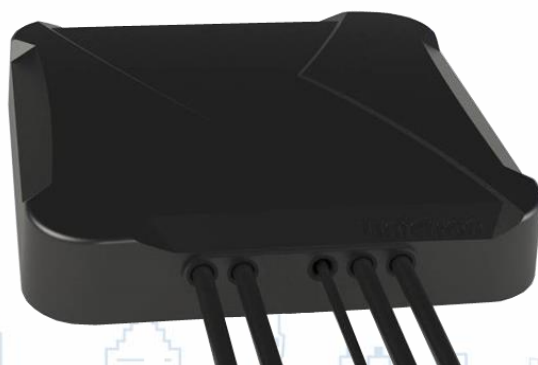




Product Name: 5-in-1 5G NR/ 4G LTE/ GNSS Combination Antenna

Part Number: MT-25B-AS-B4L01

Features:

- 1*GNSS, 4*LTE Antenna Combination
- Support GPS L1 / GLONASS L1 / BEIDOU L1 Bands
- Support LTE 617-960MHz, 1710-2690MHz, 3300-3800MHz, 5150-5850MHz
- 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

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

MODEL: MT-25B-AS-B4L01

Rev.A

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		
Test Condition	Free Space		
Impedance (Ω)	50		
Dimension (mm)	25 x 25 x 4		
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 ~ 5.0		
Current Consumption (mA) (Typical)	9.0		
Output Impedance (Ω)	50		

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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	H-100, 1 meters		
Connector	SMA (Male)		

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Items		LTE 1 Specifications								
Application Bands		5G NR Band 71	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE 2600	5G NR Band	Wi-Fi 5800
Frequencies (MHz)		617	698	824	1710	1850	1920	2300	3300	5150
		~	~	~	~	~	~	~	~	~
		698	824	960	1880	1990	2170	2690	3800	5850
Efficiency (%)	30cm	48.07	55.41	46.70	73.21	77.66	73.68	56.11	55.65	41.97
	1m	45.50	51.95	43.79	66.46	70.38	66.26	50.13	48.53	35.72
	2m	41.98	47.38	39.93	57.88	61.14	56.94	42.66	39.90	29.03
	3m	38.80	43.21	36.42	50.41	53.12	48.93	36.31	32.81	23.60
	5m	33.09	35.94	30.29	38.24	40.09	36.13	26.31	22.18	15.24
Average Gain (dBi)	30cm	-3.18	-2.56	-3.31	-1.35	-1.10	-1.33	-2.51	-2.55	-3.77
	1m	-3.42	-2.84	-3.59	-1.77	-1.53	-1.79	-3.00	-3.14	-4.47
	2m	-3.77	-3.24	-3.99	-2.37	-2.14	-2.45	-3.70	-3.99	-5.37
	3m	-4.11	-3.64	-4.39	-2.97	-2.75	-3.10	-4.40	-4.84	-6.27
	5m	-4.80	-4.44	-5.19	-4.17	-3.97	-4.42	-5.80	-6.54	-8.17
Peak Gain (dBi)	30cm	2.52	3.12	2.44	6.58	6.08	6.08	4.82	3.68	3.86
	1m	2.42	3.00	2.32	6.40	5.87	5.87	4.61	3.44	3.46
	2m	2.08	2.60	1.92	5.80	5.17	5.17	3.91	2.64	2.56
	3m	1.75	2.20	1.52	5.20	4.47	4.47	3.21	1.84	1.66
	5m	1.08	1.40	0.72	4.00	3.22	3.22	1.81	0.24	-0.24
V.S.W.R		< 5.85			< 3					
Return Loss (dB)		< -3			< -6					

Test Condition	Free Space
Impedance (Ω)	50
Polarization	Linear
Cable	SNC-200, 1 meter
Connector	SMA (Male)

Items		LTE 2 Specifications								
Application Bands		5G NR Band 71	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE 2600	5G NR Band	Wi-Fi 5800
Frequencies (MHz)		617	698	824	1710	1850	1920	2300	3300	5150
		~	~	~	~	~	~	~	~	~
		698	824	960	1880	1990	2170	2690	3800	5850
Efficiency (%)	30cm	48.49	46.52	47.43	64.70	76.76	74.03	64.23	44.14	48.07
	1m	45.90	43.62	44.47	58.73	69.56	66.58	57.38	38.49	40.91
	2m	42.35	39.78	40.56	51.16	60.43	57.21	48.84	31.65	33.25
	3m	39.14	36.28	36.99	44.55	52.49	49.17	41.57	26.02	27.03
	5m	33.38	30.18	30.77	33.80	39.62	36.31	30.11	17.59	17.45
Average Gain (dBi)	30cm	-3.14	-3.32	-3.24	-1.89	-1.15	-1.31	-1.92	-3.55	-3.18
	1m	-3.38	-3.60	-3.52	-2.31	-1.58	-1.77	-2.41	-4.15	-3.88
	2m	-3.73	-4.00	-3.92	-2.91	-2.19	-2.43	-3.11	-5.00	-4.78
	3m	-4.07	-4.40	-4.32	-3.51	-2.80	-3.08	-3.81	-5.85	-5.68
	5m	-4.77	-5.20	-5.12	-4.71	-4.02	-4.40	-5.21	-7.55	-7.58
Peak Gain (dBi)	30cm	3.80	3.22	3.45	5.07	5.31	5.31	3.50	2.21	3.26
	1m	3.70	3.10	3.33	4.89	5.10	5.10	3.29	1.97	2.86
	2m	3.36	2.70	2.93	4.29	4.40	4.40	2.59	1.17	1.96
	3m	3.03	2.30	2.53	3.69	3.71	3.71	1.89	0.37	1.06
	5m	2.36	1.50	1.73	2.49	2.51	2.51	0.49	-1.23	-0.84
V.S.W.R		< 5.85			< 3					
Return Loss (dB)		< -3			< -6					
Test Condition			Free Space							
Impedance (Ω)			50							
Polarization			Linear							

Cable	SNC-200, 1 meter
Connector	SMA (Male)

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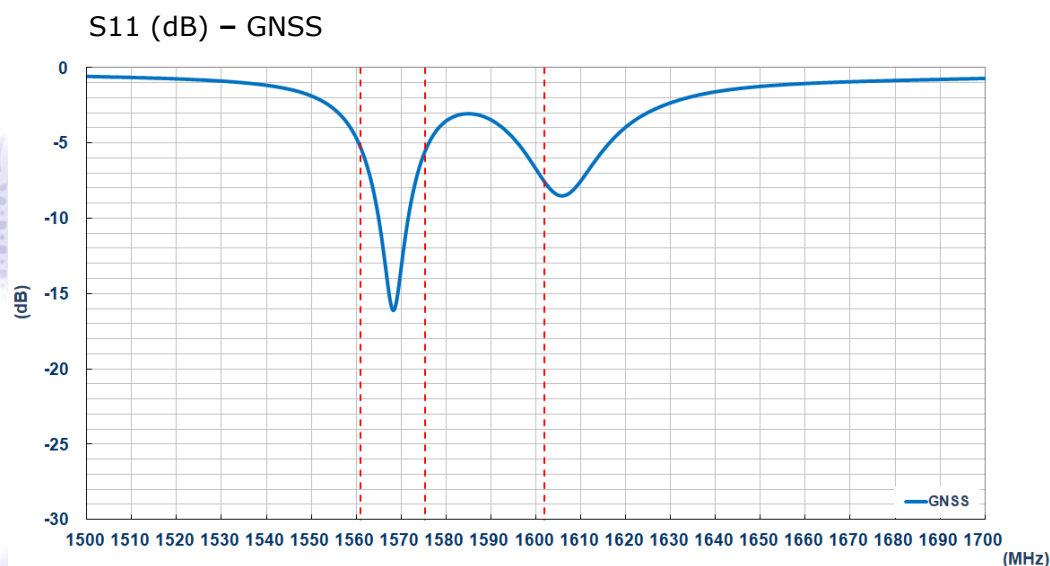
Items		LTE 3 Specifications								
Application Bands		5G NR Band 71	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE 2600	5G NR Band	Wi-Fi 5800
Frequencies (MHz)		617	698	824	1710	1850	1920	2300	3300	5150
		~	~	~	~	~	~	~	~	~
		698	824	960	1880	1990	2170	2690	3800	5850
Efficiency (%)	30cm	49.09	57.49	47.82	64.45	73.70	71.48	64.94	48.72	50.14
	1m	46.47	53.90	44.83	58.51	66.78	64.28	58.01	42.48	42.68
	2m	42.87	49.16	40.89	50.96	58.02	55.24	49.37	34.93	34.69
	3m	39.63	44.83	37.29	44.38	50.40	47.47	42.02	28.72	28.20
	5m	33.79	37.29	31.02	33.67	38.04	35.06	30.44	19.42	18.21
Average Gain (dBi)	30cm	-3.09	-2.40	-3.20	-1.91	-1.33	-1.46	-1.88	-3.12	-3.00
	1m	-3.33	-2.68	-3.48	-2.33	-1.75	-1.92	-2.37	-3.72	-3.70
	2m	-3.68	-3.08	-3.88	-2.93	-2.36	-2.58	-3.07	-4.57	-4.60
	3m	-4.02	-3.48	-4.28	-3.53	-2.98	-3.24	-3.77	-5.42	-5.50
	5m	-4.71	-4.28	-5.08	-4.73	-4.20	-4.55	-5.17	-7.12	-7.40
Peak Gain (dBi)	30cm	3.53	3.31	3.33	4.37	6.16	6.16	3.56	2.51	3.52
	1m	3.43	3.19	3.21	4.19	5.98	5.98	3.35	2.27	3.12
	2m	3.09	2.79	2.81	3.59	5.38	5.38	2.65	1.47	2.22
	3m	2.76	2.39	2.41	2.99	4.78	4.78	1.95	0.67	1.32
	5m	2.09	1.59	1.61	1.79	3.58	3.58	0.55	-0.93	-0.58
V.S.W.R		< 5.85			< 3					
Return Loss (dB)		< -3			< -6					
Test Condition			Free Space							
Impedance (Ω)			50							
Polarization			Linear							
Cable			SNC-200, 1 meter							
Connector			SMA (Male)							

Items		LTE 4 Specifications								
Application Bands		5G NR Band 71	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE 2600	5G NR Band	Wi-Fi 5800
Frequencies (MHz)		617	698	824	1710	1850	1920	2300	3300	5150
		~	~	~	~	~	~	~	~	~
		698	824	960	1880	1990	2170	2690	3800	5850
Efficiency (%)	30cm	38.89	56.39	46.11	61.03	69.79	69.88	46.72	58.19	51.00
	1m	36.81	52.87	43.23	55.41	63.24	62.84	41.73	50.74	43.41
	2m	33.96	48.22	39.43	48.26	54.94	54.00	35.52	41.72	35.29
	3m	31.39	43.98	35.96	42.03	47.73	46.41	30.23	34.30	28.68
	5m	26.77	36.58	29.91	31.88	36.02	34.27	21.90	23.19	18.52
Average Gain (dBi)	30cm	-4.10	-2.49	-3.36	-2.14	-1.56	-1.56	-3.31	-2.35	-2.92
	1m	-4.34	-2.77	-3.64	-2.56	-1.99	-2.02	-3.80	-2.95	-3.62
	2m	-4.69	-3.17	-4.04	-3.16	-2.60	-2.68	-4.50	-3.80	-4.52
	3m	-5.03	-3.57	-4.44	-3.76	-3.21	-3.33	-5.20	-4.65	-5.42
	5m	-5.72	-4.37	-5.24	-4.96	-4.43	-4.65	-6.60	-6.35	-7.32
Peak Gain (dBi)	30cm	1.60	3.85	2.66	6.30	7.04	7.04	3.45	3.87	4.28
	1m	1.48	3.73	2.54	6.12	6.83	6.83	3.24	3.60	3.88
	2m	1.08	3.33	2.14	5.52	6.23	6.23	2.54	2.70	2.98
	3m	0.68	2.93	1.74	4.92	5.63	5.63	1.84	1.80	2.08
	5m	-0.12	2.13	0.94	3.72	4.43	4.43	0.44	0.00	0.18
V.S.W.R		< 5.85			< 3					
Return Loss (dB)		< -3			< -6					
Test Condition			Free Space							
Impedance (Ω)			50							
Polarization			Linear							
Cable			SNC-200, 1 meter							
Connector			SMA (Male)							

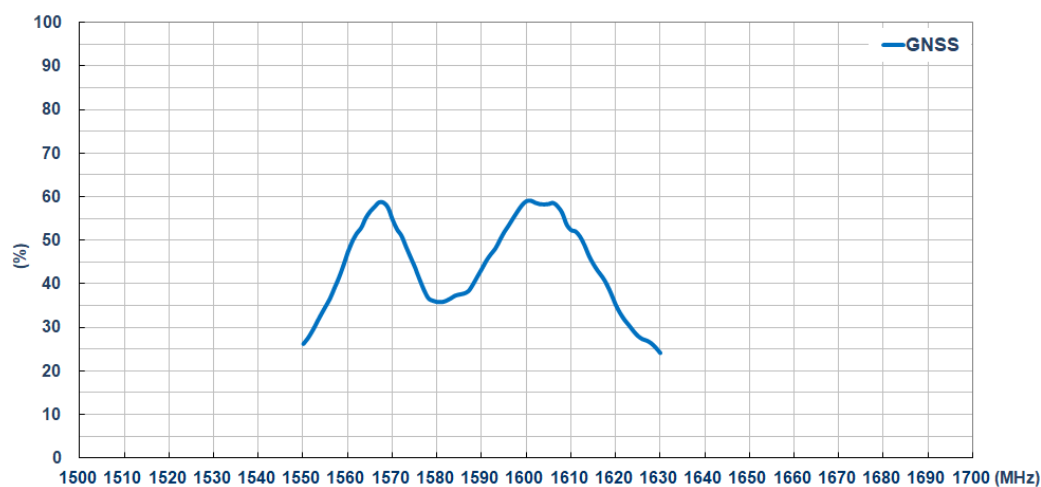
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Mechanical	
Dimension (mm)	136.47(L) x 135.95(W) x 29.89(H)
Casing	ABS + PC
Base and Thread	Zinc Alloy
Weigh (g) (including cable)	1622
Waterproof Resistant	IP69
Maximum Assembly Torque	40 N-m
Environmental Conditions	
Operation Temperature (°C)	-40 ~ +85
Storage Temperature (°C)	-40 ~ +85
Humidity	Non-condensing 65 °C 95% RH

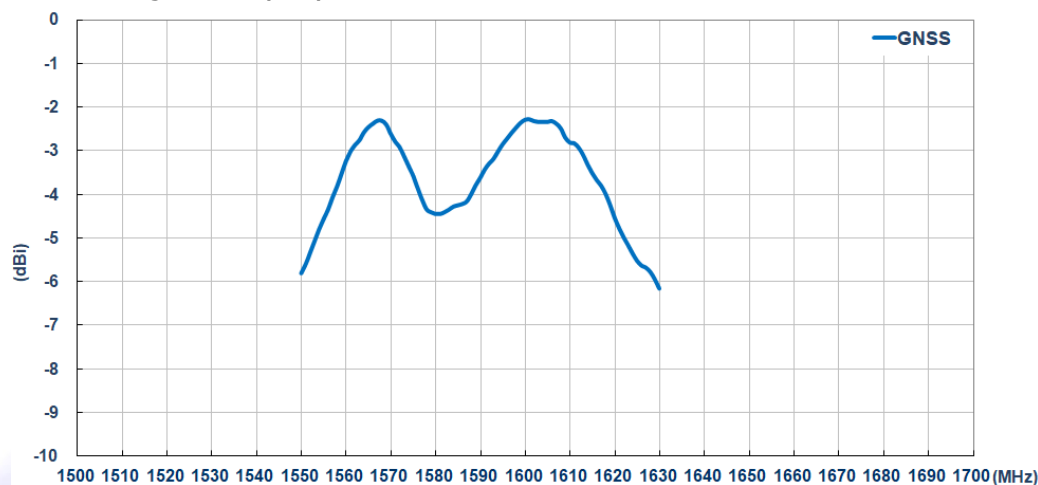
II. Antenna Electrical Properties:



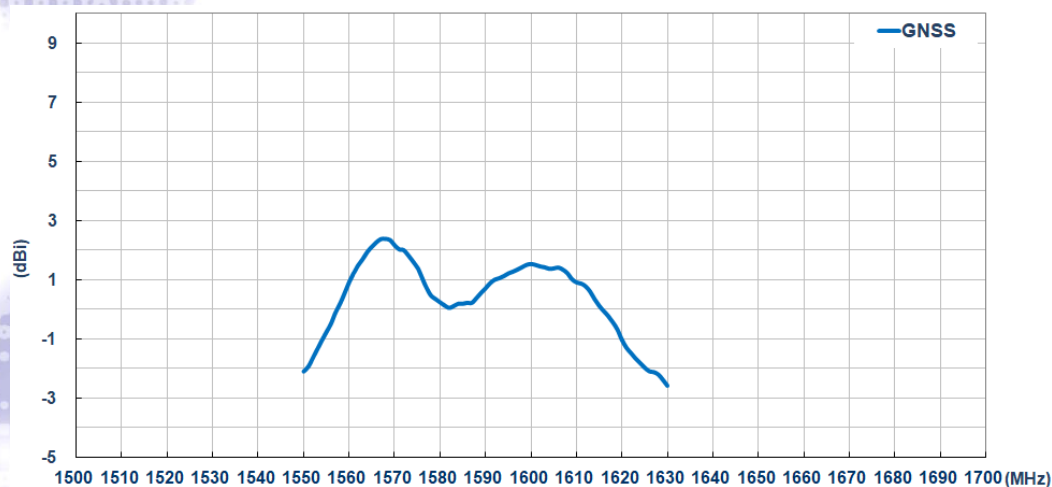
Efficiency (%) - GNSS



Average Gain (dBi) - GNSS

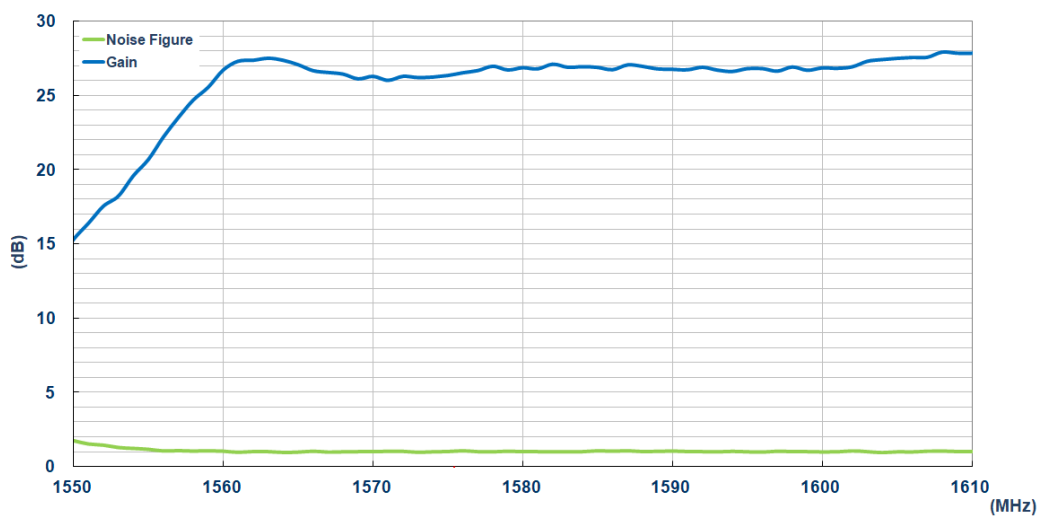


Peak Gain (dBi) - GNSS

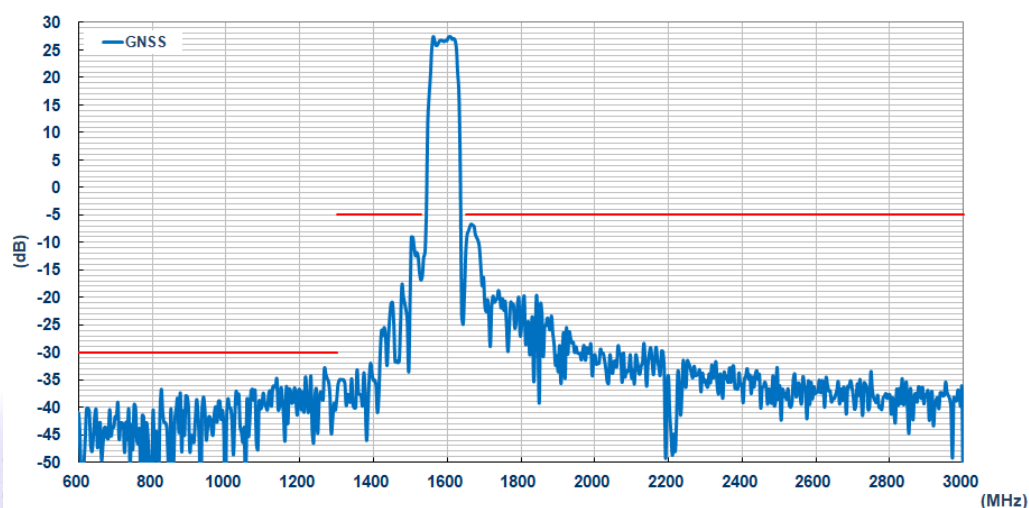


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Noise Figure & Gain (dB) - GNSS

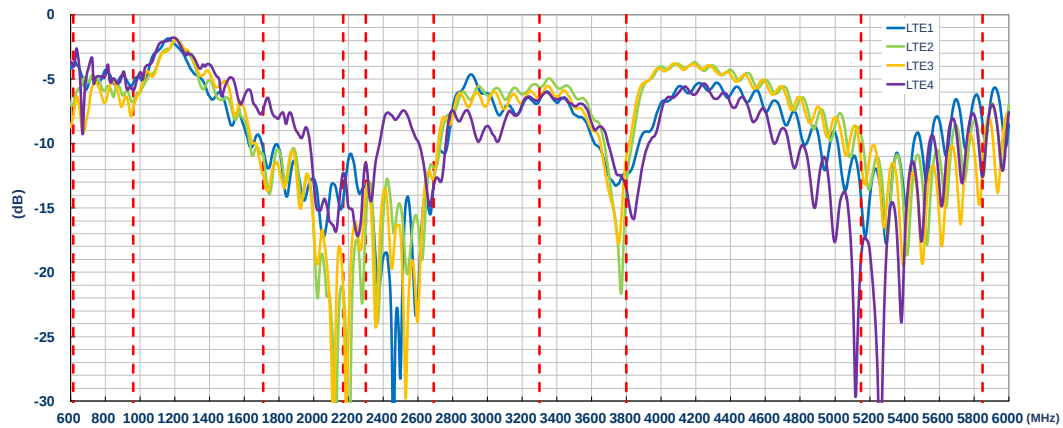


Out of Band Rejection (dB) - GNSS

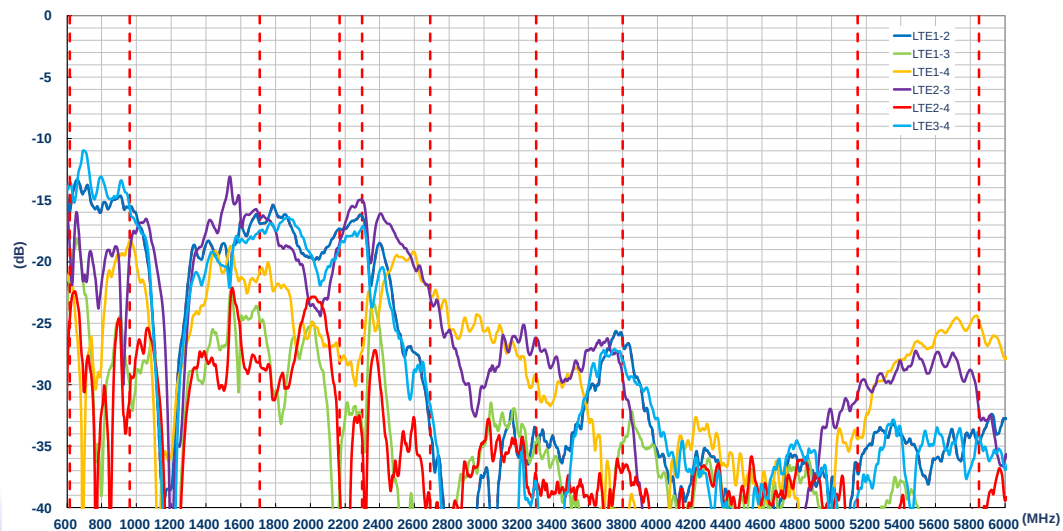


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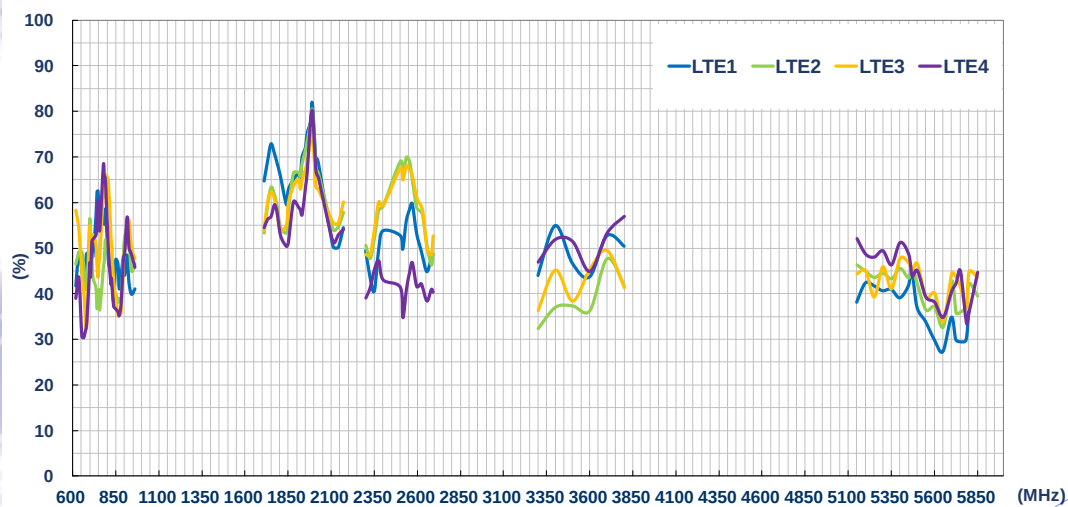
S11 (dB) - LTE 1 & LTE 2 & LTE 3 & LTE 4



Isolation (dB) - LTE 1 & LTE 2 & LTE 3 & LTE 4

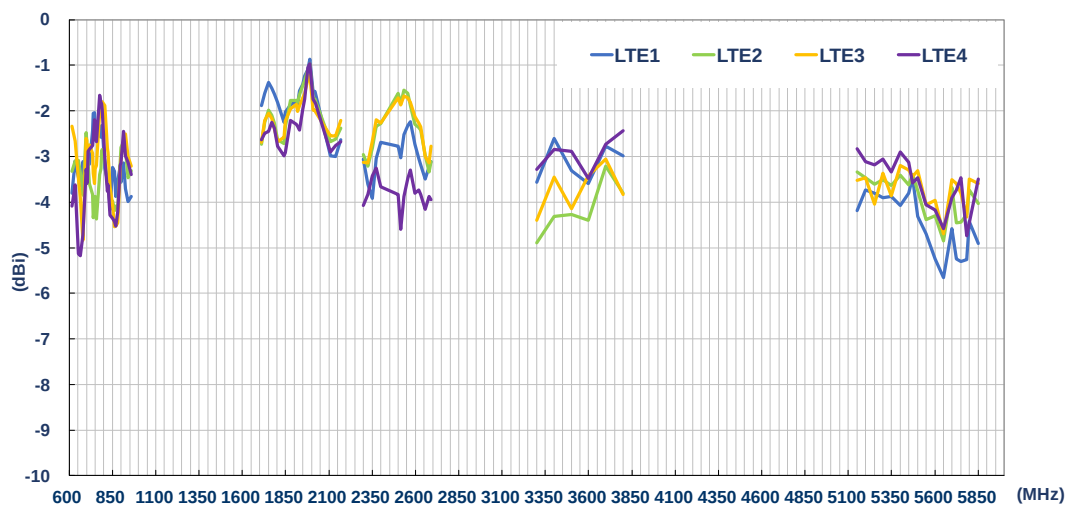


Efficiency (%) - LTE 1 & LTE 2 & LTE 3 & LTE 4

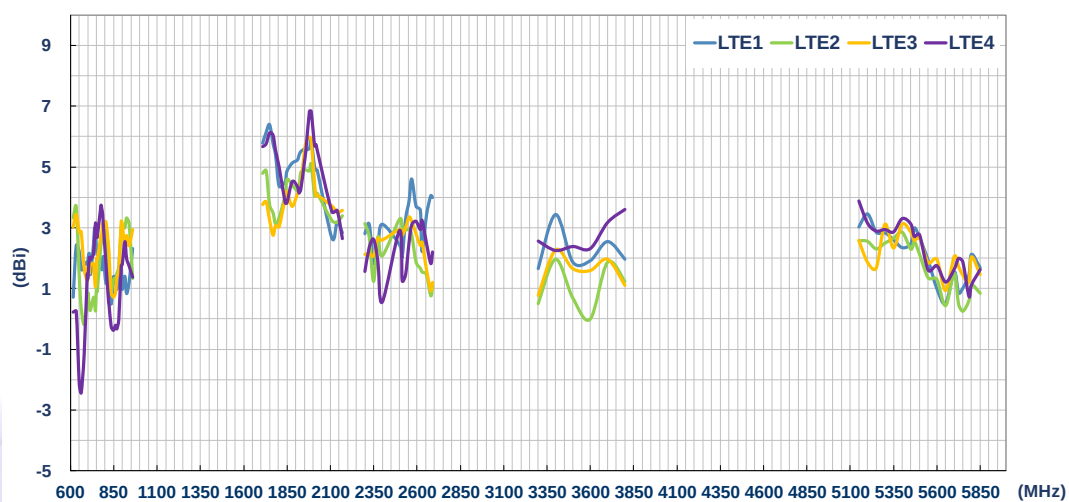


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Average Gain (dBi) - LTE 1 & LTE 2 & LTE 3 & LTE 4



Peak Gain (dBi) - LTE 1 & LTE 2 & LTE 3 & LTE 4

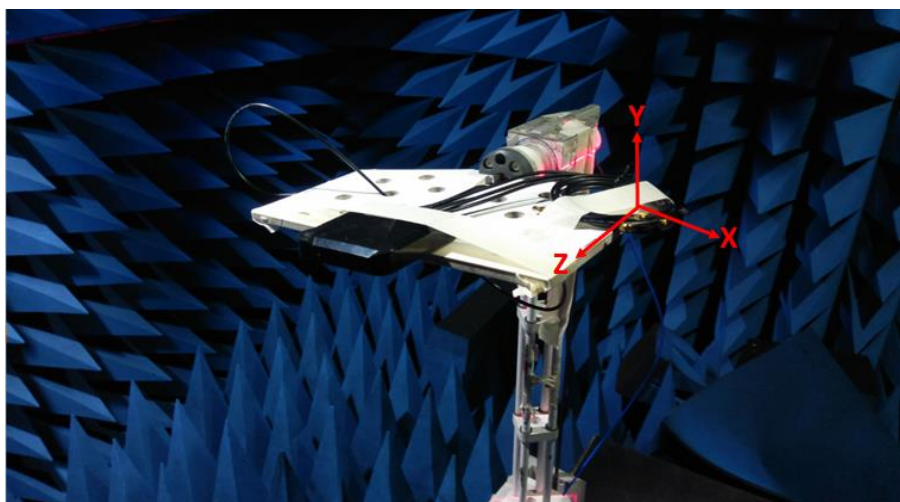


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III. Antenna Radiation Pattern Measurement:

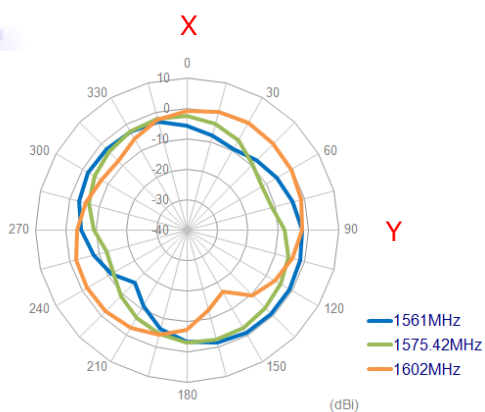
The antenna radiation patterns are measured in 3D Anechoic Chamber.
The measurement setup is as show below,

Free Space

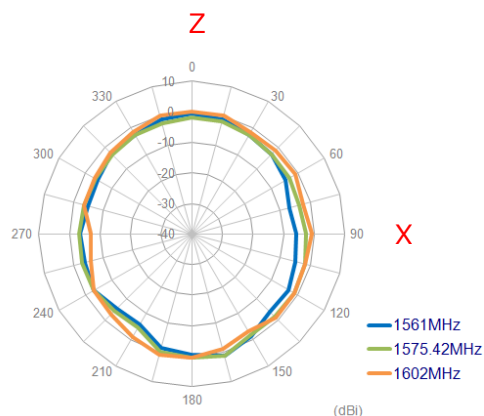


IV. 2D Radiation Pattern:

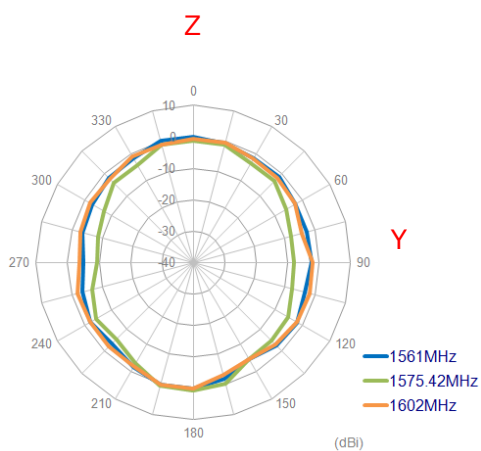
GNSS X-Y Plane



GNSS X-Z Plane

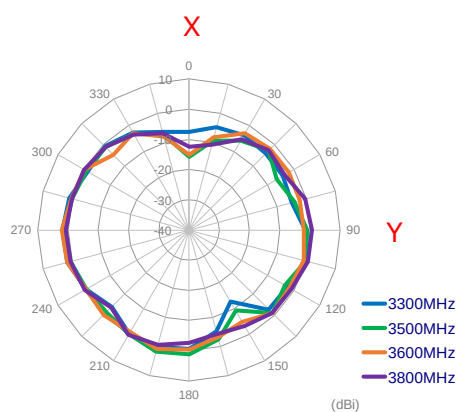
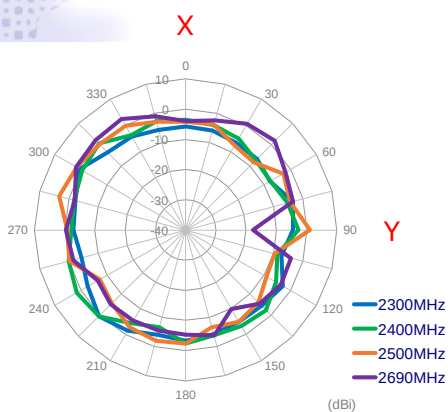
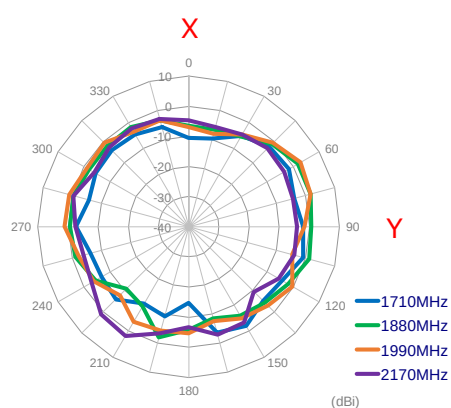
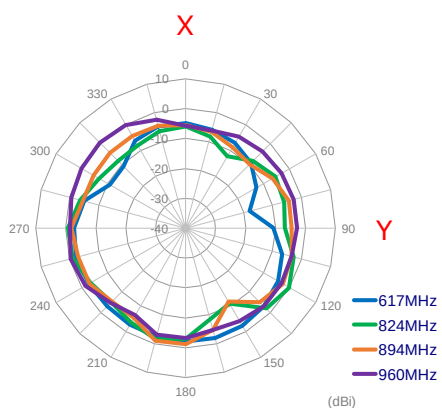


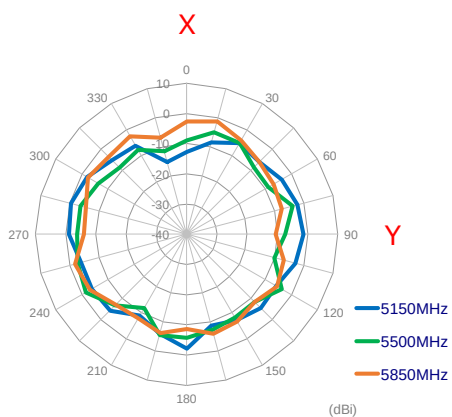
GNSS Y-Z Plane



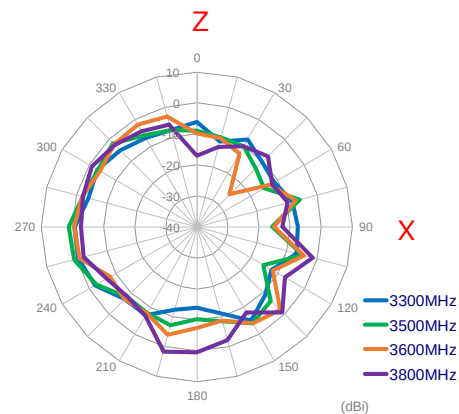
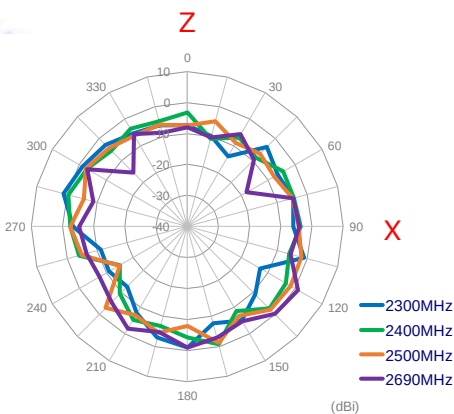
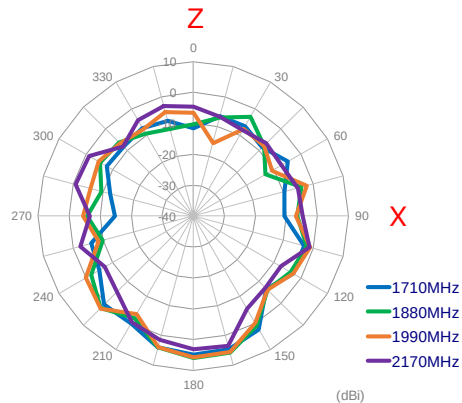
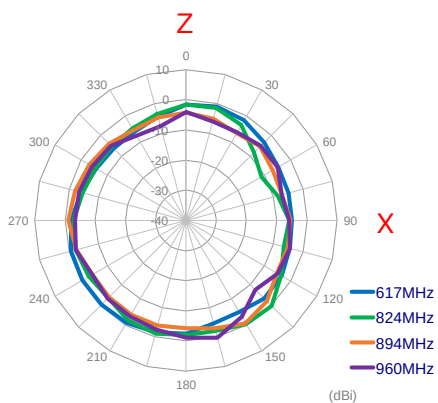
Free Space – LTE 1

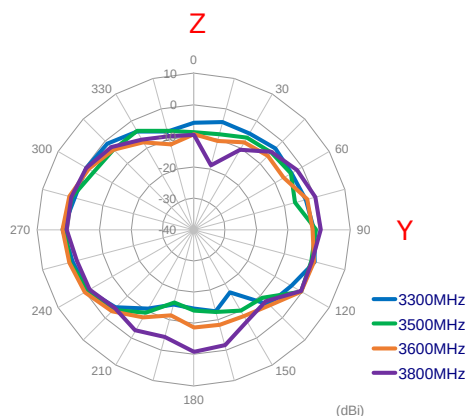
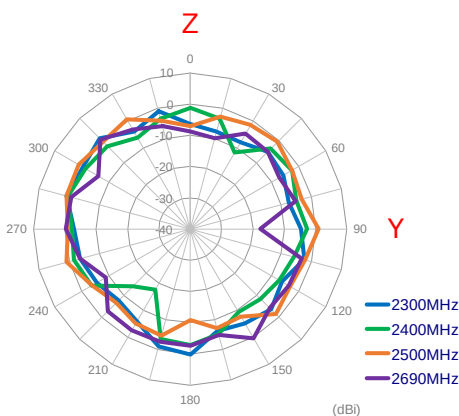
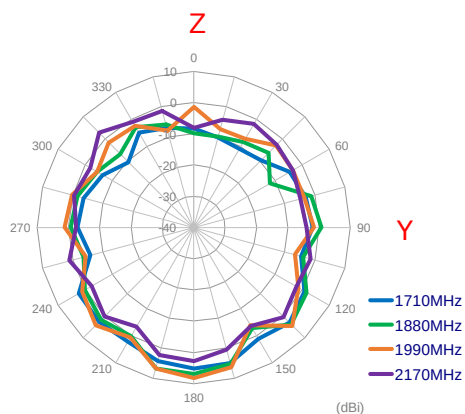
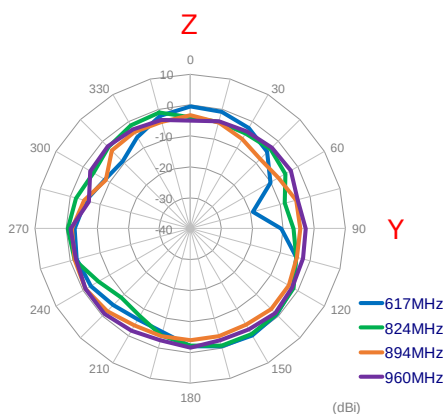
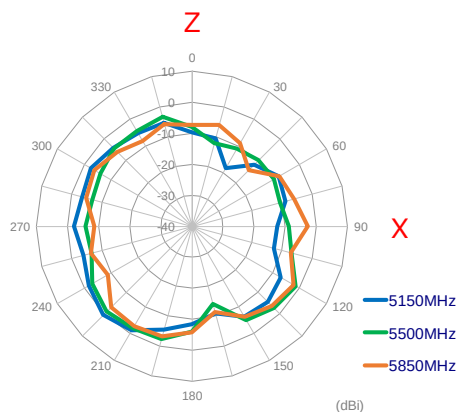
X-Y Plane

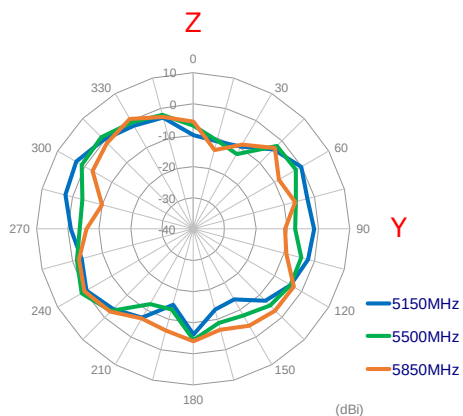




X-Z Plane

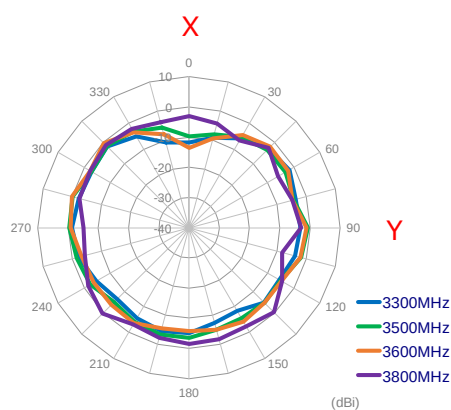
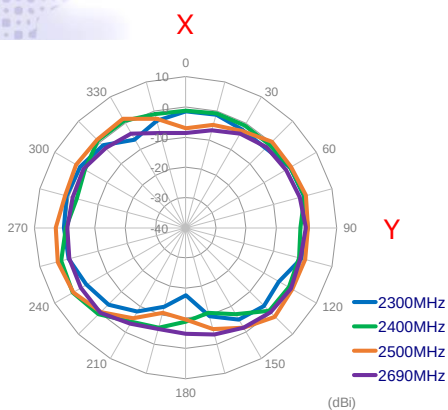
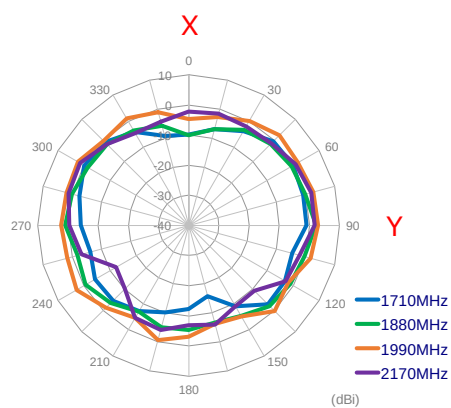
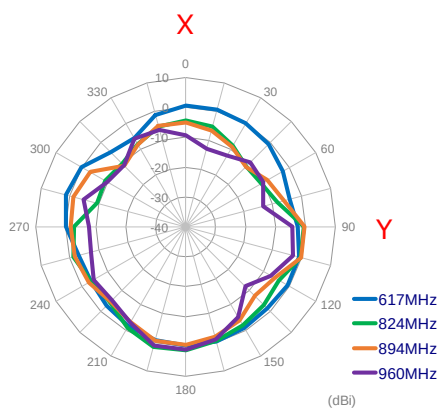


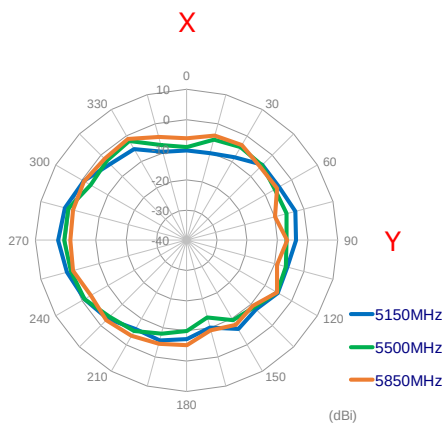




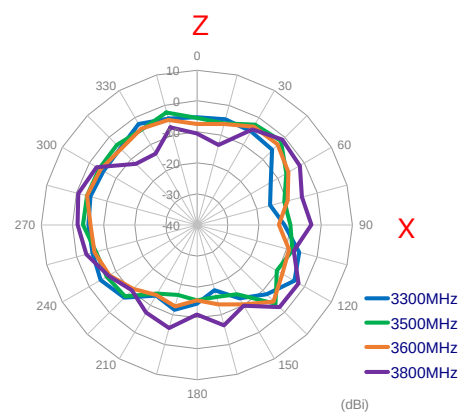
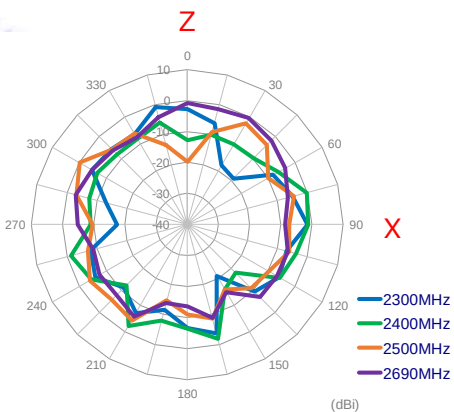
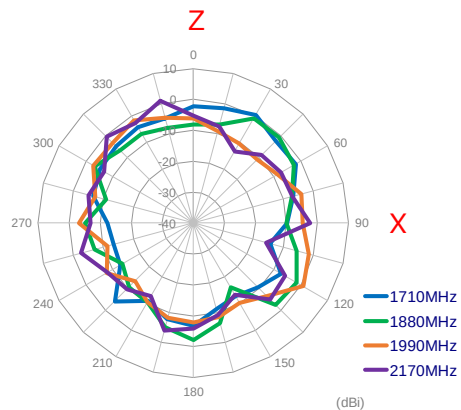
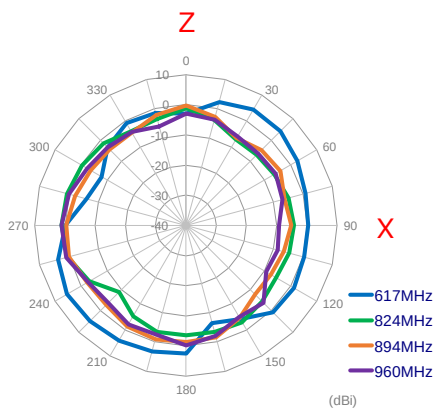
Free Space – LTE 2

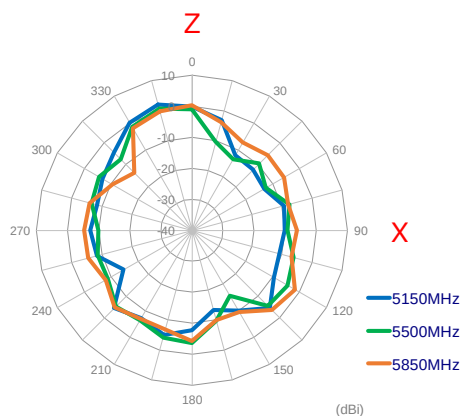
X-Y Plane



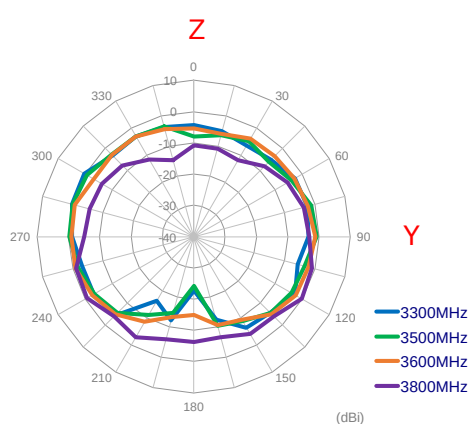
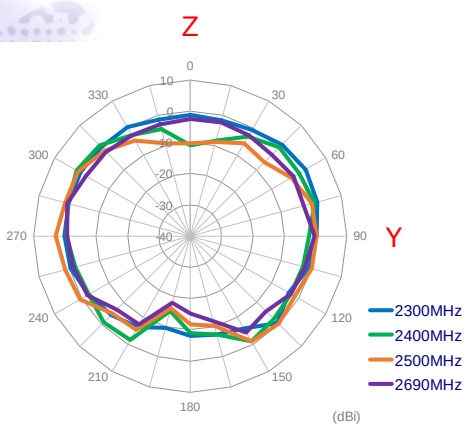
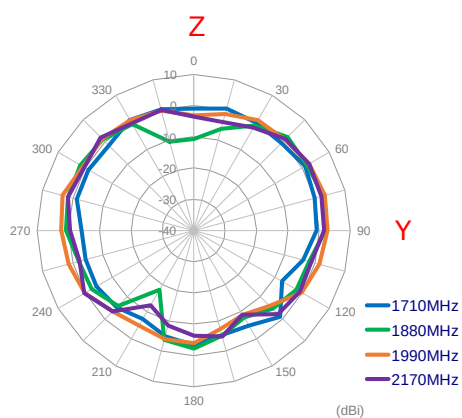
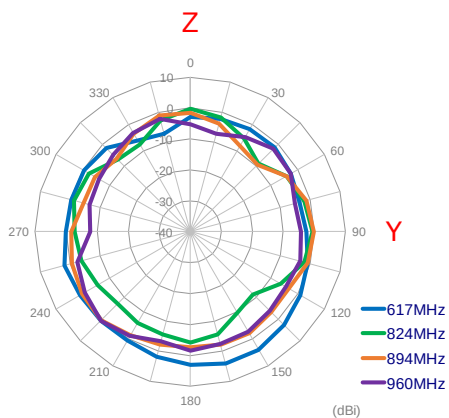


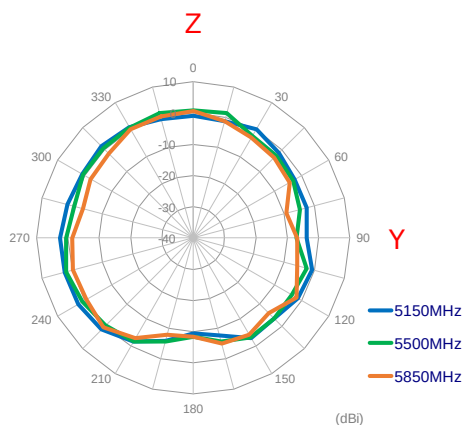
X-Z Plane





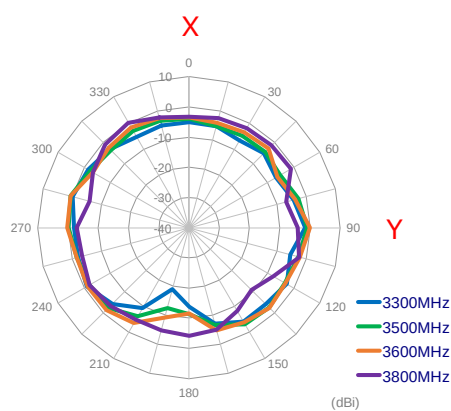
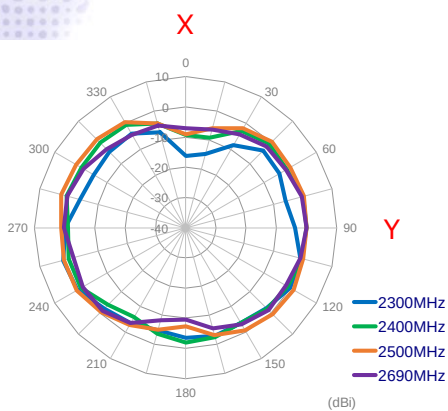
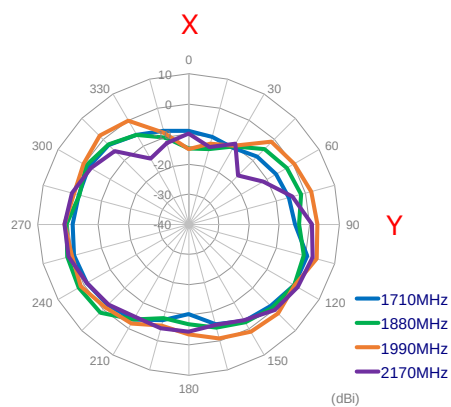
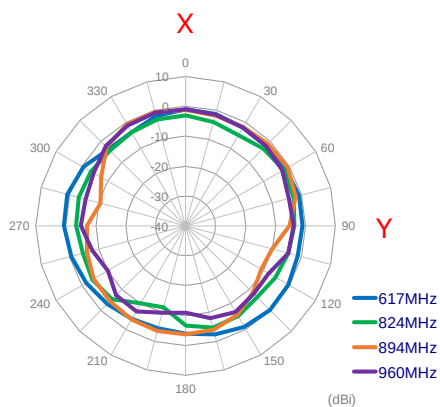
Y-Z Plane

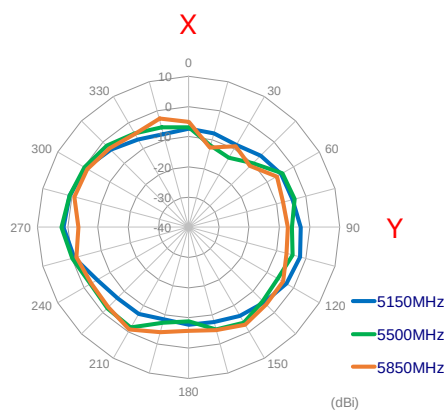




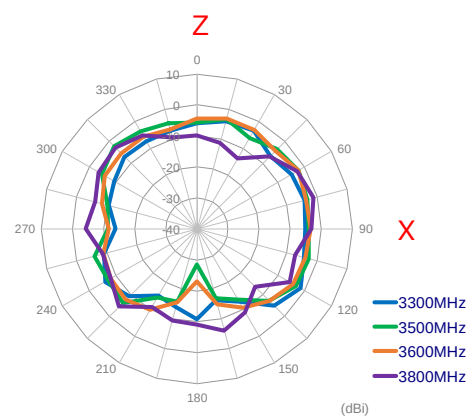
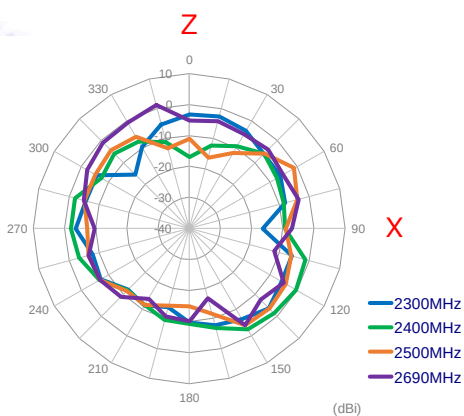
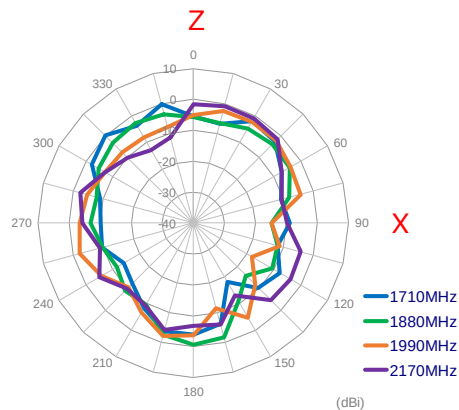
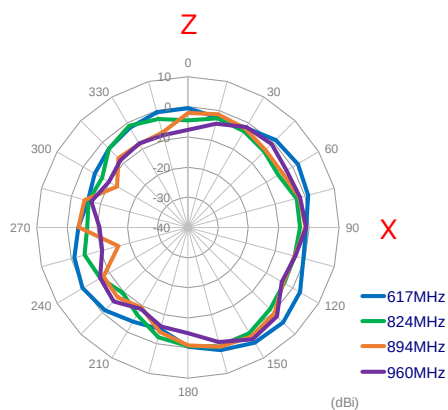
Free Space – LTE 3

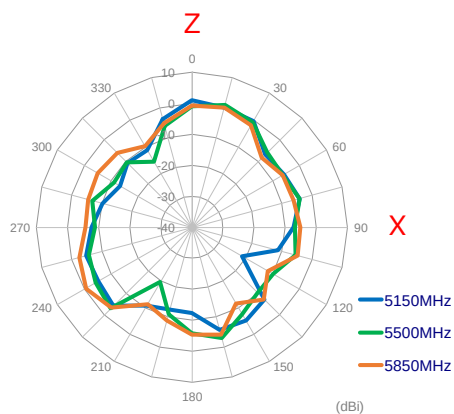
X-Y Plane



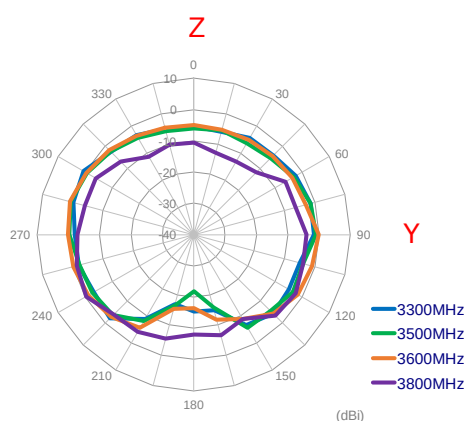
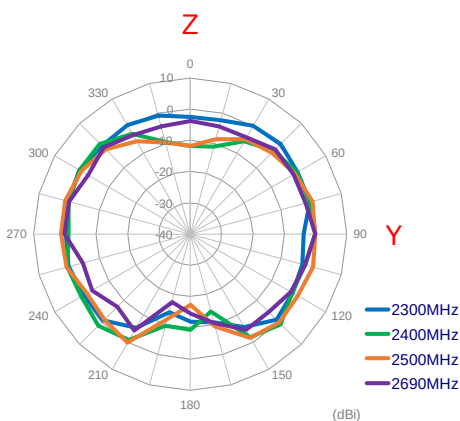
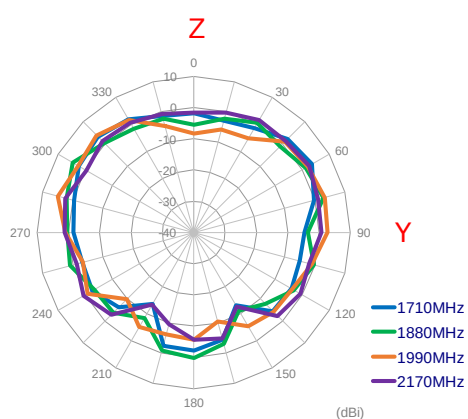
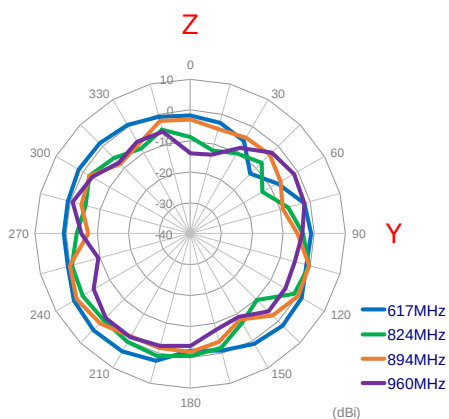


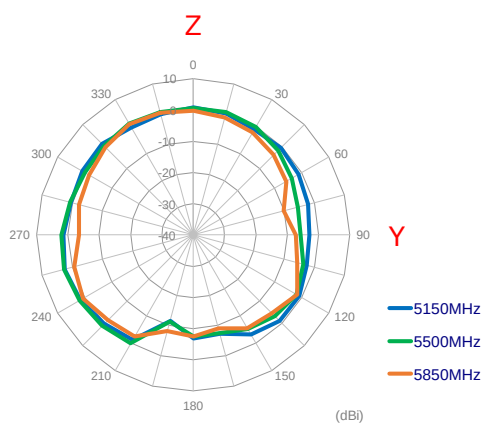
X-Z Plane





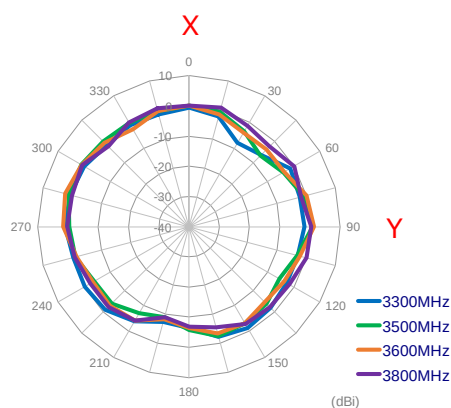
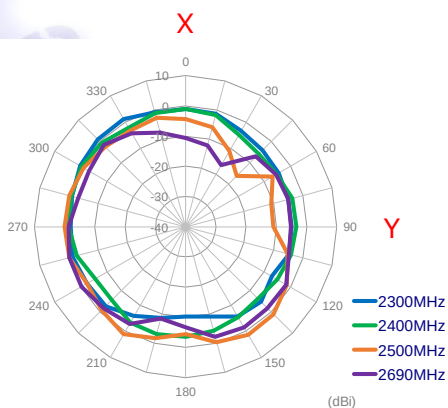
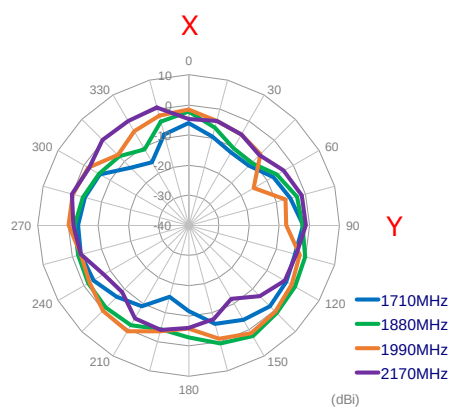
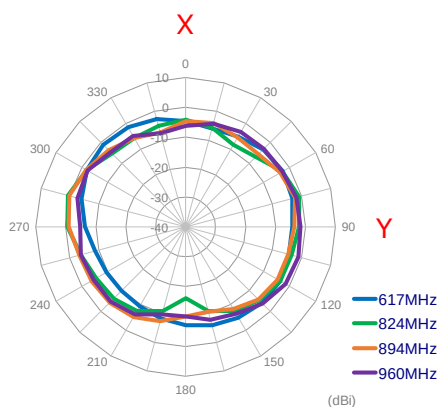
Y-Z Plane

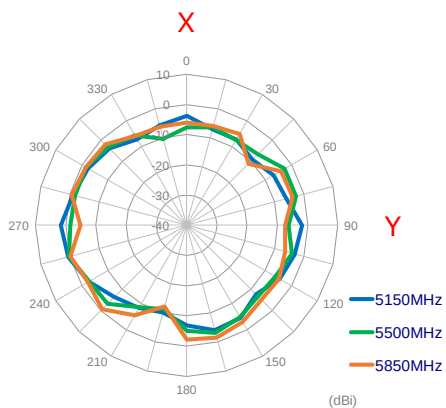




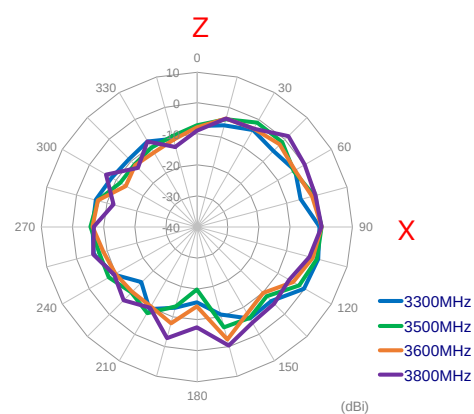
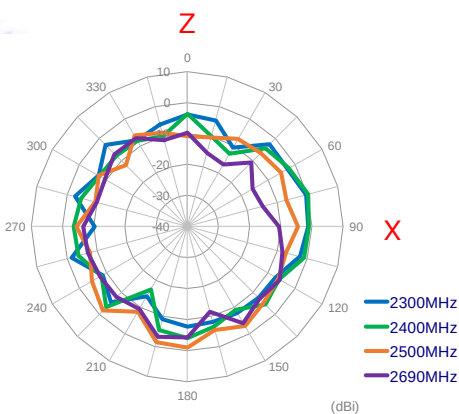
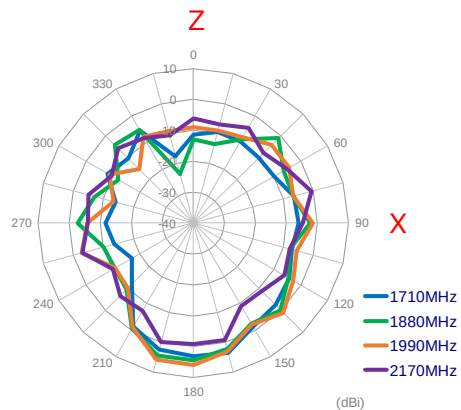
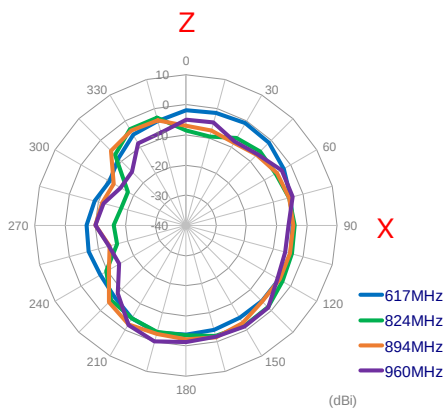
Free Space – LTE 4

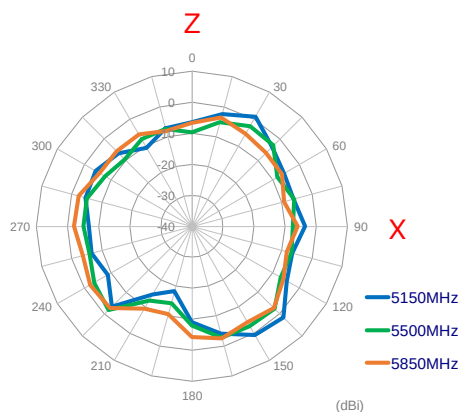
X-Y Plane



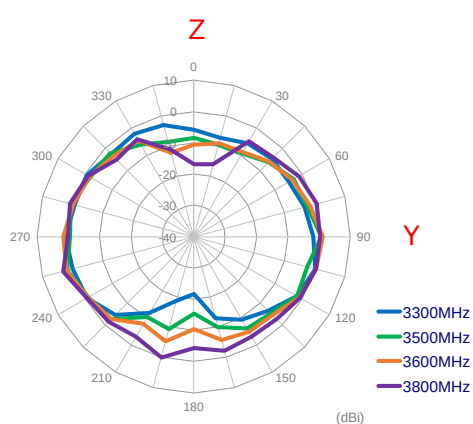
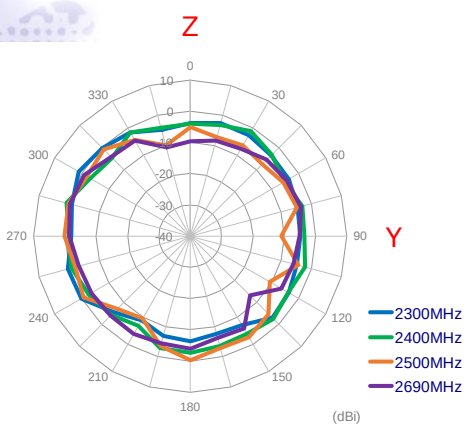
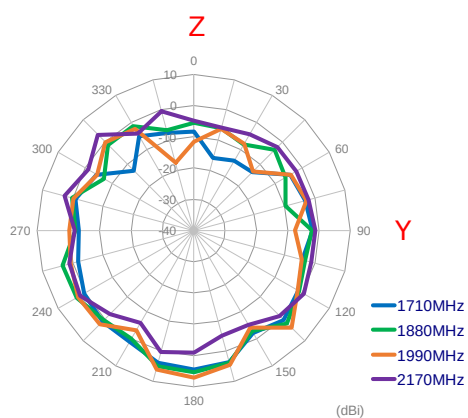
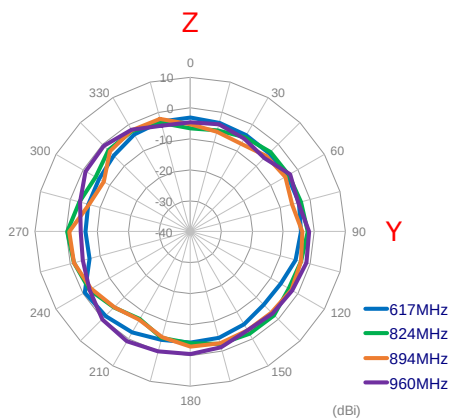


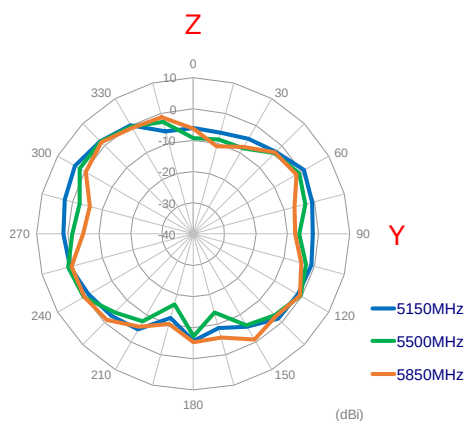
X-Z Plane





Y-Z Plane

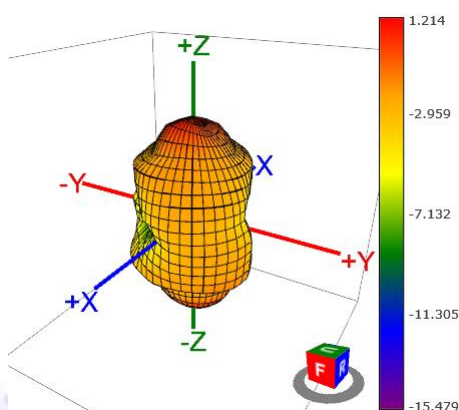




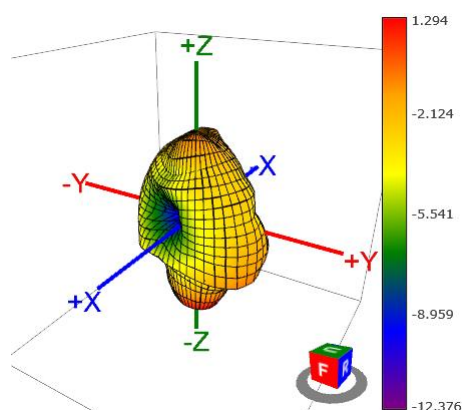
V. 3D Radiation Pattern:

GNSS

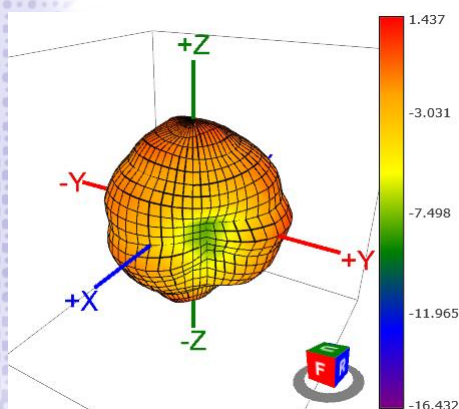
1561MHz



1575.42MHz

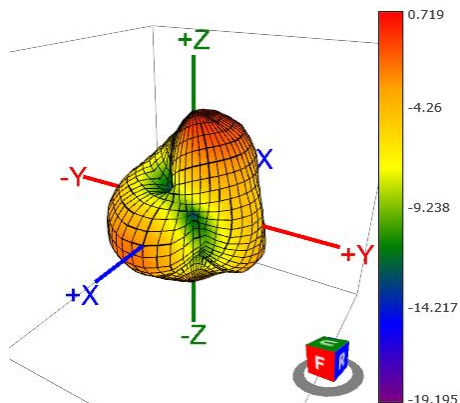


1602MHz

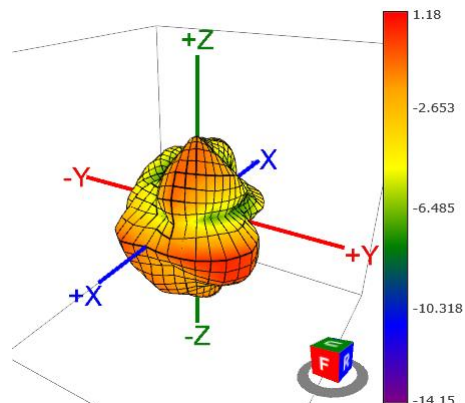


Free Space – LTE 1

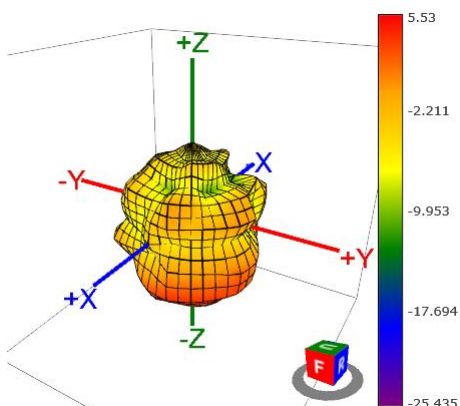
617MHz



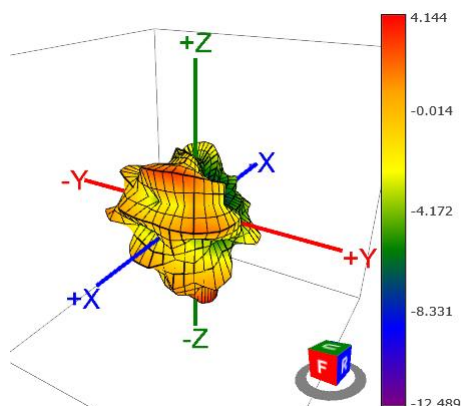
960MHz



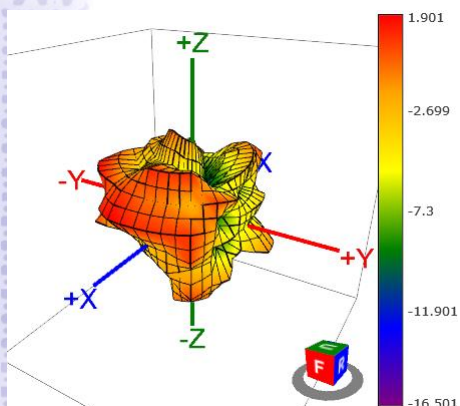
1710MHz



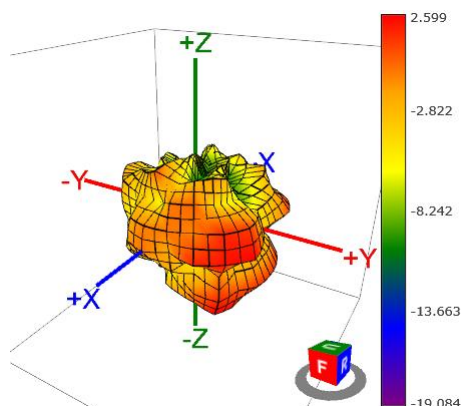
2170MHz



2300MHz

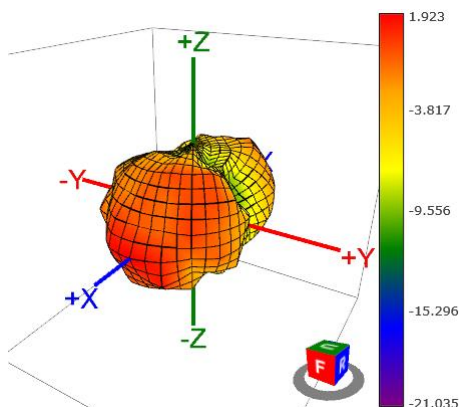


2690MHz

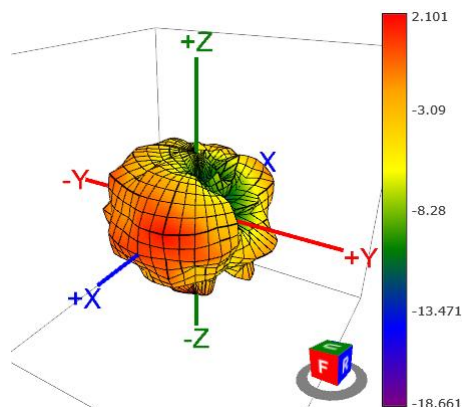


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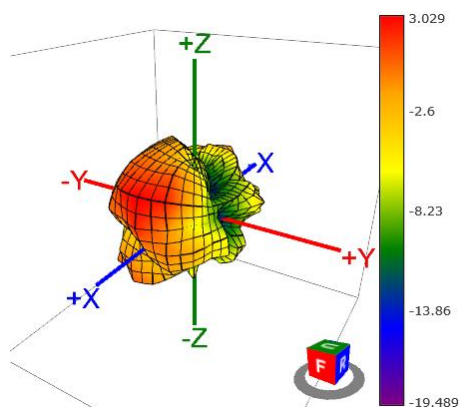
3300MHz



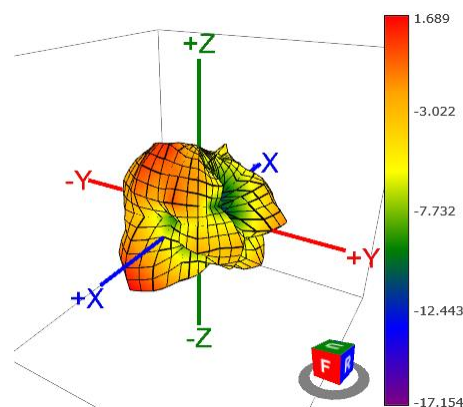
3800MHz



5150MHz

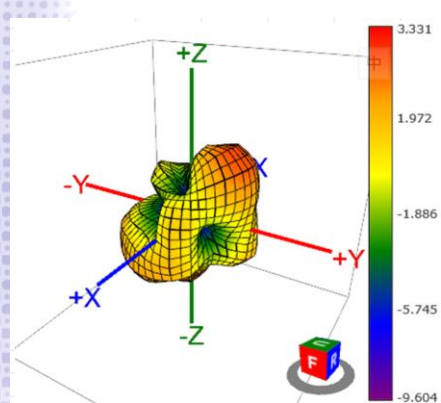


5850MHz

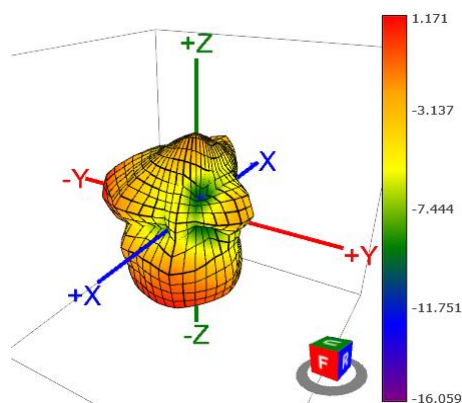


Free Space - LTE 2

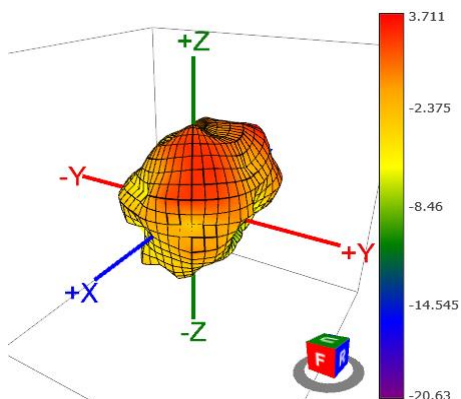
617MHz



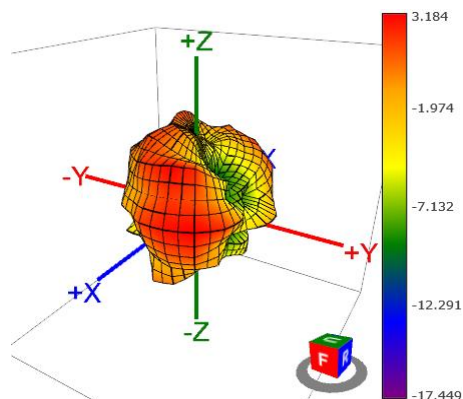
960MHz



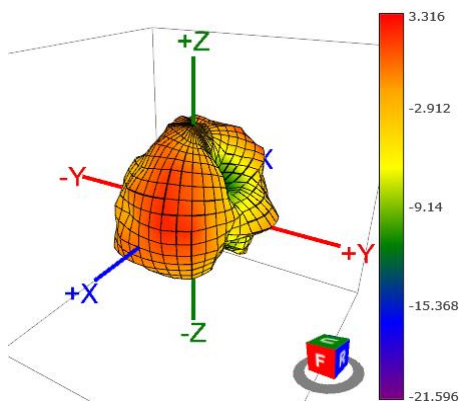
1710MHz



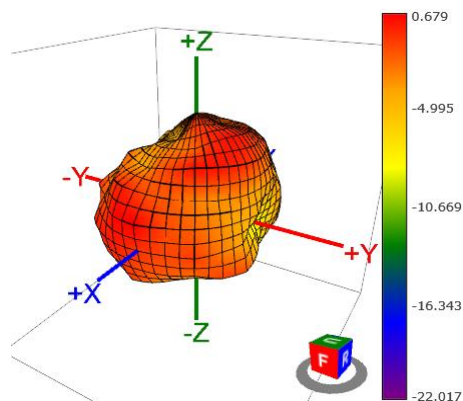
2170MHz



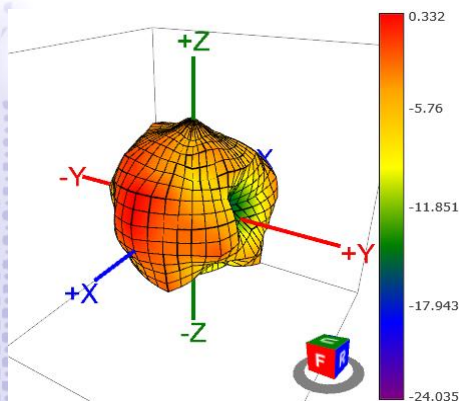
2300MHz



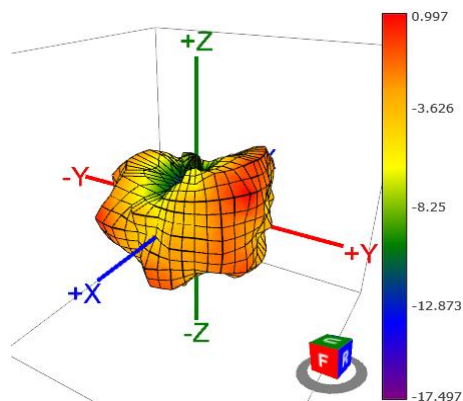
2690MHz



3300MHz

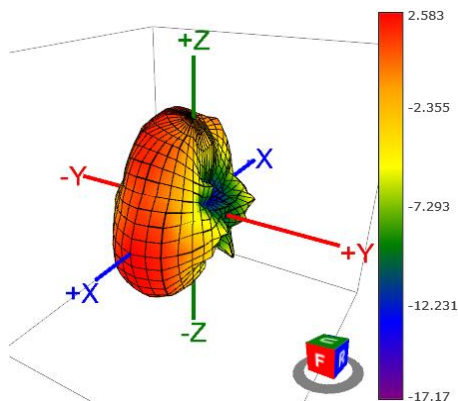


3800MHz

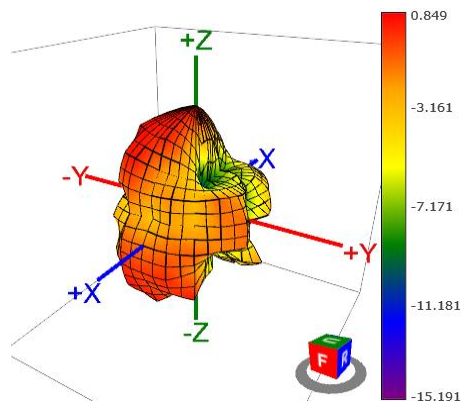


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5150MHz

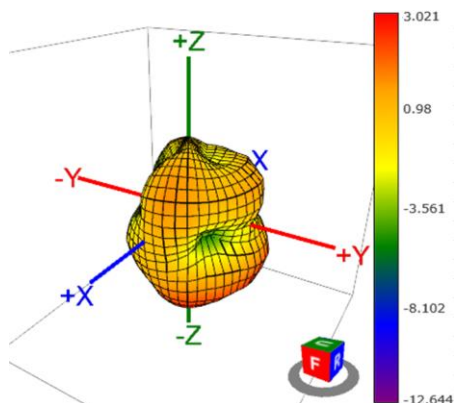


5850MHz

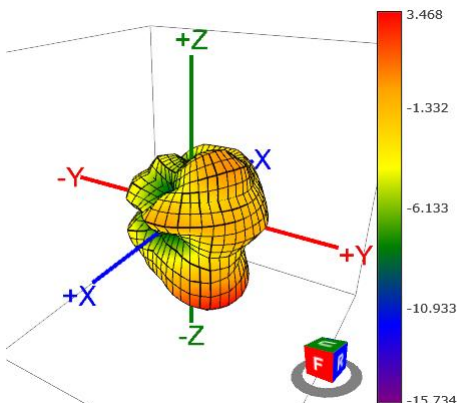


Free Space - LTE 3

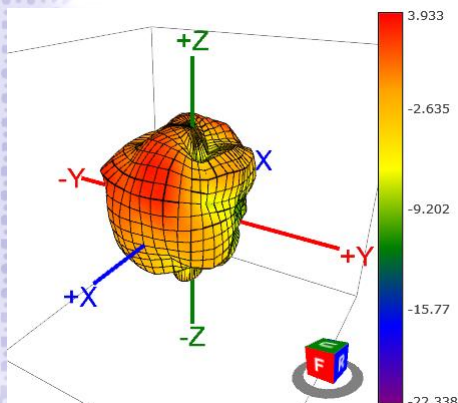
617MHz



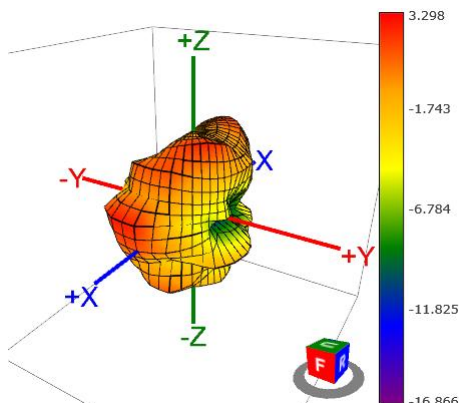
960MHz



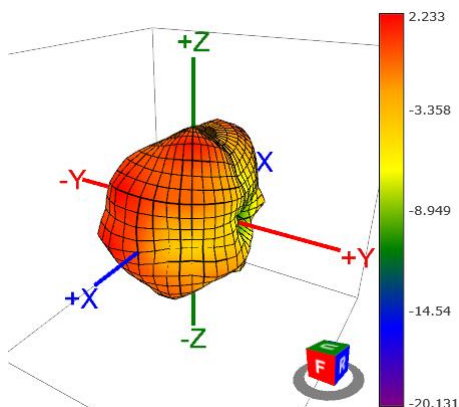
1710MHz



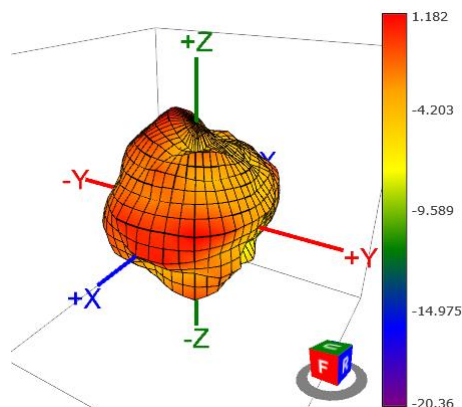
2170MHz



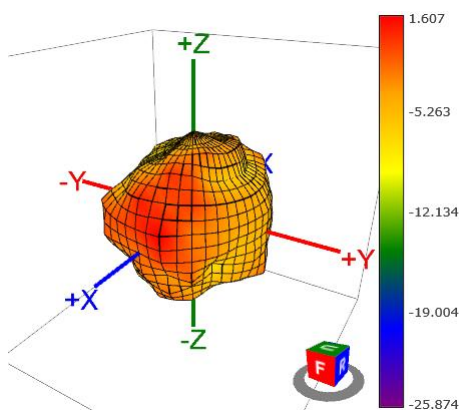
2300MHz



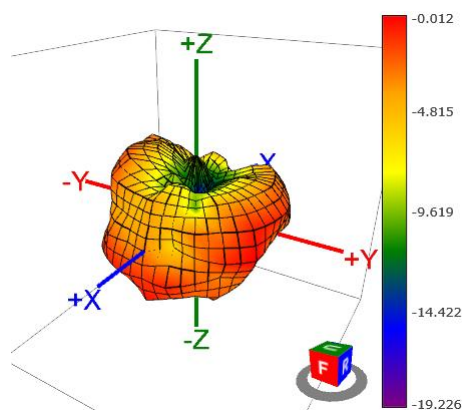
2690MHz



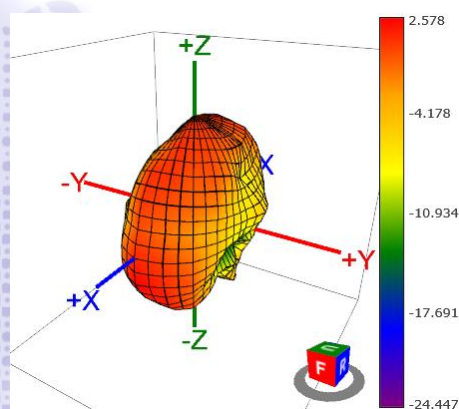
3300MHz



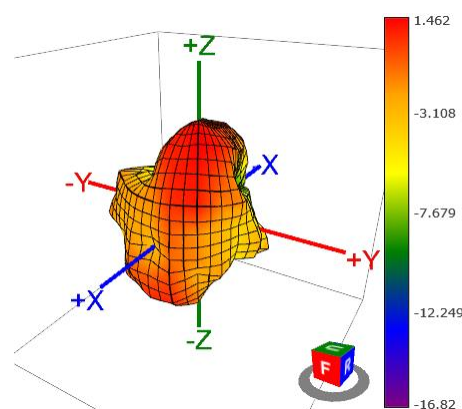
3800MHz



5150MHz



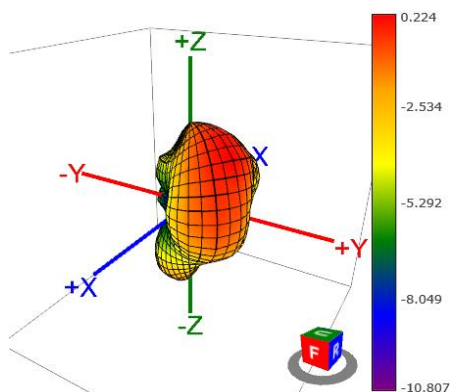
5850MHz



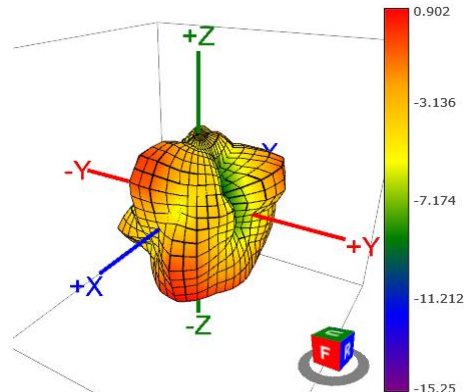
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Free Space – LTE 4

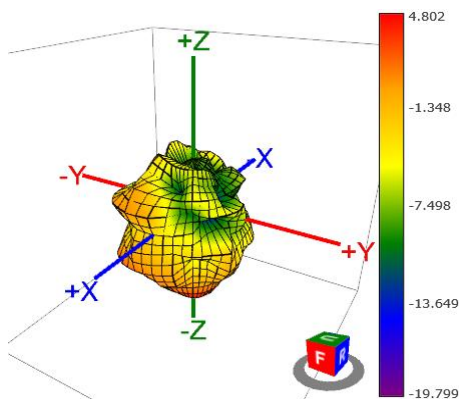
617MHz



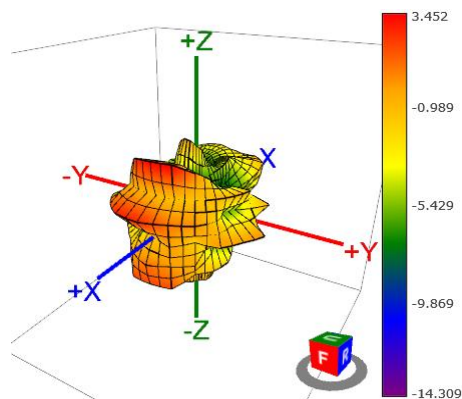
960MHz



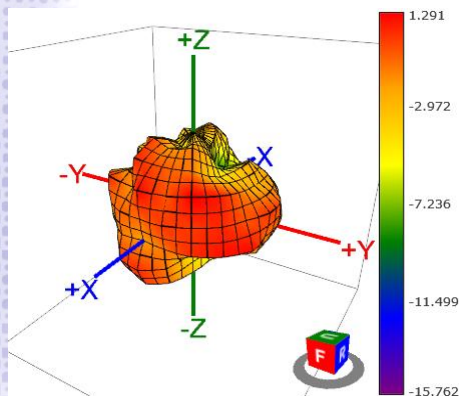
1710MHz



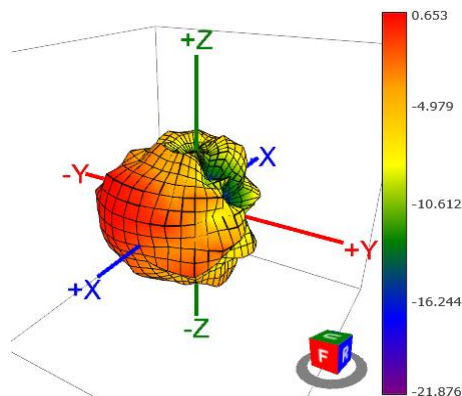
2170MHz



2300MHz

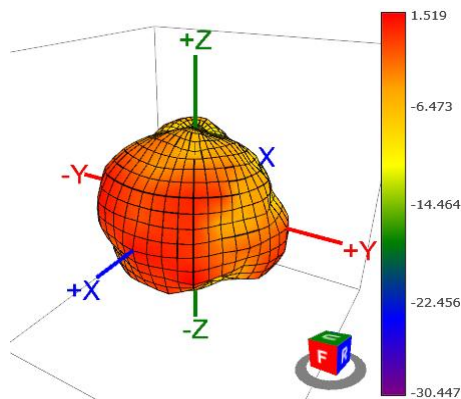


2690MHz

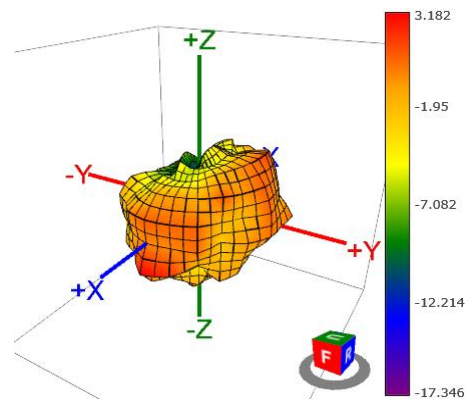


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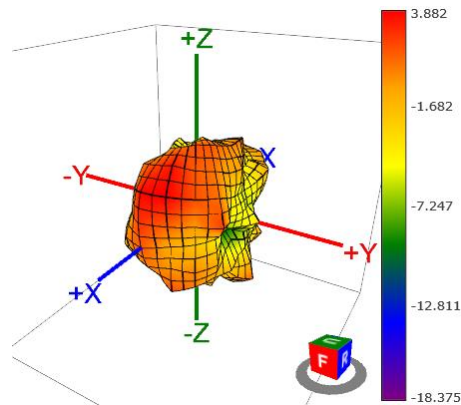
3300MHz



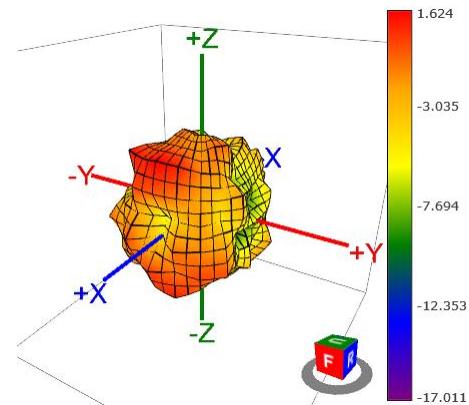
3800MHz



5150MHz

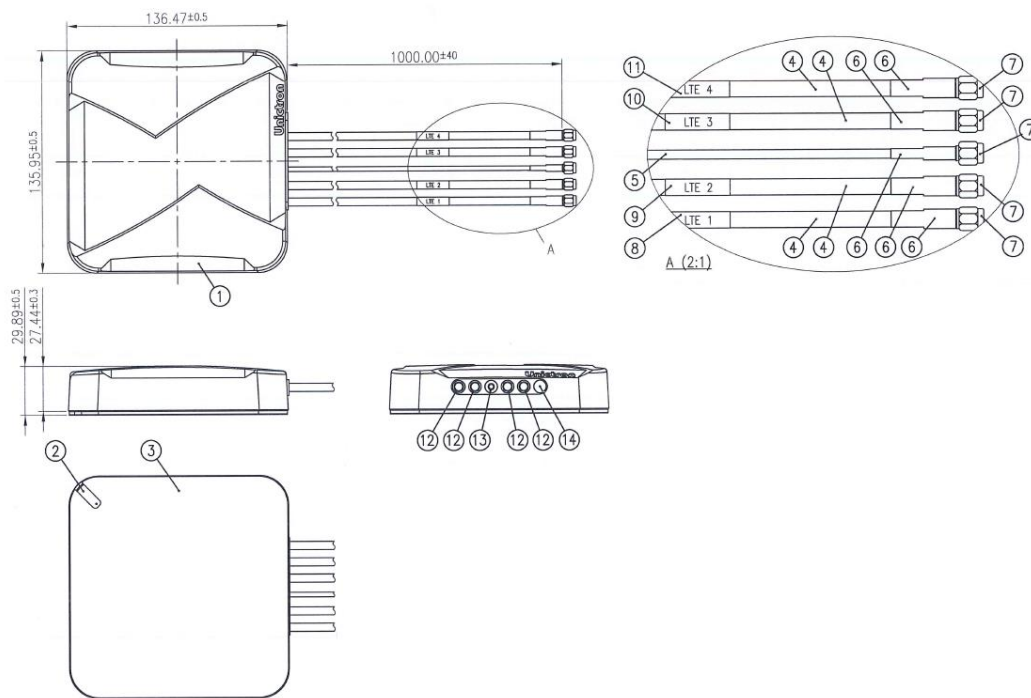


5850MHz



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VI. Mechanical Drawing (Unit:mm):



14	Rubber Stopper	Silicone	Black	1
13	Ø2.80 Cable Rubber	Silicone	Black	1
12	Ø4.95 Cable Rubber	Silicone	Black	4
11	LTE 4 Heat Shrink Tube	CTMS	White	1
10	LTE 3 Heat Shrink Tube	CTMS	White	1
9	LTE 2 Heat Shrink Tube	CTMS	White	1
8	LTE 1 Heat Shrink Tube	CTMS	White	1
7	SMA(M) Connector	Brass	Au Plated	5
6	Heat Shrink Tube	EVA	Black	5
5	Cable H100	PVC	Black	1
4	Cable SNC200	PVC	Black	4
3	Double Adhesive Foam	EVA	White Liner	1
2	Bottom Housing	PC+ABS	Black	1
1	Top Housing	PC+ABS	Black	1
No	NAME	MATERIAL	FINISH	Q'TY

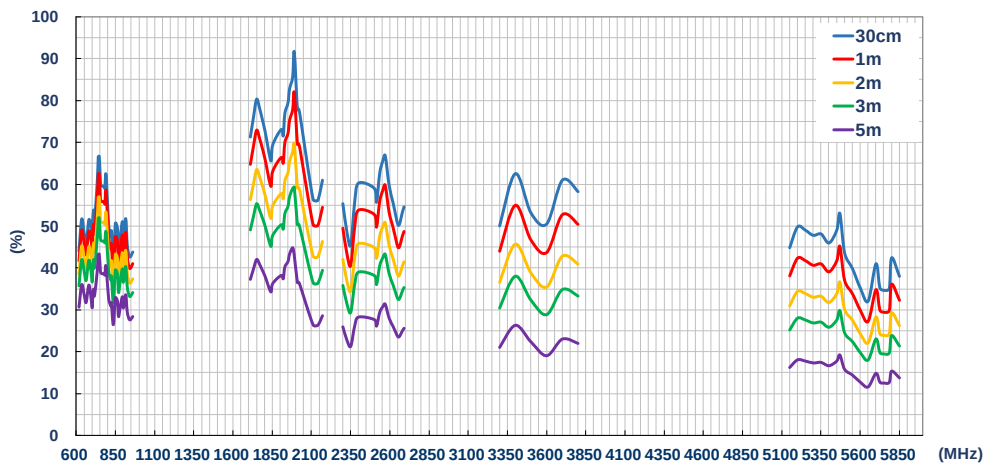
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VII. Applications Note:

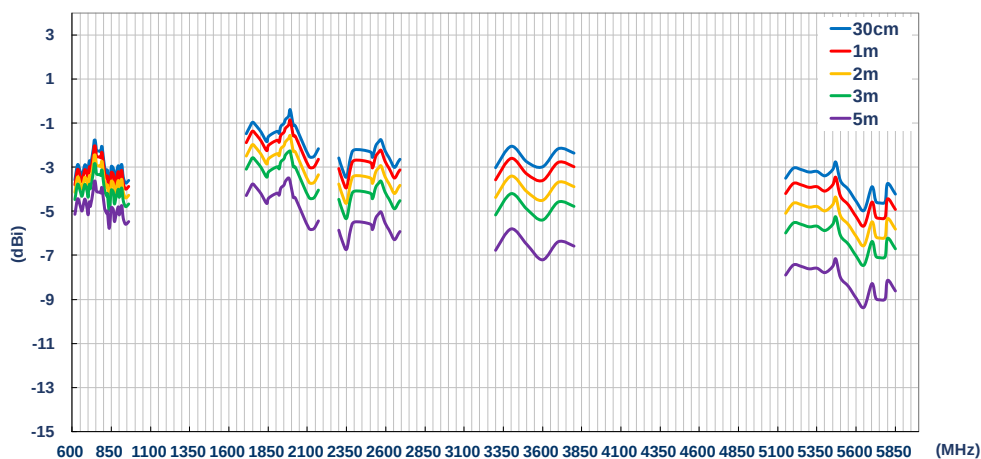
The antenna performance with different cable lengths is shown below.

Free Space – LTE 1

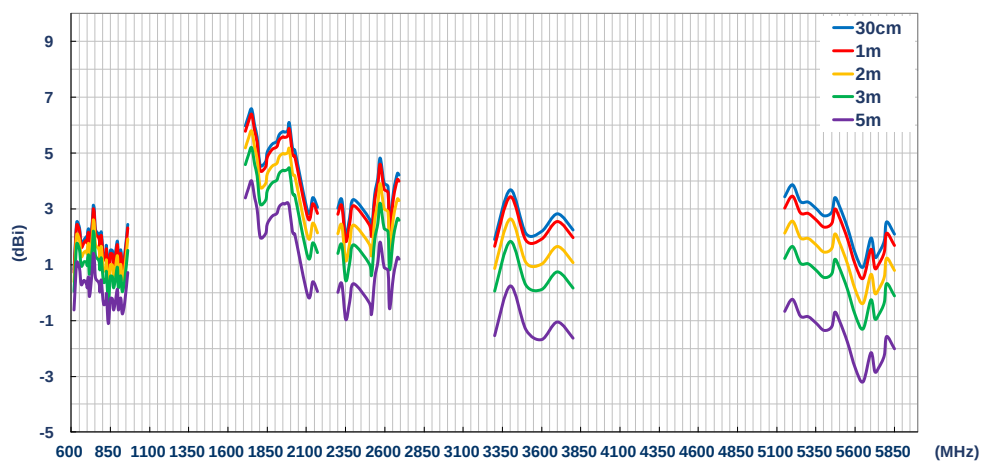
Efficiency (%)



Average Gain (dBi)



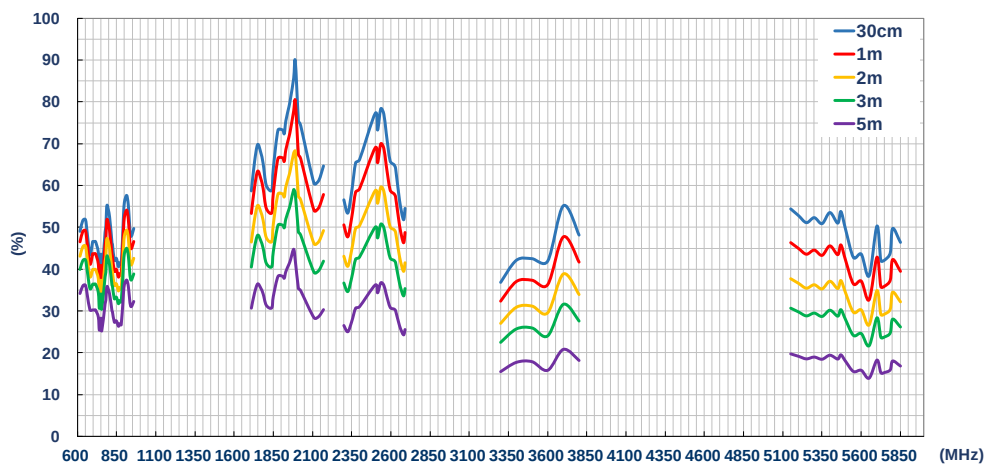
Peak Gain (dBi)



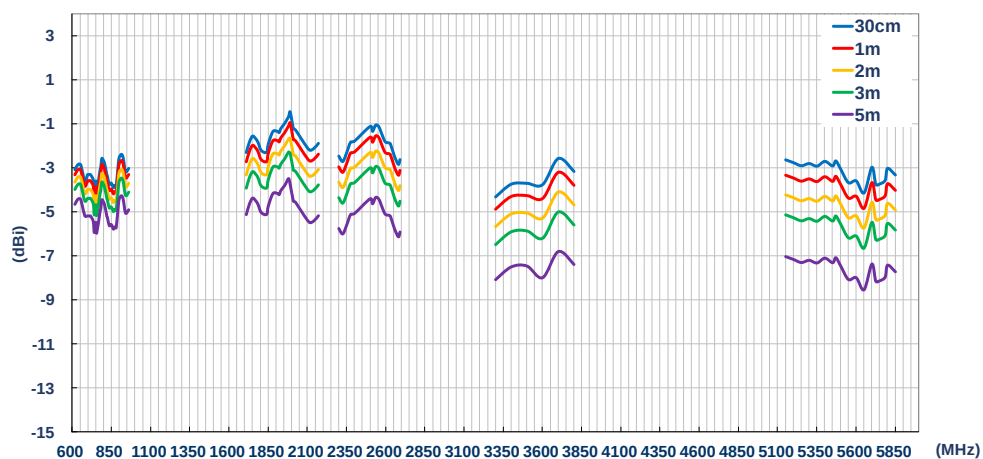
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Free Space – LTE 2

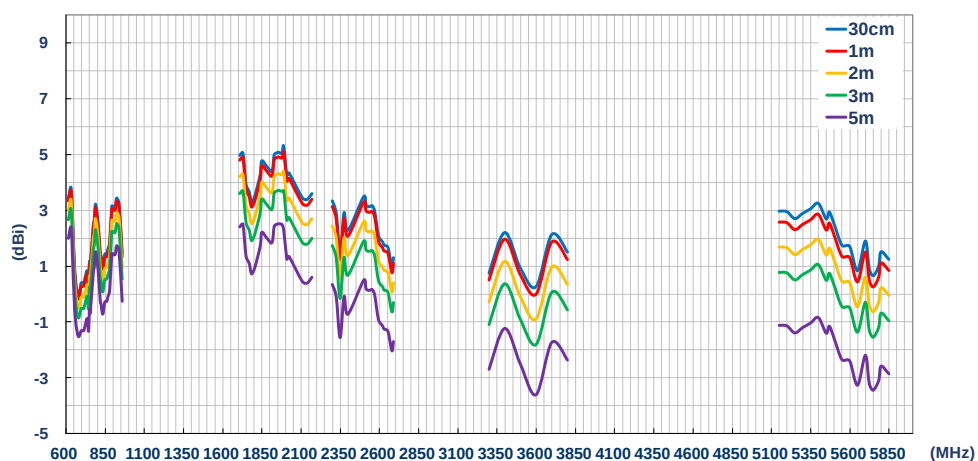
Efficiency (%)



Average Gain (dBi)



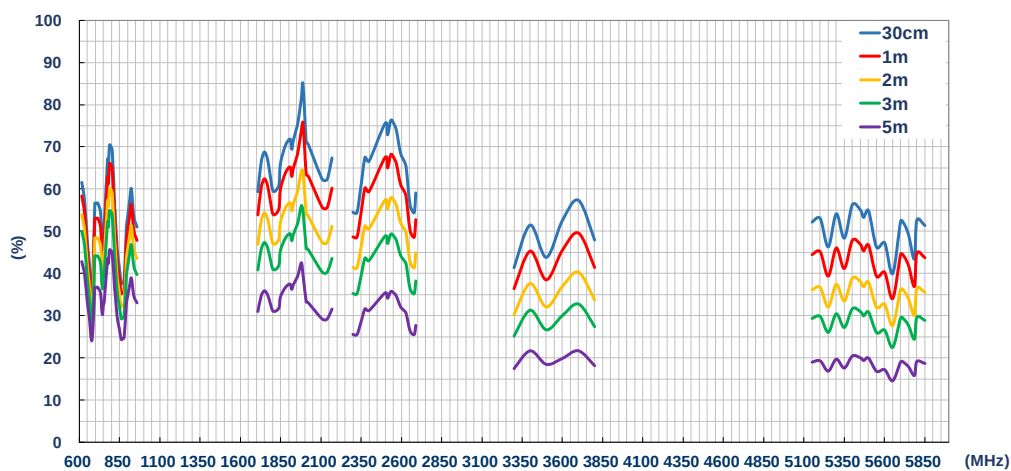
Peak Gain (dBi)



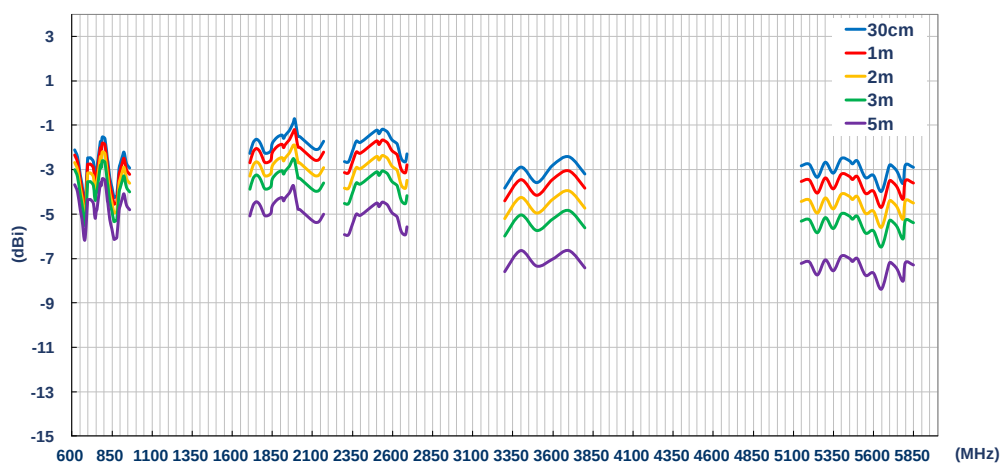
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Free Space – LTE 3

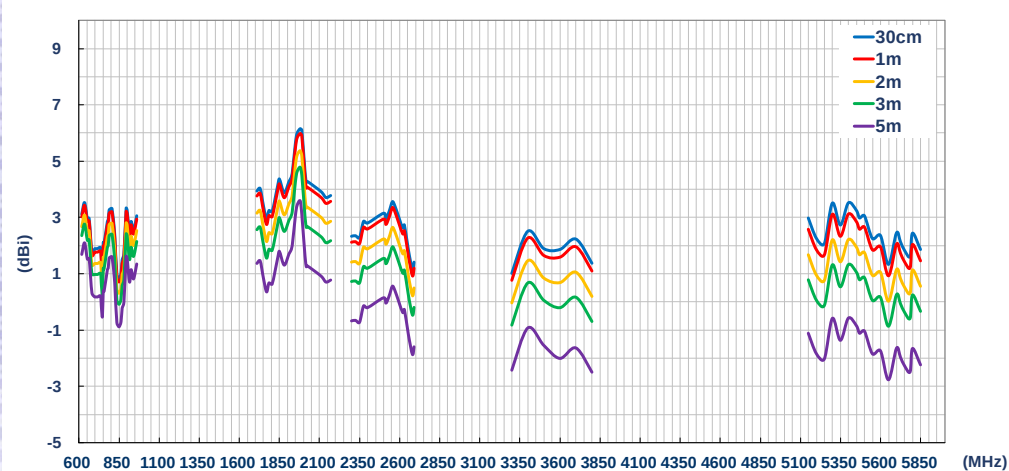
Efficiency (%)



Average Gain (dBi)



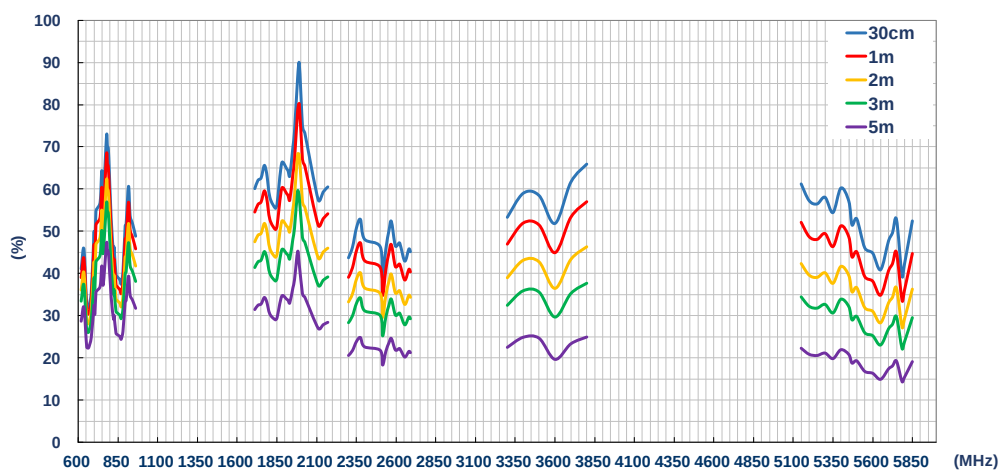
Peak Gain (dBi)



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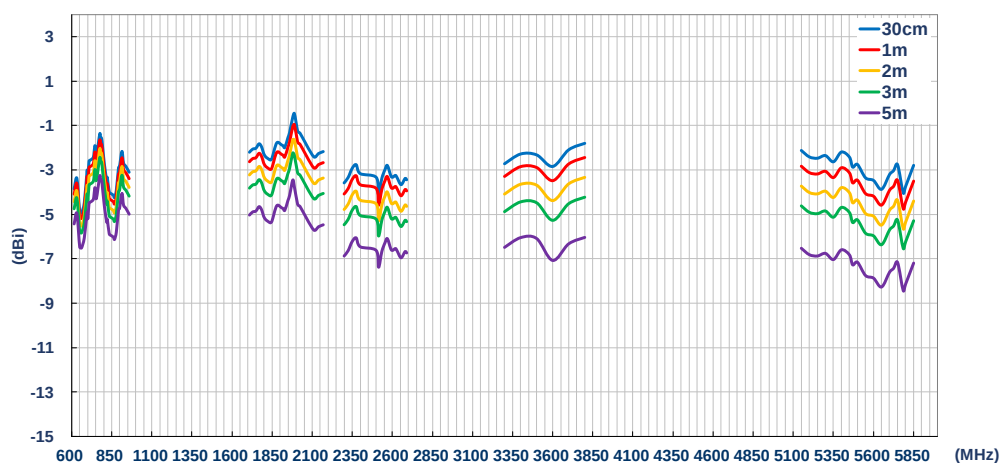
Free Space – LTE 4

Efficiency (%)



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Average Gain (dBi)



Peak Gain (dBi)

