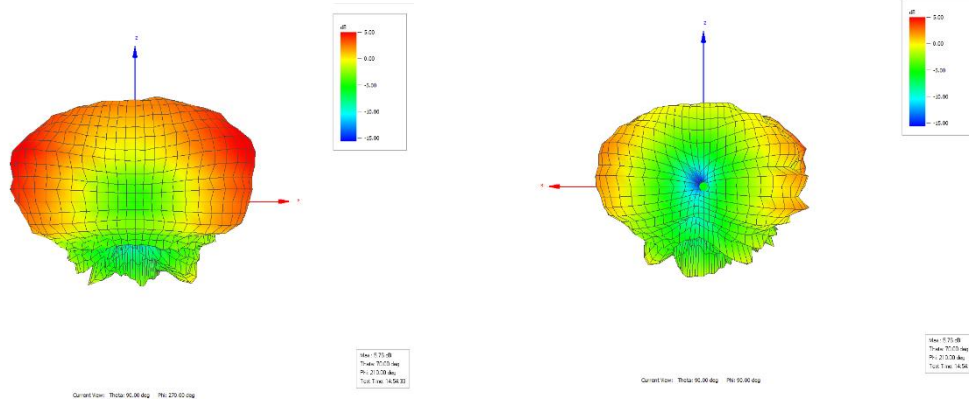
4.3.3. Antenna Pattern @6525MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta) (dBi)	Vertical (Phi) (dBi)	Total (dBi)
6525	3.37	-0.46	4.88

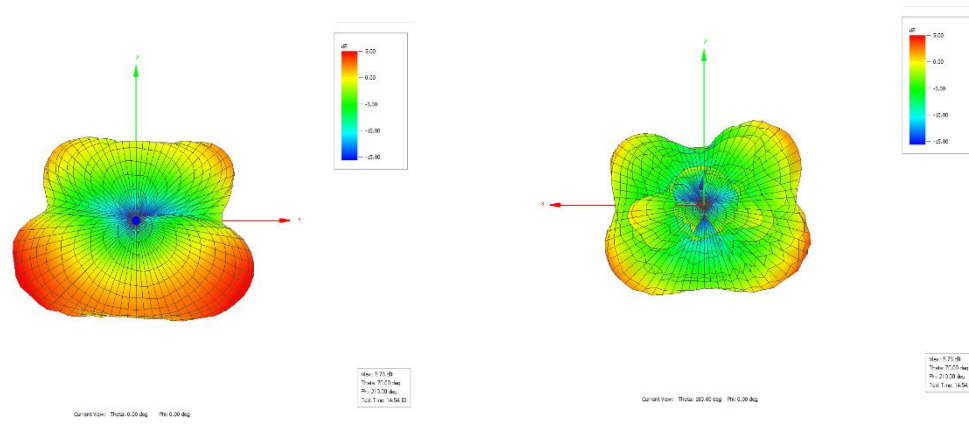
Front **Back**



Left **Right**



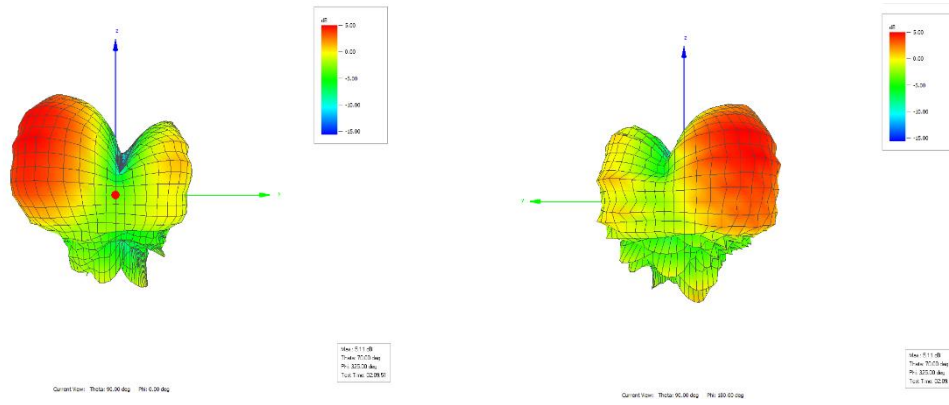
Top **Bottom**



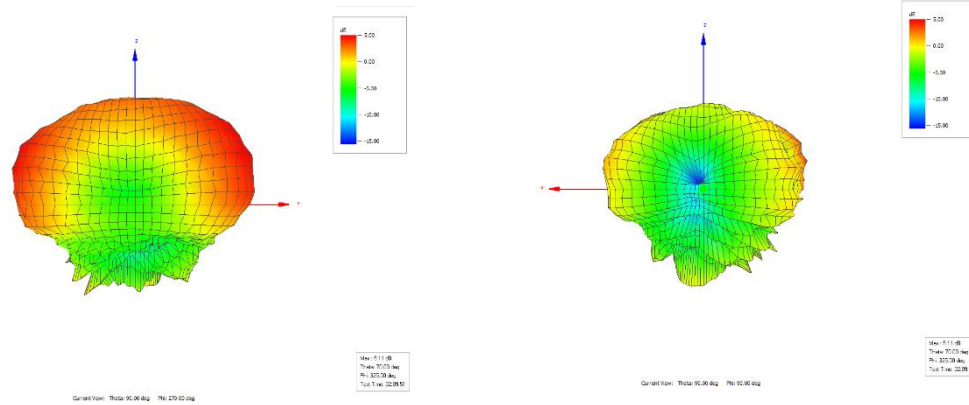
4.3.4. Antenna Pattern @6875MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta) (dBi)	Vertical (Phi) (dBi)	Total (dBi)
6875	3.03	0.53	4.96

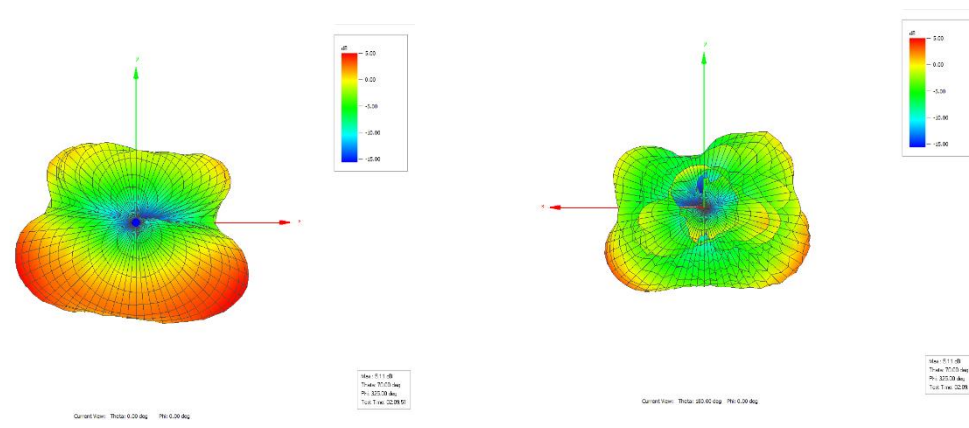
Front **Back**



Left **Right**



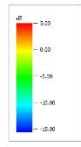
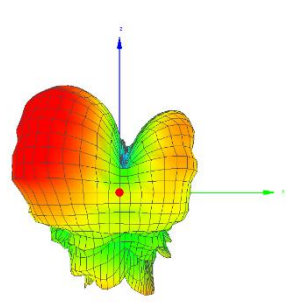
Top **Bottom**



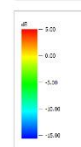
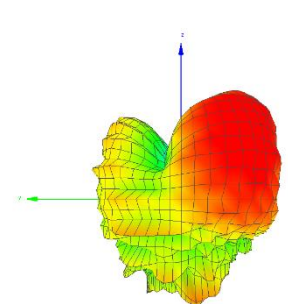
4.3.5. Antenna Pattern @7125MHz

Frequency (MHz)	Peak Gain		
	Horizontal (Theta) (dBi)	Vertical (Phi) (dBi)	Total (dBi)
7125	4.38	-4.02	4.96

Front **Back**

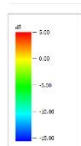
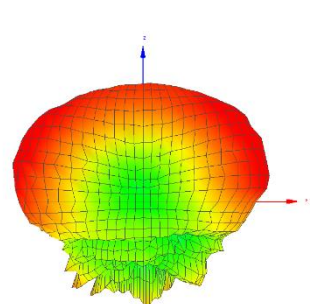


Gain: 4.38 dBi
Theta: 90.00 deg
Phi: 0.00 deg
Total: 4.96 dBi

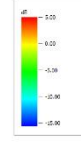
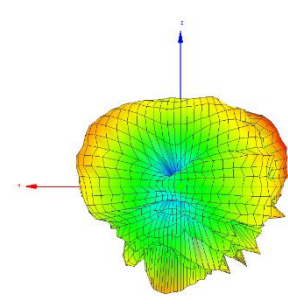


Gain: -4.02 dBi
Theta: 90.00 deg
Phi: 180.00 deg
Total: 4.96 dBi

Left **Right**

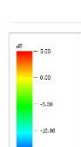
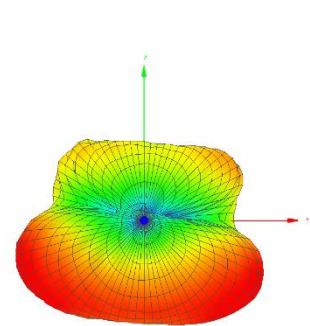


Gain: 4.38 dBi
Theta: 90.00 deg
Phi: 270.00 deg
Total: 4.96 dBi

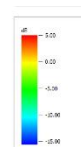
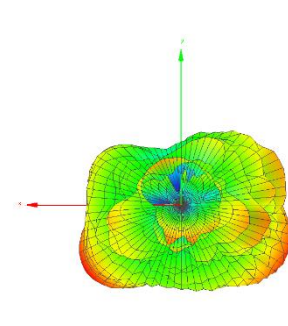


Gain: -4.02 dBi
Theta: 90.00 deg
Phi: 90.00 deg
Total: 4.96 dBi

Top **Bottom**

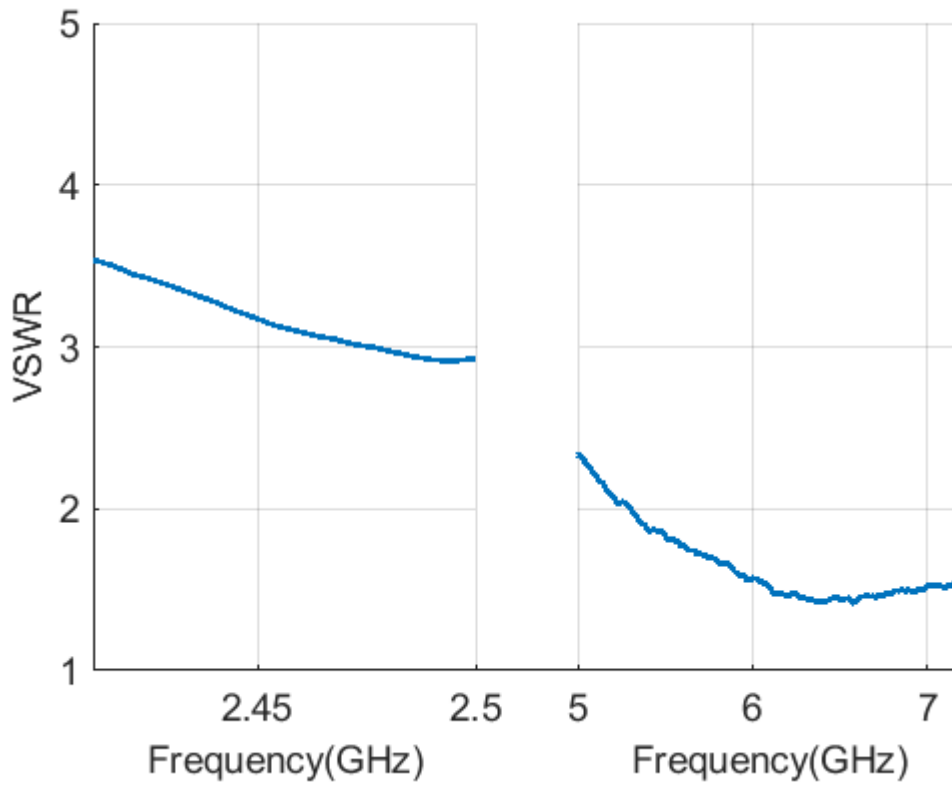


Gain: 4.38 dBi
Theta: 0.00 deg
Phi: 0.00 deg
Total: 4.96 dBi

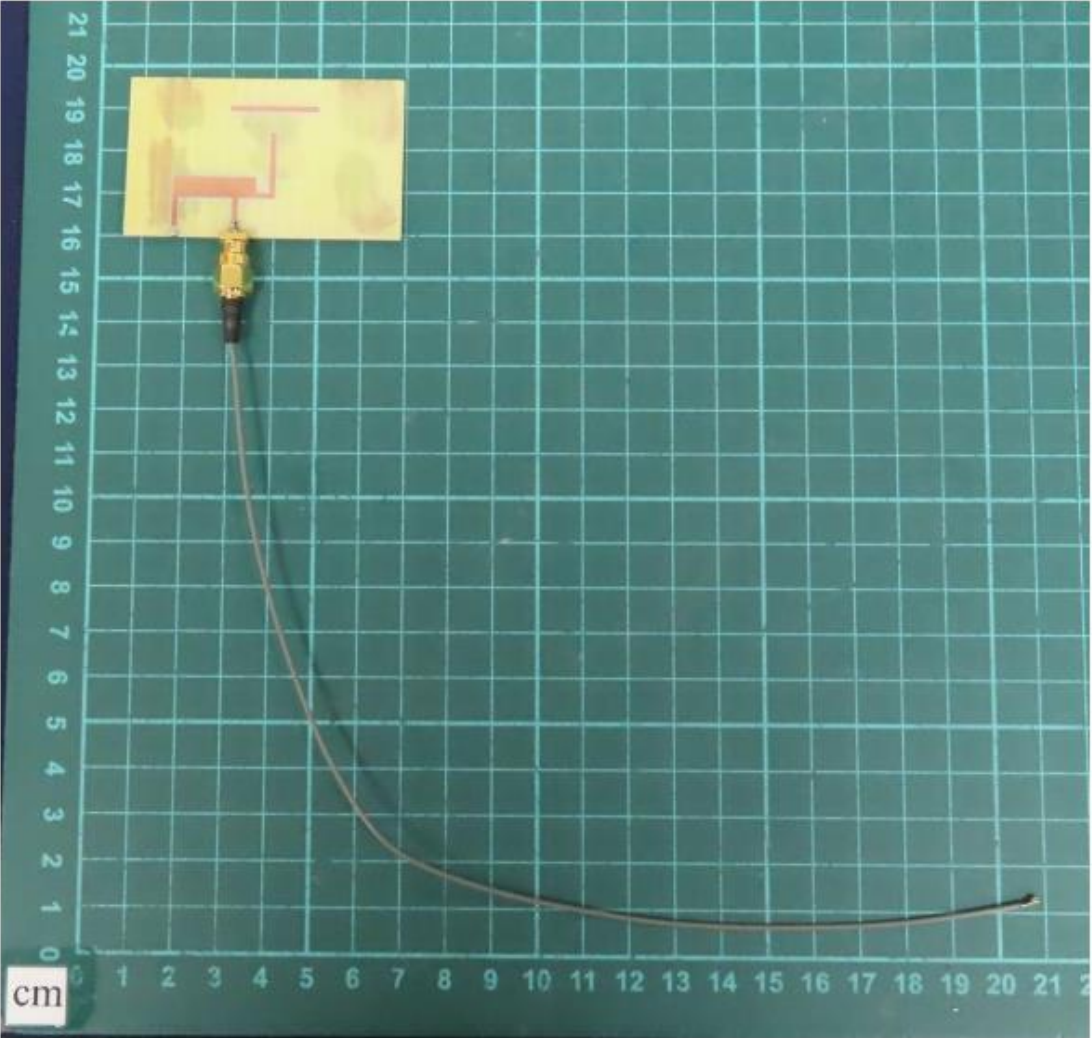
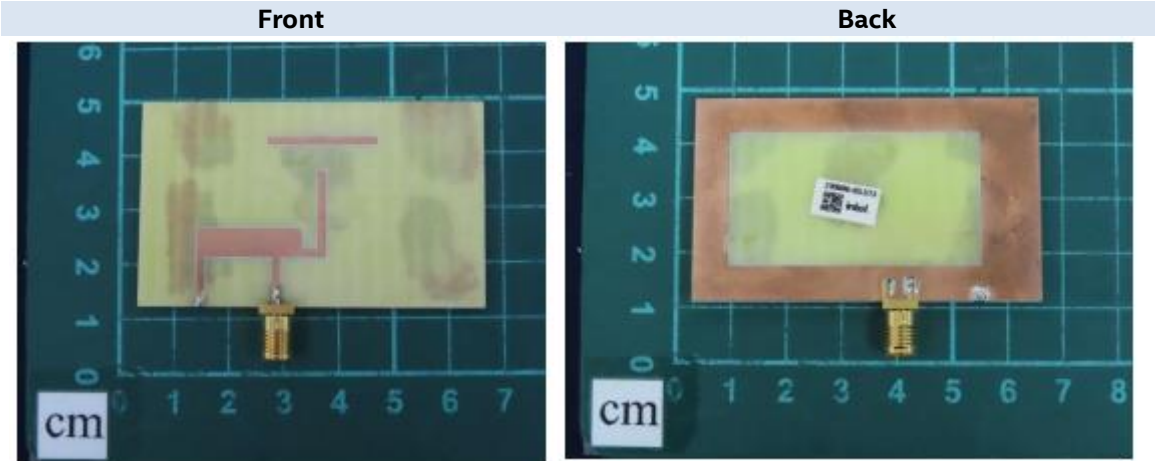


Gain: -4.02 dBi
Theta: 180.00 deg
Phi: 0.00 deg
Total: 4.96 dBi

5. VSWR

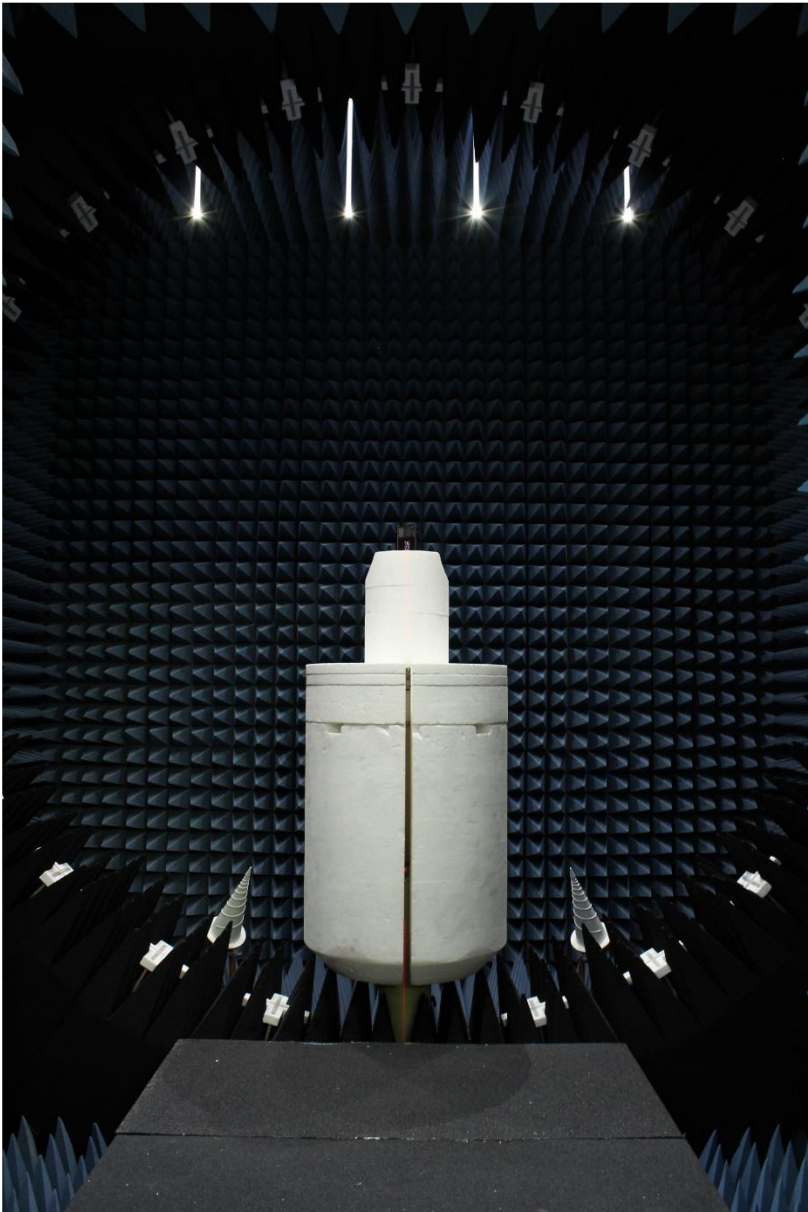


6. Antenna Photo



7. Test Setup Photo

7.1. WiFi 2.4G (2400 - 2483 MHz) and WiFi 5G (5150 – 5925 MHz)



7.2. WiFi 6G (5925 – 7200 MHz)



8. Document revision history

Revision #	Revision Details	Issued Date
Rev. 00	First Issue	2023.03.09
Rev. 01	Antenna photo added	2023.07.28
Rev. 02	6.5 GHz peak gain updated in section 3.1	2023.07.31
Rev. 03	Test personnel names added in section 3	2023.09.11