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

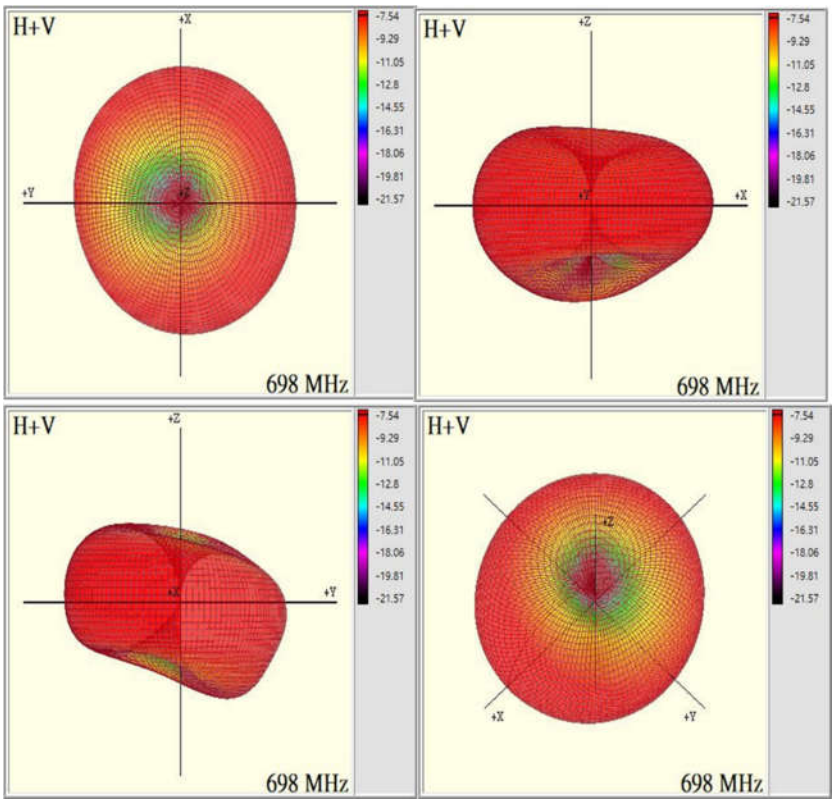
2.1 _Ant 1 : Main Antenna Tx/PRx (L+M*+H*)

Antenna gain

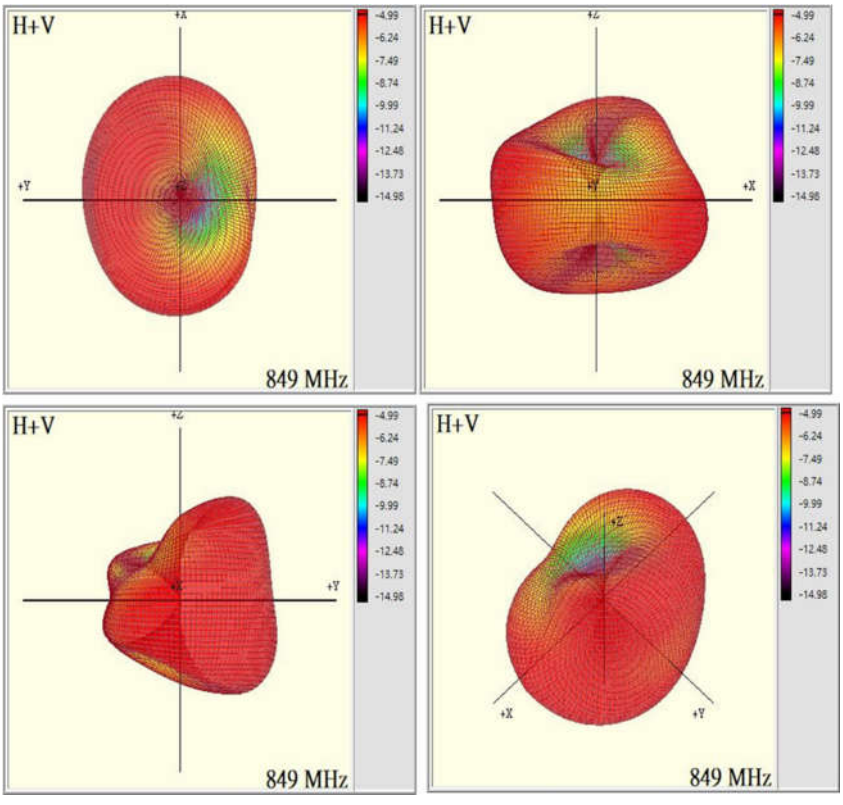
Frequency(MHz)	617	634	652	663	680	698						
Ant.Gain(dBi)	-14.64	-12.21	-10.40	-9.16	-7.21	-6.02						
Frequency(MHz)	704	714	724	734	744	754	764	774	784	794	804	814
Ant.Gain(dBi)	-5.47	-6.40	-7.77	-8.16	-7.38	-7.26	-7.28	-6.56	-6.46	-6.66	-6.90	-6.36
Frequency(MHz)	824	836	849	869	880	881	894	897	915	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

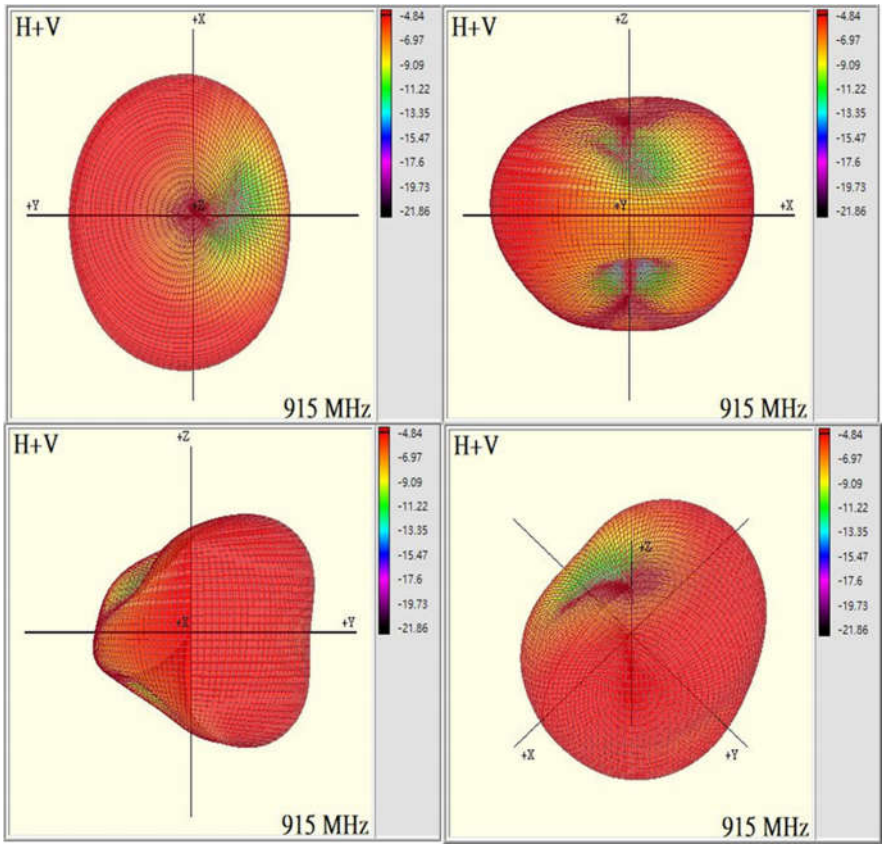
698MHz



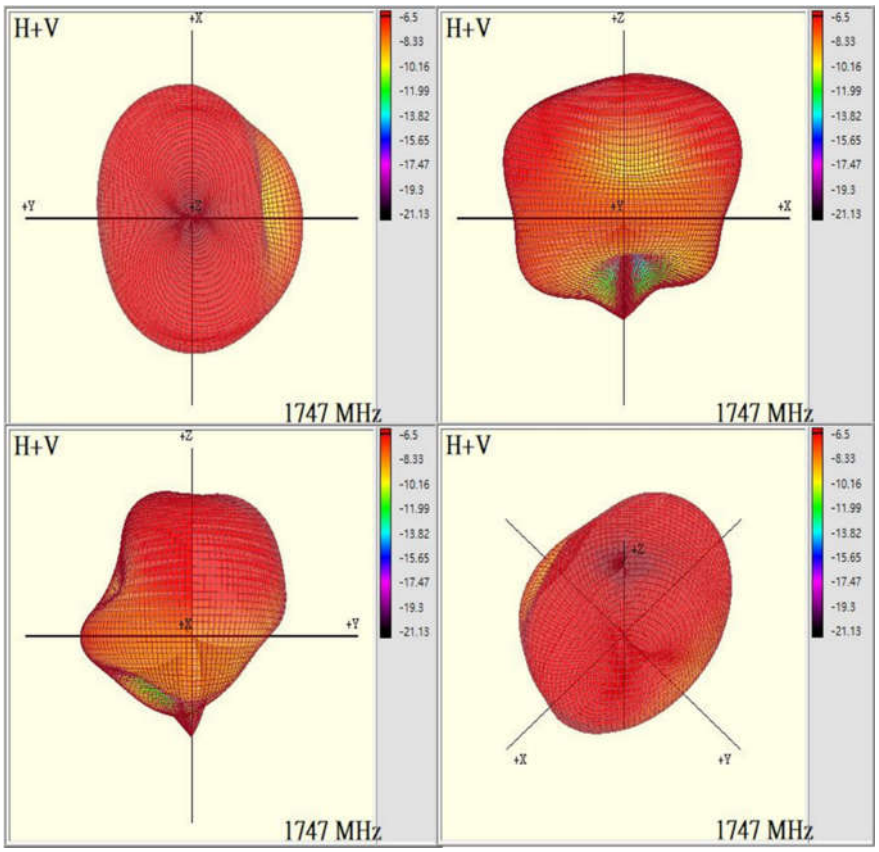
849MHz



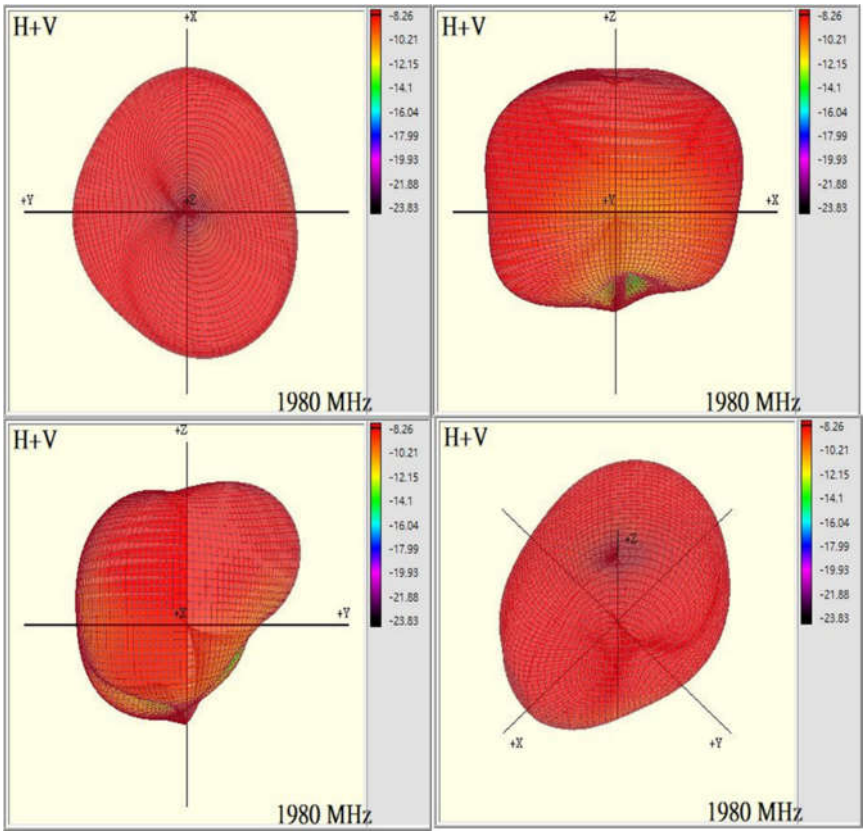
915MHz



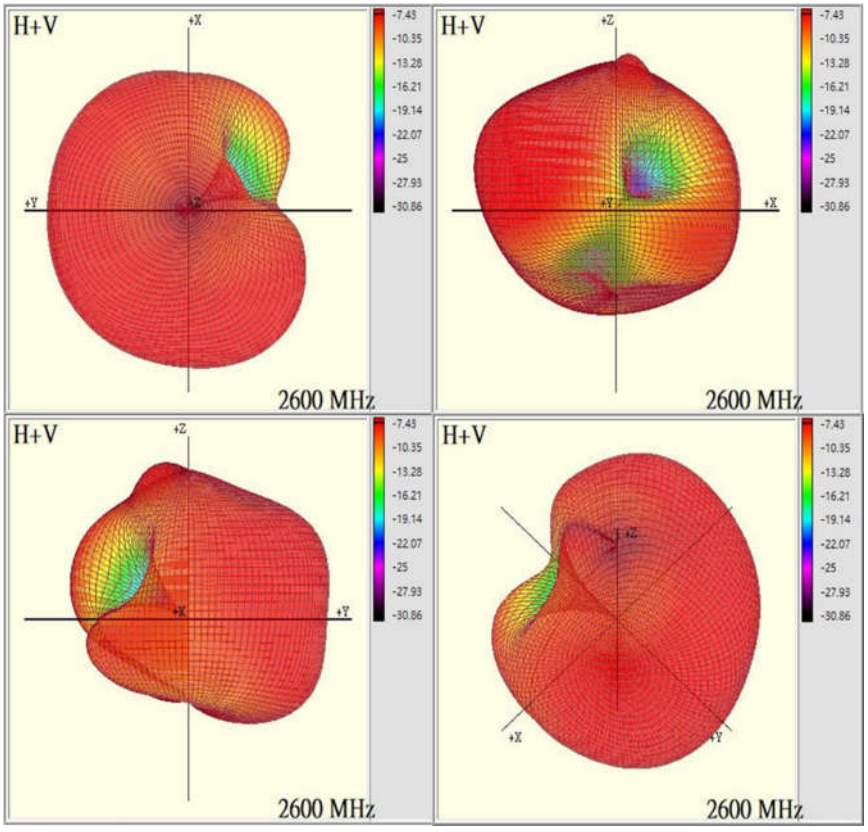
1747MHz



1980MHz



2600MHz



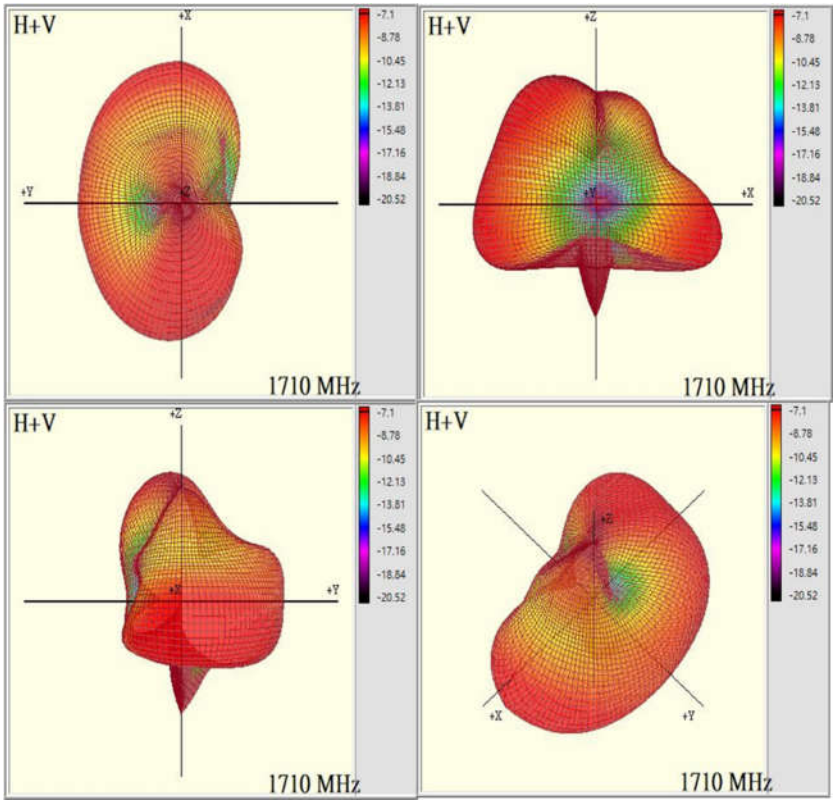
2.2 _Ant 2: Main Antenna Tx/PRx (M+H+n77 Rx4)

Antenna gain

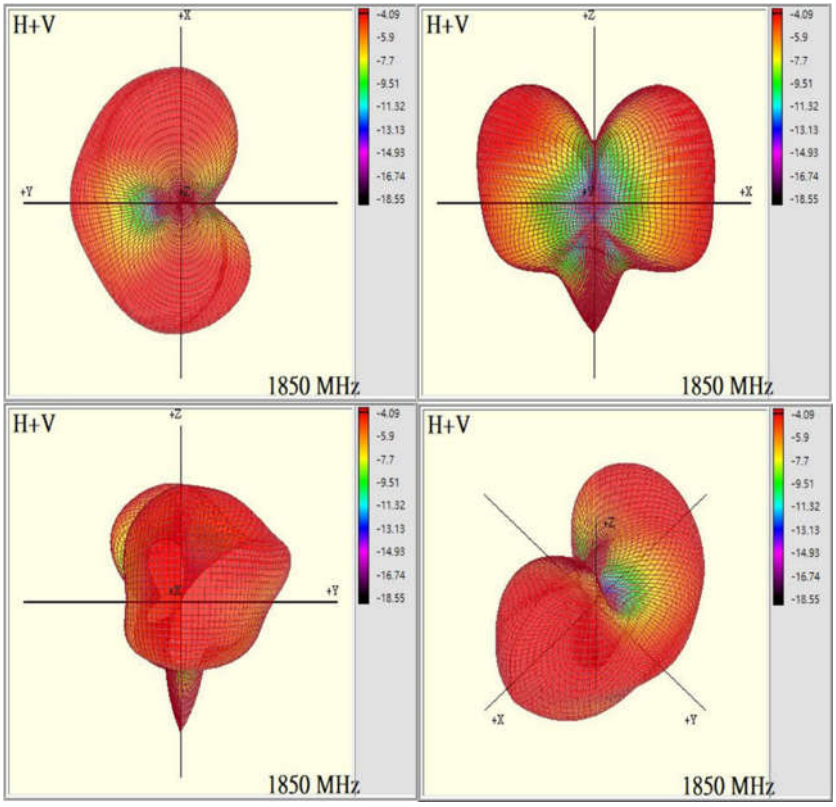
Frequency(MHz)	1710	1747	1785	1805	1842	1850	1880	1900	1910	1920	1930	1950
Ant.Gain(dBi)	-5.43	-5.09	-4.71	-4.35	-4.03	-3.67	-3.29	-3.26	-3.33	-3.24	-3.30	-3.83
Frequency(MHz)	1960	1980	1990	2010	2018	2025	2110	2140	2170			
Ant.Gain(dBi)	-4.46	-4.83	-4.92	-5.59	-5.52	-5.58	-3.80	-3.83	-5.02			
Frequency(MHz)	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

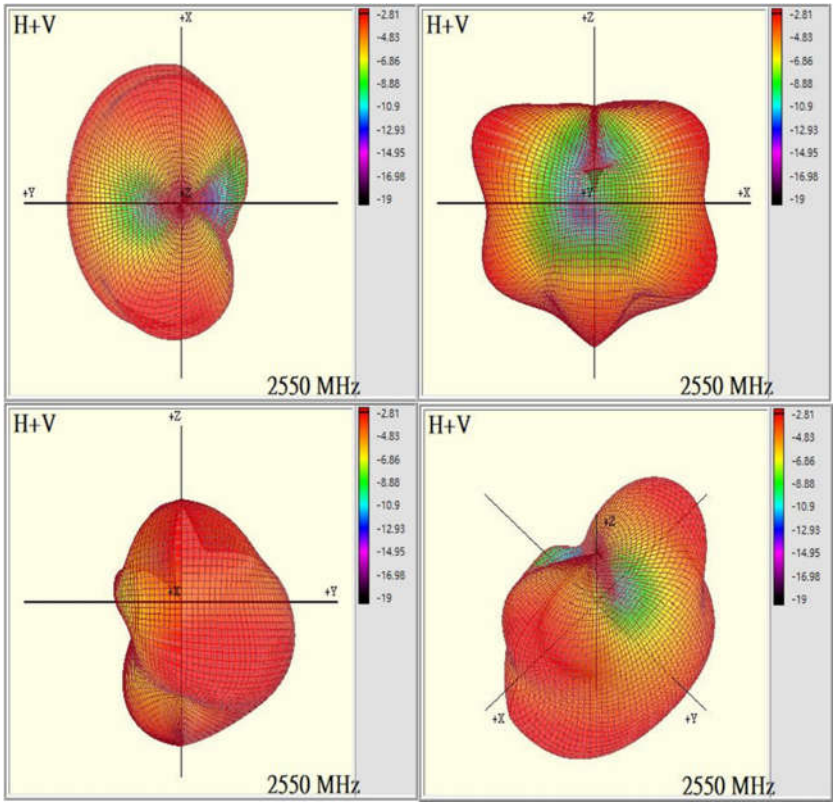
1710MHz



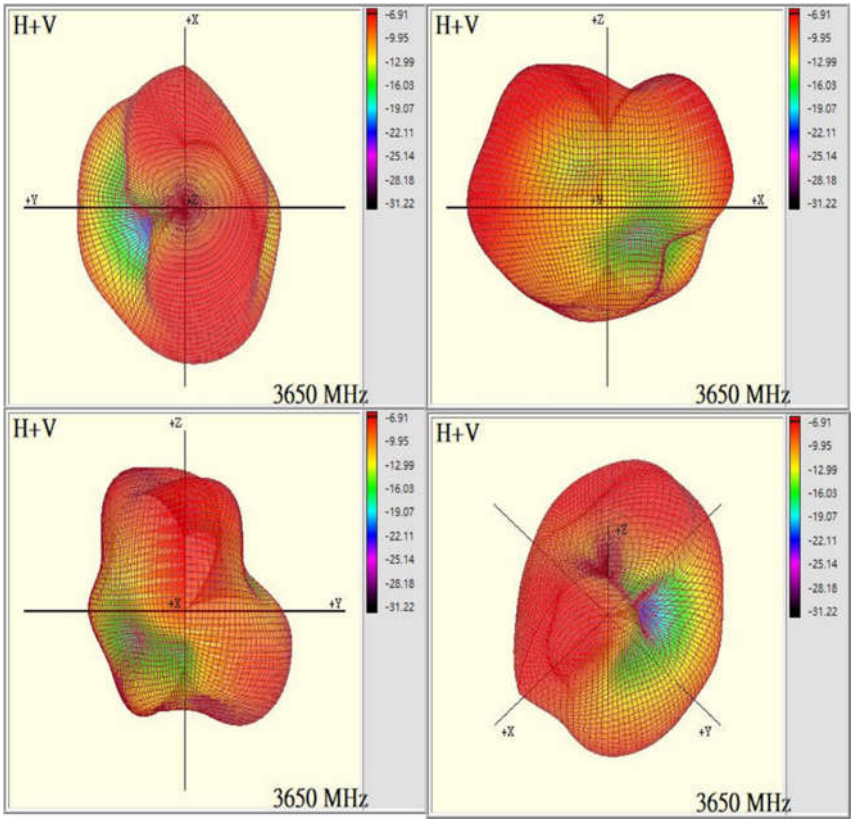
1850MHz



2550MHz



3300MHz



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

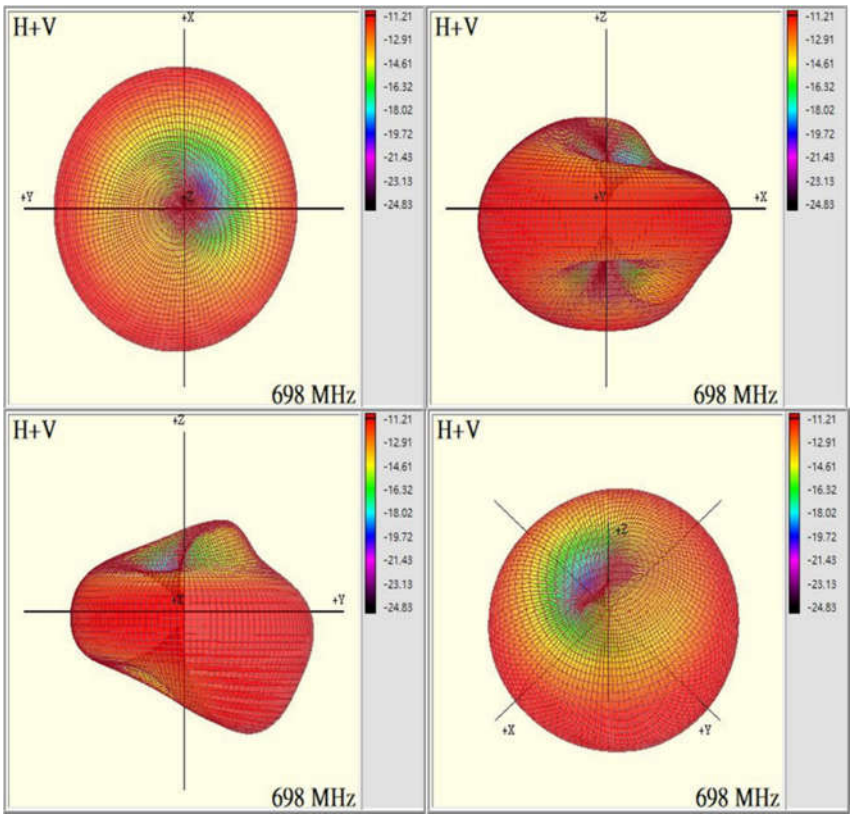
Antenna gain

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

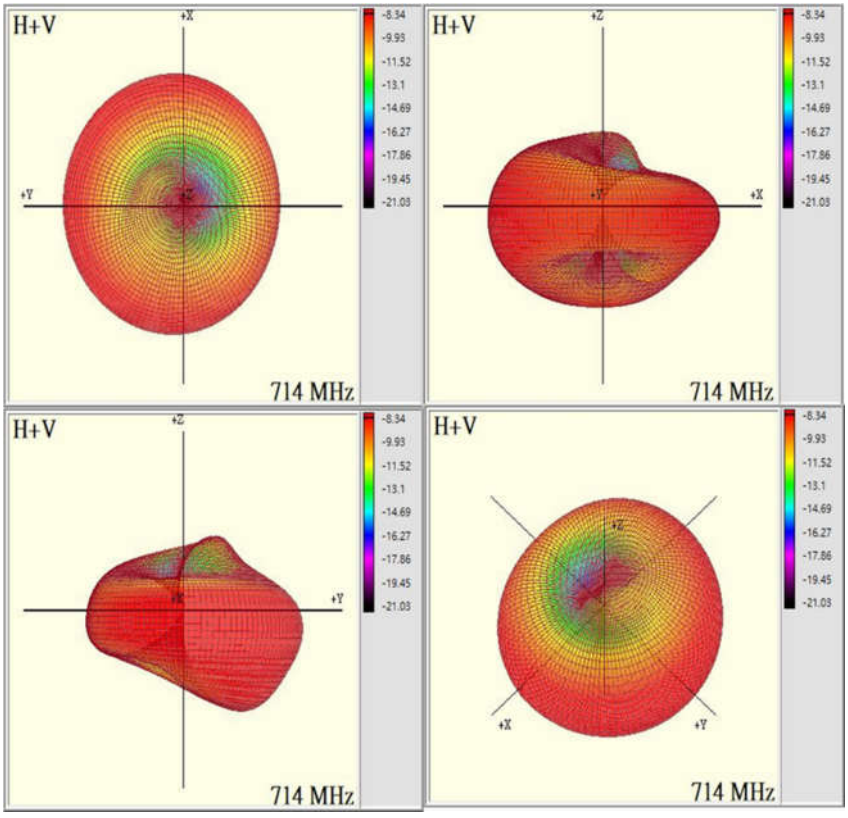
Frequency(MHz)	1710	1747	1785	1805	1842	1850	1880	1900	1910	1920	1930	1950
Ant.Gain(dBi)	-7.57	-5.04	-5.30	-4.54	-4.76	-4.34	-4.37	-4.71	-4.35	-4.17	-3.46	-4.65
Frequency(MHz)	1960	1980	1990	2010	2018	2025	2110	2140	2170	2200	2250	2300
Ant.Gain(dBi)	-4.55	-5.31	-4.83	-6.19	-5.47	-5.95	-8.80	-9.78	-10.69	-11.09	-9.33	-5.66
Frequency(MHz)	2330	2350	2380	2400	2420	2450	2480	2500	2530	2550	2590	2600
Ant.Gain(dBi)	-5.42	-6.12	-6.89	-9.94	-8.15	-7.59	-7.50	-8.74	-6.71	-5.61	-7.23	-7.23
Frequency(MHz)	2650	2700										
Ant.Gain(dBi)	-10.96	-12.68										

Antenna Pattern

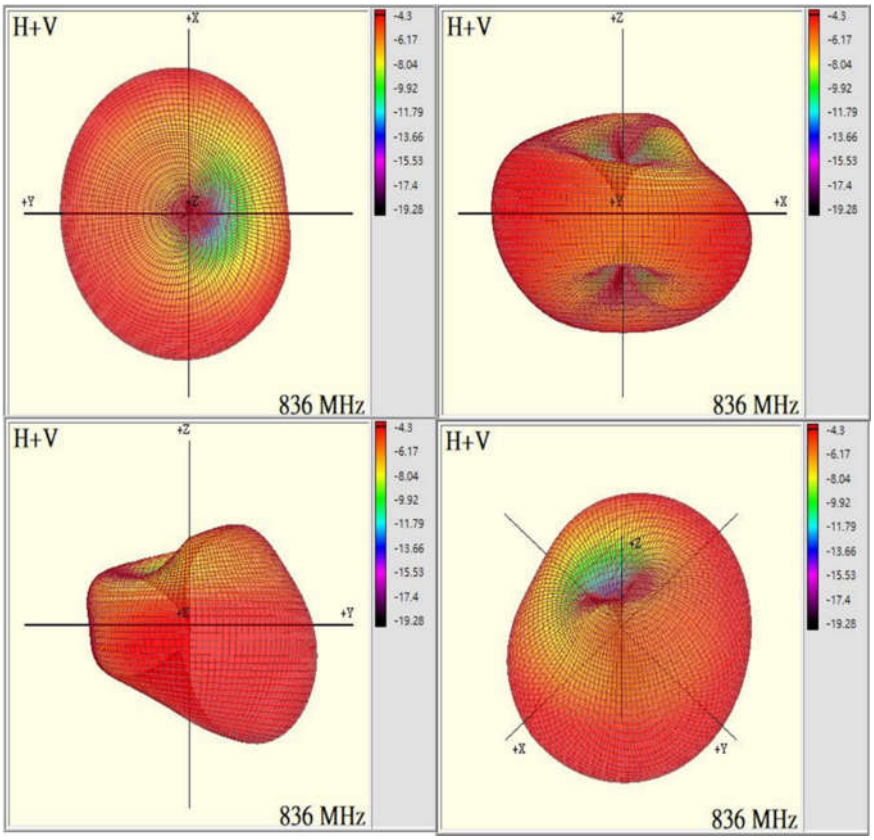
698MHz



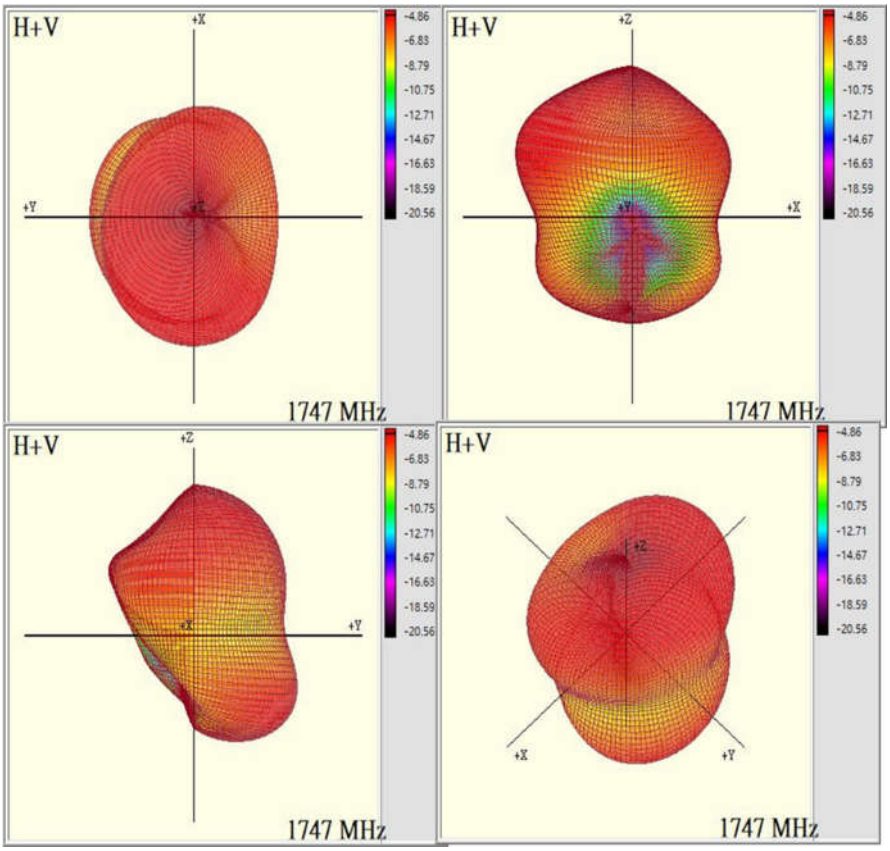
714MHz



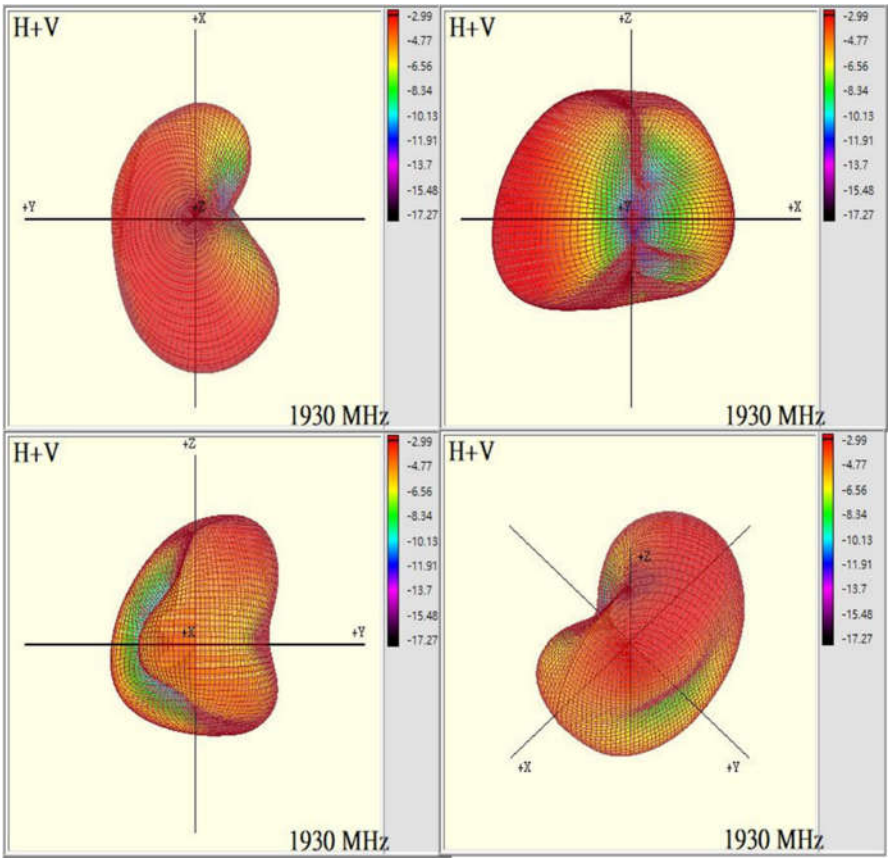
836MHz



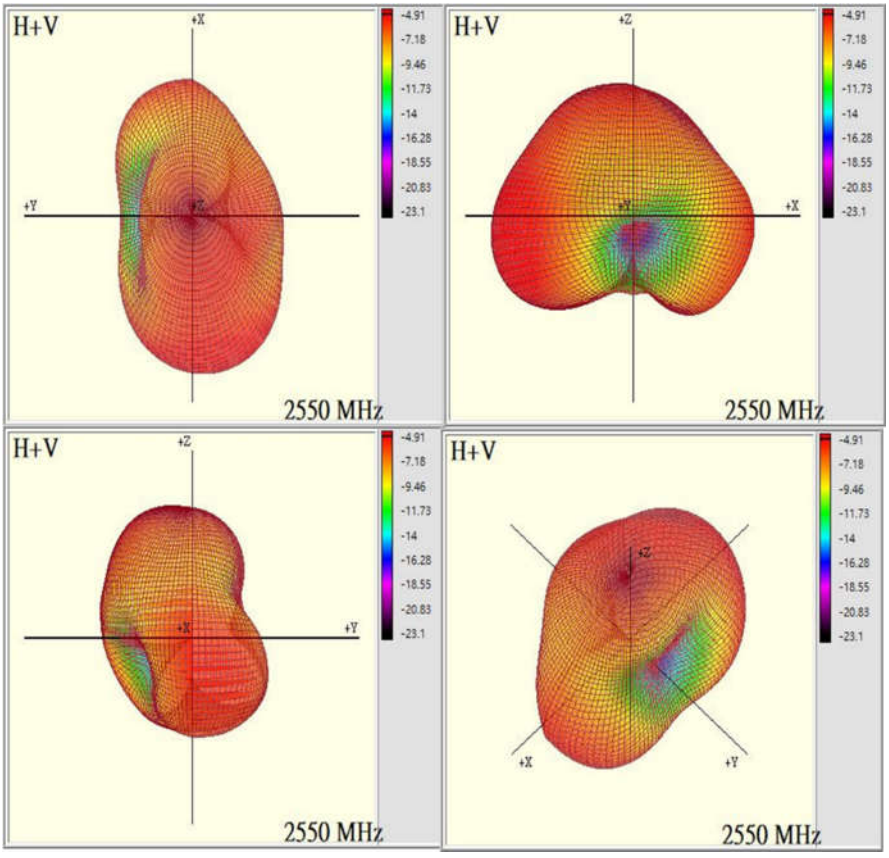
1747MHz



1930MHz



2550MHz



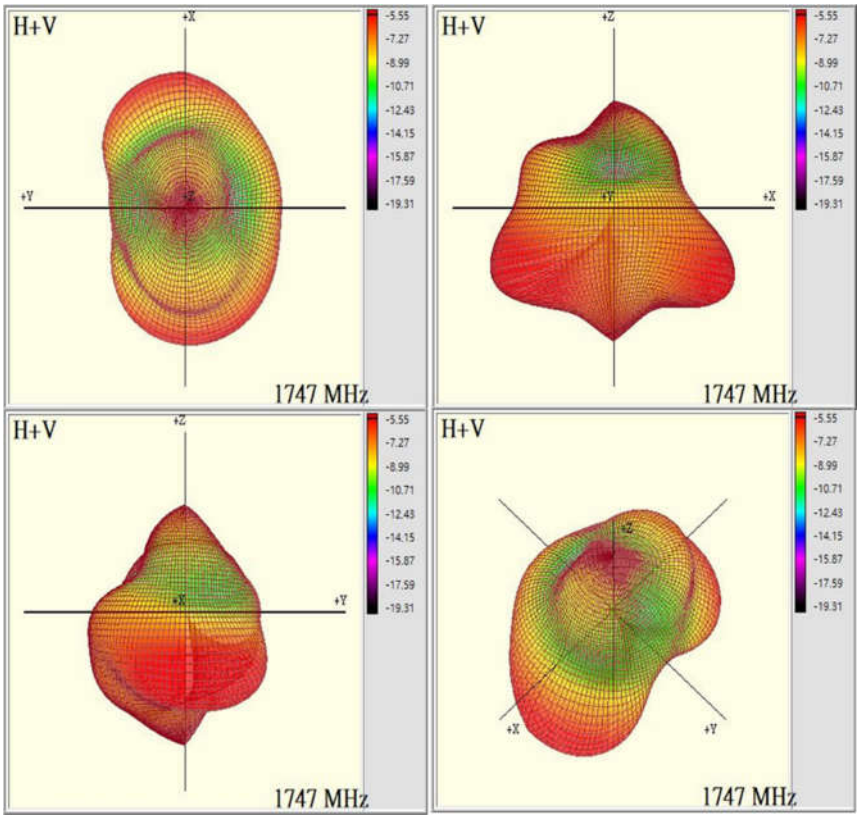
2.4 _Ant 4: Div. Antenna TX/DRx (M+H)+TX/DRX N77/78

Antenna gain

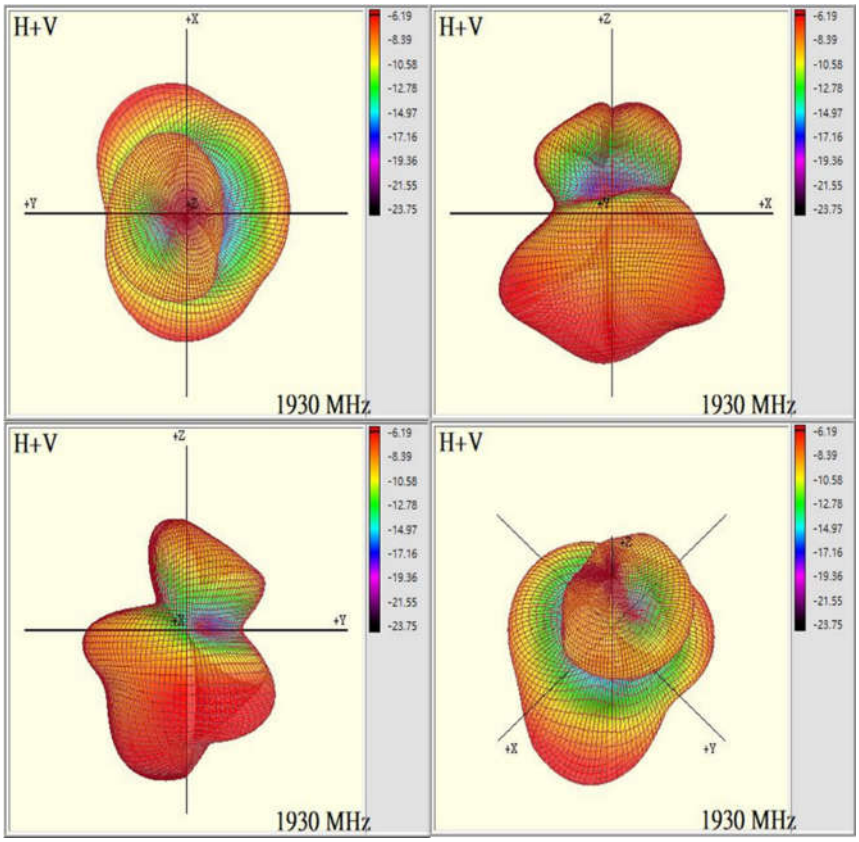
Frequency(MHz)	1710	1747	1785	1805	1842	1850	1880	1900	1910	1920	1930	1950
Ant.Gain(dBi)	-6.45	-5.59	-6.84	-6.22	-6.30	-6.66	-7.36	-7.13	-7.58	-7.31	-6.98	-8.05
Frequency(MHz)	1960	1980	1990	2010	2018	2025	2110	2140	2170	2300	2310	2320
Ant.Gain(dBi)	-8.09	-7.72	-7.09	-7.56	-7.60	-7.44	-5.10	-5.69	-5.92	-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

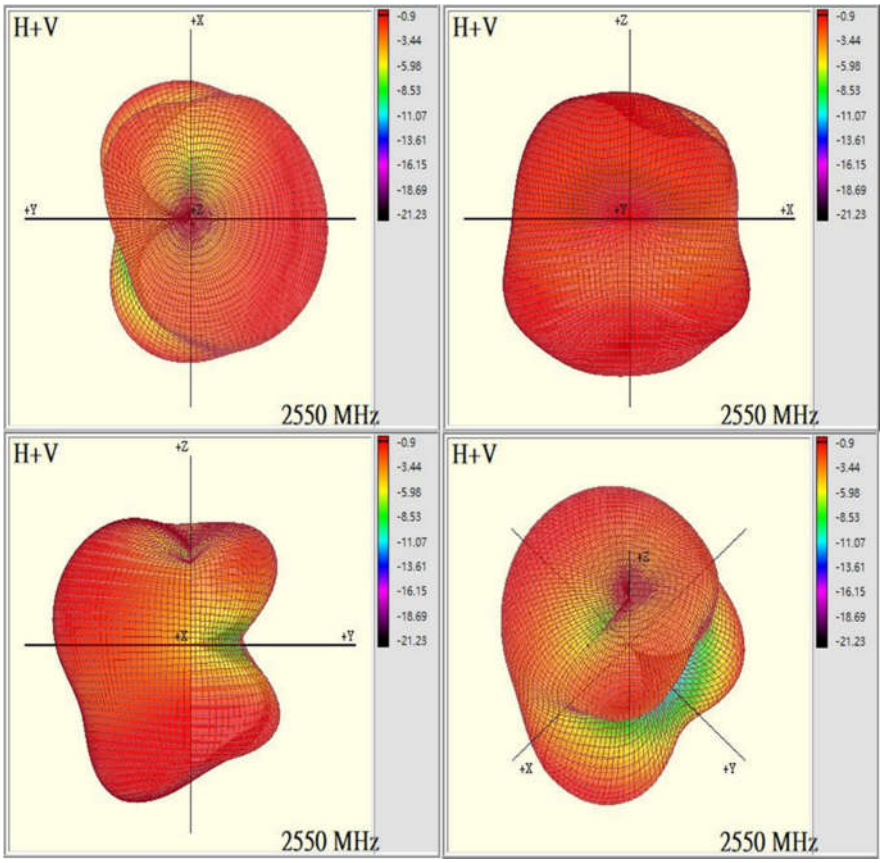
1747MHz



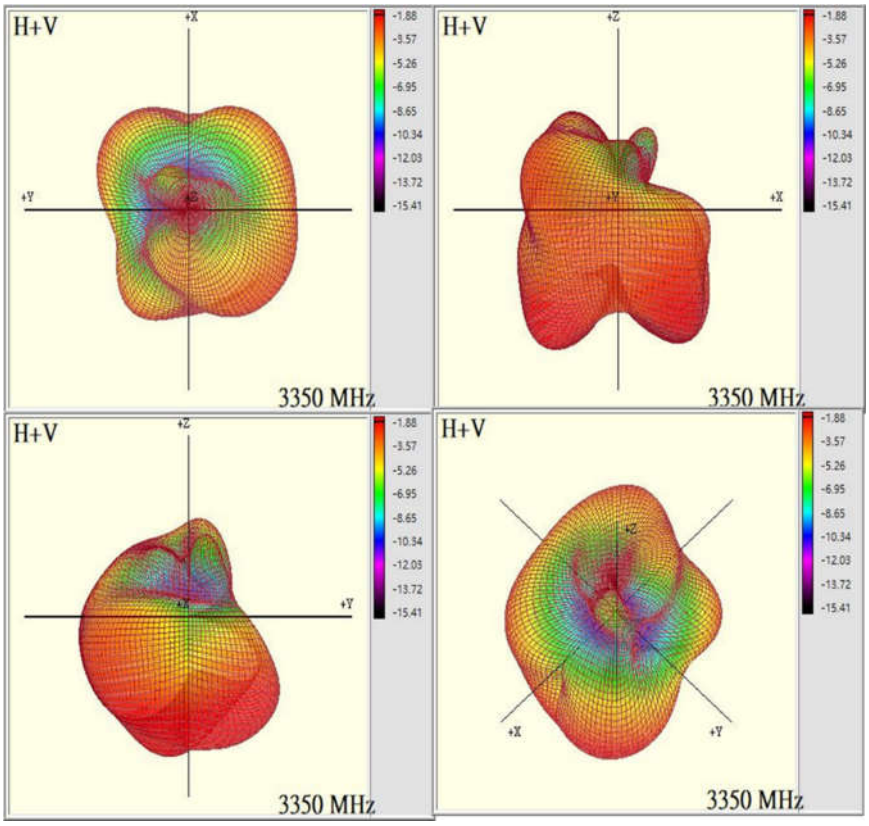
1930MHz



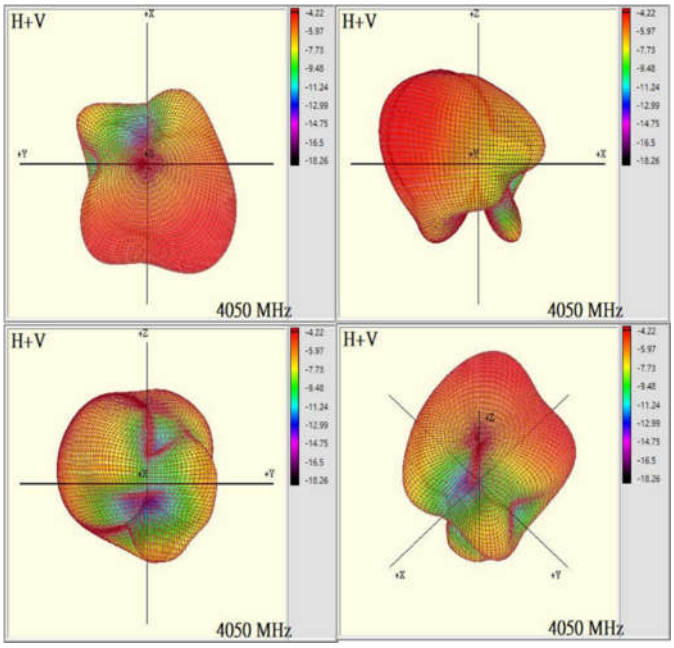
2550MHz



3350MHz



4050MHz



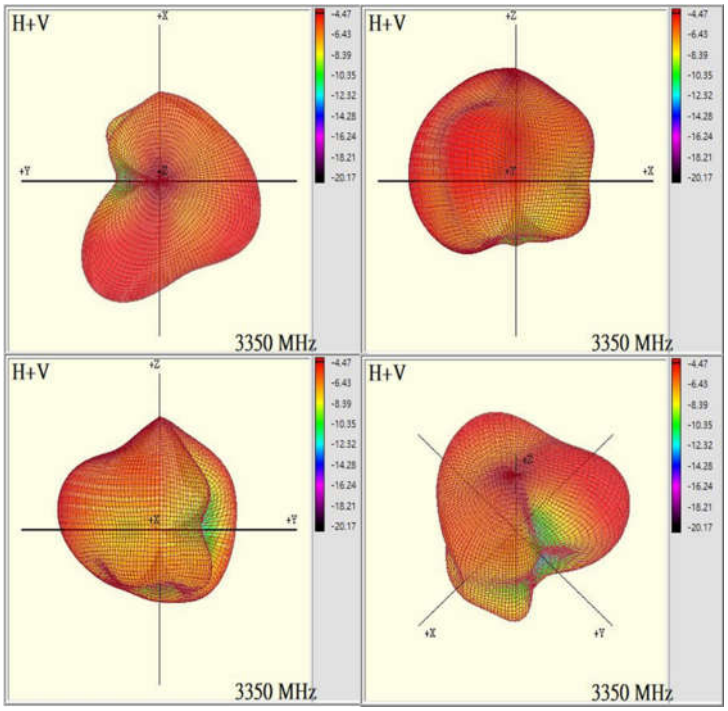
2.5 _Ant 5 : 5GNR n77/n78 (Tx/PRx)

Antenna gain

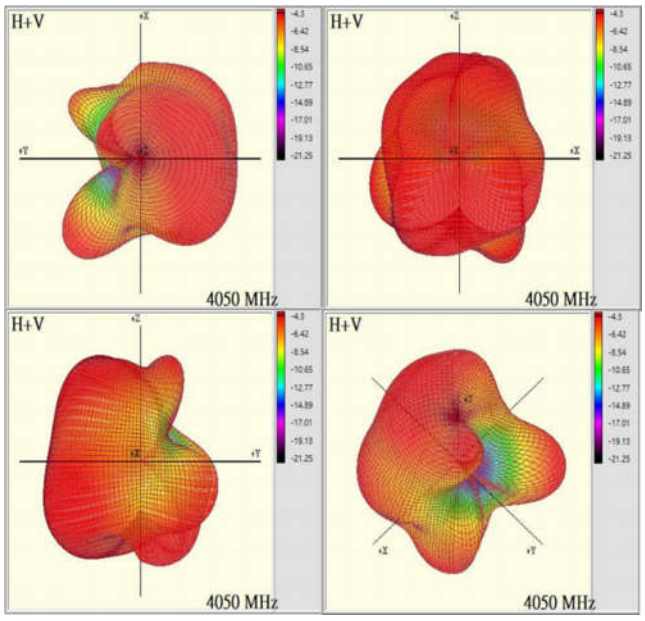
Frequency(MHz)	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850
Ant.Gain(dBi)	-6.60	-4.65	-5.49	-6.41	-5.39	-6.90	-5.40	-4.24	-7.92	-5.48	-5.55	-7.91
Frequency(MHz)	3900	3950	4000	4050	4100	4150	4200					
Ant.Gain(dBi)	-5.68	-5.28	-6.01	-4.51	-4.86	-5.37	-4.84					

Antenna Pattern

3350MHz



4050MHz



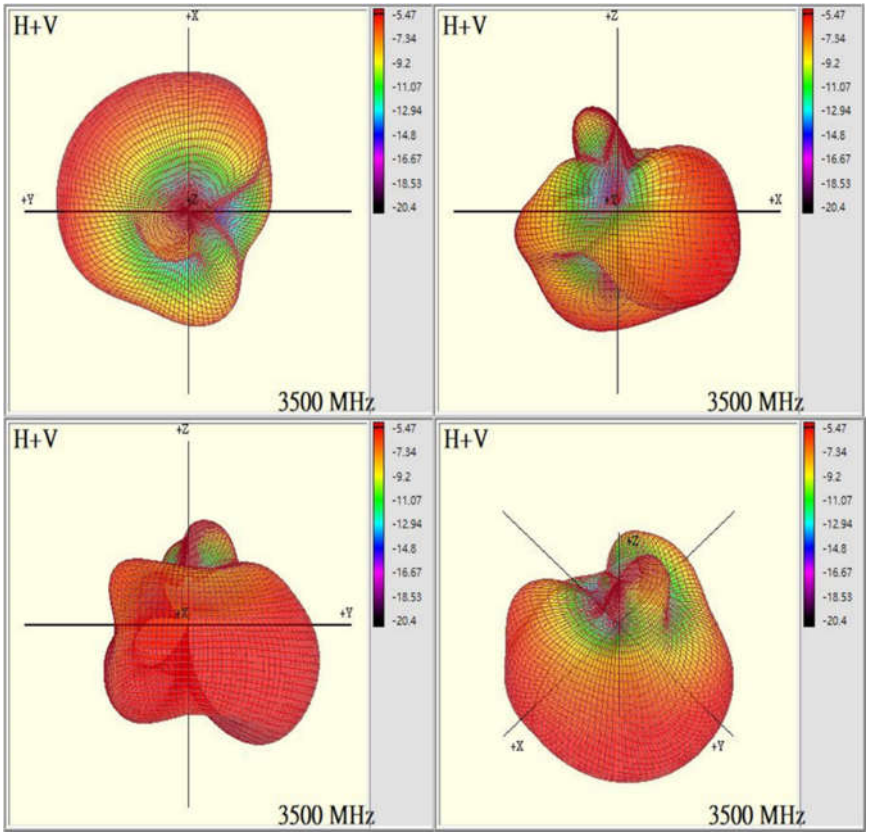
2.6 _Ant 6 : 5GNR n77/n78 (MIMO 03)

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



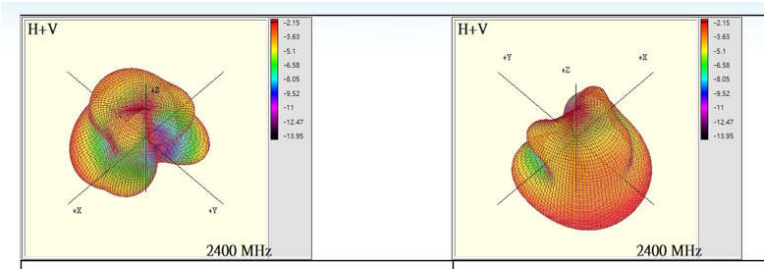
2.7 _Ant 7 : WIFI Antenna Tx/Rx

Antenna gain

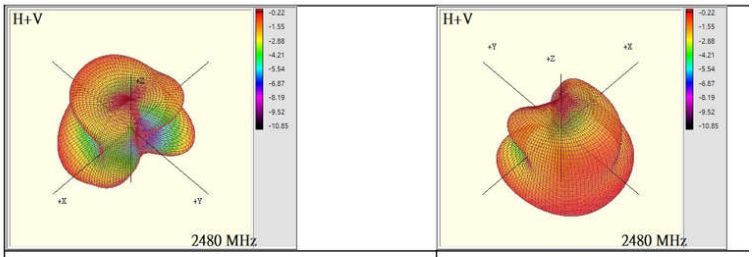
Frequency(MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500	
Ant.Gain(dBi)	-2.78	-2.49	-1.64	-2.66	-2.46	-1.09	-1.34	-2.81	-0.62	-1.37	-2.05	
Frequency(MHz)	5150	5200	5250	5300	5350	5400	5450	5500	5550	5600	5650	
Ant.Gain(dBi)	-2.50	-2.55	-2.02	-3.34	-3.79	-3.67	-3.66	-2.59	-3.49	-3.14	-1.57	
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

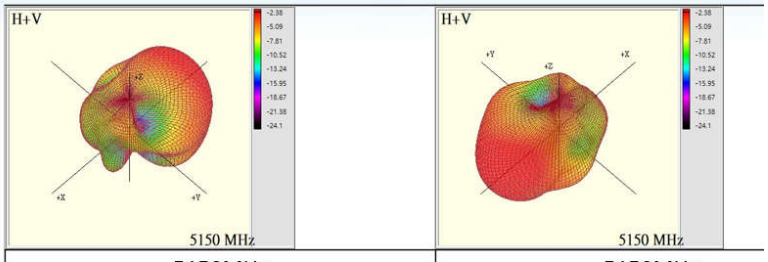


2400MHz	2400MHz

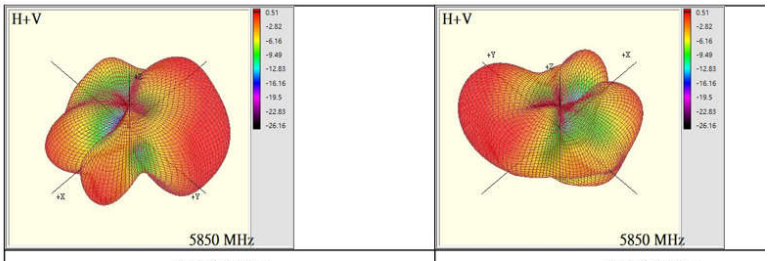


2480MHz	2480MHz

WIFI 5G

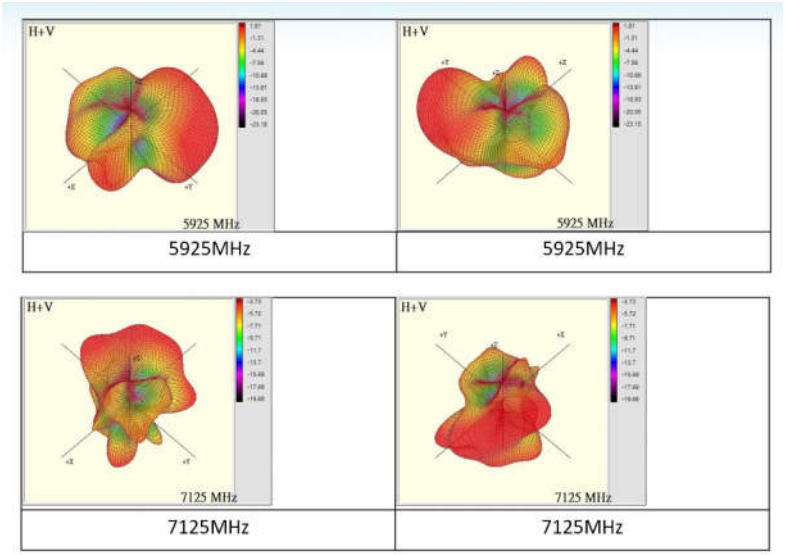


5150MHz	5150MHz



5850MHz	5850MHz

WIFI 6E



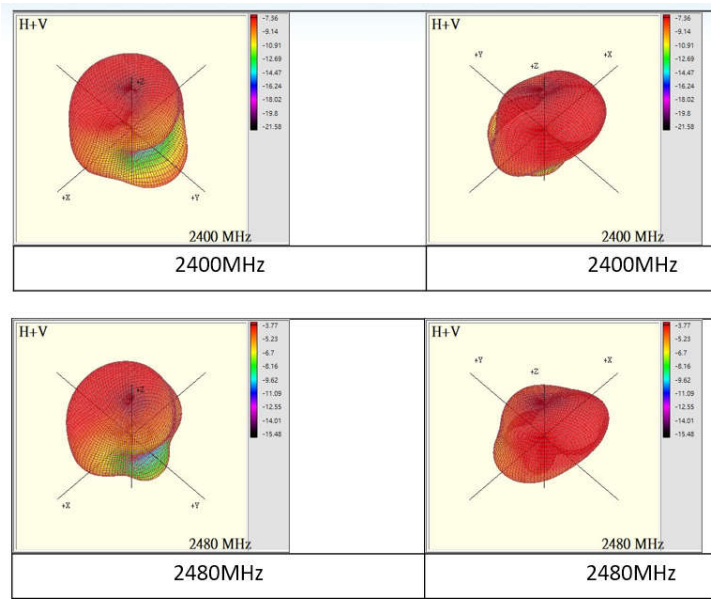
2.8 _Ant 8 : WIFI Antenna Tx/Rx

Antenna gain

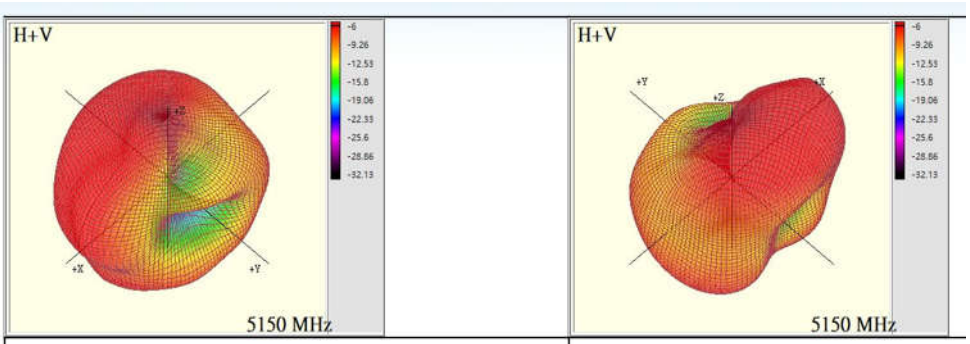
Frequency(MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500	
Ant.Gain(dBi)	-7.41	-5.78	-5.76	-6.08	-4.83	-4.57	-4.44	-4.98	-3.82	-4.54	-4.50	
Frequency(MHz)	5150	5200	5250	5300	5350	5400	5450	5500	5550	5600	5650	
Ant.Gain(dBi)	-6.02	-4.98	-3.98	-4.75	-5.67	-5.69	-4.60	-3.93	-4.44	-3.89	-2.89	
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

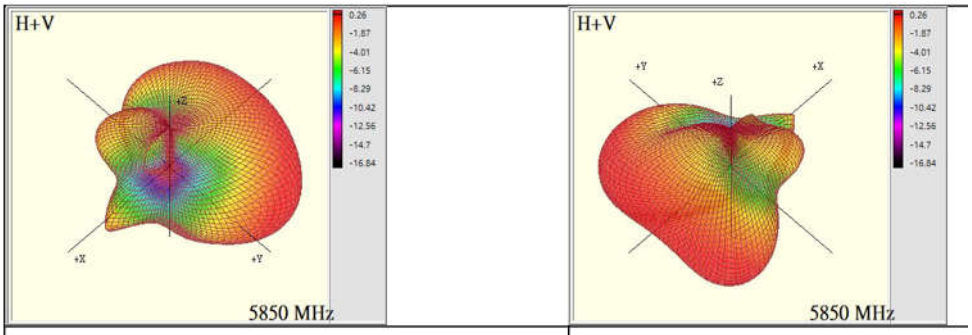
WIFI 2.4G/BT



WIFI 5G

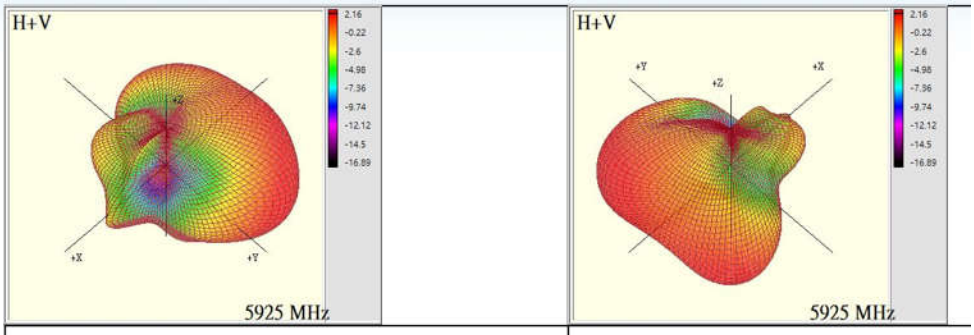


5150MHz	5150MHz

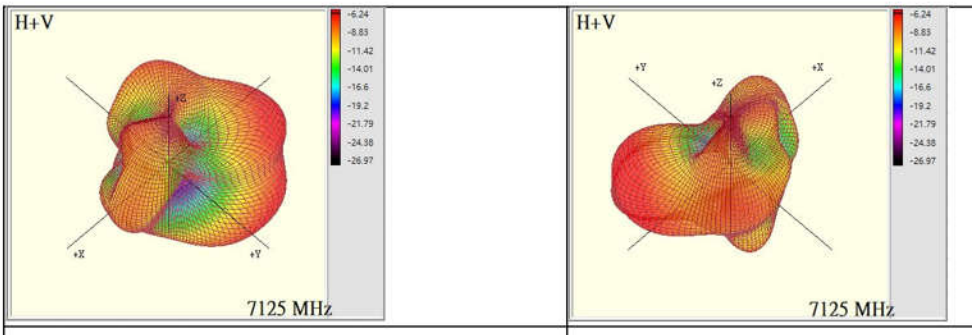


5850MHz	5850MHz

WIFI 6E



5925MHz	5925MHz

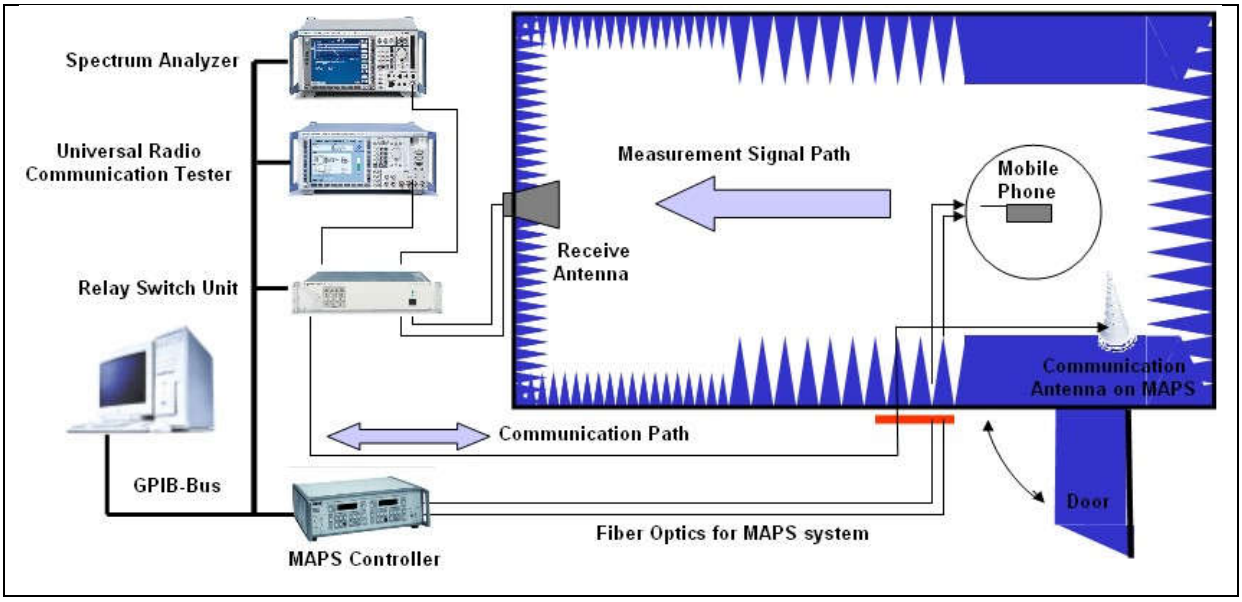


7125MHz	7125MHz

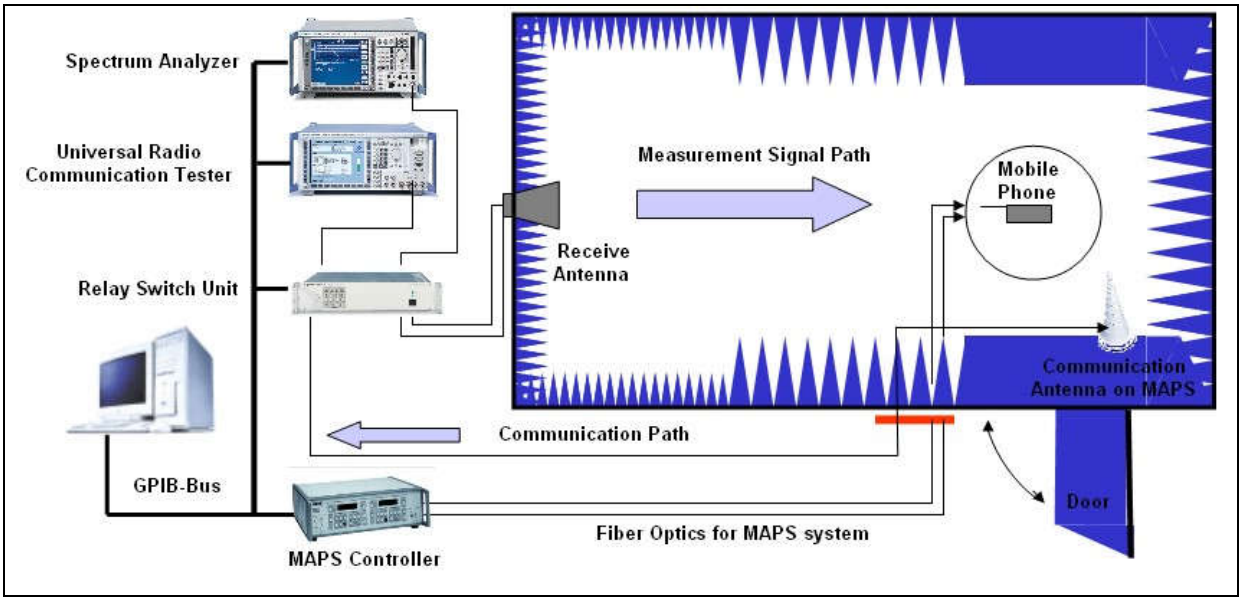
3. Measurement Methodology and Settings

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]

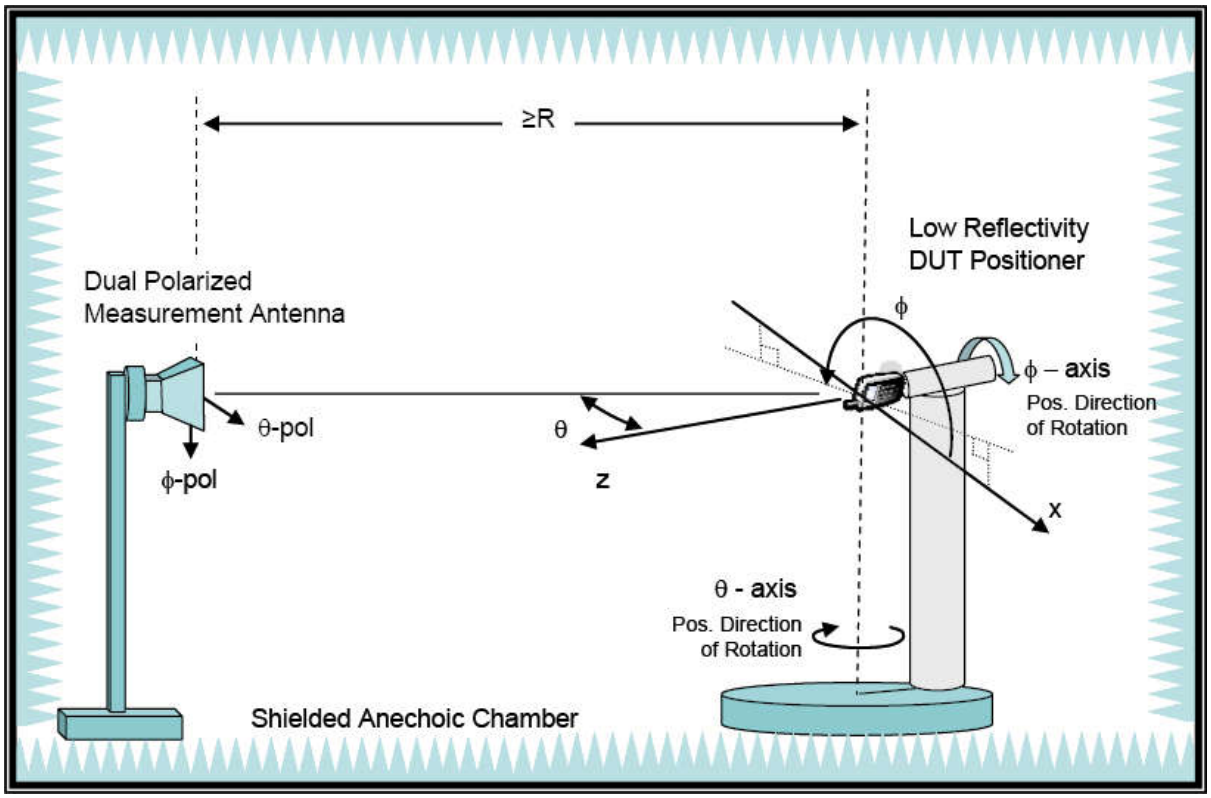
3.1 TRP (Total Radiation Power)



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