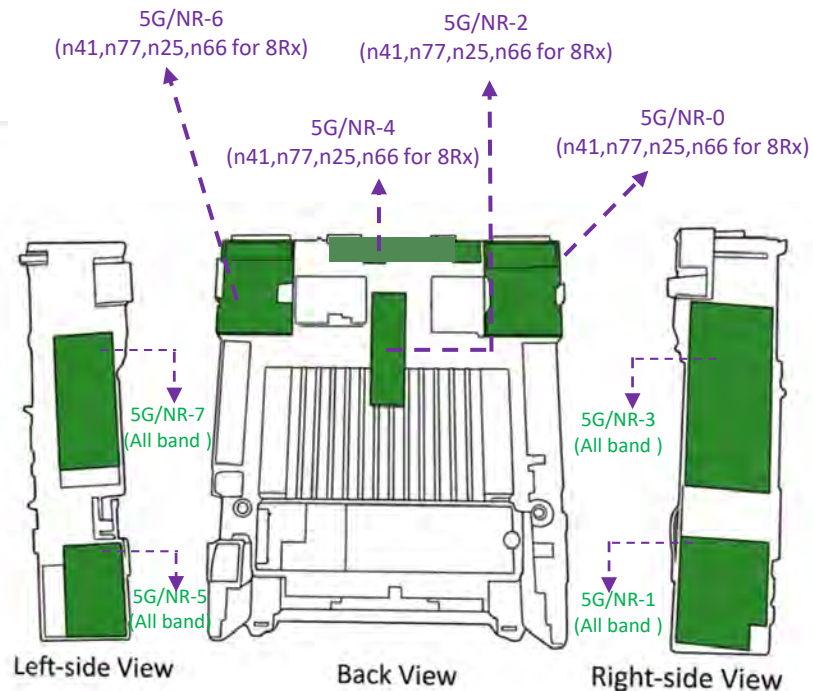
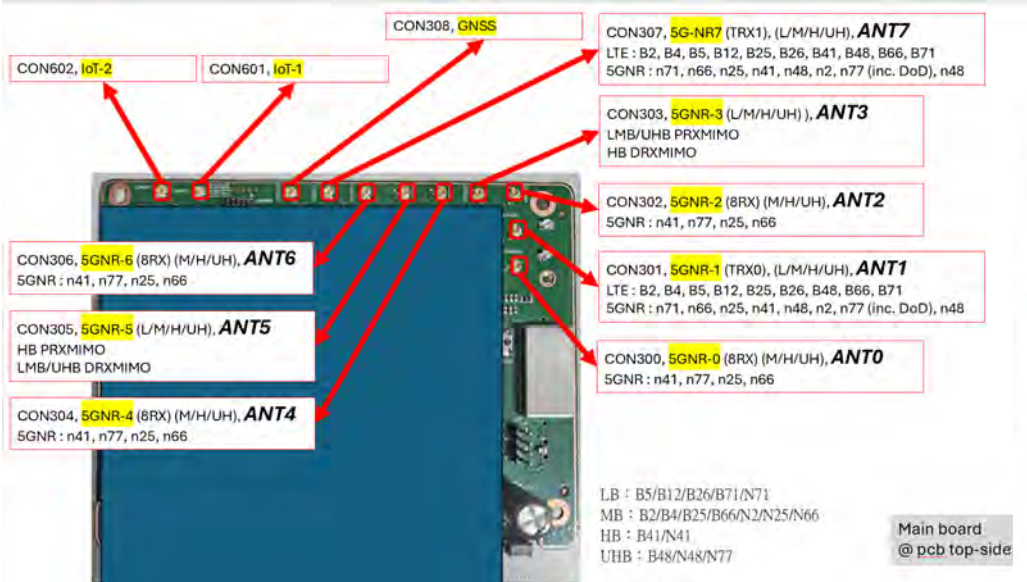


Antenna report for project F5698W

Pegatron BU6

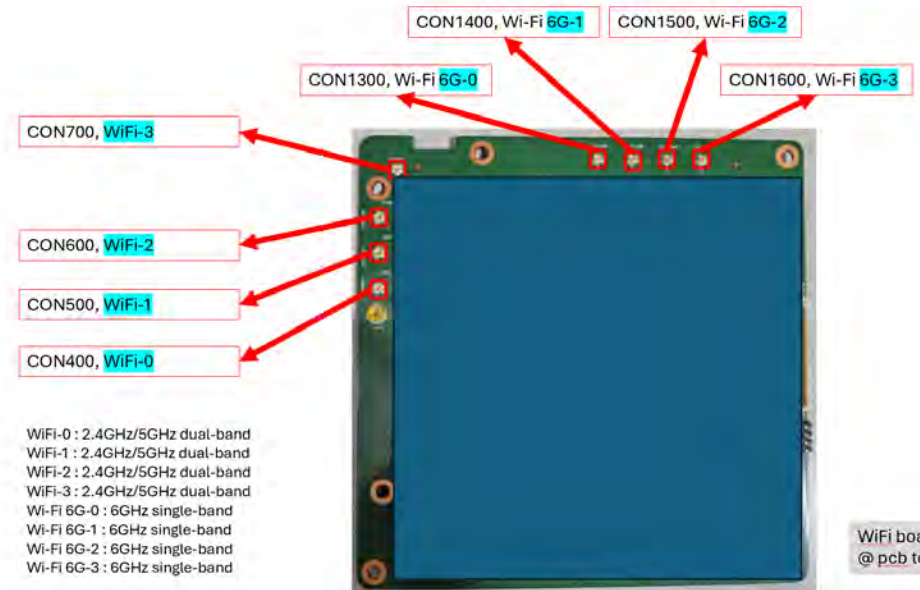
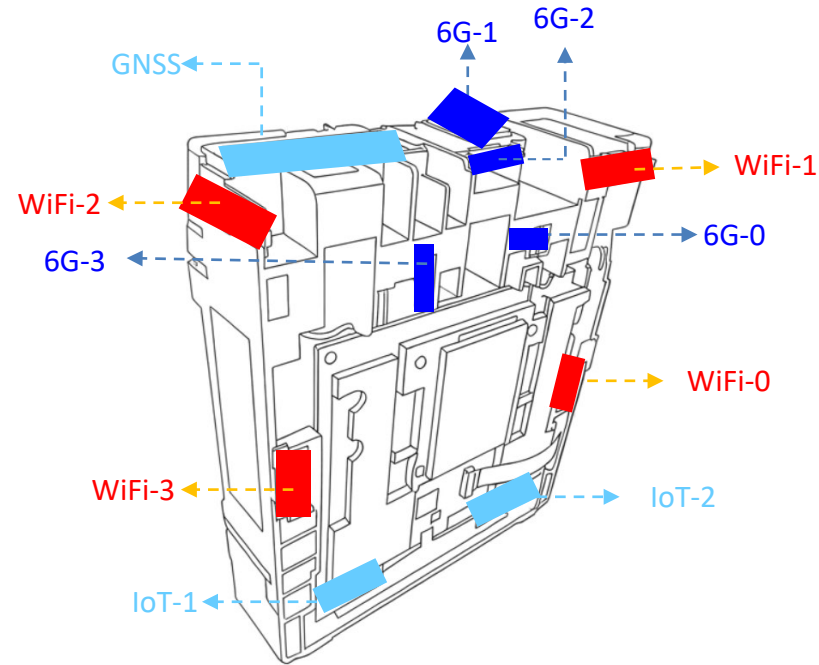
Antenna Port Mapping

■ 4G LTE/5G NR Antenna placement



Antenna Port Mapping

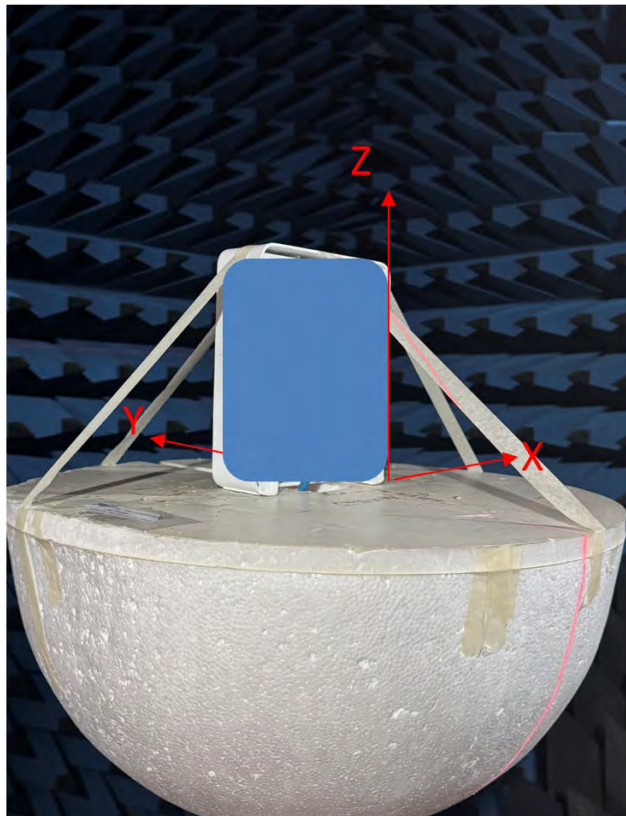
WiFi Antenna placement



WiFi board
@ pcb top-side

Antenna Port Mapping

- DUT coordinate definition



Antenna Model Name / Part Number

■ Vendor:Pagatron

■ Company Address:

Business, Design & Service Center

No.96 ,Ligong St.,Beitou Dist.,

Taipei City 112, Taiwan (R.O.C.)

ANT Model Name	Part number	Description	Type
5G NR-0	1415-0BNC000	CABLE L:61.5mm GRAY	PCB
5G NR-1	1415-0BRW000	CABLE L:89mm BLACK	FPC
5G NR-2	1415-0BRS000	CABLE L:117.5mm GREEN	PCB
5G NR-3	1415-0BRQ000	CABLE L:75mm BLUE	FPC
5G NR-4	1415-0BS7000	CABLE L:113.5mm RED	PCB
5G NR-5	1415-0BRR000	CABLE L:242mm YELLOW	FPC
5G NR-6	1415-0BMW000	CABLE L:89.5 ORANGE	PCB
5G NR-7	1415-0BRP000	CABLE L:58.5mm WHITE	FPC
WiFi-0	1415-0BS1000	CABLE L:32mm GRAY	PCB
WiFi-1	1415-0BS0000	CABLE L:77mm GREEN	PCB
WiFi-2	1415-0BS8000	CABLE L:200mm RED	PCB
WiFi-3	1415-0BS2000	CABLE L:218mm ORANGE	PCB
6G-0	1415-0BS4000	CABLE L:38mm BLACK	PCB
6G-1	1415-0BS3000	CABLE L:83.5mm BLUE	PCB
6G-2	1415-0BRY000	CABLE L:75.5mm YELLOW	PCB
6G-3	1415-0BRX000	CABLE L:29.5mm WHITE	PCB
IoT-1	1415-0BS9000	CABLE L:220mm GREEN	PCB
IoT-2	1415-0BSA000	CABLE L:145mm BLUE	PCB
GNSS	1415-0BSB000	CABLE L:82 RED	PCB

Antenna Vendor Info & Test Equipment and Calibration

- Antenna Vendor: Pegatron
- Test Date: 20260806
- Test Engineer :Angus Huang
- Measurement Setup:

- Reflection Coefficient Measurement:

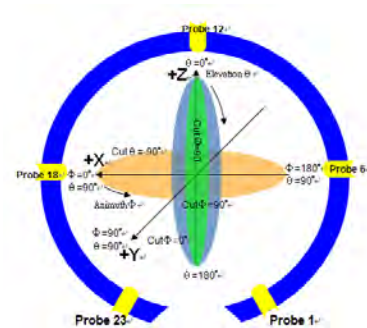
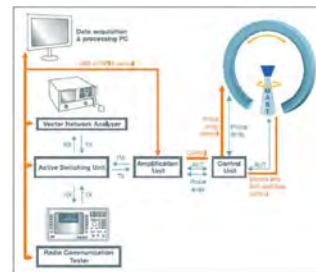
1. Network Analyzer (Keysight Agilent E5071C)
2. Setup:
 - calibrate the Network Analyzer by one port calibration using 85033E calibration kit.
 - connect the antenna under test to the Network Analyzer.
 - measure the S11 (return loss)& S12(isolation)

- Pattern & Gain measurement:

1. Satimo chamber (SG24)
2. Satimo program (wave studio)
3. system overview :

- Test Item

1. Antenna passive test 400MHz~6GHz



Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
OTA Chamber	Satimo SG24	MVG/HKG0147S	2025/09/16	2026/09/15
Network Analyzer	Keysight E5071C	MY46212481	2026/5/16	2027/5/15

Test Procedure

- For certification, We used the formulas as below which is based on FCC document 662911 to calculate directional gain.

(i) If transmit signals are *correlated*, then

Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{\text{ANT}}]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

(ii) If all transmit signals are *completely uncorrelated*, then

Directional gain = $10 \log[(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_N/10}) / N_{\text{ANT}}]$ dBi

- a) sub-divide the whole sphere surface into many 2x2 degree subsection.
- b) Measure the gain contributed from each antenna within each subsection position.
- c) Apply the KDB 662911 D01 correlated directional gain formula to calculate directional gain for each subsection.
- d) After all subsections have been evaluated, the largest calculated value among all positions evaluated is picked as the worst-case directional gain for the system and used in RF/EMC test report.

Measurement Data_ 4G 5G & 5G NR

❖ Gain table: 5G/NR antenna

Frequency (MHz)	5GNR-1		5GNR-3		5GNR-5		5GNR-7	
	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)
617	1.12	58%	0.31	43%	-1.53	44%	0.37	54%
635	-0.40	48%	-2.91	38%	-2.39	45%	0.76	56%
652	-0.38	51%	-2.25	36%	-1.85	48%	0.45	55%
663	0.00	50%	-1.89	37%	-1.21	51%	-0.64	50%
680	0.54	56%	-1.68	36%	0.02	52%	-0.25	50%
698	1.50	69%	-1.79	36%	0.97	47%	0.21	51%
707	1.75	60%	-0.34	42%	1.08	45%	0.00	48%
716	1.89	66%	0.02	44%	0.02	39%	-0.85	38%
729	1.58	67%	0.63	47%	-0.91	38%	-1.09	34%
737	1.35	62%	-0.37	40%	-1.02	40%	-1.20	35%
746	1.21	66%	-0.68	42%	-0.79	42%	-1.22	40%
824	0.89	62%	2.48	51%	-1.07	45%	-2.61	44%
836	1.11	62%	2.85	54%	-1.46	45%	-2.86	43%
849	-0.76	49%	1.90	55%	-2.18	42%	-1.54	39%
869	-1.83	41%	0.51	56%	-2.48	40%	-2.84	36%
880	-0.60	47%	-0.46	53%	-3.38	38%	-2.17	35%
894	-0.19	44%	1.57	55%	-2.65	36%	1.20	35%

Frequency (MHz)	5GNR-1		5GNR-3		5GNR-5		5GNR-7	
	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)
1710	2.59	69%	2.16	50%	0.09	53%	2.26	58%
1780	2.51	73%	2.94	60%	-0.02	52%	2.34	58%
1850	2.02	71%	1.76	65%	0.28	53%	1.26	50%
1880	3.13	68%	2.55	63%	0.62	55%	1.78	59%
1910	2.60	73%	2.64	65%	0.55	57%	1.52	59%
1960	2.83	71%	2.80	63%	1.06	58%	1.18	60%
1990	3.09	73%	2.38	60%	2.03	60%	2.59	62%
2110	3.89	70%	3.01	66%	1.13	63%	1.90	59%
2155	3.64	69%	2.84	67%	2.17	62%	2.79	57%
2200	3.50	67%	2.36	68%	2.12	60%	1.43	55%
2496	3.00	66%	2.43	68%	1.27	55%	1.28	57%
2593	3.05	65%	2.70	67%	-0.86	53%	0.67	58%
2690	1.76	59%	2.17	68%	0.62	51%	-1.12	51%
3300	2.30	63%	3.53	66%	0.58	52%	2.40	53%
3500	2.24	63%	3.03	69%	0.88	54%	2.14	59%
3600	2.21	55%	2.11	69%	1.97	53%	2.02	56%
3750	2.50	58%	3.84	72%	1.64	55%	2.23	60%
4200	2.28	53%	3.84	70%	0.91	52%	3.47	50%

*Peak Gain : 2D MAX(Phi,Theta)

Measurement Data_ 4G 5G & 5G NR

❖ Gain table: 5G/NR antenna

Frequency (MHz)	5GNR-0		5GNR-2		5GNR-4		5GNR-6	
	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)
1930	2.26	74%	2.18	65%	2.61	72%	1.04	50%
1960	1.25	70%	1.64	64%	2.62	66%	0.44	53%
1995	1.44	73%	1.44	63%	3.05	59%	1.51	61%
2110	-0.26	63%	0.62	58%	1.24	54%	1.74	58%
2155	-0.11	67%	0.23	56%	1.87	54%	1.46	60%
2200	1.21	65%	0.38	52%	2.61	56%	0.79	63%
2496	1.91	68%	3.04	67%	2.01	71%	2.98	70%
2593	2.46	73%	1.34	74%	3.03	78%	2.77	77%
2690	2.00	70%	3.23	62%	2.58	64%	1.58	61%
3300	2.07	59%	4.44	68%	3.33	69%	2.78	69%
3750	1.58	70%	4.43	69%	2.89	75%	2.71	67%
4200	2.52	69%	4.48	65%	2.91	73%	2.52	64%

*Peak Gain : 2D MAX(Phi,Theta)

Result Summary _Gain & Efficiency _WiFi

Frequency (MHz)	WiFi-0		WiFi-1		WiFi-2		WiFi-3	
	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)
2400	4.17	71%	4.44	70%	3.81	65%	3.05	63%
2450	4.58	73%	4.65	74%	4.86	72%	3.77	69%
2500	4.26	69%	3.45	71%	3.16	74%	3.61	69%
5150	4.75	66%	3.37	60%	2.86	60%	4.63	64%
5350	3.43	64%	3.37	68%	3.61	65%	4.31	67%
5470	3.27	66%	2.75	65%	2.66	67%	3.80	64%
5725	4.70	78%	3.85	62%	3.98	68%	4.21	69%
5850	5.04	79%	3.96	61%	3.30	63%	3.60	64%

Frequency (MHz)	6G-0		6G-1		6G-2		6G-3	
	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)
5925	5.4	73%	3.34	65%	5.39	64%	4.68	70%
6125	5.17	62%	2.53	61%	6.34	62%	5.16	62%
6500	4.83	64%	3.42	62%	5.18	61%	6.05	60%
6675	5.64	64%	3.31	60%	5.26	65%	5.97	60%
6925	5.8	66%	4.00	64%	6.21	72%	5.57	62%
7125	5.00	61%	3.62	62%	6.01	67%	6.19	66%

Result Summary _Gain & Efficiency _WiFi_ Directional Gain

		Realized Gain			
		Uncorrelated (dBi)		Correlated (dBi)	
		Phi	Theta	Phi	Theta
Dual-band	2400	-1.12	-0.43	3.54	4.53
	2450	-0.84	0.32	3.21	3.86
	2500	-1.86	-0.15	2.87	5.79
	5150	-1.56	0.69	3.79	6.08
	5350	-1.56	-0.11	3.63	5.66
	5470	-1.73	-0.69	3.47	5.41
	5725	-0.87	0.16	4.29	5.66
	5850	-1.04	0.26	4.16	5.89
6G	5925	0.31	0.41	5.61	5.38
	6125	0.49	0.15	4.06	4.62
	6325	0.79	-0.24	5.89	4.97
	6500	0.94	0.40	5.69	5.95
	6675	0.67	-0.06	5.78	4.72
	6925	1.41	-0.41	6.02	3.85
	7125	2.15	0.09	5.44	4.27

Realized Gain	
Phi / Theta Peak gain (Max)	
Uncorrelated(dBi)	correlated(dBi)
-0.43	4.53
0.32	3.86
-0.15	5.79
0.69	6.08
-0.11	5.66
-0.69	5.41
0.16	5.66
0.26	5.89
0.41	5.61
0.49	4.62
0.79	5.89
0.94	5.95
0.67	5.78
1.41	6.02
2.15	5.44

Max correlated gain:

2.4GHz: 5.79 dBi

This occurs at

2500MHz (phi 60/theta 50)

5GHz: 6.08 dBi

This occurs at

5150MHz (phi 60/theta 50)

6GHz: 6.02 dBi

This occurs at

6925MHz (phi 140/theta 110)

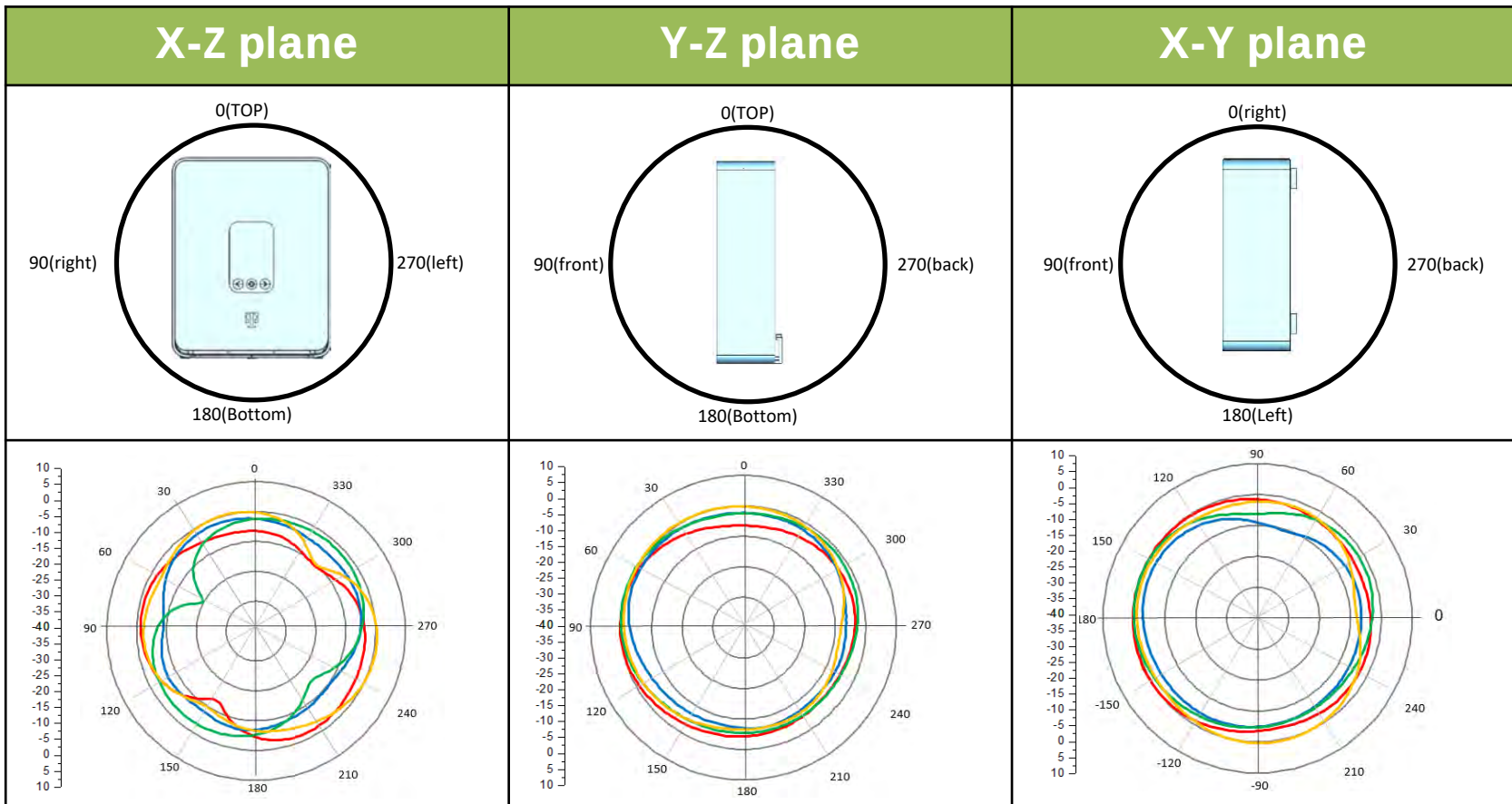
Result Summary _Gain & Efficiency _IoT & GNSS

Frequency (MHz)	IoT-1		IoT-2	
	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)
2400	3.18	51%	2.84	55%
2450	3.52	52%	2.93	57%
2500	3.72	53%	2.64	56%

Frequency (MHz)	GPS	
	Peak gain (dBi)	Efficiency (%)
1176.45	2.45	60%
1575.42	1.04	44%

Measurement Data_ 5G NR

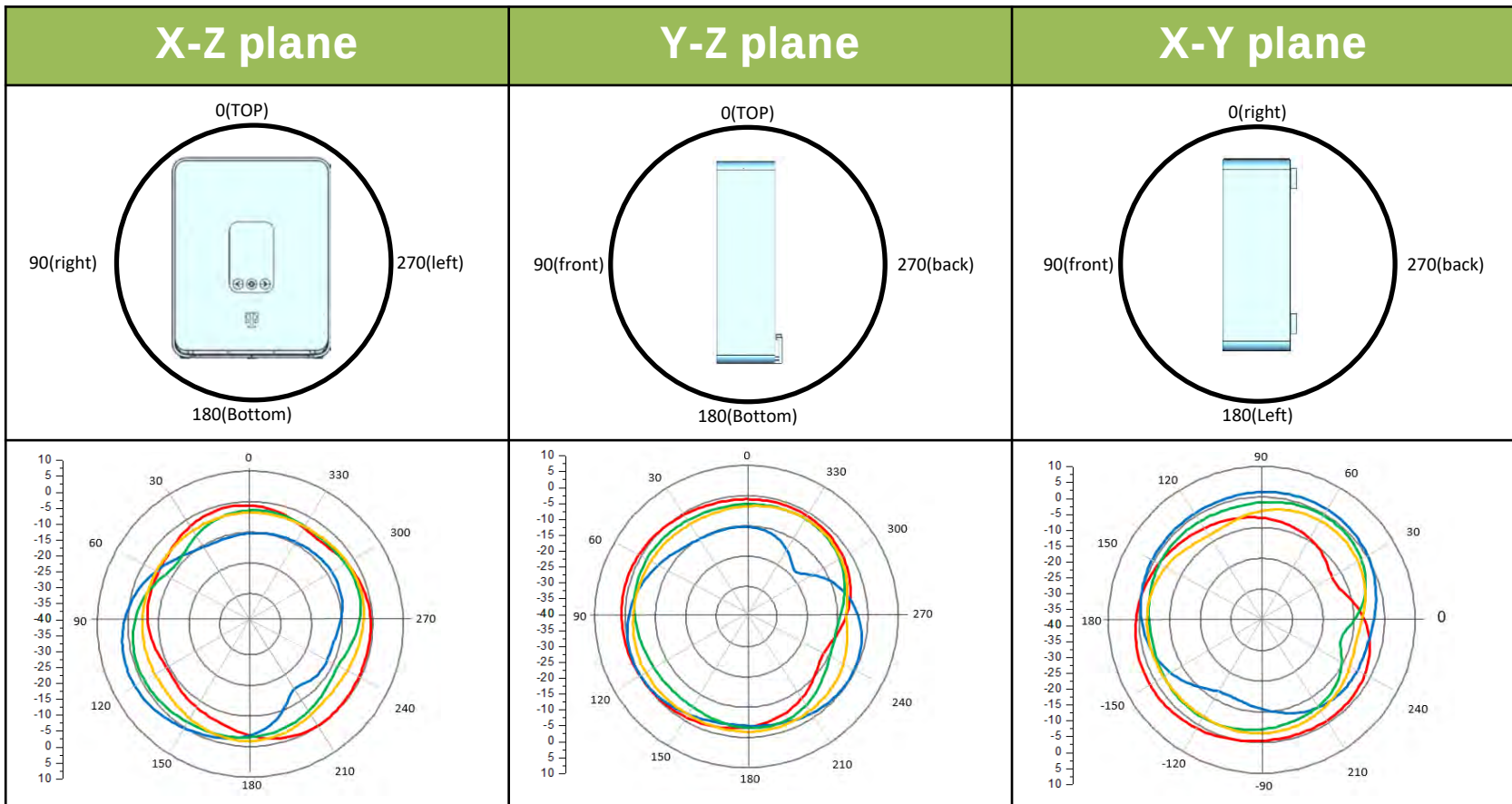
❖ Radiation pattern: 5G NR antenna_Low band (652 MHz)



— 5G/NR-1
— 5G/NR-3
— 5G/NR-5
— 5G/NR-7

Measurement Data_ 5G NR

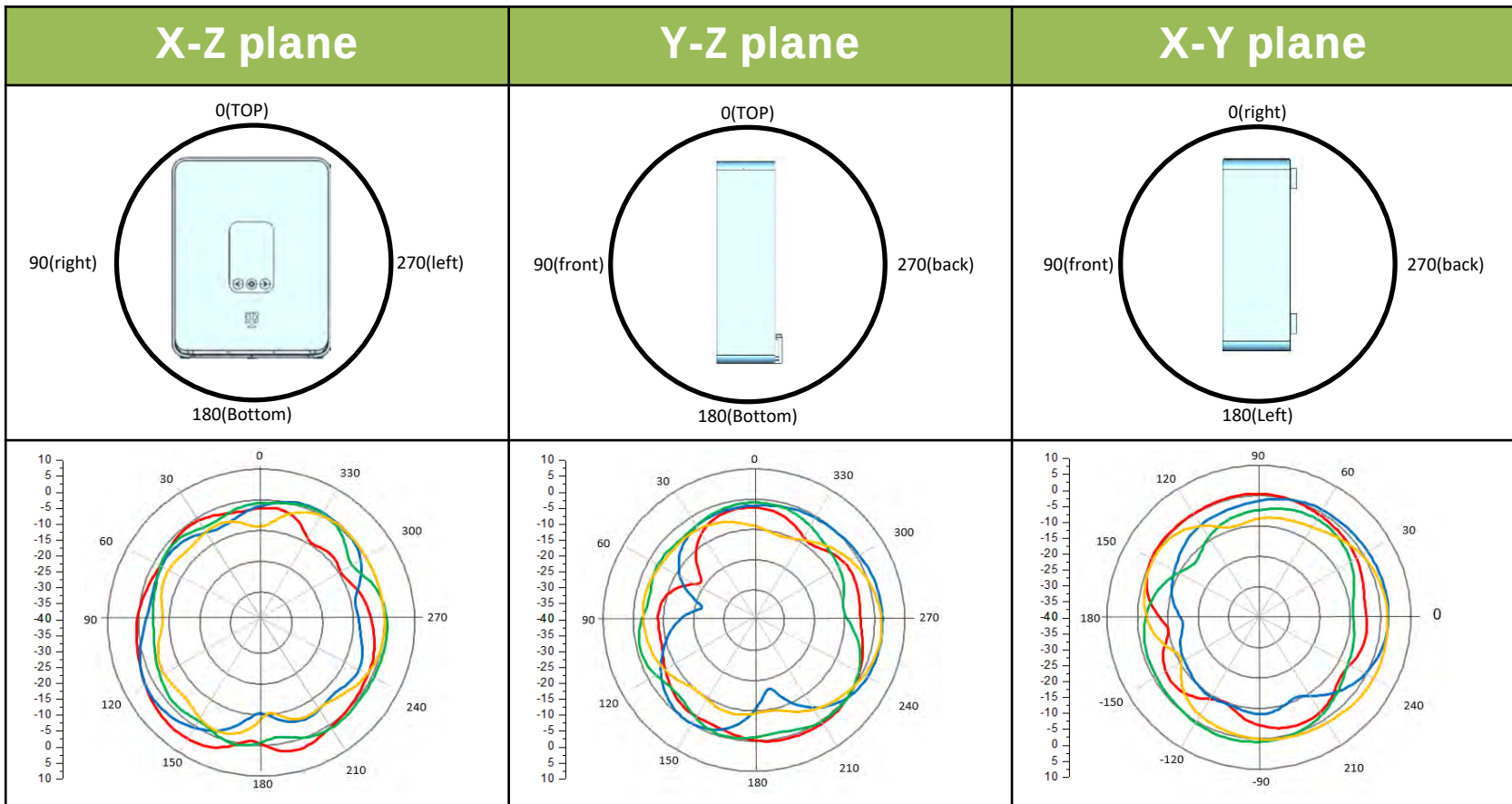
❖ Radiation pattern: 5G NR antenna_Low band (836 MHz)



— 5G/NR-1
— 5G/NR-3
— 5G/NR-5
— 5G/NR-7

Measurement Data_ 5G NR

❖ Radiation pattern: 5G NR antenna_Mid-High band (1930 MHz)



5G/NR-1
5G/NR-3
5G/NR-5
5G/NR-7

Measurement Data_ 5G NR

❖ Radiation pattern: 5G NR antenna_Ultra-High band (2690 MHz)

— 5G/NR-1
— 5G/NR-3
— 5G/NR-5
— 5G/NR-7

X-Z plane

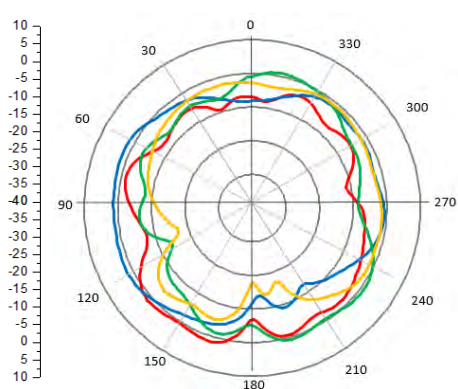
0(TOP)



180(Bottom)

90(right)

270(left)



Y-Z plane

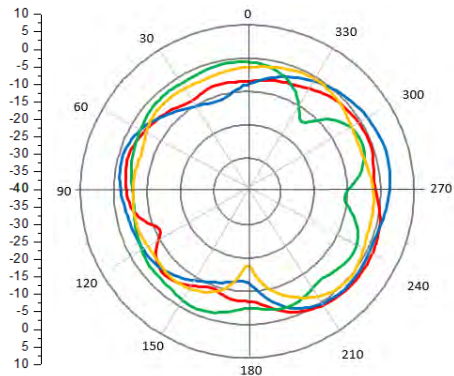
0(TOP)



180(Bottom)

90(front)

270(back)



X-Y plane

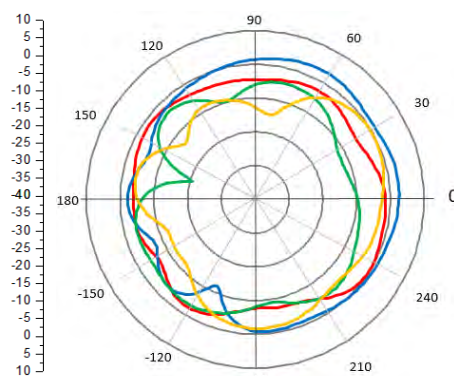
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180(Left)

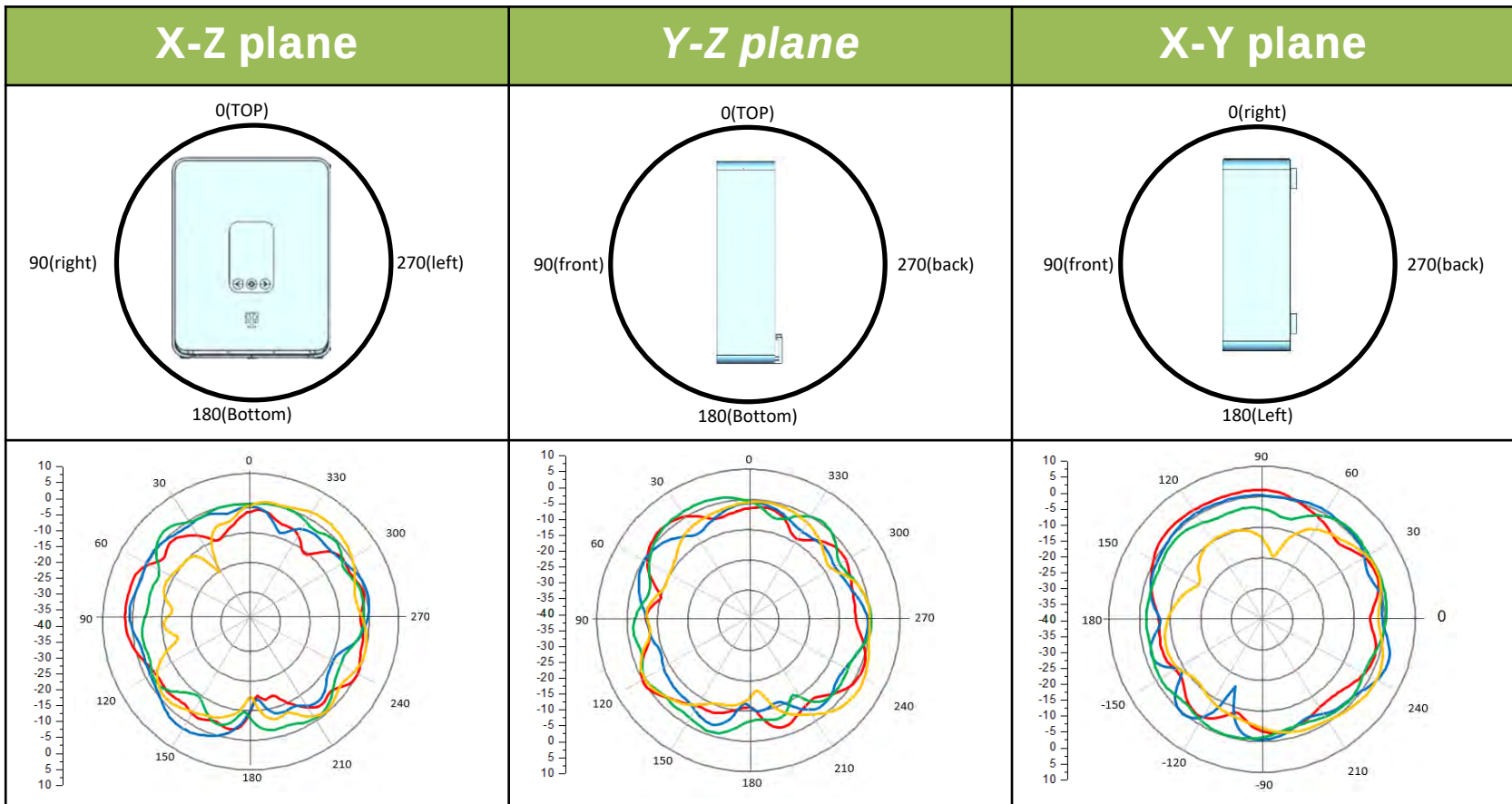
90(front)

270(back)



Measurement Data_ 5G NR

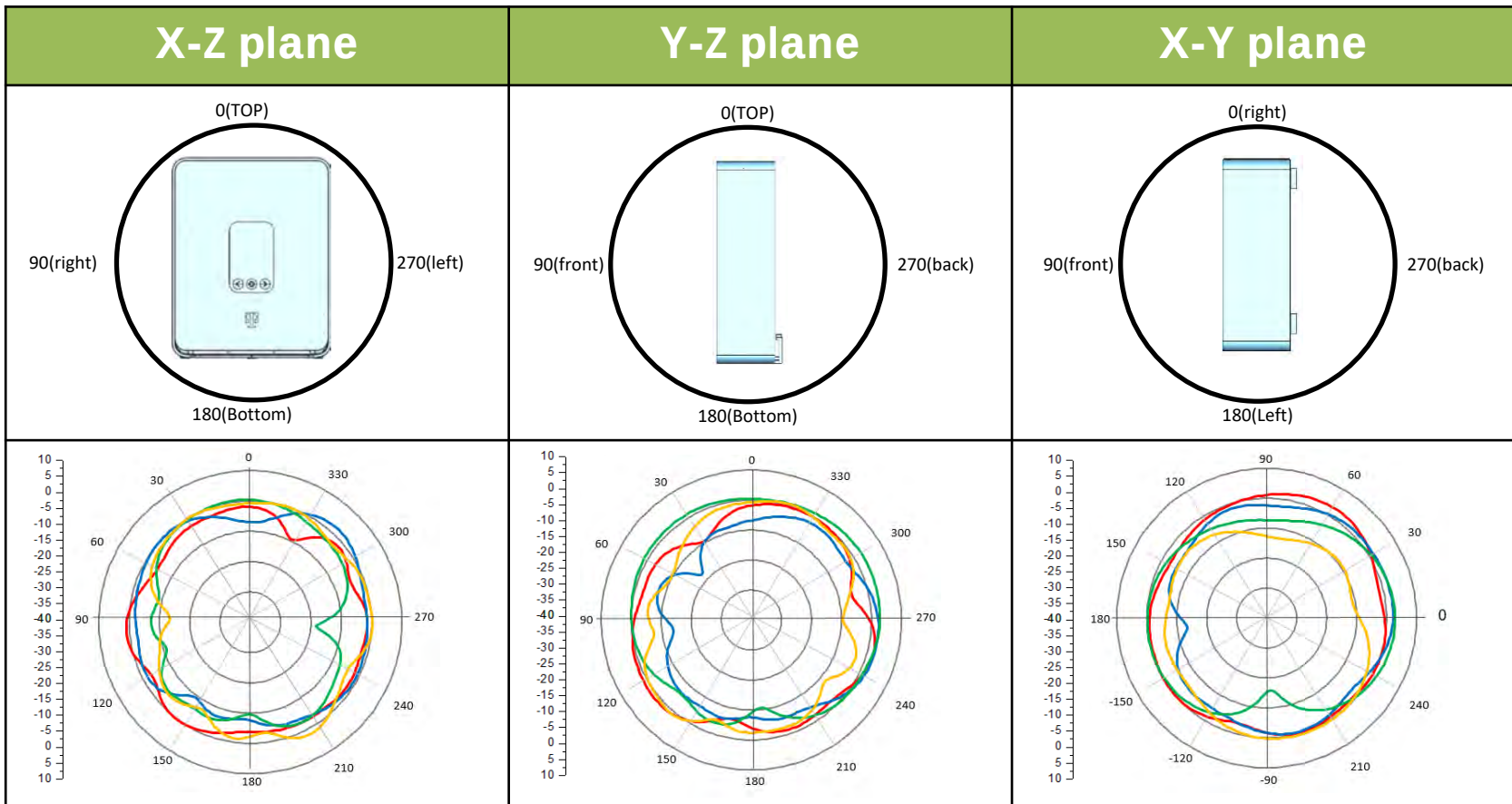
❖ Radiation pattern: 5G NR antenna_C band (n77,n48,B48) (3625 MHz)



— 5G/NR-1
— 5G/NR-3
— 5G/NR-5
— 5G/NR-7

Measurement Data_ 5G NR

❖ Radiation pattern: 5G NR antenna_Mid-High band (1930 MHz)



— 5G/NR-0
— 5G/NR-2
— 5G/NR-4
— 5G/NR-6

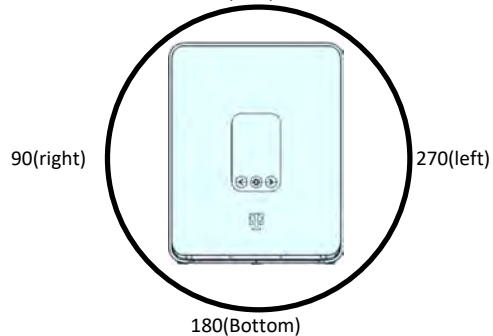
Measurement Data_ 5G NR

❖ Radiation pattern: 5G NR antenna_Ultra-High band (2690 MHz)

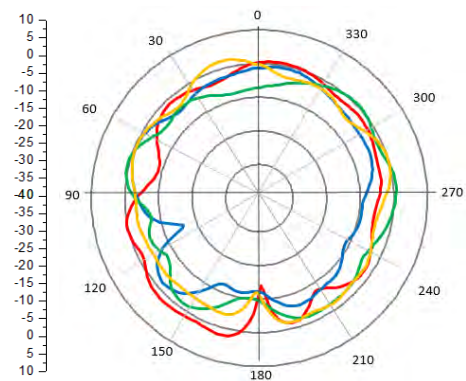
— 5G/NR-0
— 5G/NR-2
— 5G/NR-4
— 5G/NR-6

X-Z plane

0(TOP)

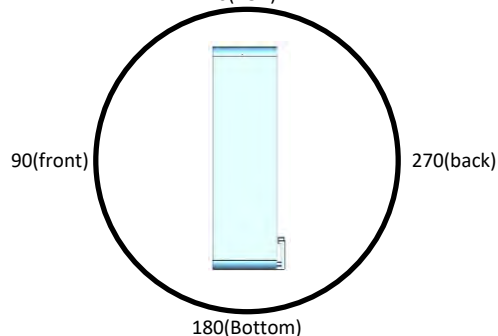


180(Bottom)

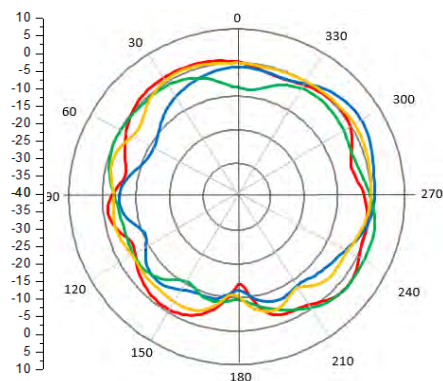


Y-Z plane

0(TOP)

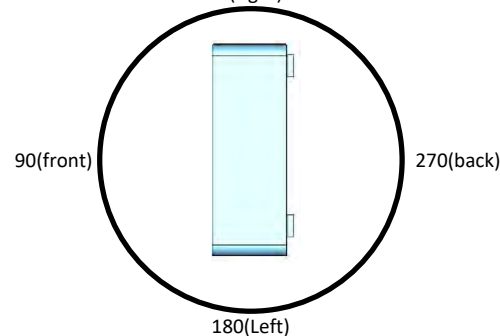


180(Bottom)

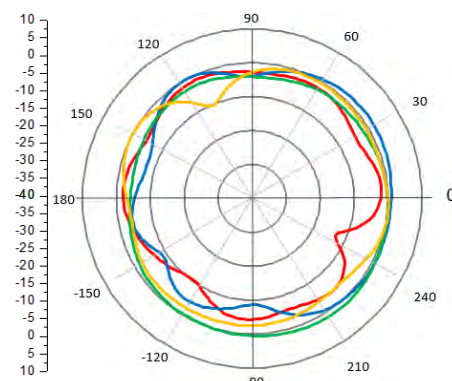


X-Y plane

0(right)



180(Left)



Measurement Data_ 5G NR

❖ Radiation pattern: 5G NR antenna_C band (n77,n48,B48) (3625 MHz)

X-Z plane

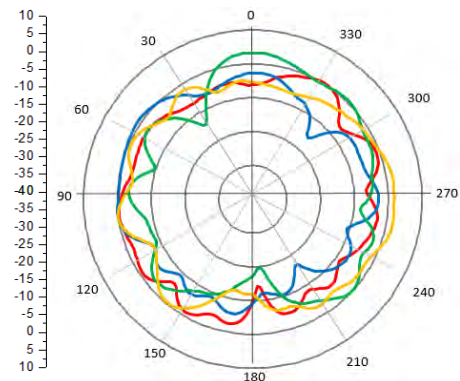
0(TOP)



180(Bottom)

90(right)

270(left)



Y-Z plane

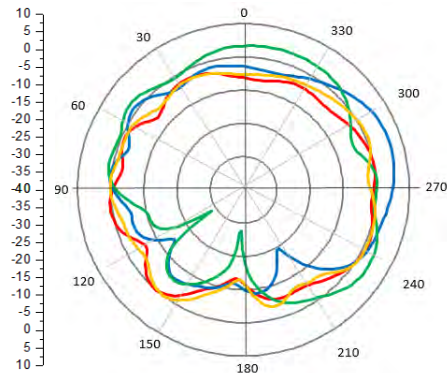
0(TOP)



180(Bottom)

90(front)

270(back)



X-Y plane

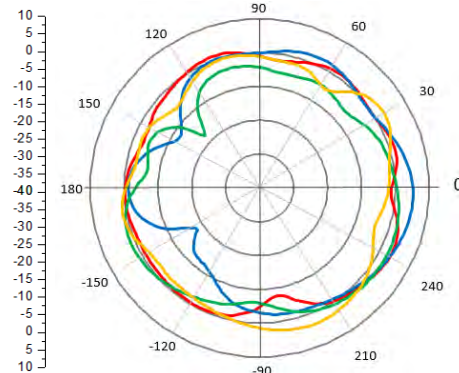
0(right)



180(Left)

90(front)

270(back)



5G/NR-0

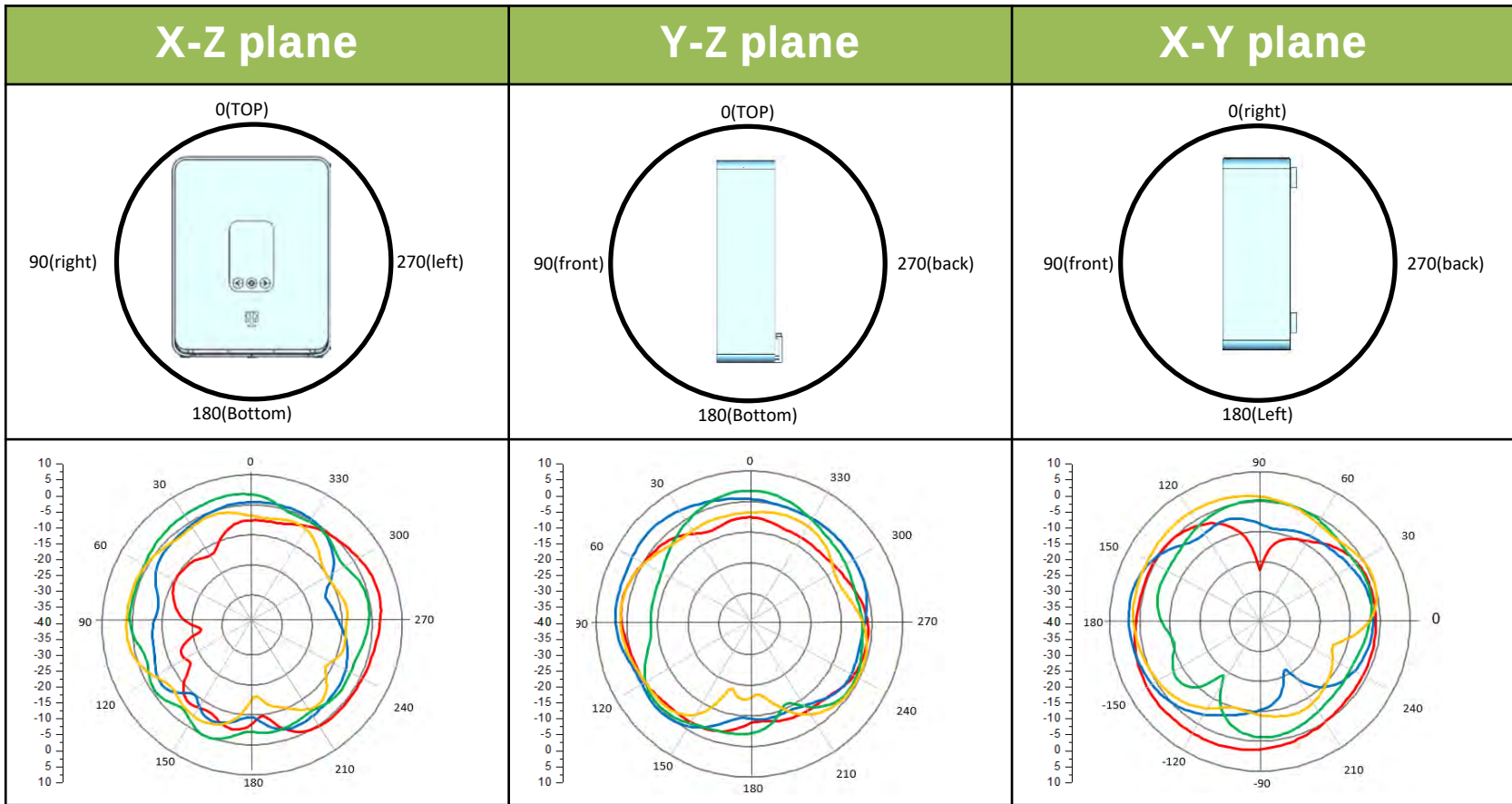
5G/NR-2

5G/NR-4

5G/NR-6

Measurement Data_ WiFi

❖ Radiation pattern: Wi-Fi 2.4G antenna

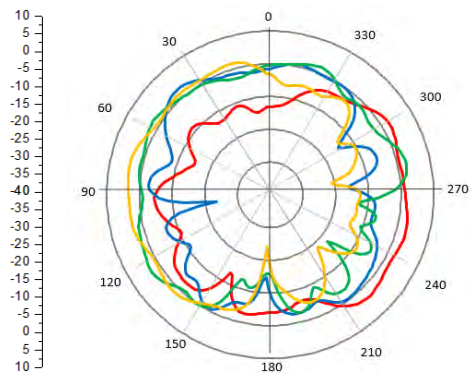
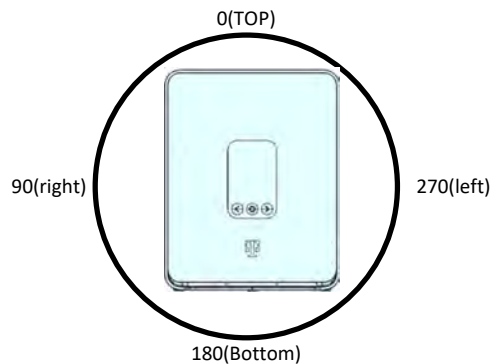


— Wi-Fi-0
— Wi-Fi-1
— Wi-Fi-2
— Wi-Fi-3

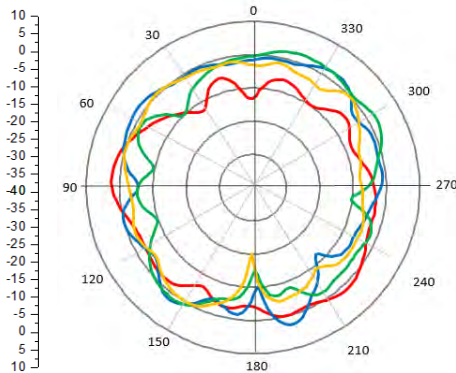
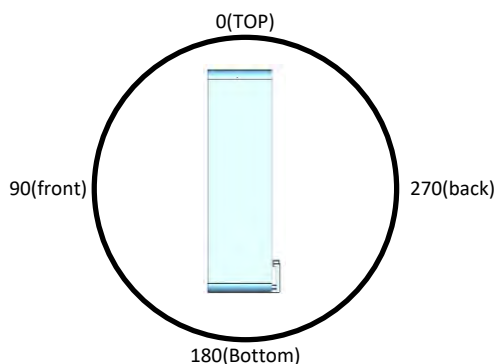
Measurement Data_WiFi

❖ Radiation pattern: Wi-Fi 5G antenna

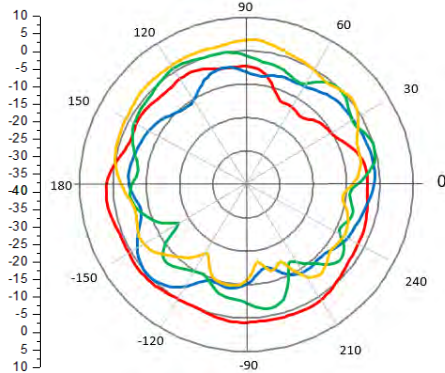
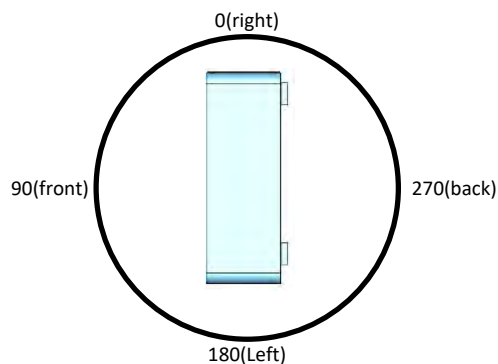
X-Z plane



Y-Z plane



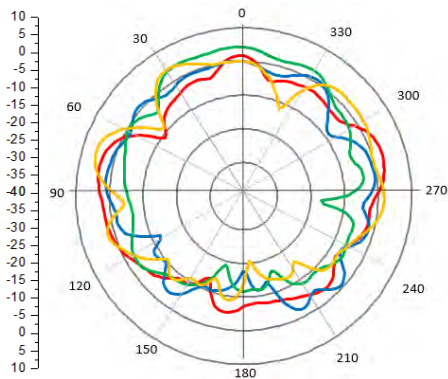
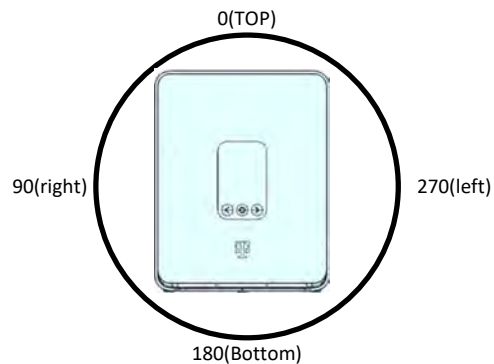
X-Y plane



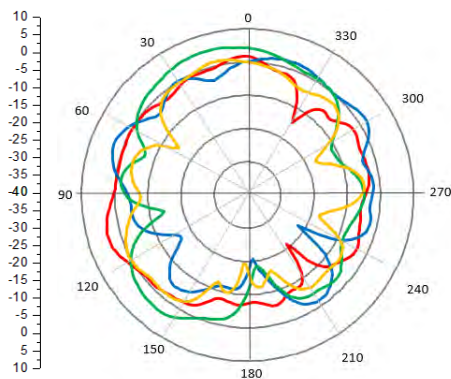
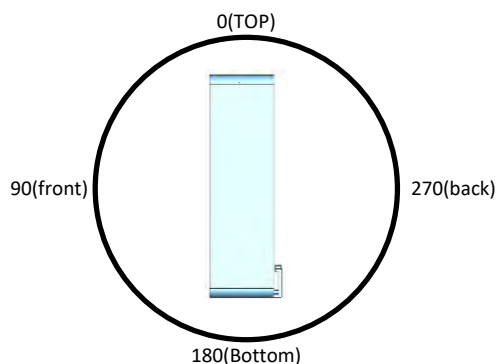
Measurement Data_ WiFi

❖ Radiation pattern: Wi-Fi 6G antenna

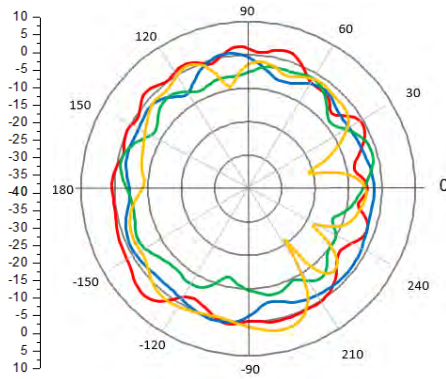
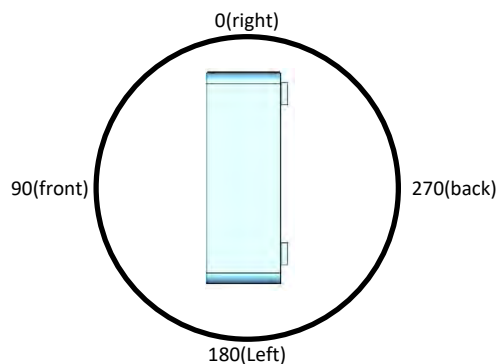
X-Z plane



Y-Z plane



X-Y plane

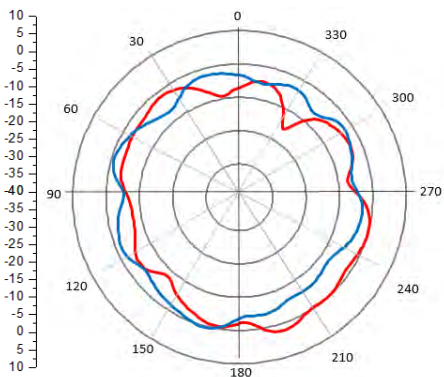
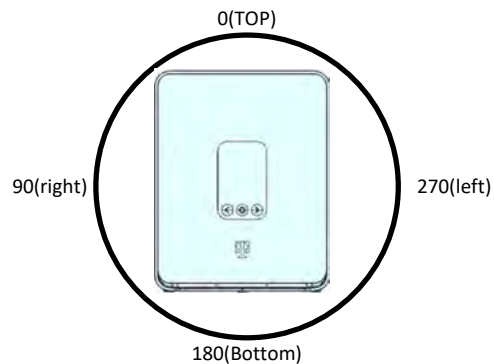


— 6G-0
— 6G-1
— 6G-2
— 6G-3

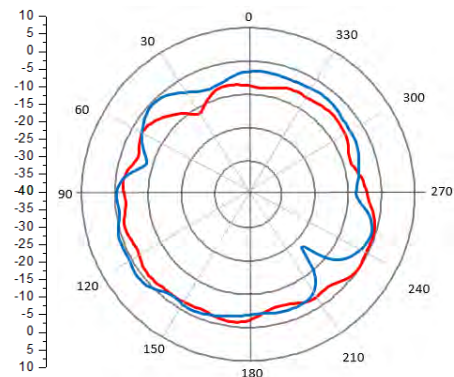
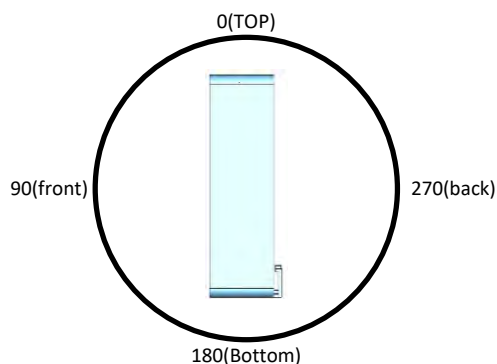
Measurement Data_ IoT

❖ Radiation pattern: IoT antenna

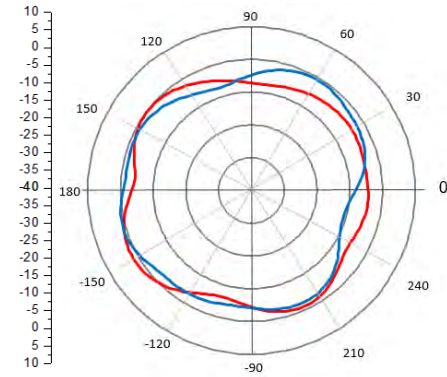
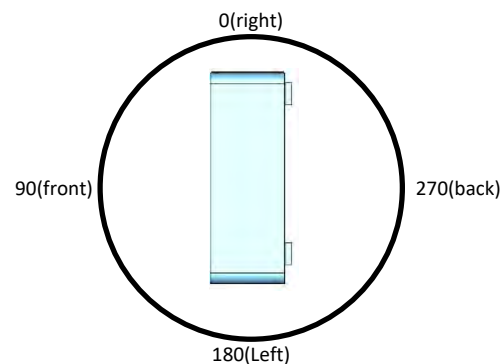
X-Z plane



Y-Z plane



X-Y plane



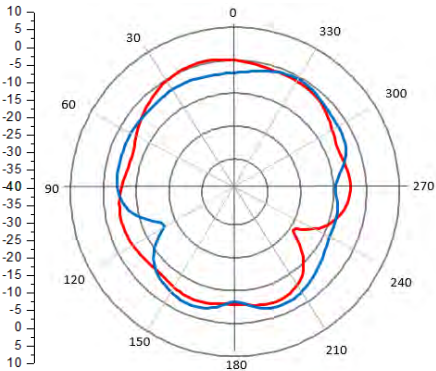
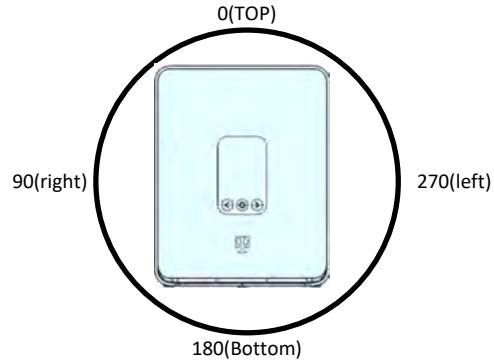
IoT-1

IoT-2

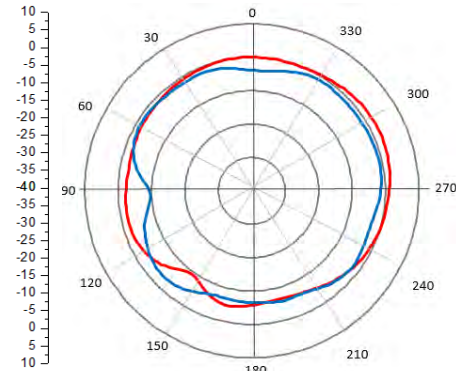
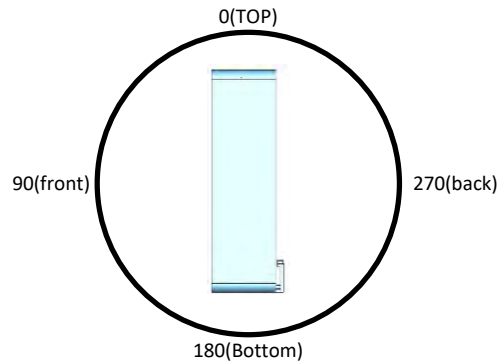
Measurement Data_ GPS

❖ Radiation pattern: GNSS antenna

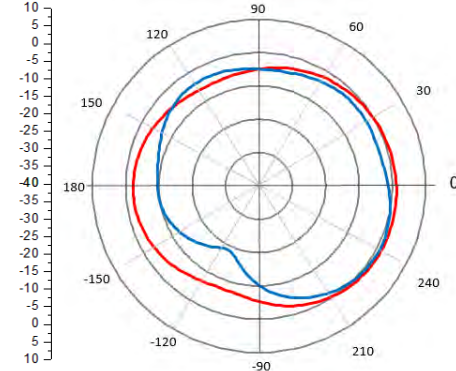
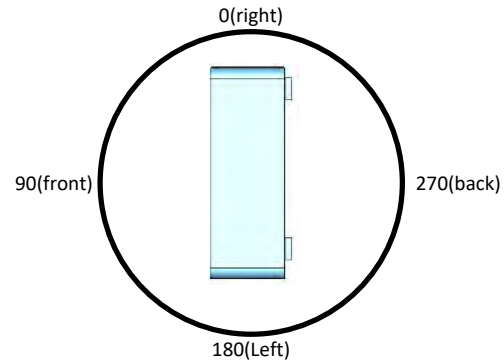
X-Z plane



Y-Z plane



X-Y plane



— L1
— L5