

2-3. VSWR ,Efficiency ,Matching and Active Data :

2-3.1 VSWR:

Frequency Band	880	960	1710	2170	2300	2690
2-3-1. Typical Value:	≤ 3.5	≤ 2.5	≤ 2	≤ 3.0	≤ 2.5	≤ 2

2-3-2 Measuring Method	<ol style="list-style-type: none"> 1. A 50Ωcoaxial cable is connected to the fpcb antenna. Then this cable is connected to a network analyzer to measure the VSWR. 2. Keeping this jig away from metal at least 20 cm.
------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



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ANGLES = ± HOLEDIA = ±

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2-3-4Picture



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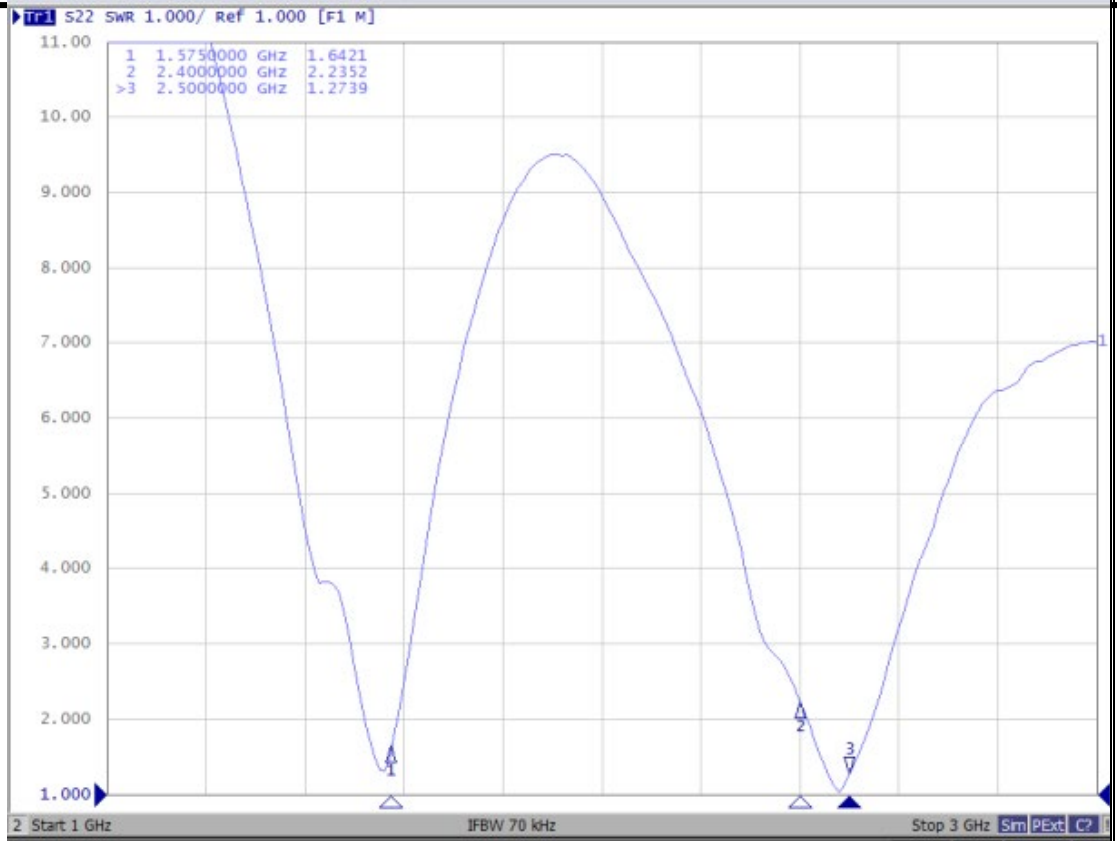
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2-3-5Picture



2-4. Measure and Chamber

2-4-1 Measure method

1. Using a low loss coaxial cable to link a standard handset jig
2. Fixed this handset jig on chamber's rotator plane
3. Linking jig into network analyzer port and using a probing horn antenna to collect data.
4. Using another standard gain horn antenna to calibrated those data

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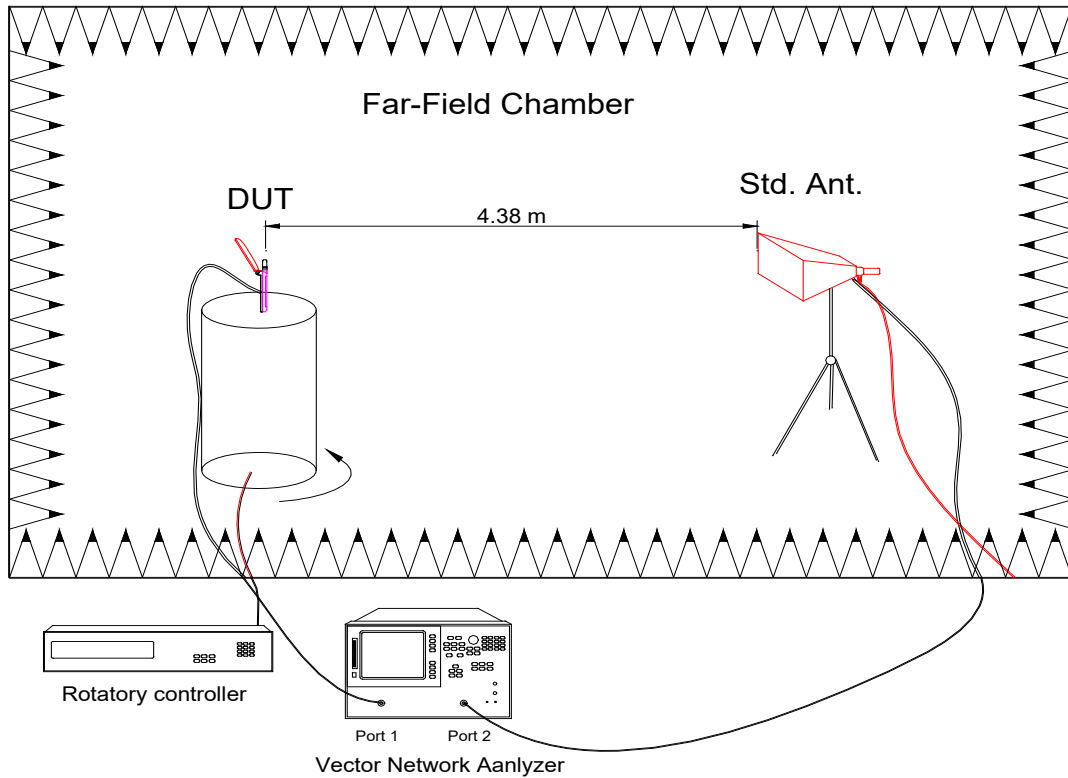
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2-4-2 Chamber definition



1. An anechoic chamber (8mx4mx3.5m) which satisfied far-field condition was applied to avoid multi-path effect
2. The quiet room region is 40cmx40cmx40cm at the center of rotator
3. The distance between DUT and standard antenna is 4.38 m
4. Probing antenna (9120D horn antenna) and standard gain horn antenna (BBHA9120 LPF 700MHz ~6GHz)

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2-4-3 LTE Antenna Efficiency

Frequency (MHz)	Efficiency (dB)		Frequency (MHz)	Efficiency (dB)	
	Efficiency (dB)	Gain (dBi)		Efficiency (dB)	Gain (dBi)
600	-10.03	-9.78	1920	-7.74	-4.82
610	-9.47	-9.35	1940	-7.69	-5.27
620	-8.59	-8.56	1960	-7.72	-5.48
630	-7.75	-7.65	1980	-7.95	-5.48
640	-7.25	-6.8	2000	-7.64	-5.08
650	-6.87	-5.87	2020	-7.51	-5.23
660	-6.77	-5.08	2040	-7.35	-5.5
670	-6.81	-4.39	2060	-7.62	-5.96
680	-7.2	-3.82	2080	-7.55	-5.99
690	-7.62	-3.38	2100	-7.46	-5.5
700	-8.02	-3.62	2120	-7.27	-4.83
710	-11.68	-4.56	2140	-7.21	-4.35
720	-13.32	-6.33	2160	-7.26	-4.02
730	-12.51	-5.54	2180	-7.12	-3.91
740	-12.02	-4.93	2200	-7.09	-3.6
750	-11.68	-4.56	2220	-7.09	-3.42
760	-11.17	-4.23	2240	-6.97	-2.63
770	-10.66	-3.9	2260	-6.93	-2.31
780	-10.11	-3.84	2280	-6.64	-1.88
790	-9.25	-3.99	2300	-6.71	-2.1
800	-7.19	-4.2	2320	-6.8	-1.66
810	-8.78	-7.03	2340	-6.85	-1.09
820	-7.89	-6.21	2360	-6.33	-0.21
830	-7.37	-5.39	2380	-7.46	0.11
840	-7.48	-2.75	2400	-7.04	0.02
850	-7.04	-4.29	2420	-7.06	0
860	-7.09	-3.34	2440	-6.96	-0.22
870	-7.31	-2.98	2460	-6.79	-0.69
880	-7.48	-2.75	2480	-6.83	-1.31
890	-7.96	-2.76	2500	-6.07	-3.14
900	-8.39	-2.95	2520	-6.03	-3.05
910	-6.49	-3.6	2540	-6.22	-3.33
920	-7.06	-3.42	2560	-6.53	-3.22
930	-7.89	-3.49	2580	-6.38	-2.88
940	-8.75	-3.57	2600	-6.64	-3.14
950	-9.71	-3.69	2620	-6.63	-3.35
960	-10.72	-3.99	2640	-6.76	-3.79

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1700	-8.81	-4.77	2660	-6.89	-4.05
1720	-8.59	-4.67	2680	-7.05	-3.81
1740	-7.37	-4.47	2700	-7.33	-3.95
1760	-7.44	-4.56			
1780	-8.2	-4.39			
1800	-8.41	-4.28			
1820	-8.77	-4.88			
1840	-8.74	-5.38			
1860	-8.56	-5.2			
1880	-8.46	-5.08			
1900	-8.07	-4.71			

2-4-4 4 IN1 Antenna Efficiency(BT/BLE/2.4G WIFI/5G WIFI)

GPS				2.4G WIFI				5G WIFI			
Frequency (MHz)	Gain (dBi)	Efficiency (dB)	Efficiency (%)	Frequency (MHz)	Gain (dBi)	Efficiency (dB)	Efficiency (%)	Frequency (MHz)	Gain (dBi)	Efficiency (dB)	Efficiency (%)
1550	1.16	-4.66	34%	2400	-0.18	-5.03	31%	5150	1.15	-4.5	35%
1555	1.47	-4.46	36%	2410	0.38	-4.69	34%	5200	-0.2	-5.14	31%
1560	1.45	-4.57	35%	2420	0.92	-4.32	37%	5250	-1.13	-5.66	27%
1565	1.44	-4.53	35%	2430	0.53	-4.53	35%	5300	-0.19	-5.88	26%
1570	1.42	-4.49	36%	2440	0.68	-4.64	34%	5350	1.15	-4.5	35%
1575	1.26	-4.49	36%	2450	1.15	-4.5	35%	5400	-0.03	-6	25%
1580	1.07	-4.54	35%	2460	0.82	-4.75	34%	5450	0.61	-6.4	23%
1585	0.85	-4.59	35%	2470	0.68	-4.97	32%	5500	-0.35	-6.46	23%
1590	0.49	-4.72	34%	2480	1.01	-4.9	32%	5550	-0.26	-6.5	22%
1595	0.13	-5.03	31%	2490	0.78	-5.05	31%	5600	1.15	-4.5	35%
1600	0.11	-5.1	31%	2500	0.38	-5.36	29%	5650	-2.38	-6.58	22%
								5700	-2.36	-7.32	19%
								5750	1.15	-4.5	35%
								5800	-1.32	-5.58	28%
								5850	-1.66	-7.14	19%

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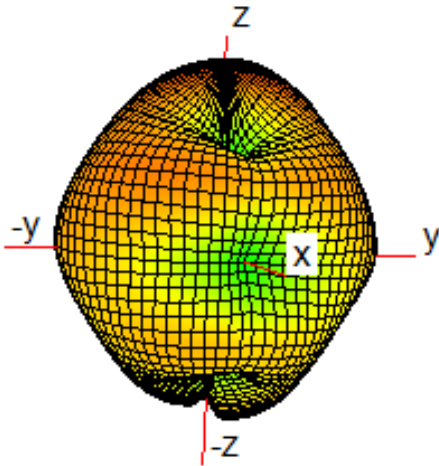


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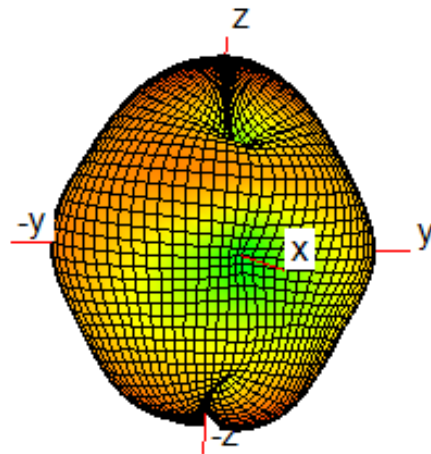
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3. LTE Antenna 3D Radiation Pattern

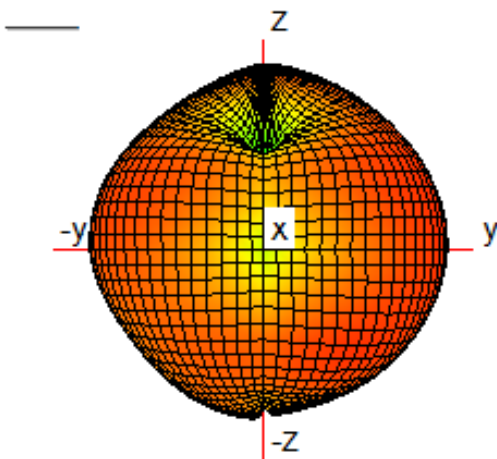
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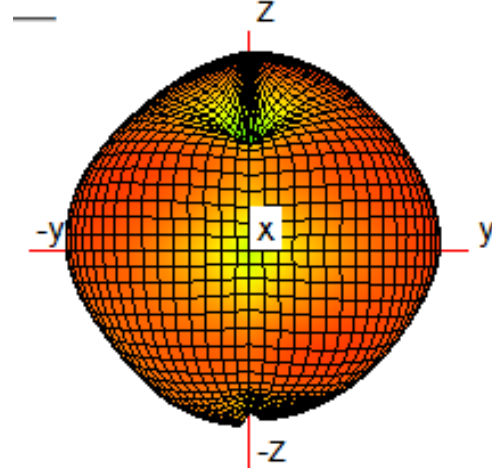
-LTE B2[1905MHz]



-LTE B4[790MHz]



-LTE B4[790MHz]



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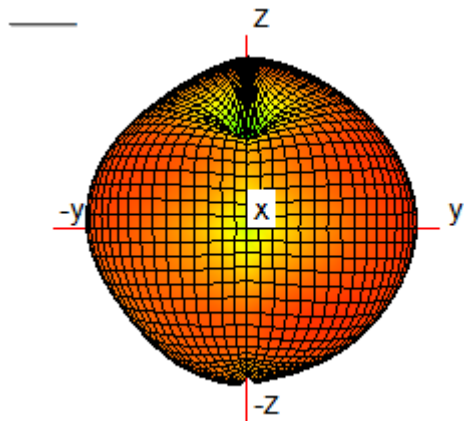
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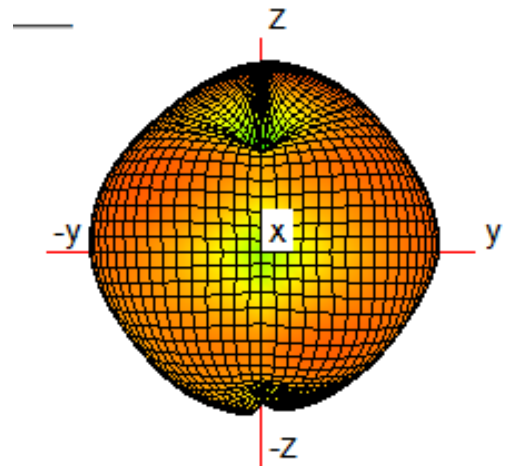
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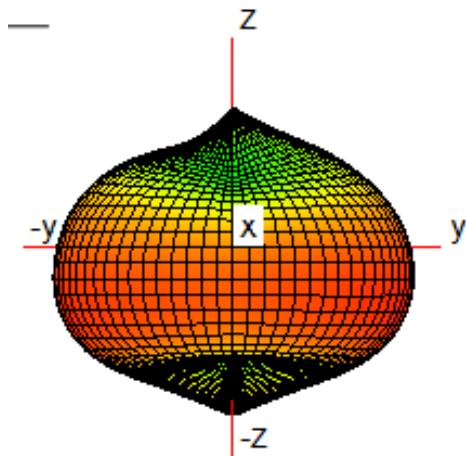
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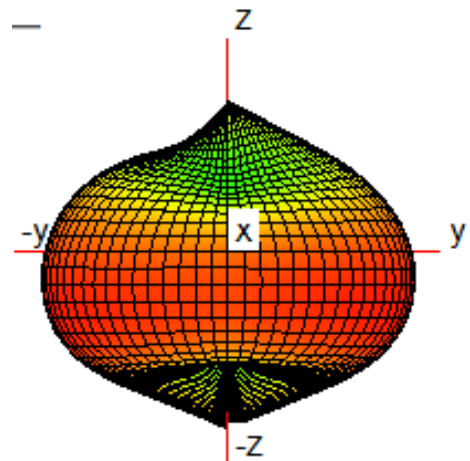
-LTE B66[1775MHz]



-LTE B5[829MHz]



-LTE B5[844MHz]



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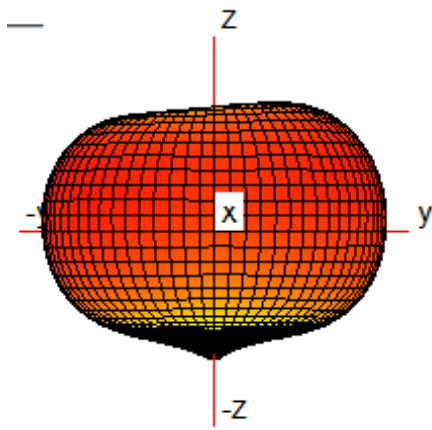
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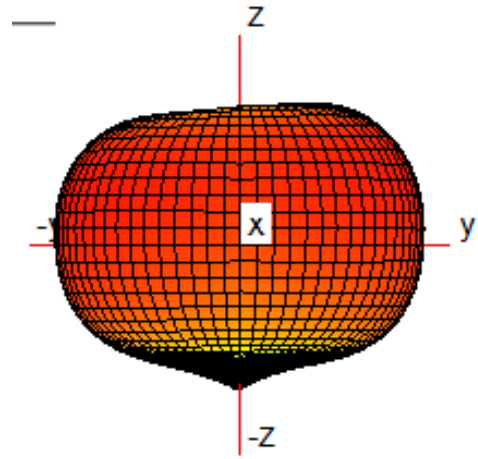
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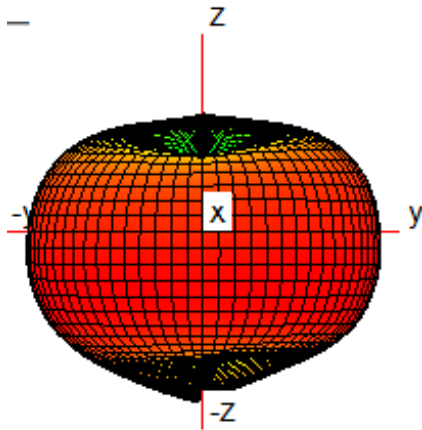
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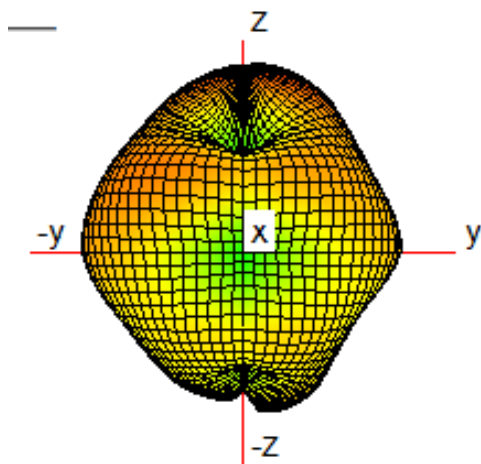
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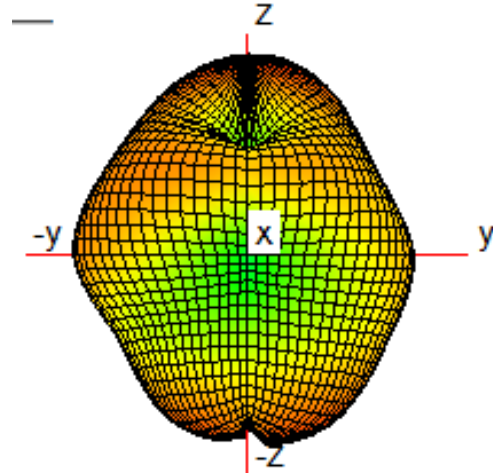
-LTE B13[782MHz]



-LTE B25[1855MHz]



-LTE B25[1910MHz]



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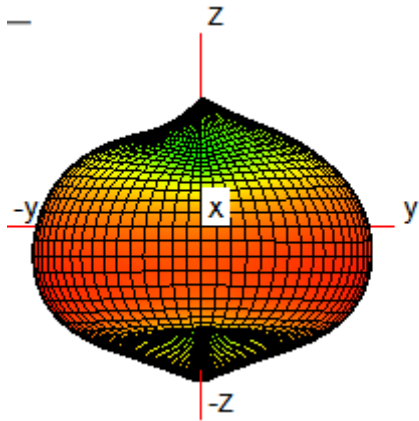
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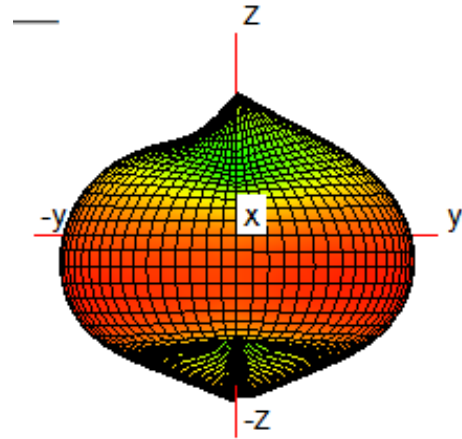
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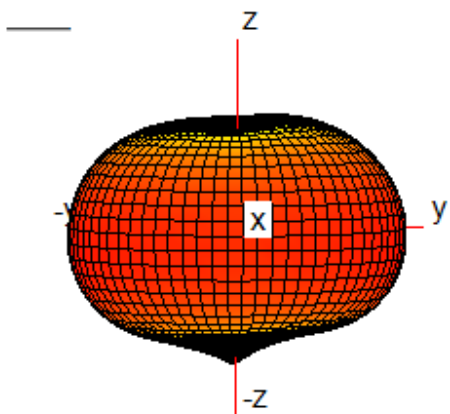
-LTE B26[819MHz]



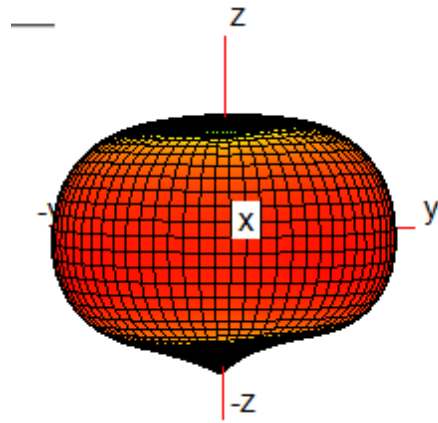
-LTE B26[844MHz]



-LTE B71[661MHz]



-LTE B71[693MHz]



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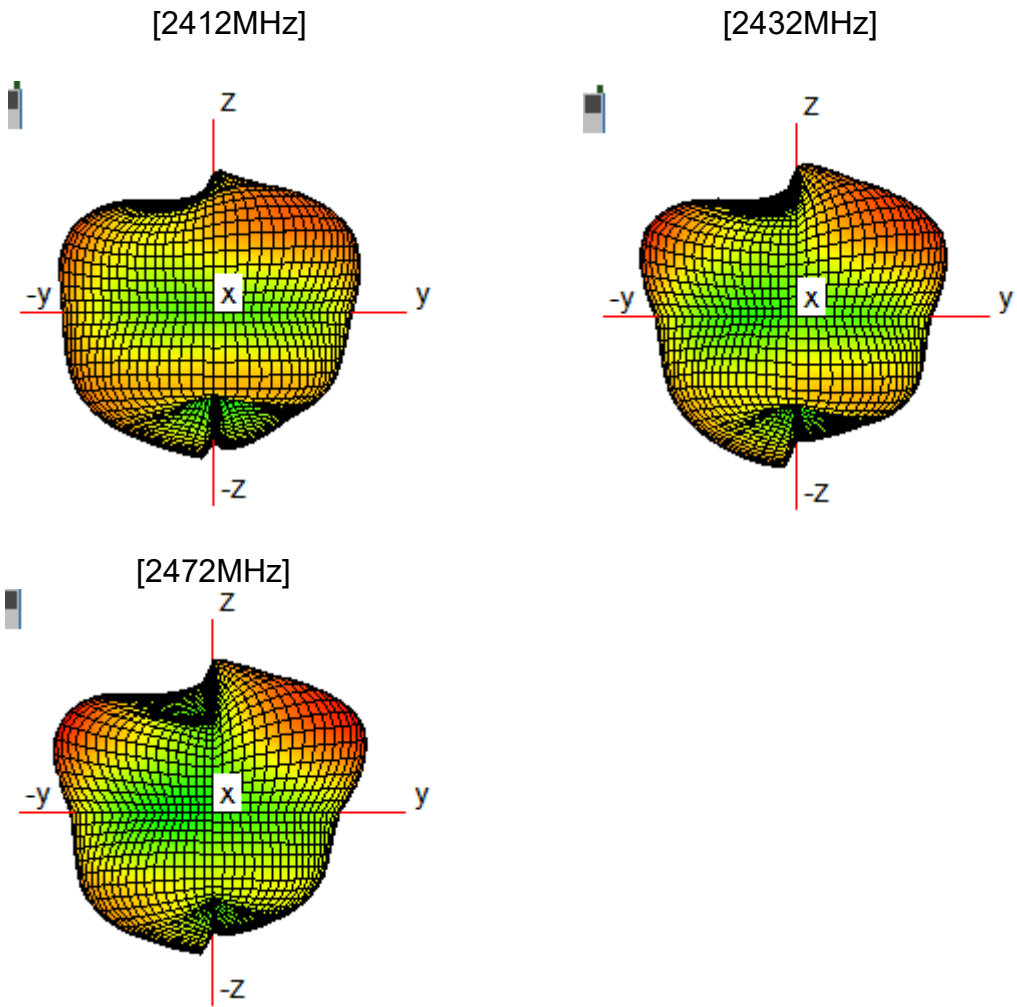
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4 4IN1 Antenna 3D Radiation Pattern(BT/BLE/2.4G WIFI/5G WIFI)

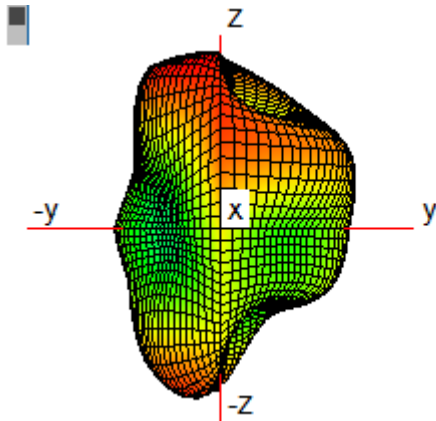
BT/WiFi 2.4GHz



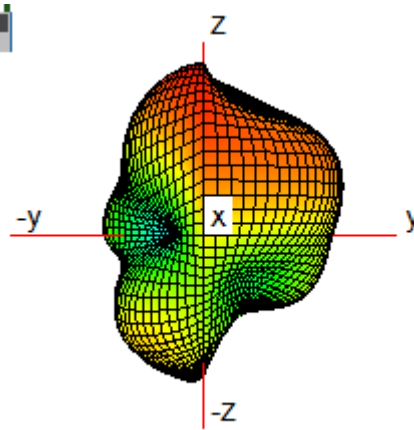
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WiFi 5GHz

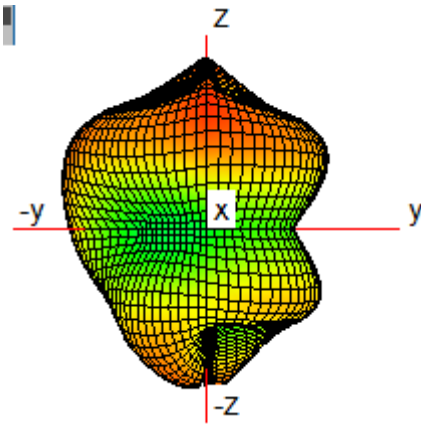
[5180MHz]



[5320MHz]



[5825MHz]



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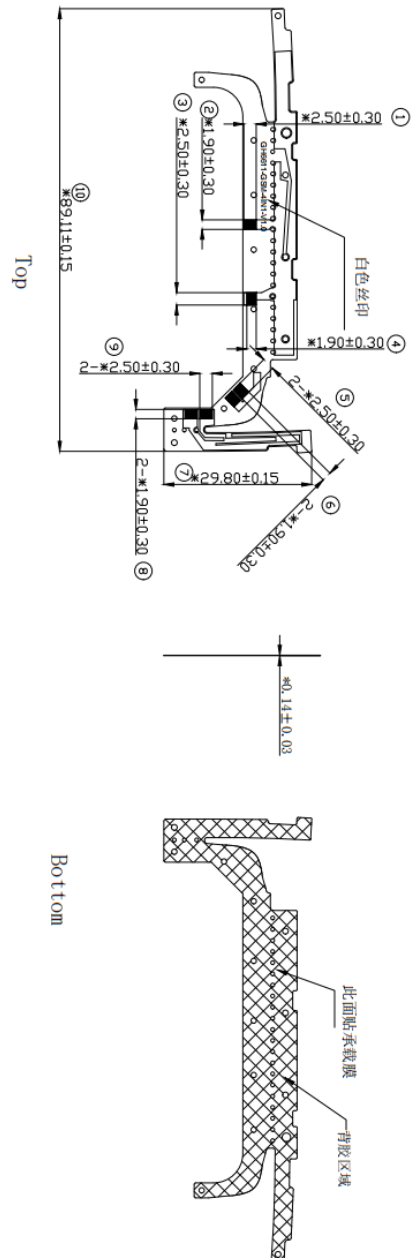
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4. Antenna Dimensions:



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