Unictron Technologies Corp.

Product Name: 3-in-1 GNSS/ 5G NR/ 4G LTE Combination Antenna

Part Number: MT-9B-AC-B2L02

Features:

- 1*GNSS, 2*LTE Antenna Combination
- Support LTE 698-960MHz, 1710-2690MHz, 3300-3800MHz
- Excellent Out of Band Rejection, Up to 55dB
- 27dBi Active Peak Gain
- Customizable Cables and Connectors
- RoHS & REACH Compliant

Applications:

- Fleet Management & Telematics
- Vehicle Navigation

3-in-1 GNSS/ 5G NR/ 4G LTE Combination Antenna

MODEL: MT-9B-AC-B2L02

WI-RD-D-422 V1.0

I. Specifications:

Items	GNSS Specifications		
Passive Antenna Performance			
Application Bands	BeiDou	GPS	GLONASS
Frequencies (MHz)	1561	1575.42	1602
Efficiency (%)	49.89	42.76	58.61
Average Gain (dBi)	-3.02	-3.69	-2.32
Peak Gain (dBi)	1.21	1.21	1.44
V.S.W.R	< 3		
Return loss (dB)	< -6		
Impedance (Ω)	50		
Polarization	R.H.C.P. (Right-Handed Circular Polarization)		
Active Antenna Performance			
Application Bands	BeiDou	GPS	GLONASS
Frequencies (MHz)	1561 ± 2.046	1575.42 ± 1.023	1602 ± 5
Gain (dB)	27	27	27
Noise Figure (dB)	0.98	0.98	0.92
Operation Voltage (V)	3.3 ~ 5		
Current Consumption (mA) (typical)	9.0		
Output Impedance (Ω)	50		
Out of Band Rejection			
Frequencies (MHz)	600 ~ 1300	1300 ~ 1530	1650 ~ 3000
Out of Band Rejection (dB)	55	30	30
ESD Protection	+/- 8 KV (direct discharge) +/- 15KV (air discharge)		
Cable / Length	H100 / 3 meters		
Connector	SMA (Male)		

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Items		LTE1 Specifications						
Application Bands		LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE2600	5G NR Band
Frequencies (MHz)		698 ~ 824	824 ~ 960	1710 ~ 1880	1850 ~ 1990	1920 ~ 2170	2300 ~ 2690	3300 ~ 3800
Efficiency (%)	**30cm**	54.99	52.87	72.31	70.69	60.00	53.46	51.05
	1m	53.49	51.29	69.38	67.76	57.33	51.46	47.97
	2m	48.78	46.33	60.43	58.87	49.27	42.80	37.62
	3m	44.49	41.85	52.63	51.14	42.34	35.60	30.58
	5m	37.01	34.15	39.92	38.60	31.27	24.21	20.94
Average Gain (dBi)	**30cm**	-2.60	-2.77	-1.41	-1.51	-2.22	-2.72	-2.92
	1m	-2.72	-2.90	-1.59	-1.69	-2.42	-2.89	-3.19
	2m	-3.12	-3.34	-2.19	-2.30	-3.07	-3.69	-4.25
	3m	-3.52	-3.78	-2.79	-2.91	-3.73	-4.49	-5.15
	5m	-4.32	-4.67	-3.99	-4.13	-5.05	-6.16	-6.79
Peak Gain (dBi)	**30cm**	2.49	2.90	6.07	6.48	5.64	5.25	4.27
	1m	2.37	2.77	5.89	6.30	5.44	5.09	4.00
	2m	1.97	2.32	5.29	5.69	4.78	4.29	3.02
	3m	1.57	1.88	4.69	5.08	4.12	3.49	2.12
	5m	0.77	1.00	3.49	3.85	2.80	1.81	0.40
V.S.W.R		< 3.57						
Return Loss (dB)		< -5						
Test Condition		Free Space						
Impedance (Ω)		50						
Polarization		Linear						
Cable / Length		SNC-200 / 3 meters						
Connector		SMA (Male)						

Items		LTE2 Specifications						
Application Bands		LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE2600	5G NR Band
Frequencies (MHz)		698 ~ 824	824 ~ 960	1710 ~ 1880	1850 ~ 1990	1920 ~ 2170	2300 ~ 2690	3300 ~ 3800
Efficiency (%)	**30cm**	40.88	44.37	56.41	61.08	61.09	57.90	53.37
	1m	39.77	43.04	54.12	58.55	58.38	54.79	50.16
	2m	36.27	38.87	47.13	50.87	50.17	45.51	39.90
	3m	33.08	35.12	41.05	44.19	43.11	37.91	32.12
	5m	27.51	28.65	31.14	33.35	31.84	26.22	21.89
Average Gain (dBi)	**30cm**	-3.88	-3.53	-2.49	-2.14	-2.14	-2.37	-2.73
	1m	-4.00	-3.66	-2.67	-2.32	-2.34	-2.61	-3.00
	2m	-4.40	-4.10	-3.27	-2.94	-3.00	-3.42	-3.99
	3m	-4.80	-4.55	-3.87	-3.55	-3.65	-4.21	-4.93
	5m	-5.60	-5.43	-5.07	-4.77	-4.97	-5.81	-6.60
Peak Gain (dBi)	**30cm**	1.54	1.81	5.71	6.02	5.86	5.07	3.25
	1m	1.42	1.68	5.53	5.84	5.67	4.83	2.98
	2m	1.02	1.24	4.93	5.23	5.01	3.98	2.18
	3m	0.62	0.80	4.33	4.62	4.35	3.13	1.33
	5m	-0.18	-0.09	3.13	3.39	3.03	1.63	-0.62
V.S.W.R		< 3.57		< 3				
Return Loss (dB)		< -5		< -6				
Test Condition		Free Space						
Impedance (Ω)		50						
Polarization		Linear						
Cable / Length		SNC-200 / 3 meters						
Connector		SMA (Male)						
Mechanical								
Dimensions (mm)		φ 80.00(D) x 37.90(H)						
Casing		PC + PBT						
Waterproof		IP67						

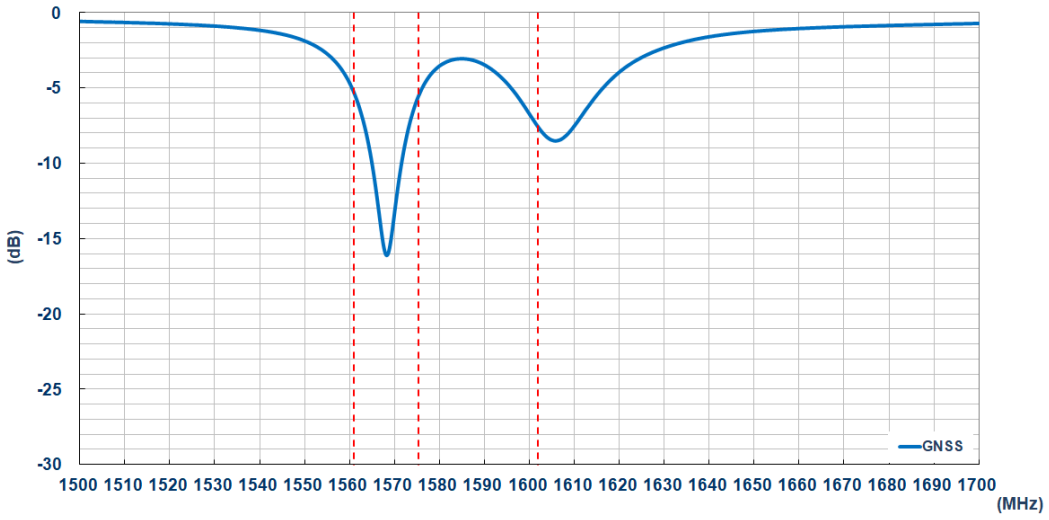
Environmental Conditions	
Operation Temperature (°C)	-40 ~ +85
Storage Temperature (°C)	-40 ~ +85
Humidity	95% Non-condensing

II. Antenna Electrical Properties:

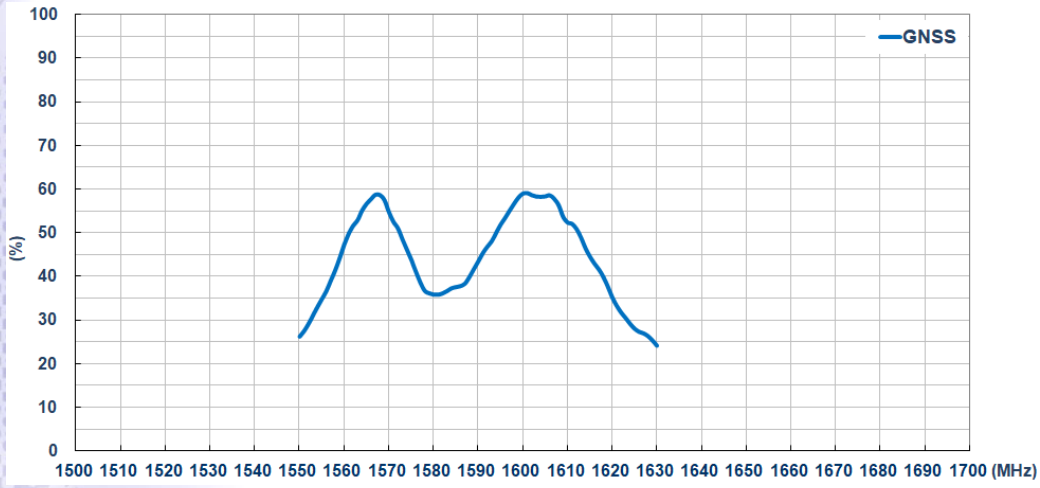
A) Testing Condition: Free Space

GNSS

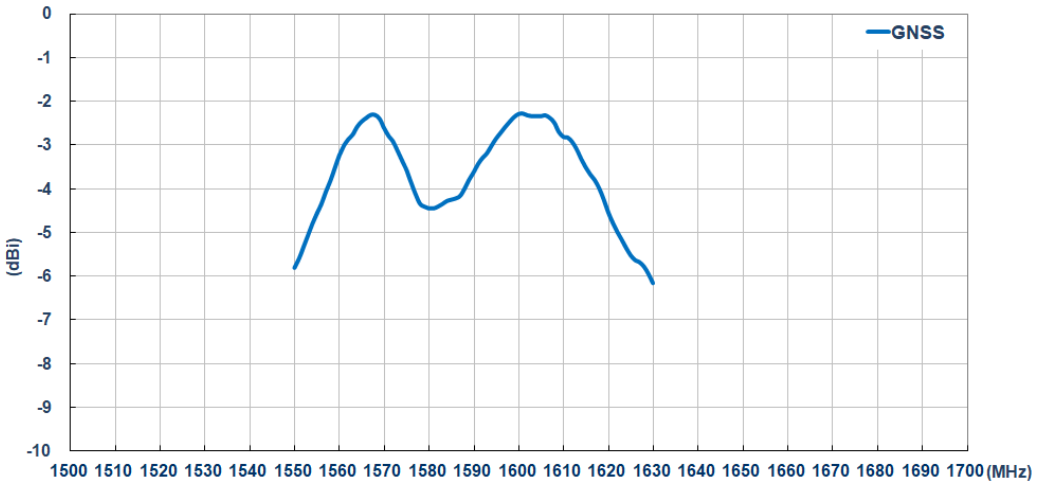
S11 (dB)



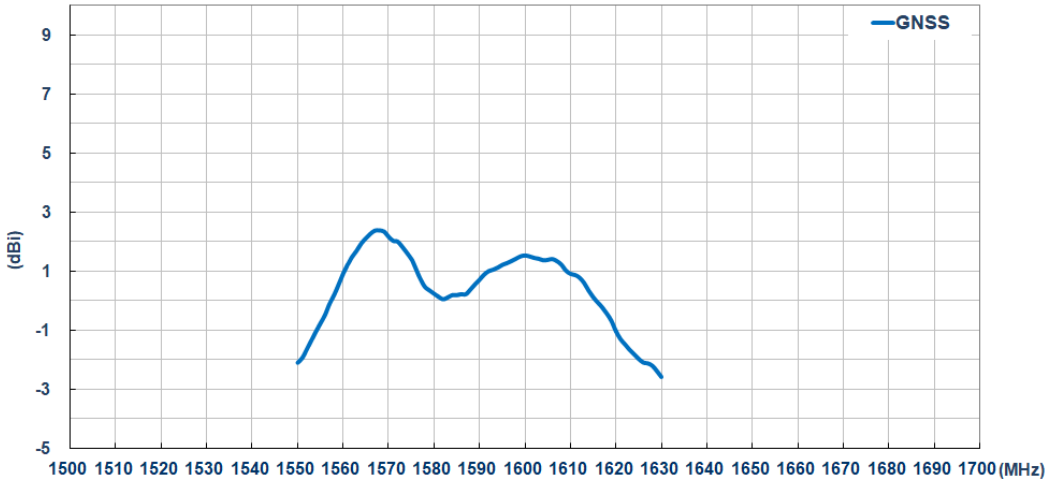
Efficiency (%)



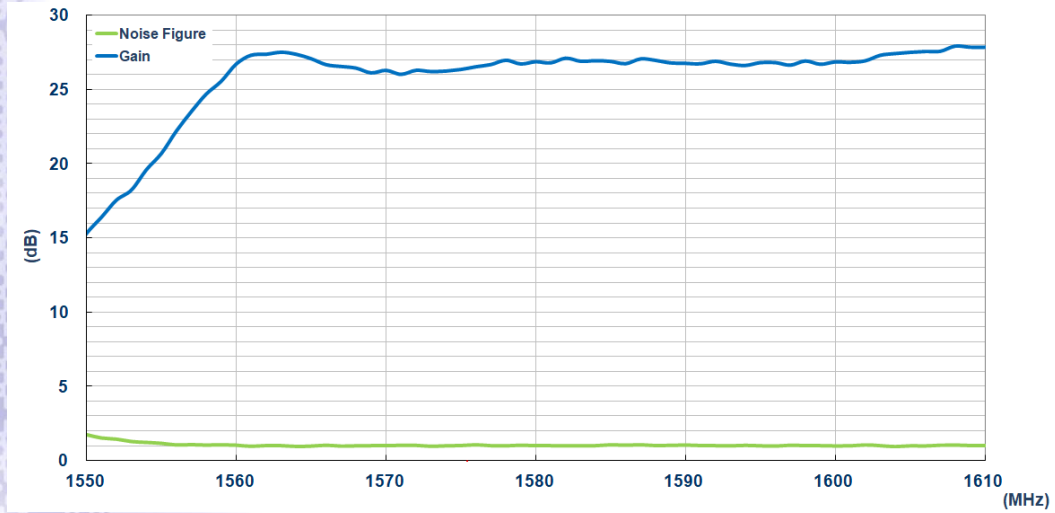
Average Gain (dBi)



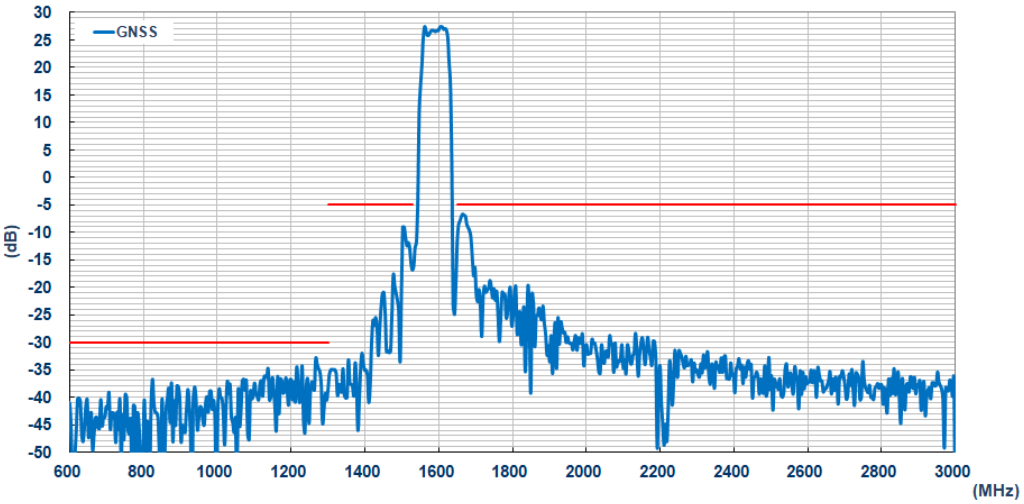
Peak Gain (dBi)



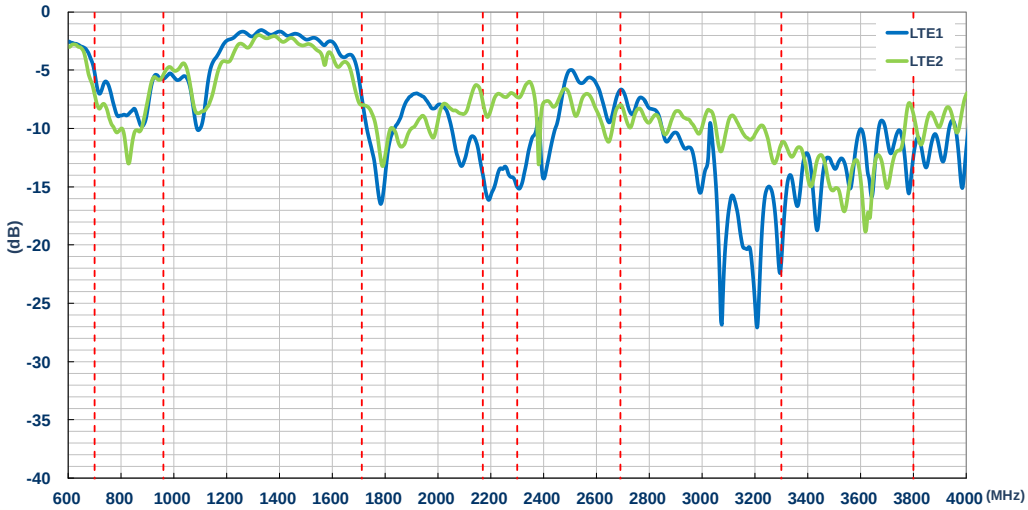
Noise Figure & Gain (dB)



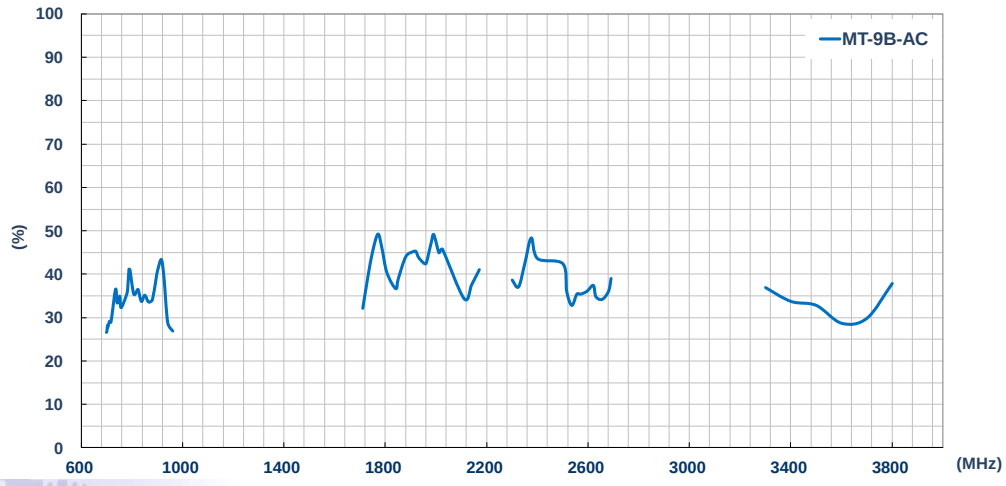
Out of Band Rejection (dB)



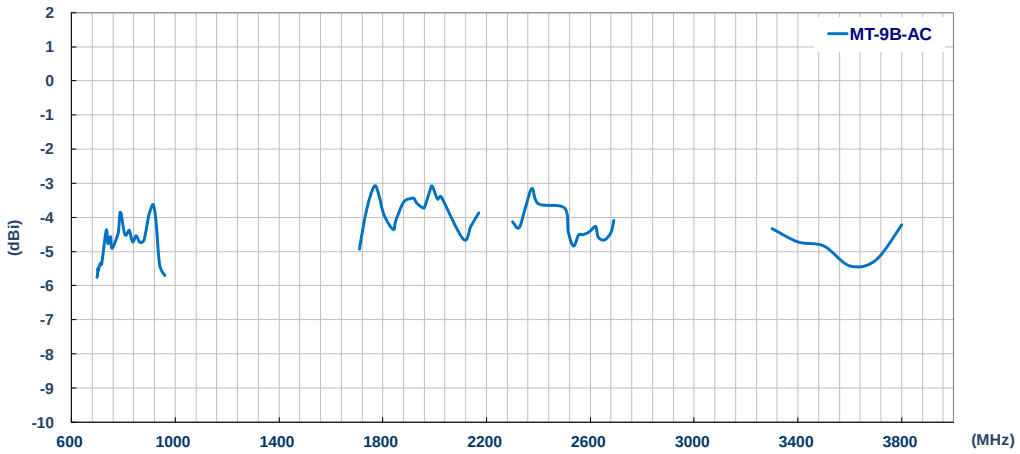
S11 (dB) – LTE1 & LTE2



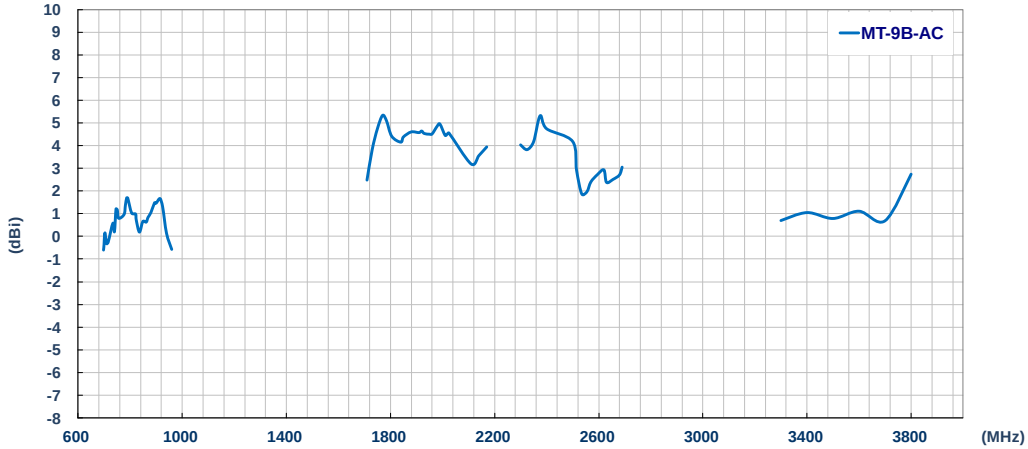
Efficiency (%)– LTE 1



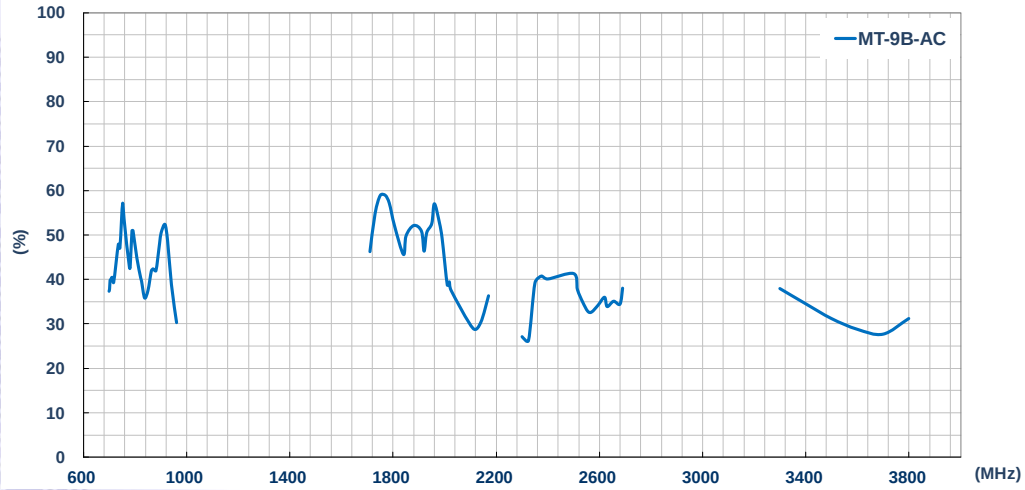
Average Gain (dBi) – LTE 1



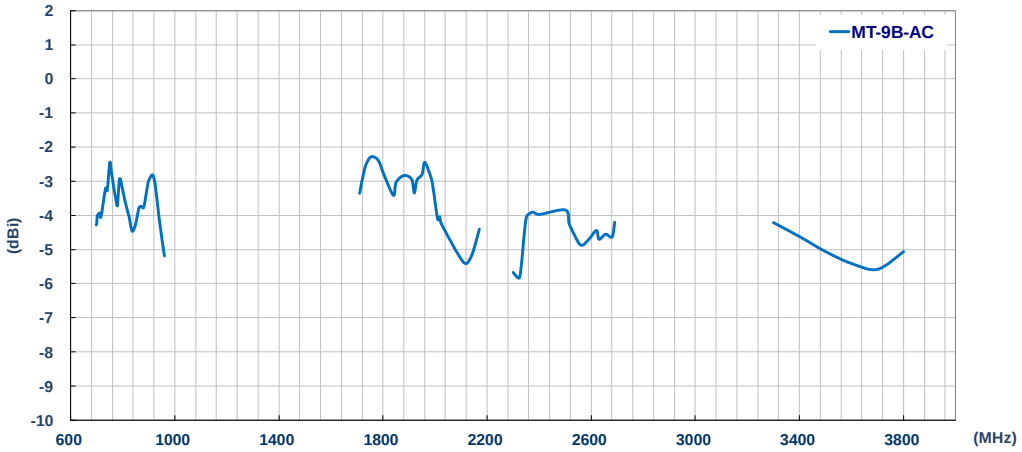
Peak Gain (dBi) – LTE 1



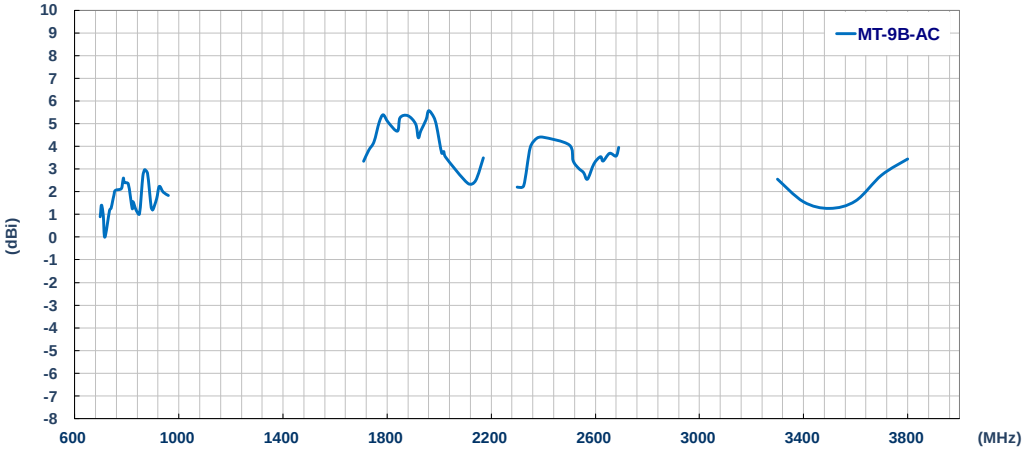
Efficiency (%)– LTE 2



Average Gain (dBi) – LTE 2



Peak Gain (dBi) – LTE 2

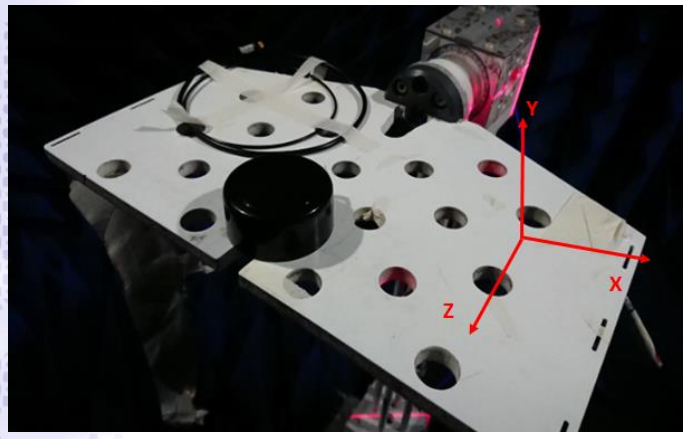


III. Antenna Radiation Pattern Measurement:

The antenna radiation patterns are measured in 3D Anechoic Chamber.

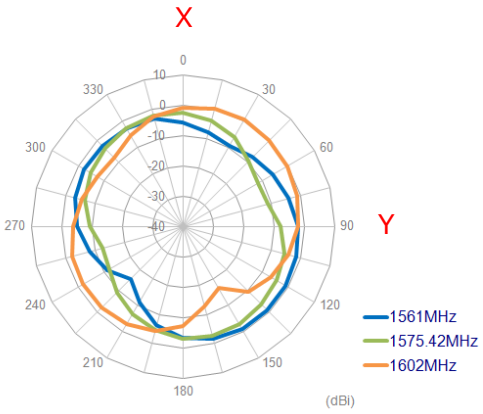
The measurement setup is as show below,

Free Space

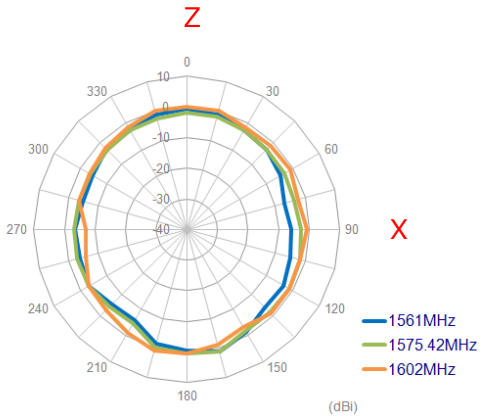


A) 2D Radiation Pattern:

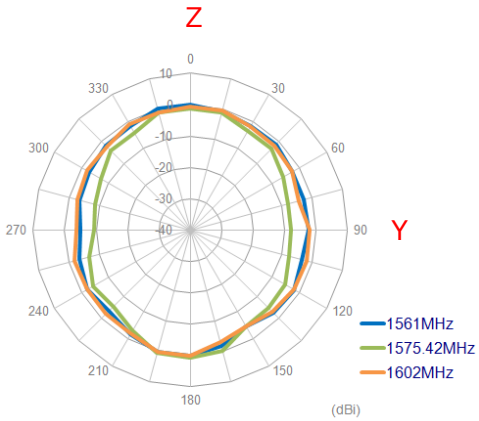
GNSS X-Y Plane



GNSS X-Z Plane

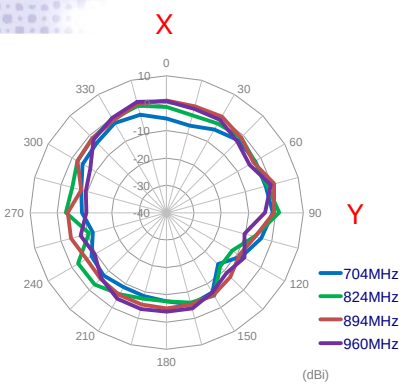


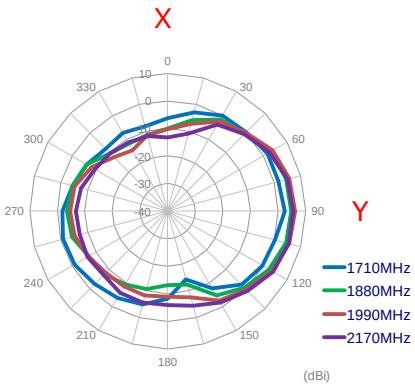
GNSS Y-Z Plane

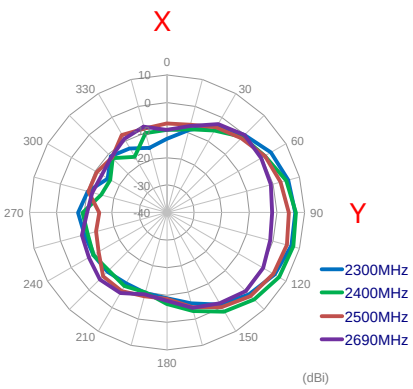


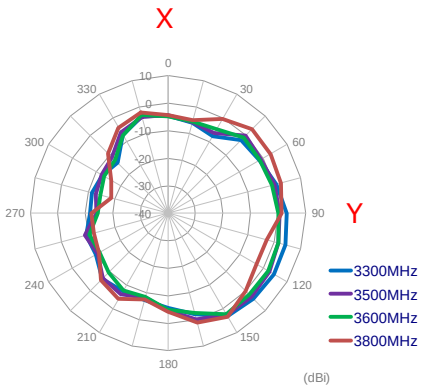
Free Space - LTE 1

X-Y Plane

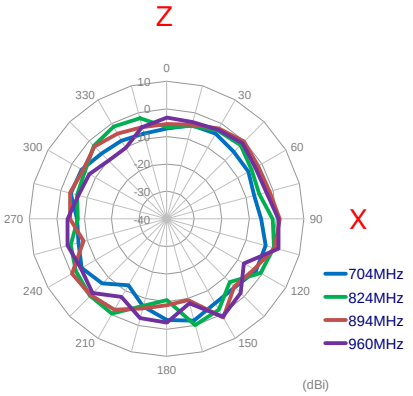


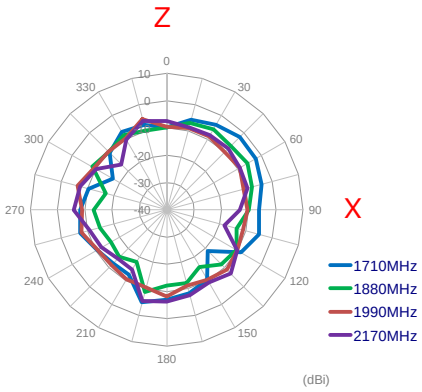


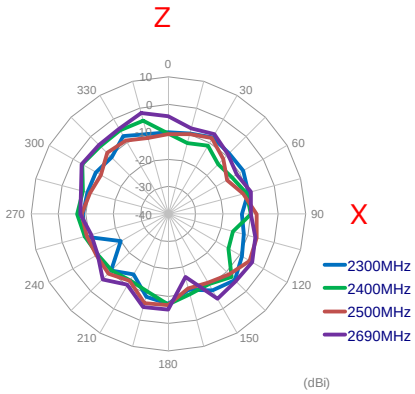


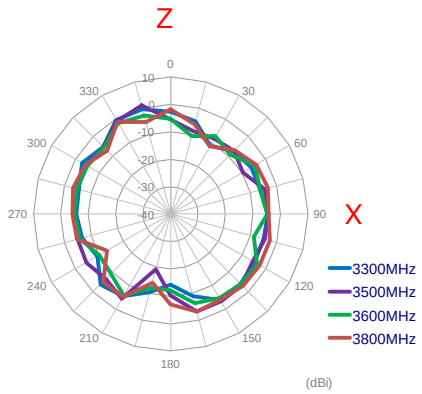


X-Z Plane









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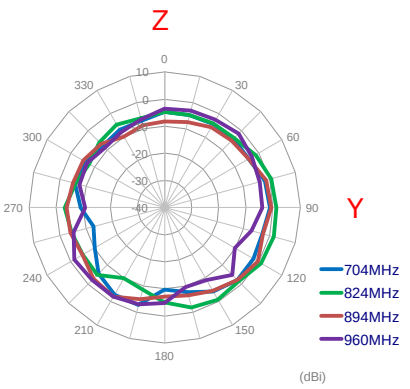
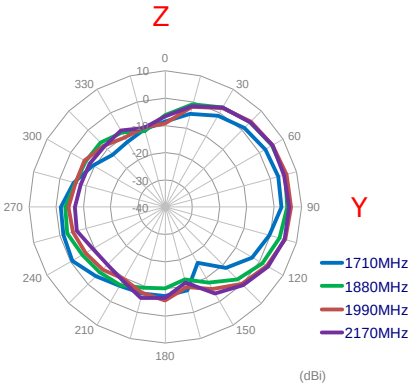
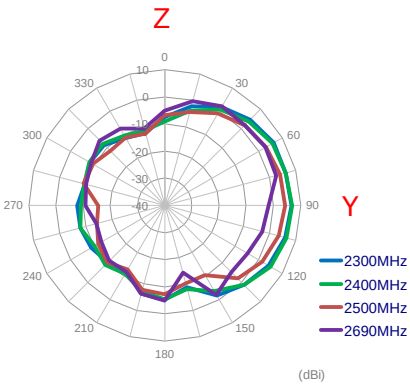
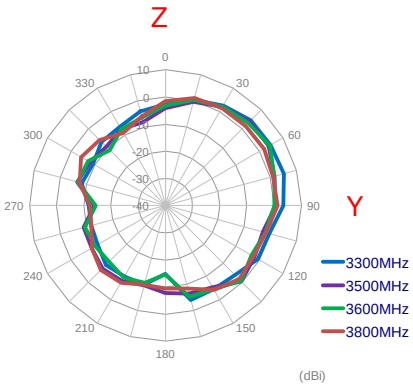
Y-Z Plane



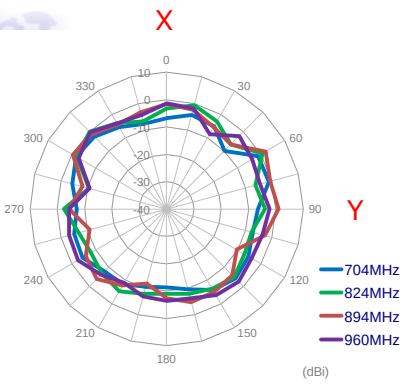


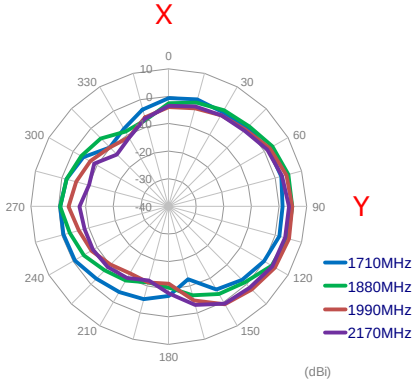


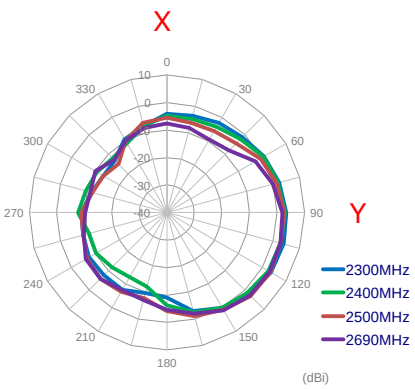


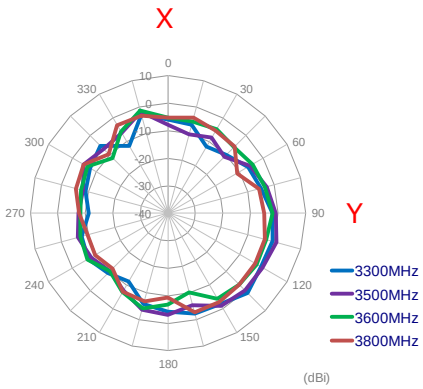
Free Space - LTE 2

X-Y Plane

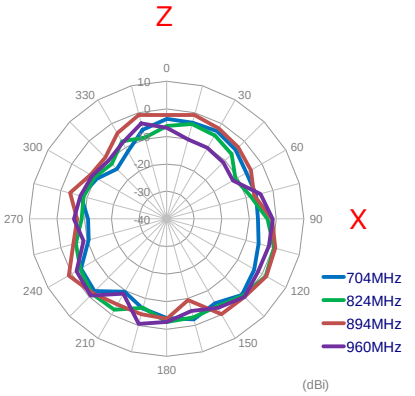


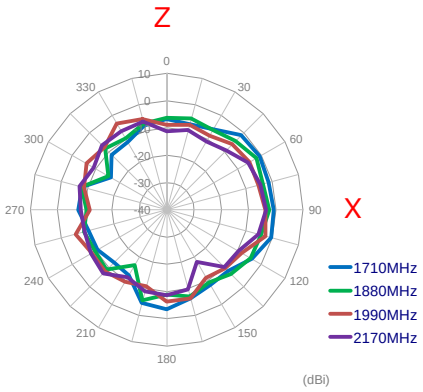


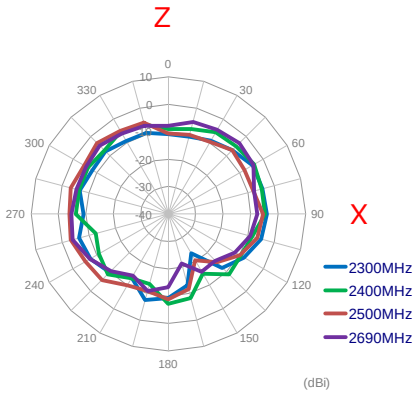


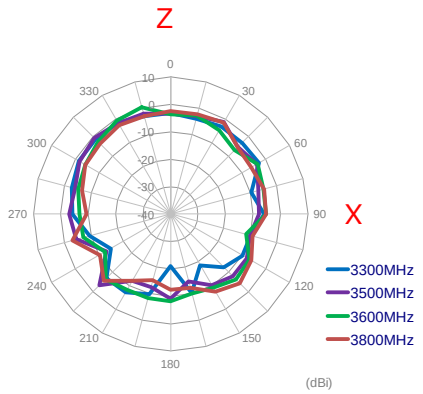


X-Z Plane









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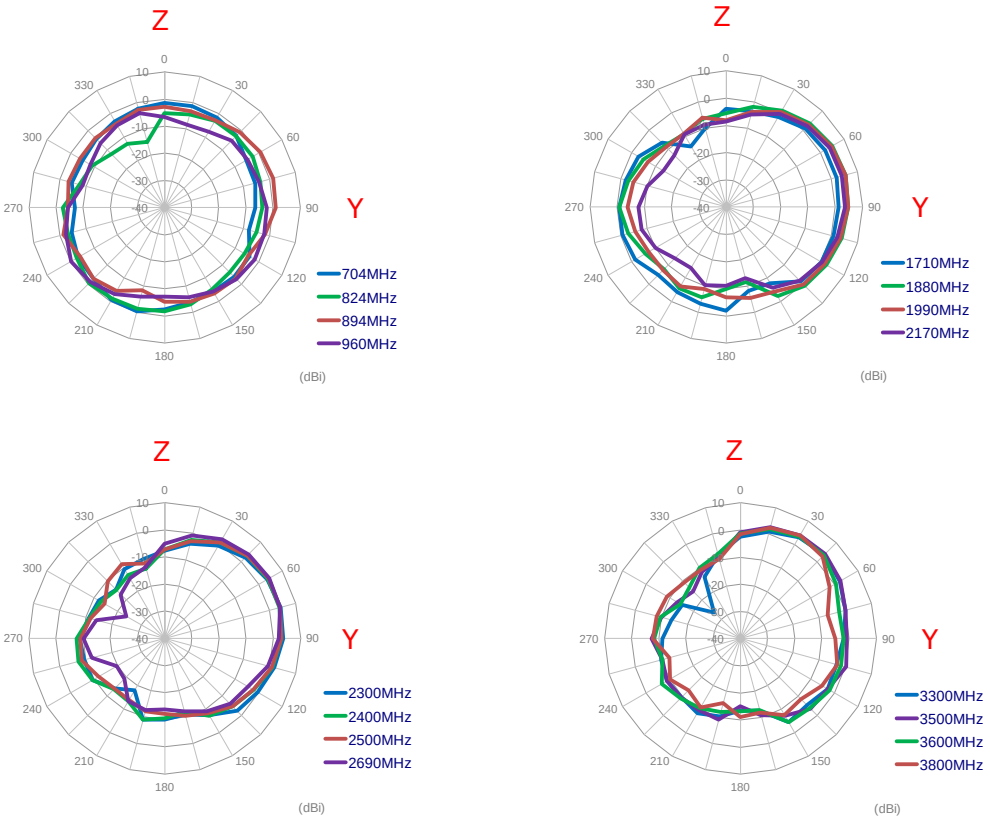
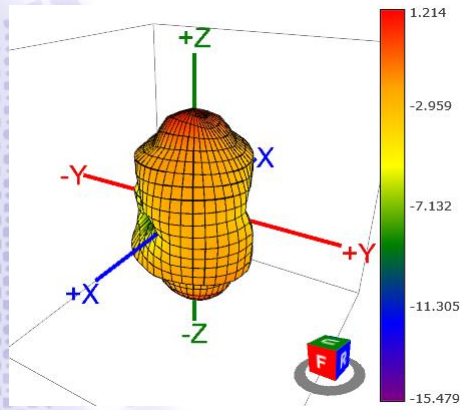
Y-Z Plane



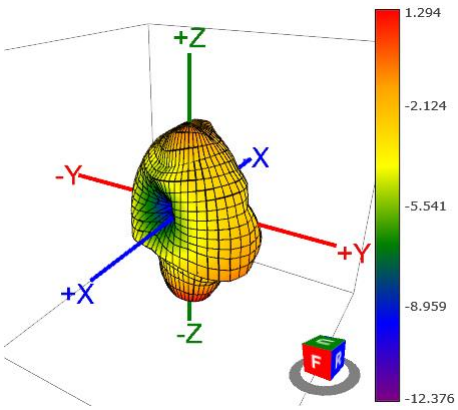
B) 3D Radiation Pattern:

GNSS

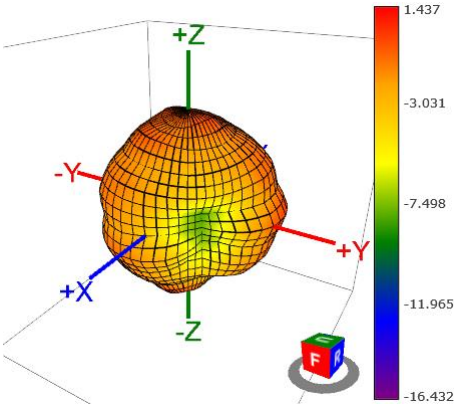
1561MHz



1575.42MHz

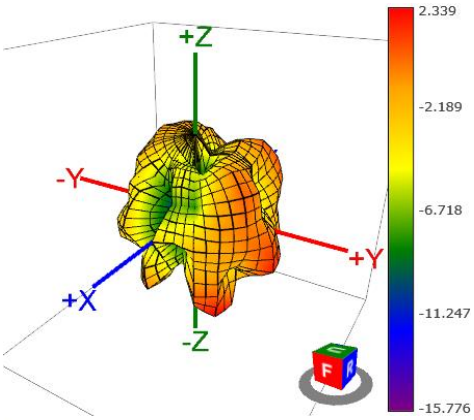


1602MHz

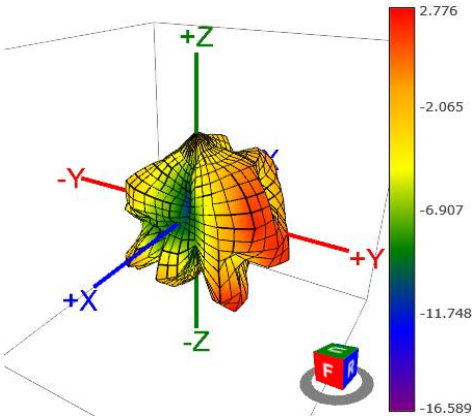


Free Space - LTE 1

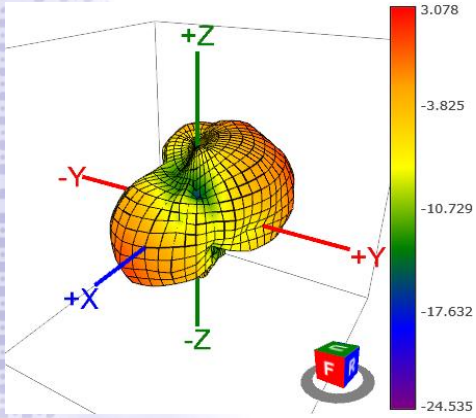
824MHz



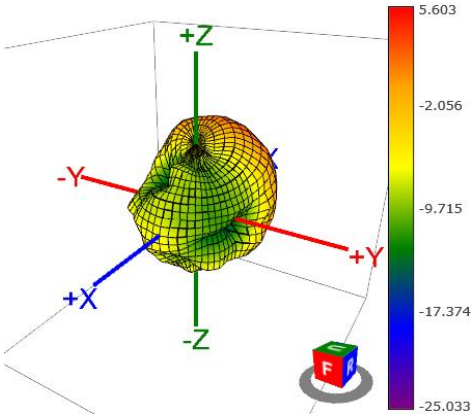
960MHz



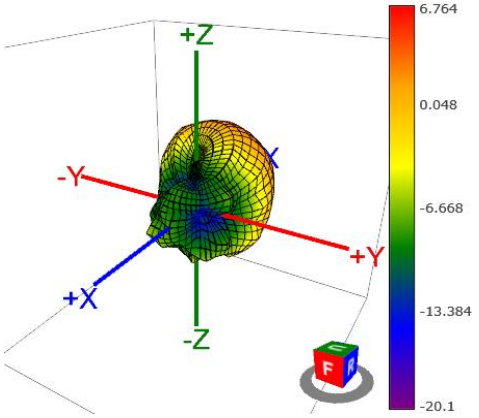
1710MHz



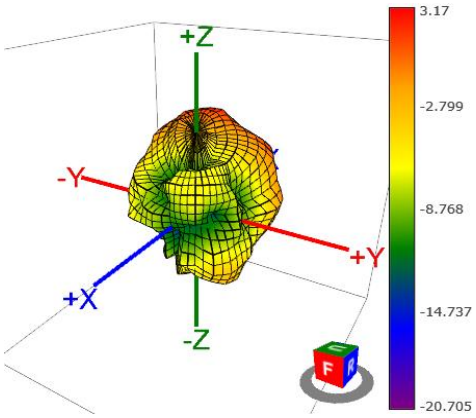
2170MHz



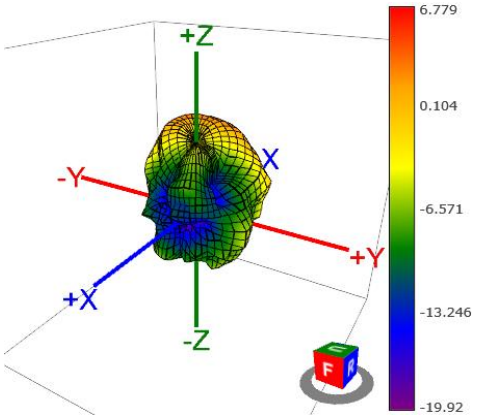
2300MHz



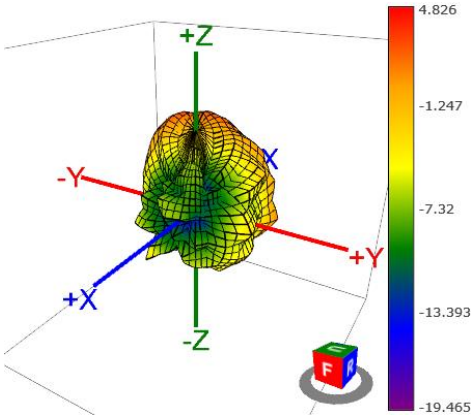
2690MHz



3300MHz

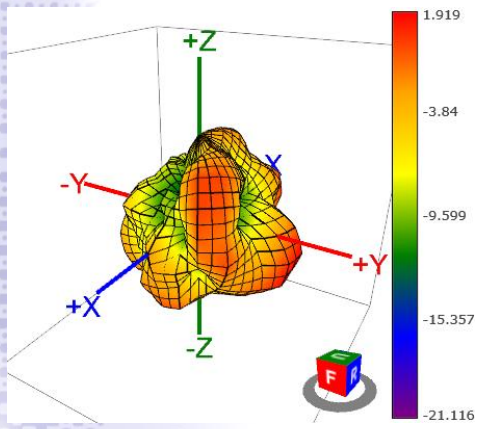


3600MHz

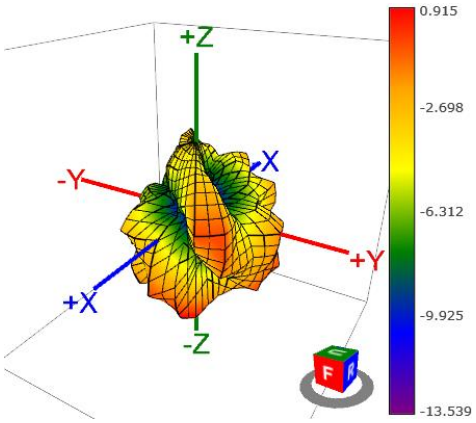


Free Space - LTE 2

824MHz



960MHz



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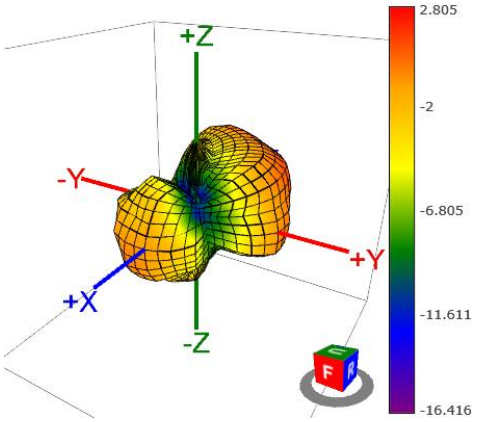
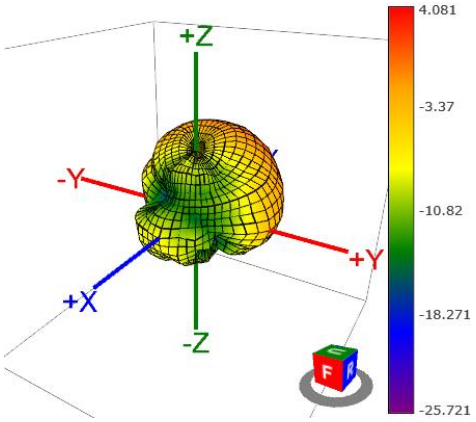
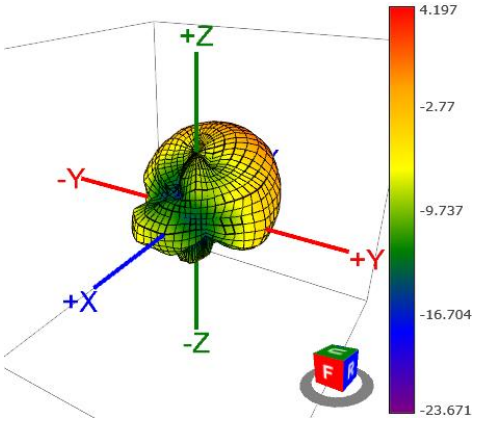
1710MHz



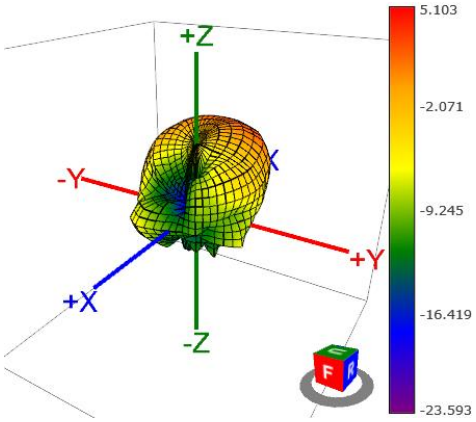
2170MHz



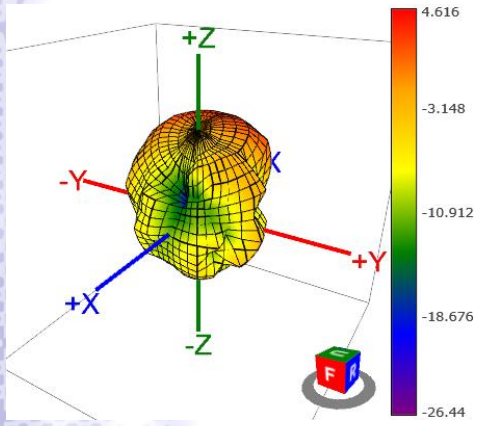
2300MHz



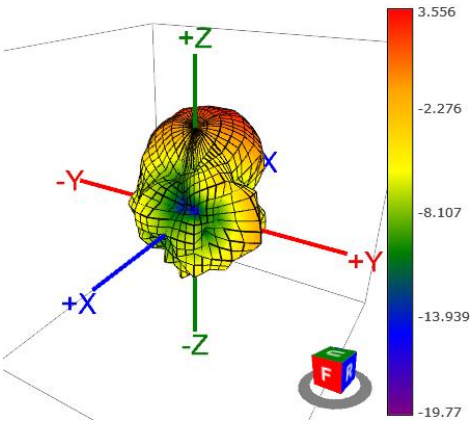
2690MHz



3300MHz



3600MHz



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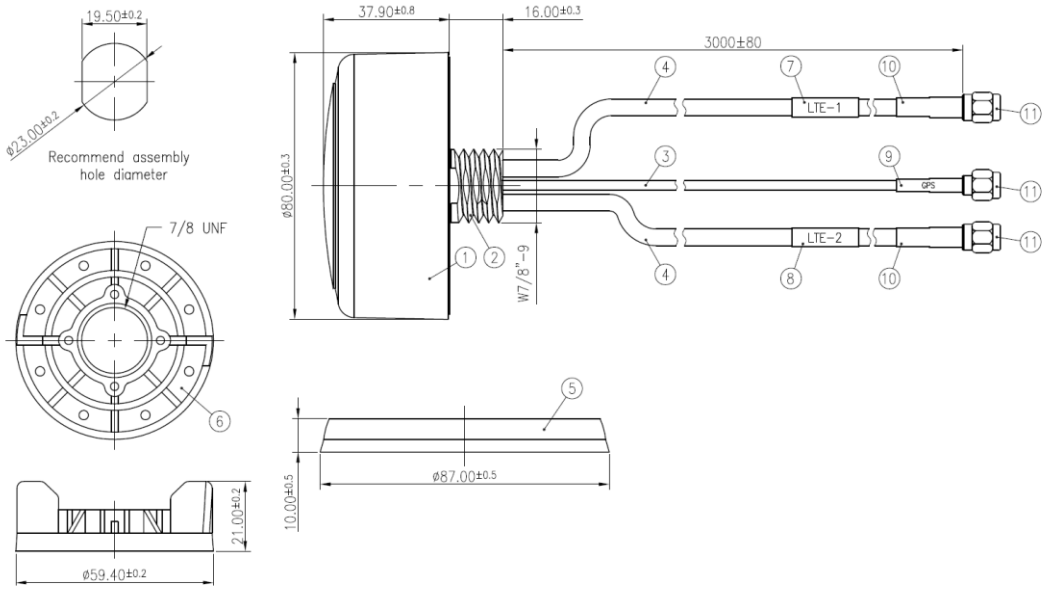
IV. Mechanical Drawing (Unit:mm):



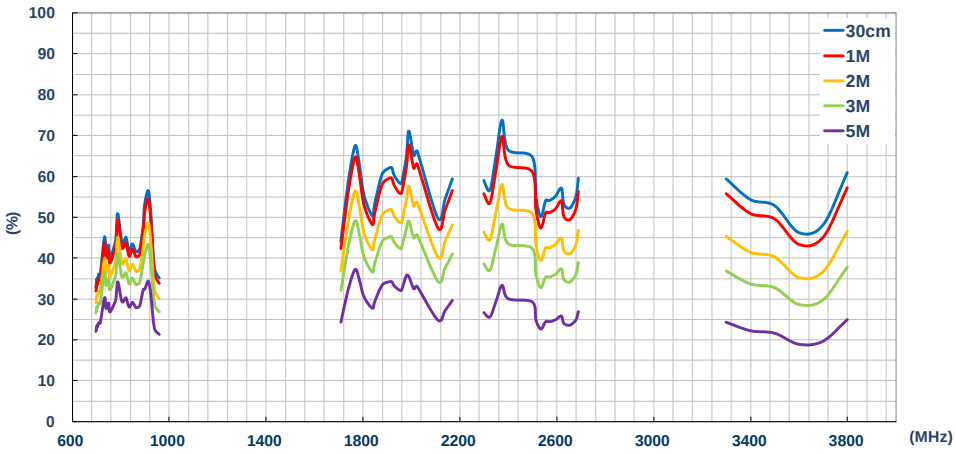
No	NAME	MATERIAL	FINISH	Q'TY
11	SMA(M) Connector	Brass	Au plating	3
10	Heat Shrink Tube Inner Glue	EVA	Black	2
9	GPS Heat Shrink Tube	CTMS	Blue	1
8	LTE-2 Heat Shrink Tube	CTMS	White	1
7	LTE-1 Heat Shrink Tube	CTMS	White	1
6	Nut	PC+PBT	Black	1
5	Gasket	Silicone	Black	1
4	Cable SNC-200	PVC	Black	2
3	Cable H100	PVC	Black	1
2	Bottom Base	Zinc Alloy	Ni Plated	1
1	Top Housing	PC+PBT	Black	1

V. Applications Note:

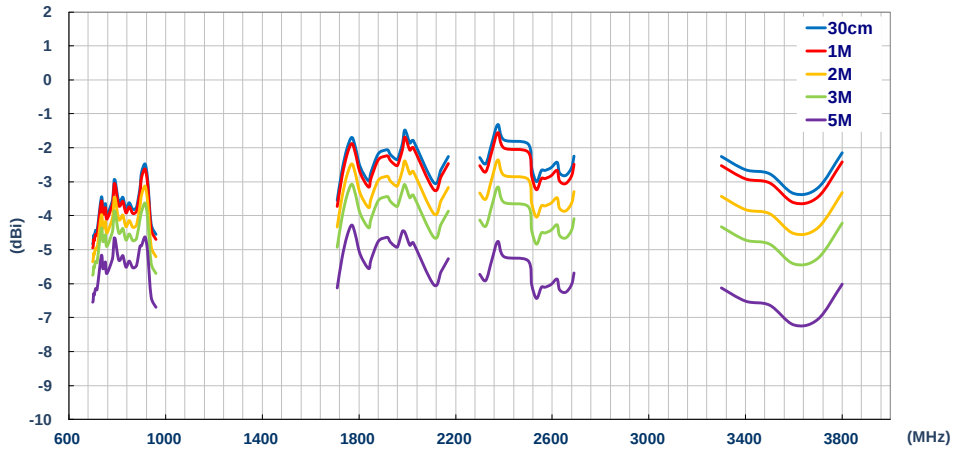
The antenna performance with different cable lengths is shown below.

Free Space – LTE 1

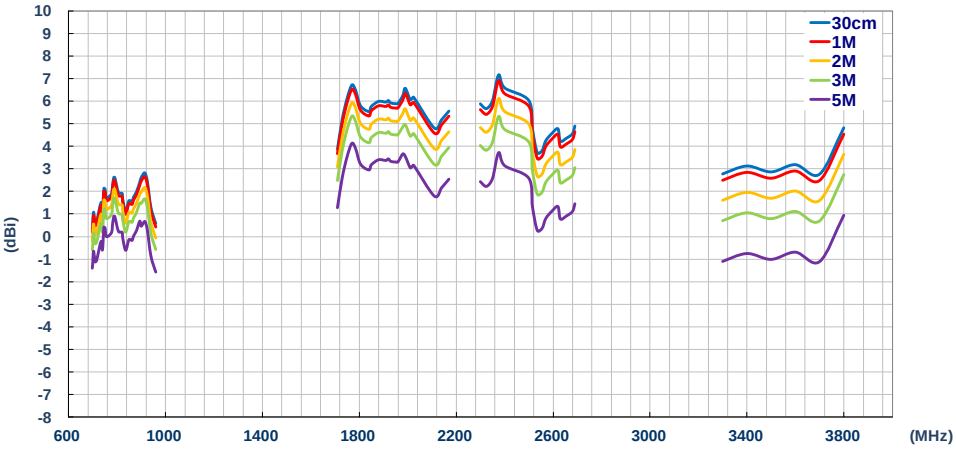
Efficiency (%)



Average Gain (dBi)

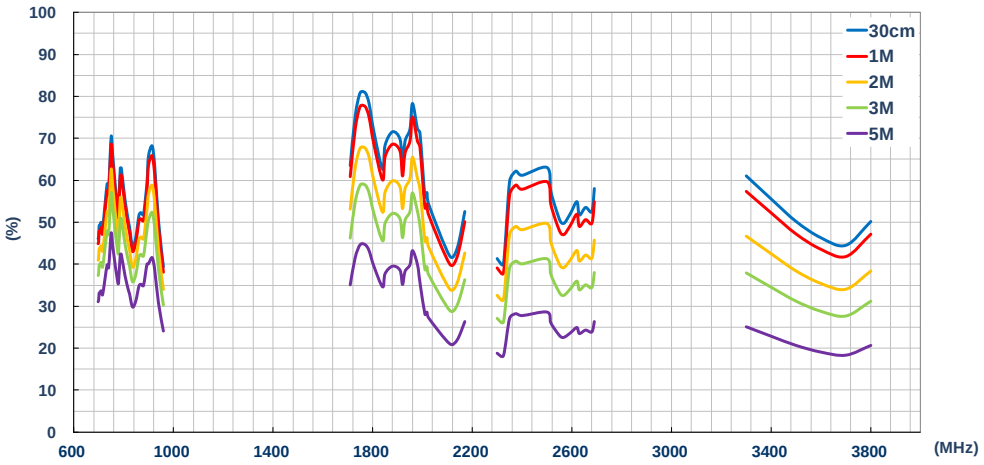


Peak Gain (dBi)

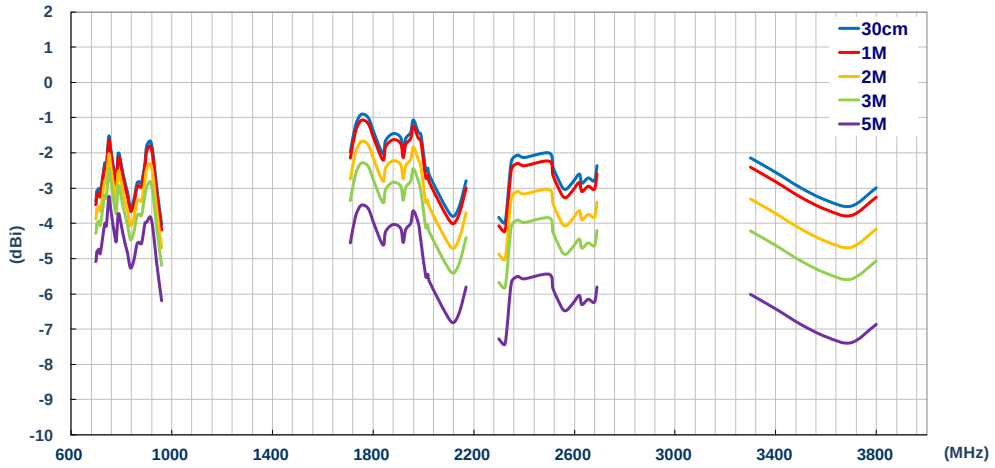


Free Space – LTE 2

Efficiency (%)



Average Gain (dBi)



Peak Gain (dBi)