



Datasheet

4-in-1 Antennas

Part No:
MA9904.A.004.ep

Description:

Guardian X 0.35m 4in1 4*LTE/5GNR MIMO

Features:

Low-profile Housing with Wall Mount

4*5G/4G LTE MIMO 600 to 6000MHz

Cables: 5G/4G 0.35m of TGC-200

Connectors: 5G/4G – FAKRA Code

Dimensions: 360x160x16.5mm

0.35m RG-58 with FAKRA

RoHS & Reach Compliant

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1. Introduction



The Taoglas MA9904.A Guardian X has been designed to combine a high number of antenna combinations in one enclosure. The MA9904.A is a 4-in-1 combination antenna that combines all 4 antenna elements in one low-profile heavy-duty, IP67 rated waterproof, adhesive mount external enclosure. The MA9904.A comes with 4* 5G/4G Cellular MIMO (600-6000MHz) as standard. The MA9904.A has been designed as a low profile solution for IoT and Automotive applications where space is at a premium.

This is an ideal external combination antenna solution that is used where drilling a hole through the roof of a vehicle or a metal panel for an external antenna is not feasible. The MA9904 also operates at Band 71, the newly established 5G band at 600MHz.

Typical applications include:

- Passenger Bus / Rail / Air Applications.
- Automotive and Heavy Equipment Vehicle Tracking and Telematics
- HD Video over 5G/4G - First Responder and Emergency Services
- M2M Applications/IoT

5G/4G applications demand high-speed data uplink and downlink. High efficiency and high gain MIMO antennas are necessary to achieve the required signal to noise ratio and throughput required to solve these challenges. Taoglas also takes care to ensure high isolation between the MIMO antennas to prevent selfinterference. Low loss cables are used to keep efficiency high over longer cable lengths. In contrast, smaller MIMO antennas with poorer quality thin cables will have reduced efficiency and isolation, which would lead to a large drop in system throughput, increased incidences of signal drops, and may indeed not make a system connection at all.

Cable type and length, and connector types are fully customizable and the GuardianX can also be customized for any variation of antennas below 4-in-1. Contact your regional Taoglas customer support team for more information.

2. Specifications

5GNR Antennas											
Frequency (MHz)		5GNR B71	LTE 700	LTE B5_B8	5GNR 1500	5GNR N66	LTE 2600	5GNR N77	5GNR N78	5GNR N79	LTE 5200
		650-698	698-824	824-960	1427-1518	1710-2200	2300-2690	3300-4200	3300-3800	4400-5000	5150-5925
Efficiency (%)											
LTE 1	0.35m	84.5	74.9	69.6	64.2	75.6	64.5	70.0	70.0	79.3	66.2
LTE 3	0.35m	71.8	82.4	71.4	62.1	77.4	77.0	65.4	64.5	77.4	65.7
LTE 6	0.35m	49.6	76.0	73.1	55.0	65.5	66.8	65.2	64.5	74.5	58.4
LTE 8	0.35m	73.4	62.6	55.4	34.7	75.6	74.2	64.5	65.0	59.6	45.4
Average Gain (dB)											
LTE 1	0.35m	-0.73	-1.26	-1.58	-1.92	-1.22	-1.91	-1.55	-1.55	-1.01	-1.79
LTE 3	0.35m	-1.44	-0.84	-1.46	-2.07	-1.11	-1.13	-1.85	-1.91	-1.11	-1.82
LTE 6	0.35m	-3.05	-1.19	-1.36	-2.60	-1.84	-1.75	-1.86	-1.90	-1.28	-2.34
LTE 8	0.35m	-1.34	-2.03	-2.56	-4.59	-1.22	-1.30	-1.91	-1.87	-2.25	-3.43
Peak Gain (dBi)											
LTE 1	0.35m	5.09	4.39	4.91	4.54	5.11	4.29	5.98	4.97	6.30	5.89
LTE 3	0.35m	2.99	4.65	3.87	3.23	5.92	6.19	4.62	4.62	4.65	4.75
LTE 6	0.35m	3.04	3.61	3.66	3.61	4.71	4.53	4.90	4.90	4.72	5.52
LTE 8	0.35m	3.69	3.82	3.53	2.30	6.09	6.26	5.52	4.06	5.63	4.11
Impedance				50 Ω							
Polarization				Linear							
Radiation Pattern				Omni							
Max. input power				20W							

Mechanical	
Dimensions	360mm*160mm
Weight	740 g (Not Included Cable and Package)
Housing	PC
Connector	LTE: FAKRA Code A(LTE-1); FAKRA Code B(LTE-3); FAKRA Code C(LTE-8); FAKRA Code D(LTE-6)
Cable	TGC-200 Coaxial Cable
Environmental	
Waterproof Rating	IP67
Temperature Range	-40°C to 85°C
Humidity	Non-condensing 65°C 95% RH

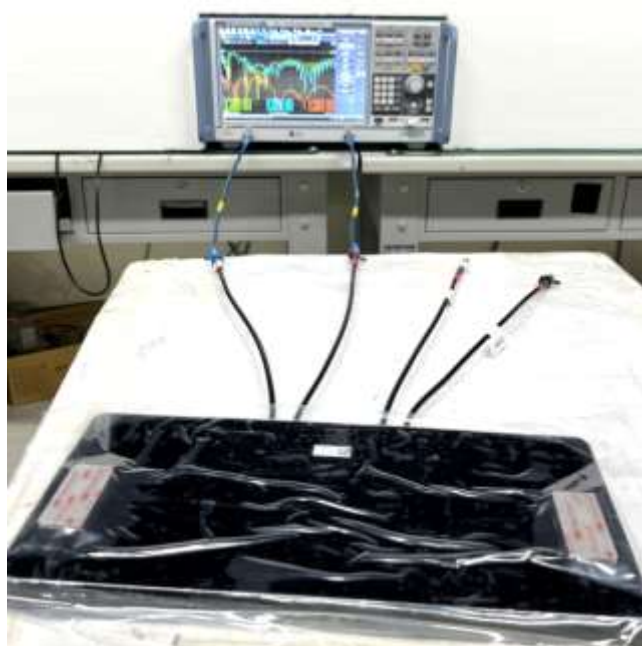
3. Test Setup

3.1 S11 / VSWR / Return Loss

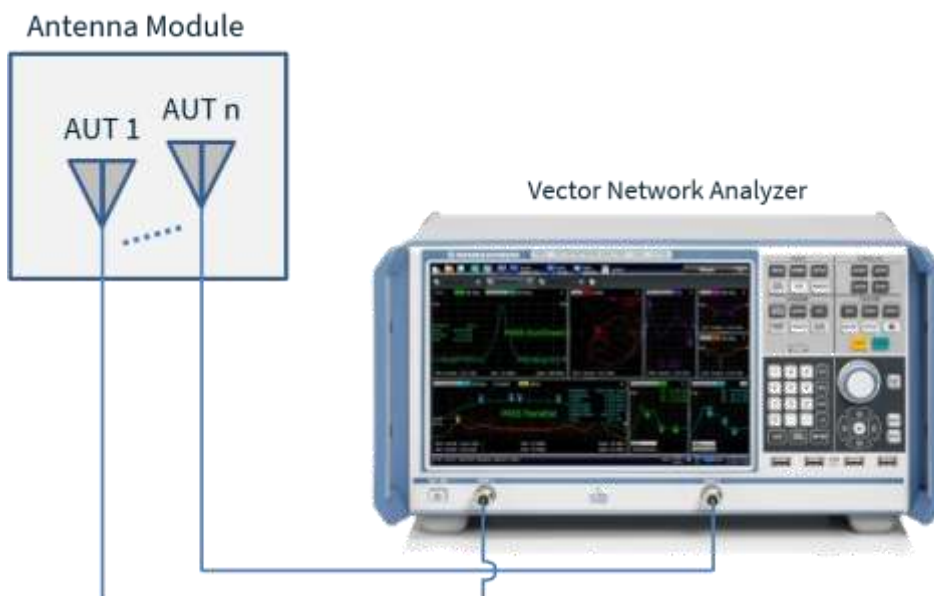
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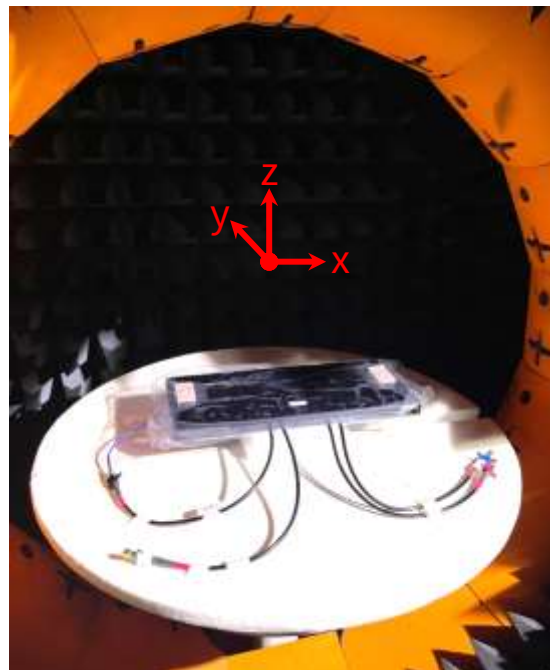
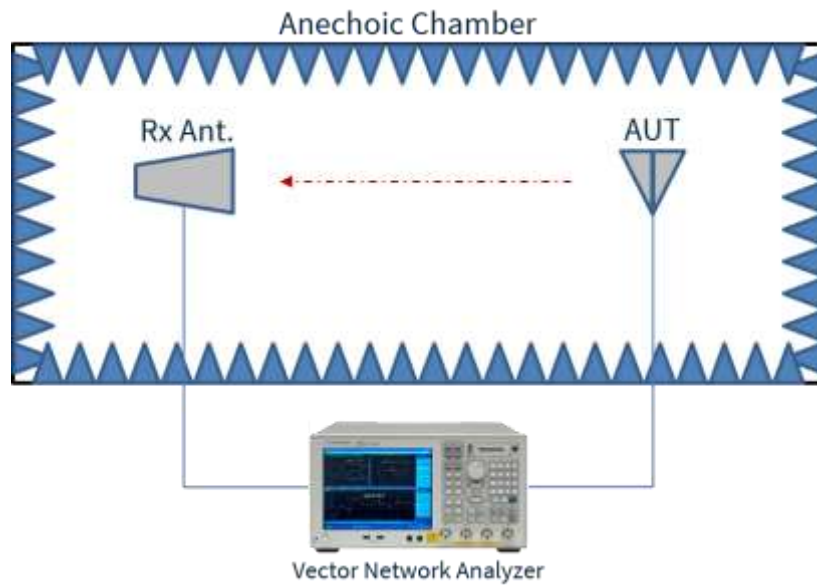
Vector Network Analyzer



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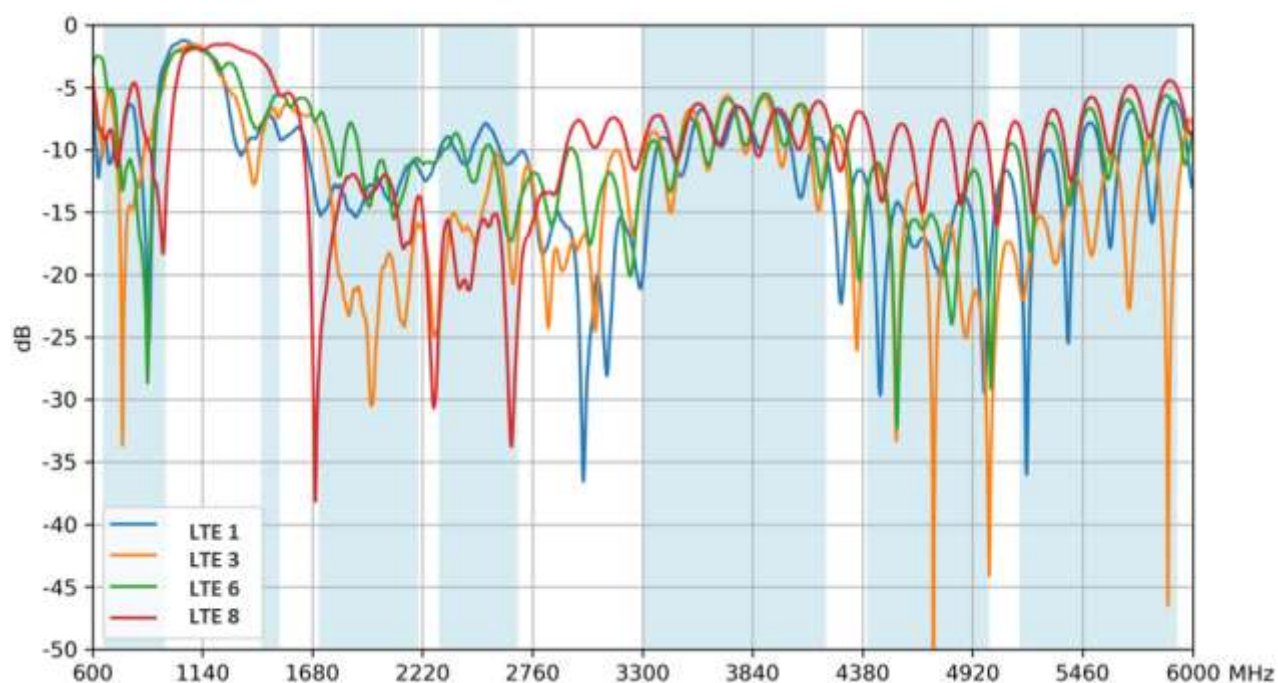


3.3 Radiation Performance

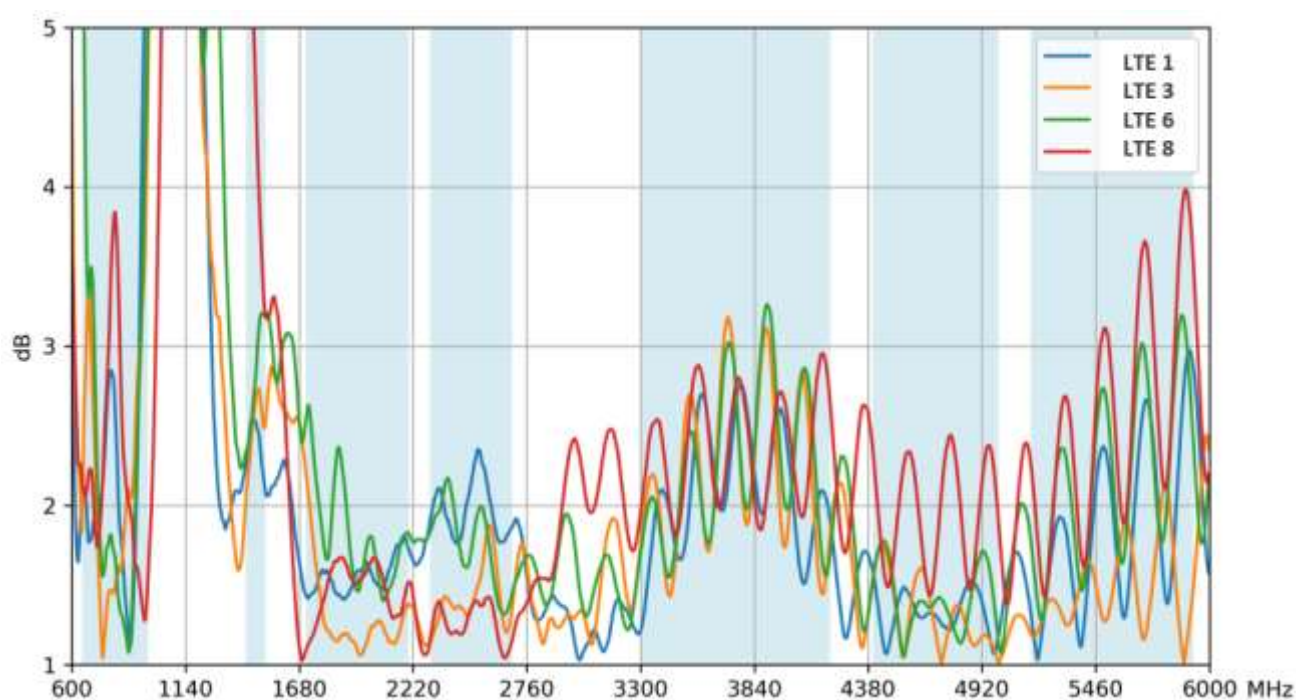


4. Antenna Characteristics

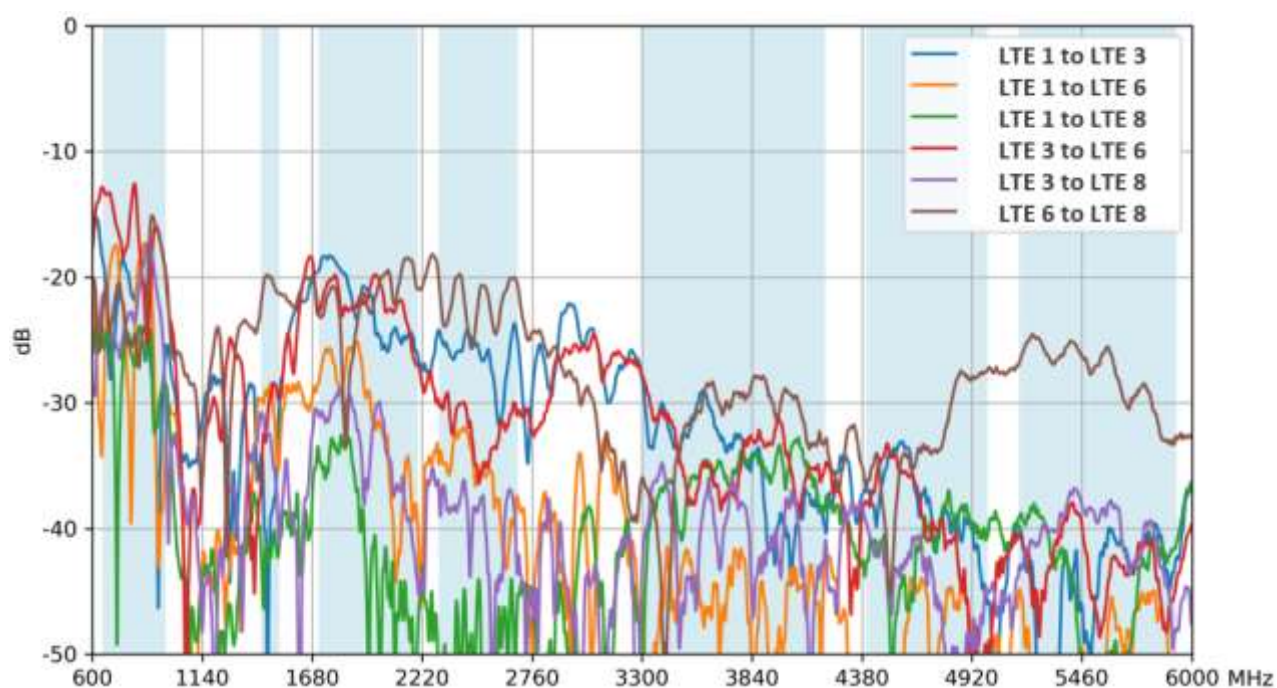
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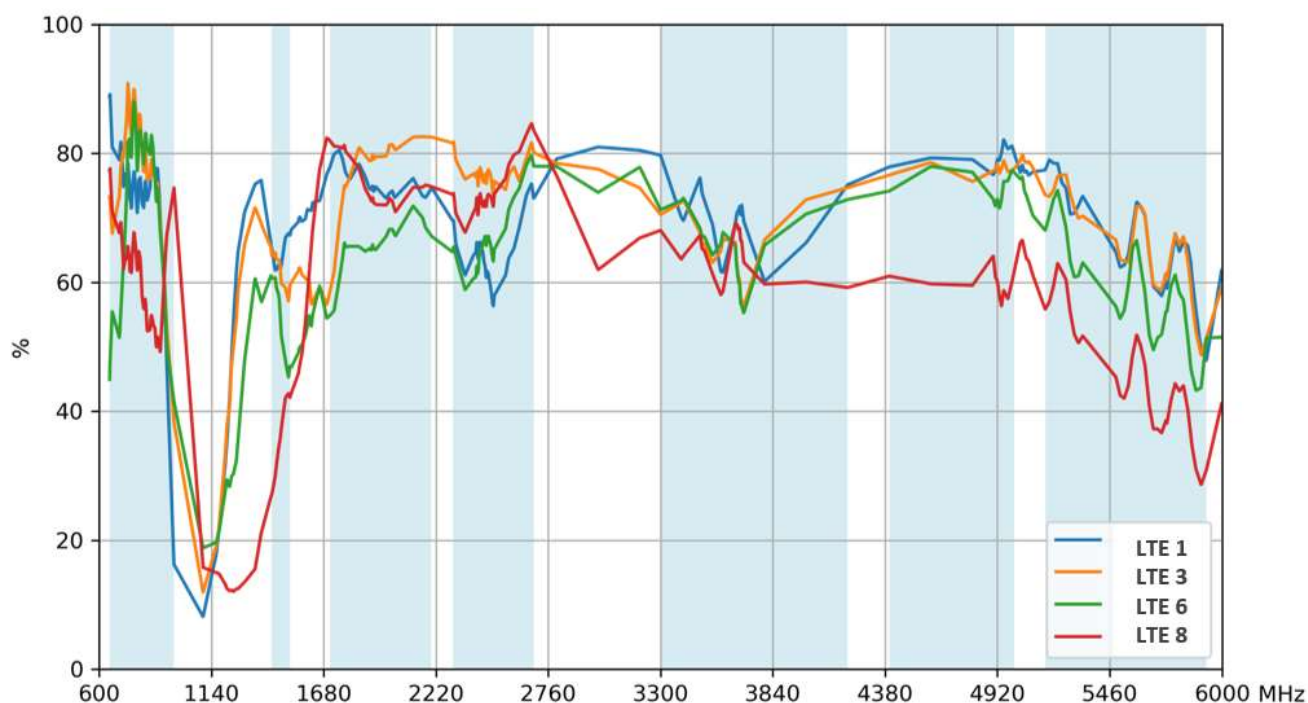
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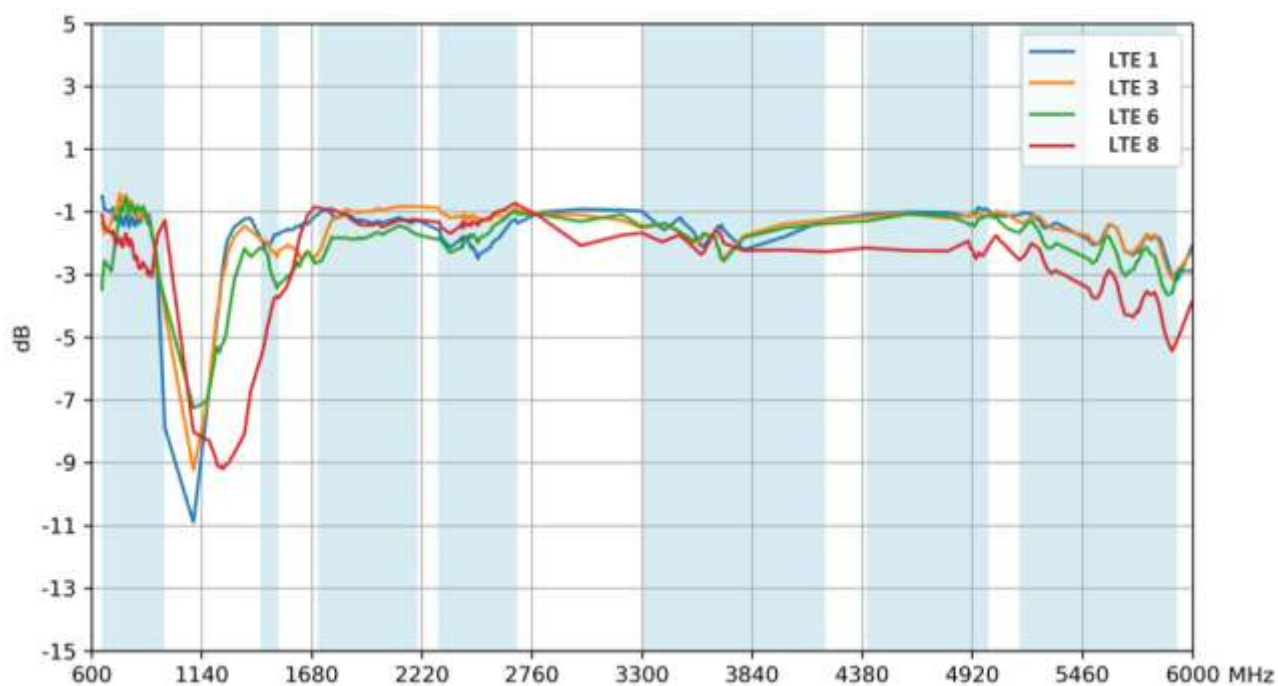
4.3 Isolation



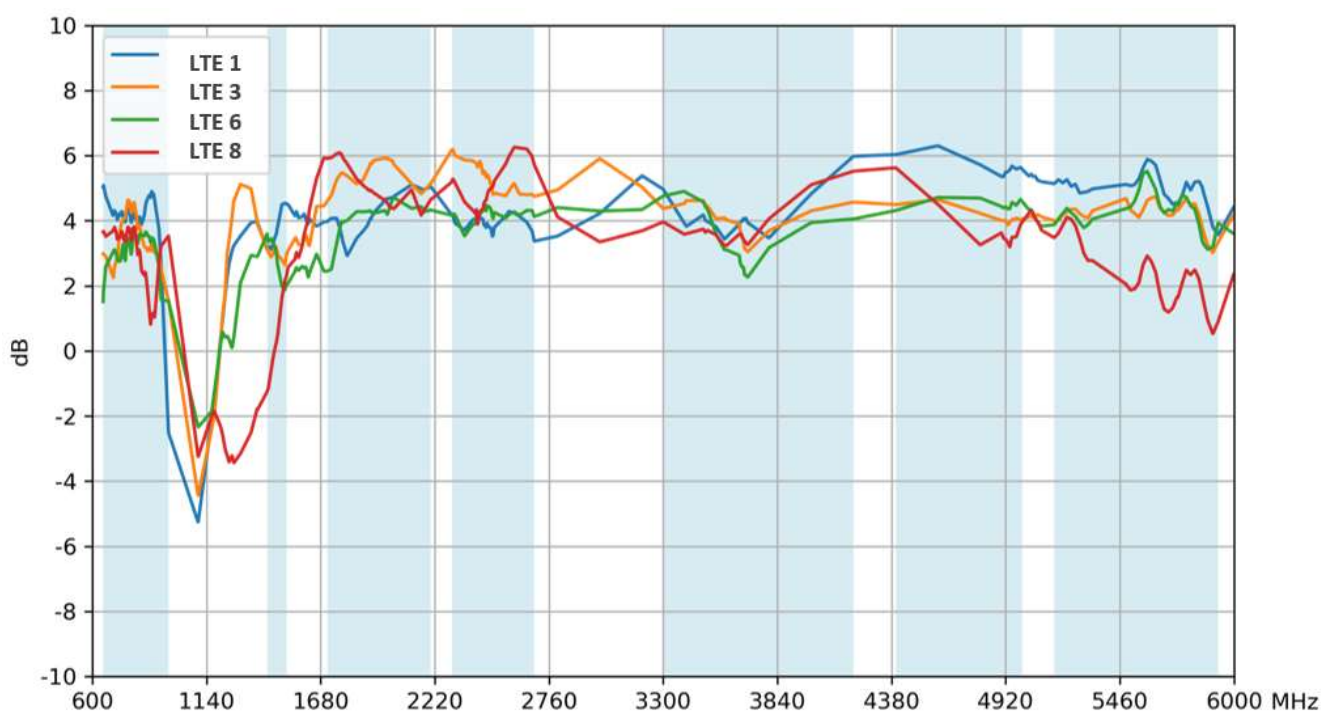
4.4 Efficiency



4.5 Average Gain

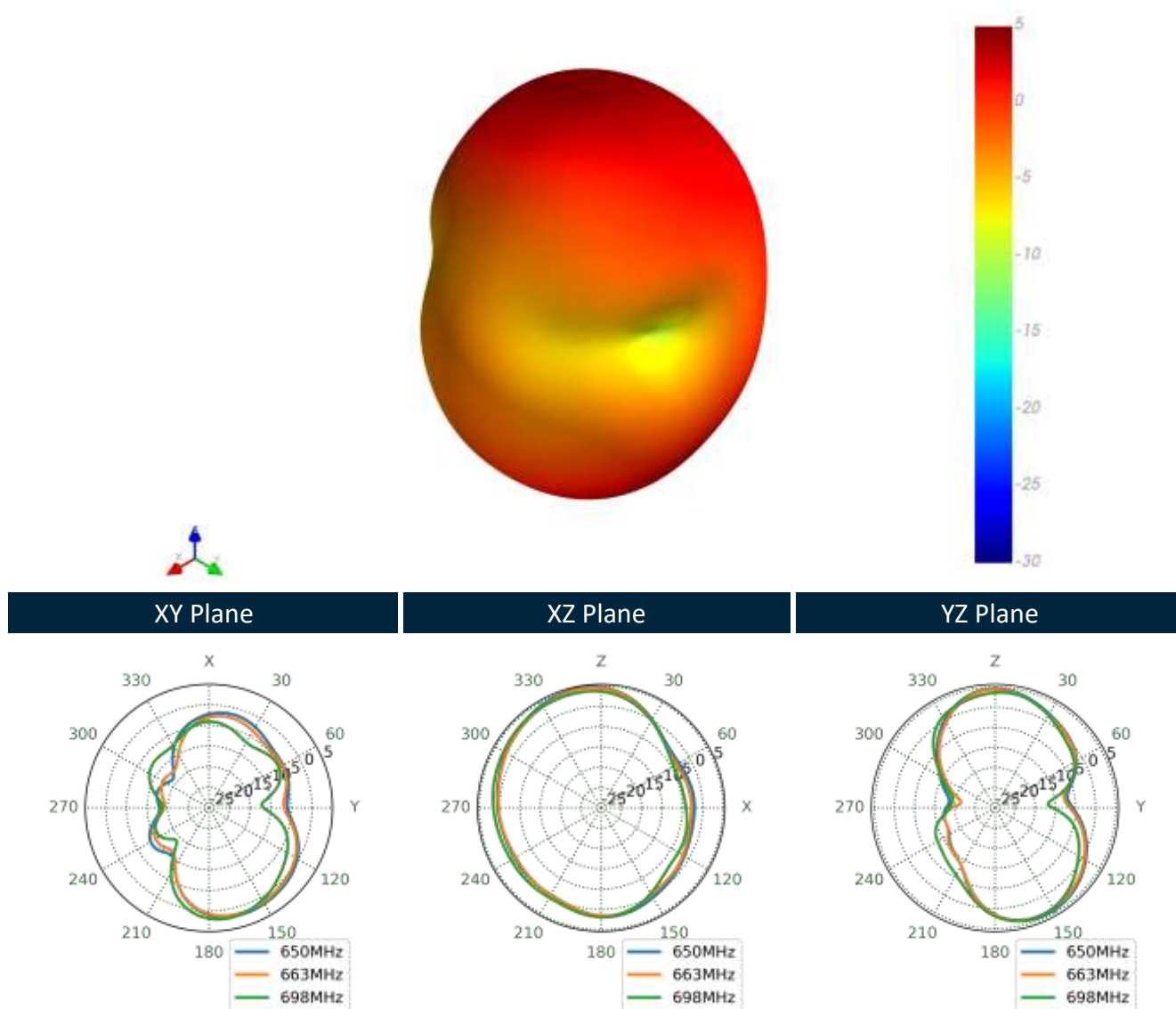


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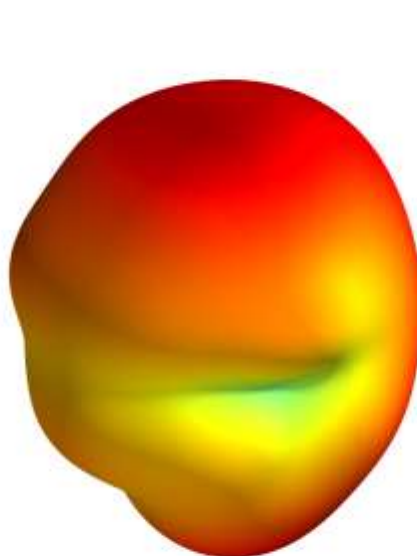


5. Radiation Patterns

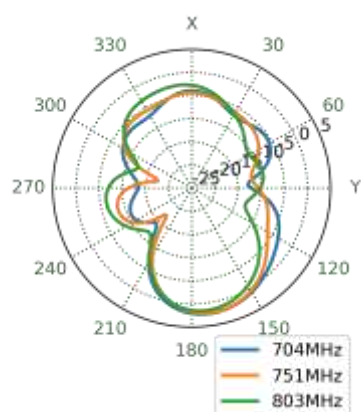
5.1 LTE 1 663MHz 3D and 2D Radiation Patterns



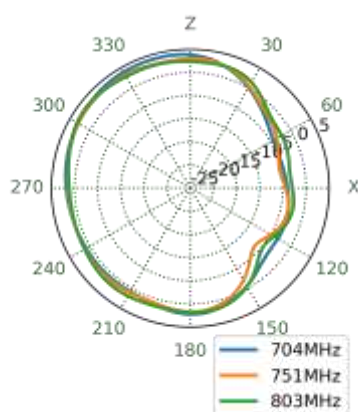
751MHz



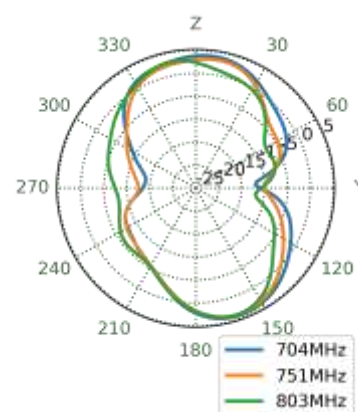
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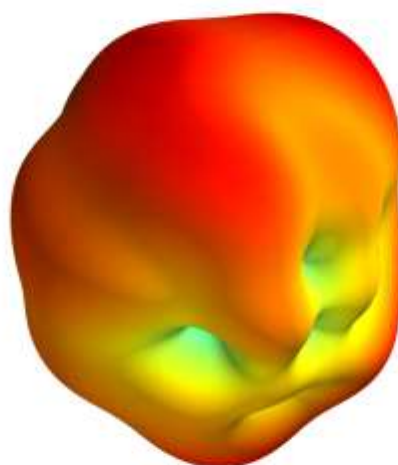
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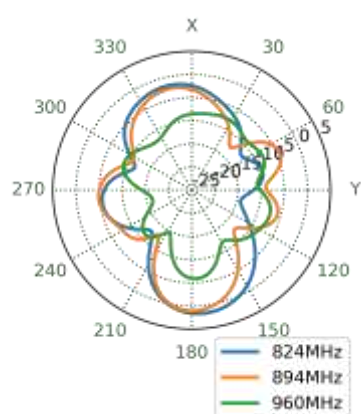
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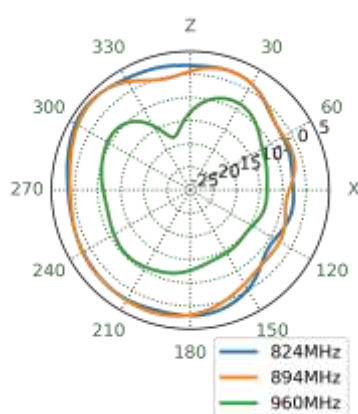
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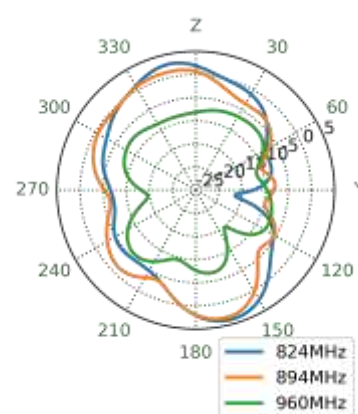
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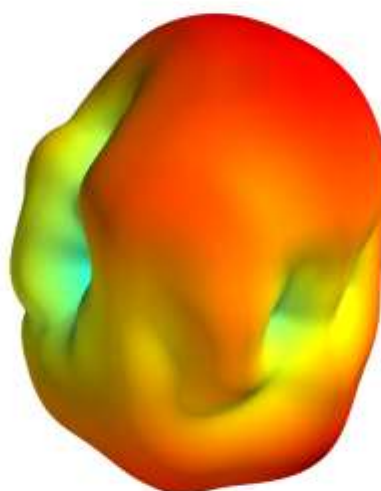
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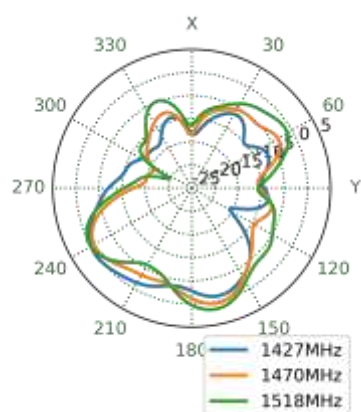
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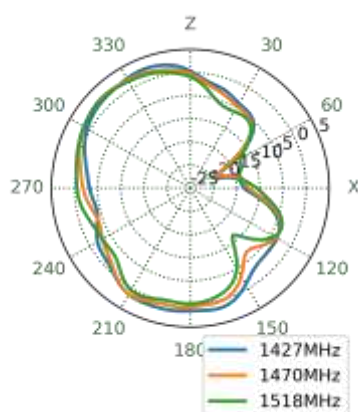
1470MHz



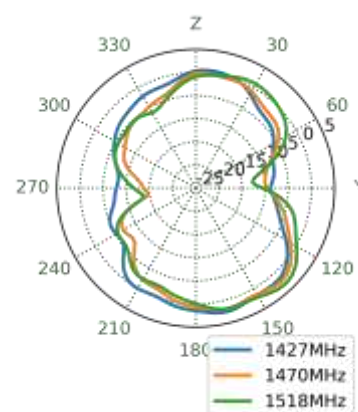
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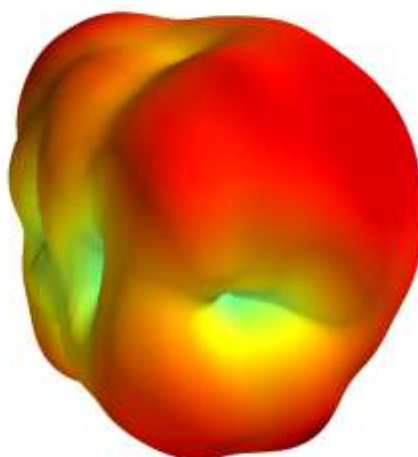
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YZ Plane



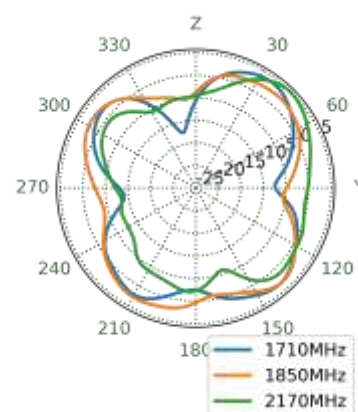
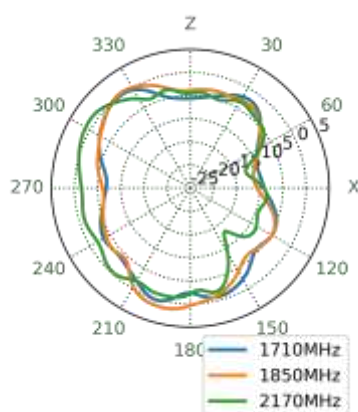
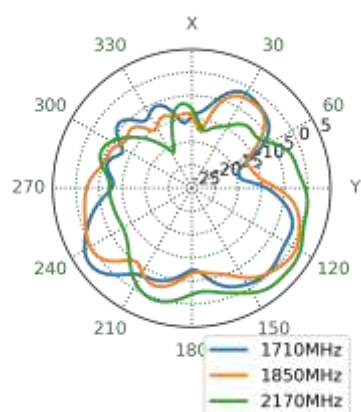
1850MHz



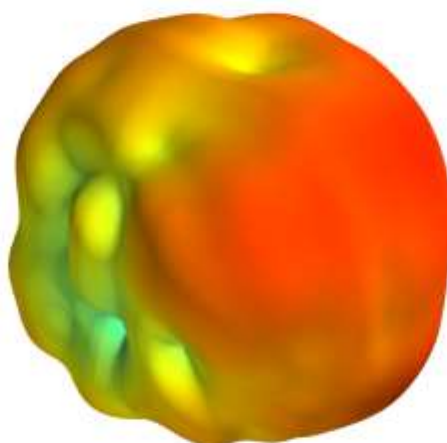
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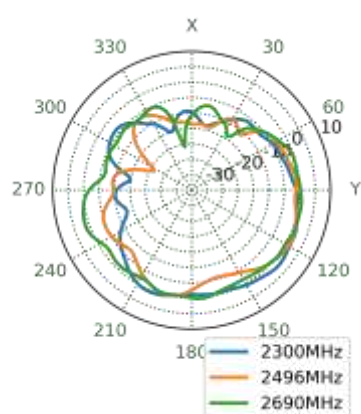
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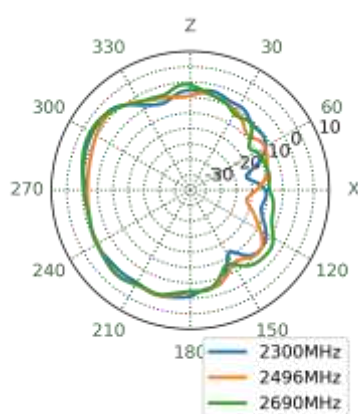
2496MHz



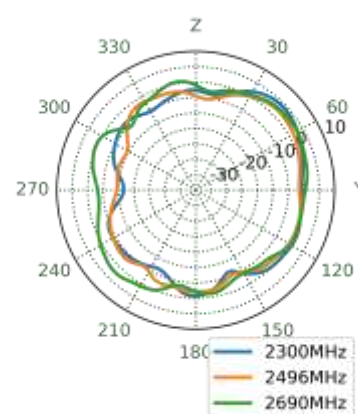
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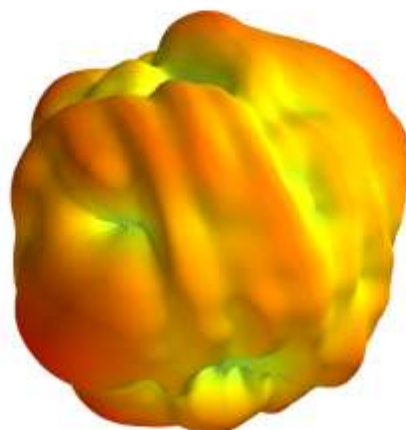
XZ Plane



YZ Plane



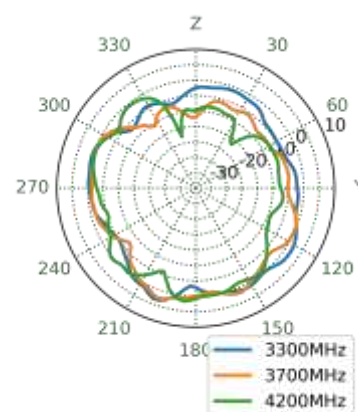
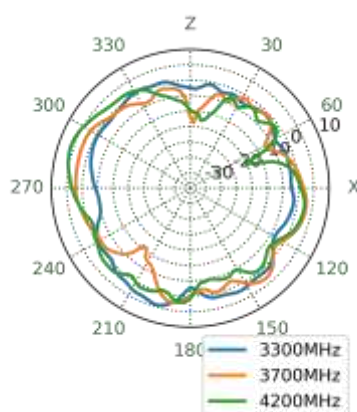
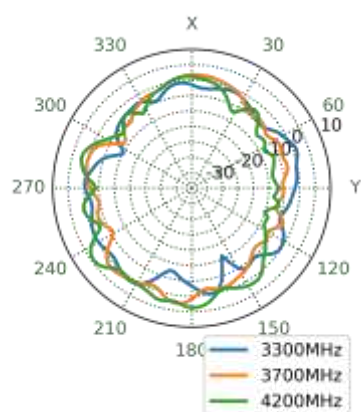
3700MHz



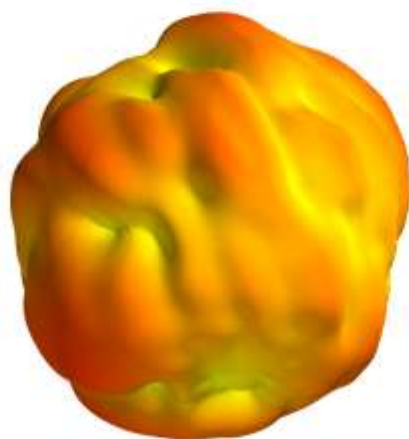
XY Plane

XZ Plane

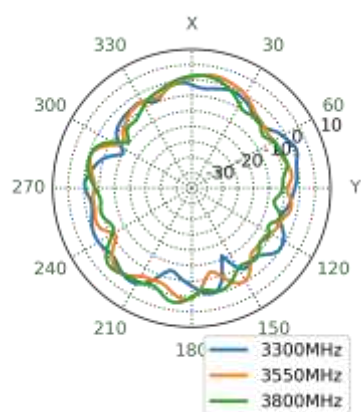
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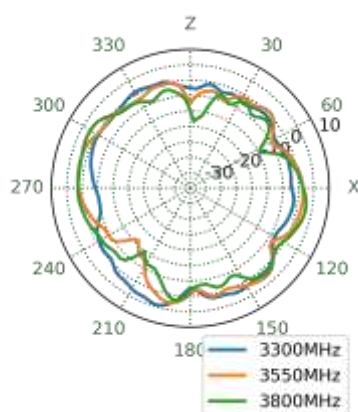
3550MHz



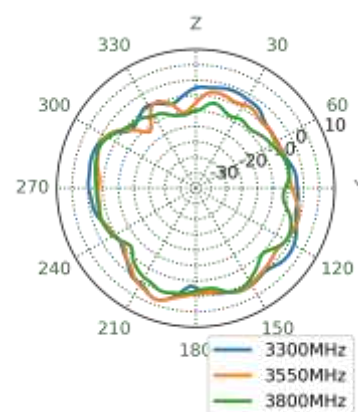
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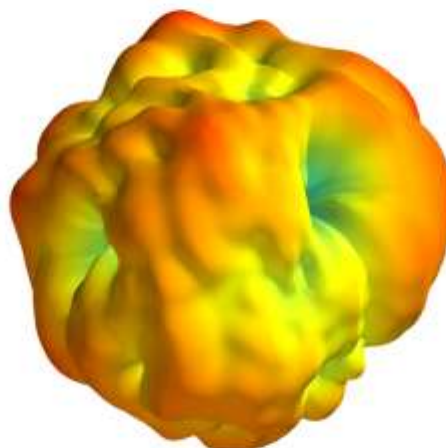
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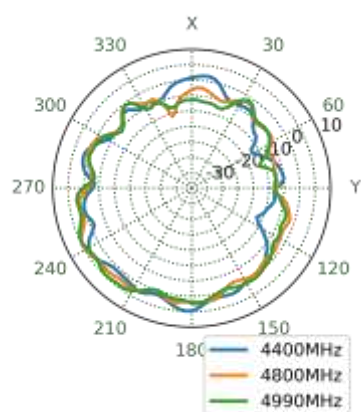
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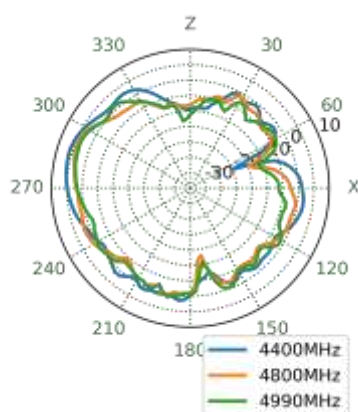
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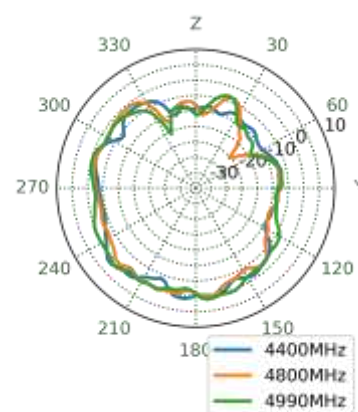
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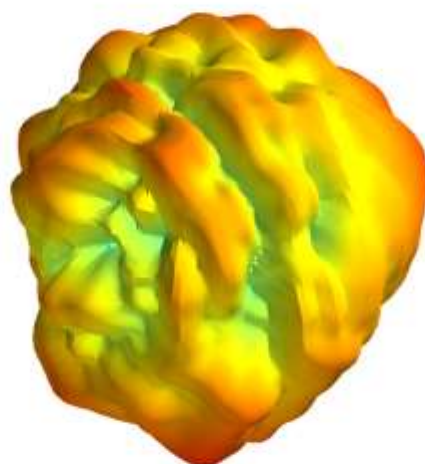
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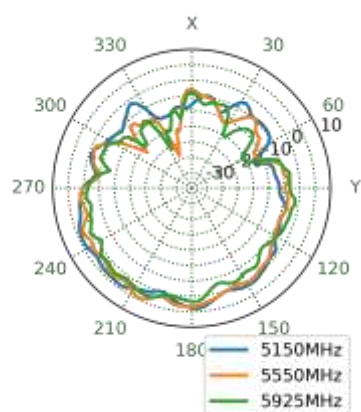
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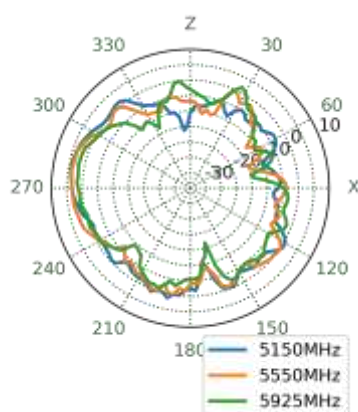
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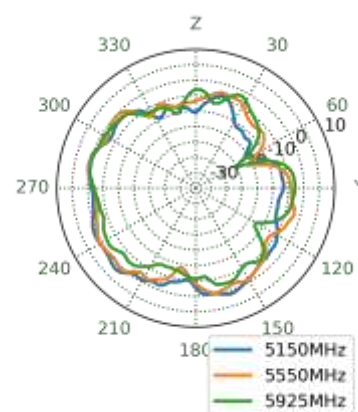
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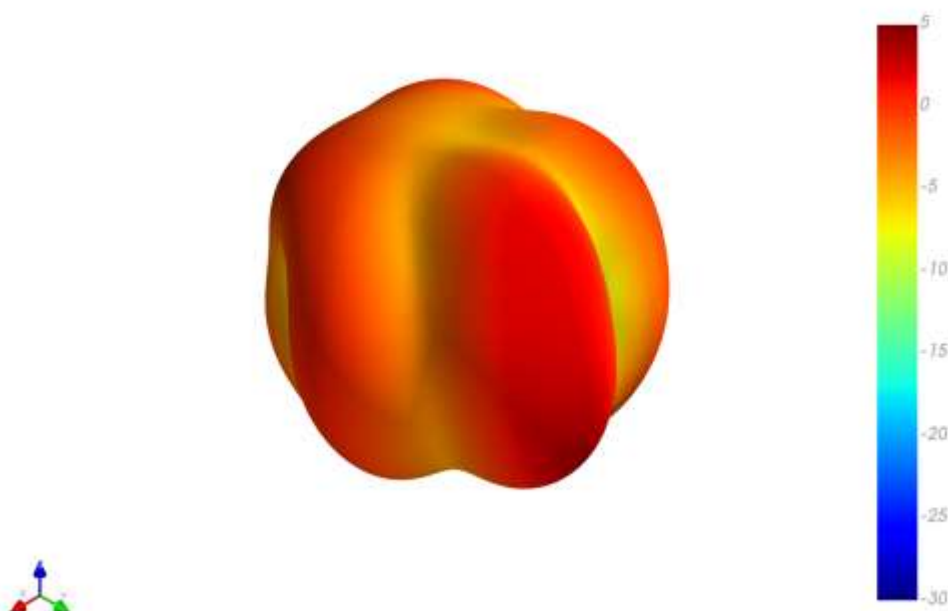
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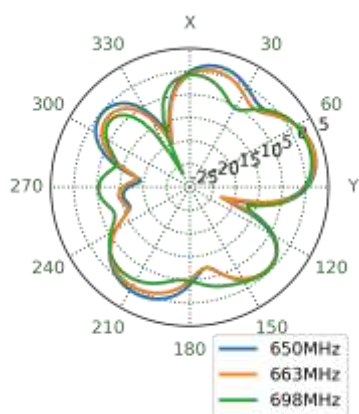
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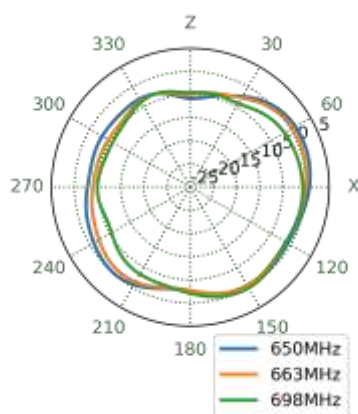
5.2 LTE 3 663MHz 3D and 2D Radiation Patterns



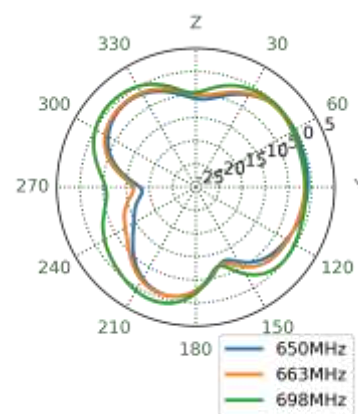
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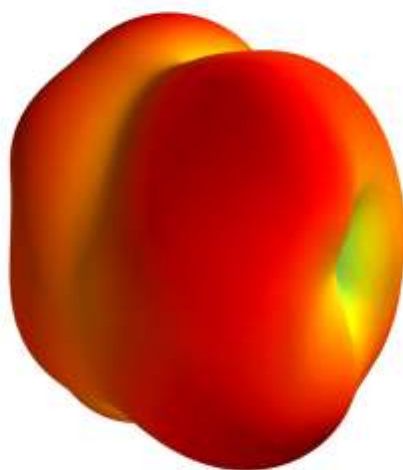
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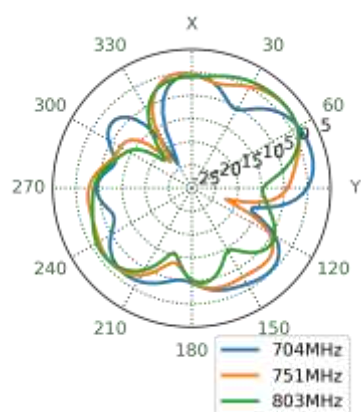
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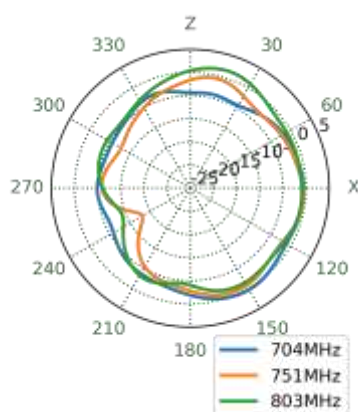
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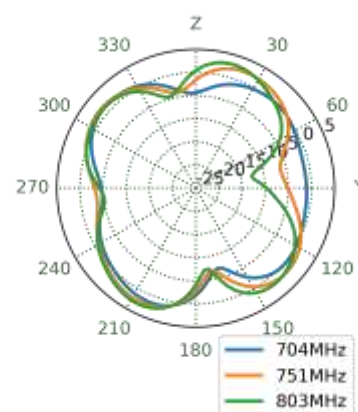
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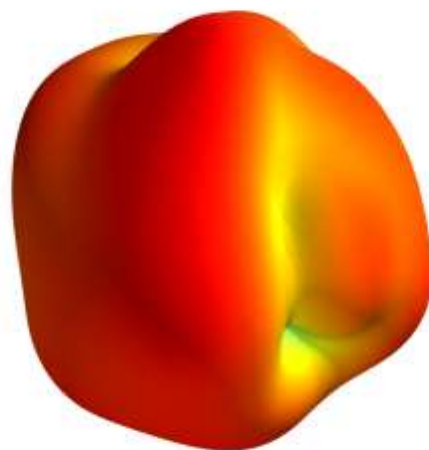
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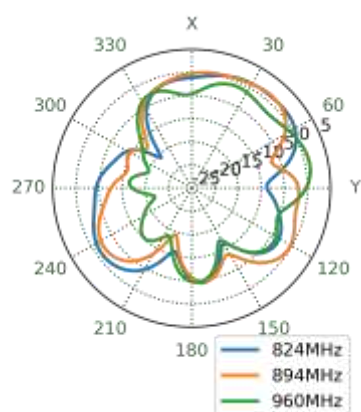
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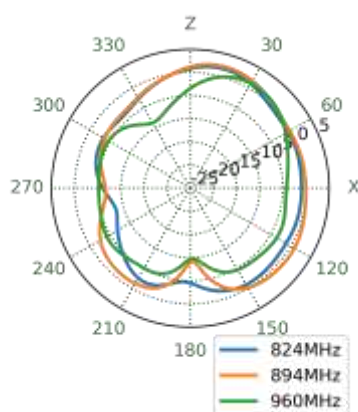
894MHz



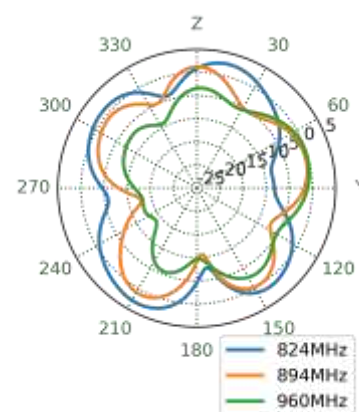
XY Plane



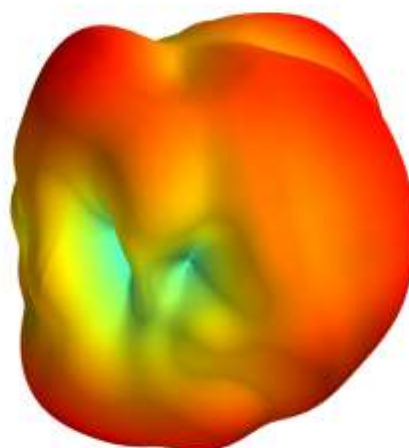
XZ Plane



YZ Plane



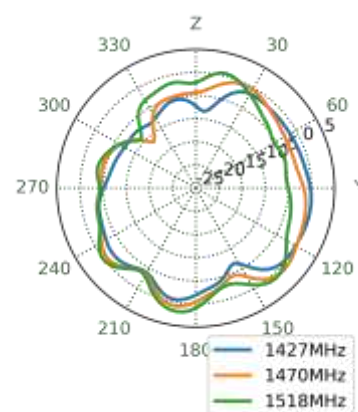
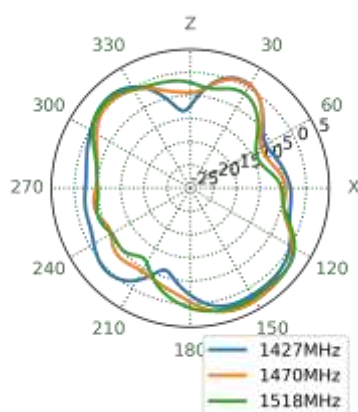
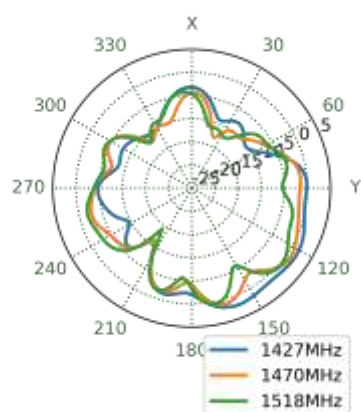
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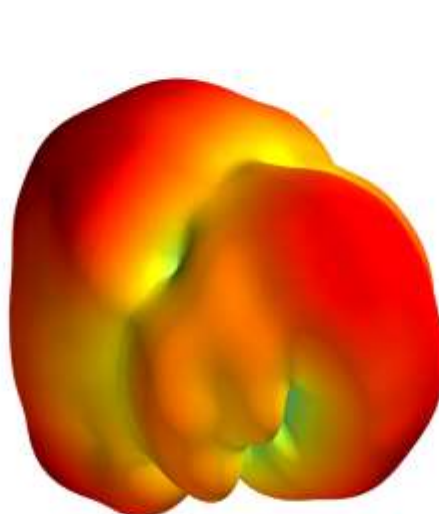
XY Plane

XZ Plane

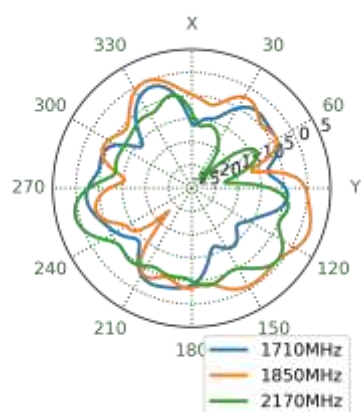
YZ Plane



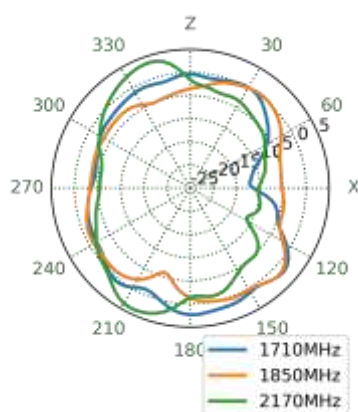
1850MHz



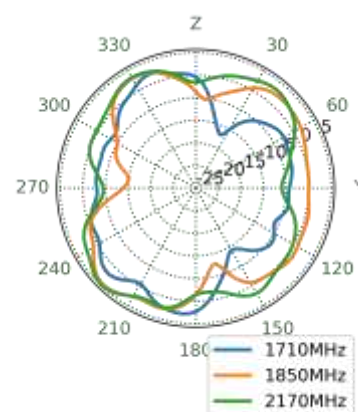
XY Plane



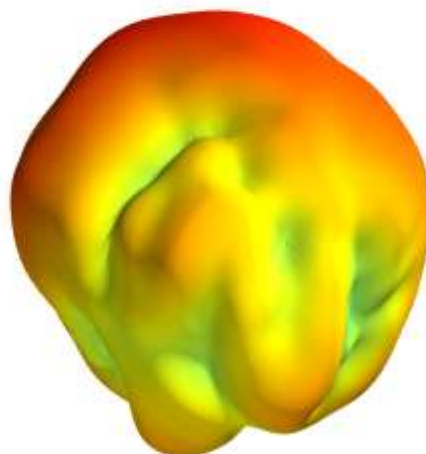
XZ Plane



YZ Plane



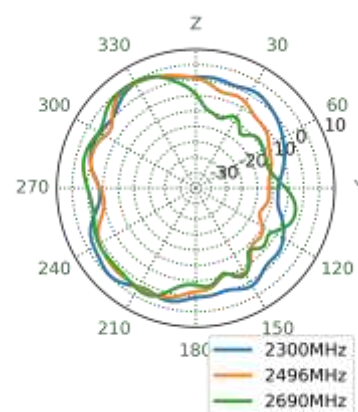
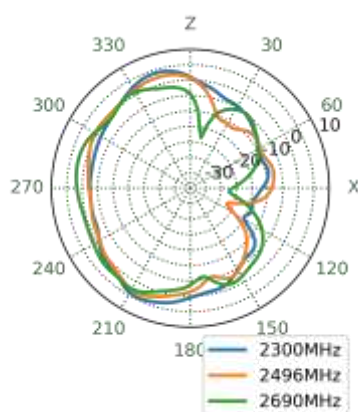
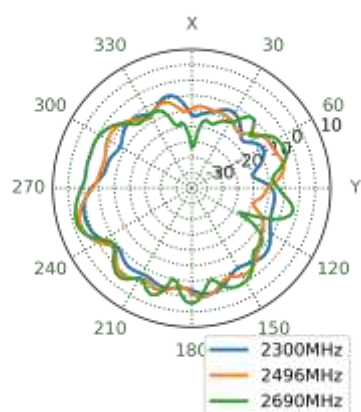
2496MHz



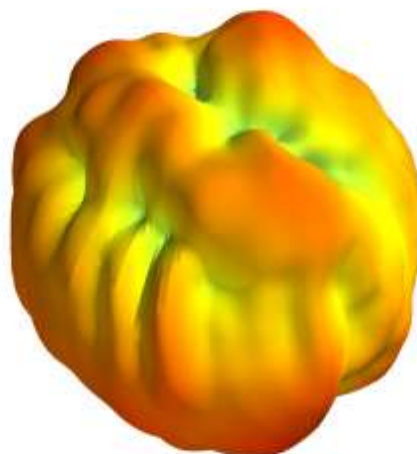
XY Plane

XZ Plane

YZ Plane



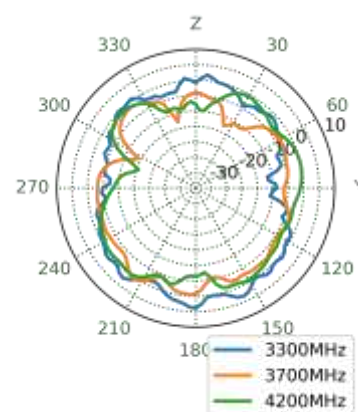
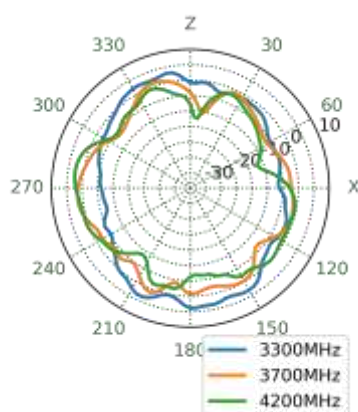
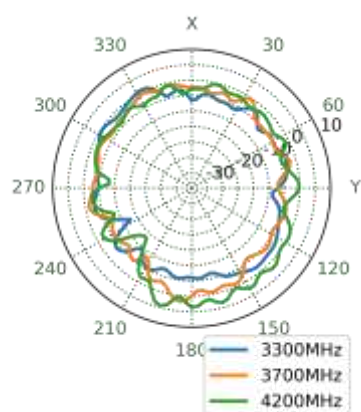
3700MHz



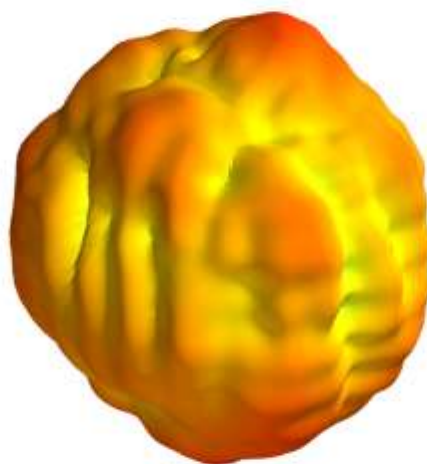
XY Plane

XZ Plane

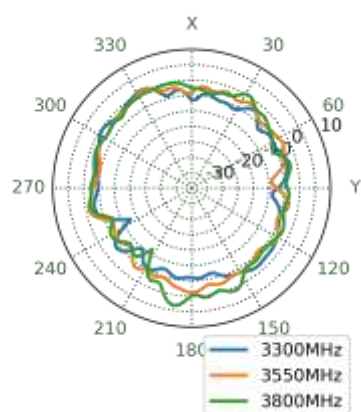
YZ Plane



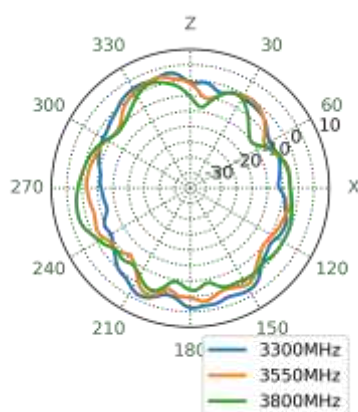
3550MHz



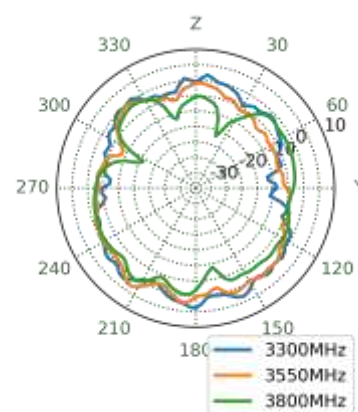
XY Plane



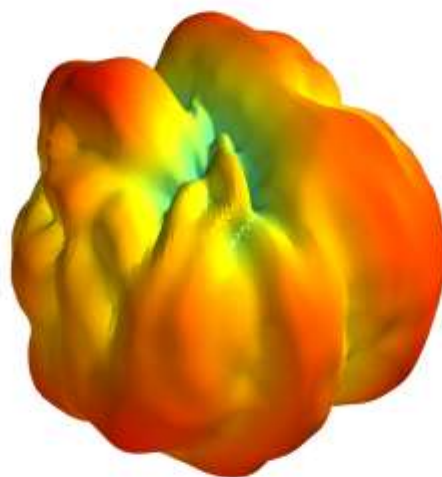
XZ Plane



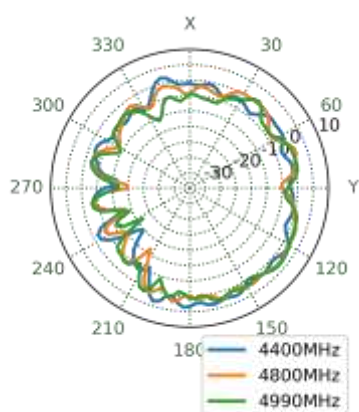
YZ Plane



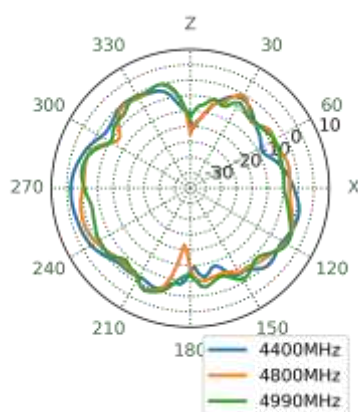
4800MHz



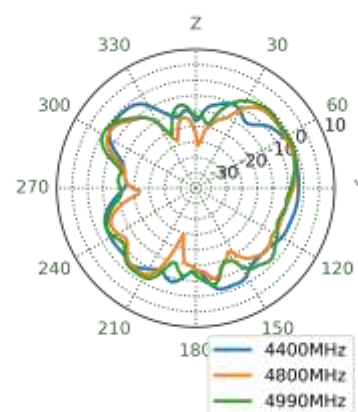
XY Plane



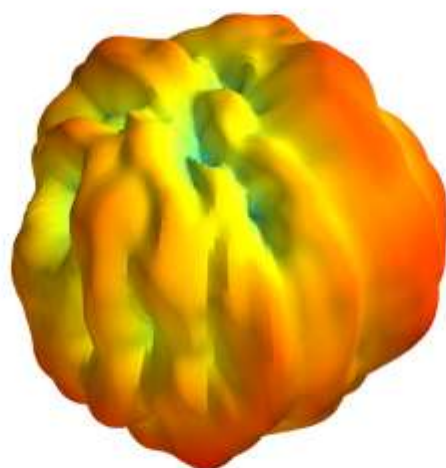
XZ Plane



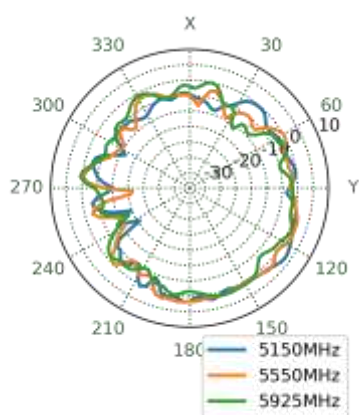
YZ Plane



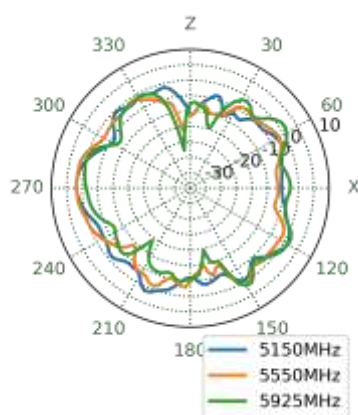
5550MHz



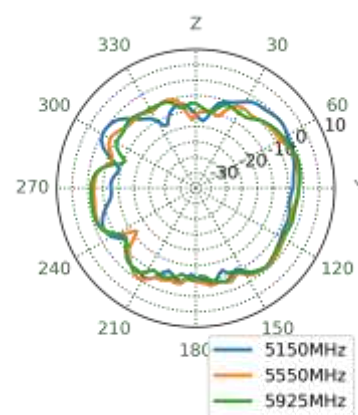
XY Plane



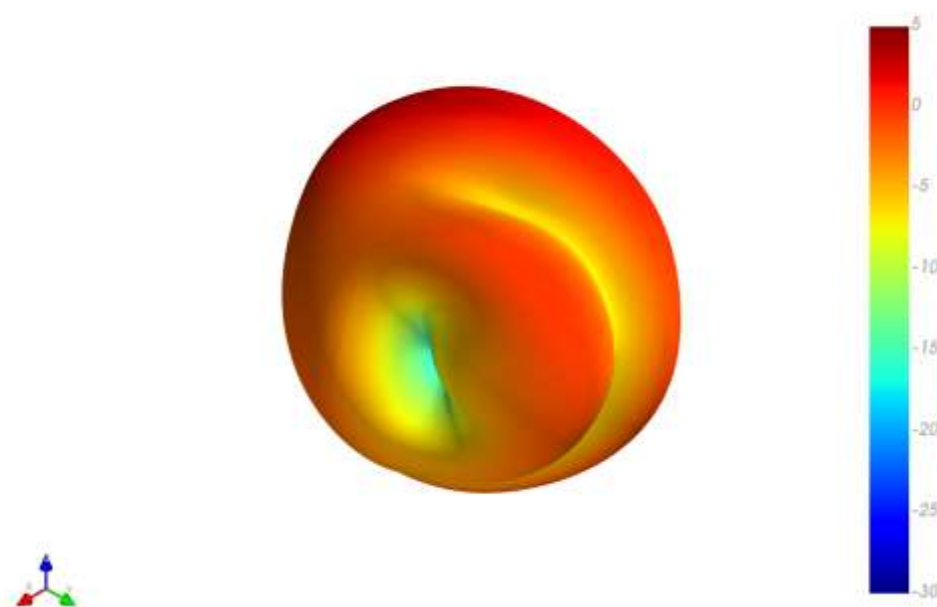
XZ Plane



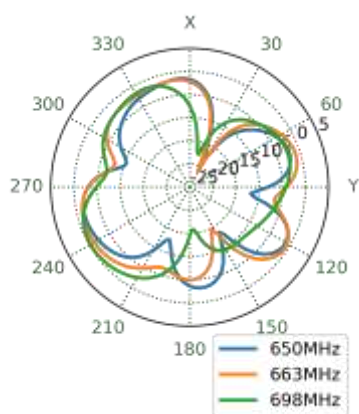
YZ Plane



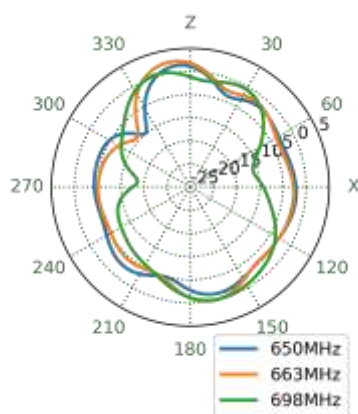
5.3 LTE 6 663MHz 3D and 2D Radiation Patterns



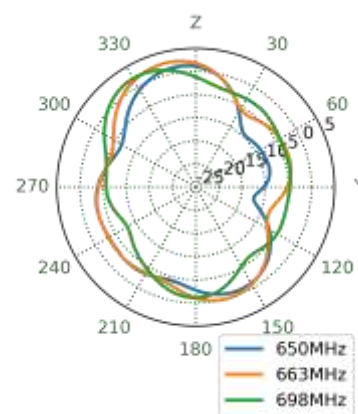
XY Plane



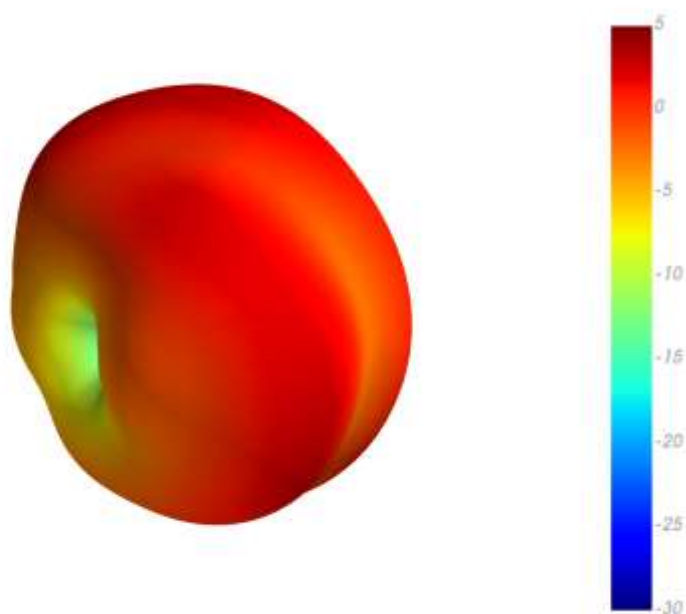
XZ Plane



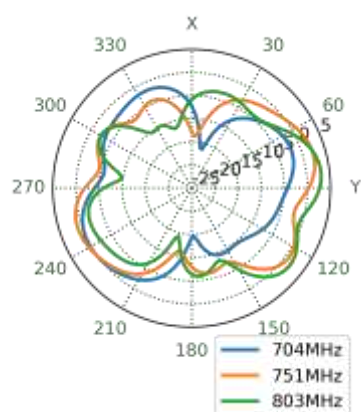
YZ Plane



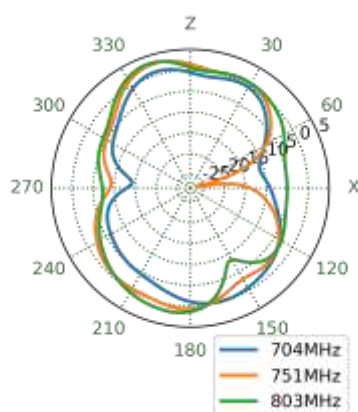
751MHz



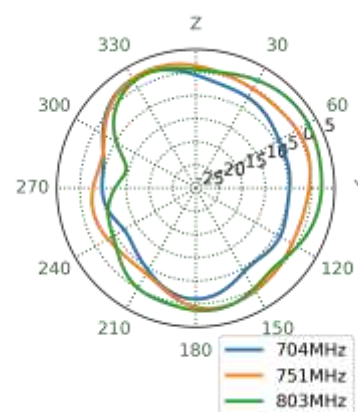
XY Plane



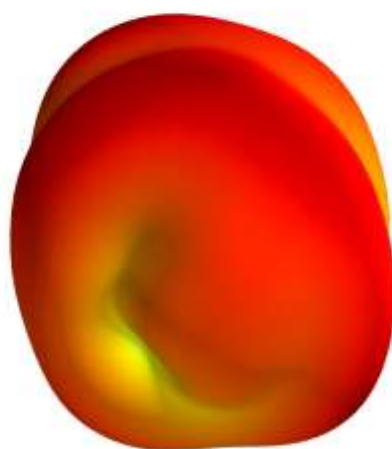
XZ Plane



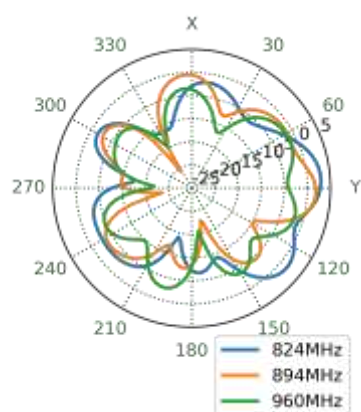
YZ Plane



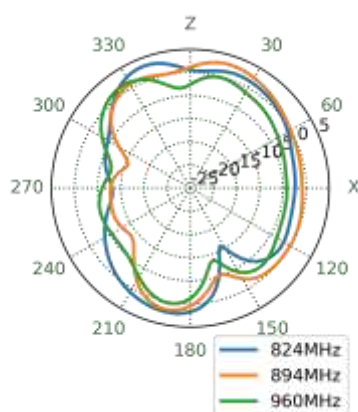
894MHz



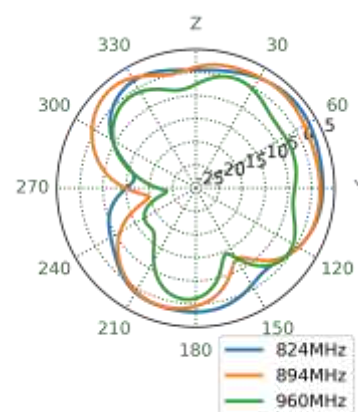
XY Plane



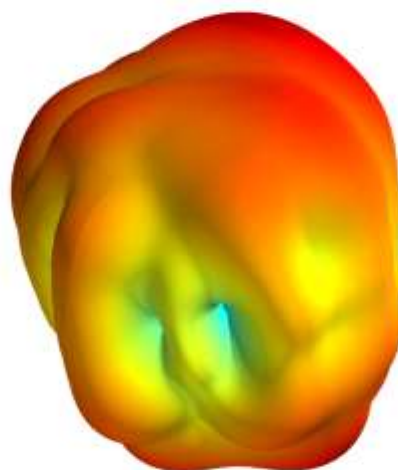
XZ Plane



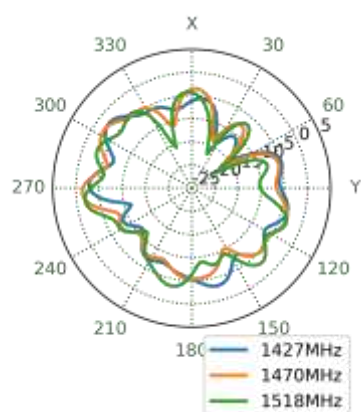
YZ Plane



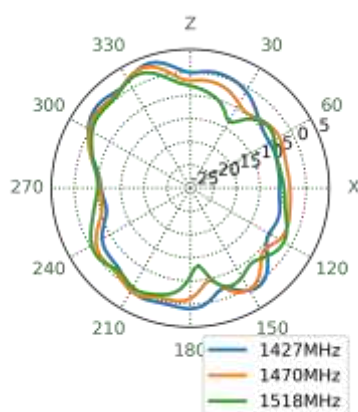
1470MHz



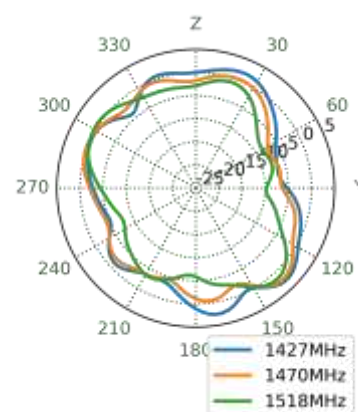
XY Plane



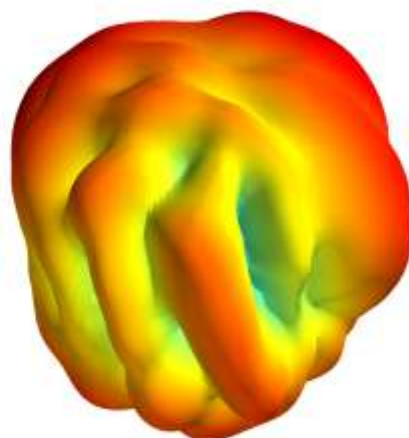
XZ Plane



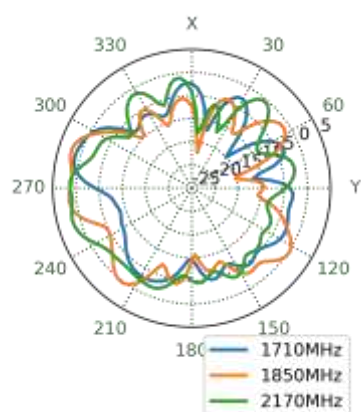
YZ Plane



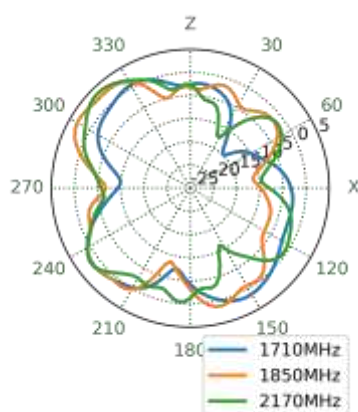
1850MHz



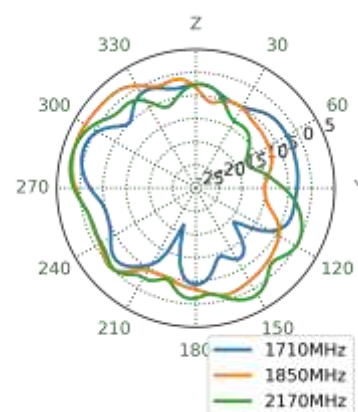
XY Plane



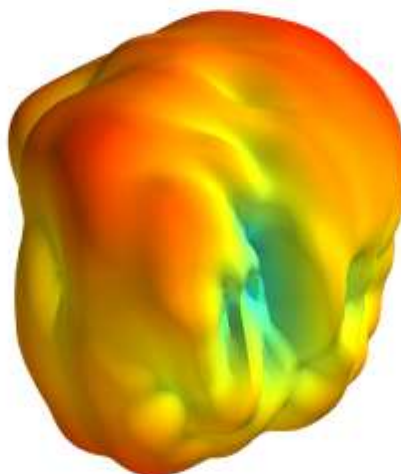
XZ Plane



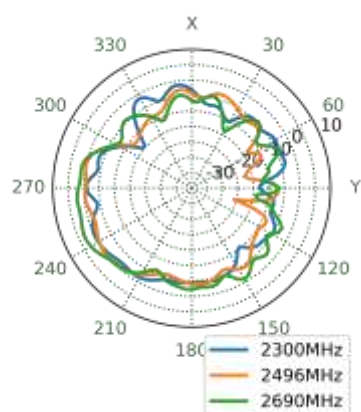
YZ Plane



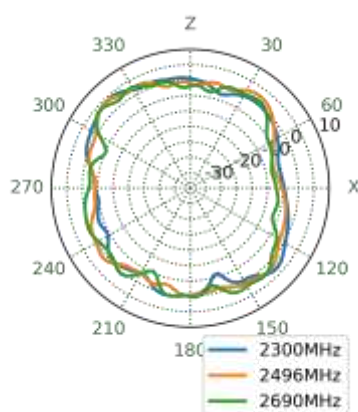
2496MHz



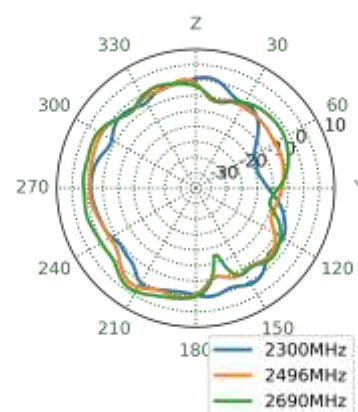
XY Plane



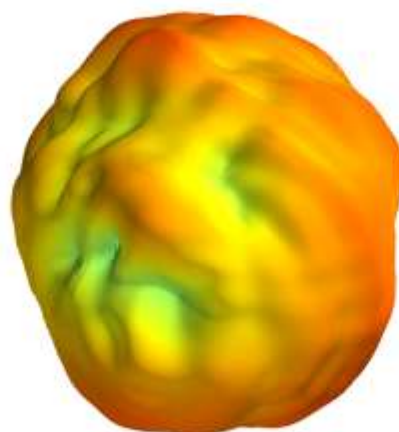
XZ Plane



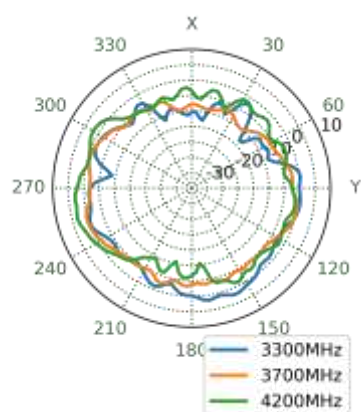
YZ Plane



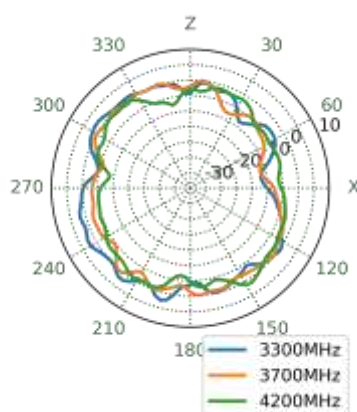
3700MHz



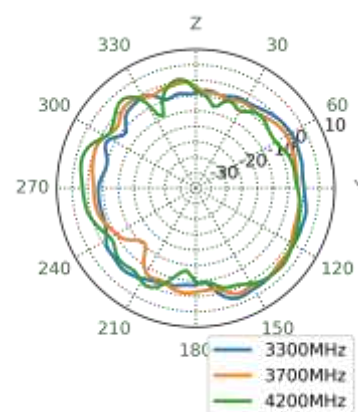
XY Plane



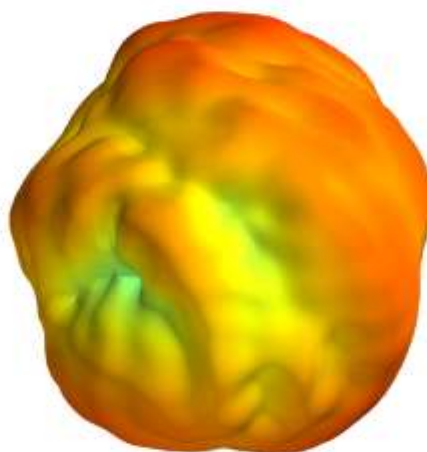
XZ Plane



YZ Plane



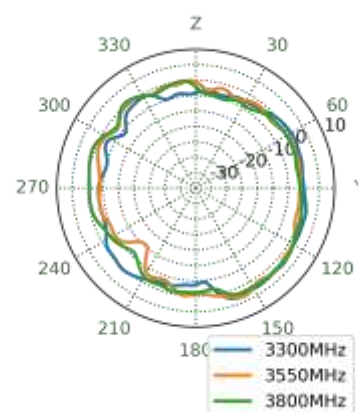
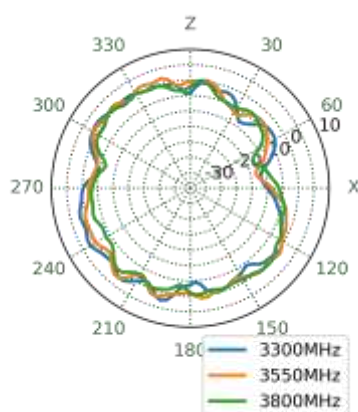
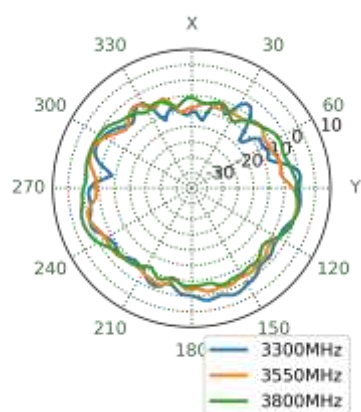
3550MHz



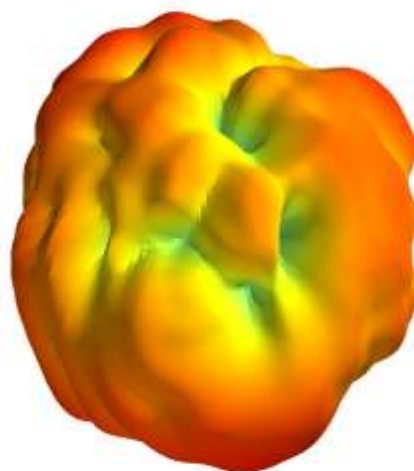
XY Plane

XZ Plane

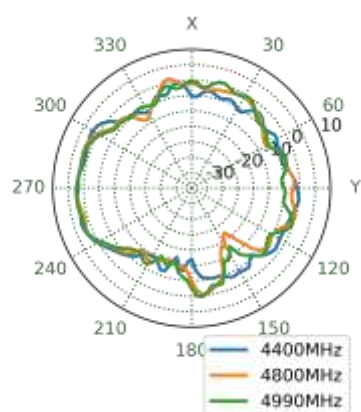
YZ Plane



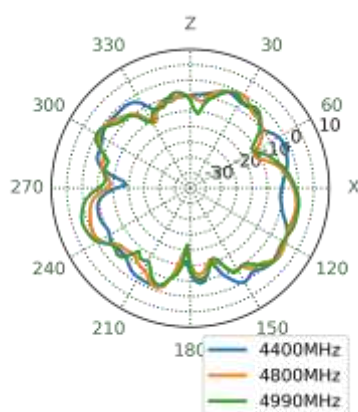
4800MHz



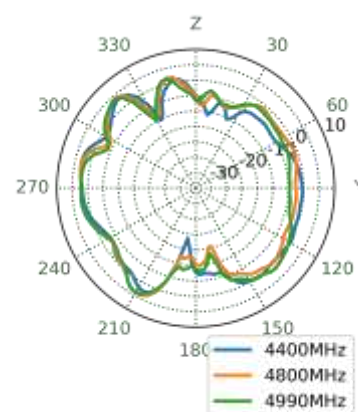
XY Plane



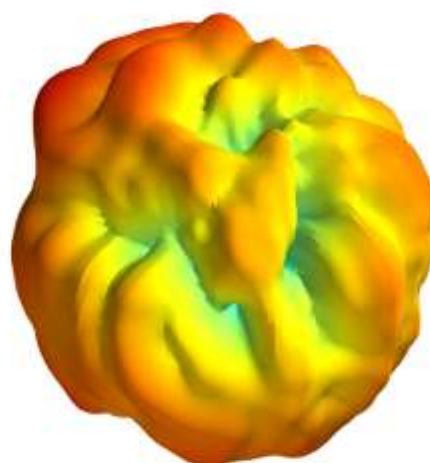
XZ Plane



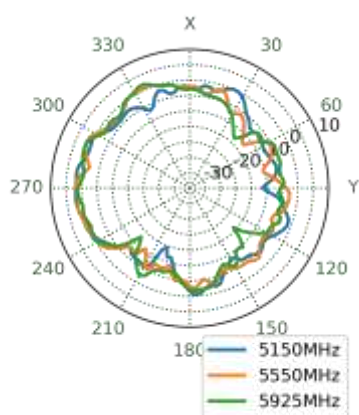
YZ Plane



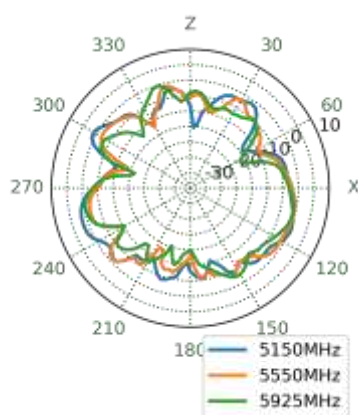
5550MHz



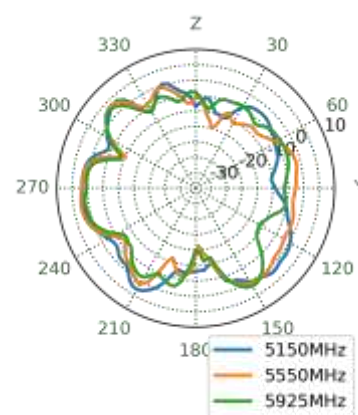
XY Plane



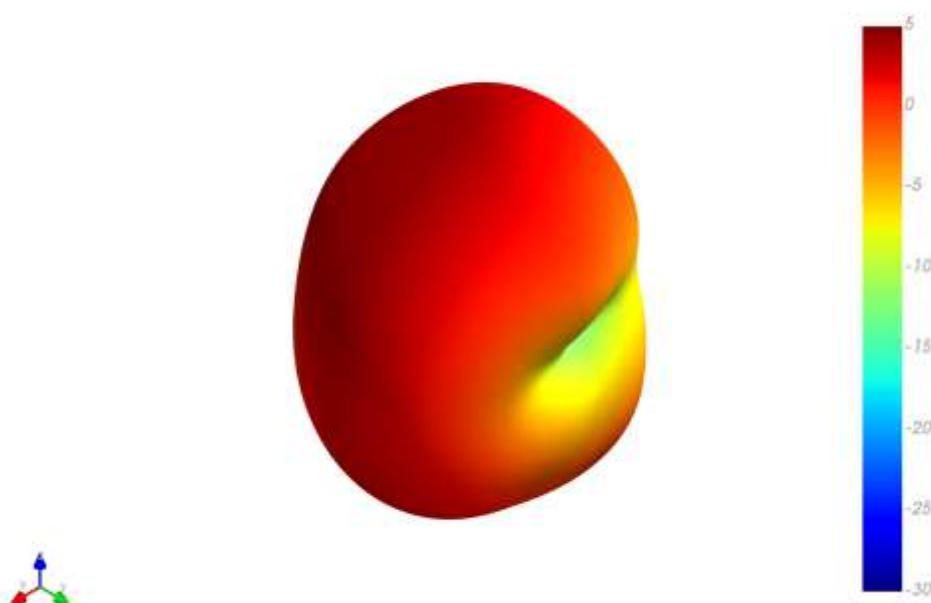
XZ Plane



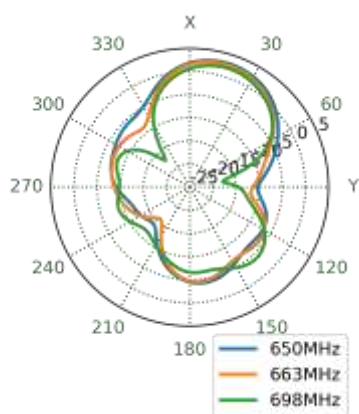
YZ Plane



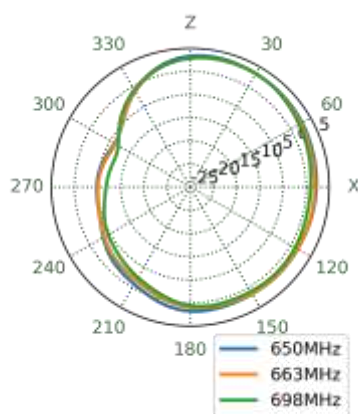
5.4 LTE 8 663MHz 3D and 2D Radiation Patterns



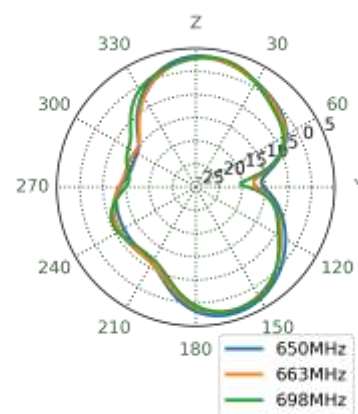
XY Plane



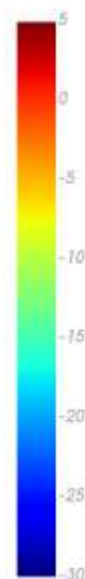
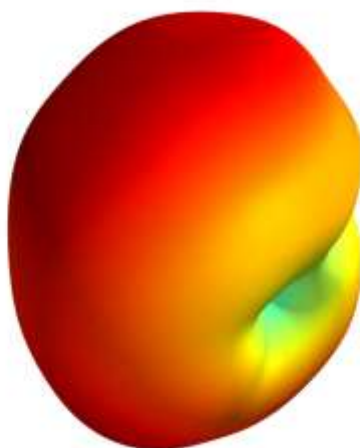
XZ Plane



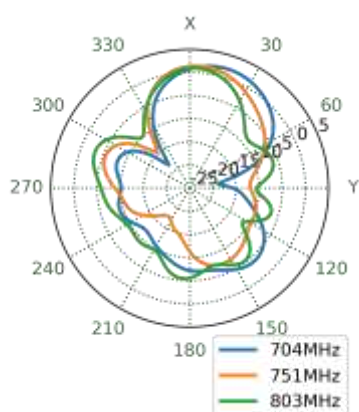
YZ Plane



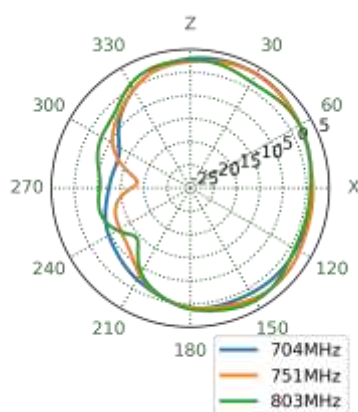
751MHz



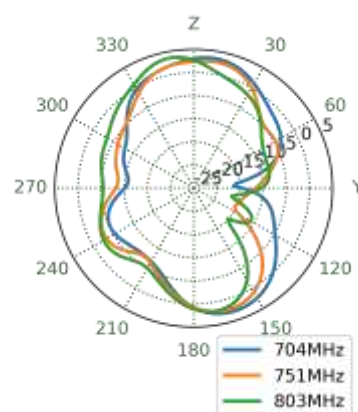
XY Plane



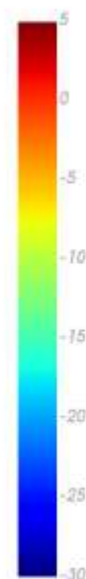
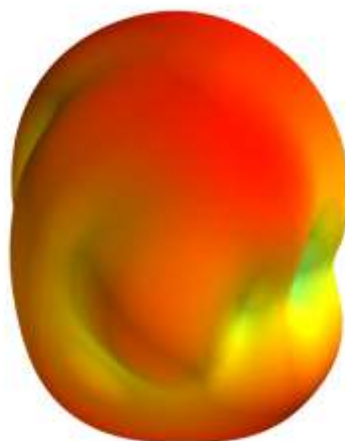
XZ Plane



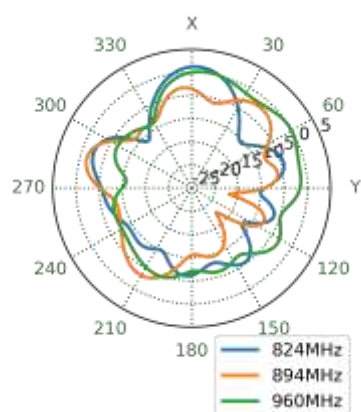
YZ Plane



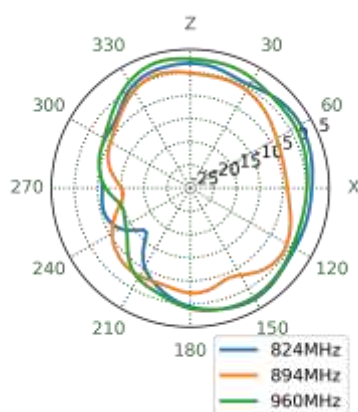
894MHz



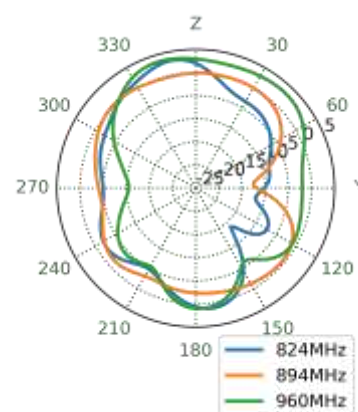
XY Plane



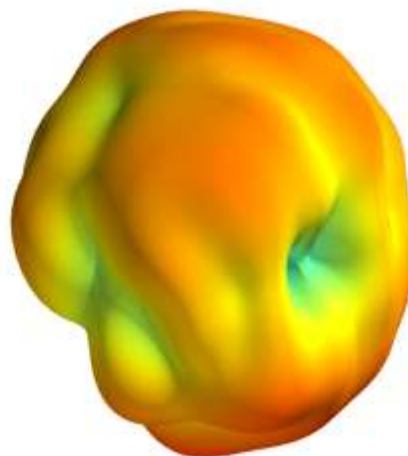
XZ Plane



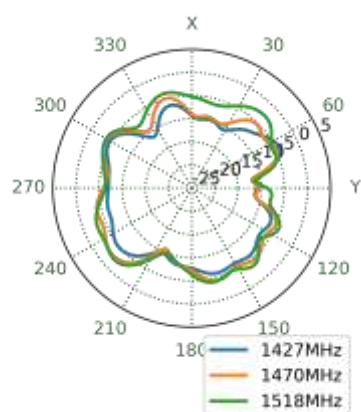
YZ Plane



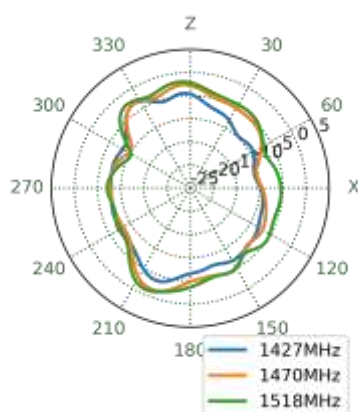
1470MHz



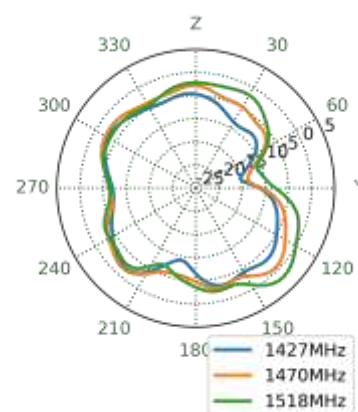
XY Plane



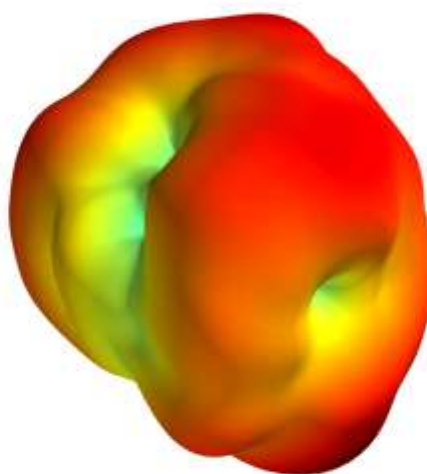
XZ Plane



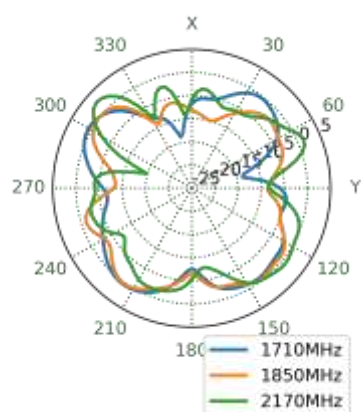
YZ Plane



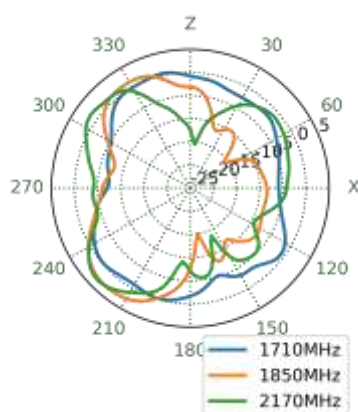
1850MHz



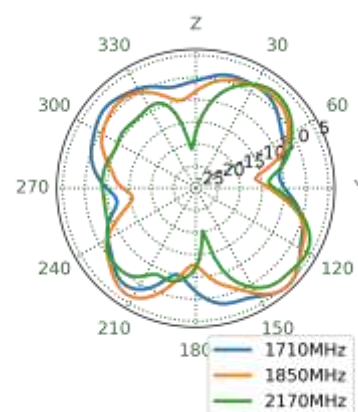
XY Plane



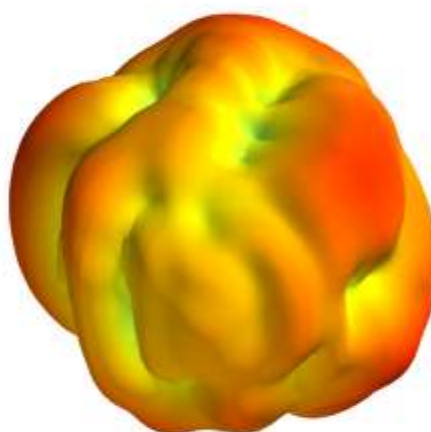
XZ Plane



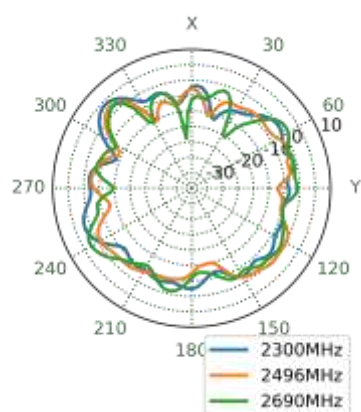
YZ Plane



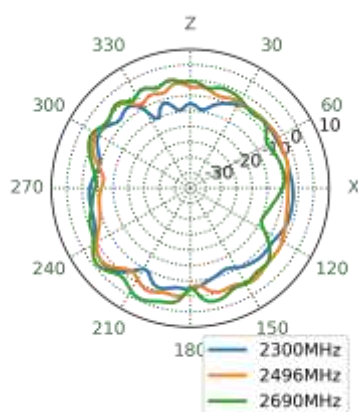
2496MHz



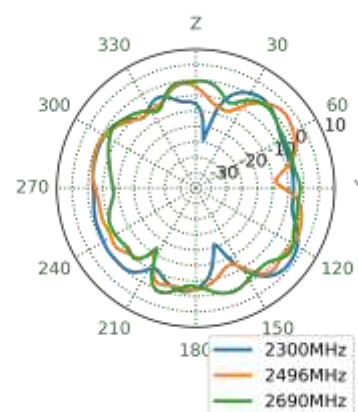
XY Plane



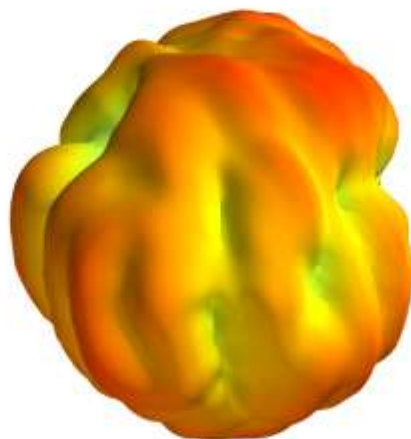
XZ Plane



YZ Plane



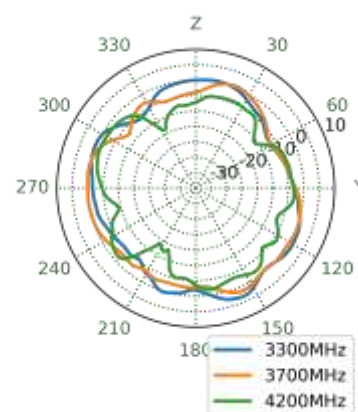
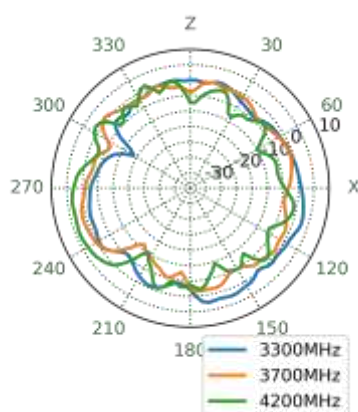
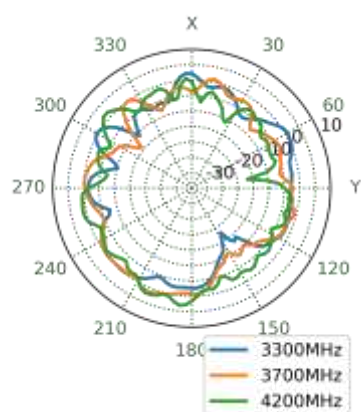
3700MHz



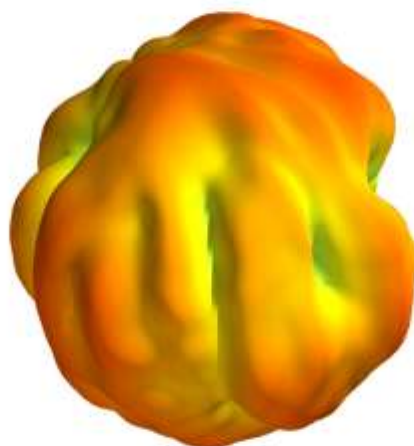
XY Plane

XZ Plane

YZ Plane



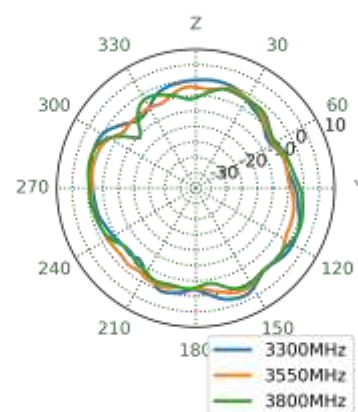
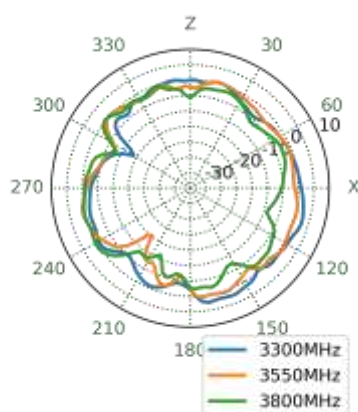
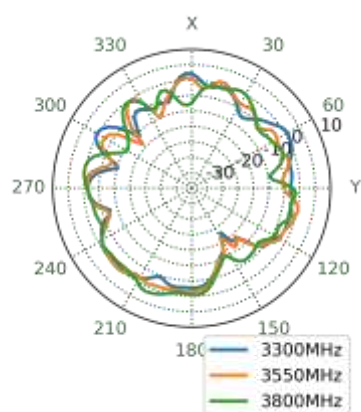
3550MHz



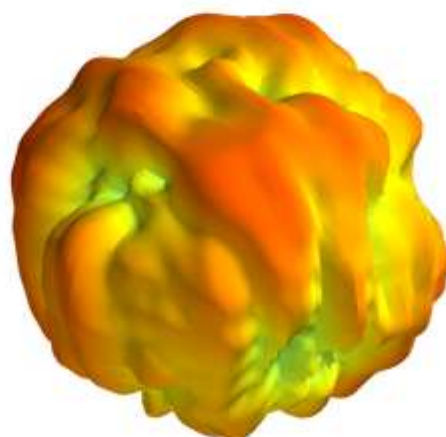
XY Plane

XZ Plane

YZ Plane



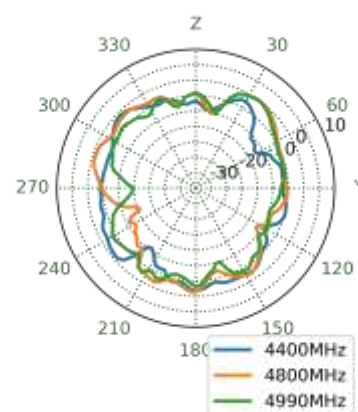
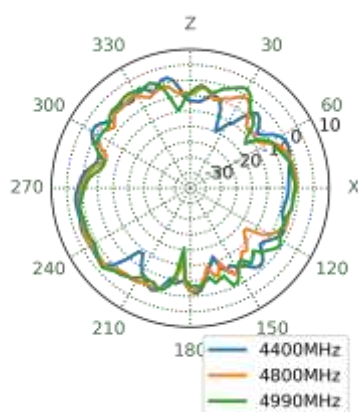
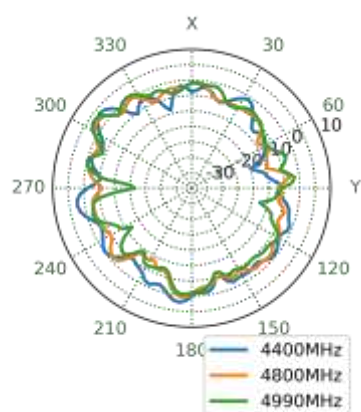
4800MHz



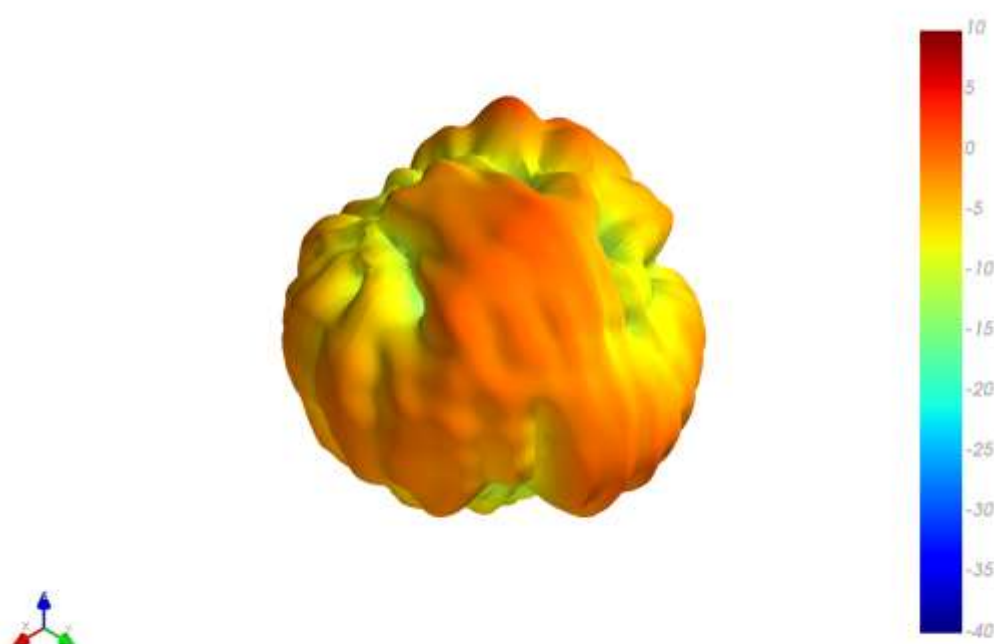
XY Plane

XZ Plane

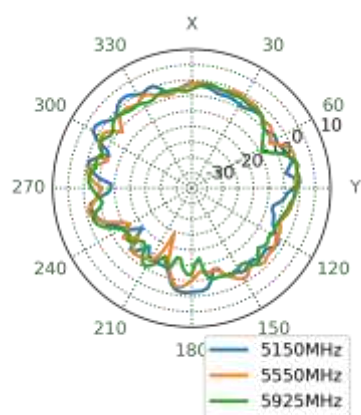
YZ Plane



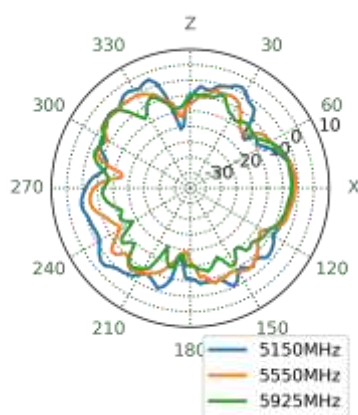
5550MHz



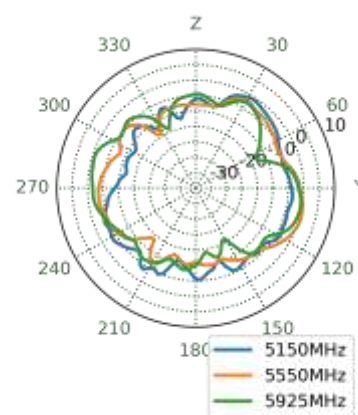
XY Plane



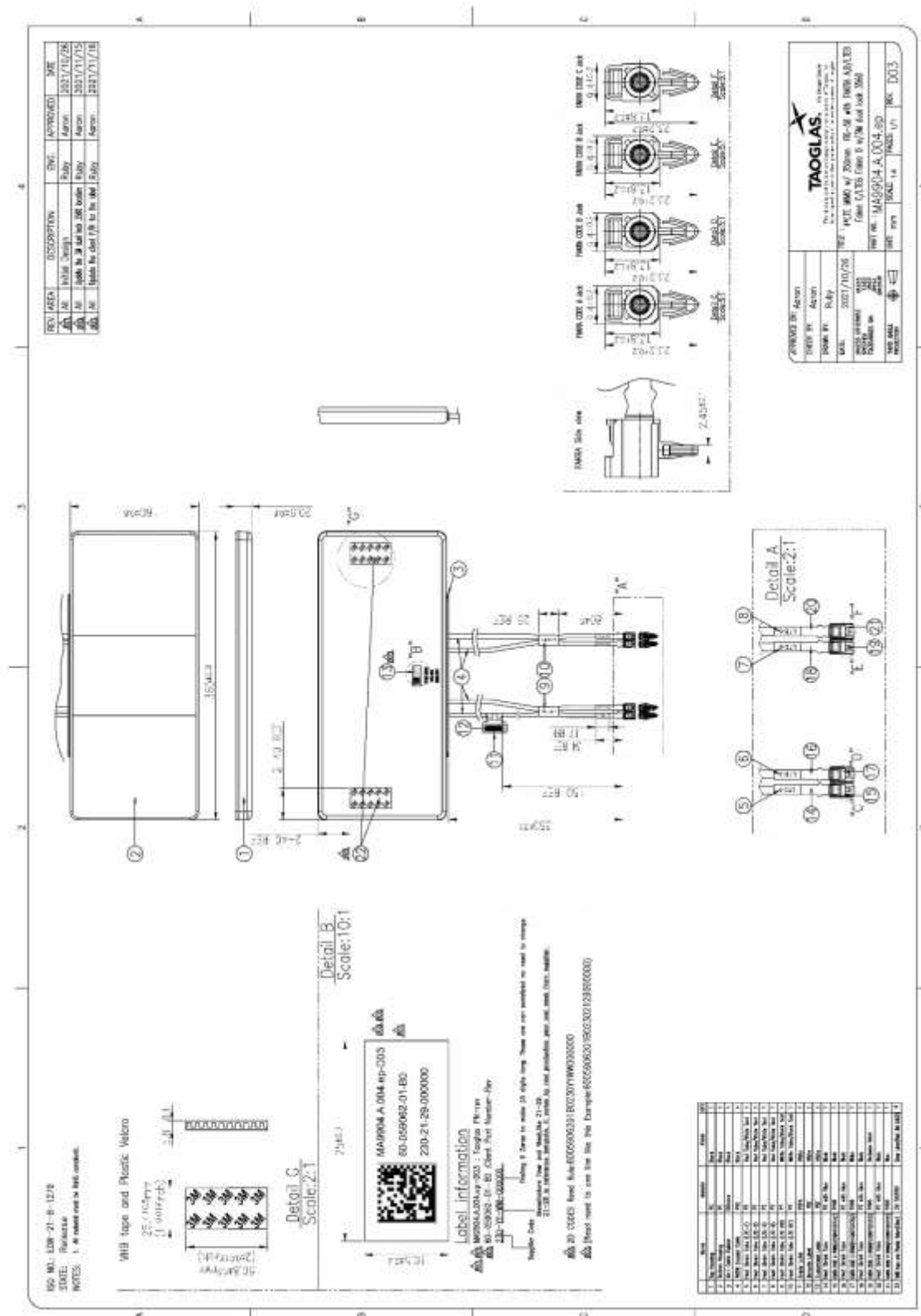
XZ Plane



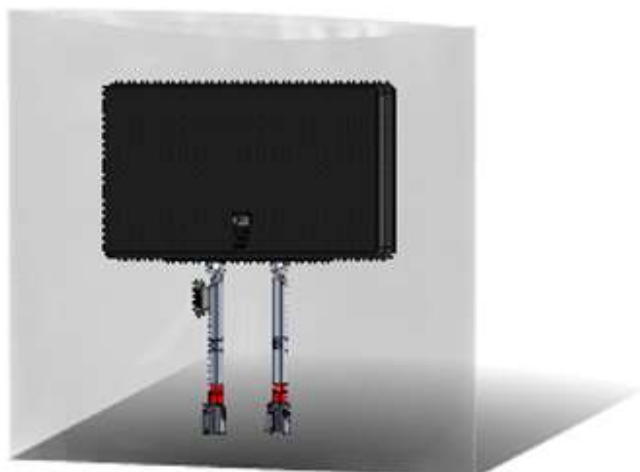
YZ Plane



6. Mechanical Drawing (Units: mm)



7. Packaging



☑ Antenna x1 / PE bag



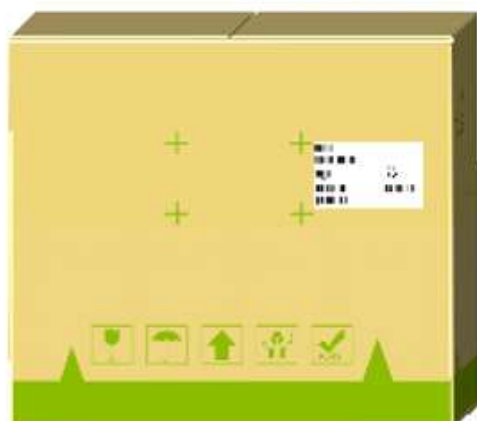
☑ 7 SET / Carton

☑ Honeycomb Board 1 SET

☑ Partition Board x 2

☑ Carton(mm): 525x415x260

☑ Carton Label



Changelog for the datasheet

SPE-22-8-013 – MA9904.A.004.ep

Revision: A (Original First Release)	
Date:	2022-01-27
Notes:	Custom Datasheet
Author:	Gary West

Previous Revisions



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