

Classification	Confidential
Date	2022/06/23



ZF9

Antenna Report

1 Antenna Type

	Antenna type
ANT1	PIFA
ANT2	PIFA
ANT3	PIFA
ANT4	PIFA
ANT5	PIFA
ANT6	PIFA
ANT7	PIFA
ANT8	PIFA

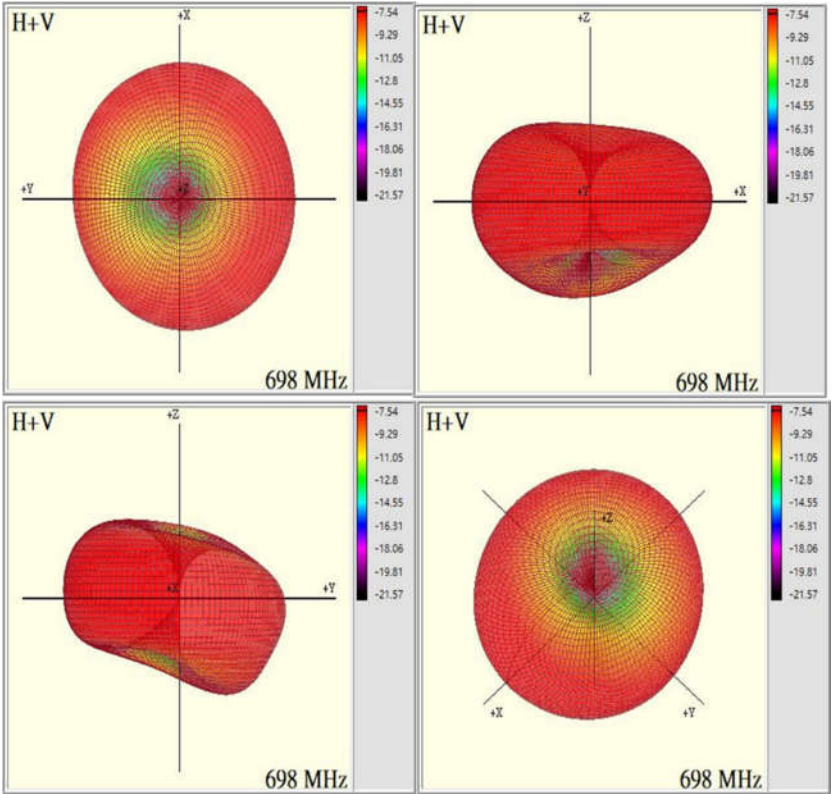
2.1 _Ant 1 : Main Antenna Tx/PRx (L+M*+H*)

Antenna gain

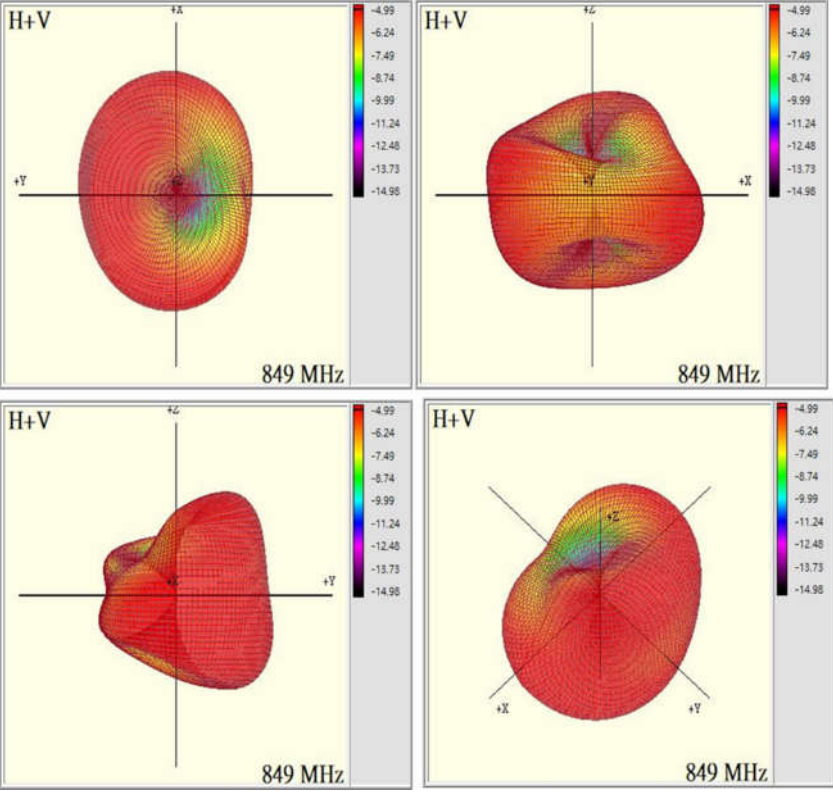
Frequency(MHz)	617	634	652	663	680	698						
Ant. Gain(dBi)	-14.64	-12.21	-10.40	-9.16	-7.21	-6.02						
Frequency(MHz)	704	714	724	734	744	754	764	774	784	794	804	814
Ant. Gain(dBi)	-5.47	-6.40	-7.77	-8.16	-7.38	-7.26	-7.28	-6.56	-6.46	-6.66	-6.90	-6.36
Frequency(MHz)	824	836	849	869	880	881	894	897	915	925	942	960
Ant. Gain(dBi)	-6.11	-6.29	-6.04	-5.99	-6.16	-5.91	-6.31	-6.46	-4.87	-4.52	-4.03	-4.42
Frequency(MHz)	1710	1747	1785	1805	1842	1850	1880	1900	1910	1920	1930	1950
Ant. Gain(dBi)	-7.38	-6.17	-6.19	-5.83	-6.31	-6.90	-7.06	-7.63	-8.26	-8.37	-8.42	-8.57
Frequency(MHz)	1960	1980	1990	2010	2018	2025	2110	2140	2170	2300	2310	2320
Ant. Gain(dBi)	-7.38	-6.17	-6.19	-5.83	-6.31	-6.90	-7.06	-7.63	-8.26	-8.37	-8.42	-8.57
Frequency(MHz)	2350	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Ant. Gain(dBi)	-10.60	-10.43	-10.41	-10.54	-10.85	-10.94	-10.70	-10.80	-10.85	-10.24	-10.28	-9.55
Frequency(MHz)	2550	2600	2650	2700								
Ant. Gain(dBi)	-8.66	-8.26	-6.42	-5.36								

Antenna Pattern

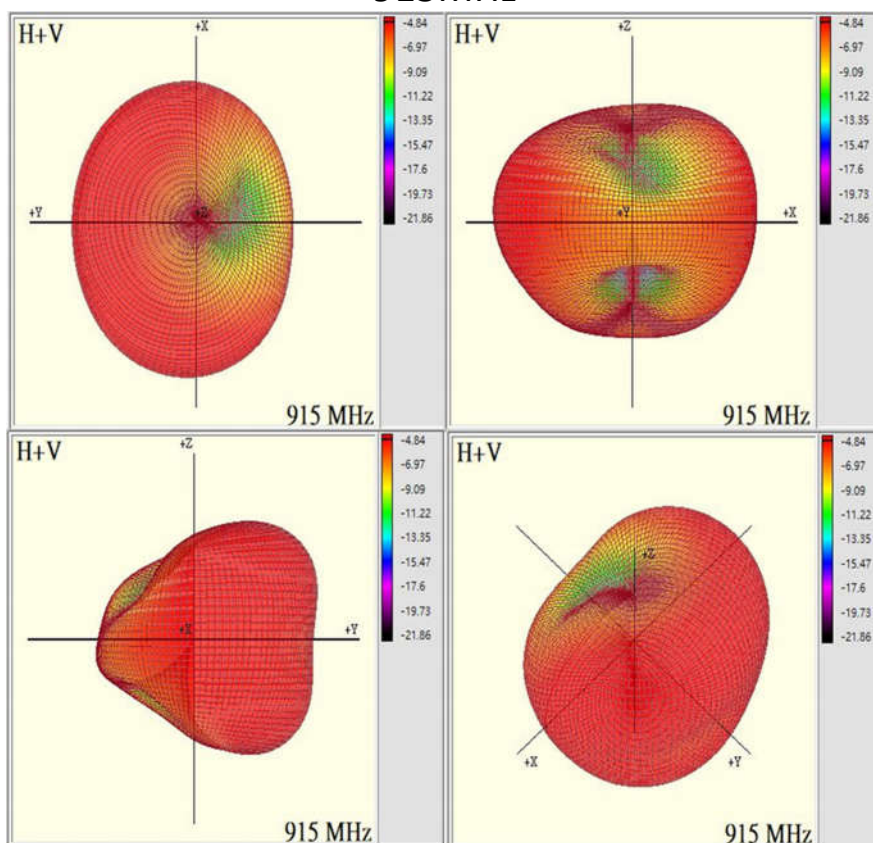
698MHz



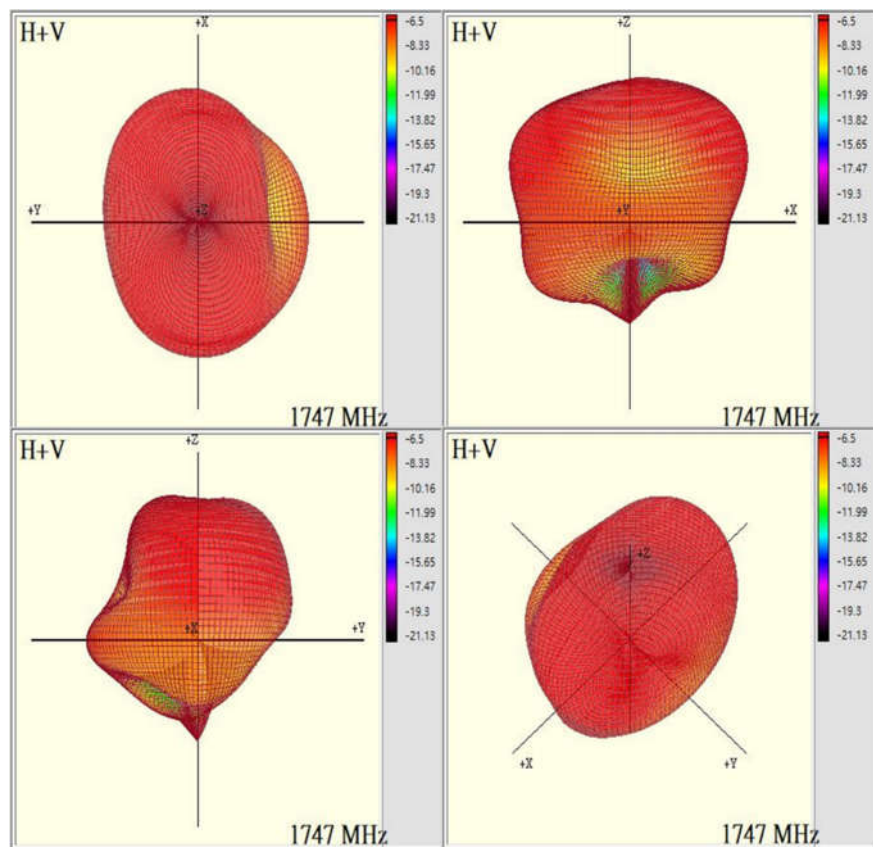
849MHz



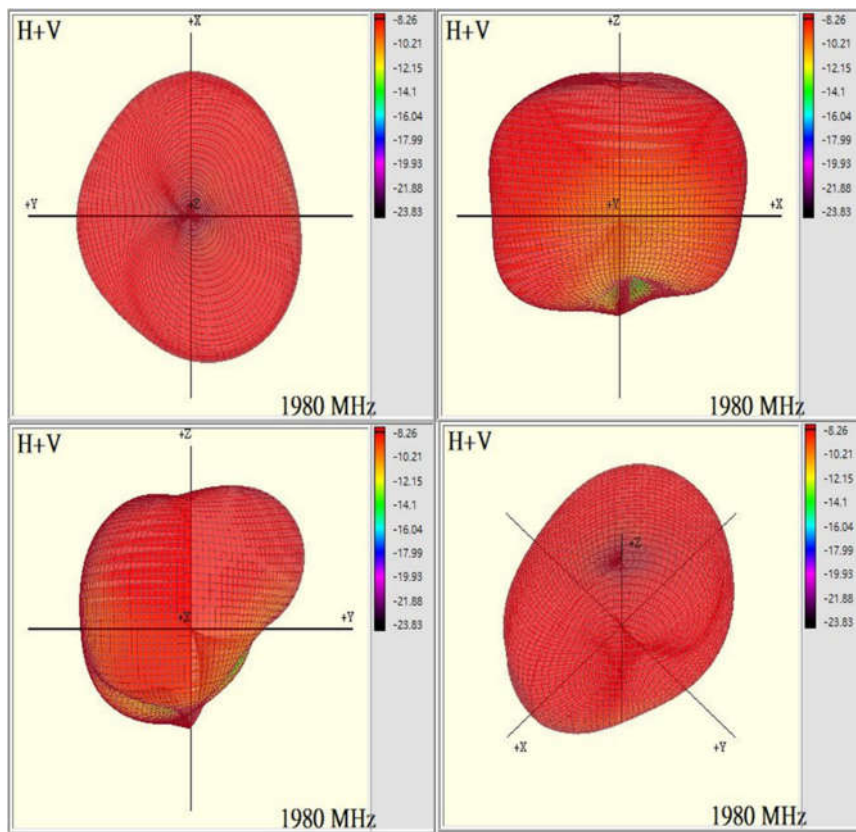
915MHz



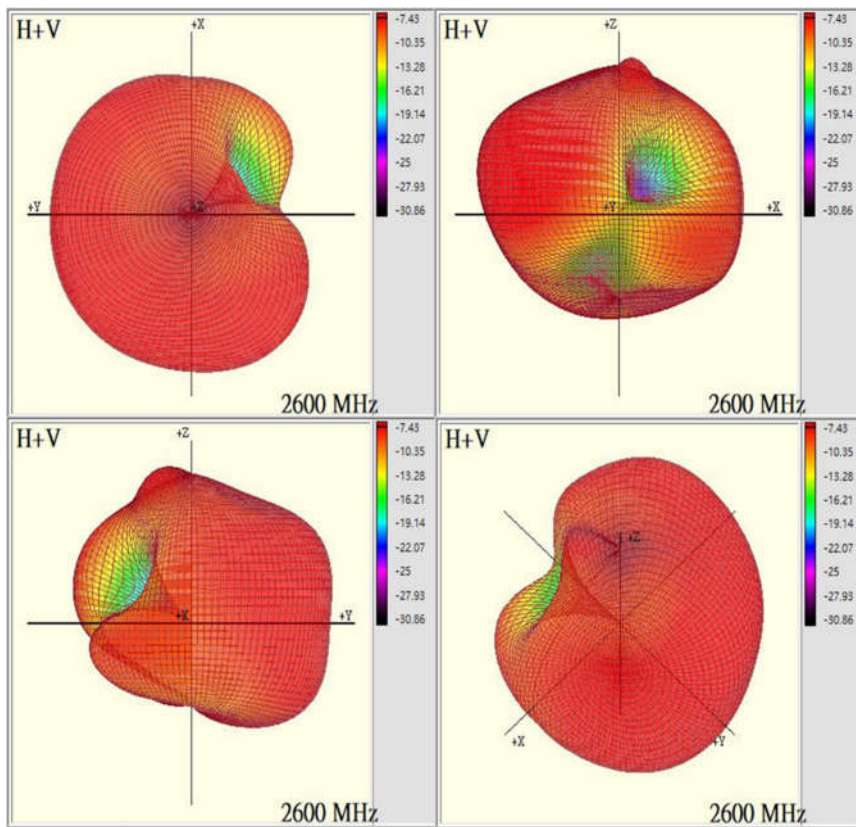
1747MHz



1980MHz



2600MHz



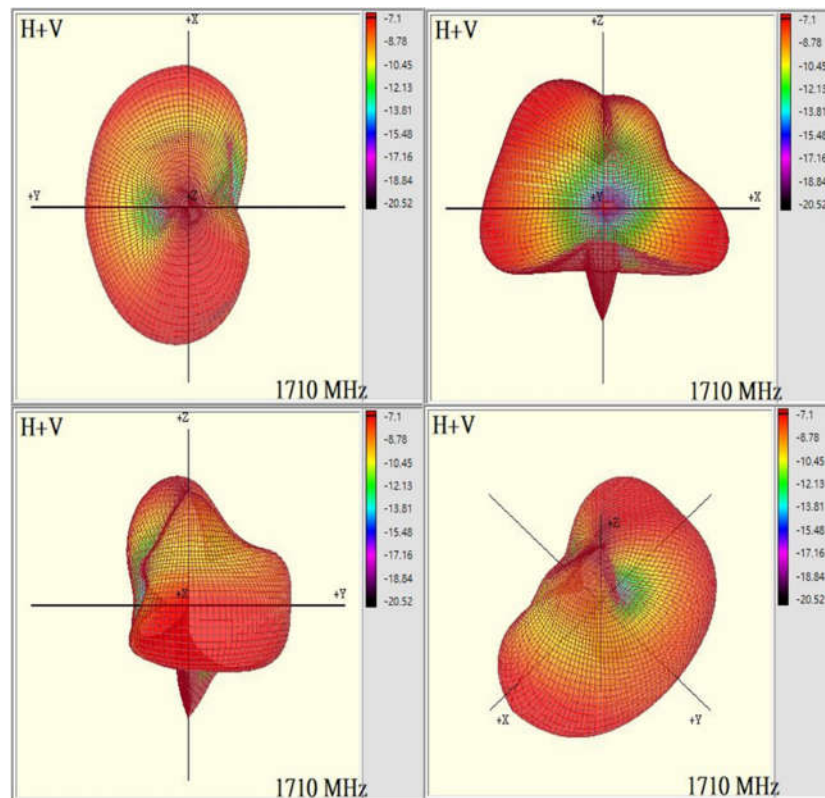
2.2 _Ant 2: Main Antenna Tx/PRx (M+H+n77 Rx4)

Antenna gain

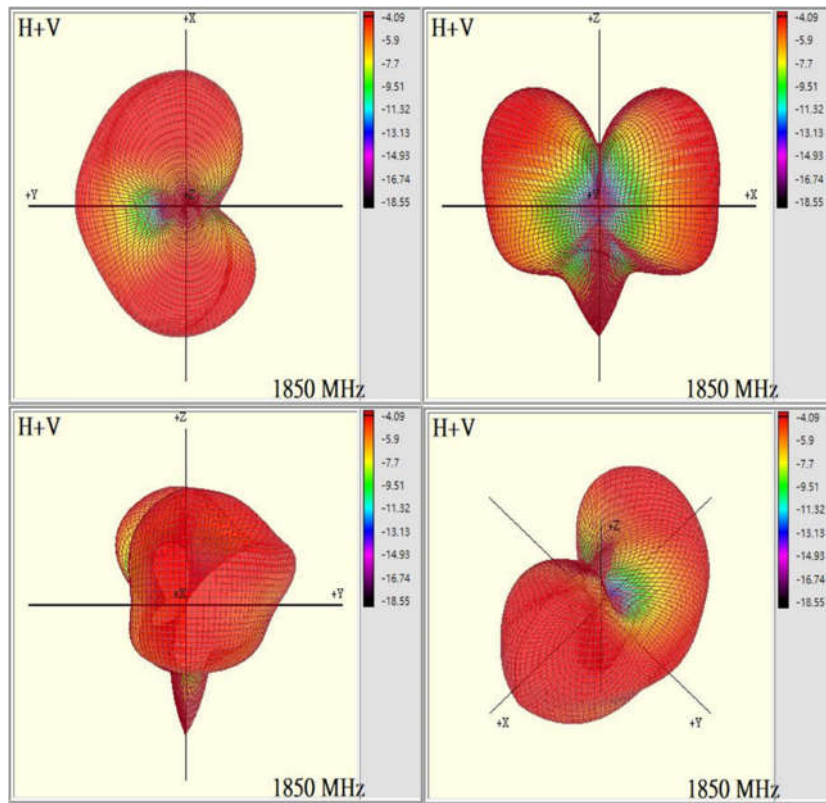
Frequency(MHz)	1710	1747	1785	1805	1842	1850	1880	1900	1910	1920	1930	1950
Ant.Gain(dBi)	-5.43	-5.09	-4.71	-4.35	-4.03	-3.67	-3.29	-3.26	-3.33	-3.24	-3.30	-3.83
Frequency(MHz)	1960	1980	1990	2010	2018	2025	2110	2140	2170			
Ant.Gain(dBi)	-4.46	-4.83	-4.92	-5.59	-5.52	-5.58	-3.80	-3.83	-5.02			
Frequency(MHz)	2200	2250	2300	2350	2400	2410	2420	2430	2440	2450	2460	2470
Ant.Gain(dBi)	-5.27	-3.91	-3.80	-4.83	-4.26	-3.95	-3.90	-4.06	-3.94	-3.53	-3.46	-3.66
Frequency(MHz)	2480	2490	2500	2550	2600	2650	2700					
Ant.Gain(dBi)	-2.83	-3.15	-2.93	-1.82	-3.34	-4.29	-3.29					
Frequency(MHz)	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850
Ant.Gain(dBi)	-4.77	-5.31	-5.25	-5.04	-5.59	-6.19	-4.94	-3.96	-5.71	-5.71	-7.57	-8.58
Frequency(MHz)	3900	3950	4000	4050	4100	4150	4200					
Ant.Gain(dBi)	-9.89	-10.98	-12.01	-10.57	-12.76	-11.02	-11.07					

Antenna Pattern

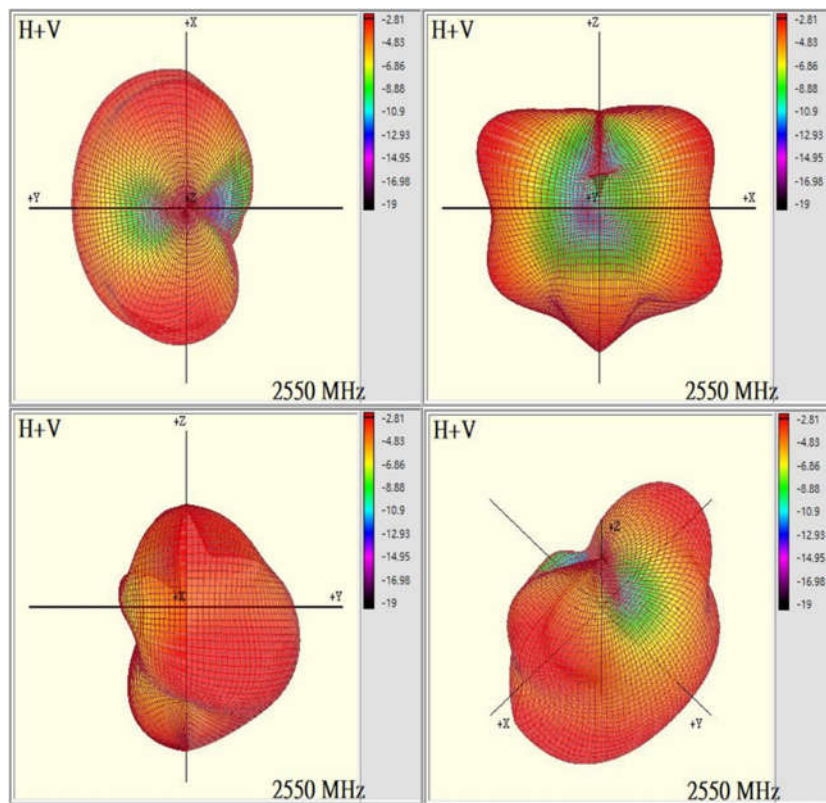
1710MHz



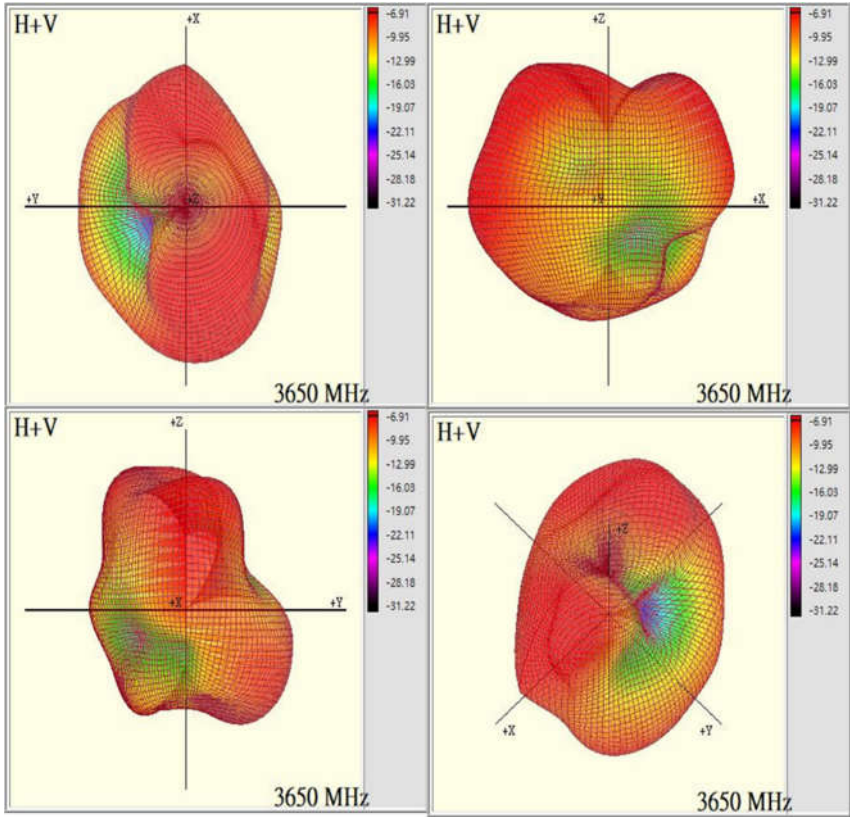
1850MHz



2550MHz



3300MHz



2.3 _Ant 3: Div. Antenna Tx/DRx (L+M*+H*)

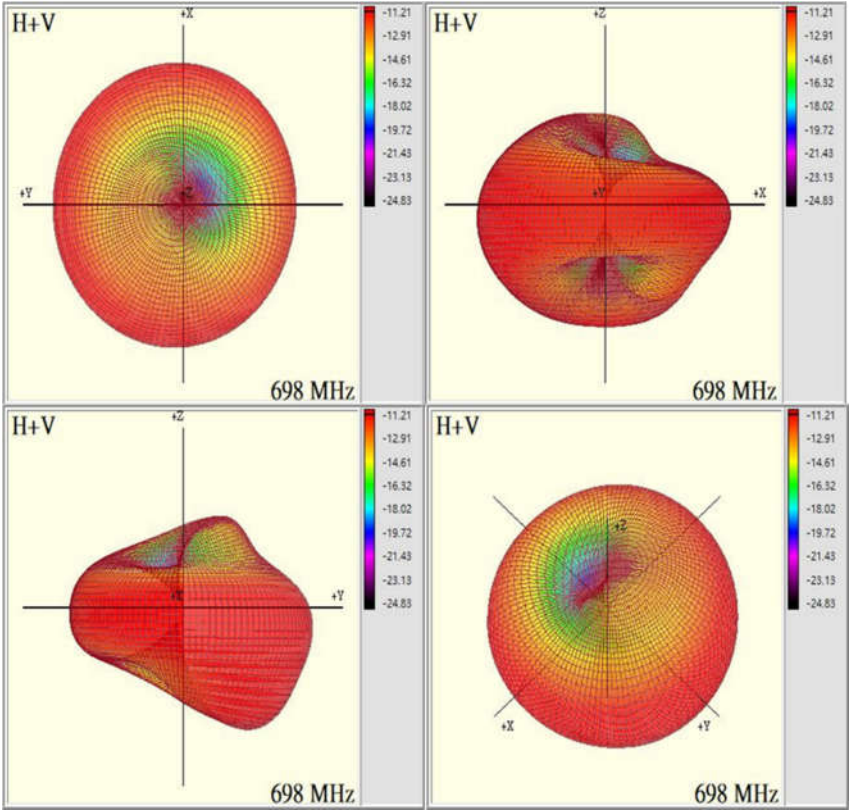
Antenna gain

Frequency(MHz)	617	634	652	663	680	698						
Ant.Gain(dBi)	-25.78	-21.94	-16.15	-18.01	-14.79	-11.39						
Frequency(MHz)	704	714	724	734	744	754	764	774	784	794	804	814
Ant.Gain(dBi)	-11.41	-8.64	-10.01	-10.10	-5.73	-7.34	-9.63	-7.63	-7.34	-9.30	-8.70	-6.15
Frequency(MHz)	824	836	849	869	880	881	894	897	915	925	942	960
Ant.Gain(dBi)	-4.56	-4.31	-4.39	-5.72	-5.86	-6.05	-7.04	-8.12	-8.02	-6.42	-6.98	-8.10

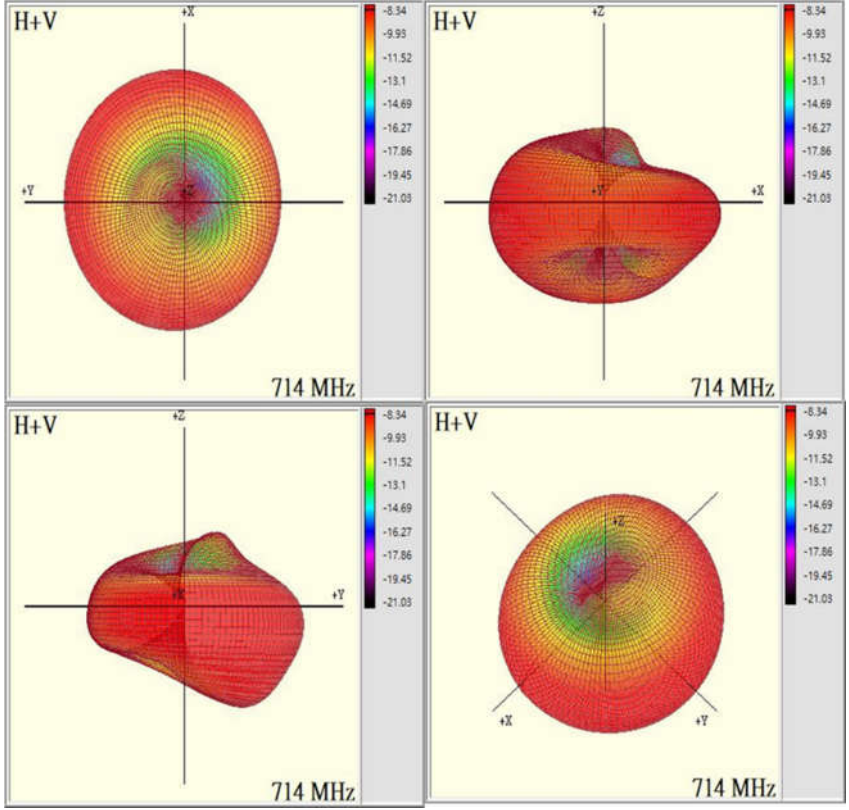
[illegible]

Antenna Pattern

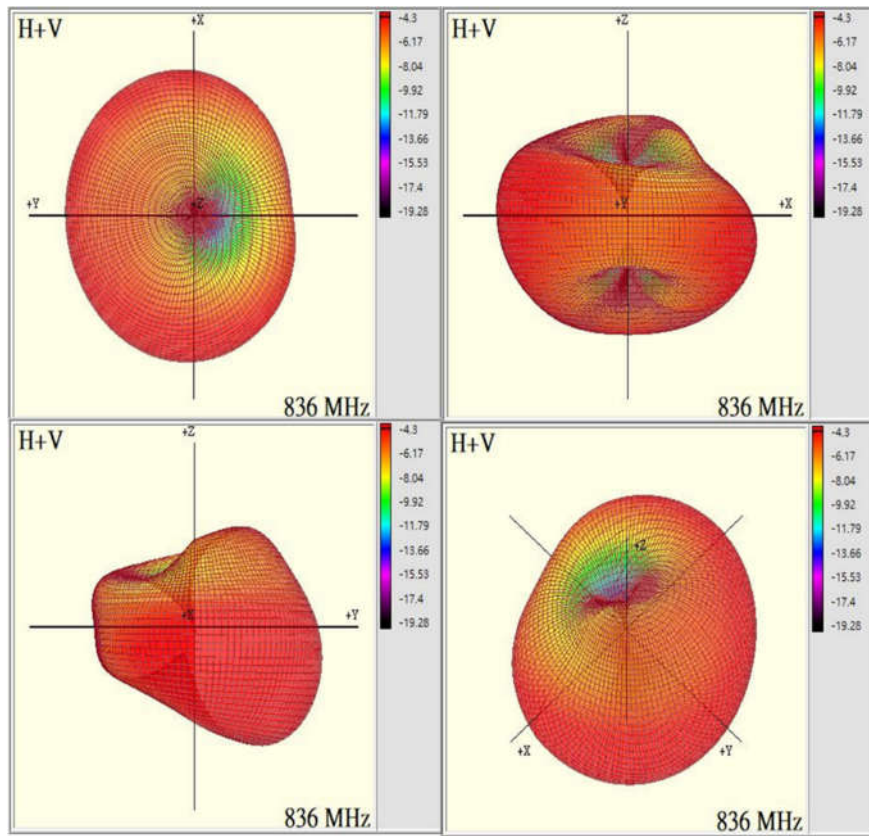
698MHz



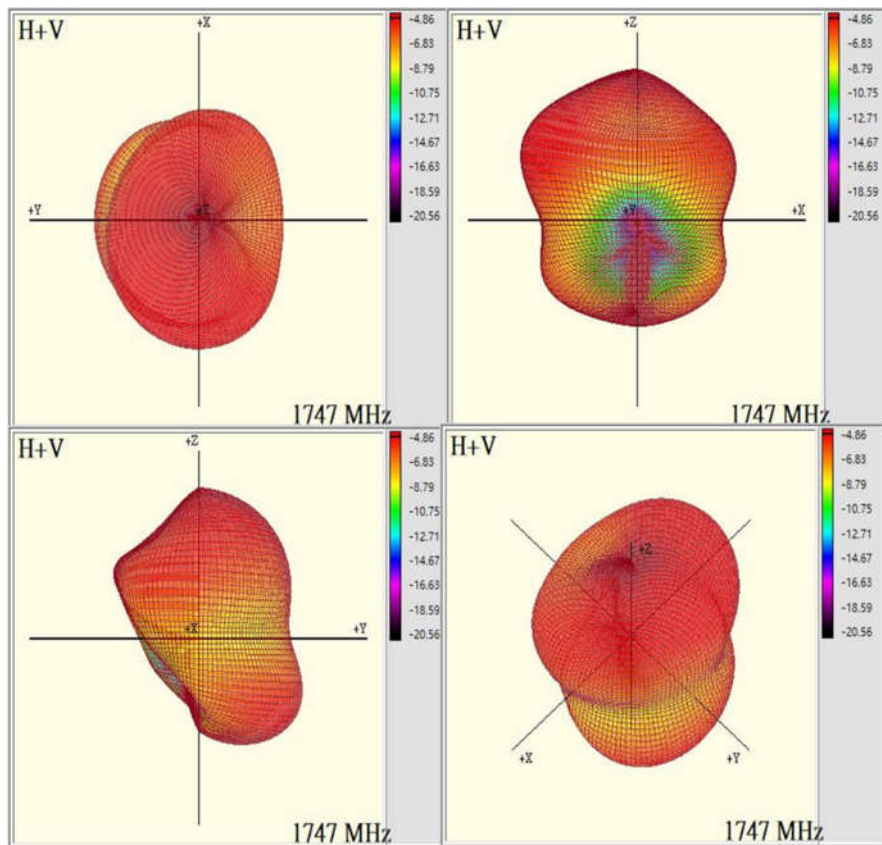
714MHz



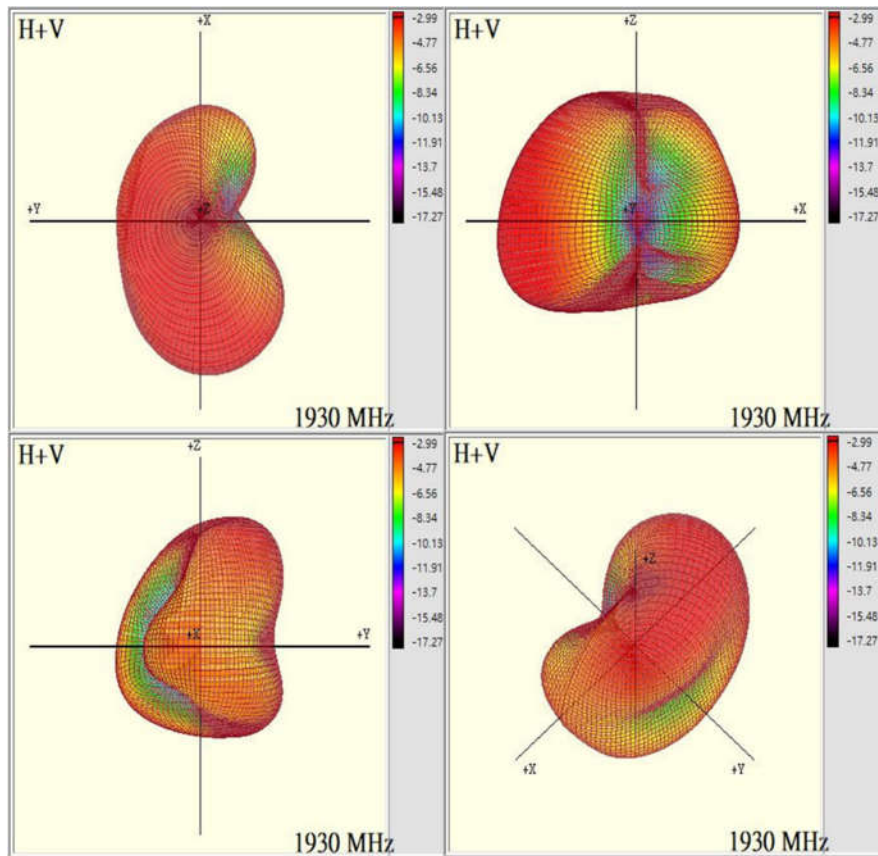
836MHz



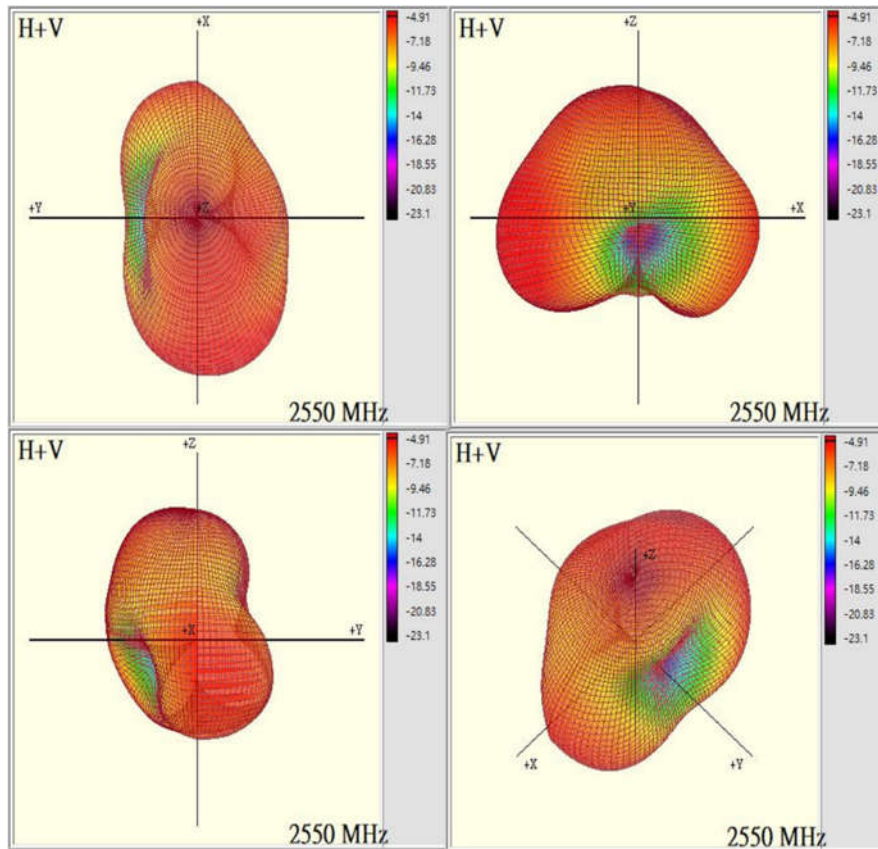
1747MHz



1930MHz



2550MHz



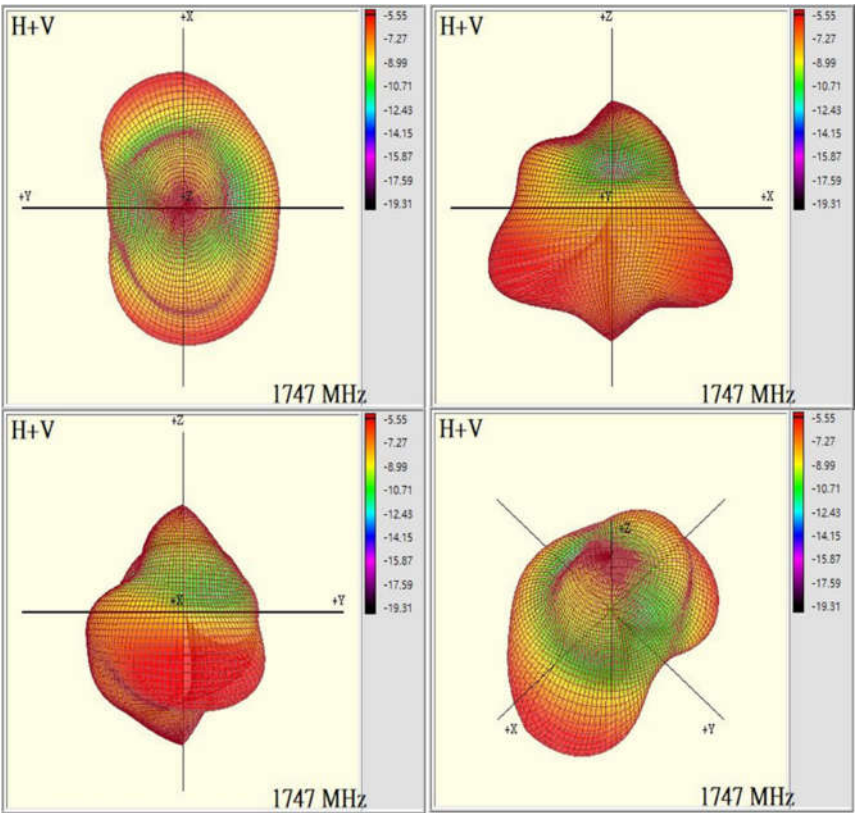
2.4 _Ant 4: Div. Antenna TX/DRx (M+H)+TX/DRX N77/78

Antenna gain

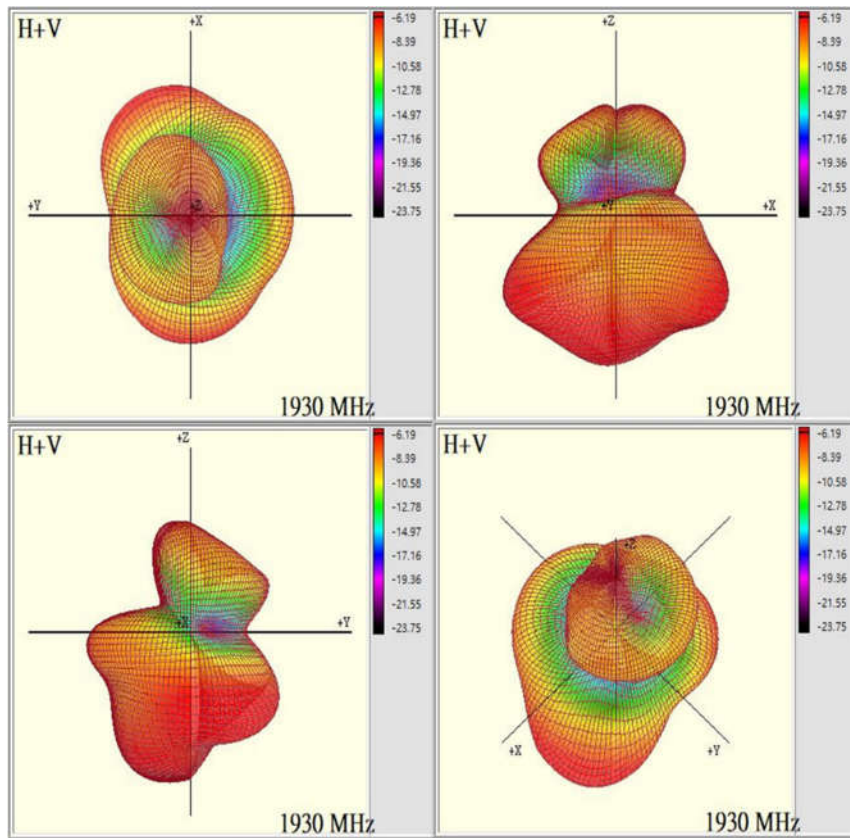
Frequency(MHz)	1710	1747	1785	1805	1842	1850	1880	1900	1910	1920	1930	1950
Ant.Gain(dBi)	-6.45	-5.59	-6.84	-6.22	-6.30	-6.66	-7.36	-7.13	-7.58	-7.31	-6.98	-8.05
Frequency(MHz)	1960	1980	1990	2010	2018	2025	2110	2140	2170	2300	2310	2320
Ant.Gain(dBi)	-8.09	-7.72	-7.09	-7.56	-7.60	-7.44	-5.10	-5.69	-5.92	-6.05	-6.93	-7.93
Frequency(MHz)	2330	2340	2350	2360	2370	2380	2390	2400	2410	2420	2430	2440
Ant.Gain(dBi)	-8.70	-8.47	-7.84	-6.86	-6.20	-6.35	-6.46	-8.36	-5.73	-6.46	-5.81	-4.52
Frequency(MHz)	2450	2460	2470	2480	2490	2500	2510	2520	2530	2540	2550	2560
Ant.Gain(dBi)	-3.91	-4.51	-4.73	-4.31	-4.25	-4.98	-3.59	-2.89	-2.75	-2.52	-0.93	-1.66
Frequency(MHz)	2570	2580	2590	2600	2650	2700						
Ant.Gain(dBi)	-2.18	-0.90	-1.30	-1.13	-0.93	0.39						
Frequency(MHz)	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850
Ant.Gain(dBi)	-3.38	-2.22	-3.98	-5.16	-4.98	-6.60	-5.27	-4.44	-7.58	-5.37	-4.54	-6.51
Frequency(MHz)	3900	3950	4000	4050	4100	4150	4200					
Ant.Gain(dBi)	-5.72	-4.72	-4.44	-4.33	-4.88	-4.82	-5.59					

Antenna Pattern

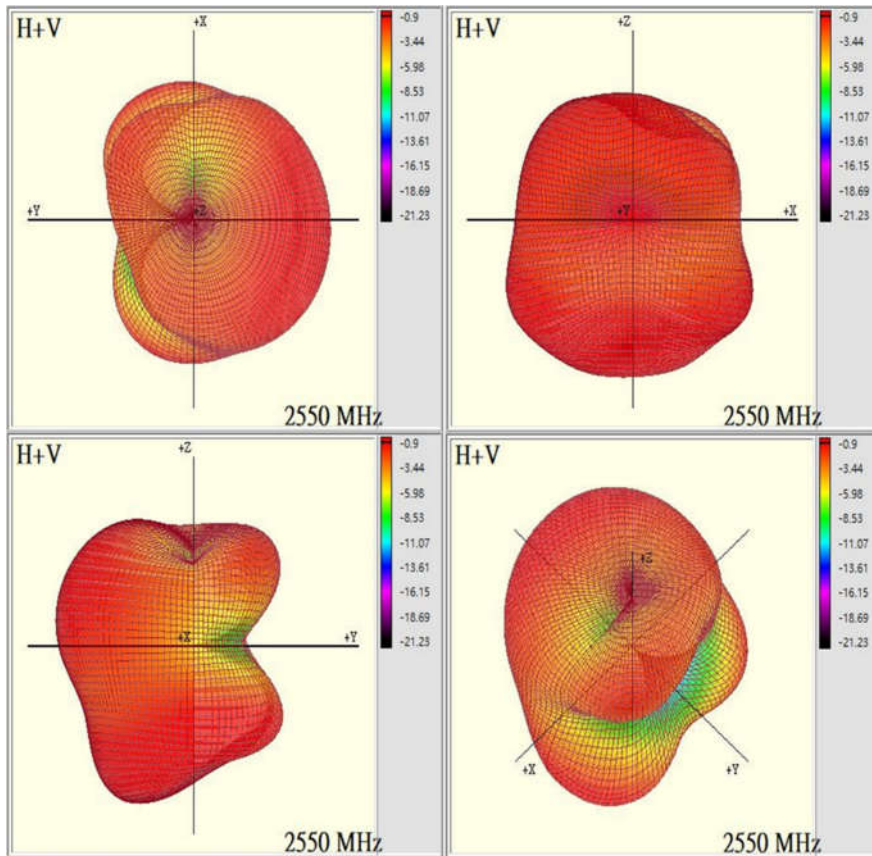
1747MHz



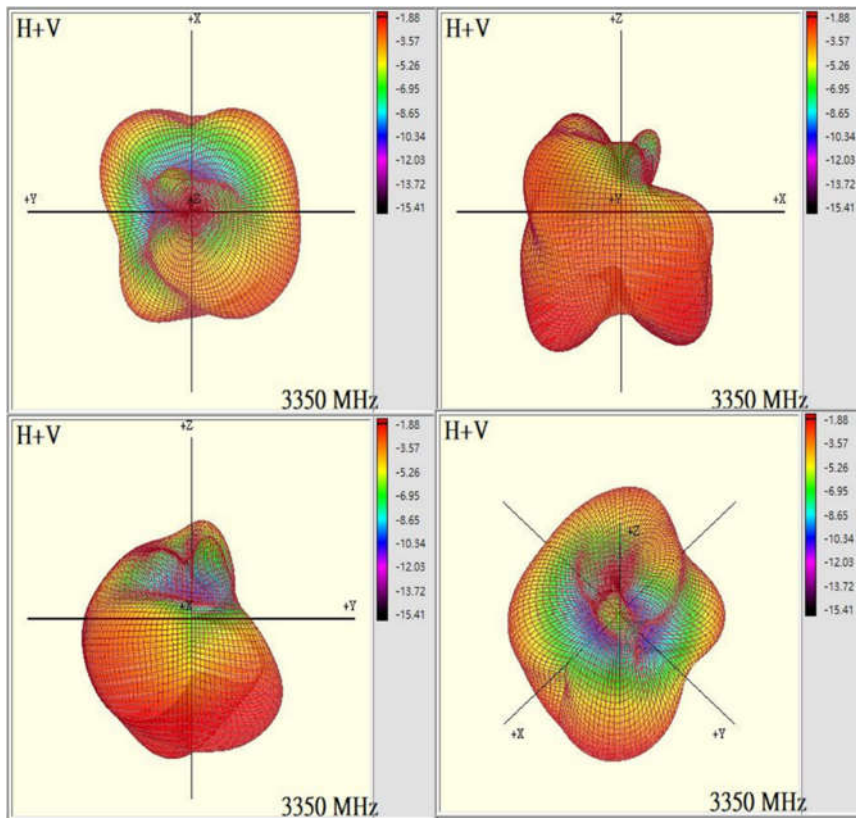
1930MHz



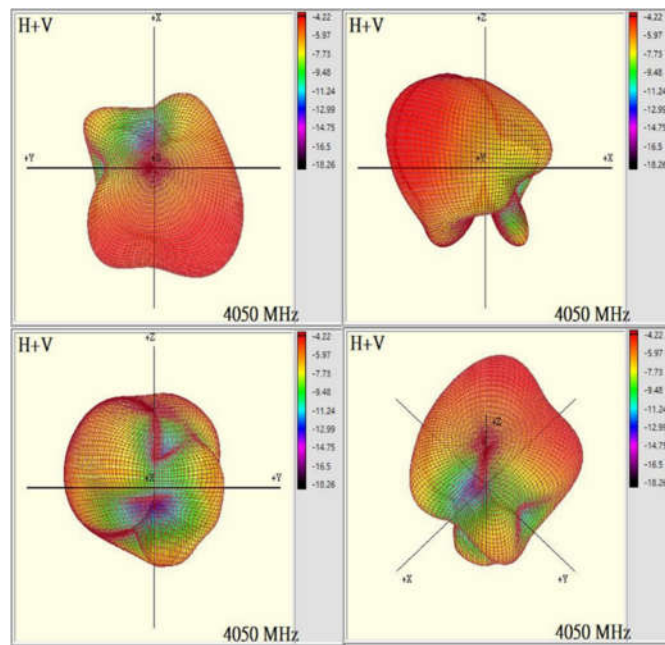
2550MHz



3350MHz



4050MHz



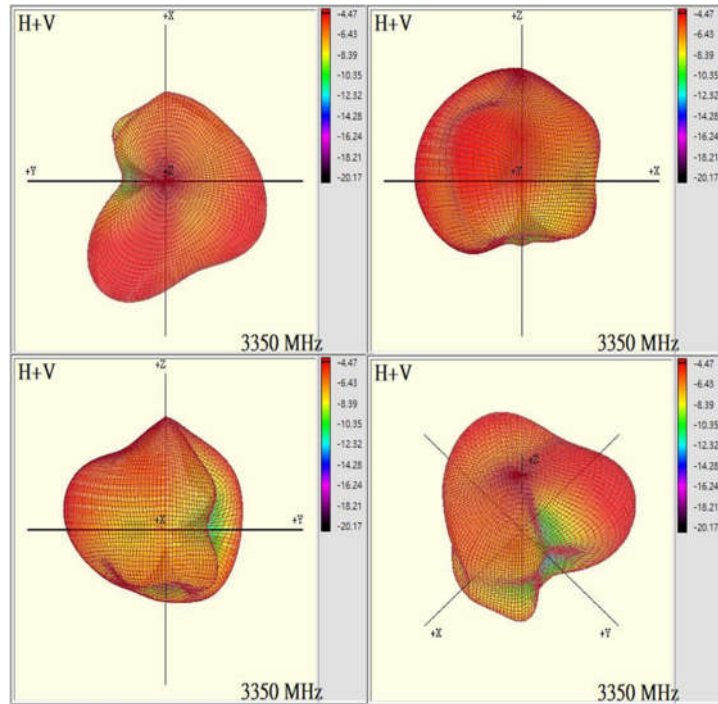
2.5 _Ant 5 : 5GNR n77/n78 (Tx/PRx)

Antenna gain

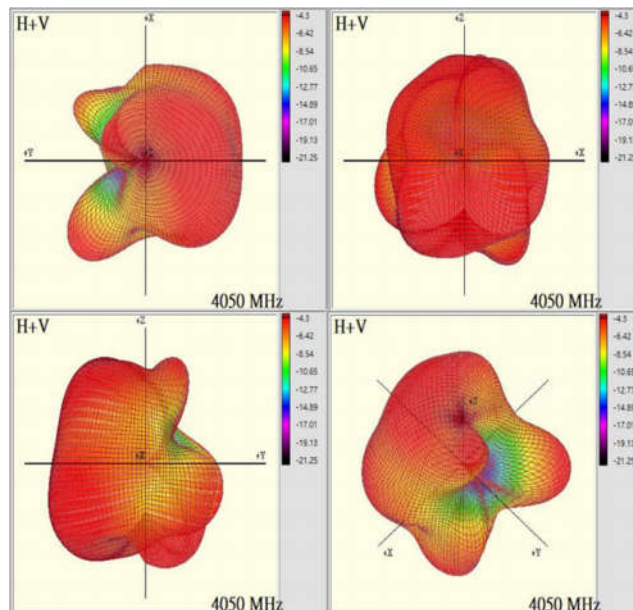
Frequency(MHz)	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850
Ant.Gain(dBi)	-6.60	-4.65	-5.49	-6.41	-5.39	-6.90	-5.40	-4.24	-7.92	-5.48	-5.55	-7.91
Frequency(MHz)	3900	3950	4000	4050	4100	4150	4200					
Ant.Gain(dBi)	-5.68	-5.28	-6.01	-4.51	-4.86	-5.37	-4.84					

Antenna Pattern

3350MHz



4050MHz



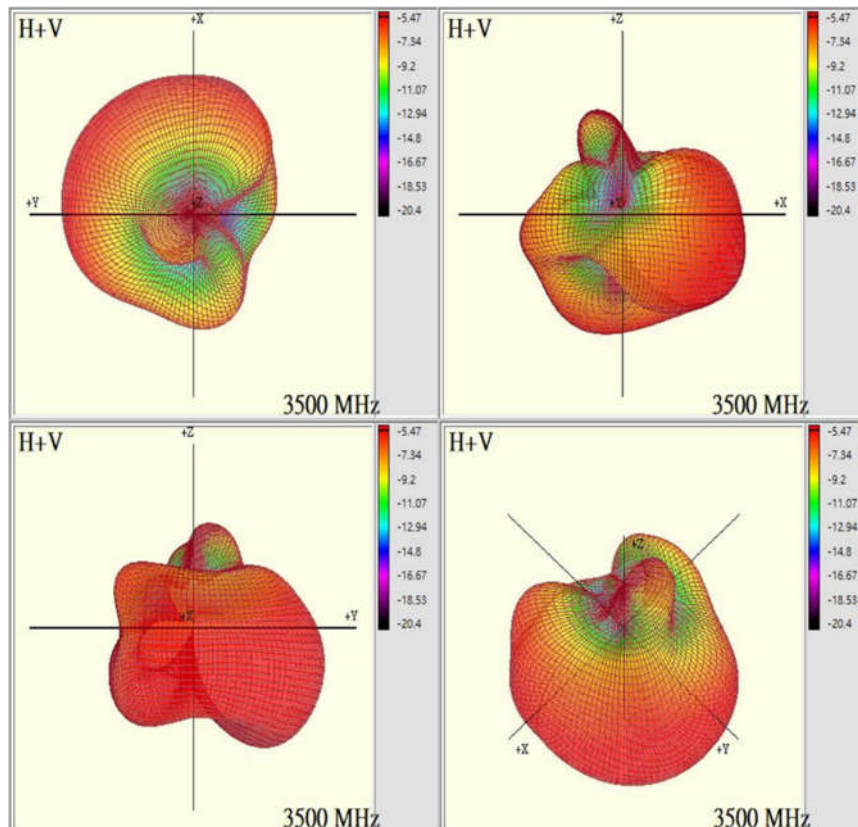
2.6 _Ant 6 : 5GNR n77/n78 (MIMO 03)

Antenna gain

Frequency(MHz)	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850
Ant.Gain(dBi)	-5.41	-5.36	-5.70	-5.19	-4.95	-5.85	-6.19	-5.97	-8.96	-9.90	-9.10	-10.66
Frequency(MHz)	3900	3950	4000	4050	4100	4150	4200					
Ant.Gain(dBi)	-11.27	-10.88	-9.79	-8.72	-9.30	-9.32	-9.53					

Antenna Pattern

3500MHz



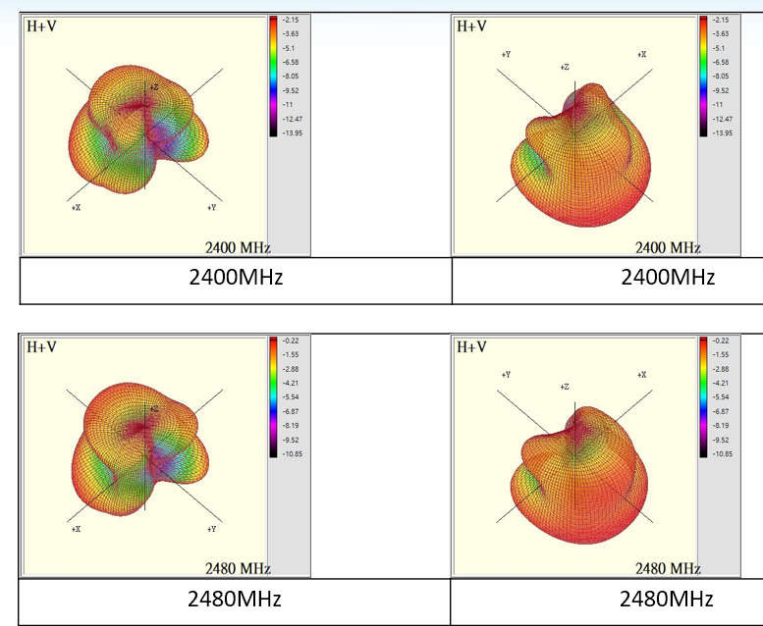
2.7 _Ant 7 : WIFI Antenna Tx/Rx

Antenna gain

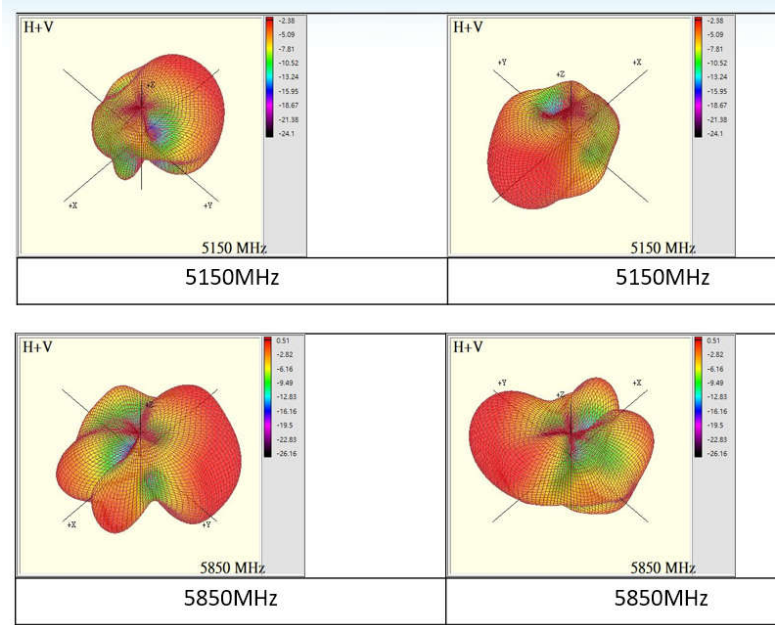
Frequency(MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500	
Ant.Gain(dBi)	-2.78	-2.49	-1.64	-2.66	-2.46	-1.09	-1.34	-2.81	-0.62	-1.37	-2.05	
Frequency(MHz)	5150	5200	5250	5300	5350	5400	5450	5500	5550	5600	5650	
Ant.Gain(dBi)	-2.50	-2.55	-2.02	-3.34	-3.79	-3.67	-3.66	-2.59	-3.49	-3.14	-1.57	
Frequency(MHz)	5700	5750	5800	5850	5900	5925	5950	5975	6000	6050	6100	
Ant.Gain(dBi)	-1.16	-0.78	-0.52	-0.27	0.16	0.50	-0.23	-0.24	-0.52	-1.41	-2.92	
Frequency(MHz)	6150	6200	6250	6300	6350	6400	6450	6500	6550	6600	6650	
Ant.Gain(dBi)	-4.00	-5.79	-6.79	-7.71	-6.87	-6.68	-7.11	-6.02	-5.80	-6.31	-6.81	
Frequency(MHz)	6700	6750	6800	6850	6900	6950	7000	7050	7100	7150	7200	7250
Ant.Gain(dBi)	-6.88	-6.75	-7.03	-6.18	-5.16	-5.14	-4.63	-5.03	-4.70	-4.16	-3.97	-2.97

Antenna Pattern

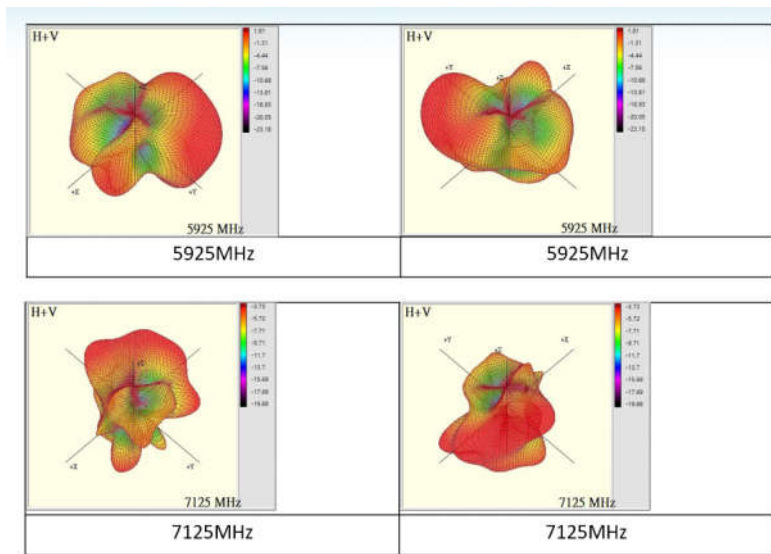
WIFI 2.4G/BT



WIFI 5G



WIFI 6E



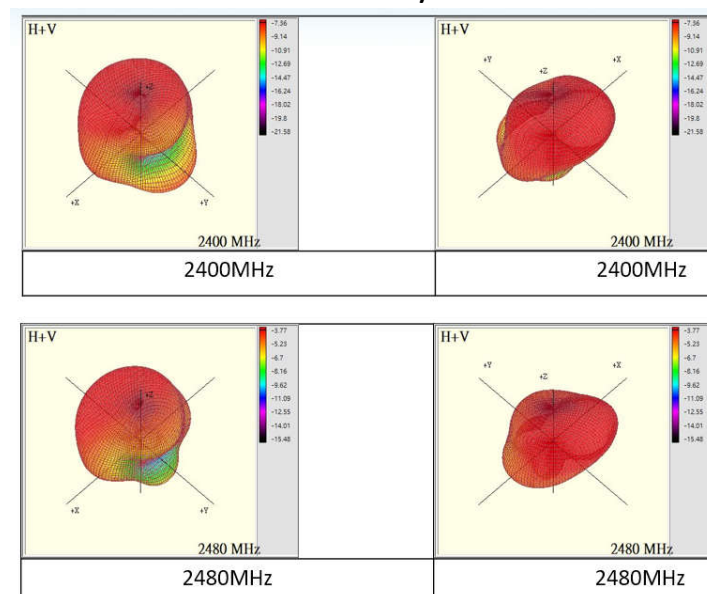
2.8 _Ant 8 : WIFI Antenna Tx/Rx

Antenna gain

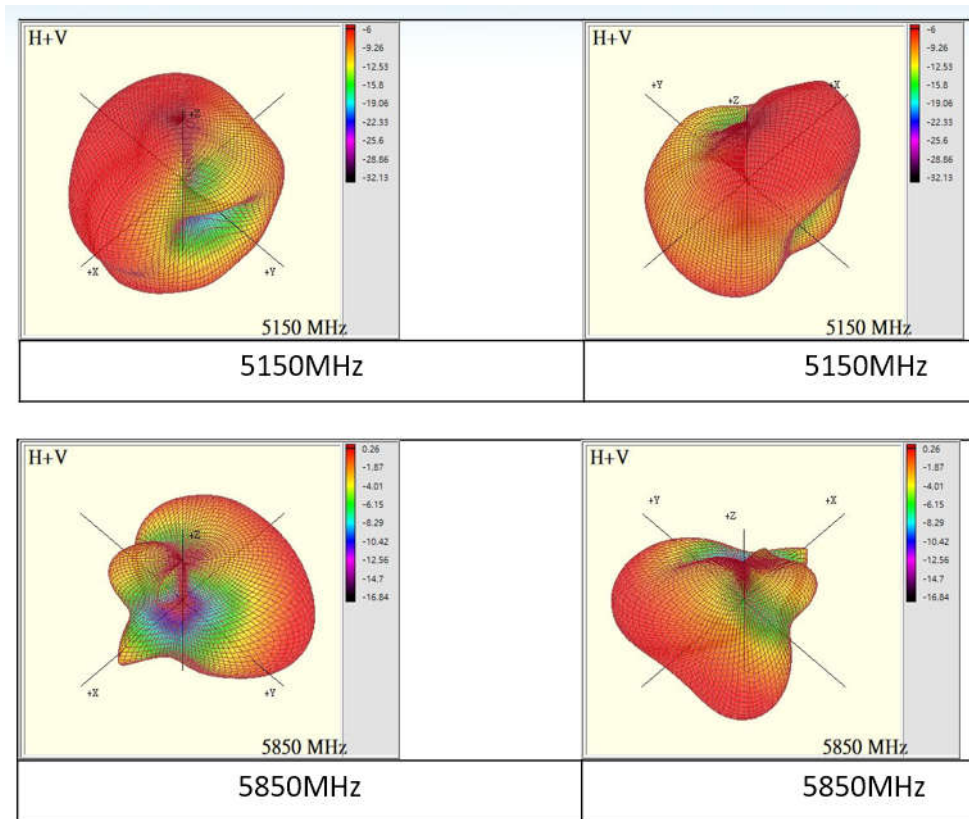
Frequency(MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500	
Ant.Gain(dBi)	-7.41	-5.78	-5.76	-6.08	-4.83	-4.57	-4.44	-4.98	-3.82	-4.54	-4.50	
Frequency(MHz)	5150	5200	5250	5300	5350	5400	5450	5500	5550	5600	5650	
Ant.Gain(dBi)	-6.02	-4.98	-3.98	-4.75	-5.67	-5.69	-4.60	-3.93	-4.44	-3.89	-2.89	
Frequency(MHz)	5700	5750	5800	5850	5900	5925	5950	5975	6000	6050	6100	
Ant.Gain(dBi)	-1.70	-1.87	-1.74	-0.76	0.16	1.05	0.69	0.65	0.80	0.60	0.15	
Frequency(MHz)	6150	6200	6250	6300	6350	6400	6450	6500	6550	6600	6650	
Ant.Gain(dBi)	-0.70	-1.78	-1.96	-2.32	-2.46	-2.50	-2.39	-2.01	-2.63	-3.42	-2.87	
Frequency(MHz)	6700	6750	6800	6850	6900	6950	7000	7050	7100	7150	7200	7250
Ant.Gain(dBi)	-3.20	-4.11	-4.98	-5.42	-5.36	-5.61	-6.02	-7.25	-7.33	-7.33	-7.87	-7.74

Antenna Pattern

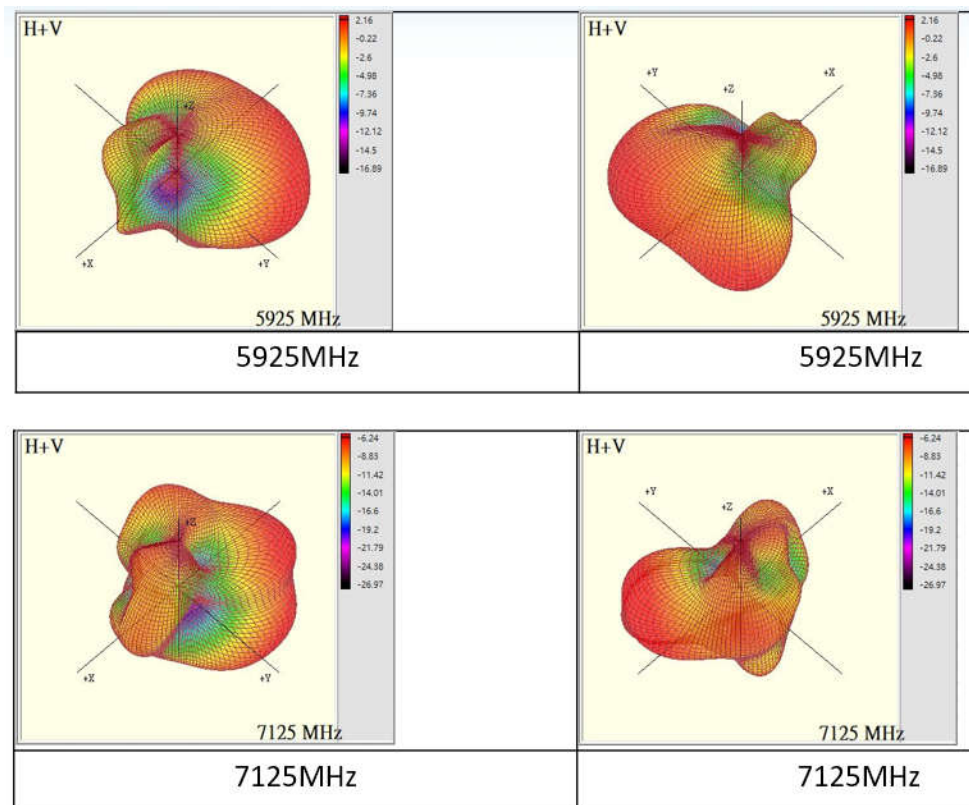
WIFI 2.4G/BT



WIFI 5G



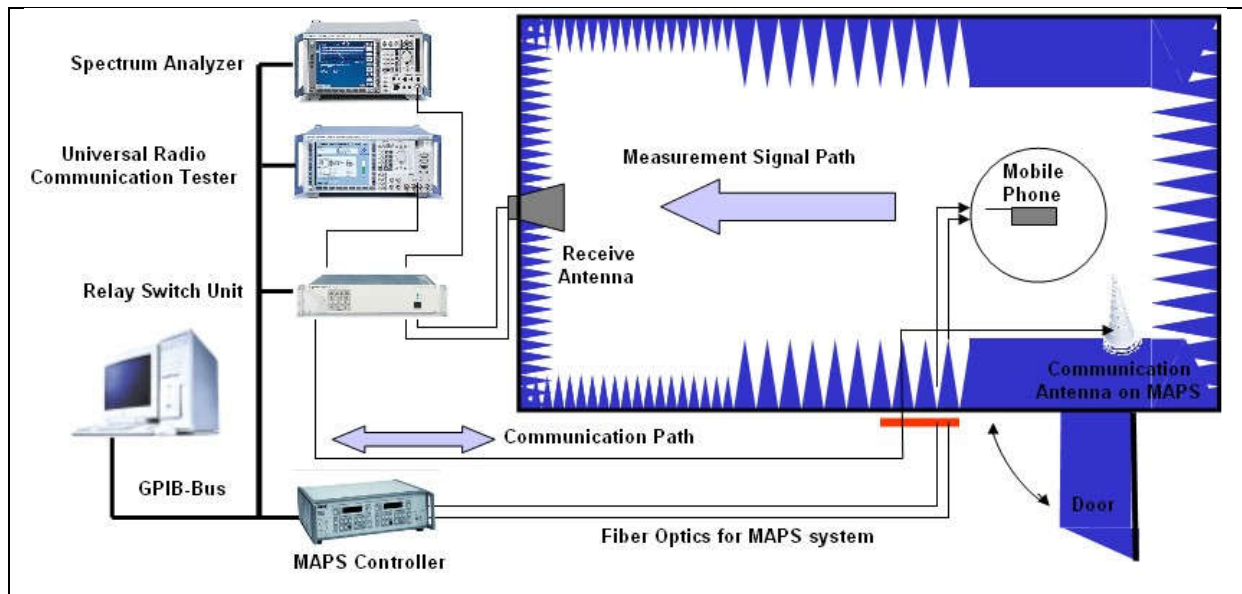
WIFI 6E



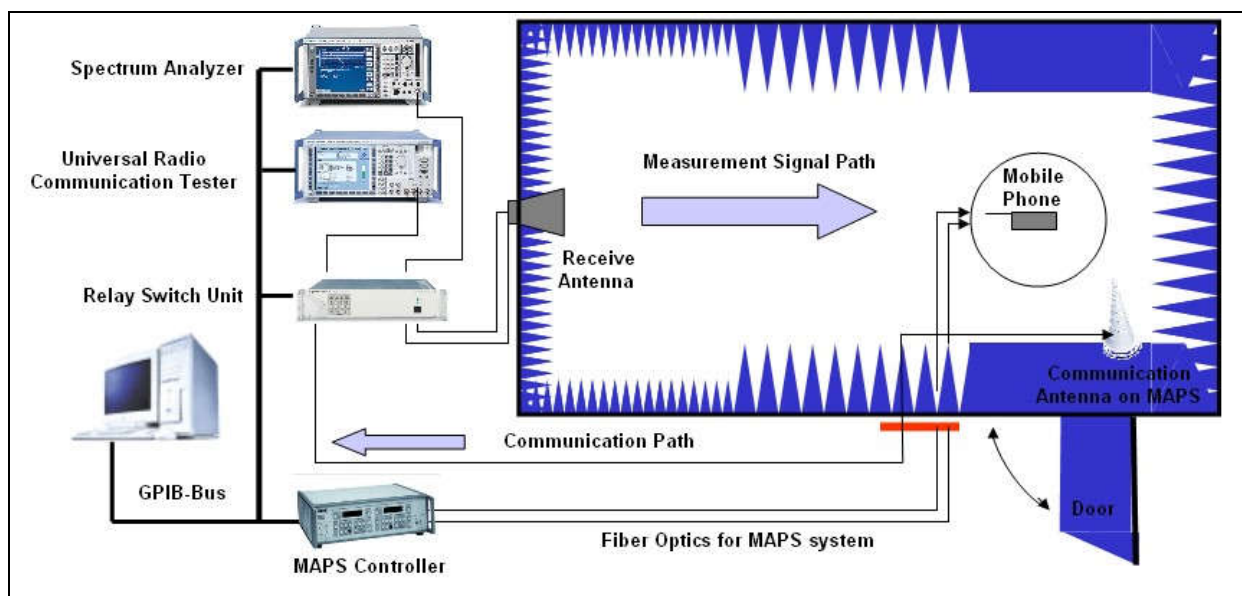
3. Measurement Methodology and Settings

All test results are under chamber environment of [ASUS Antenna Lab](#). The basic methodology of getting the test result is following mostly the principles outlined in CTIA the test plan. ^[4]

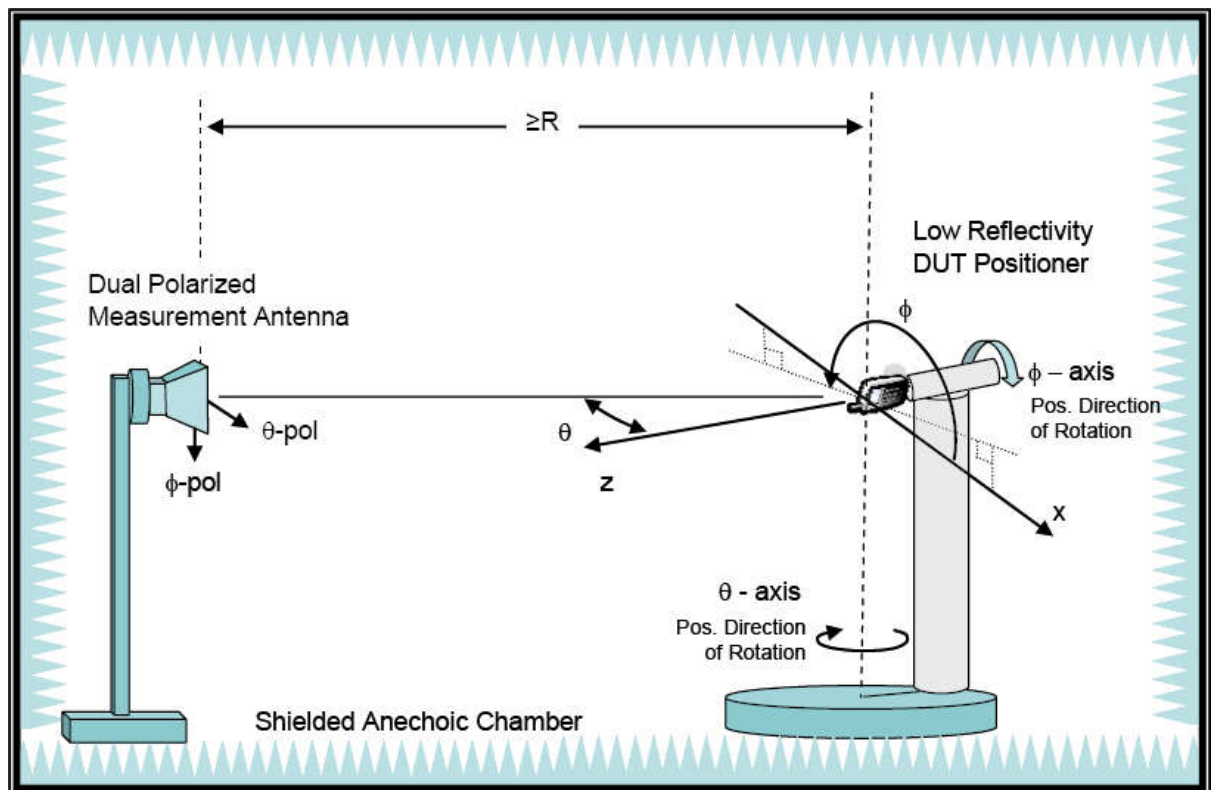
3.1 TRP (Total Radiation Power)



3.1 TIS (Total Isotropic Sensitivity)



3.3 Rectangular / Spherical Coordination of DUT



3.4 Equipment List

Description	Manufacturer	Model	Serial No.
Anechoic Chamber	ETS-Lindgren	AMS-8500	1036
MAPS Positioner	ETS-Lindgren	2015-72	N/A
Light Duty Mast Shaft Accessory	ETS-Lindgren	107354	N/A
Conical Log Spiral Communication Antenna	ETS-Lindgren	3102	00042655
Dual-Polarized Diagonal Horn Antenna	ETS-Lindgren	3164-04	00041919
SAM Phantom Head	ETS-Lindgren	IEEE SCC34	N/A
Positioner Controller	ETS-Lindgren	2090	00042680
RF Switch Module	R&S	TS-RSP	100122
Universal Radio Communication Test	R&S	CMU200	106387
Spectrum Analyzer	R&S	FSP 7	100330
Pattern Measurement Software	ETS-Lindgren	EMQuest™ EMQ-100	V1.06
Desktop Computer with Windows XP	DELL	N/A	N/A
Vector Network Analyzer	R&S	ZVM	100144
Sleeve Dipole	ETS-Lindgren	3126-836	00045587
Sleeve Dipole	ETS-Lindgren	3126-1800	00040647
Loop Antenna	ETS-Lindgren	3127-836	00034836
Loop Antenna	ETS-Lindgren	3127-1880	00034837

4 NFC Antenna

- 4.1 Antenna Type: Loop antenna
- 4.2 Antenna Dimension(mm): 39.80 x 32.74 x 0.26(L x W x H)
- 4.3 Manufacturer: INPAQ
- 4.4 Manufacturer P/N: NF-C-F9-R0-140-6
- 4.5 Test equipment: WK4100
- 4.6 Test environment: Fig4.3