



**Product Name:** 15 Series\_ 6 in 1 Adhesive Mount Combination Antenna

**Part Number:** MT-15B-AS-BLLWWW01

**Features:**

- 2\*LTE, 3\*WiFi, 1\*GNSS Antenna Combination
- LTE 698-960MHz, 1710-2170MHz, 2300-2690MHz, 3300-3800MHz 5150-5925MHz Supporting
- WiFi Dual Bands, 2400-2500MHz, 5150-5850MHz Supporting
- GPS / GLONASS / BEIDOU / GALILEO / QZSS / SBAS L1 Bands
- Adhesive Mounting, Direct Stick on Target Plate
- Customizable Cables and Connectors
- RoHS & REACH Compliant

**Applications:**

- Vehicle Communication
- IoT Application

# 6 in 1 Adhesive Mount Combination Antenna

**MODEL: MT-15B-AS-BLLWWW01**

**WI-RD-D-215 V1.1**

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## I. Specifications:

Category	Specifications		
<b>GNSS Electrical Characteristics</b>			
<b>Application Band</b>	BeiDou	GPS	GLONASS
<b>Frequency (MHz)</b>	1561	1575.42	1602
<b>Efficiency (%)</b>	49.89	42.76	58.61
<b>Average Gain (dBi)</b>	-3.02	-3.69	-2.32
<b>Peak Gain (dBi)</b>	1.21	1.21	1.44
<b>Active Antenna Performance</b>			
<b>Application band</b>	BeiDou	GPS	GLONASS
<b>Frequency (MHz)</b>	1561 ± 2.046MHz	1575.42 ± 1.023MHz	1602 ± 5MHz
<b>Gain (dB)</b>	27	27	27
<b>Noise Figure (dB)</b>	0.98	0.98	0.92
<b>Current Consumption</b>	9.0mA (typical)		
<b>Output Impedance (Ω)</b>	50		
<b>GNSS _Out Of Band Rejection</b>			
<b>Frequency (MHz)</b>	600~1300	1300~1530	1650~3000
<b>Gain (dB)</b>	55	30	30
<b>ESD Protection</b>			
<b>Contact (KV)</b>	± 8		
<b>Air (KV)</b>	± 15		

Passive Antenna Performance									
<b>V.S.W.R</b>		< 2							
<b>Return loss (dB)</b>		< -10							
<b>Impedance (<math>\Omega</math>)</b>		50							
<b>Polarization</b>		R.H.C.P. (Right Handed Circular Polarization)							
<b>Cable</b>		H-100							
<b>Connector</b>		SMA (Male)							
Category		LTE MIMO1							
Application Band	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE2600	5G NR Band	5G NR Band	
Frequency (MHz)	698 ~ 824	824 ~ 960	1710 ~ 1880	1850 ~ 1990	1920 ~ 2170	2300 ~ 2690	3300 ~ 3800	5150 ~ 5925	
Efficiency (%)									
Free Space	30cm	45.72	55.91	66.24	76.72	73.49	71.50	67.05	56.61
	1M	44.47	54.23	63.55	73.55	70.23	67.66	62.52	50.34
	2M	40.56	48.99	55.35	63.89	60.35	56.27	49.50	34.03
	3M	36.99	44.25	48.21	55.51	51.86	46.81	39.19	23.01
	5M	30.77	36.11	36.57	41.89	38.30	32.38	24.56	10.52
Average Gain (dBi)									
Free Space	30cm	-3.40	-2.53	-1.79	-1.15	-1.34	-1.46	-1.74	-2.47
	1M	-3.52	-2.66	-1.97	-1.33	-1.54	-1.70	-2.04	-2.98
	2M	-3.92	-3.10	-2.57	-1.95	-2.19	-2.50	-3.05	-4.68
	3M	-4.32	-3.54	-3.17	-2.56	-2.85	-3.30	-4.07	-6.38
	5M	-5.12	-4.42	-4.37	-3.78	-4.17	-4.90	-6.10	-9.78
Peak Gain (dBi)									
Free Space	30cm	2.52	2.89	3.75	4.71	4.71	3.50	5.05	4.13
	1M	2.40	2.74	3.57	4.53	4.53	3.26	4.78	3.62
	2M	2.00	2.24	2.97	3.93	3.93	2.46	3.88	1.92
	3M	1.60	1.74	2.37	3.33	3.33	1.66	2.98	0.22
	5M	0.80	0.74	1.17	2.13	2.13	0.06	1.18	-3.18

<b>V.S.W.R</b>		< 3							
<b>Return Loss (dB)</b>		< -6							
<b>Impedance (<math>\Omega</math>)</b>		50							
<b>Polarization</b>		Linear							
<b>Cable</b>		SNC-200							
<b>Connector</b>		SMA (Male)							
<b>Category</b>		<b>LTE MIMO2</b>							
<b>Application Band</b>	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE2600	5G NR Band	5G NR Band	
<b>Frequency (MHz)</b>	698 ~ 824	824 ~ 960	1710 ~ 1880	1850 ~ 1990	1920 ~ 2170	2300 ~ 2690	3300 ~ 3800	5150 ~ 5925	
<b>Efficiency (%)</b>									
<b>Free Space</b>	<b>30cm</b>	41.35	53.11	66.94	75.16	73.72	58.93	60.06	62.70
	<b>1M</b>	40.22	51.51	64.22	72.06	70.44	55.76	55.99	55.76
	<b>2M</b>	36.68	46.53	55.93	62.60	60.53	46.38	44.33	37.70
	<b>3M</b>	33.45	42.03	48.72	54.38	52.02	38.58	35.10	25.49
	<b>5M</b>	27.83	34.30	36.95	41.04	38.41	26.69	22.00	11.65
<b>Average Gain (dBi)</b>									
<b>Free Space</b>	<b>30cm</b>	-3.84	-2.75	-1.74	-1.24	-1.32	-2.30	-2.21	-2.03
	<b>1M</b>	-3.96	-2.88	-1.92	-1.42	-1.52	-2.54	-2.52	-2.54
	<b>2M</b>	-4.36	-3.32	-2.52	-2.03	-2.18	-3.34	-3.53	-4.24
	<b>3M</b>	-4.76	-3.76	-3.12	-2.65	-2.84	-4.14	-4.55	-5.94
	<b>5M</b>	-5.56	-4.65	-4.32	-3.87	-4.16	-5.74	-6.58	-9.34
<b>Peak Gain (dBi)</b>									
<b>Free Space</b>	<b>30cm</b>	2.45	6.96	3.69	4.61	4.61	4.75	4.18	4.66
	<b>1M</b>	2.33	6.81	3.51	4.40	4.40	4.51	3.91	4.15
	<b>2M</b>	1.93	6.31	2.91	3.70	3.70	3.71	3.01	2.45
	<b>3M</b>	1.53	5.81	2.31	3.09	3.09	2.91	2.11	0.75
	<b>5M</b>	0.73	4.81	1.11	1.89	1.89	1.31	0.31	-2.65
<b>V.S.W.R</b>		< 3							
<b>Return Loss (dB)</b>		< -6							
<b>Impedance (<math>\Omega</math>)</b>		50							

<b>Polarization</b>	Linear							
<b>Cable</b>	SNC-200							
<b>Connector</b>	SMA (Male)							
<b>Category</b>	WiFi MIMO1							
<b>Frequency (MHz)</b>	2400	2450	2500	5150	5350	5750	5850	
<b>Efficiency (%)</b>								
<b>Free Space</b>	<b>30cm</b>	64.65	54.90	44.94	77.97	87.28	97.48	75.32
	<b>1M</b>	54.08	45.92	37.58	53.33	59.70	66.68	51.52
	<b>2M</b>	44.98	38.19	31.26	36.06	40.36	45.08	34.83
	<b>3M</b>	37.41	31.77	26.00	24.38	27.29	30.48	23.55
	<b>5M</b>	25.88	21.98	17.99	11.14	12.47	13.93	10.76
<b>Average Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	-1.89	-2.60	-3.47	-1.08	-0.59	-0.11	-1.23
	<b>1M</b>	-2.67	-3.38	-4.25	-2.73	-2.24	-1.76	-2.88
	<b>2M</b>	-3.47	-4.18	-5.05	-4.43	-3.94	-3.46	-4.58
	<b>3M</b>	-4.27	-4.98	-5.85	-6.13	-5.64	-5.16	-6.28
	<b>5M</b>	-5.87	-6.58	-7.45	-9.53	-9.04	-8.56	-9.68
<b>Peak Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	2.80	3.85	3.76	6.59	6.96	5.58	4.75
	<b>1M</b>	2.02	3.07	2.98	4.94	5.31	3.93	3.10
	<b>2M</b>	1.22	2.27	2.18	3.24	3.61	2.23	1.40
	<b>3M</b>	0.42	1.47	1.38	1.54	1.91	0.53	-0.30
	<b>5M</b>	-1.18	-0.13	-0.22	-1.86	-1.49	-2.87	-3.70
<b>V.S.W.R</b>	< 3							
<b>Return Loss (dB)</b>	< -6							
<b>Impedance (<math>\Omega</math>)</b>	50							
<b>Polarization</b>	Linear							
<b>Cable</b>	SNC-200							
<b>Connector</b>	SMA (Male)							

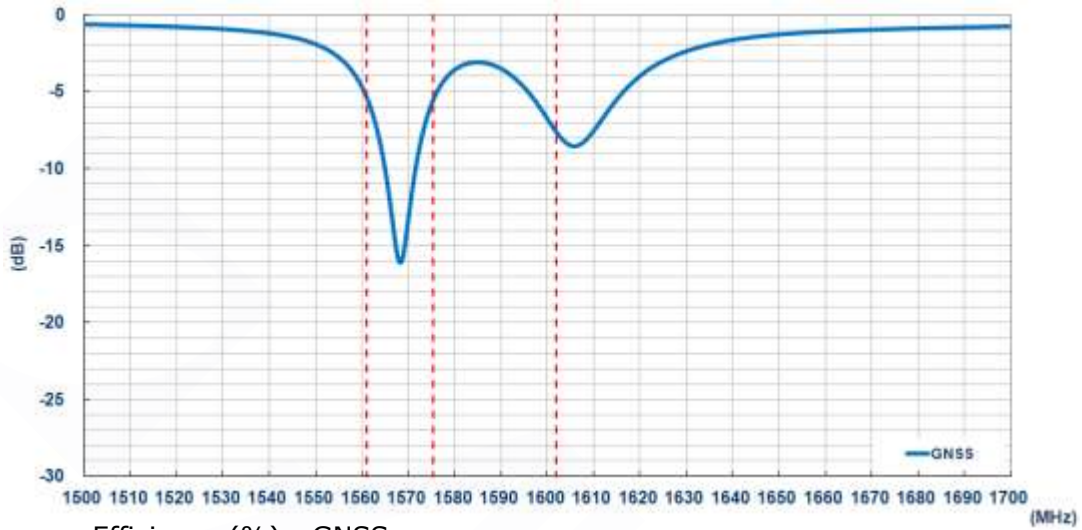
Category		WiFi MIMO2						
Frequency (MHz)		2400	2450	2500	5150	5350	5750	5850
<b>Efficiency (%)</b>								
<b>Free Space</b>	<b>30cm</b>	72.54	61.46	60.48	76.72	93.09	93.73	71.76
	<b>1M</b>	60.67	51.40	50.58	52.48	63.68	64.12	49.09
	<b>2M</b>	50.47	42.76	42.07	35.48	43.05	43.35	33.19
	<b>3M</b>	41.98	35.56	34.99	23.99	29.11	29.31	22.44
	<b>5M</b>	29.04	24.60	24.21	10.96	13.30	13.40	10.26
<b>Average Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	-1.39	-2.11	-2.18	-1.15	-0.31	-0.28	-1.44
	<b>1M</b>	-2.17	-2.89	-2.96	-2.80	-1.96	-1.93	-3.09
	<b>2M</b>	-2.97	-3.69	-3.76	-4.50	-3.66	-3.63	-4.79
	<b>3M</b>	-3.77	-4.49	-4.56	-6.20	-5.36	-5.33	-6.49
	<b>5M</b>	-5.37	-6.09	-6.16	-9.60	-8.76	-8.73	-9.89
<b>Peak Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	3.24	2.71	2.92	6.77	8.18	8.30	6.83
	<b>1M</b>	2.46	1.93	2.14	5.12	6.53	6.65	5.18
	<b>2M</b>	1.66	1.13	1.34	3.42	4.83	4.95	3.48
	<b>3M</b>	0.86	0.33	0.54	1.72	3.13	3.25	1.78
	<b>5M</b>	-0.74	-1.27	-1.06	-1.68	-0.27	-0.15	-1.62
<b>V.S.W.R</b>		< 3						
<b>Return Loss (dB)</b>		< -6						
<b>Impedance (Ω)</b>		50						
<b>Polarization</b>		Linear						
<b>Cable</b>		SNC-200						
<b>Connector</b>		SMA (Male)						

Category		WiFi MIMO3						
<b>Frequency (MHz)</b>		2400	2450	2500	5150	5350	5750	5850
<b>Efficiency (%)</b>								
<b>Free Space</b>	<b>30cm</b>	65.40	76.49	72.54	52.35	59.28	80.89	72.59
	<b>1M</b>	54.70	63.97	60.67	35.81	40.55	55.34	49.66
	<b>2M</b>	45.50	53.21	50.47	24.21	27.42	37.41	33.57
	<b>3M</b>	37.84	44.26	41.98	16.37	18.54	25.29	22.70
	<b>5M</b>	26.18	30.62	29.04	7.48	8.47	11.56	10.38
<b>Average Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	-1.84	-1.16	-1.39	-2.81	-2.27	-0.92	-1.39
	<b>1M</b>	-2.62	-1.94	-2.17	-4.46	-3.92	-2.57	-3.04
	<b>2M</b>	-3.42	-2.74	-2.97	-6.16	-5.62	-4.27	-4.74
	<b>3M</b>	-4.22	-3.54	-3.77	-7.86	-7.32	-5.97	-6.44
	<b>5M</b>	-5.82	-5.14	-5.37	-11.26	-10.72	-9.37	-9.84
<b>Peak Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	5.78	6.46	6.54	3.68	3.94	4.74	4.08
	<b>1M</b>	5.00	5.68	5.76	2.03	2.29	3.09	2.43
	<b>2M</b>	4.20	4.88	4.96	0.33	0.59	1.39	0.73
	<b>3M</b>	3.40	4.08	4.16	-1.37	-1.11	-0.31	-0.97
	<b>5M</b>	1.80	2.48	2.56	-4.77	-4.51	-3.71	-4.37
<b>V.S.W.R</b>		< 3						
<b>Return Loss (dB)</b>		< -6						
<b>Impedance (Ω)</b>		50						
<b>Polarization</b>		Linear						
<b>Cable</b>		SNC-200						
<b>Connector</b>		SMA (Male)						
<b>Dimension (mm)</b>		170.34(L) x 70.34(W) x 15.4(T)						
<b>Environmental Conditions</b>								
<b>Operation Temperature</b>		-40 ~ +85 °C						
<b>Storage Temperature</b>		-40 ~ +85 °C						
<b>Waterproof Resistant</b>		IP67						
<b>Relative Humidity</b>		95% non-condensing						

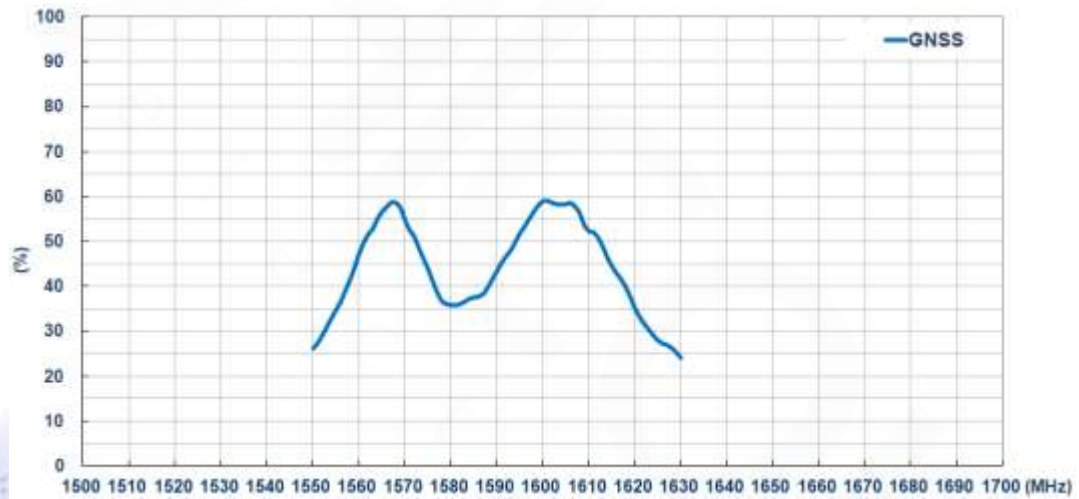
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## II. Antenna Technical Parameters:

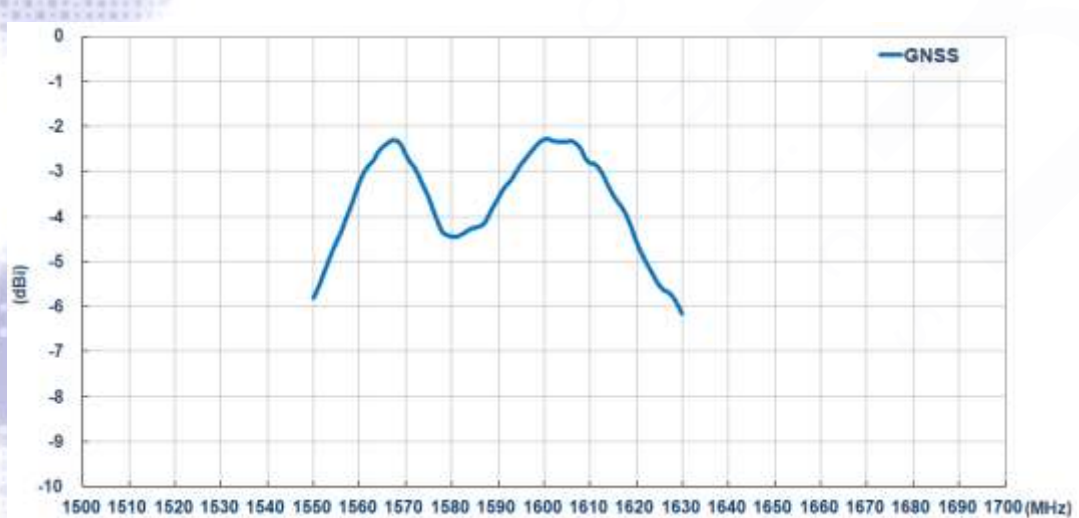
S11 (dB) - GNSS



Efficiency (%) - GNSS



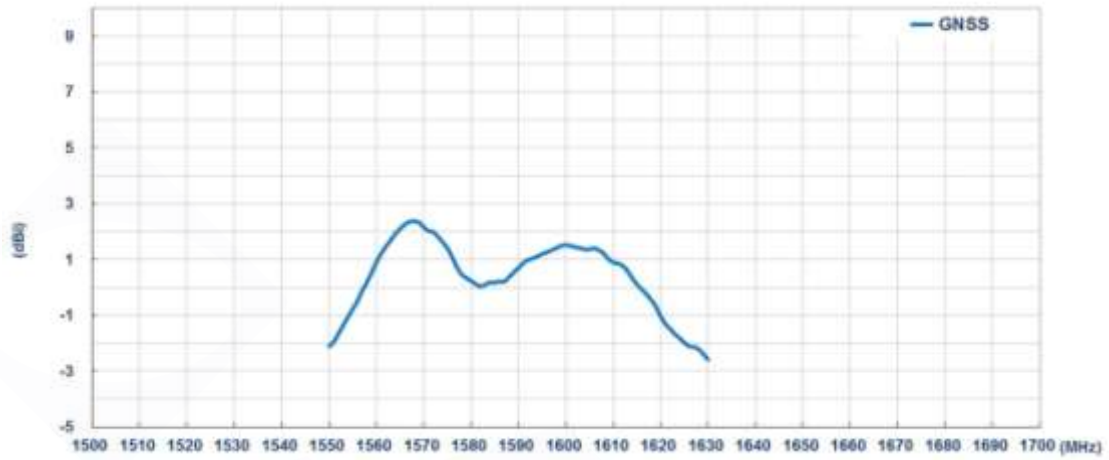
Average Gain (dBi) - GNSS



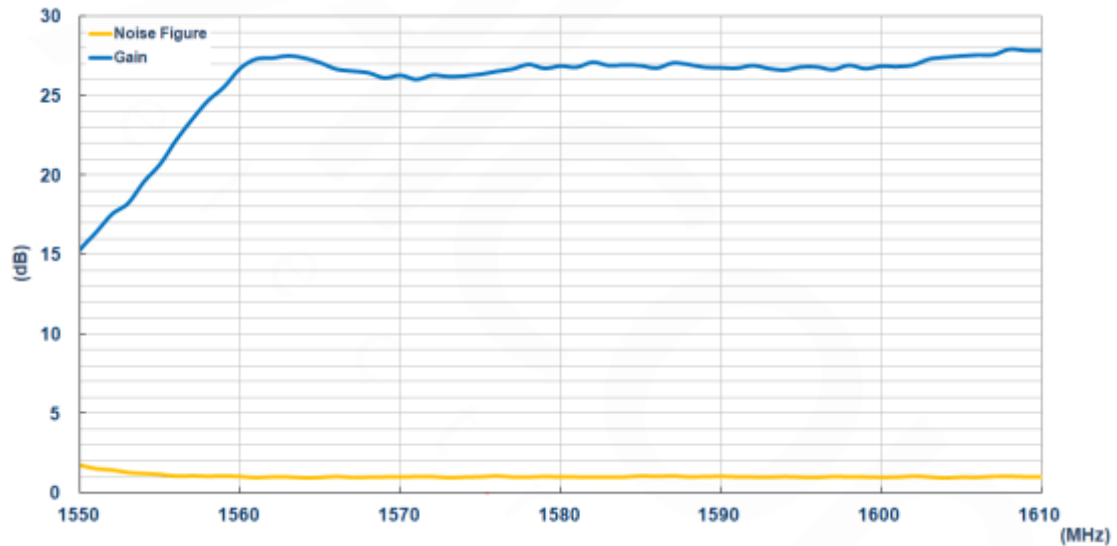
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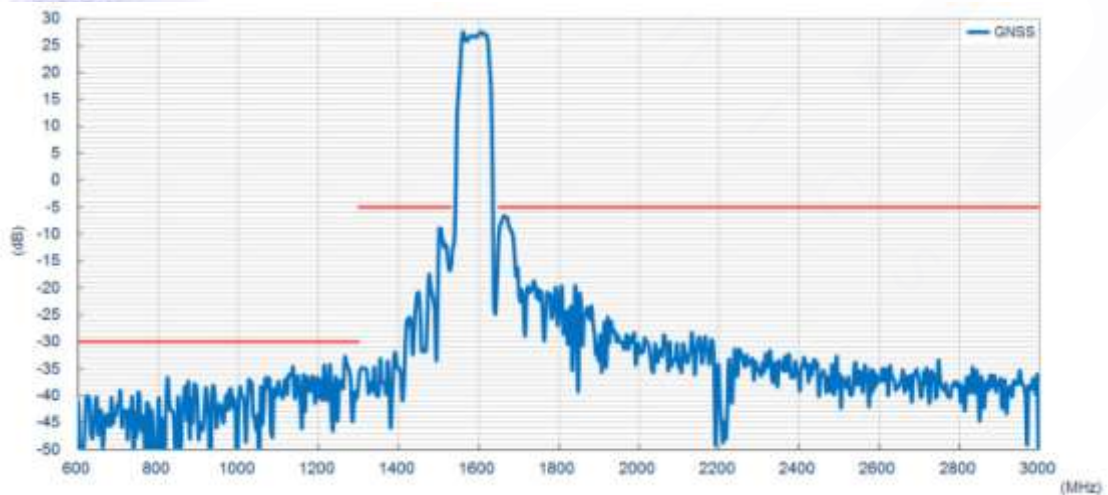
Peak Gain (dBi) – GNSS



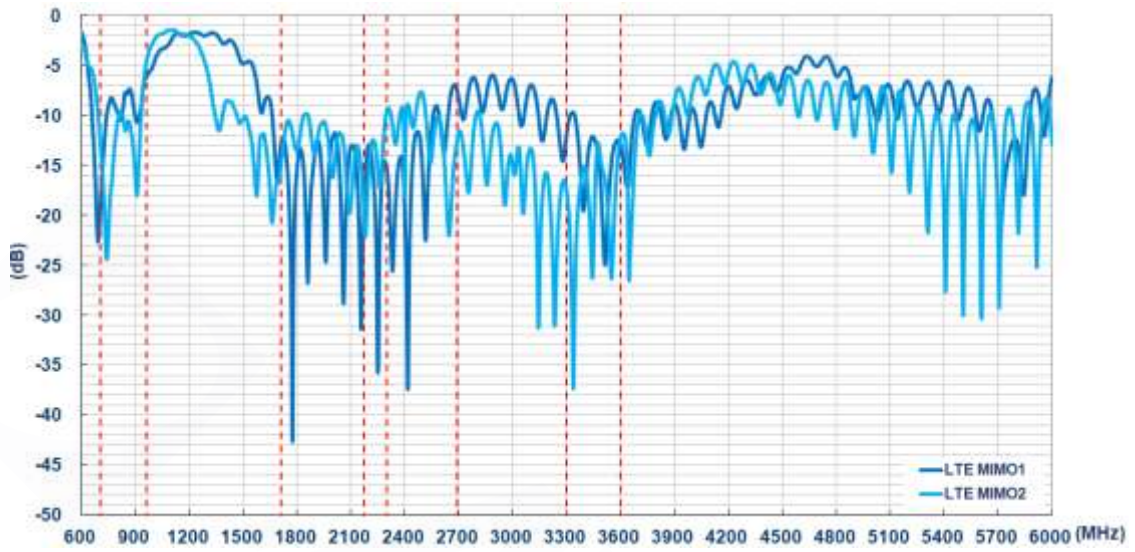
Noise Figure & Gain (dB) - GNSS



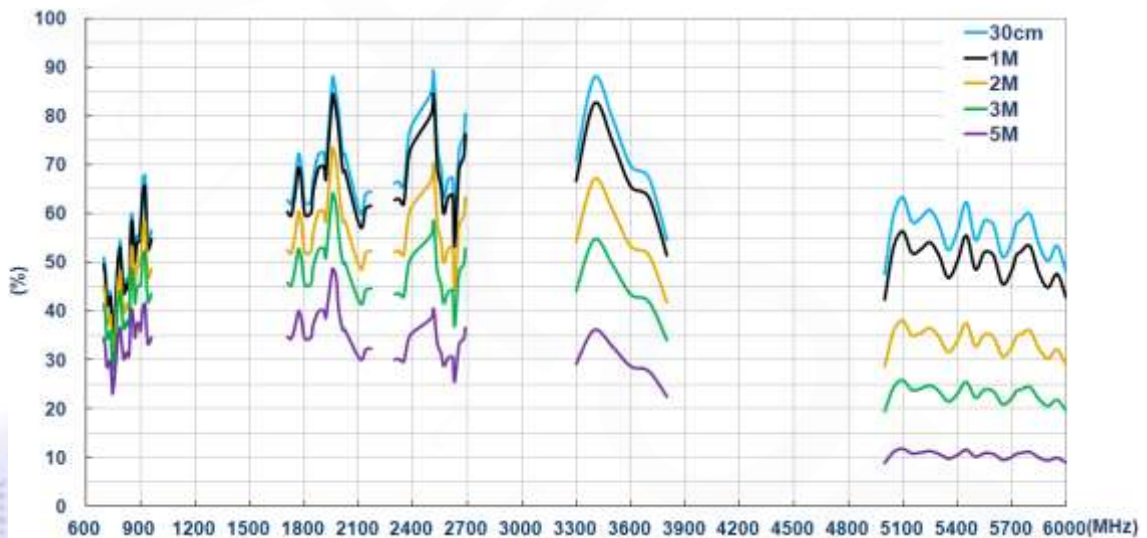
Out Of Band Rejection (dB) - GNSS



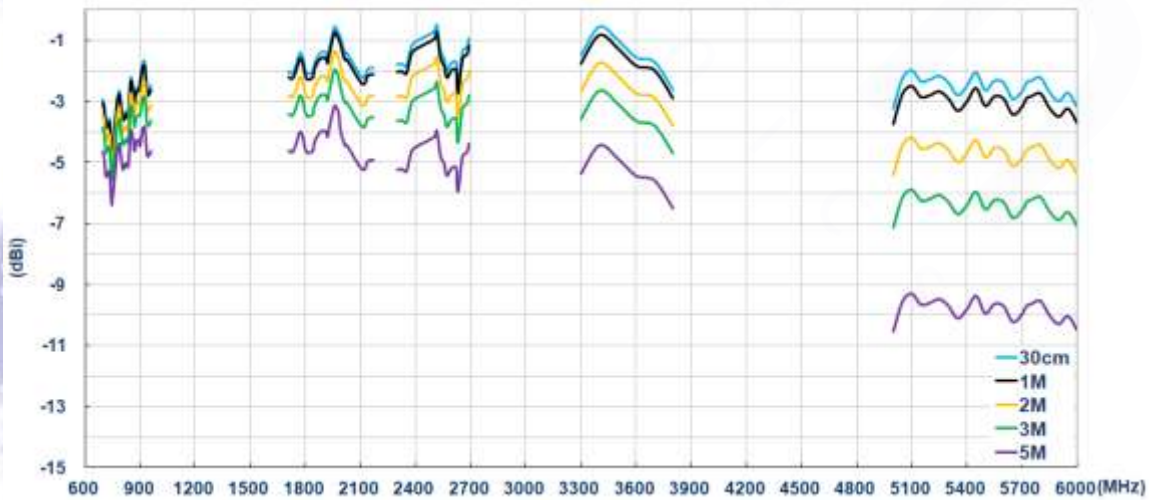
S11 (dB) – LTE MIMO1 & MIMO2



Efficiency (%) – LTE MIMO1

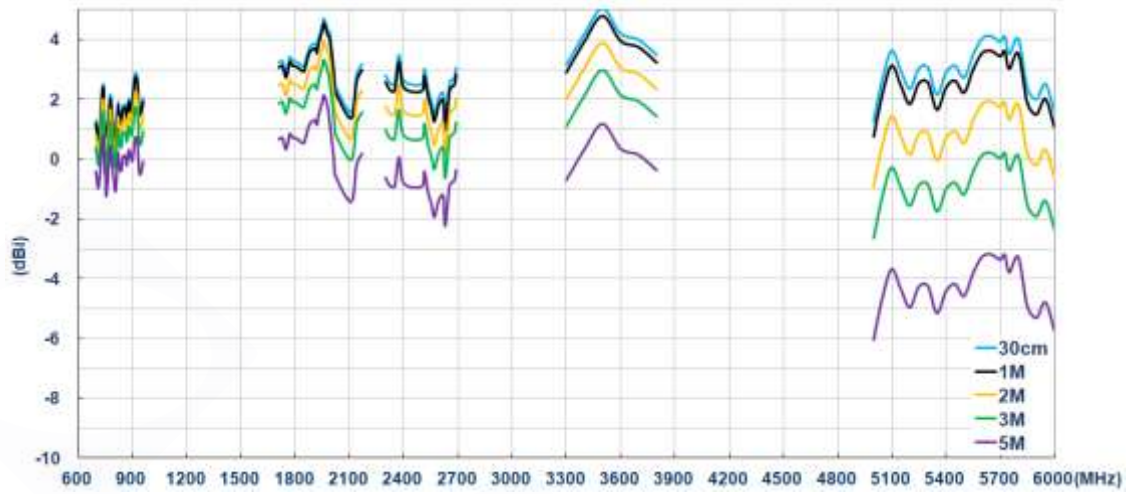


Average Gain (dBi) - LTE MIMO1

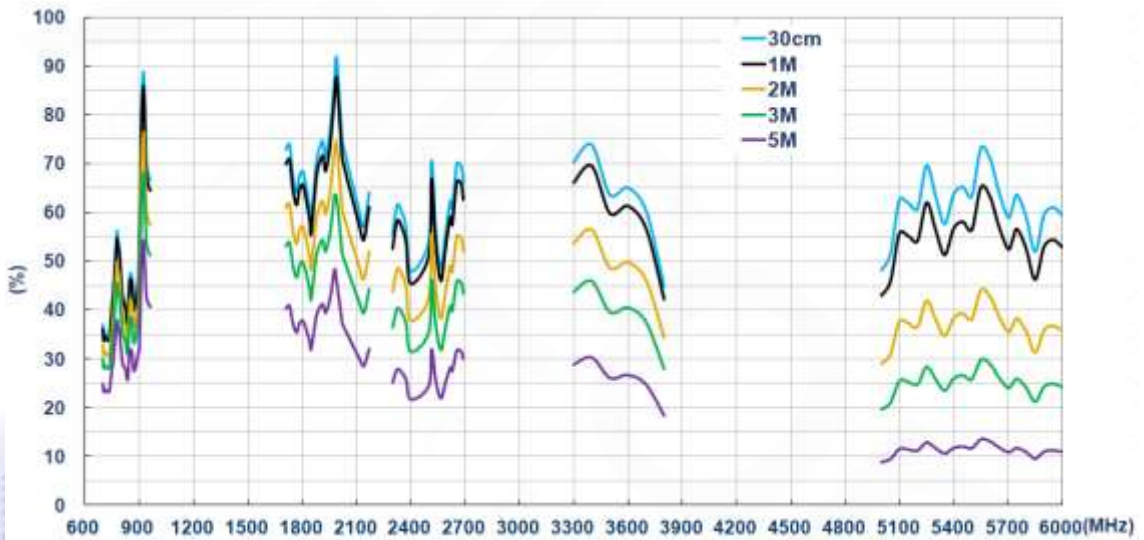


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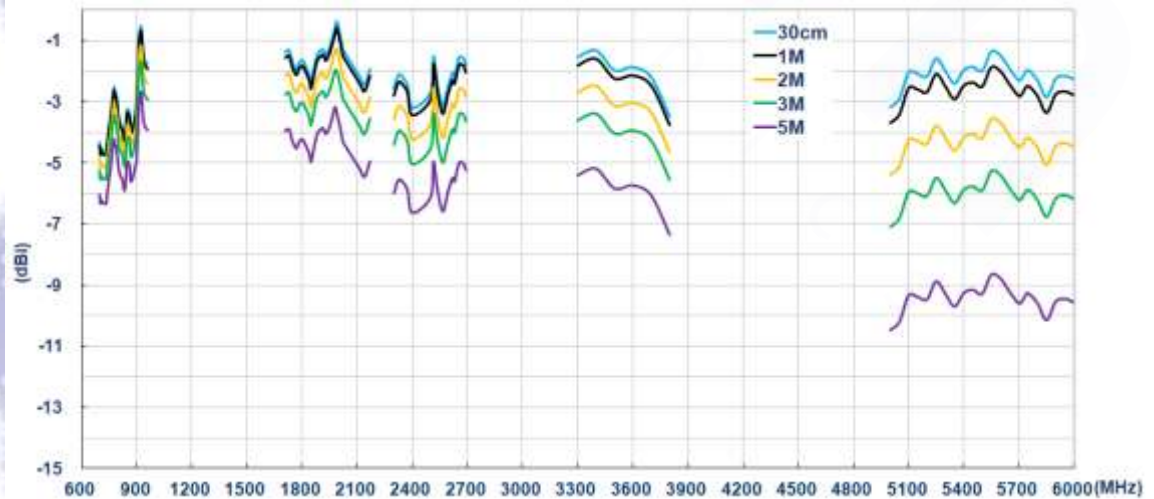
Peak Gain (dBi) -LTE MIMO1



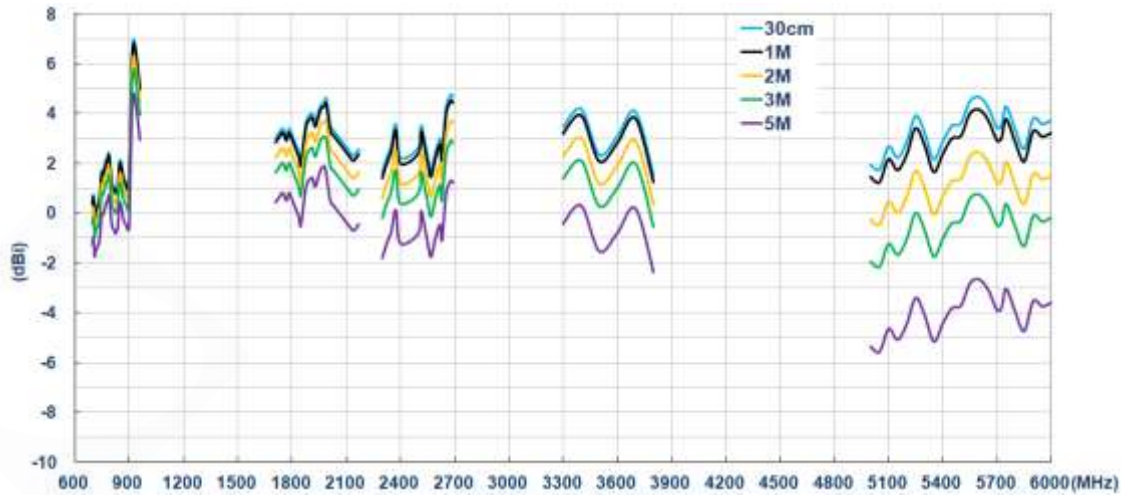
Efficiency (%) -LTE MIMO2



Average Gain (dBi) - LTE MIMO2

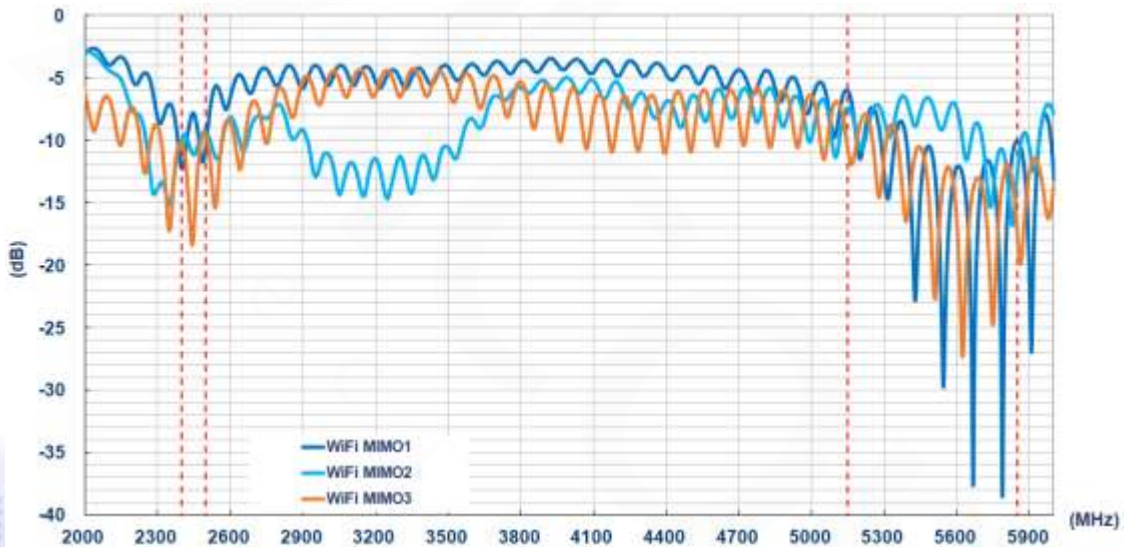


Peak Gain (dBi) –LTE MIMO2

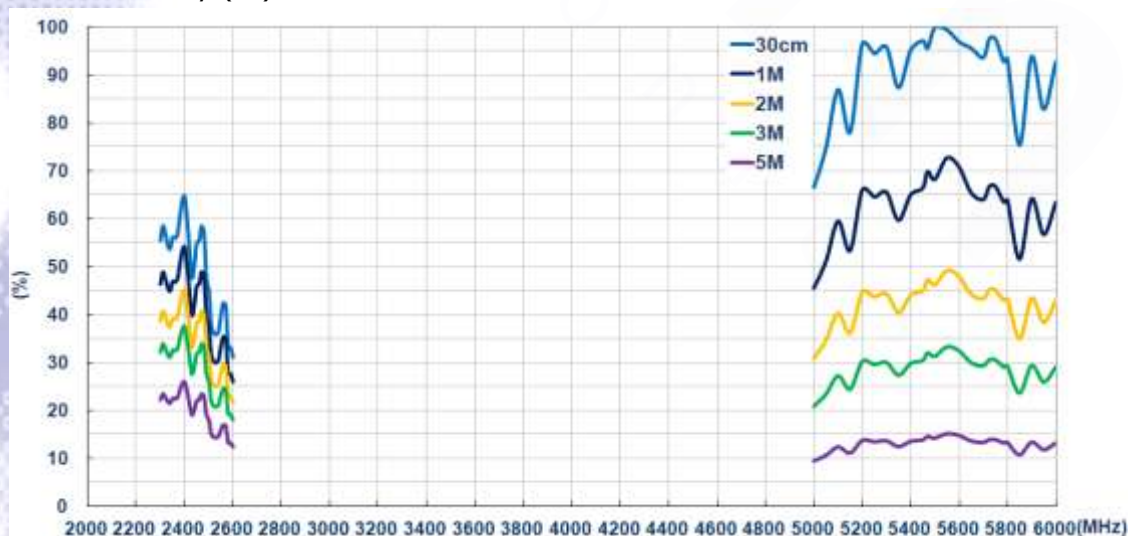


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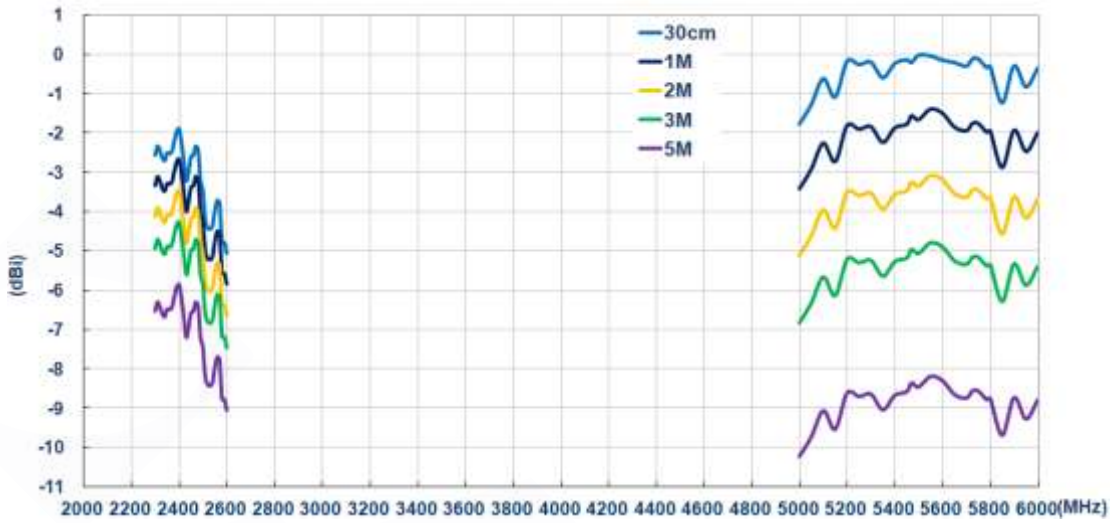
S11 (dB) – WiFi MIMO1 & MIMO2 & MIMO3



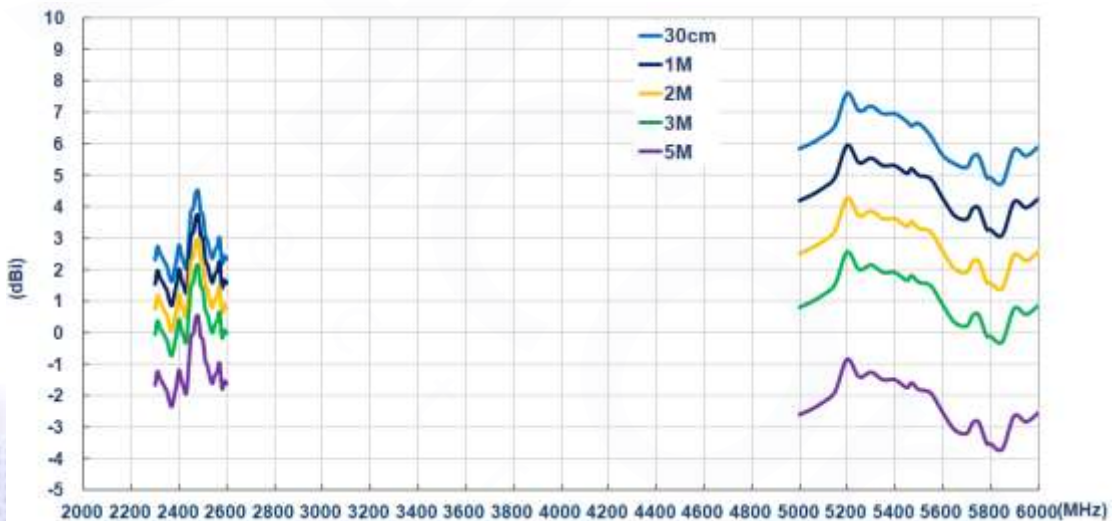
Efficiency (%) – WiFi MIMO1



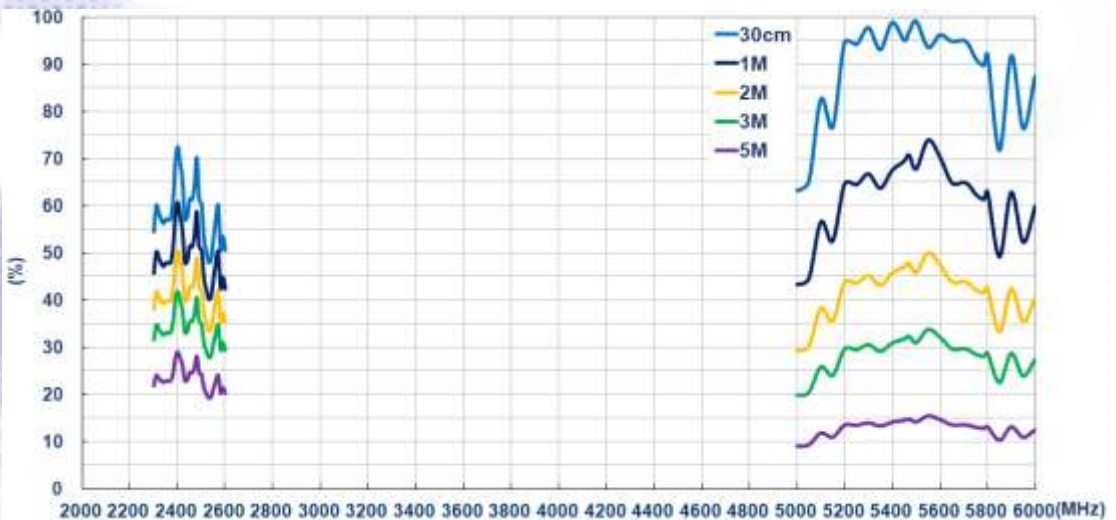
Average Gain (dBi) - WiFi MIMO1



Peak Gain (dBi) - WiFi MIMO1

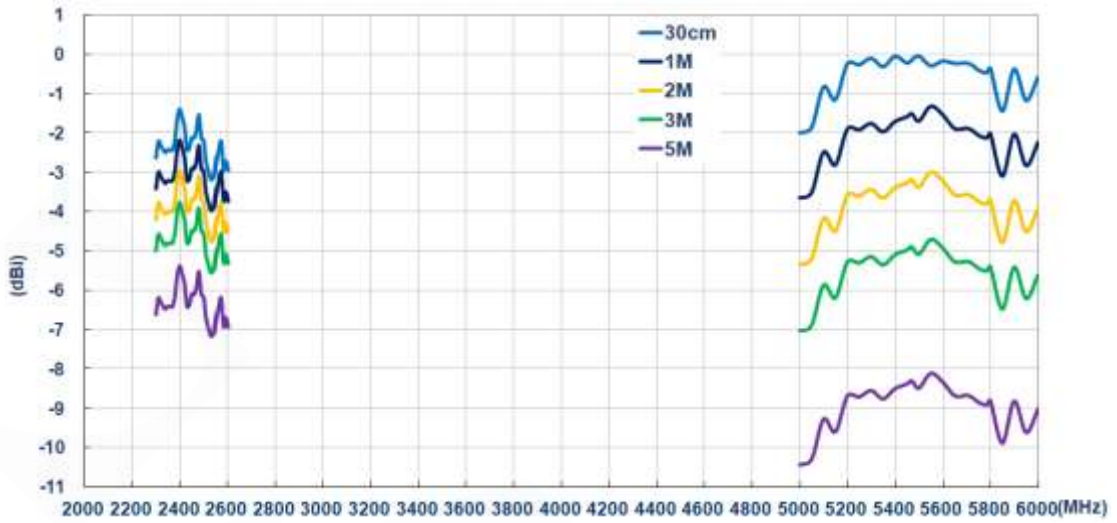


Efficiency (%) - WiFi MIMO2

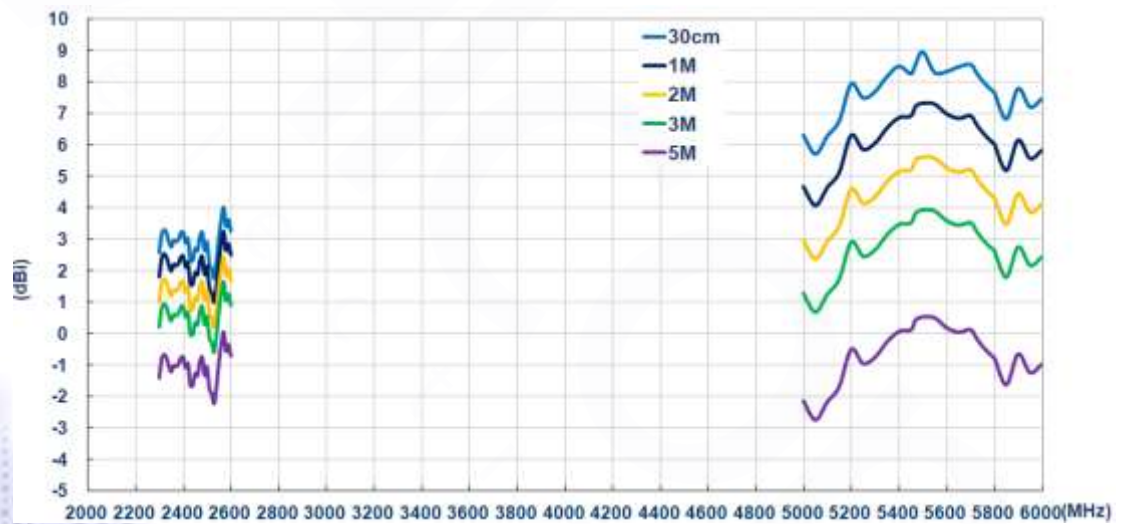


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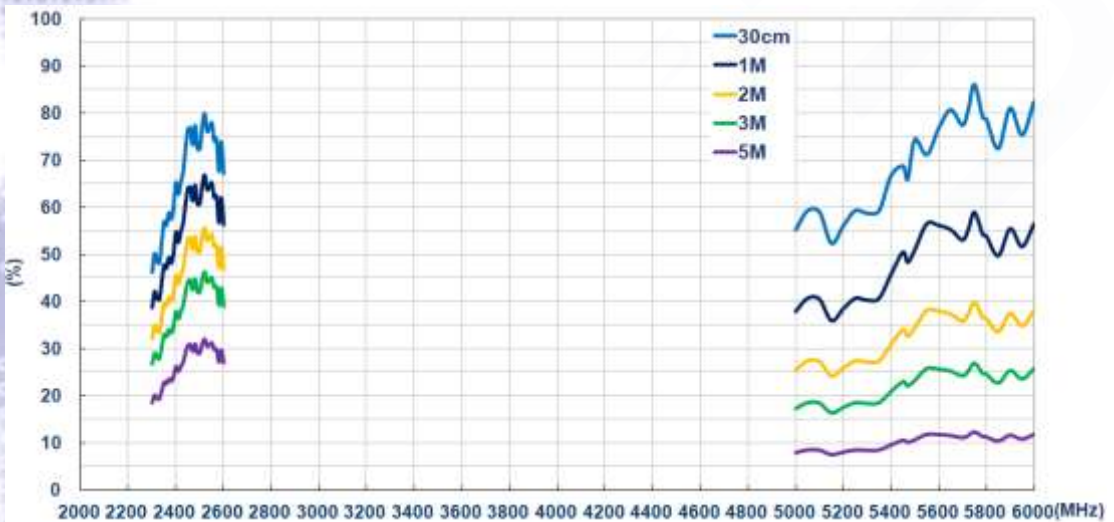
Average Gain (dBi) - WiFi MIMO2



Peak Gain (dBi) - WiFi MIMO2

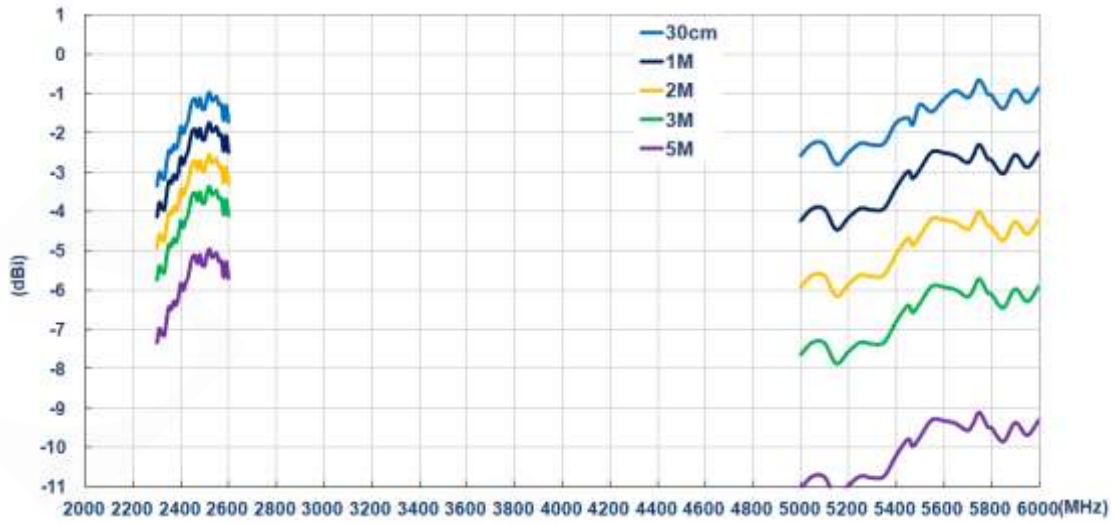


Efficiency (%) - WiFi MIMO3

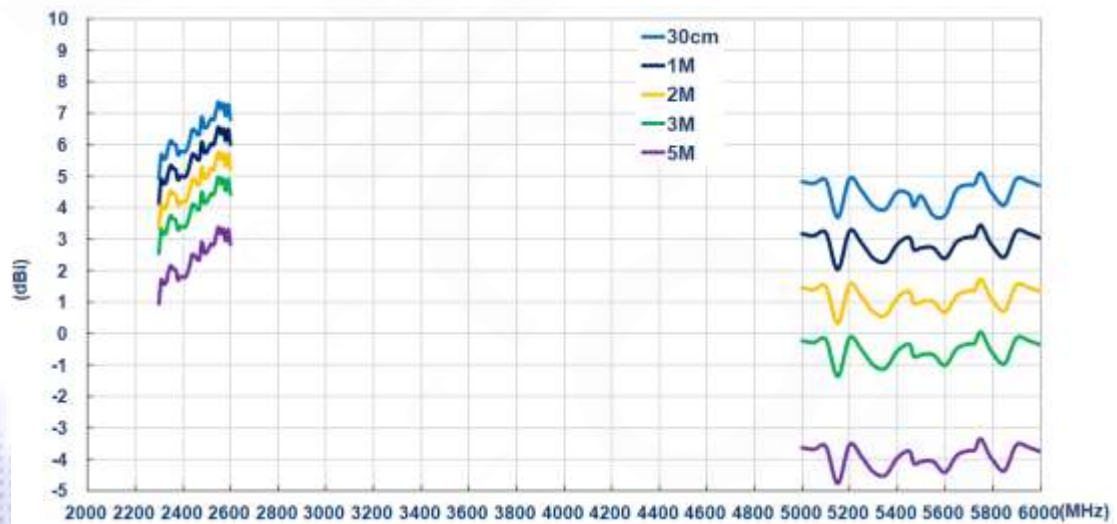


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### Average Gain (dBi) - WiFi MIMO3



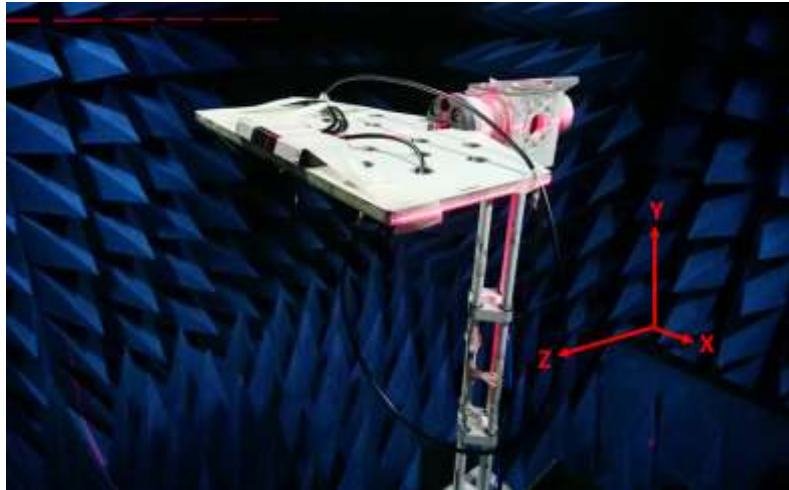
### Peak Gain (dBi) - WiFi MIMO3



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### III. Antenna Radiation Pattern Measurement:

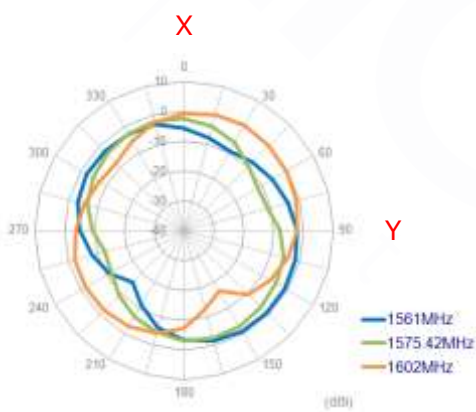
The antenna radiation patterns were measured in Anechoic Chamber. The measurement setup as below,



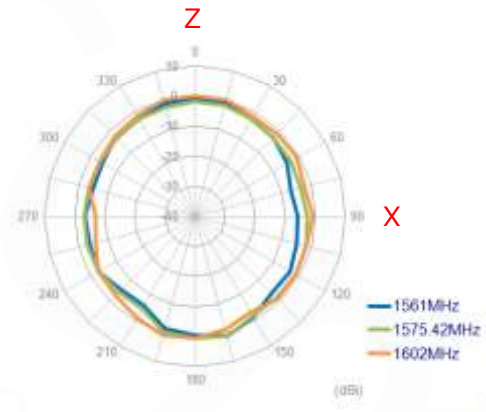
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### IV. 2D Radiation Pattern:

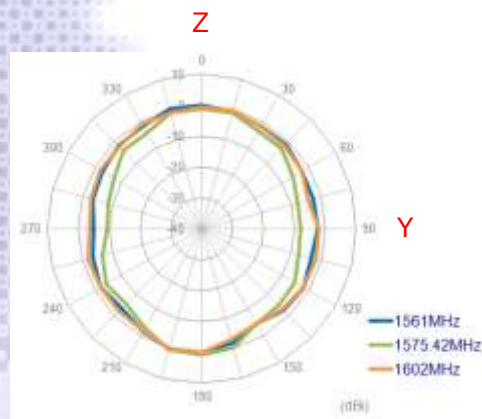
GNSS X-Y Plane



GNSS X-Z Plane



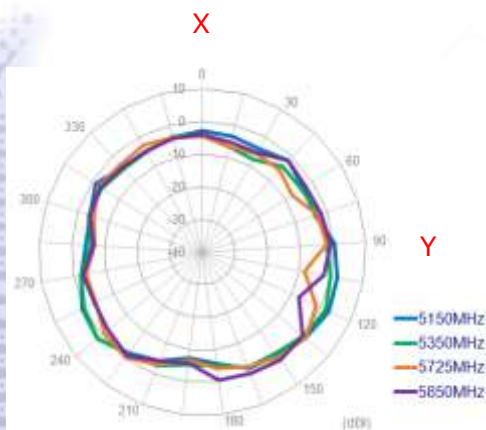
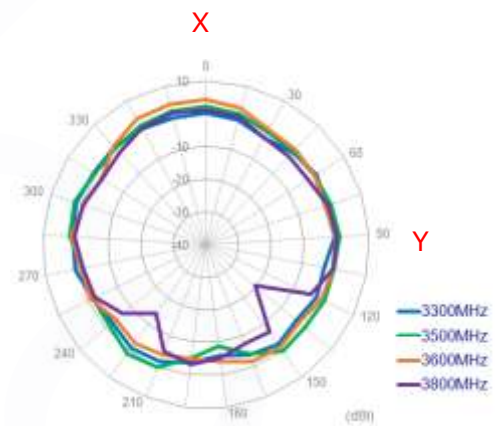
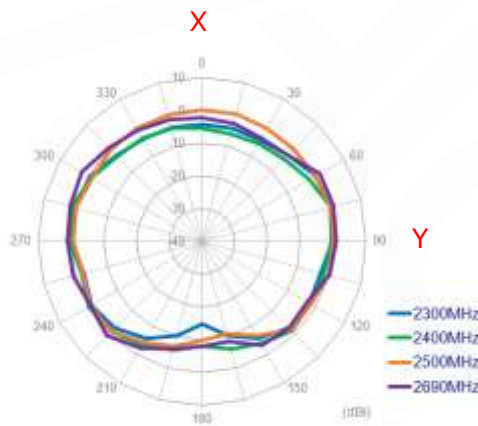
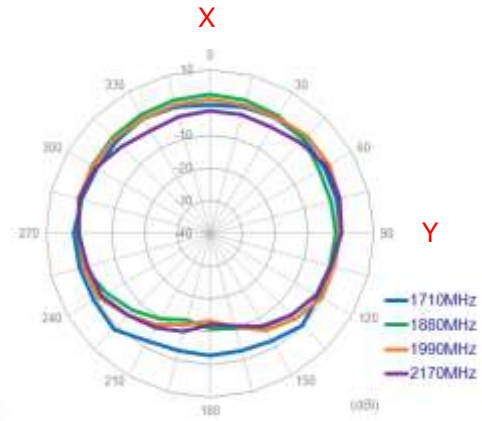
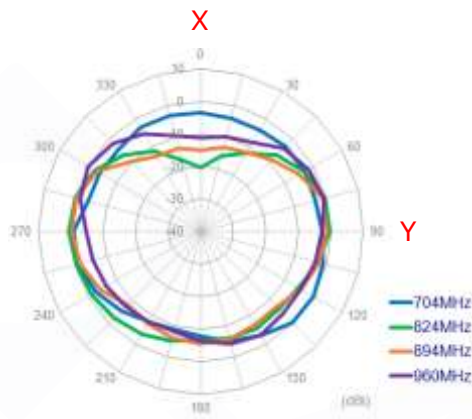
GNSS Y-Z Plane





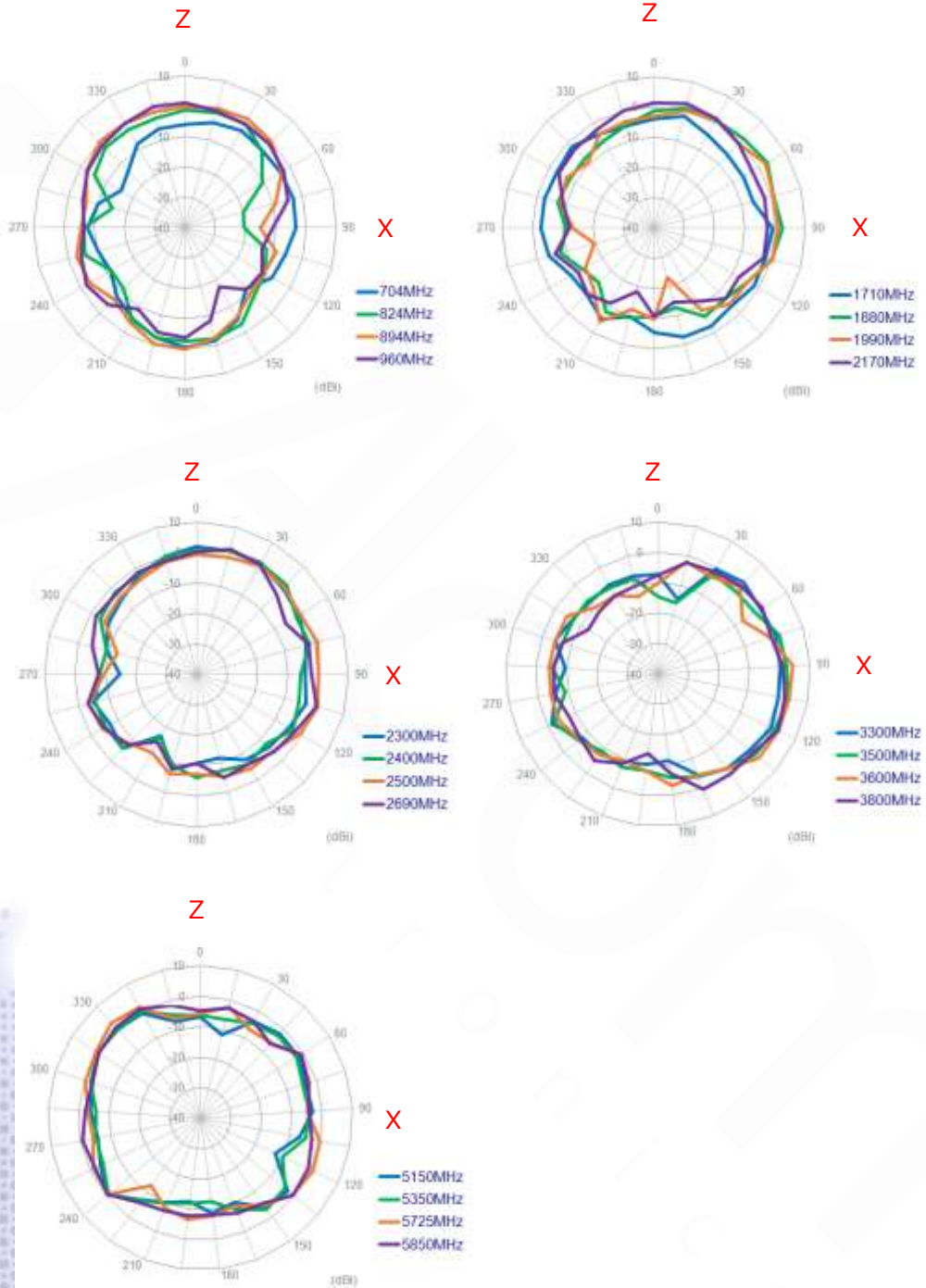
# LTE MIMO1

## X-Y Plane



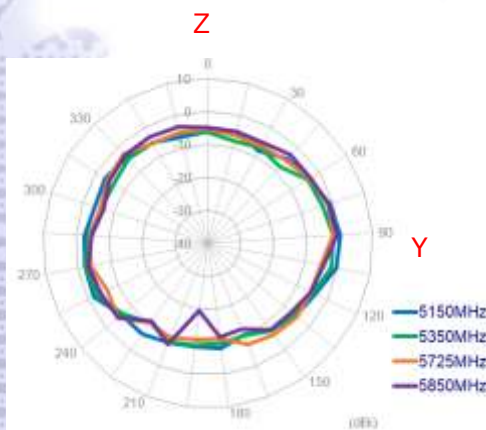
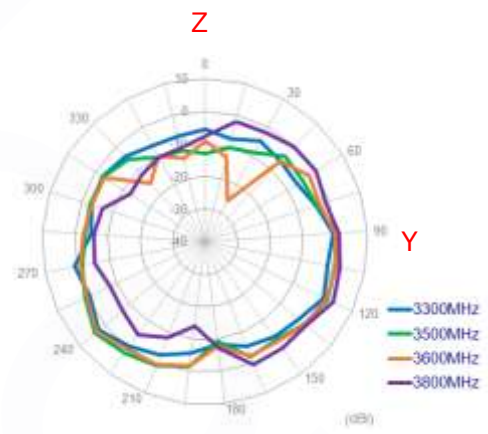
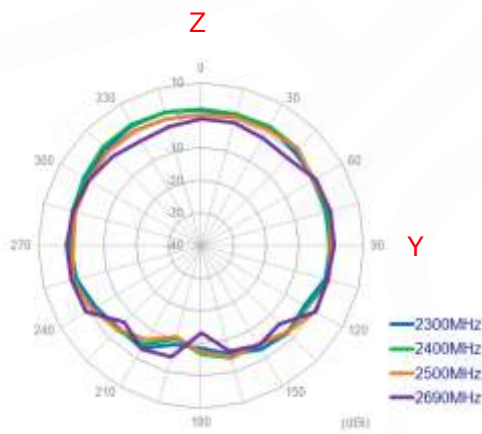
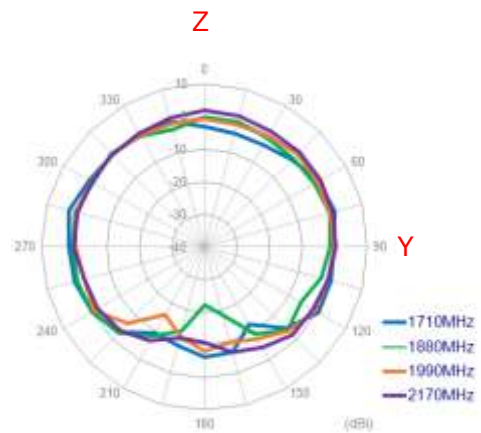
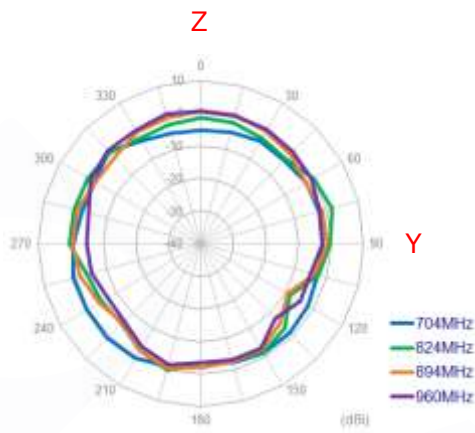
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X-Z Plane



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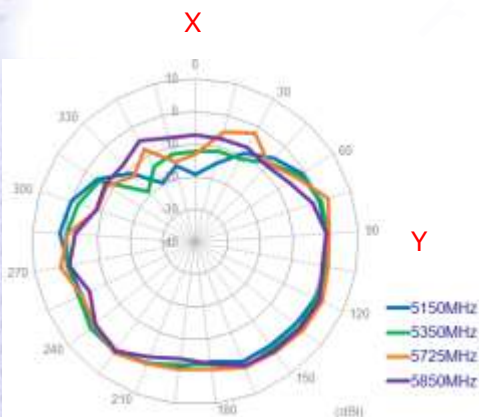
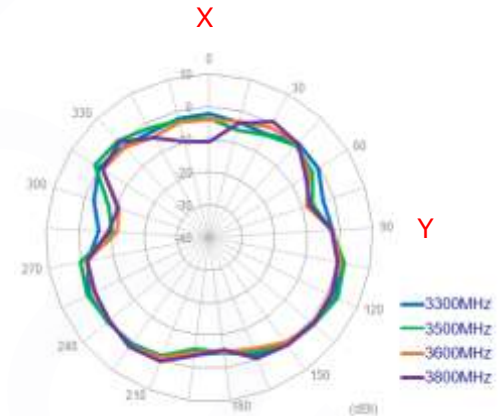
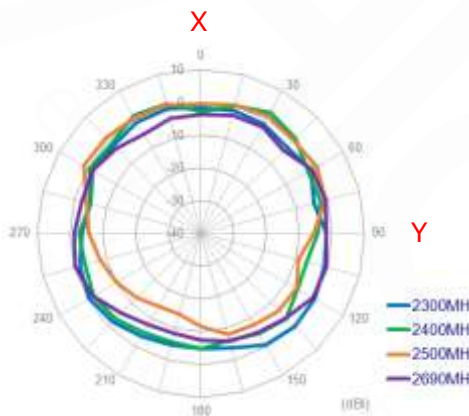
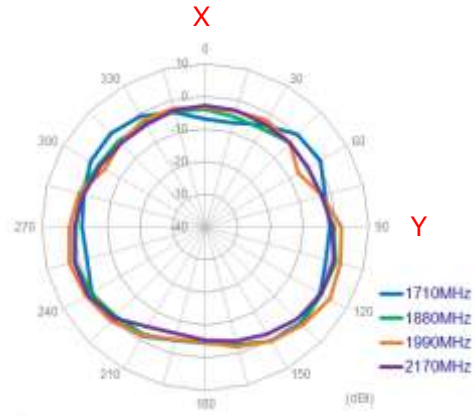
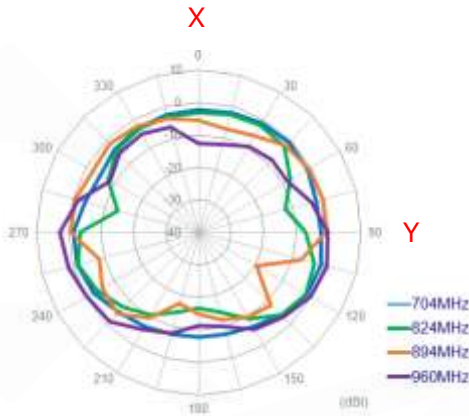
Y-Z Plane



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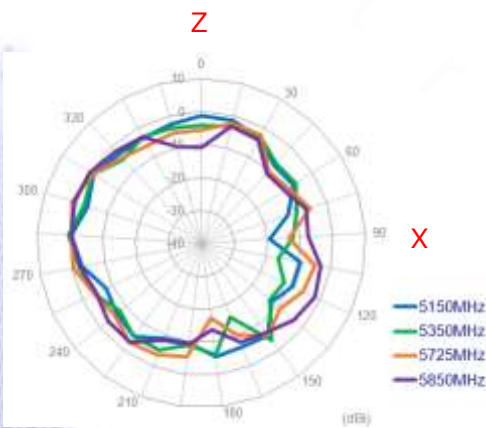
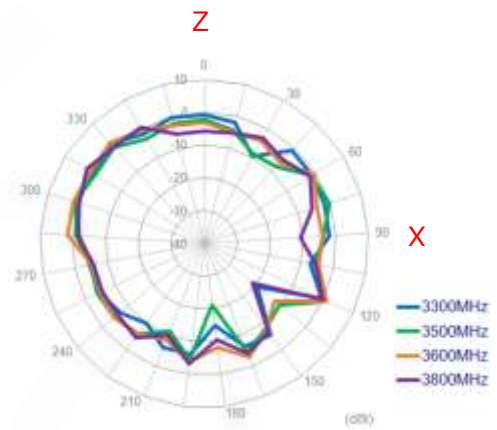
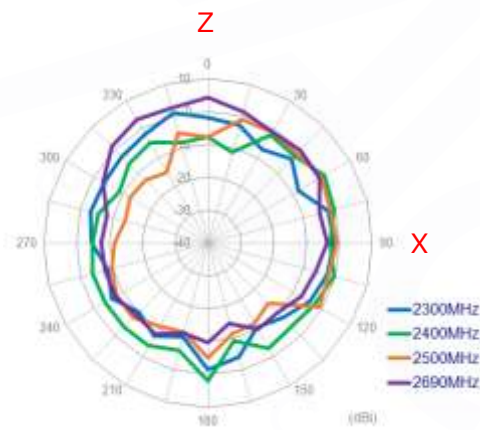
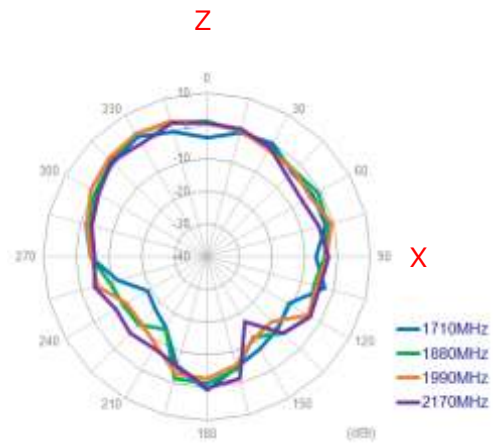
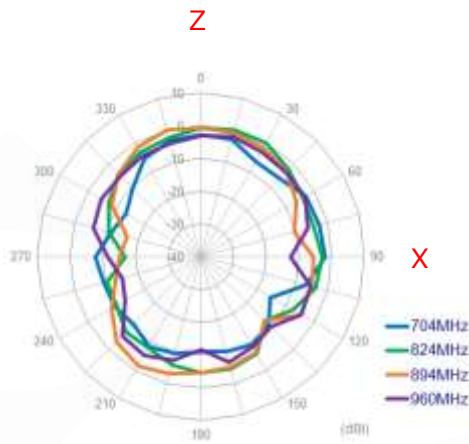
LTE MIMO2

X-Y Plane



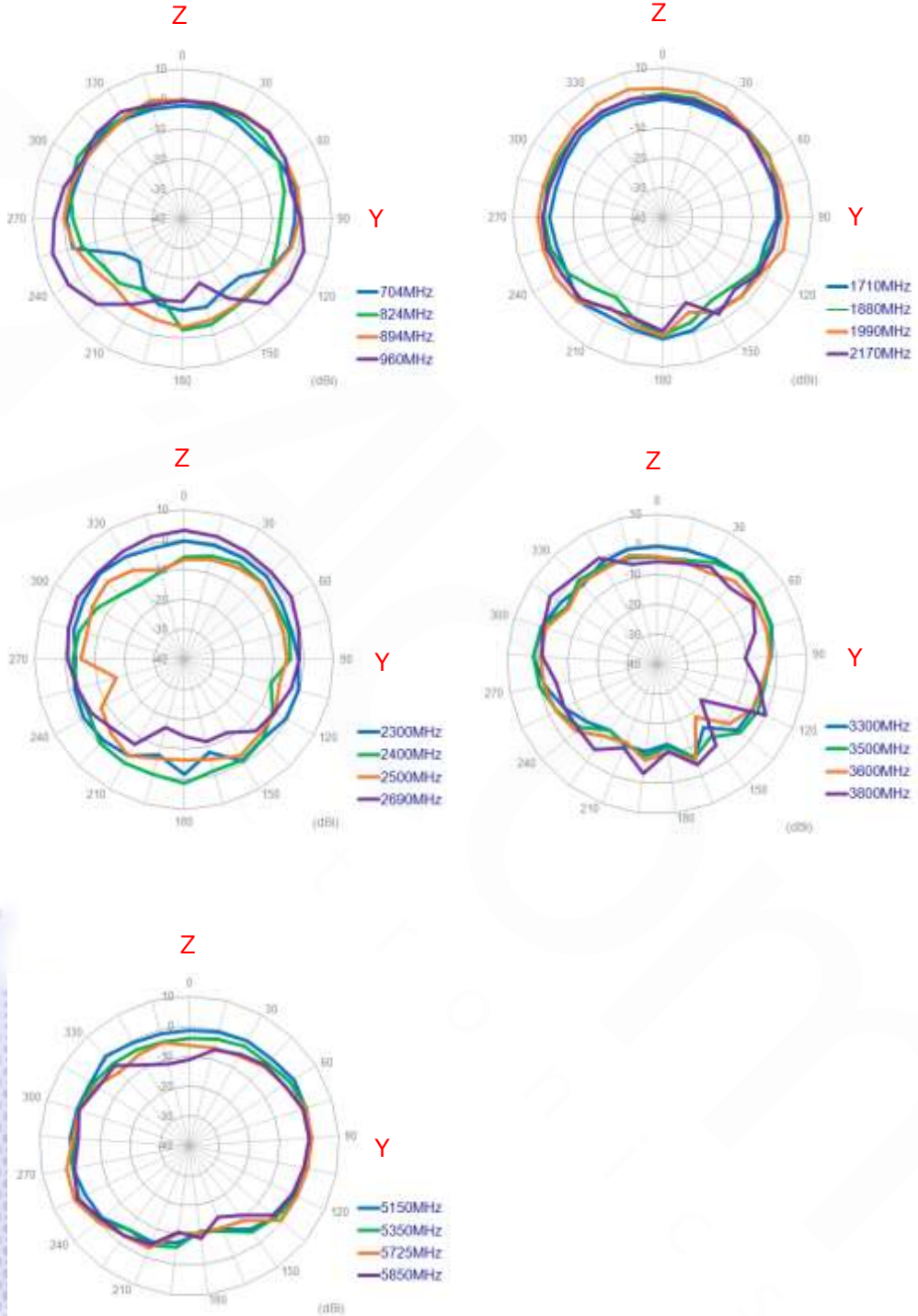
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X-Z Plane



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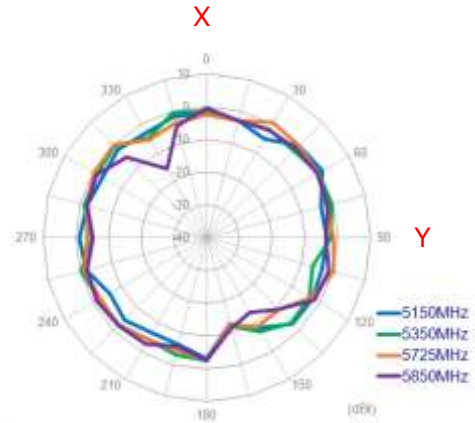
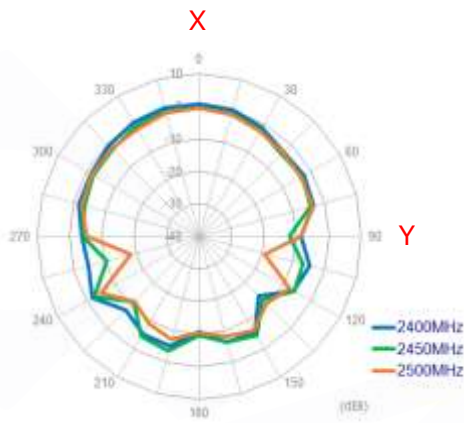
Y-Z Plane



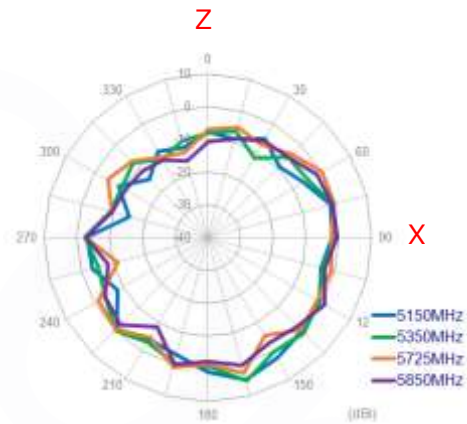
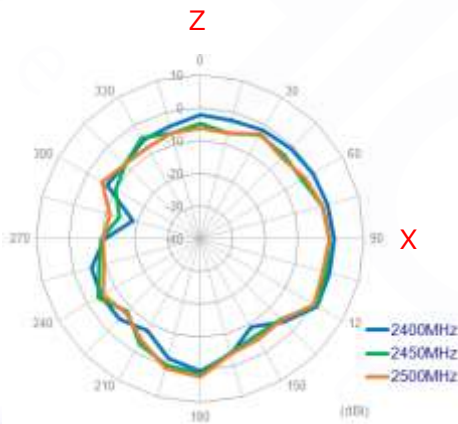
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### WiFi MIMO1

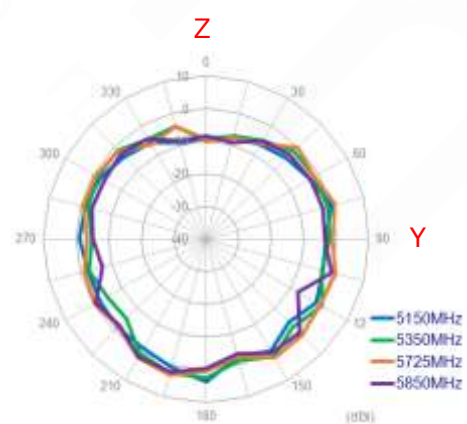
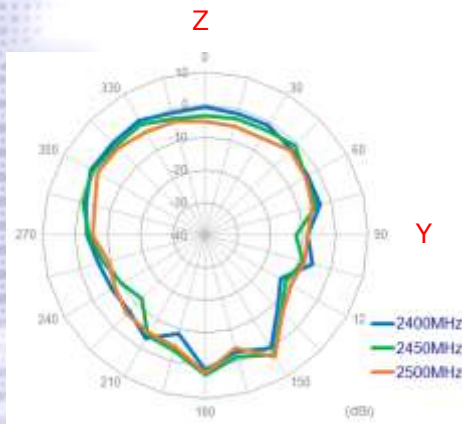
#### X-Y Plane



#### X-Z Plane

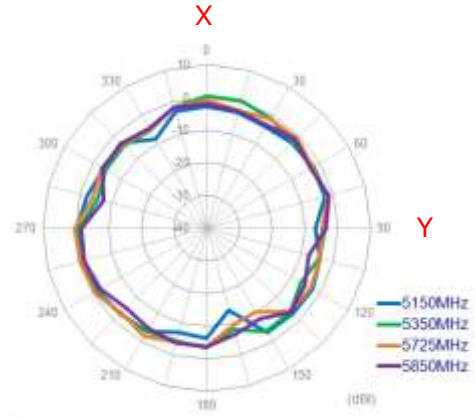
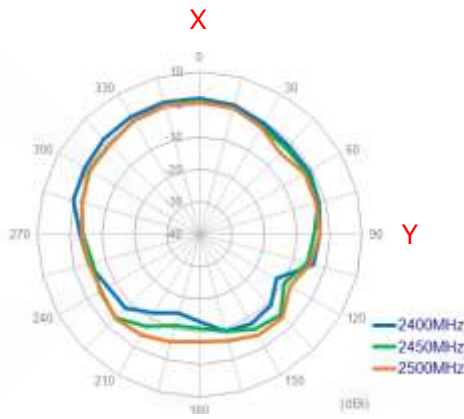


#### Y-Z Plane

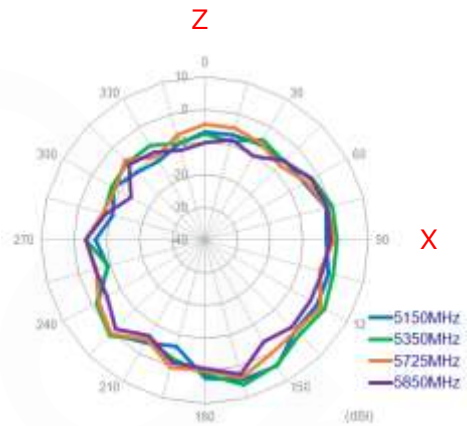
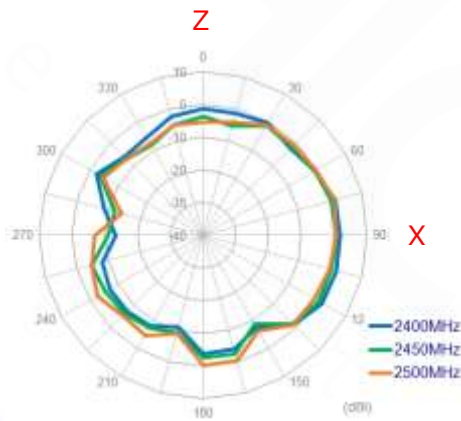


WiFi MIMO2

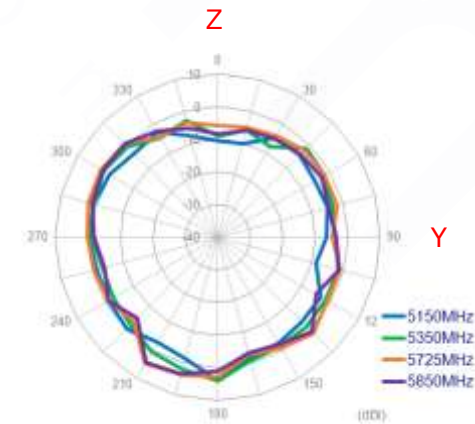
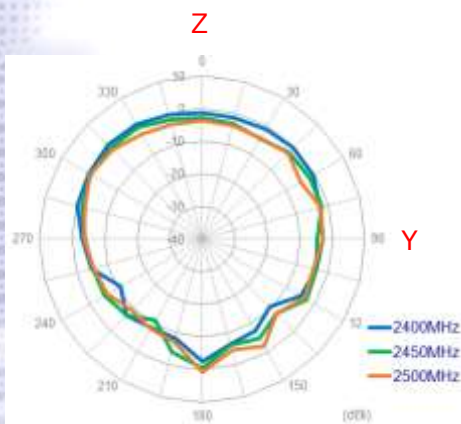
X-Y Plane



X-Z Plane



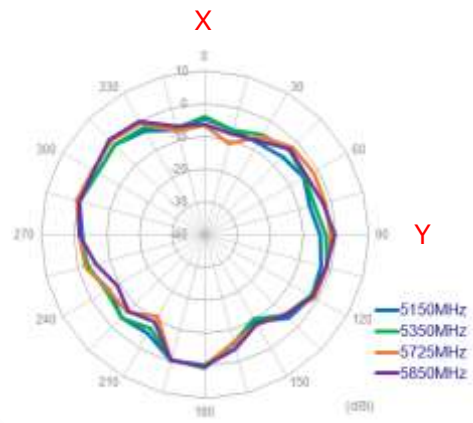
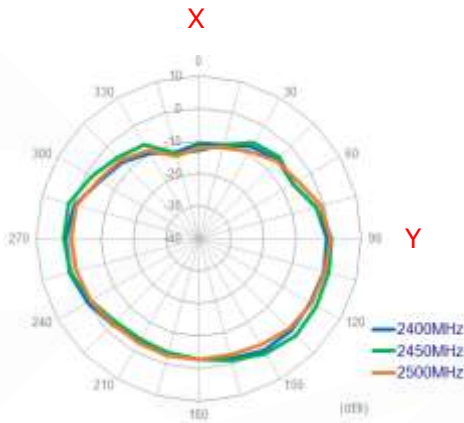
Y-Z Plane



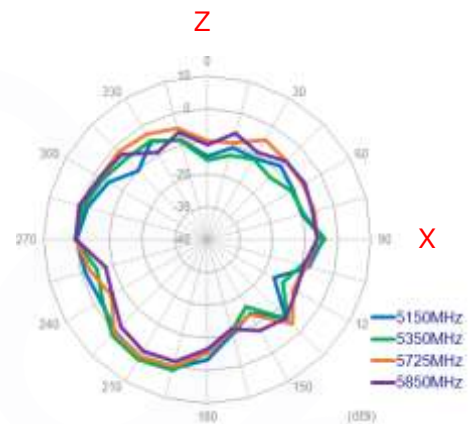
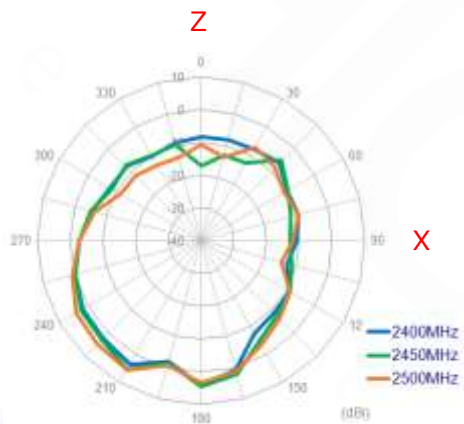


## WiFi MIMO3

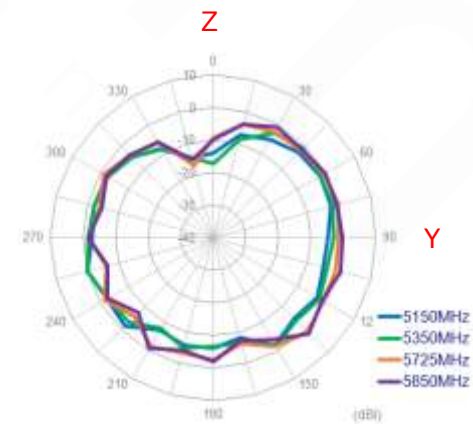
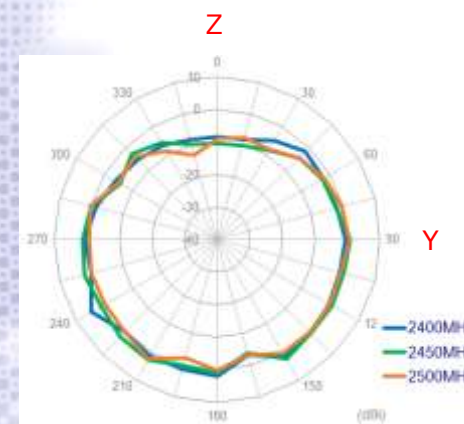
### X-Y Plane



### X-Z Plane



### Y-Z Plane

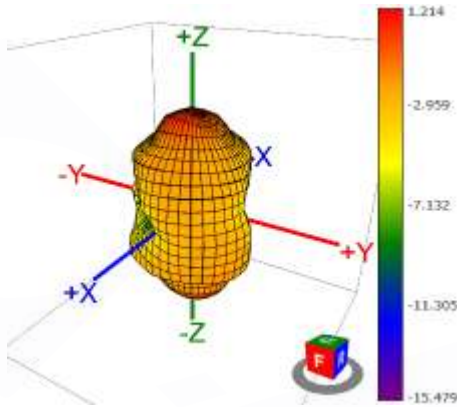


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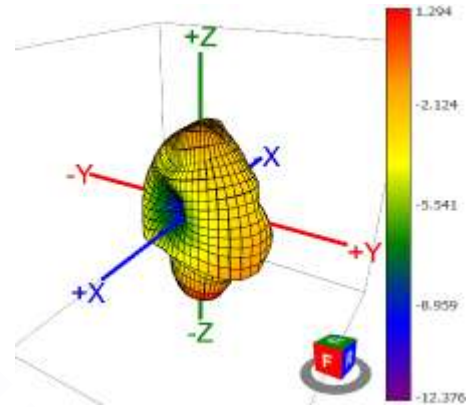
## V. 3D Radiation Pattern:

GNSS

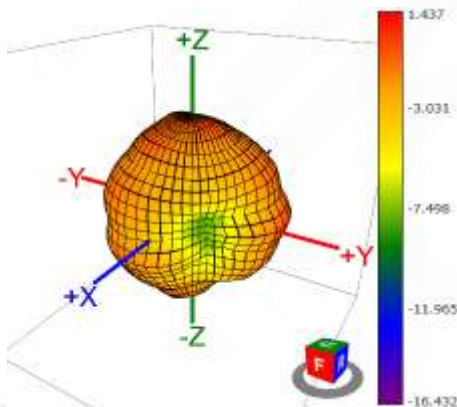
1561MHz



1575.42MHz

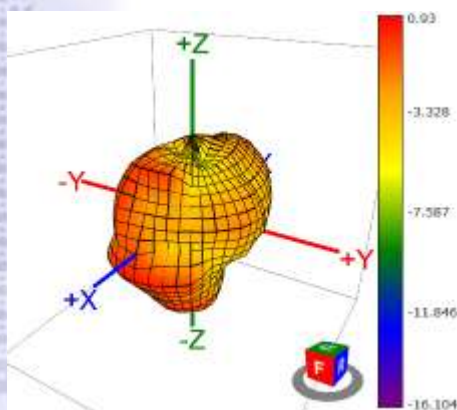


1602MHz

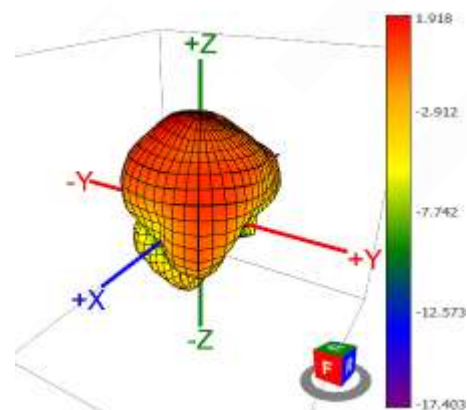


LTE MIMO1

704MHz

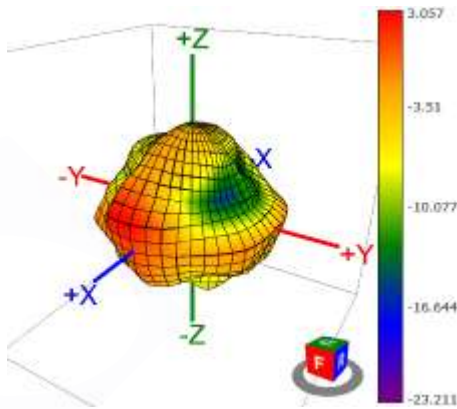


960MHz

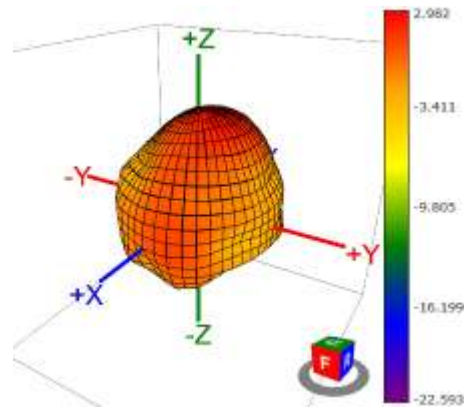


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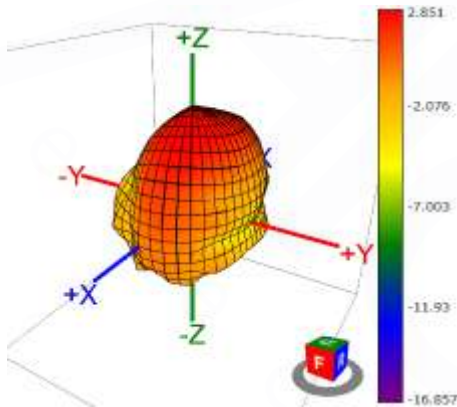
1710MHz



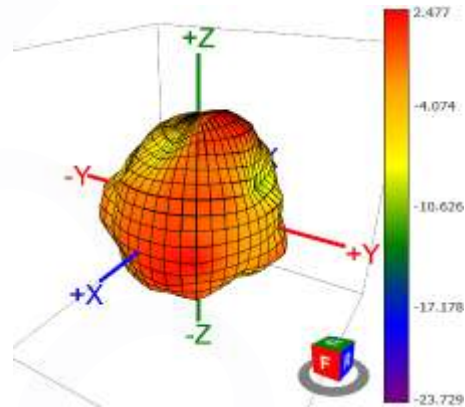
2170MHz



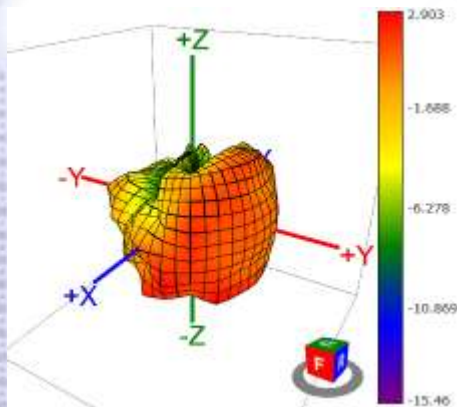
2300MHz



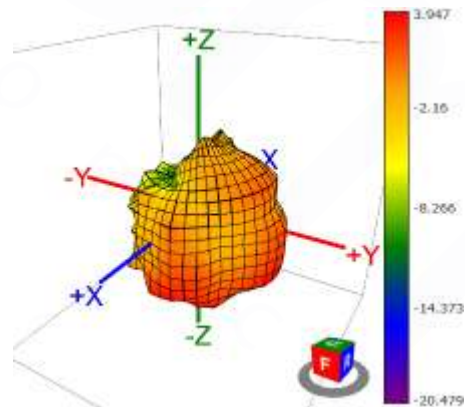
2690MHz



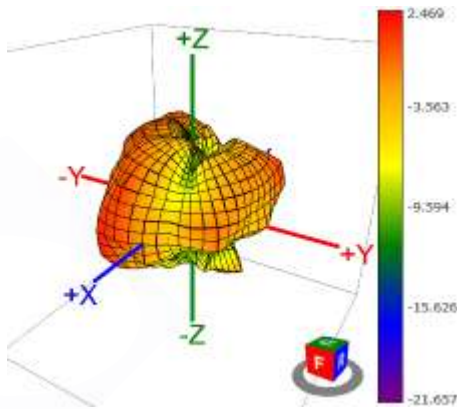
3300MHz



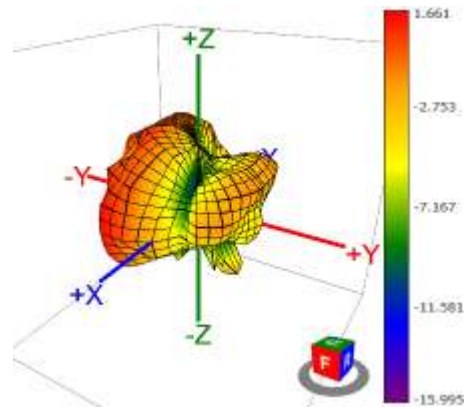
3600MHz



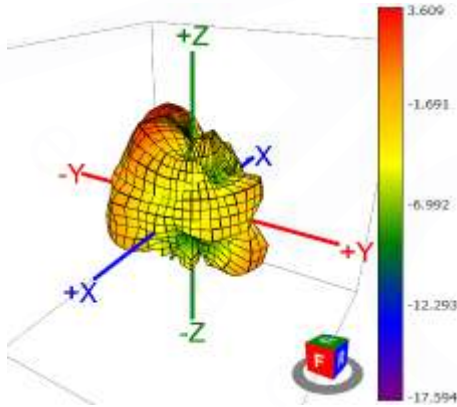
5150MHz



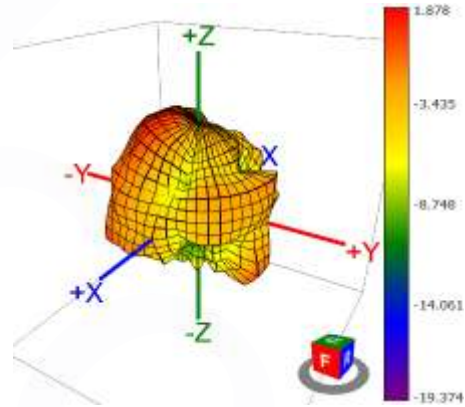
5350MHz



5725MHz

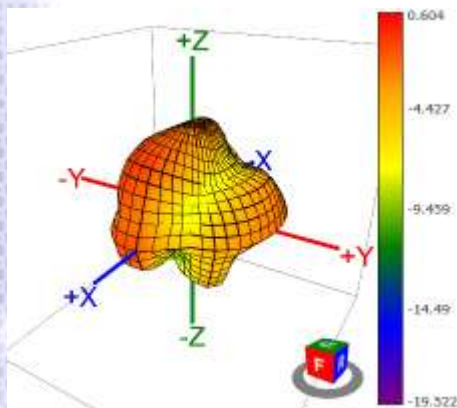


5850MHz

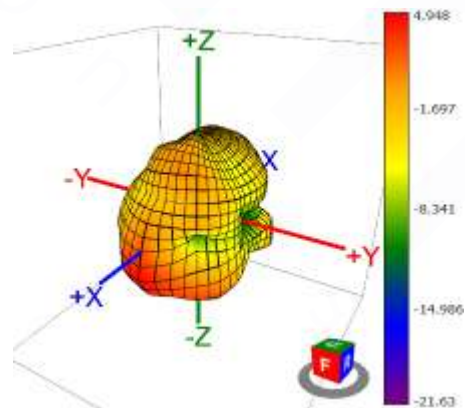


LTE MIMO2

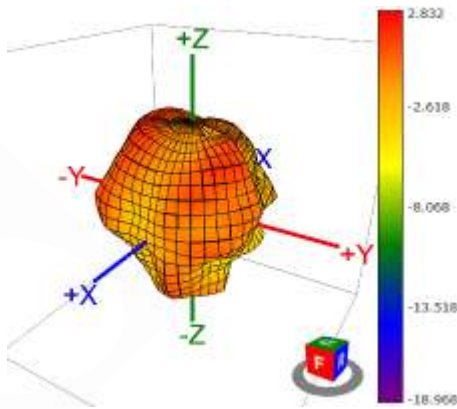
704MHz



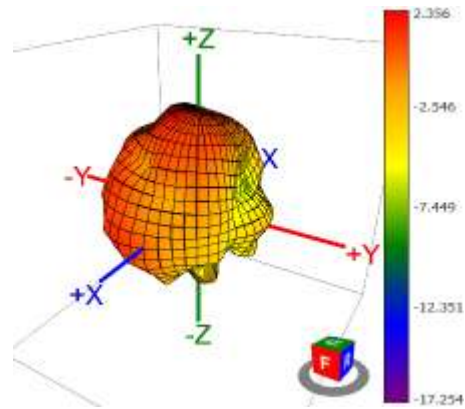
960MHz



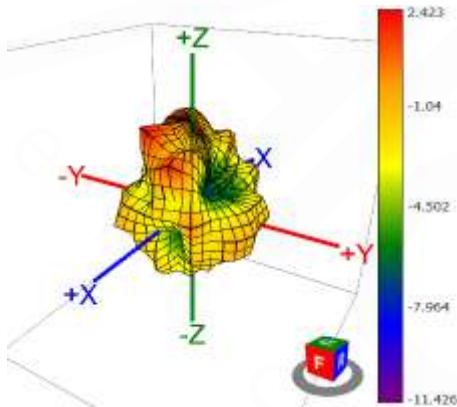
1710MHz



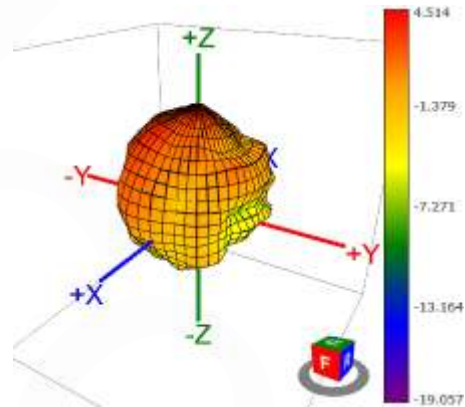
2170MHz



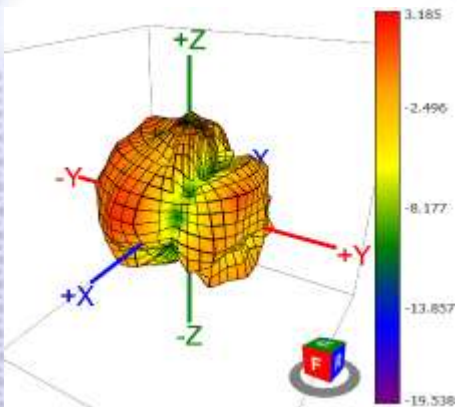
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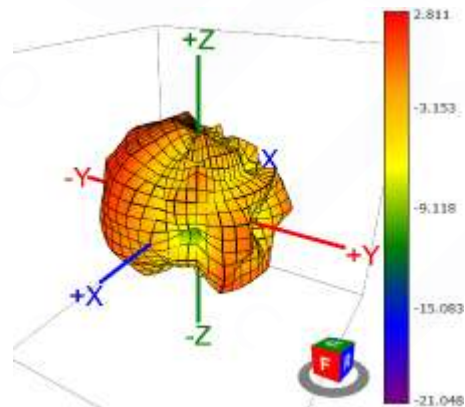
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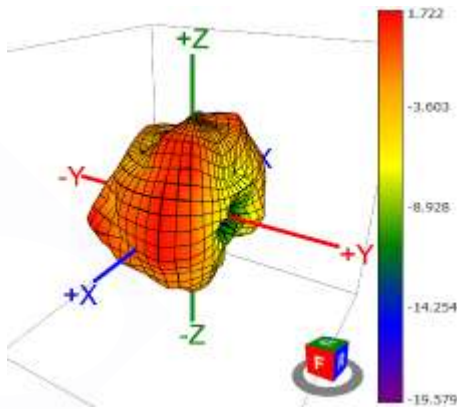
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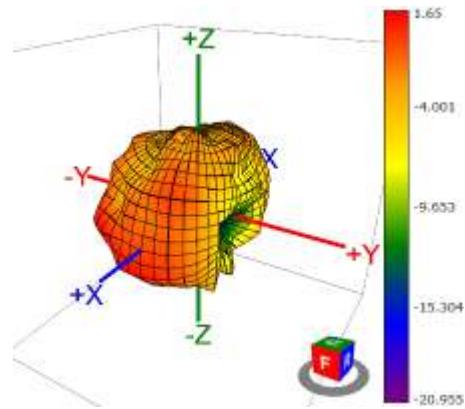
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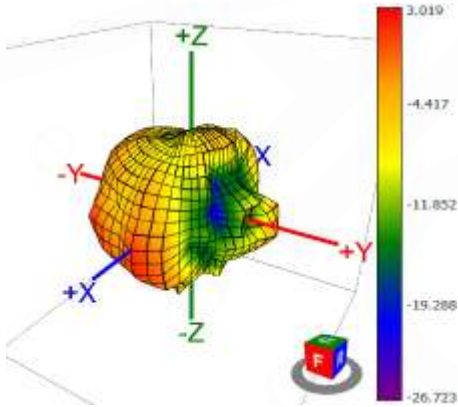
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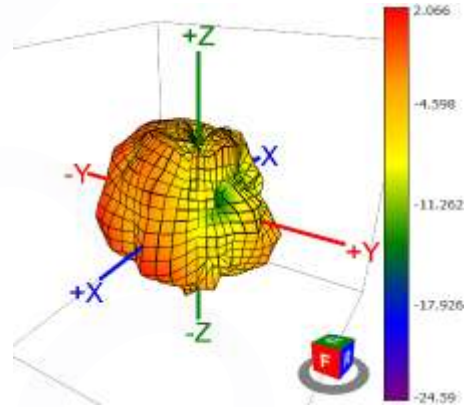
5350MHz



5725MHz

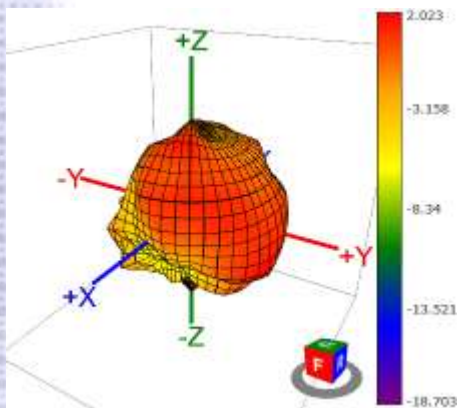


5850MHz

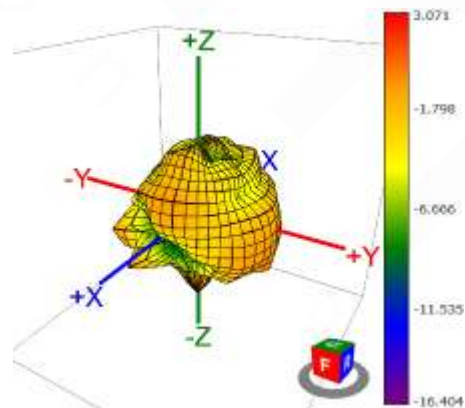


WiFi MIMO1

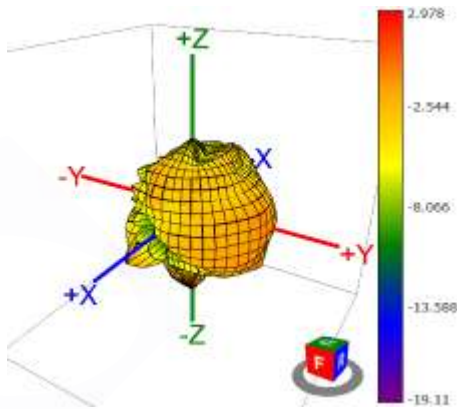
2400MHz



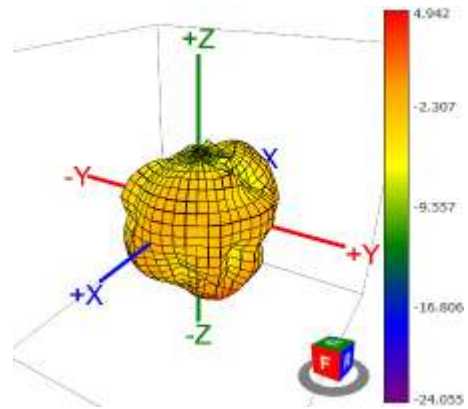
2450MHz



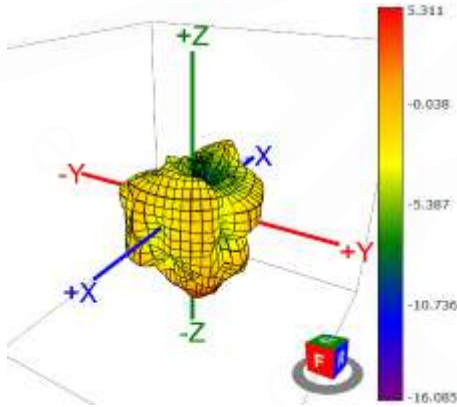
2500MHz



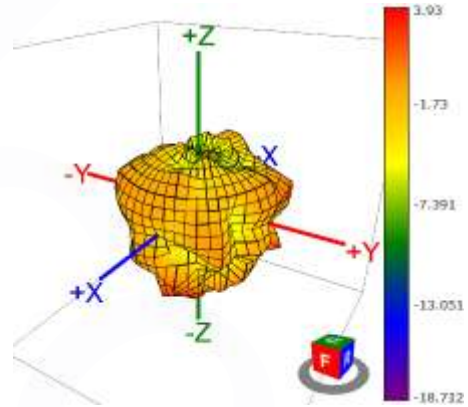
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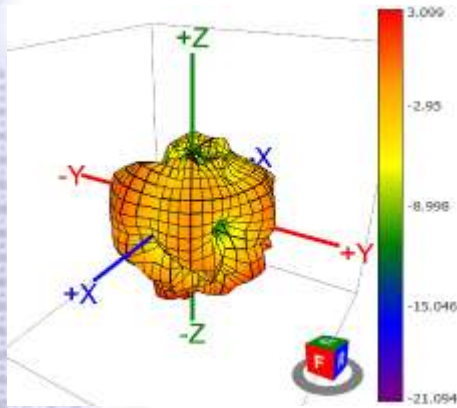
5350MHz



5750MHz



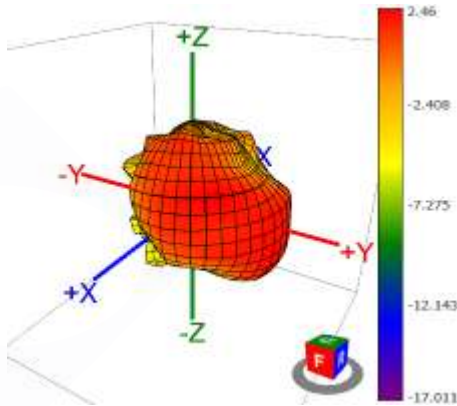
5850MHz



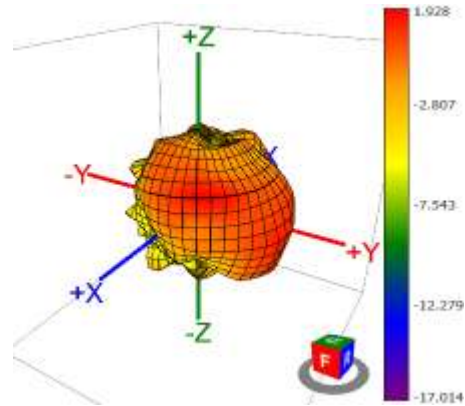
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WiFi MIMO2

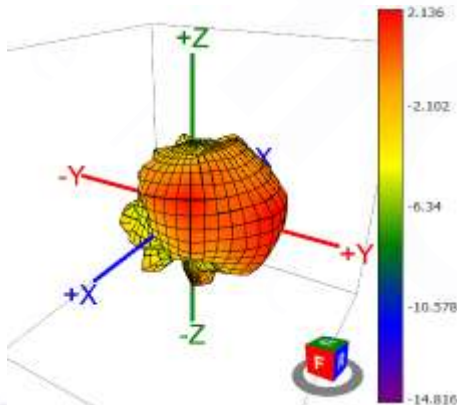
2400MHz



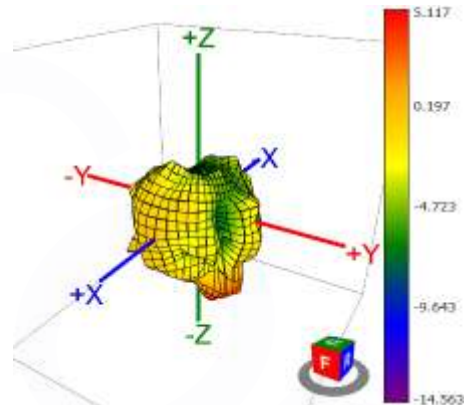
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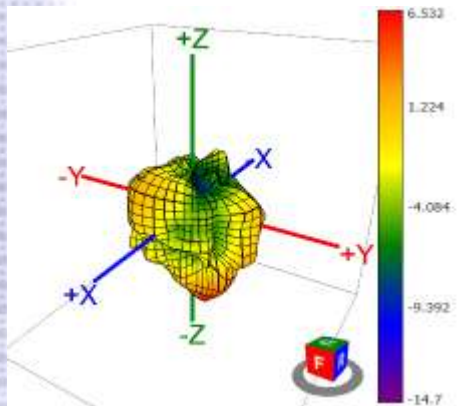
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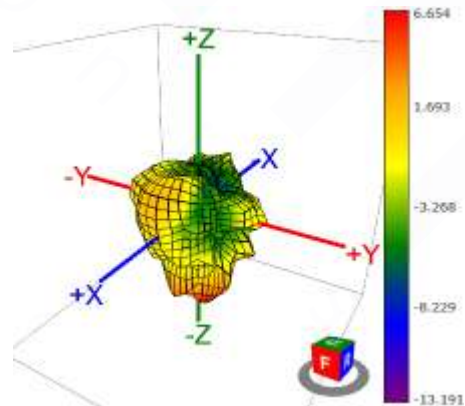
5150MHz



5350MHz



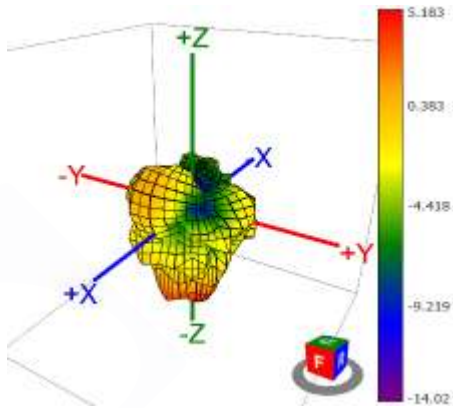
5750MHz



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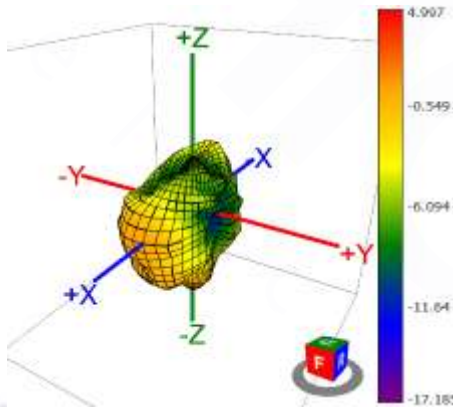


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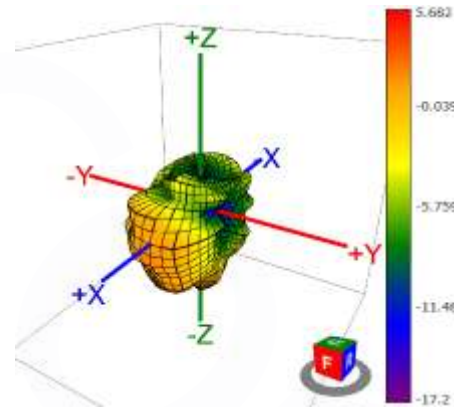


WiFi MIMO3

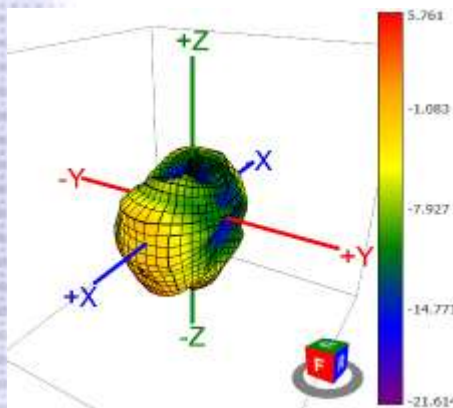
2400MHz



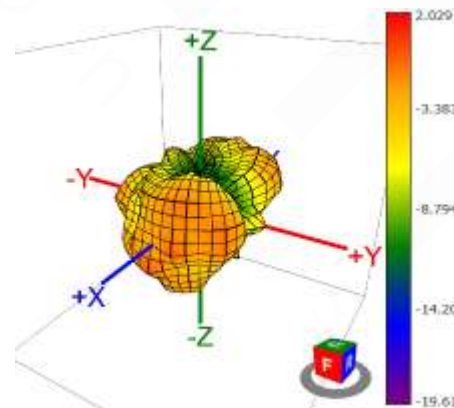
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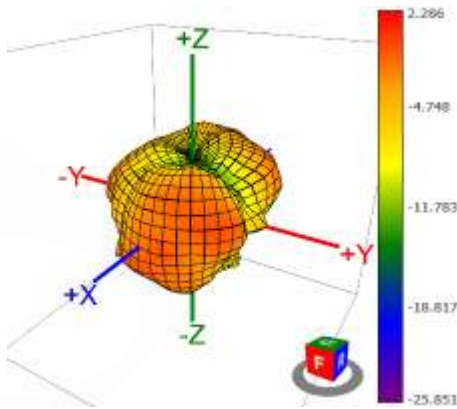
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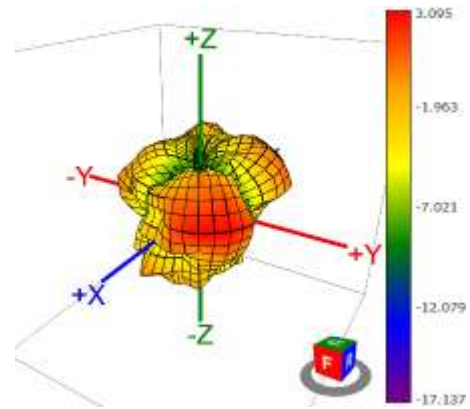
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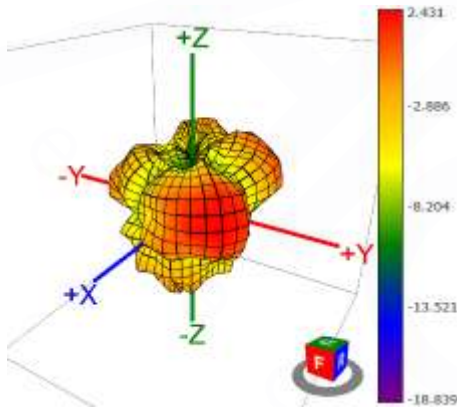
5350MHz



5750MHz



5850MHz



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**VI. Mechanical Drawing (Unit:mm):**

