TAOGLAS

Datasheet

Comet Series

Part No:
MA321.A.001

Description

Comet 3-in-1GNSS and 2*5G/4G MIMO Adhesive/Magnetic Mount Puck Antenna

Features:

Low-profile Housing with Adhesive/Magnetic Mount
1*GNSS L1 Band
2* 5G/4G MIMO 600-6000MHz
Worldwide 5G Bands including legacy 4G 3G and 2G bands
IP67 Waterproof Enclosure
Dimensions: Diameter 80mm * 18.1mm
2m Low Loss TGC-1.5DS cable with SMA(M) connectors
Custom Cables and Connectors Available
RoHS & Reach Compliant

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Ireland ISO 9001: 2015 Certified

Taiwan ISO 9001: 2015 Certified

1. Introduction

The Taoglas Comet MA321 is a low profile, puck style, adhesive or magnetic mount antenna. The MA321 contains two 5G/4G high-performance antennas for use in MIMO cellular systems and one GNSS antenna. Through innovative antenna engineering techniques, it covers all worldwide cellular frequencies from 600MHz to 6GHz and GNSS Bands, BeiDou, GPS and GLONASS with stable gain and high efficiency, usually difficult to achieve in smaller style antennas.

The Comet series has been designed to be compact and low profile, measuring just 80x18mm, to be utilized in application areas where other larger and taller antennas are not possible. The robust ASA magnetic mount enclosure is designed to be waterproof rated to IP67 and can be mounted internally or externally on devices or vehicles.

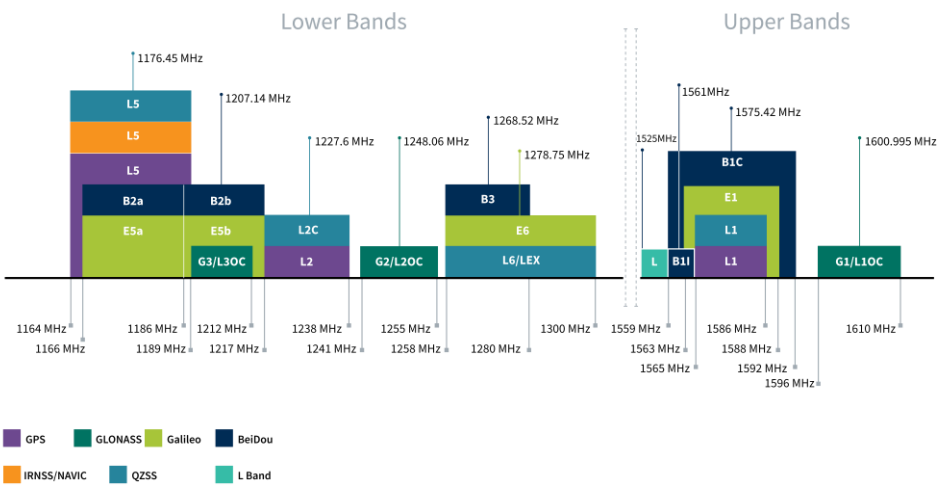
Typical Applications Include:
- Telematics, Transport and Fleet Management
- Gateways and Routers
- Digital Signage and Point of Sale Terminals
- First Responder and Emergency Services

The Comet has been designed with an option for either magnetic or adhesive mounting. This allows it to be utilized and installed in applications where destructive installations are not allowed, such as drilling mounting holes to secure a permanent antenna on a leased vehicle. The Comet is supplied with an additional 3M foam high-performance pad for adhesive mount application.

The GNSS and cellular MIMO connections utilize 2m of TGC-1.5DS coaxial cable with SMA(M) connectors as standard. Customized cable and connector versions are also available upon request. Contact your regional Taoglas customer support team for further information.

2. Specification

GNSS Frequency Bands					
GPS	L1 1575.42 MHz	L2 1227.6 MHz	L5 1176.45 MHz		
	■	□	□		
GLONASS	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz		
	■	□	□		
Galileo	E1 1575.24 MHz	E5a 1176.45 MHz	E5b 1201.5 MHz	E6 1278.75 MHz	
	■	□	□	□	
BeiDou	B1C 1575.42 MHz	B1I 1561 MHz	B2a 1176.45 MHz	B2b 1207.14 MHz	B3 1268.52 MHz
	■	■	□	□	□
L-Band	L-Band 1542 MHz				
	□				
QZSS (Regional)	L1 1575.42 MHz	L2C 1227.6 MHz	L5 1176.45 MHz	L6 1278.75e6	
	■	□	□	□	
IRNSS (Regional)	L5 1176.45 MHz				
	□				
SBAS	L1/E1/B1 1575.42 MHz	L5/B2a/E5a 1176.45 MHz	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz
	■	□	■	□	□



GNSS Bands and Constellations

GNSS Electrical								
Band	Frequency (MHz)	Measurement	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Patter
BeiDou_B1	1559-1563	Free Space	35.3	-4.52	-0.29	50 Ω	RHCP	Directional
		Ground Plane	44.4	-3.53	3.05			
GPS_L1	1563-1587	Free Space	48.4	-3.15	1.65			
		Ground Plane	54.8	-2.61	3.38			
Glonass_G1	1593-1610	Free Space	28.7	-5.43	-0.18			
		Ground Plane	39.9	-3.99	2.06			

LNA and Filter Electrical Properties			
Frequency (MHz)	BeiDou_B1	GPS_L1	GLONASS_G1
	1561	1575	1602
LNA Gain (dB)	31.3	30.6	29.9
Noise Figure (dB)	1.9	1.8	2.0
Return Loss (dB)	< -10		
Input Voltage (V)	+ 1.8 to 5.5		
Current consumption (mA)	9 ± 3		
Outer Band Attenuation (dB)	> 70dB @ 600-960MHz ; > 60dB @ 1710-3000MHz		

LTE Electrical										
Band	Frequency (MHz)	Measurement		Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
5G NR Band 71	617-698	Free Space	LTE 1	54.2	-2.66	3.47	50 Ω	Linear	Omni	10W
			LTE 2	45.5	-3.42	2.85				
		Ground Plane	LTE 1	73.0	-1.37	5.98				
			LTE 2	41.2	-3.85	3.88				
LTE700	698-824	Free Space	LTE 1	67.2	-1.73	3.93				
			LTE 2	65.6	-1.83	3.79				
		Ground Plane	LTE 1	65.7	-1.83	4.90				
			LTE 2	71.8	-1.44	7.04				
GSM800/900	824-960	Free Space	LTE 1	59.8	-2.24	4.09				
			LTE 2	67.8	-1.69	3.88				
		Ground Plane	LTE 1	62.5	-2.04	4.80				
			LTE 2	69.6	-1.58	7.26				
5G NR Band 1500	1427-1518	Free Space	LTE 1	49.3	-3.07	2.97				
			LTE 2	49.3	-3.08	2.63				
		Ground Plane	LTE 1	35.3	-4.52	1.91				
			LTE 2	45.6	-3.41	4.32				
5G NR N66	1710-2200	Free Space	LTE 1	62.9	-2.01	5.41				
			LTE 2	65.1	-1.86	4.73				
		Ground Plane	LTE 1	49.7	-3.03	5.66				
			LTE 2	42.2	-3.74	5.41				
LTE2600	2300-2690	Free Space	LTE 1	43.9	-3.57	6.04				
			LTE 2	64.9	-1.88	6.54				
		Ground Plane	LTE 1	46.2	-3.35	5.83				
			LTE 2	56.9	-2.45	5.99				
5G NR N77	3300-4200	Free Space	LTE 1	51.9	-2.85	4.37				
			LTE 2	52.9	-2.76	4.46				
		Ground Plane	LTE 1	54.7	-2.62	6.86				
			LTE 2	47.7	-3.22	6.44				
5G NR N78	3300-3800	Free Space	LTE 1	52.8	-2.77	4.05				
			LTE 2	53.7	-2.70	4.46				
		Ground Plane	LTE 1	54.8	-2.62	6.86				
			LTE 2	47.1	-3.27	6.44				
5G NR N79	4400-5000	Free Space	LTE 1	52.0	-2.84	7.21				
			LTE 2	62.4	-2.05	7.59				
		Ground Plane	LTE 1	47.0	-3.28	6.36				
			LTE 2	55.2	-2.58	6.41				
LTE5200	5150-5925	Free Space	LTE 1	45.8	-3.39	5.28				
			LTE 2	57.9	-2.37	6.70				
		Ground Plane	LTE 1	47.4	-3.24	5.93				
			LTE 2	51.8	-2.86	7.75				

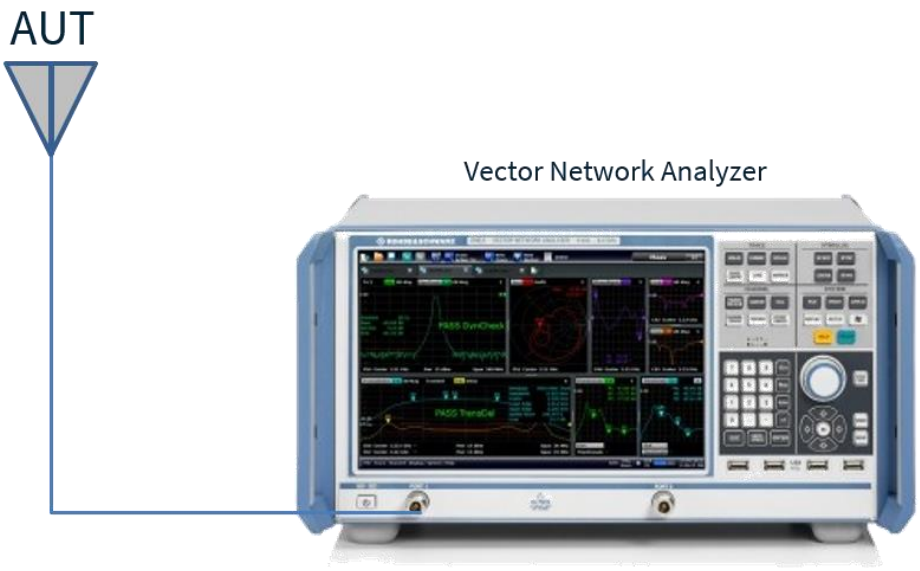
Mechanical	
Dimensions	Ø80mm x 18 mm
Weight	113g
Material	ASA
Connector	SMA(M)ST
Cable	2m TGC-1.5DS

Environmental	
Waterproof Rating	IP67
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Relative Humidity	Non-condensing 65°C 95% RH
RoHs Compliant	Yes

Note: The antenna was measured with 300mm 1.5DS cable in free space.

3. Antenna Characteristics

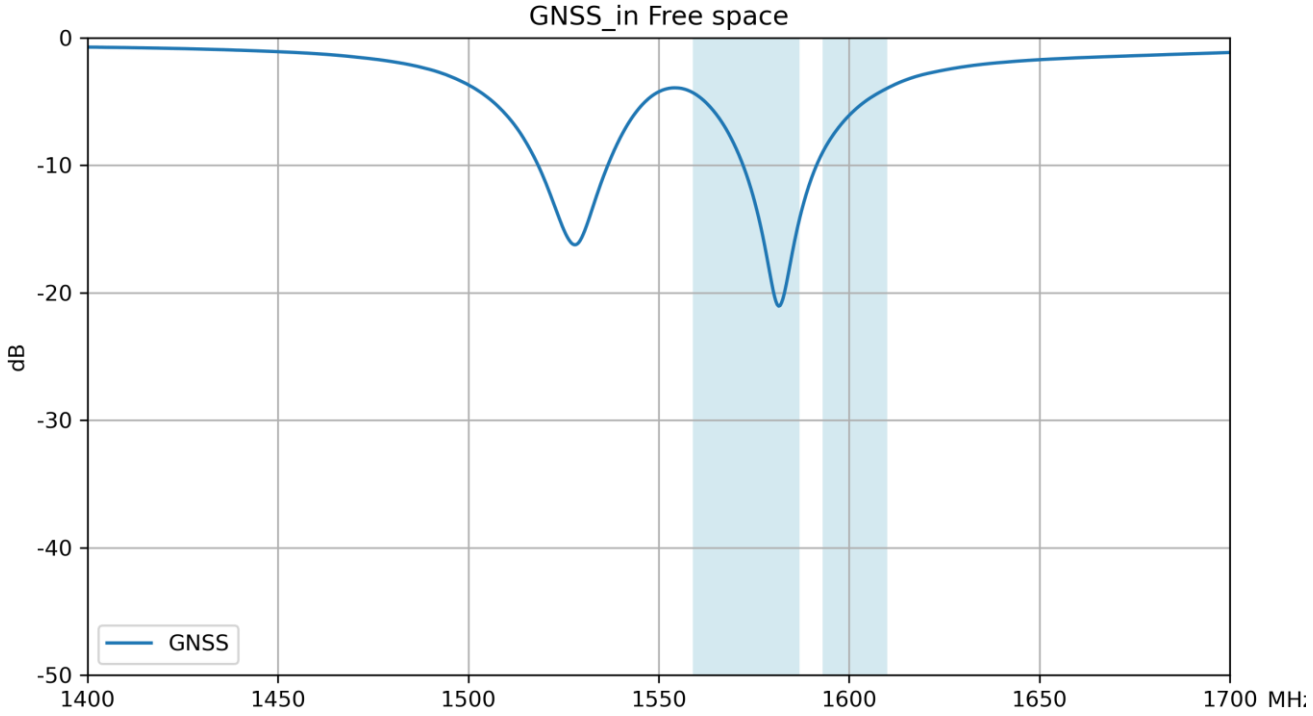
3.1 Test Setup

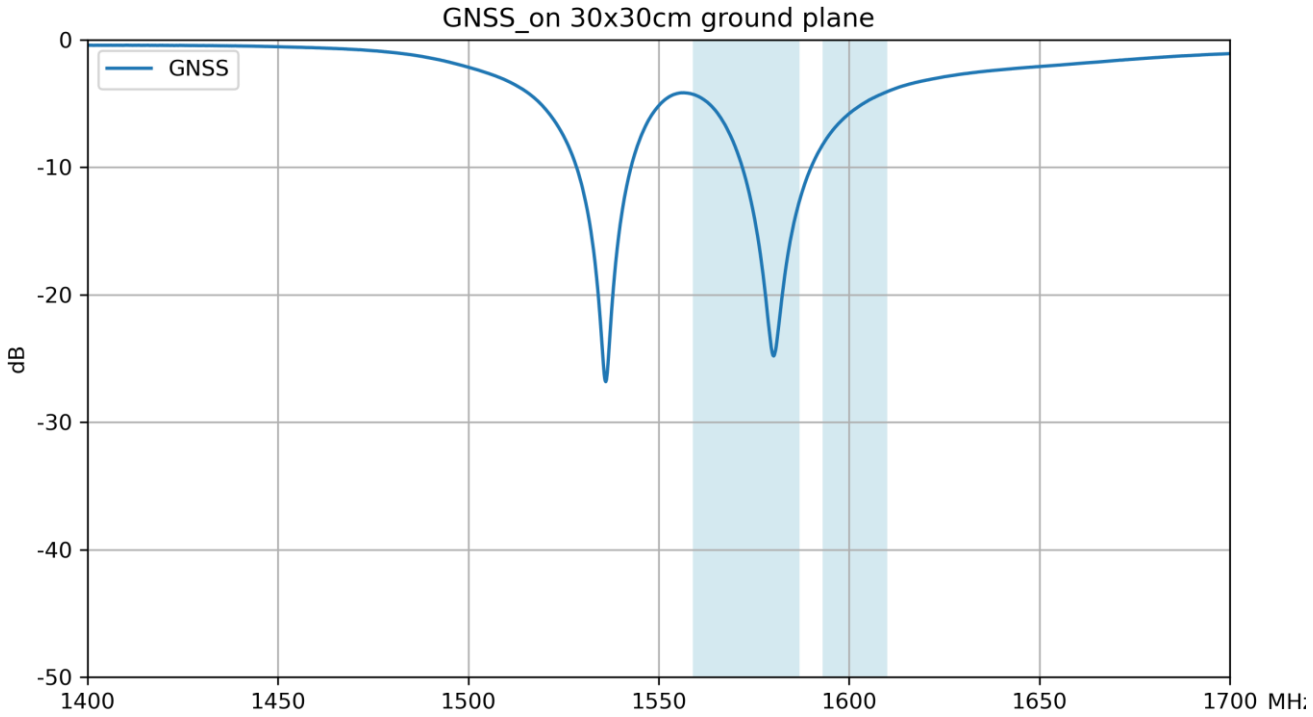


In Free space

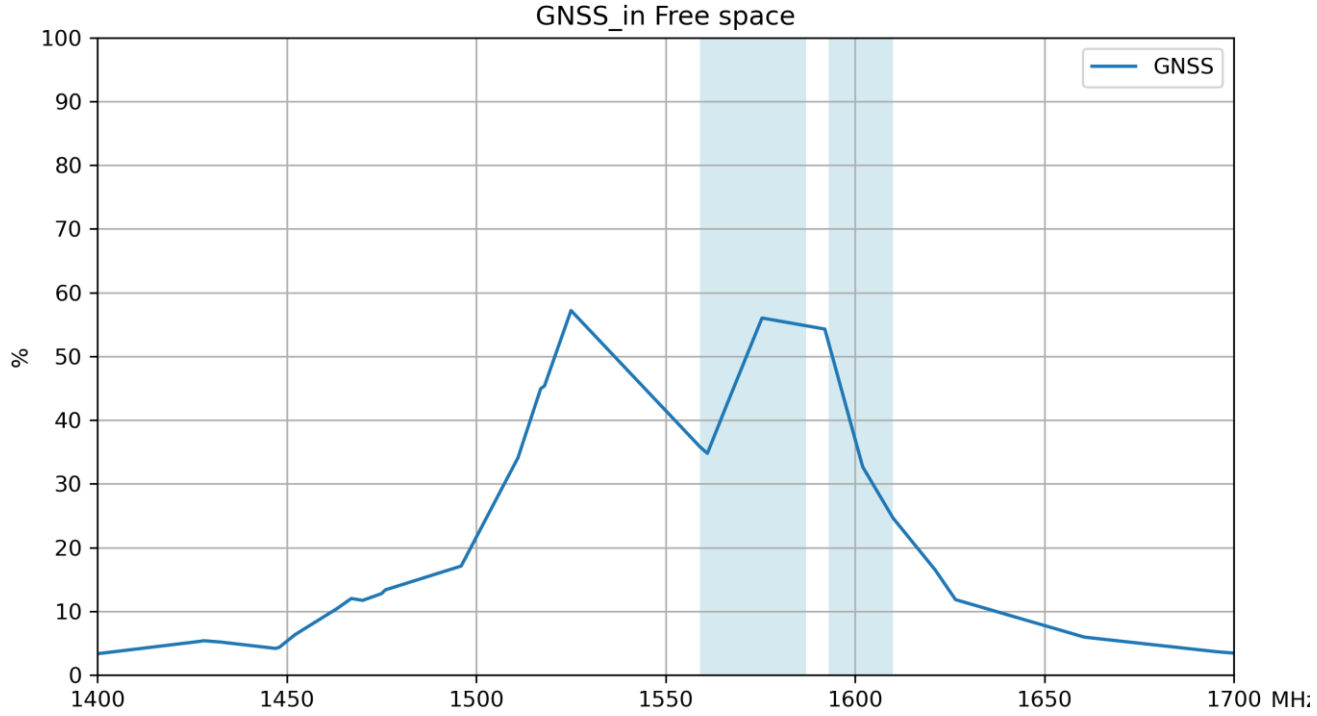
On 30X30cm Ground plane

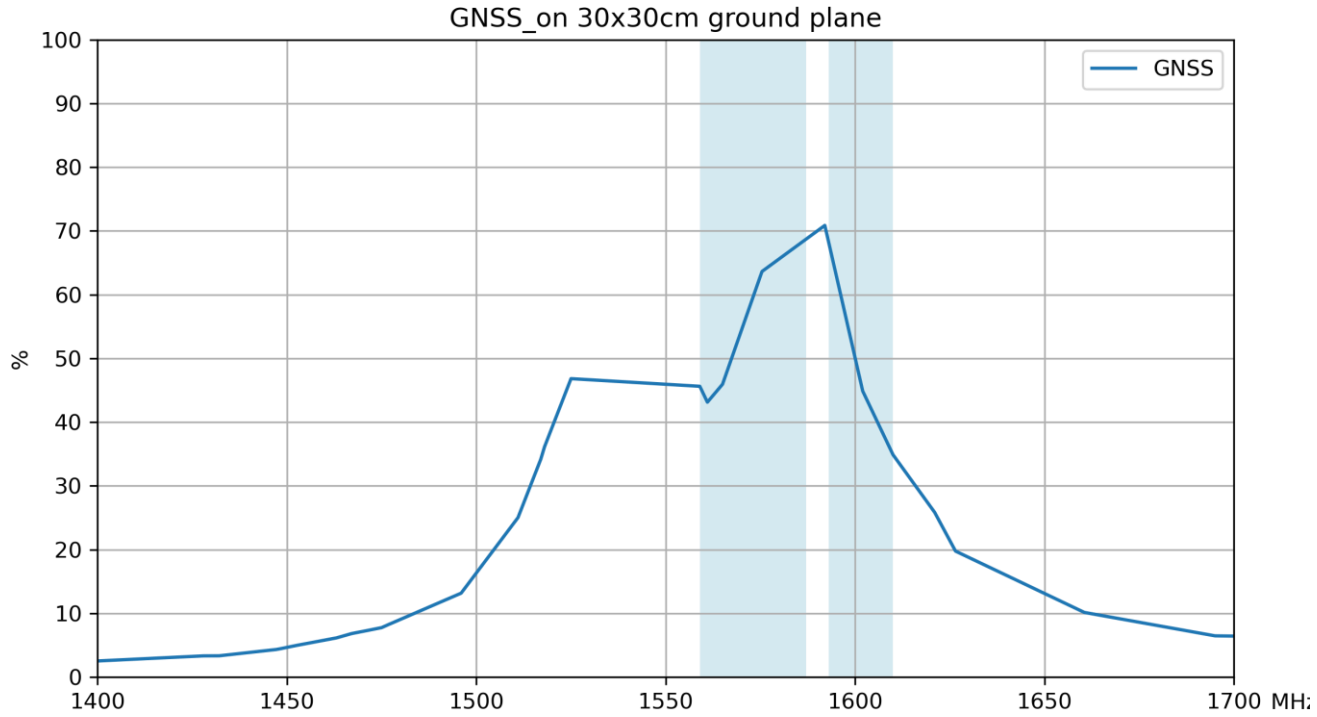
3.2 Return Loss



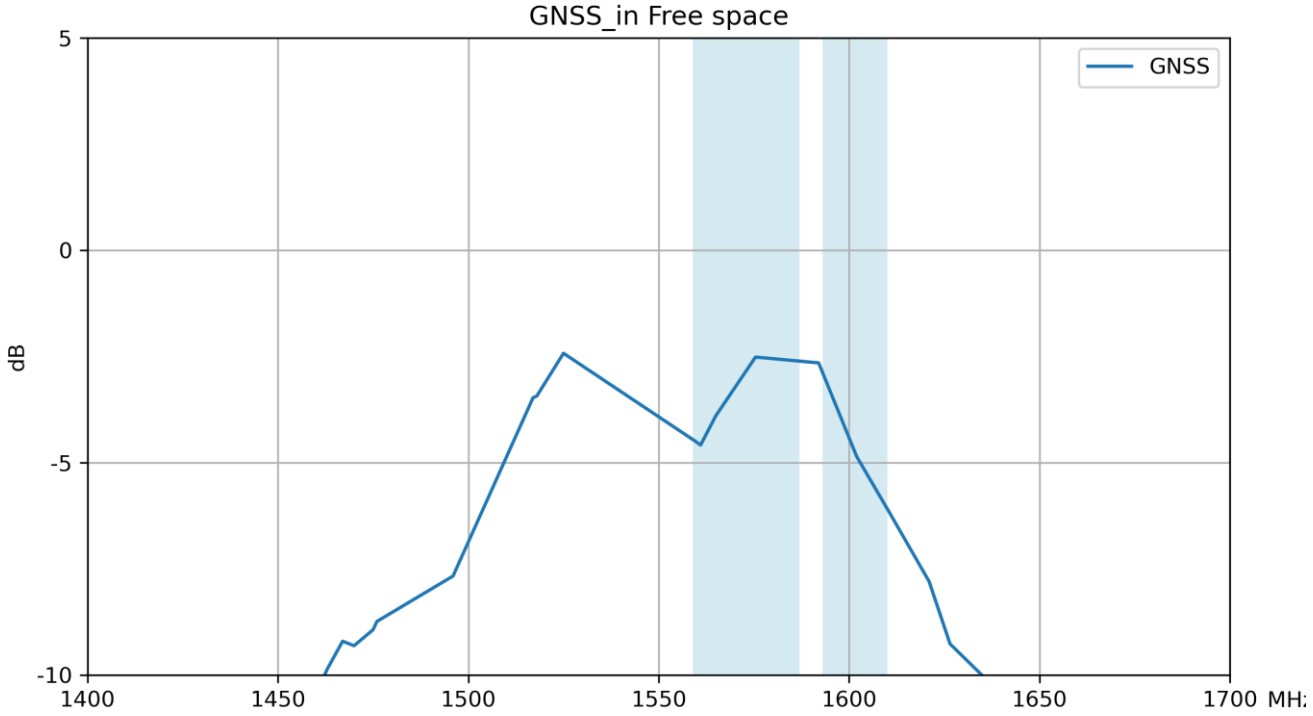


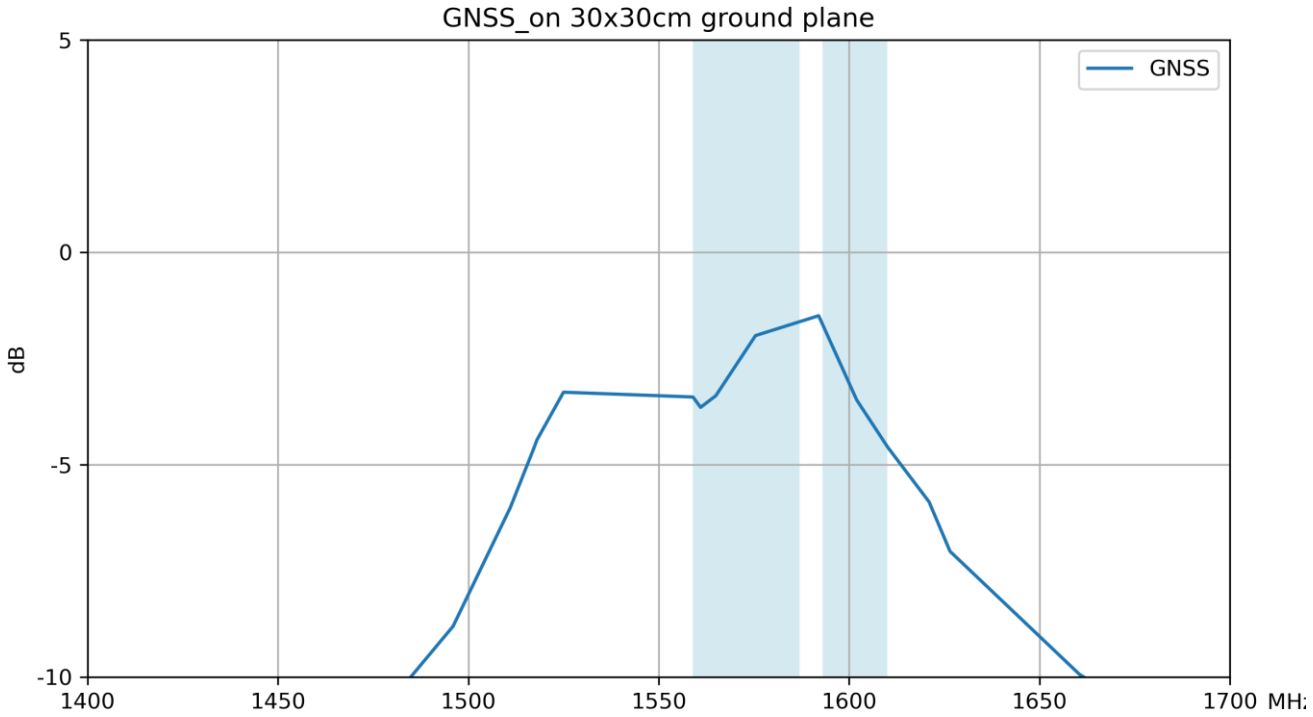
3.3 Efficiency



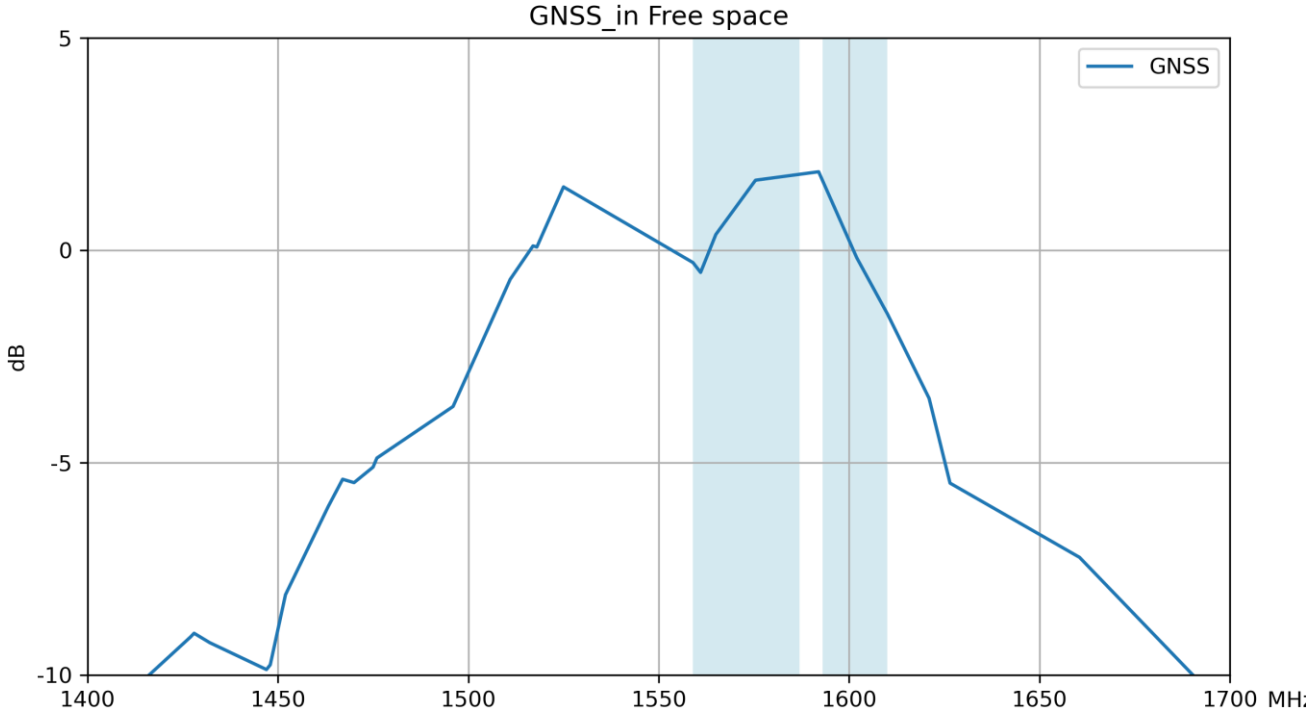


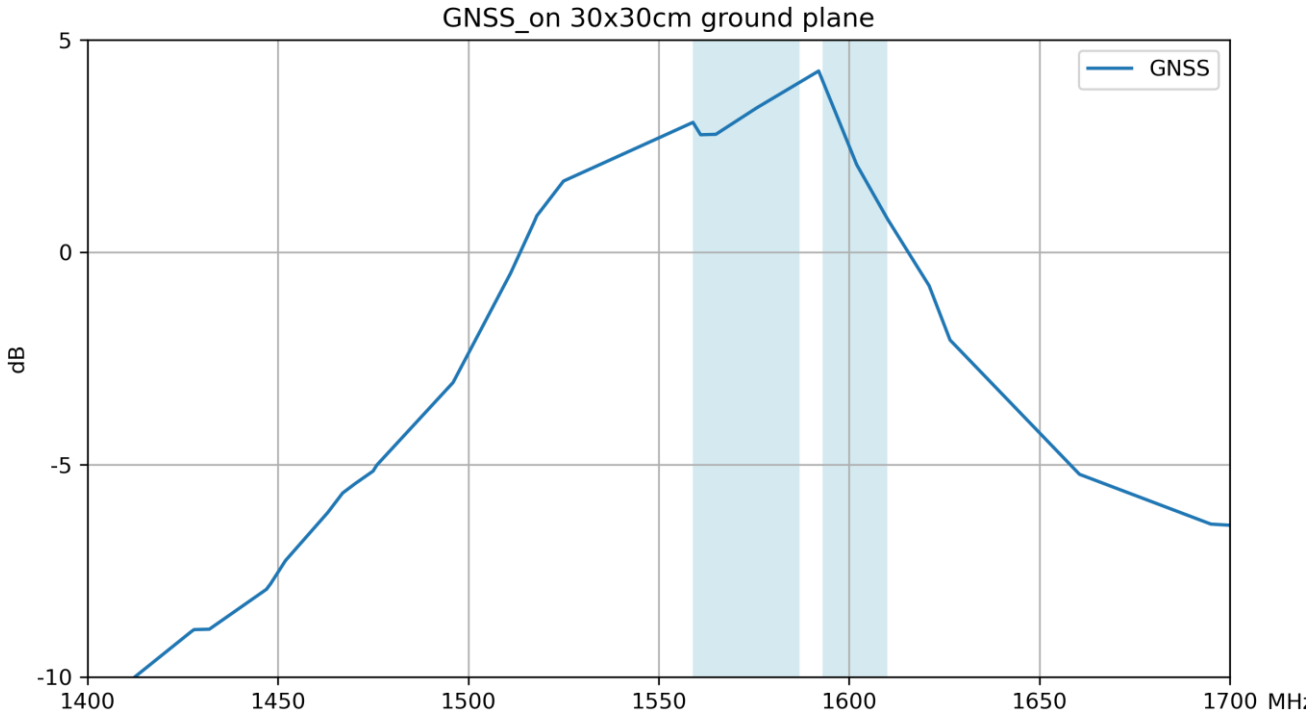
3.4 Average Gain



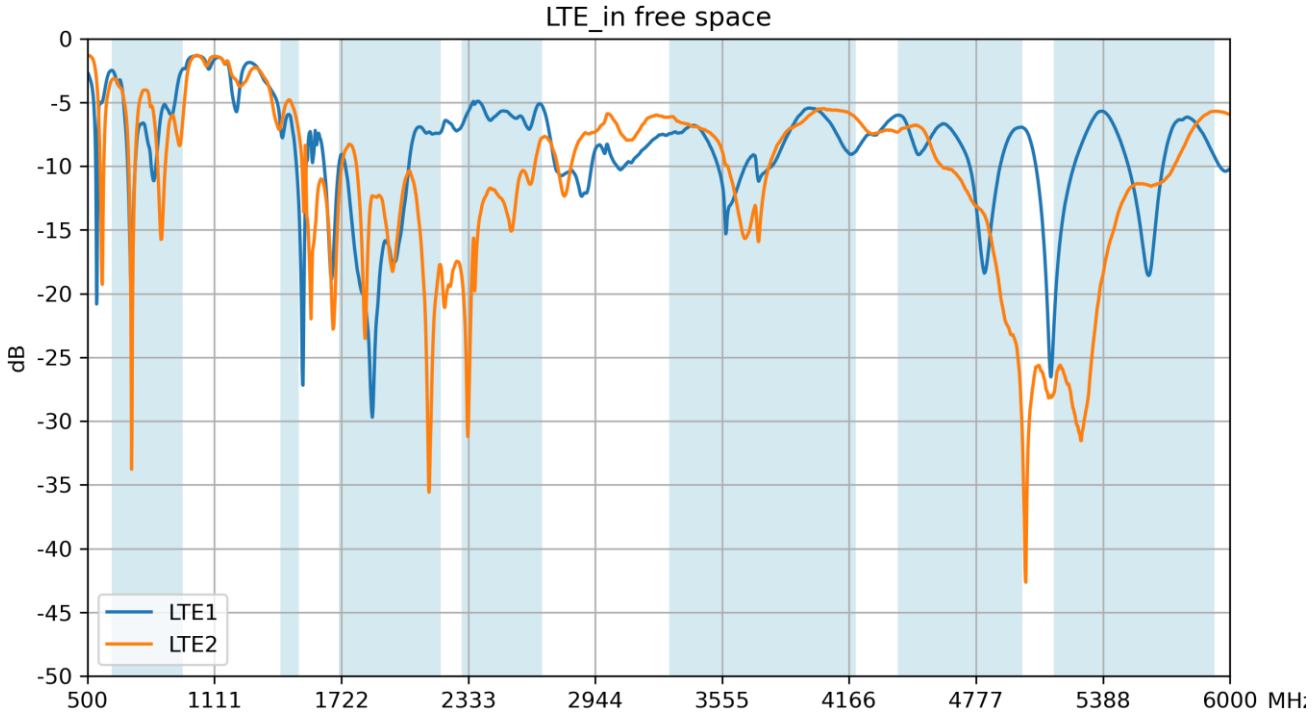


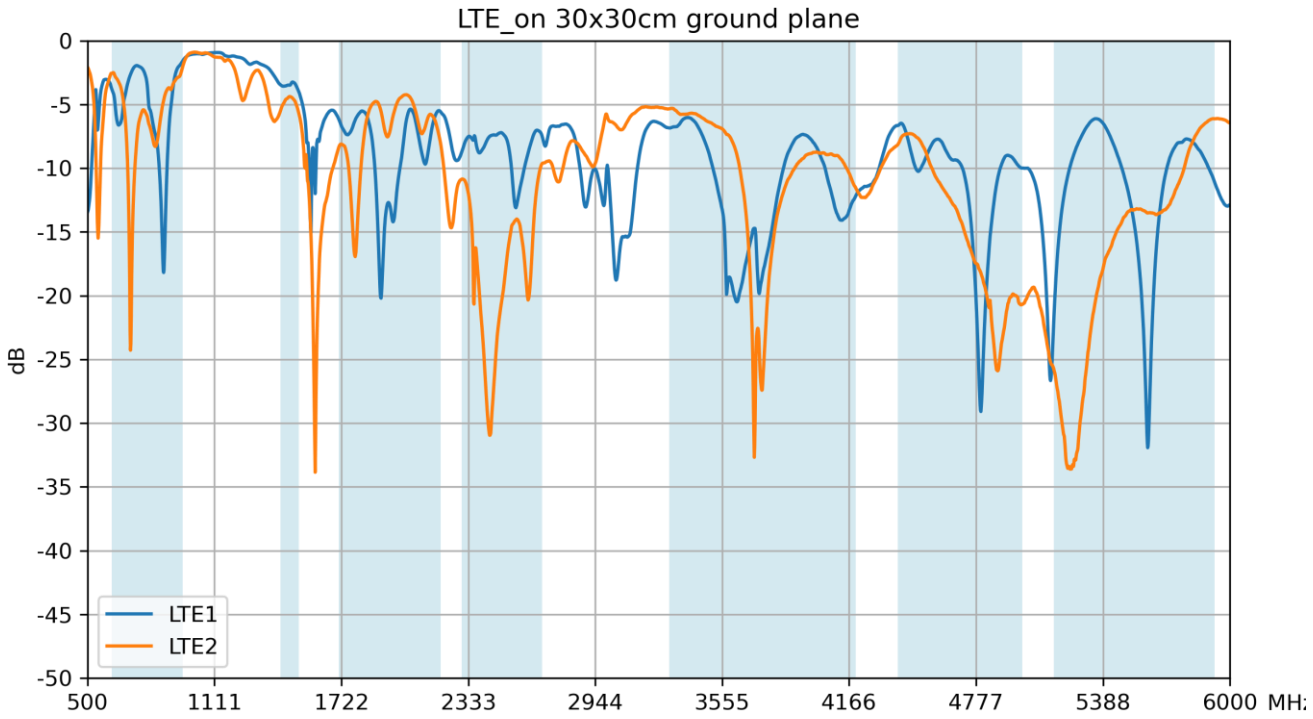
3.5 Peak Gain


GNSS_in Free space
GNSS
dB
5
0
-5
-10
1400
1450
1500
1550
1600
1650
1700 MH:

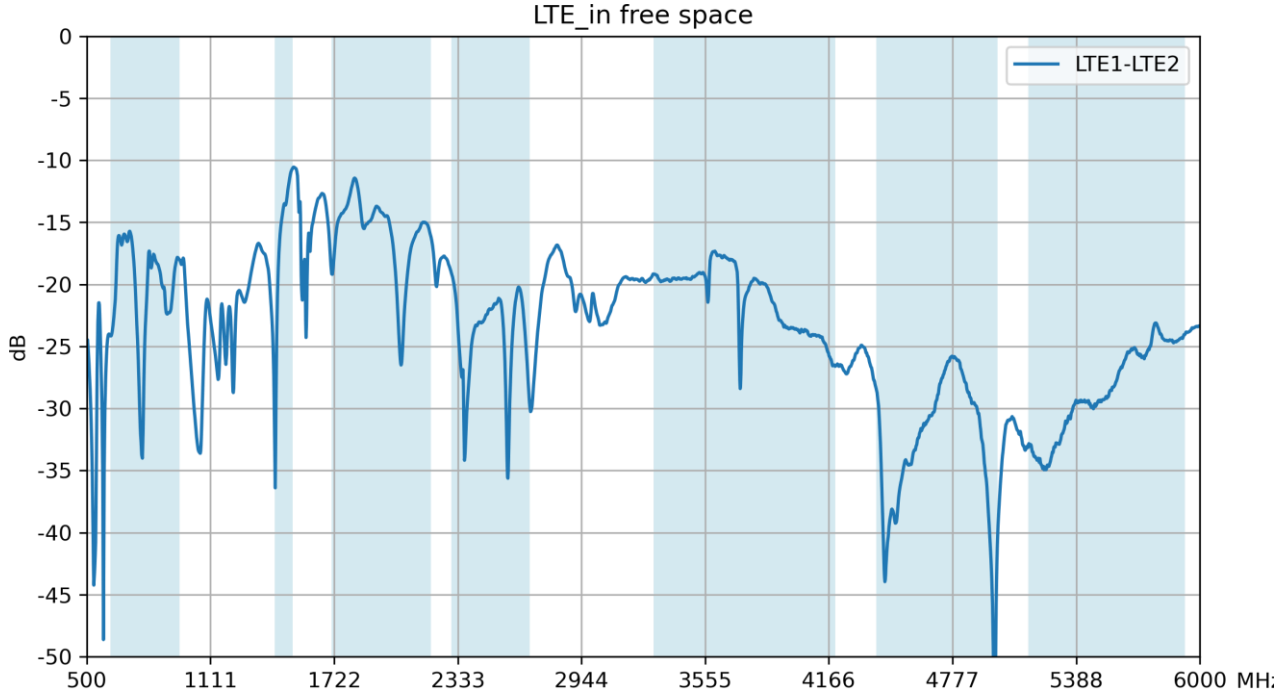

GNSS_on 30x30cm ground plane
GNSS
dB
5
0
-5
-10
1400
1450
1500
1550
1600
1650
1700 MH:

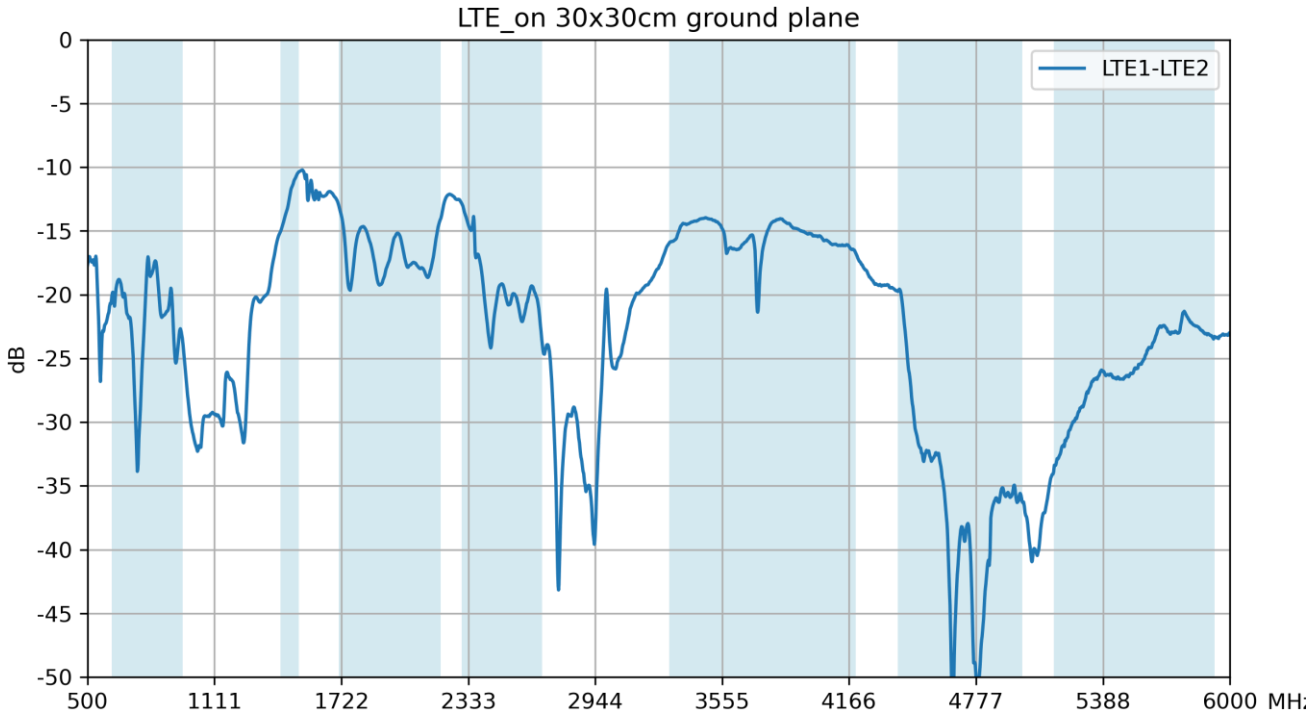
3.6 Return Loss



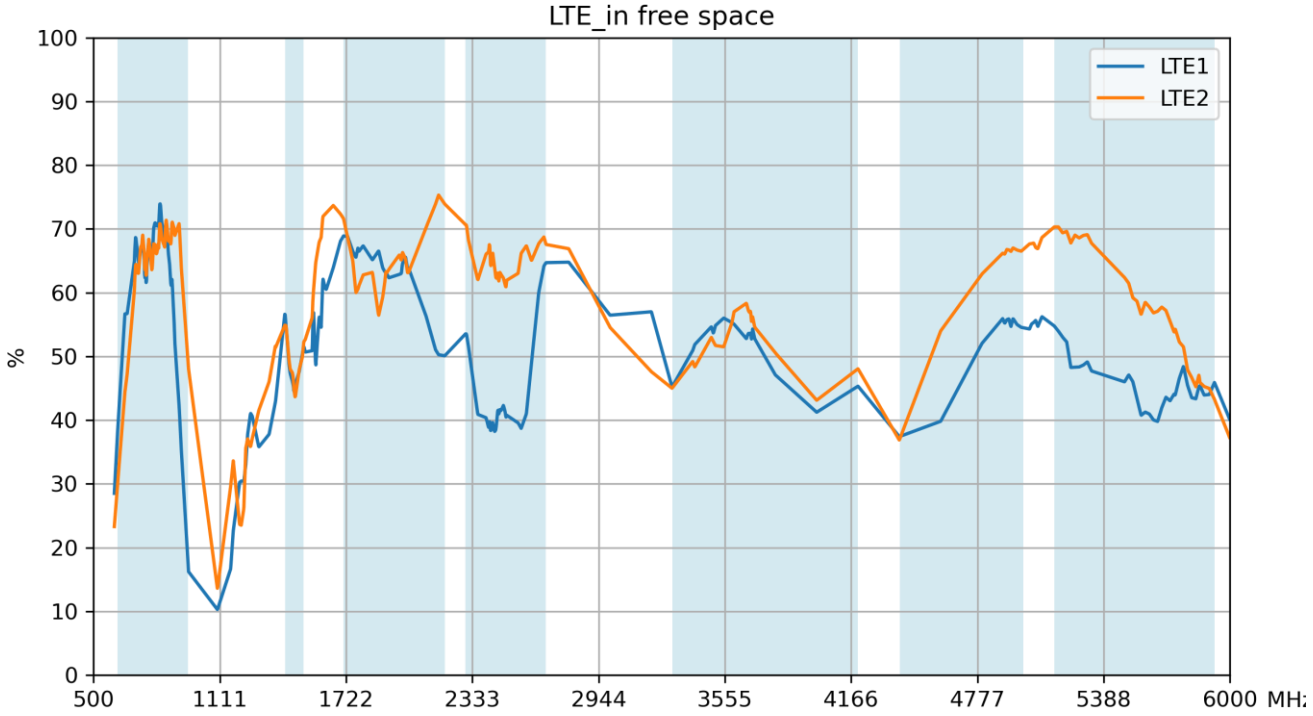


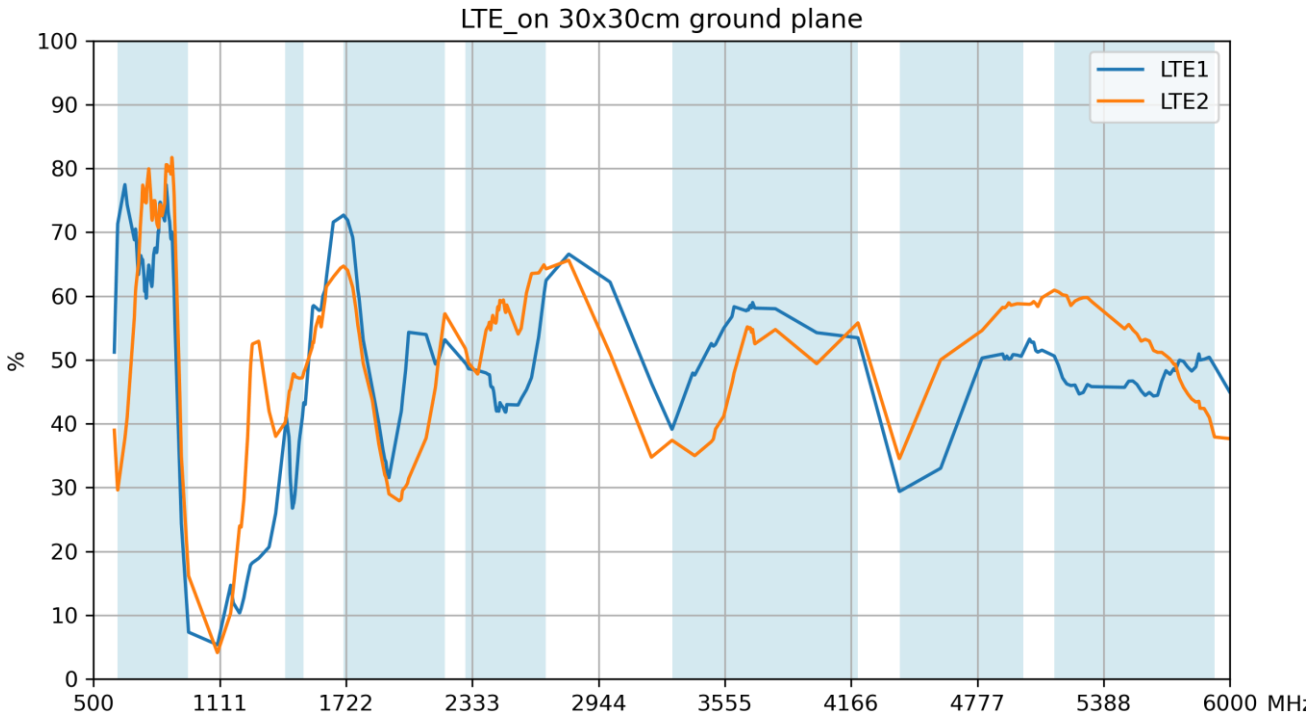
3.7 Isolation



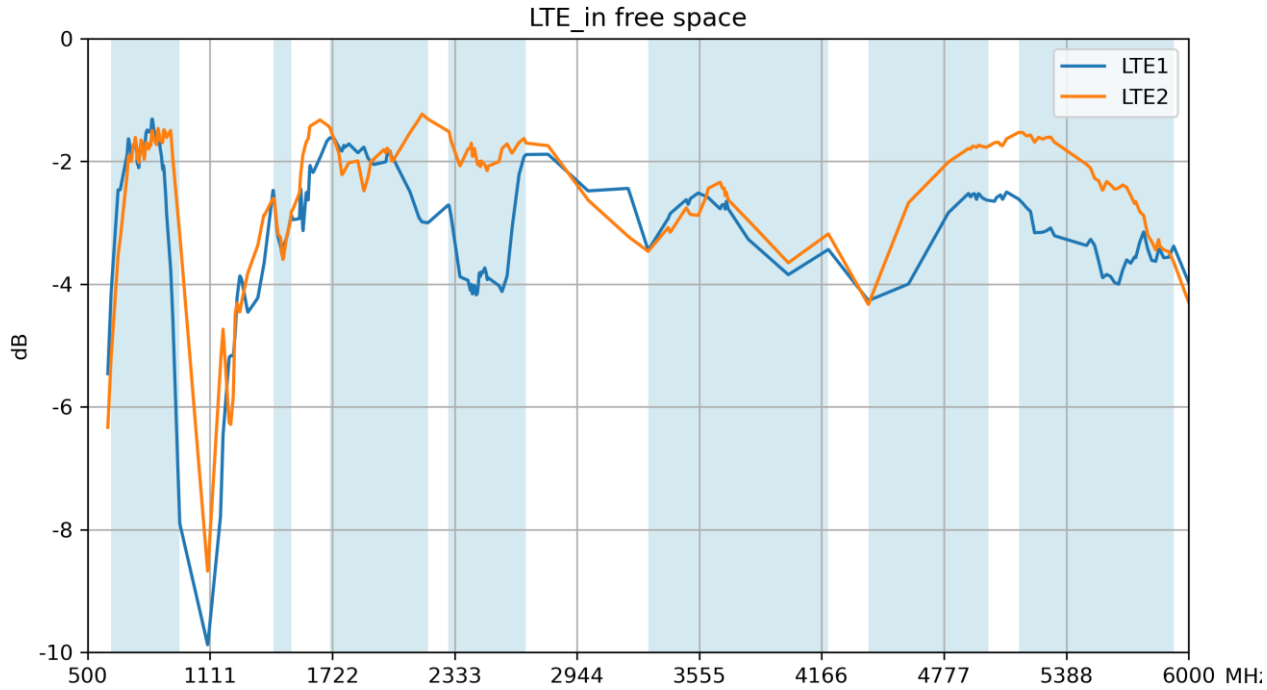


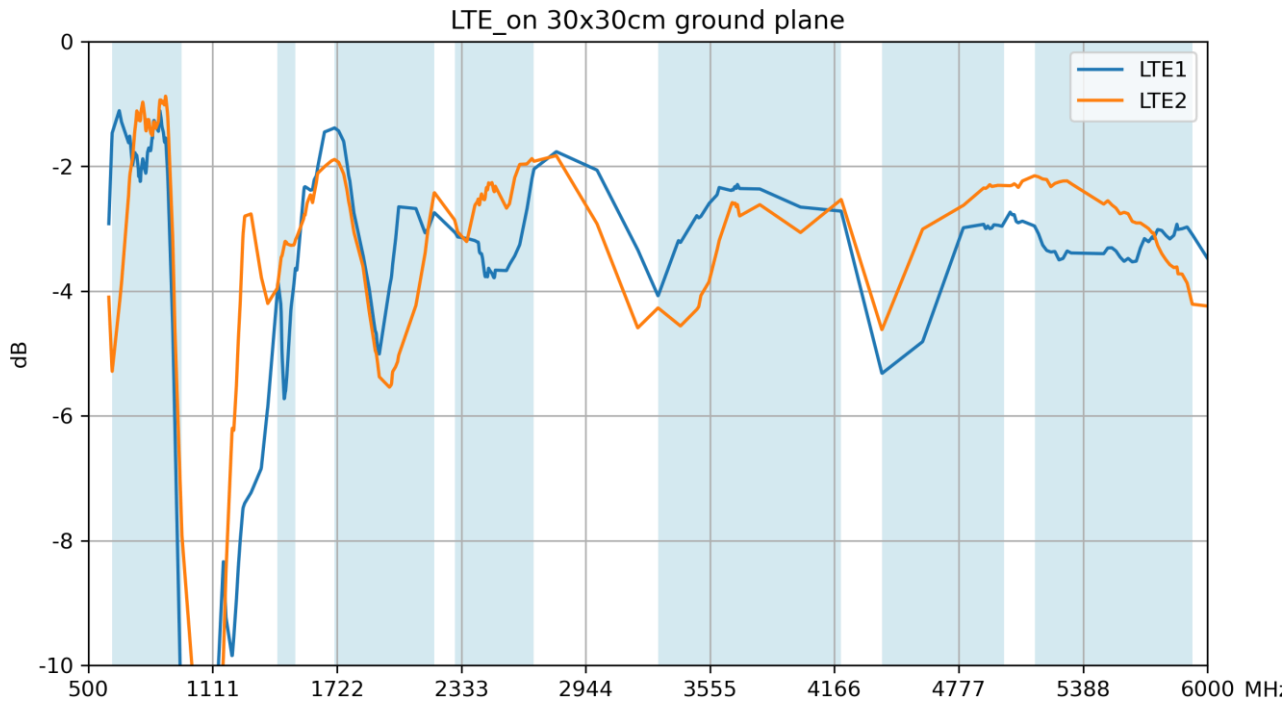
3.8 Efficiency



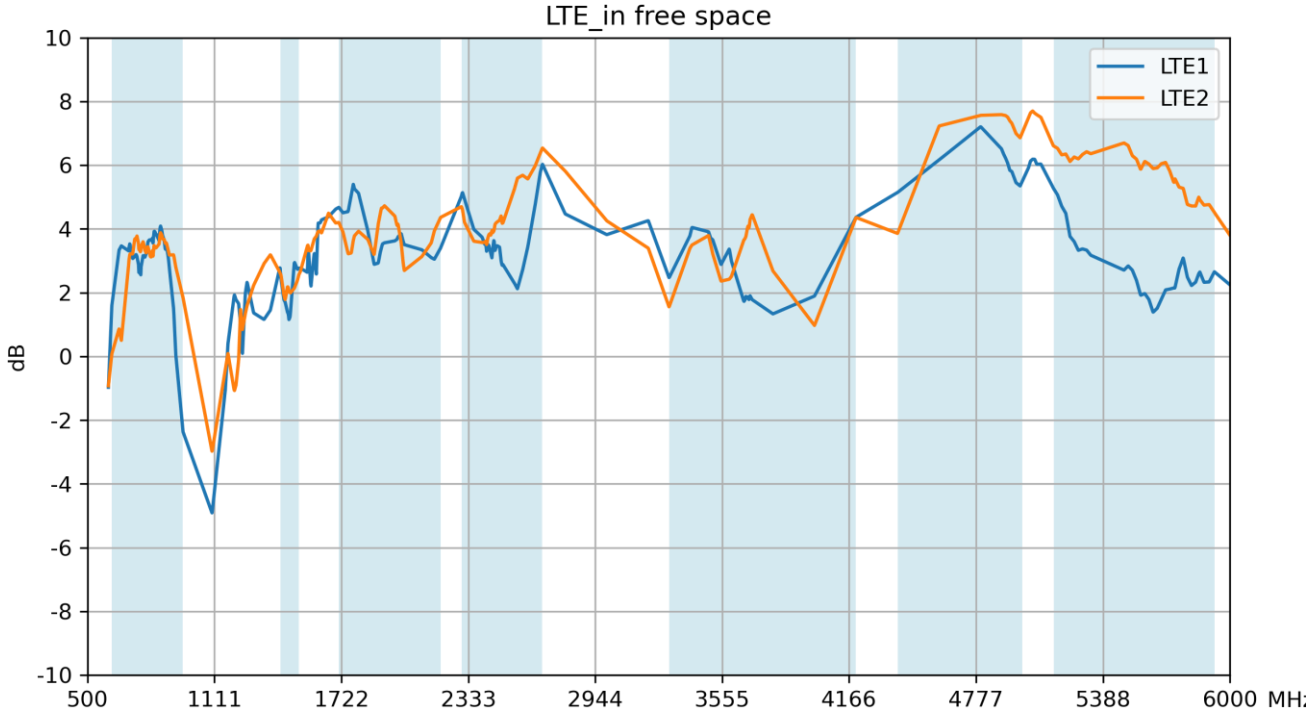


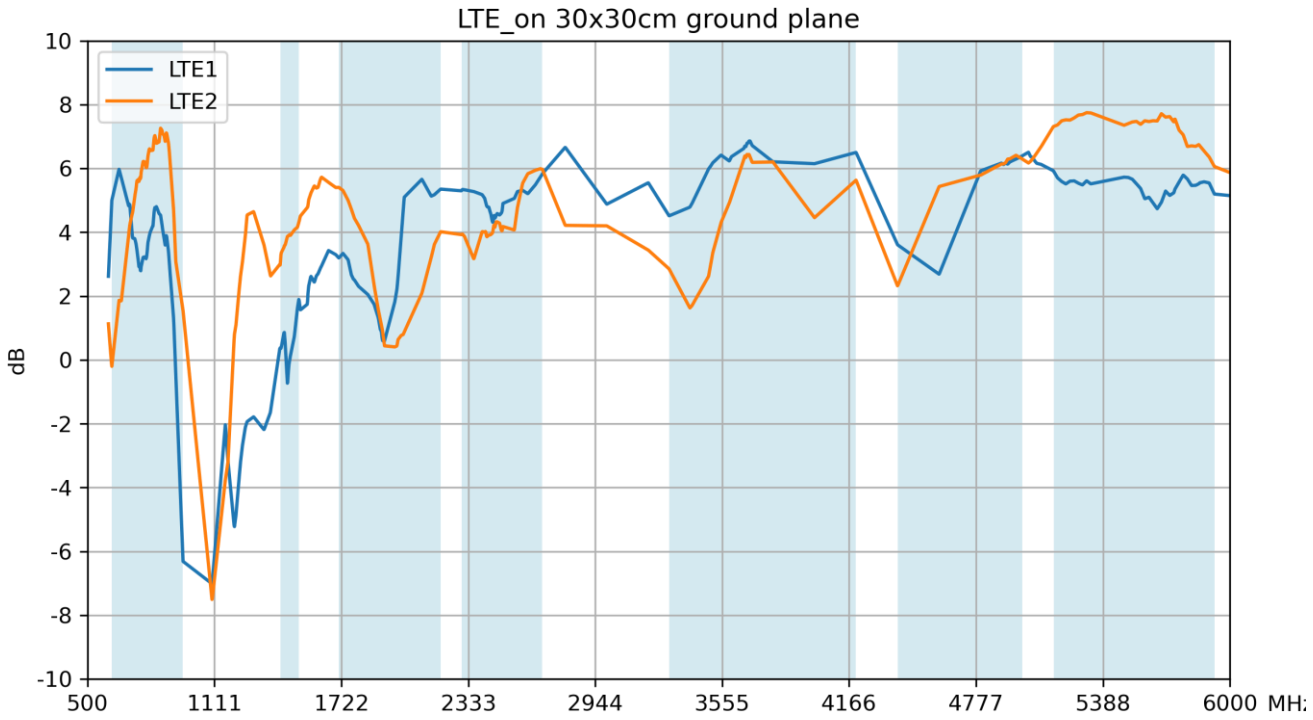
3.9 Average Gain





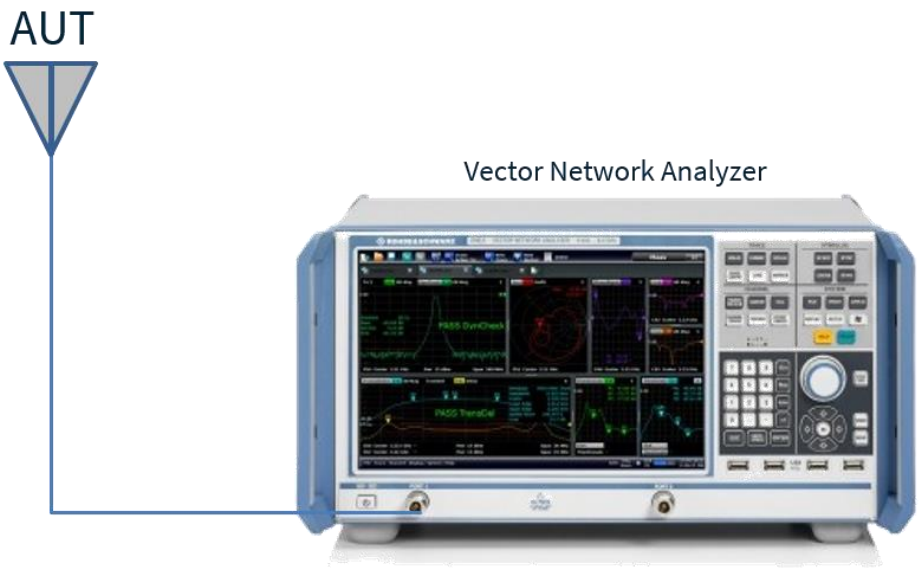
3.10 Peak Gain

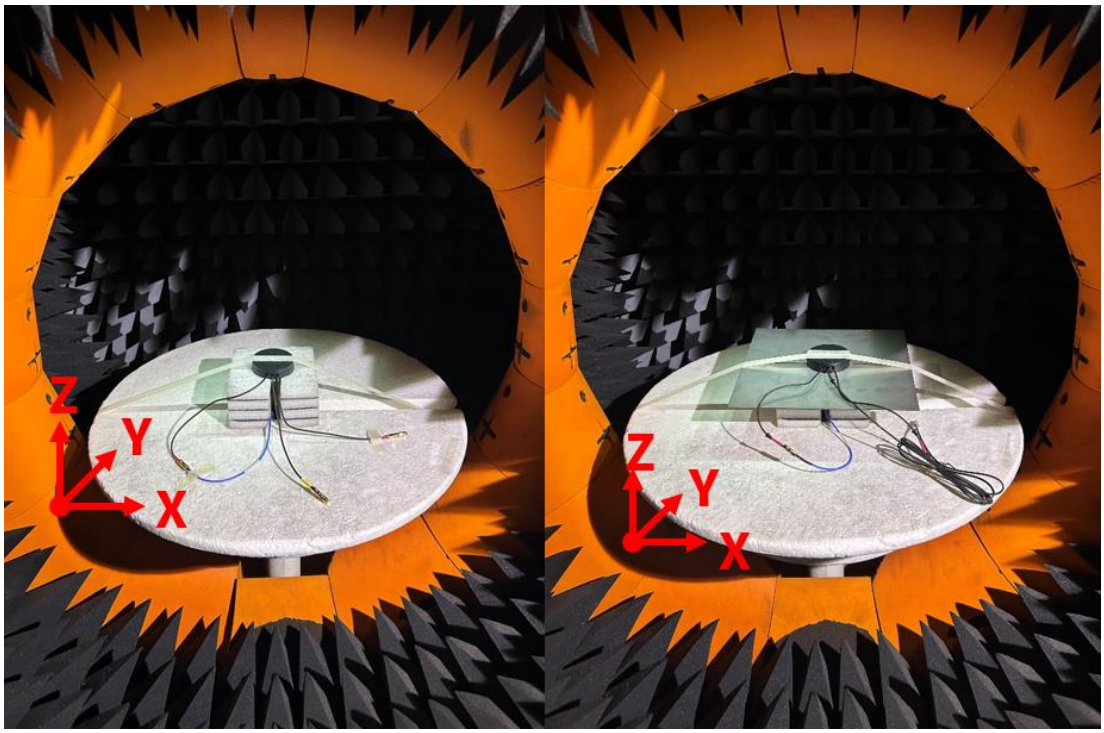




4. Radiation Patterns

4.1 Test Setup

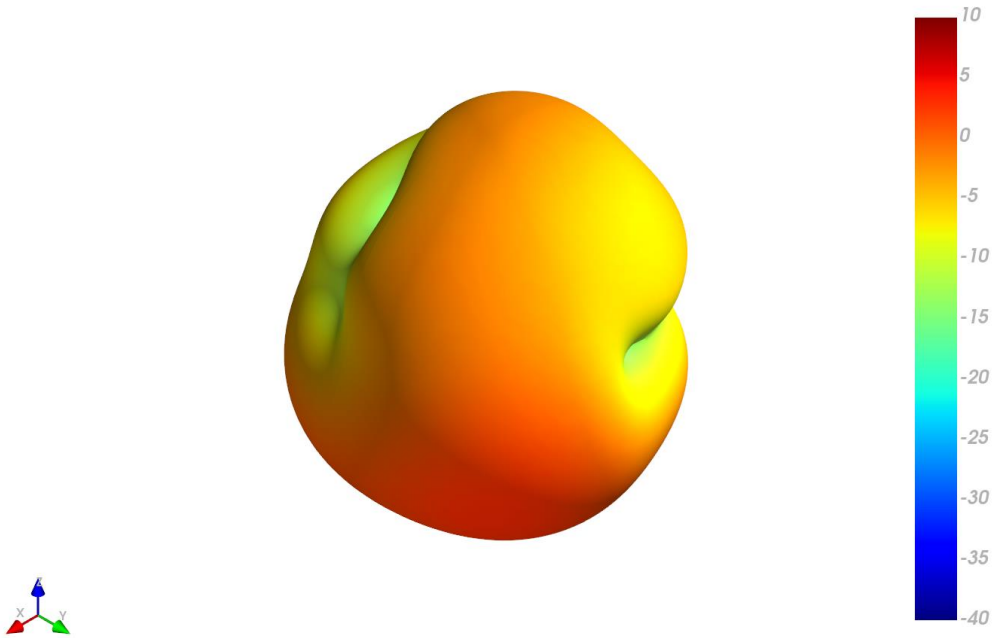




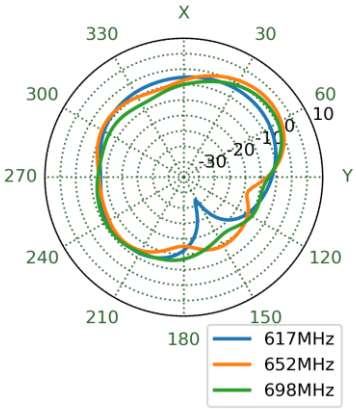
In Free space

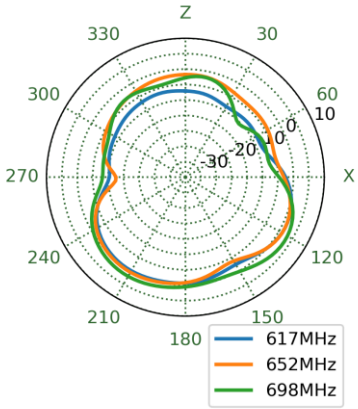
On 30X30cm Ground plane

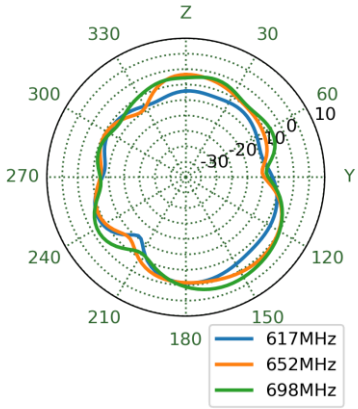
4.2 LTE 1 in Free Space Patterns at 652 MHz



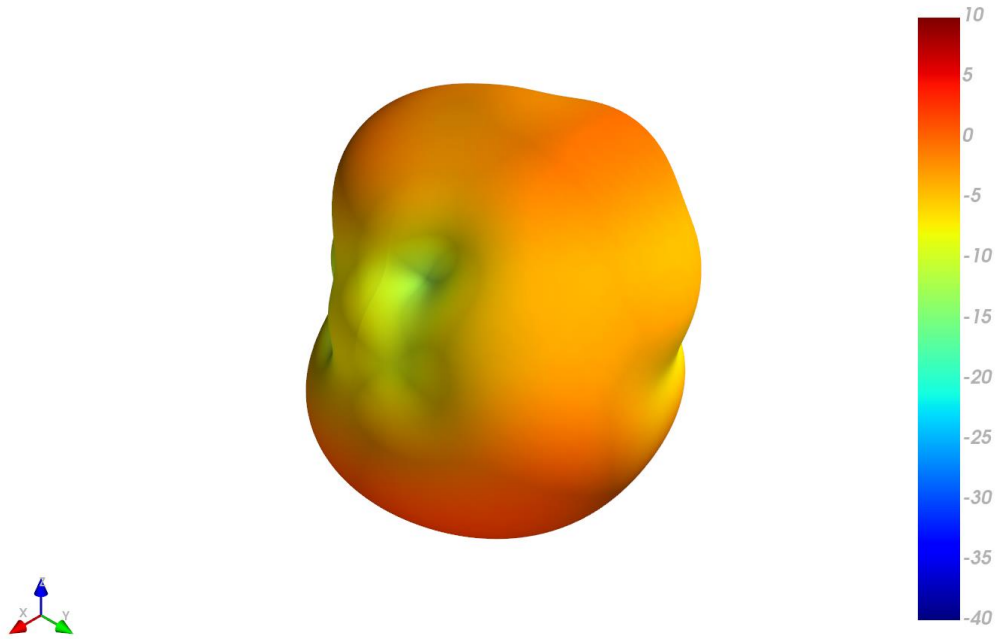
XY Plane	XZ Plane	YZ Plane



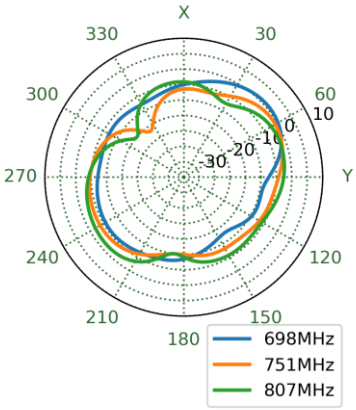


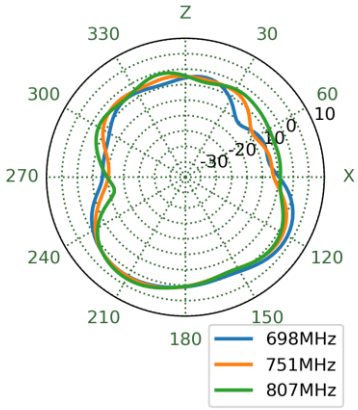


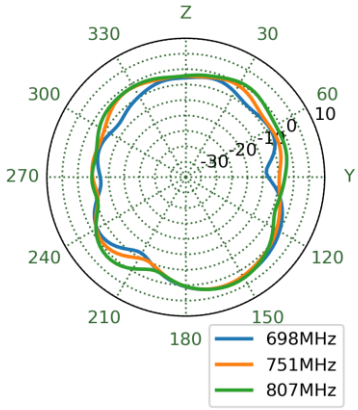
4.3 LTE 1 in Free Space Patterns at 751 MHz



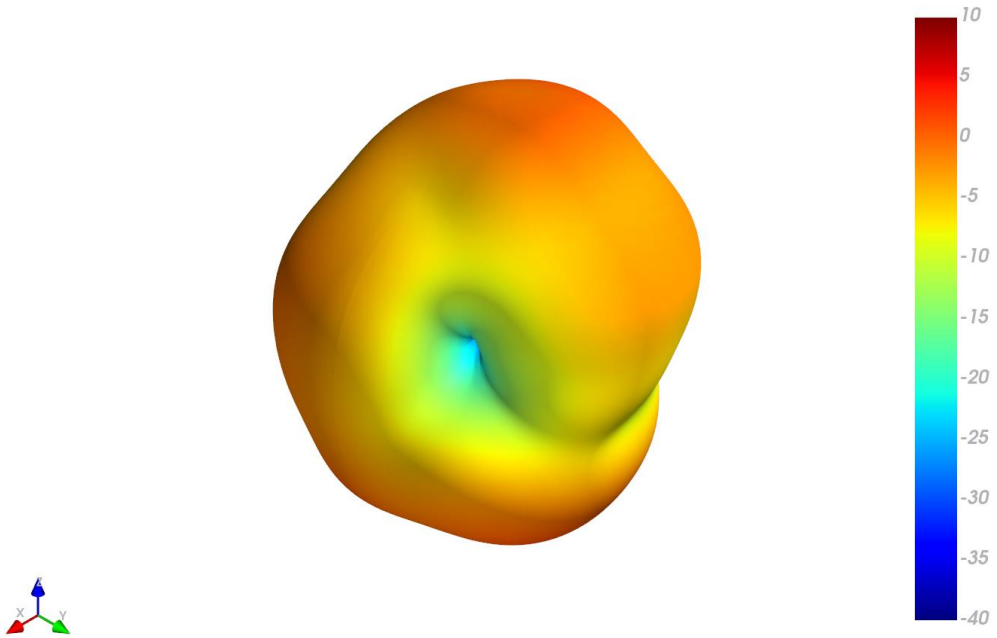
XY Plane	XZ Plane	YZ Plane



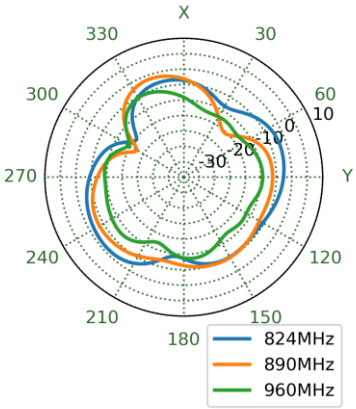


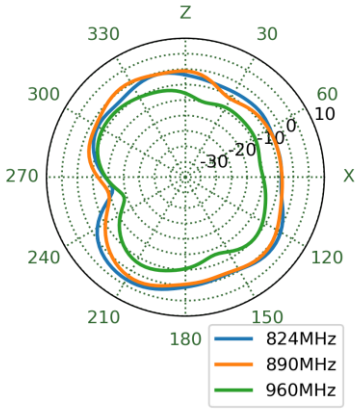


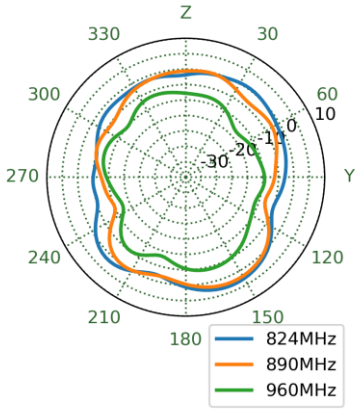
4.4 LTE 1 in Free Space Patterns at 890 MHz



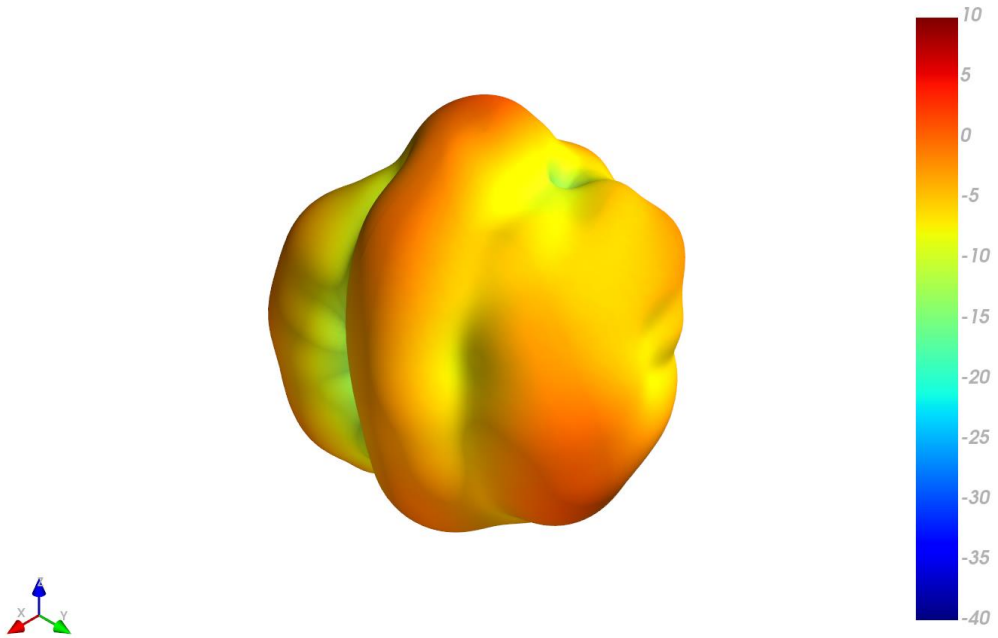
XY Plane	XZ Plane	YZ Plane



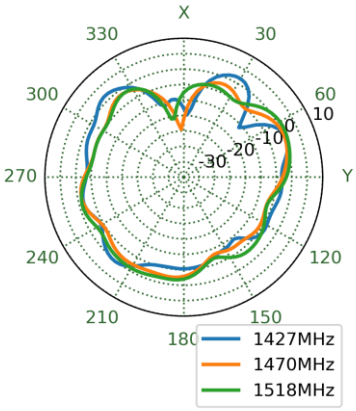


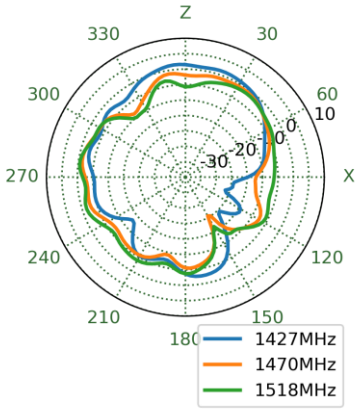


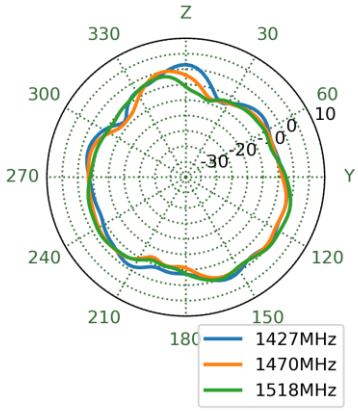
4.5 LTE 1 in Free Space Patterns at 1470 MHz



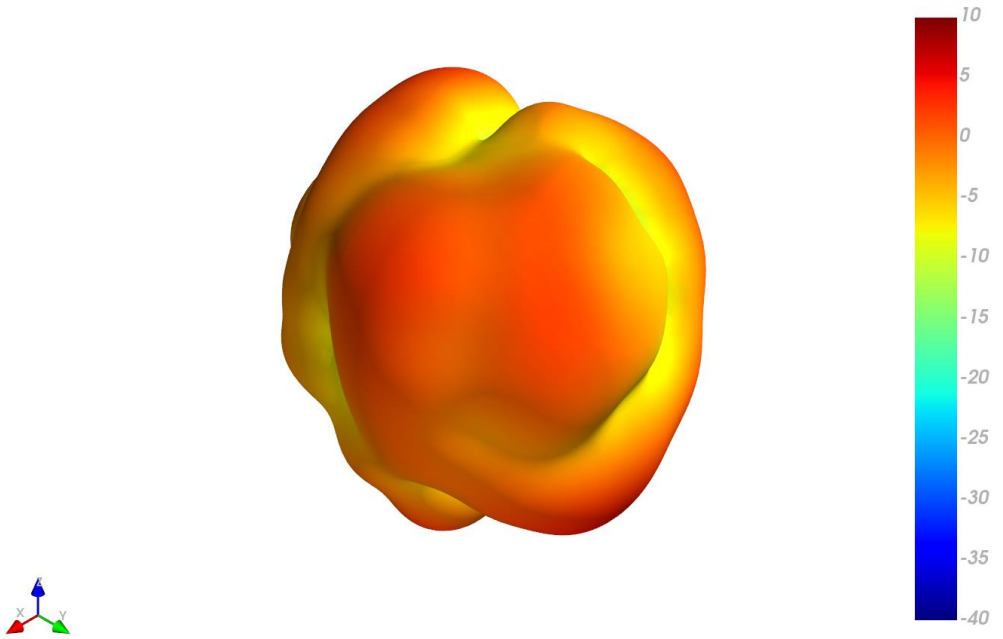
XY Plane	XZ Plane	YZ Plane



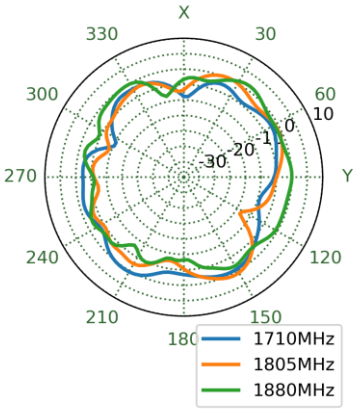


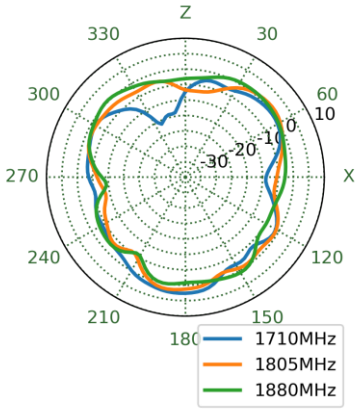


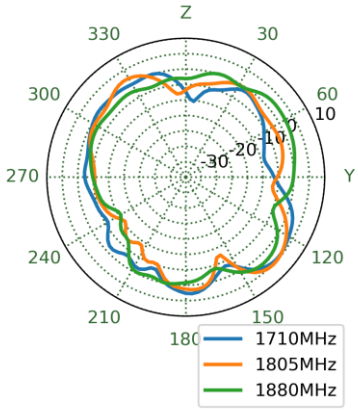
4.6 LTE 1 in Free Space Patterns at 1805 MHz



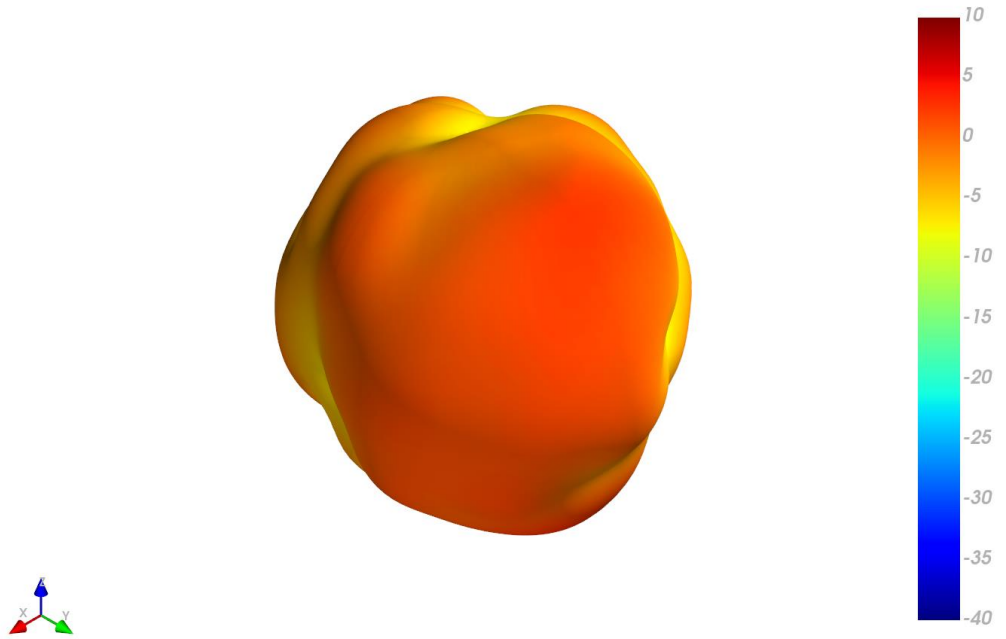
XY Plane	XZ Plane	YZ Plane



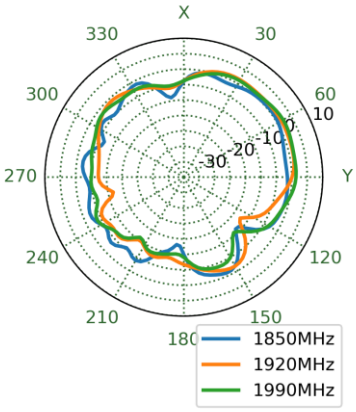


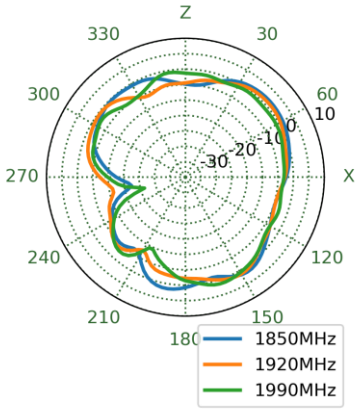


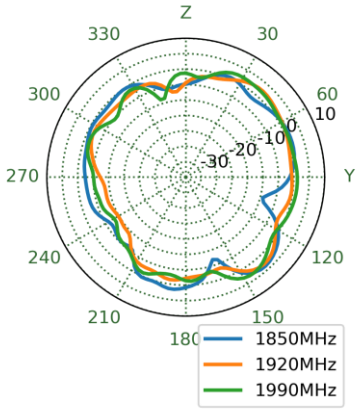
4.7 LTE 1 in Free Space Patterns at 1920 MHz



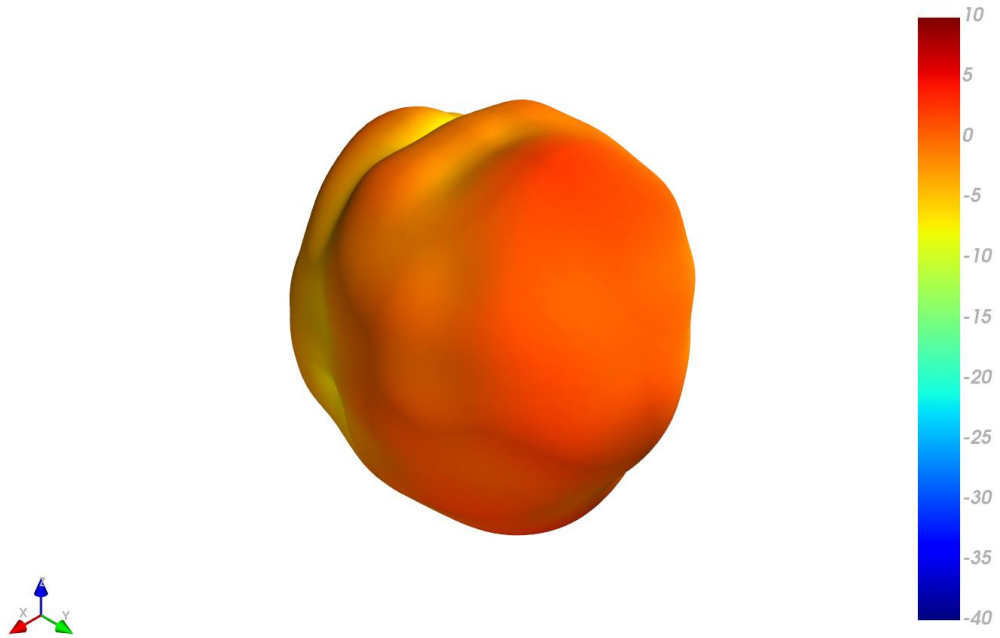
XY Plane	XZ Plane	YZ Plane



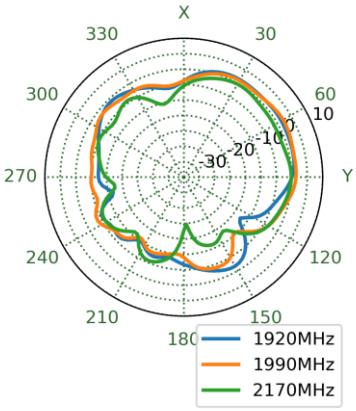


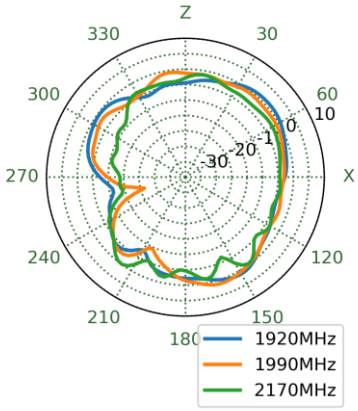


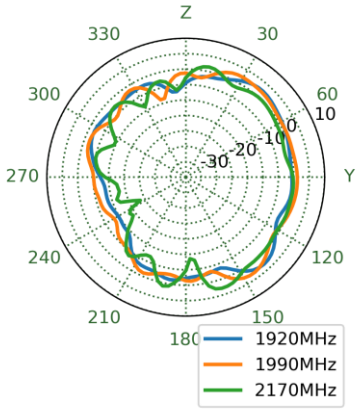
4.8 LTE 1 in Free Space Patterns at 1990 MHz



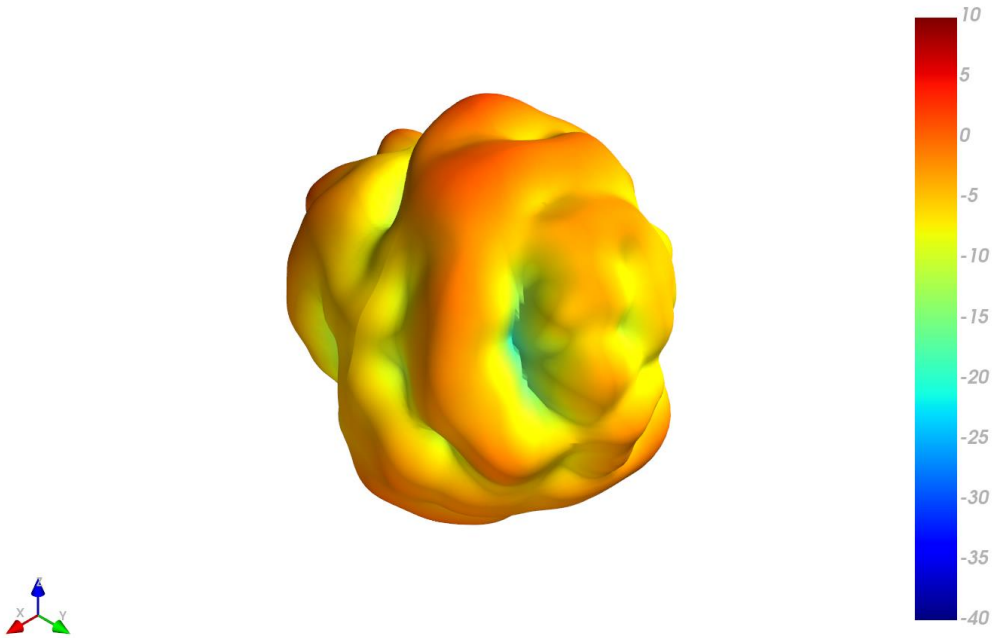
XY Plane	XZ Plane	YZ Plane



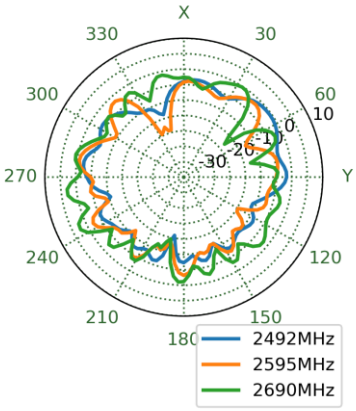


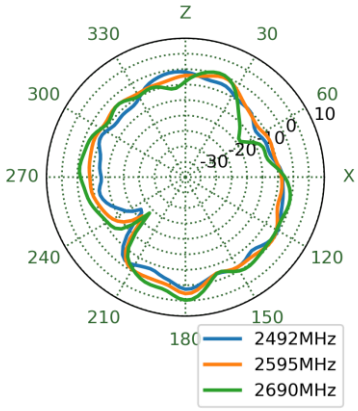


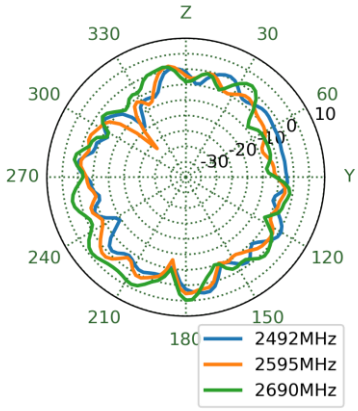
4.9 LTE 1 in Free Space Patterns at 2595 MHz



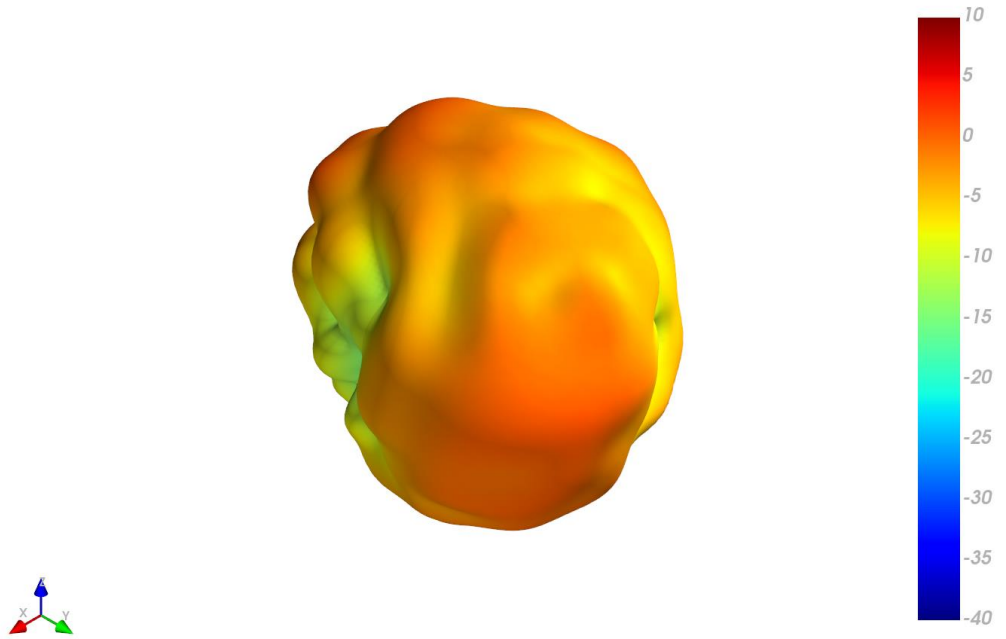
XY Plane	XZ Plane	YZ Plane



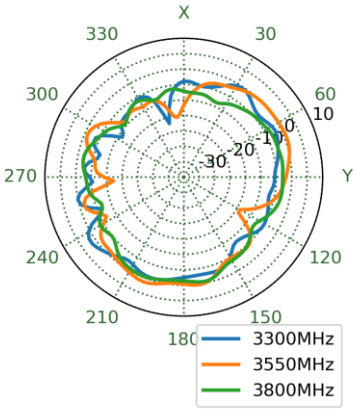


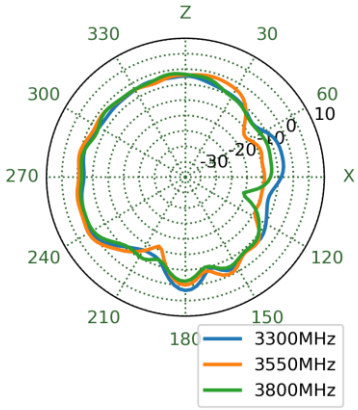


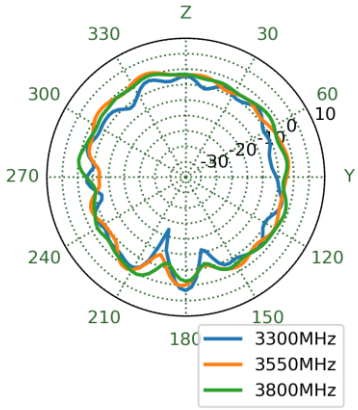
4.10 LTE 1 in Free Space Patterns at 3550 MHz



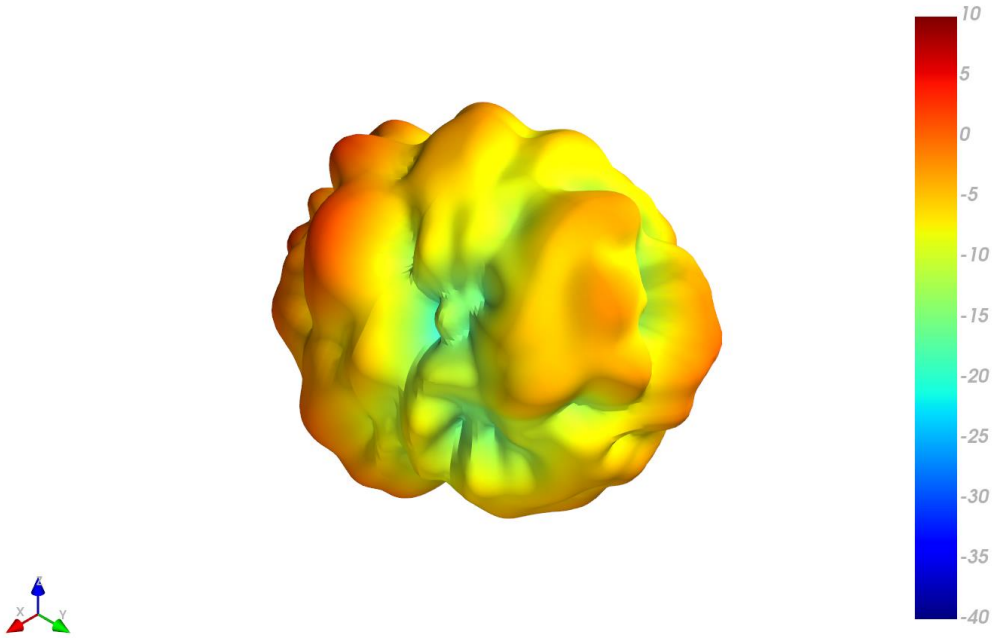
XY Plane	XZ Plane	YZ Plane



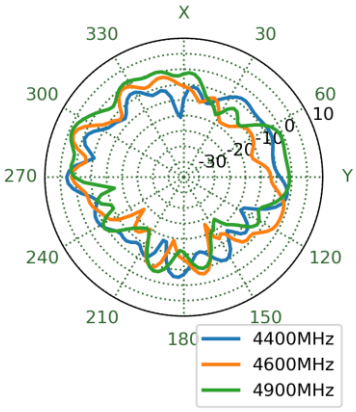


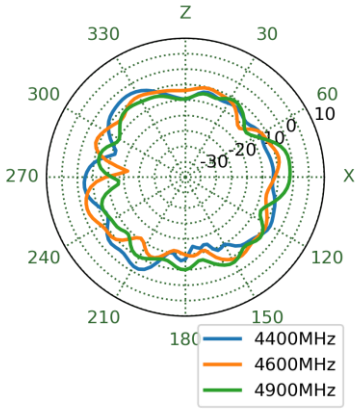


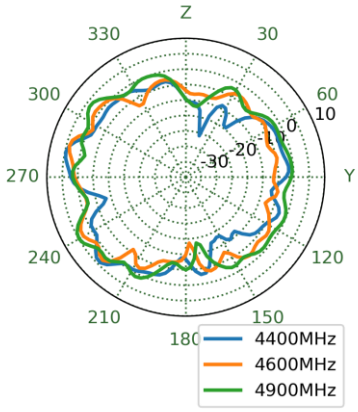
4.11 LTE 1 in Free Space Patterns at 4600 MHz



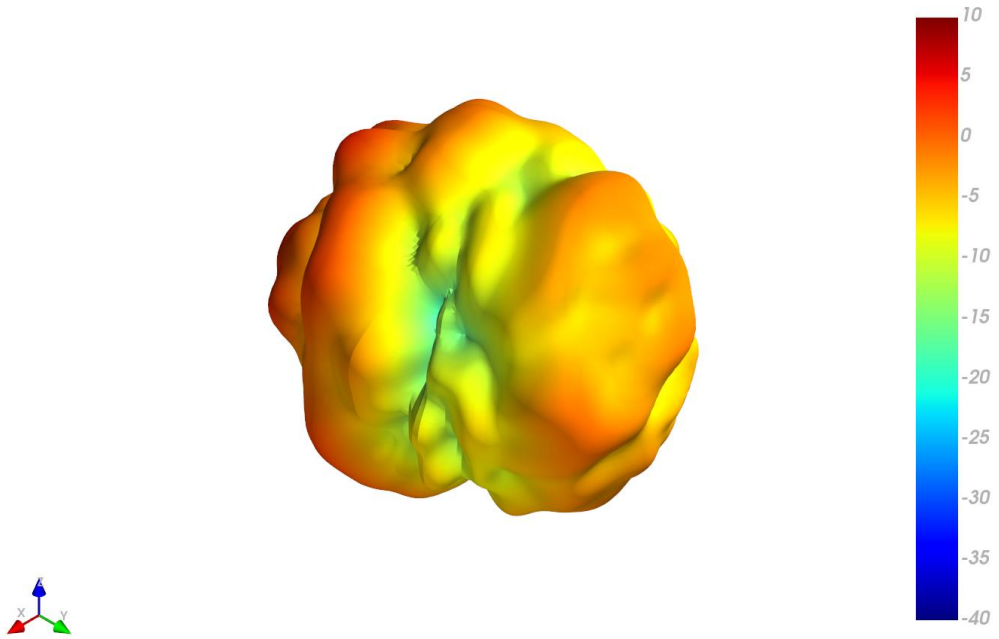
XY Plane	XZ Plane	YZ Plane



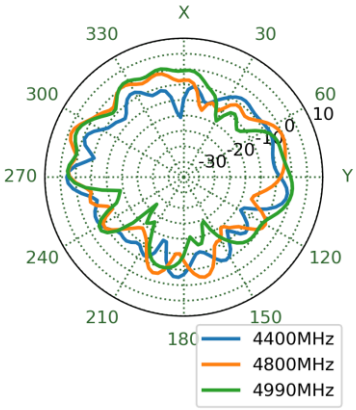


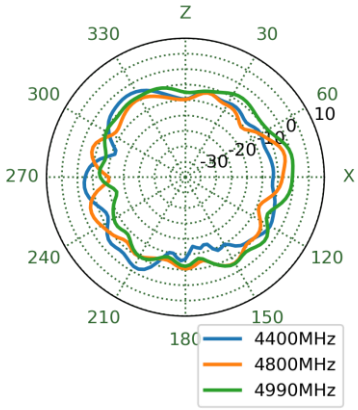


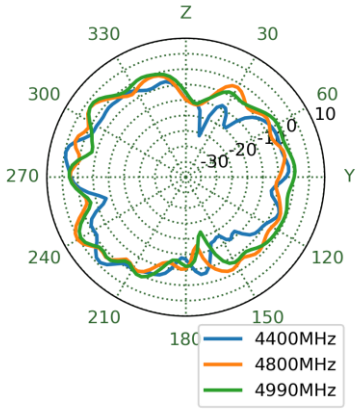
4.12 LTE 1 in Free Space Patterns at 4800 MHz



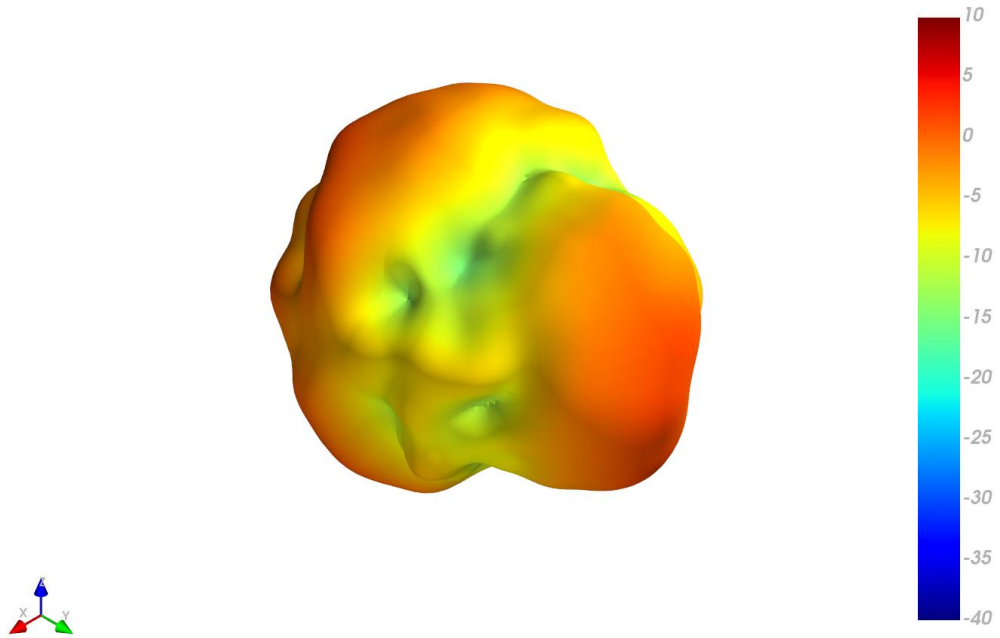
XY Plane	XZ Plane	YZ Plane



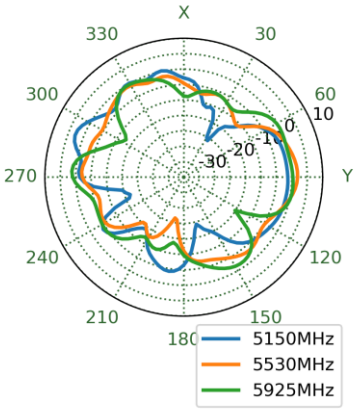


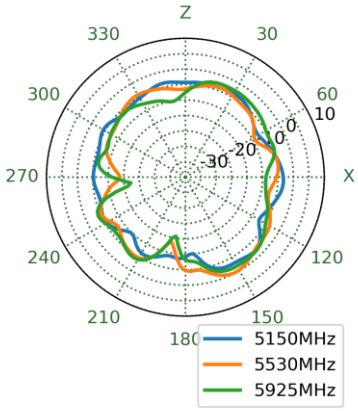


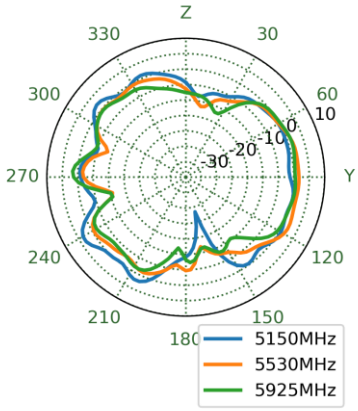
4.13 LTE 1 in Free Space Patterns at 5530 MHz



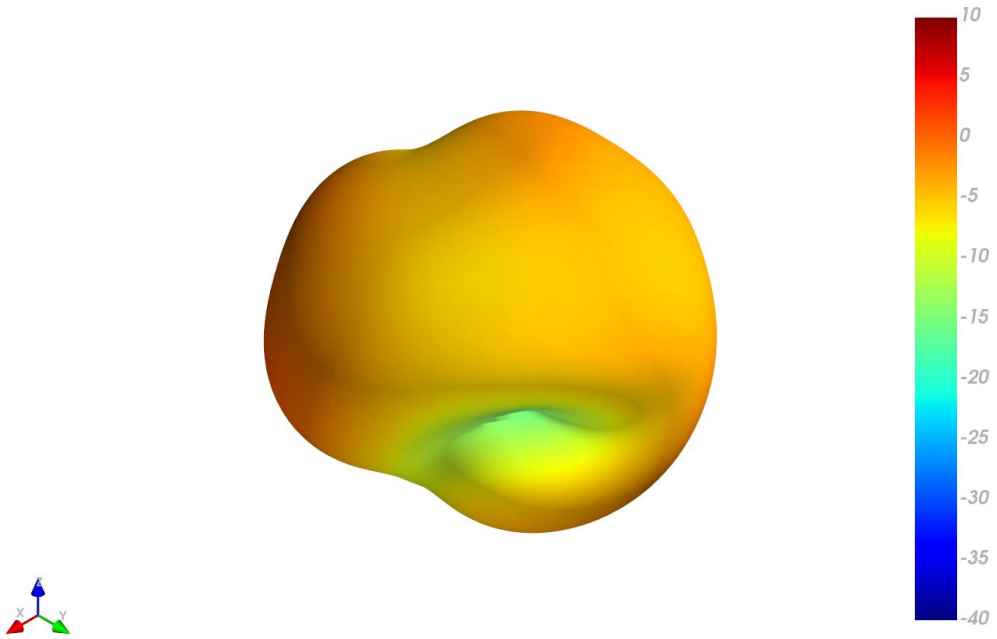
XY Plane	XZ Plane	YZ Plane



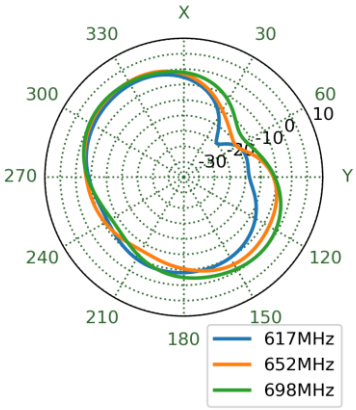


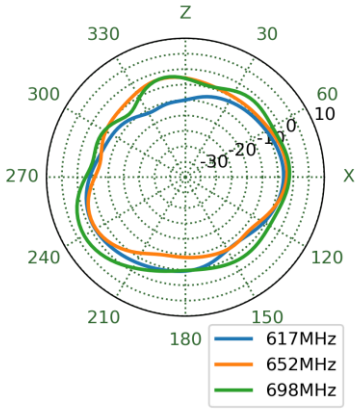


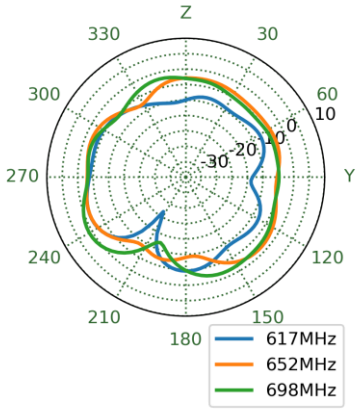
4.14 LTE 2 in Free Space Patterns at 652 MHz



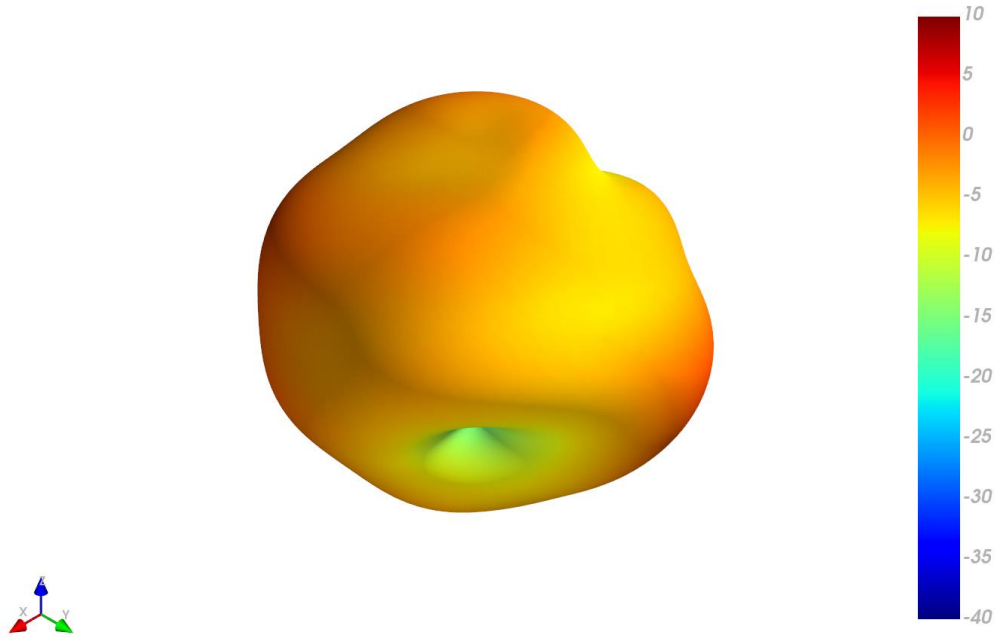
XY Plane	XZ Plane	YZ Plane



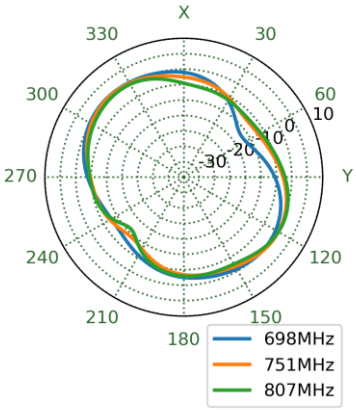


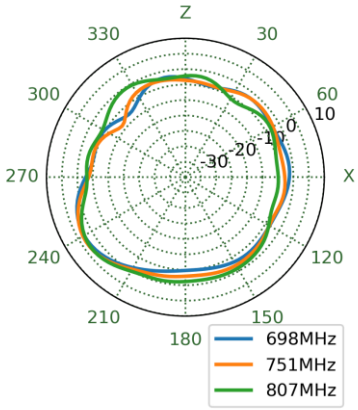


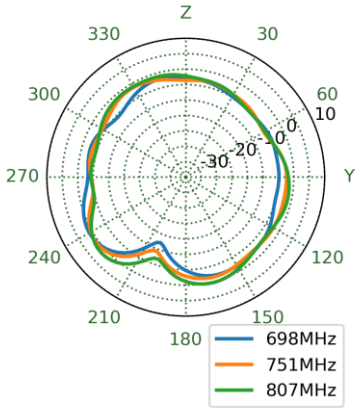
4.15 LTE 2 in Free Space Patterns at 751 MHz



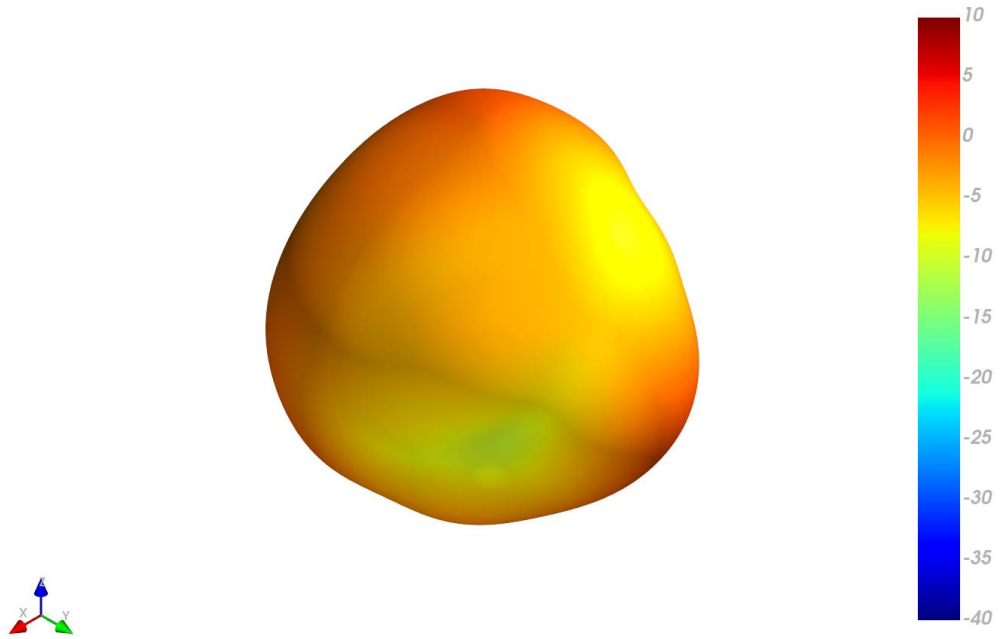
XY Plane	XZ Plane	YZ Plane



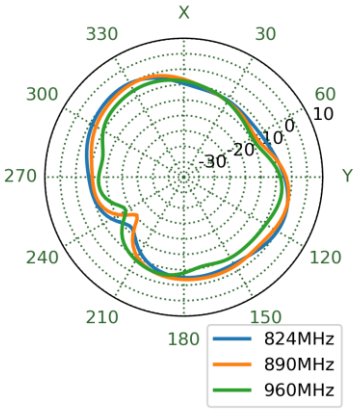


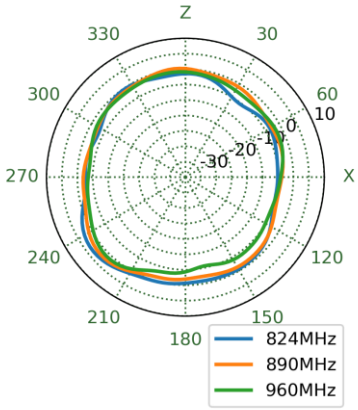


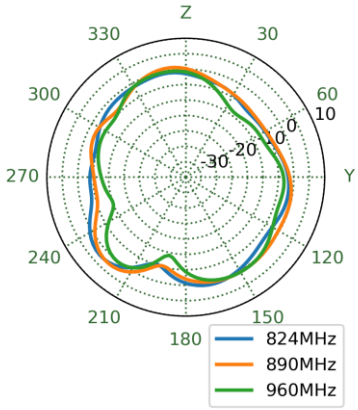
4.16 LTE 2 in Free Space Patterns at 890 MHz



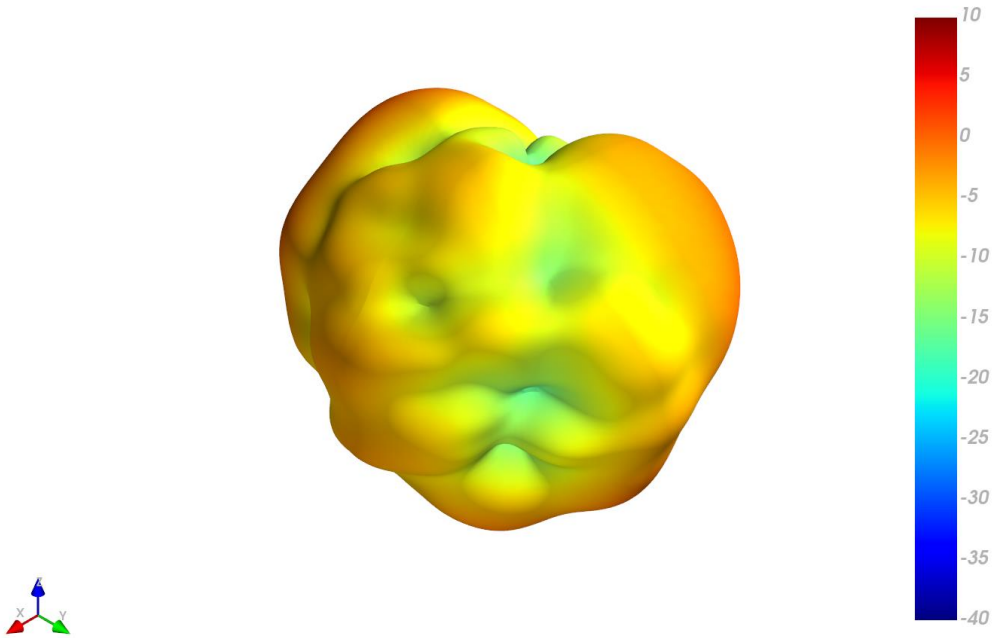
XY Plane	XZ Plane	YZ Plane



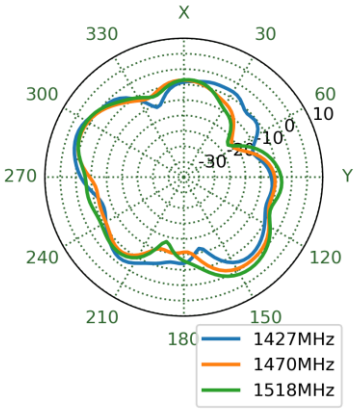


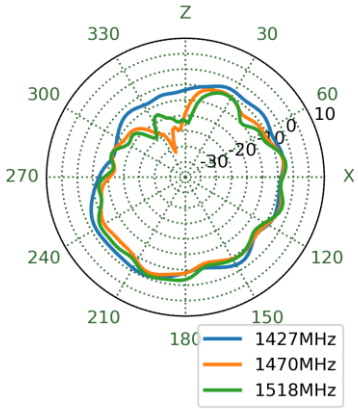


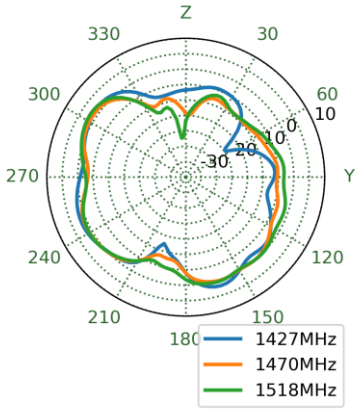
4.17 LTE 2 in Free Space Patterns at 1470 MHz



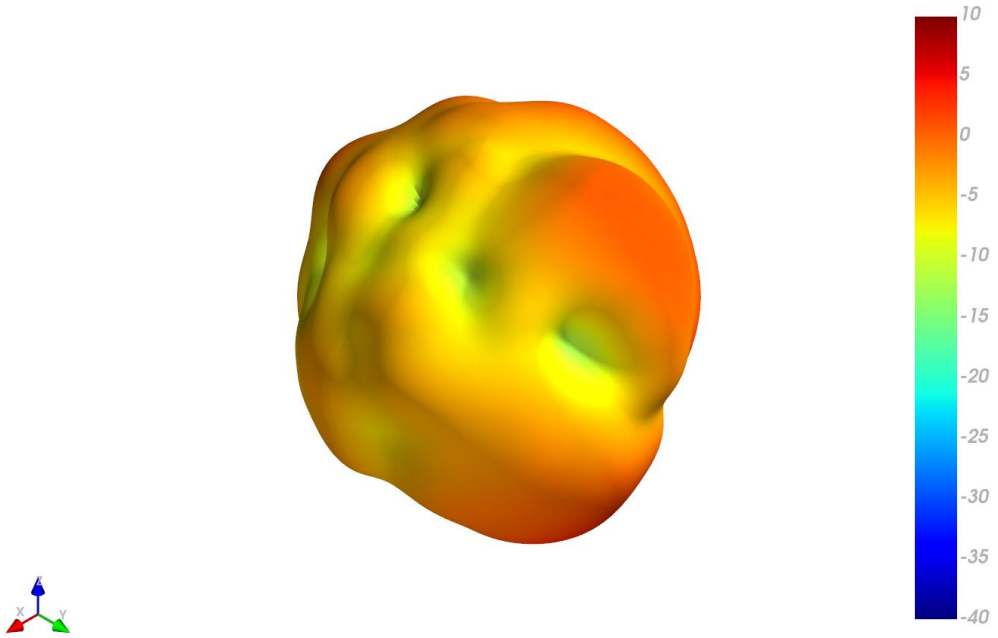
XY Plane	XZ Plane	YZ Plane



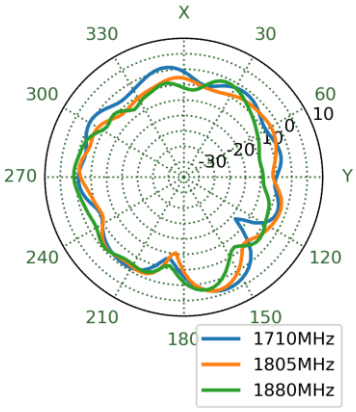


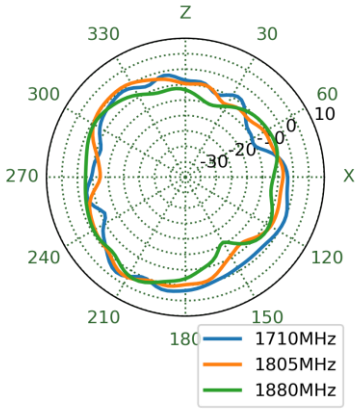


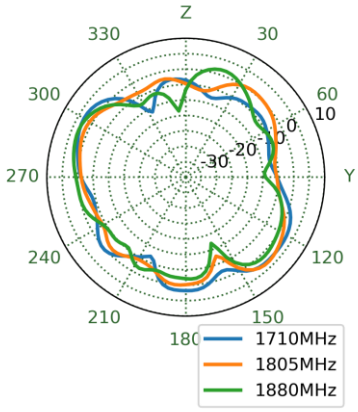
4.18 LTE 2 in Free Space Patterns at 1805 MHz



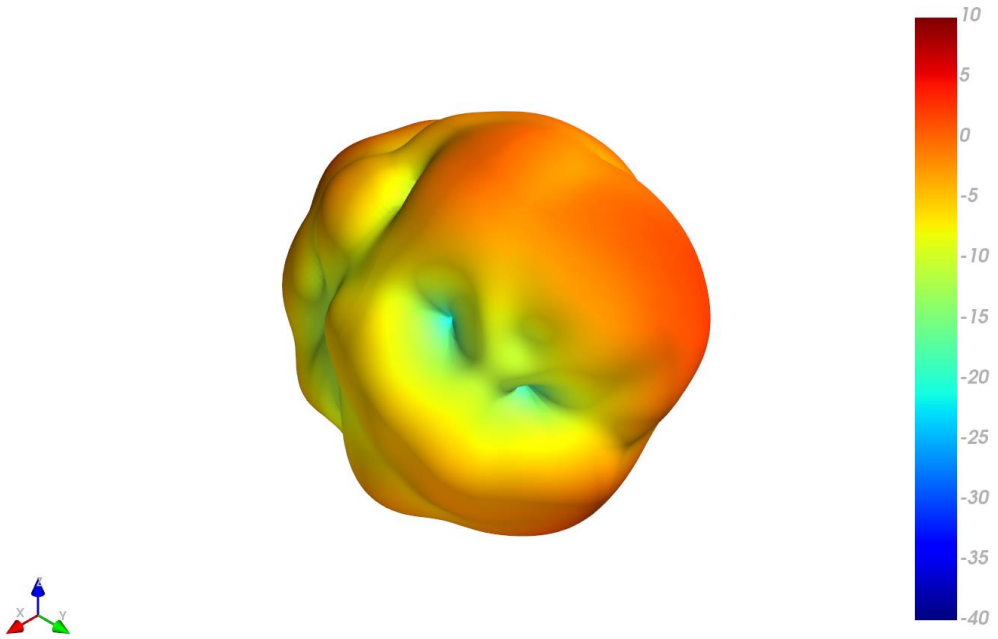
XY Plane	XZ Plane	YZ Plane



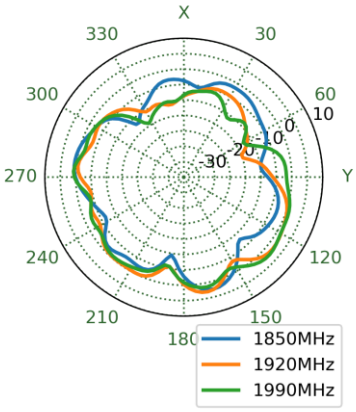


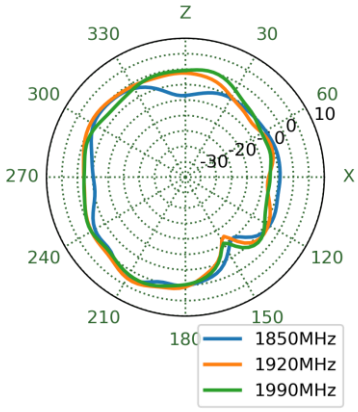


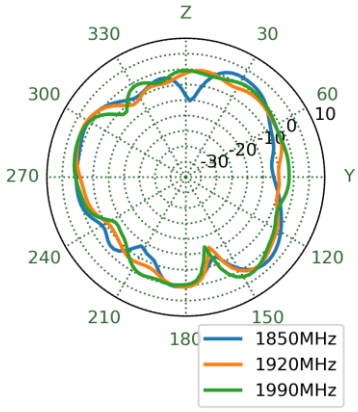
4.19 LTE 2 in Free Space Patterns at 1920 MHz



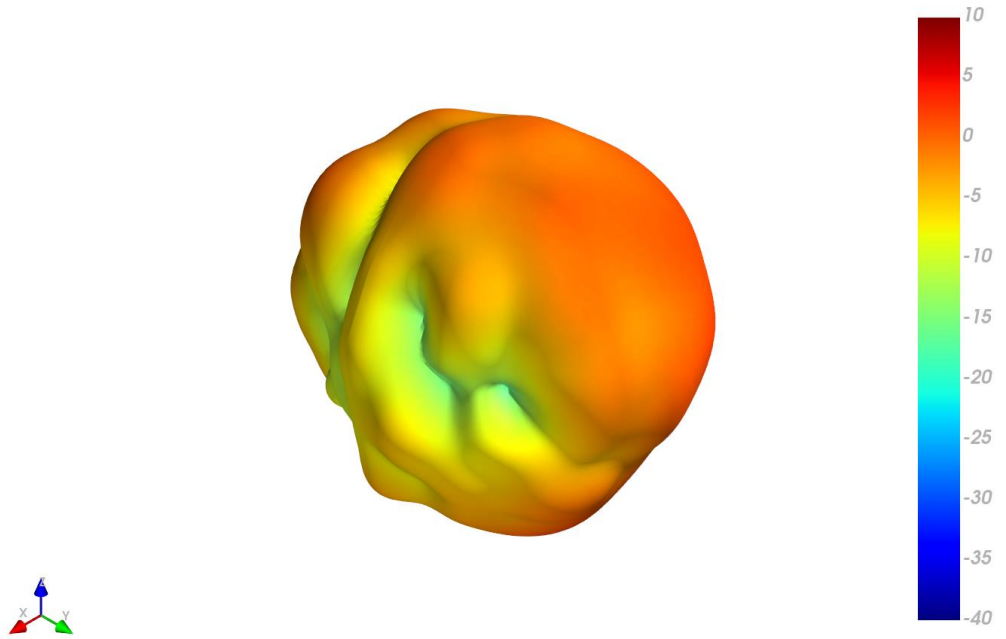
XY Plane	XZ Plane	YZ Plane



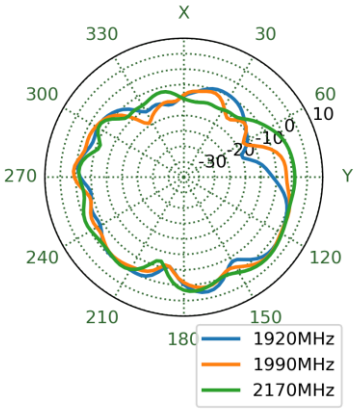


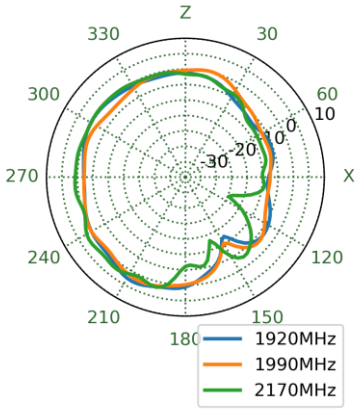


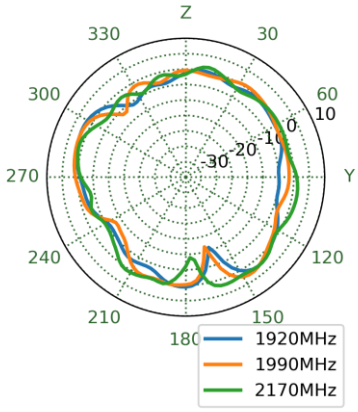
4.20 LTE 2 in Free Space Patterns at 1990 MHz



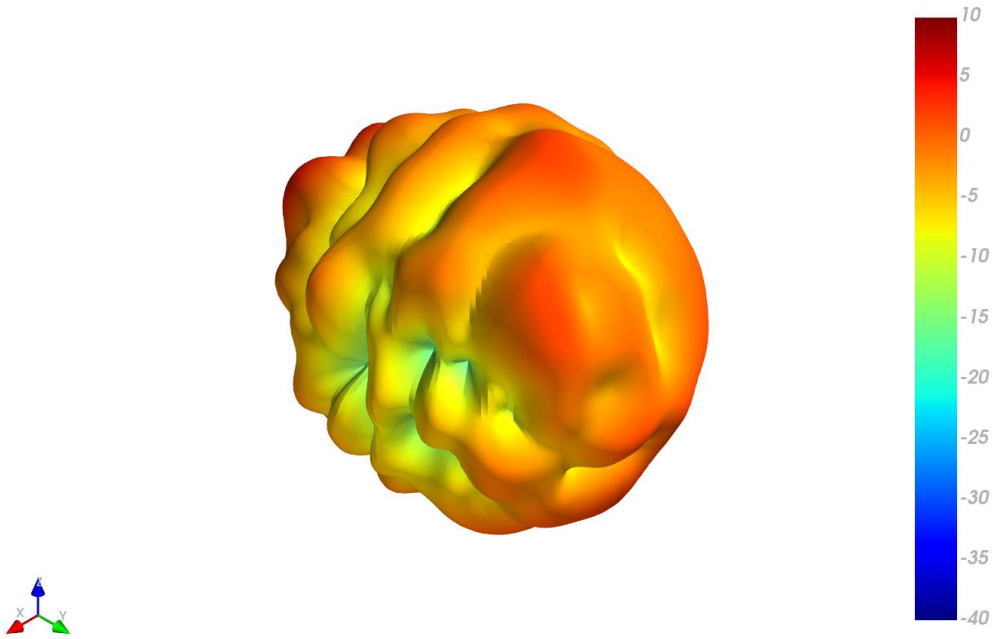
XY Plane	XZ Plane	YZ Plane



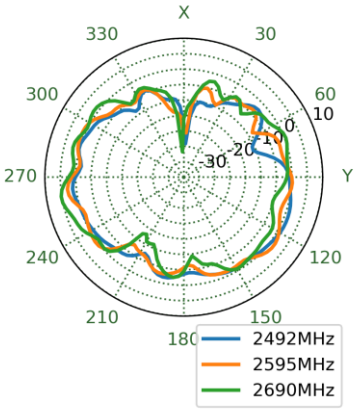


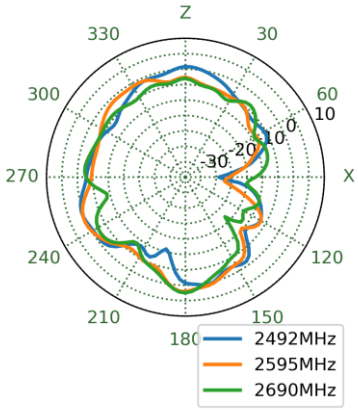


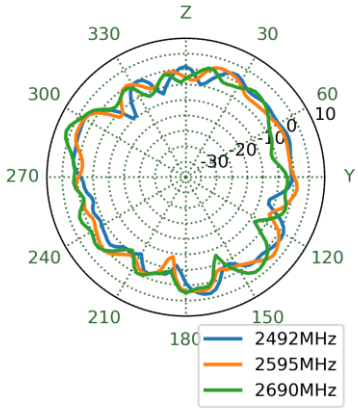
4.21 LTE 2 in Free Space Patterns at 2595 MHz



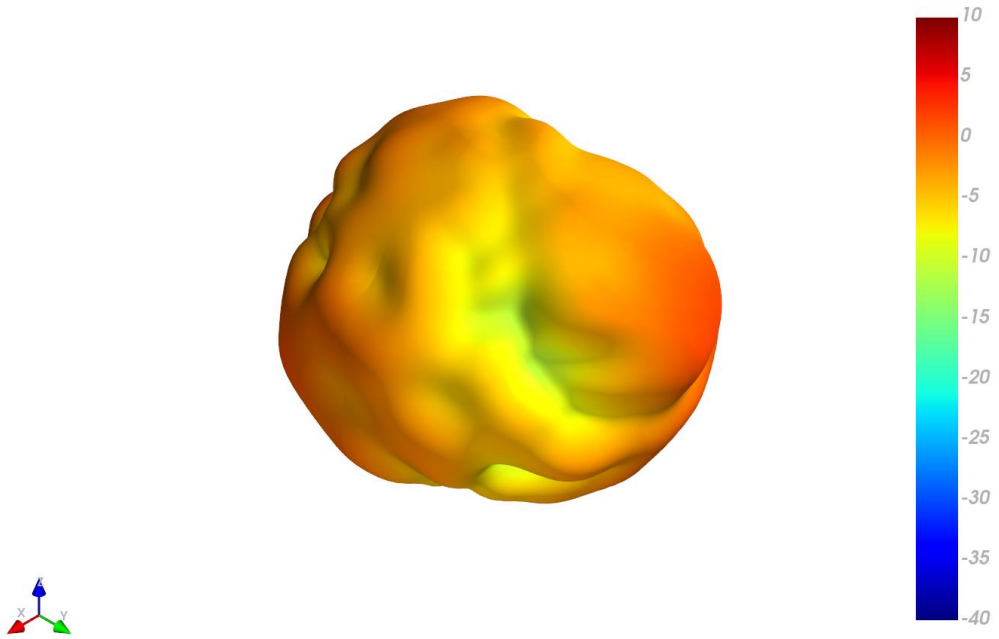
XY Plane	XZ Plane	YZ Plane



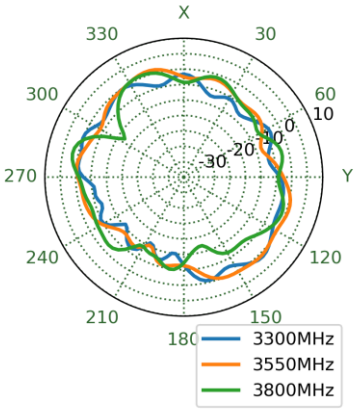


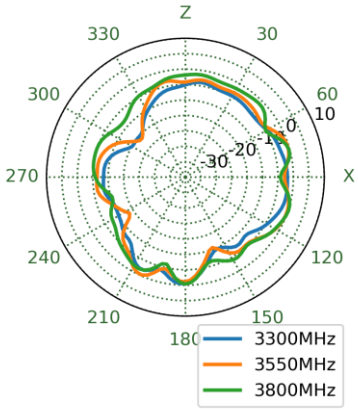


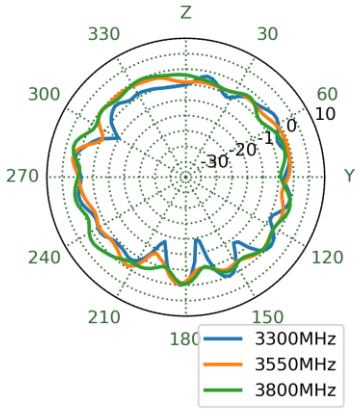
4.22 LTE 2 in Free Space Patterns at 3550 MHz



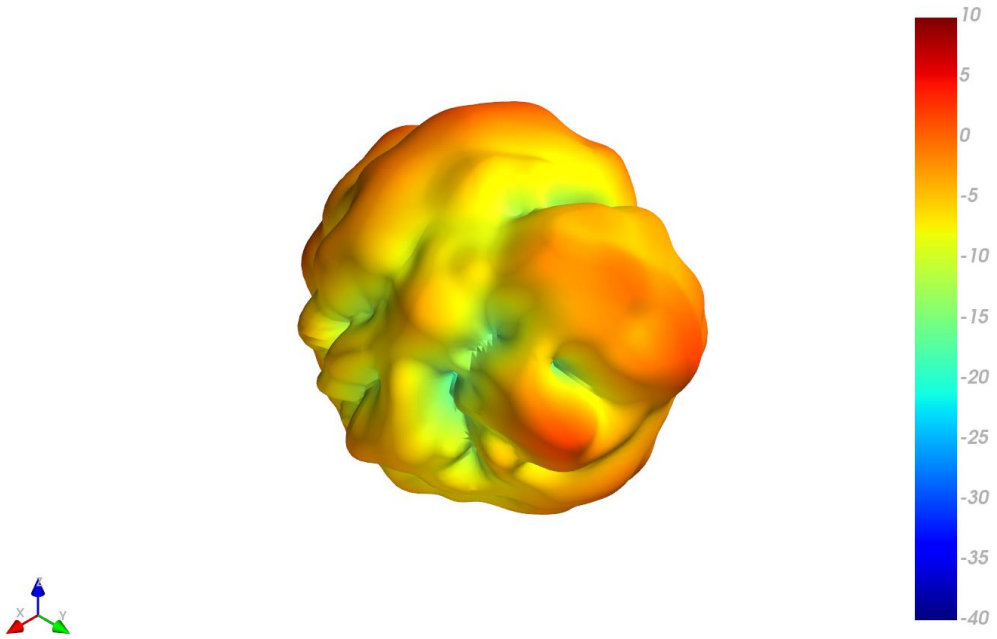
XY Plane	XZ Plane	YZ Plane



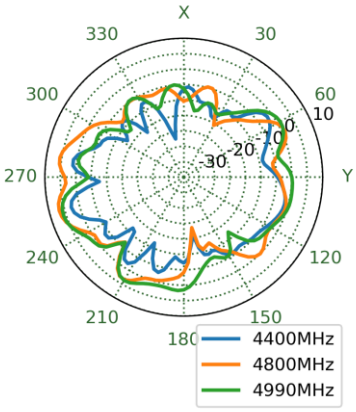


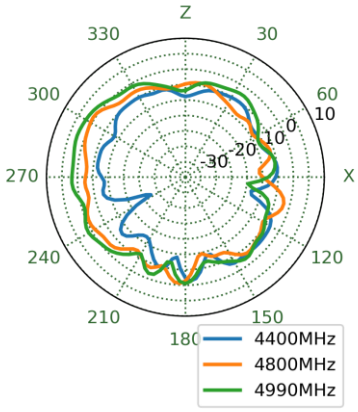


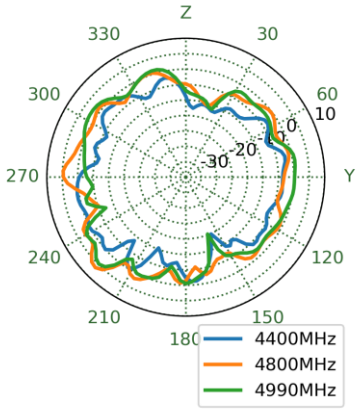
4.23 LTE 2 in Free Space Patterns at 4800 MHz



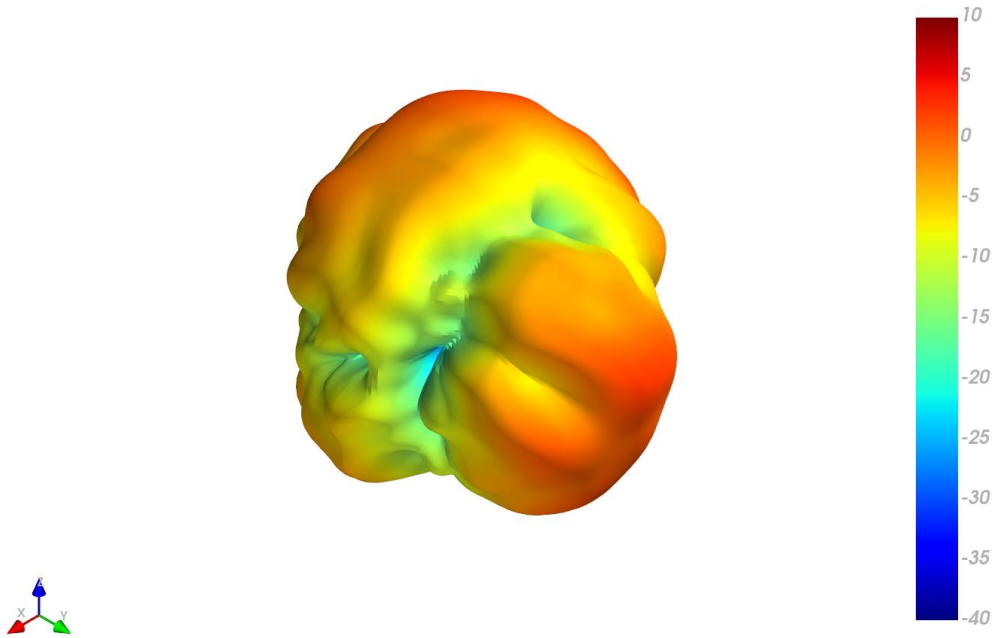
XY Plane	XZ Plane	YZ Plane



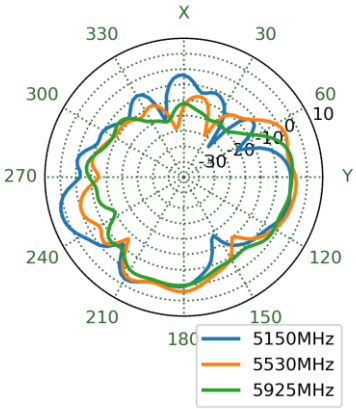


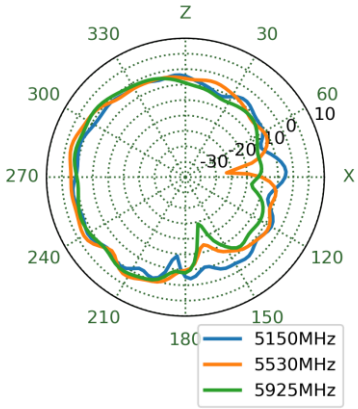


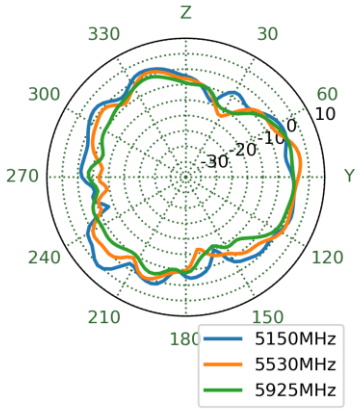
4.24 LTE 2 in Free Space Patterns at 5530 MHz



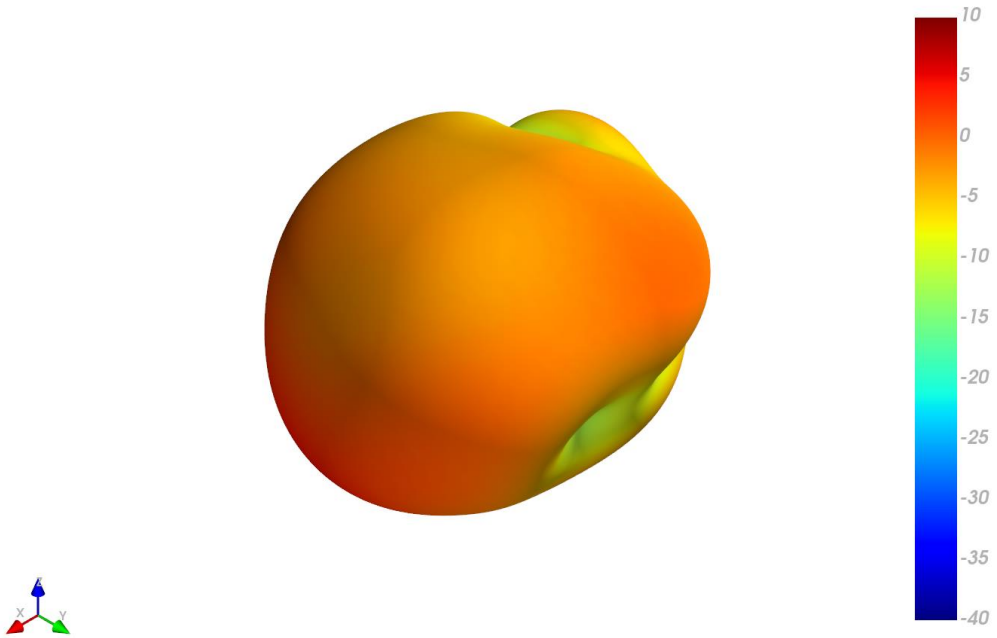
XY Plane	XZ Plane	YZ Plane



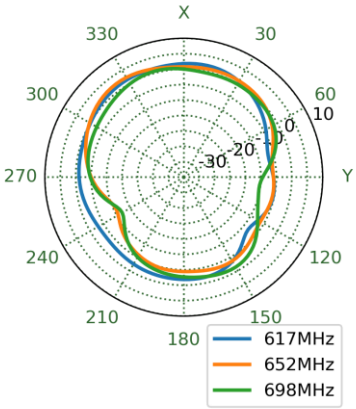


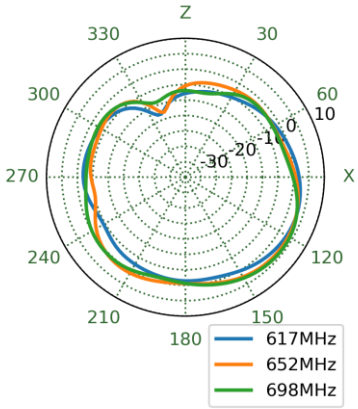


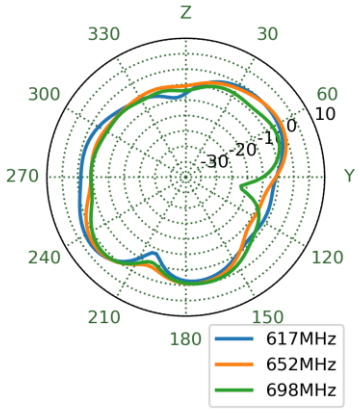
4.25 LTE 1 on 30x30cm Ground Plane Patterns at 652 MHz



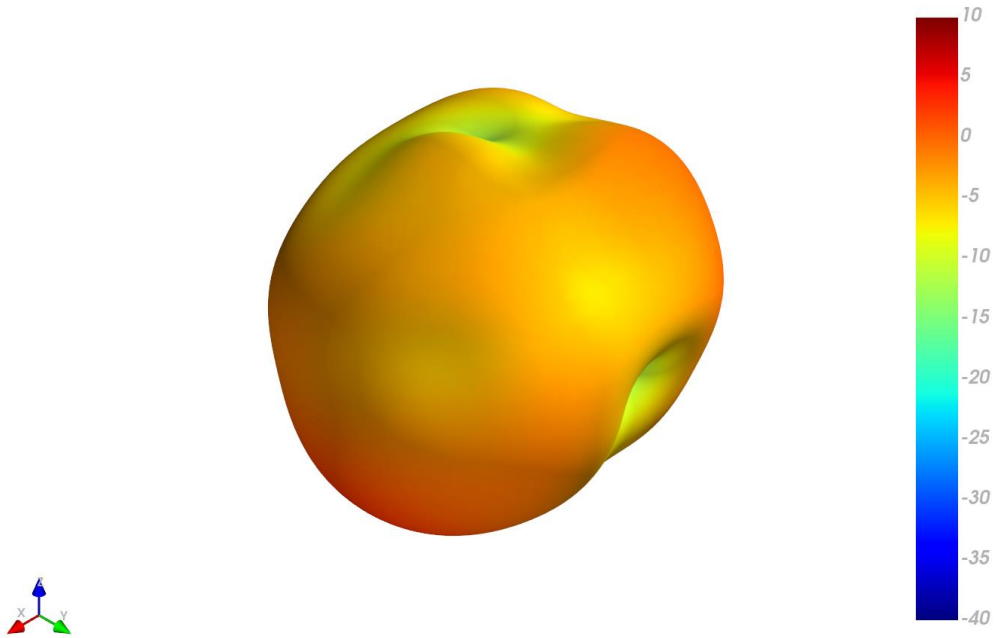
XY Plane	XZ Plane	YZ Plane



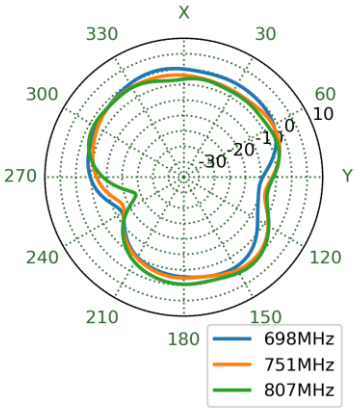


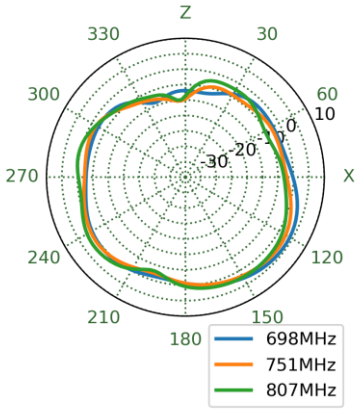


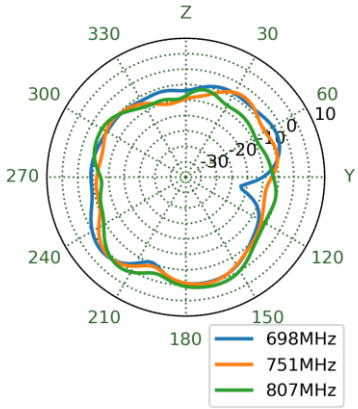
4.26 LTE 1 on 30x30cm Ground Plane Patterns at 751 MHz



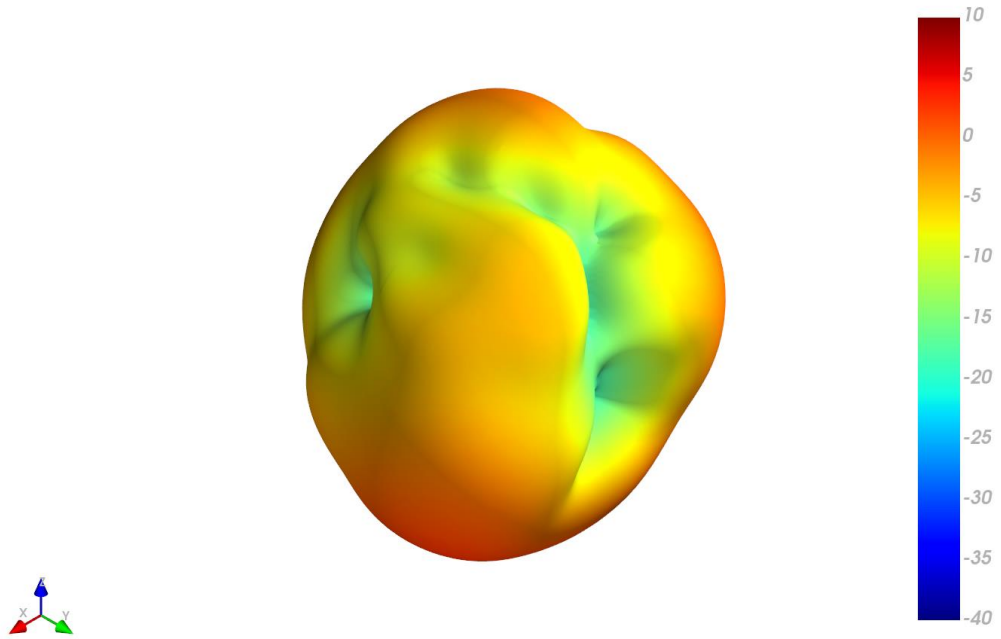
XY Plane	XZ Plane	YZ Plane



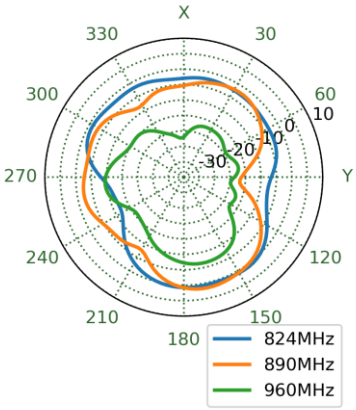


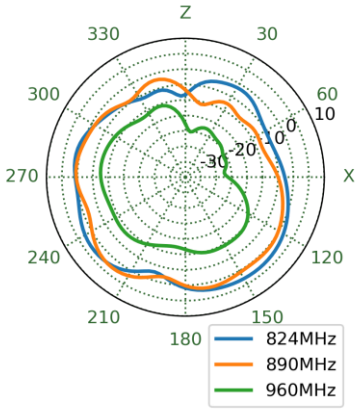


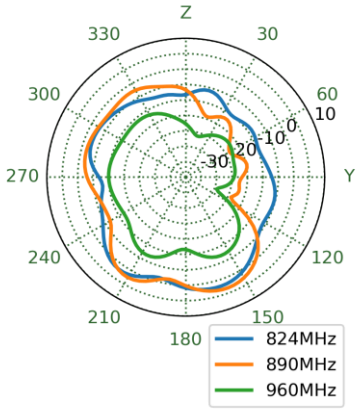
4.27 LTE 1 on 30x30cm Ground Plane Patterns at 890 MHz



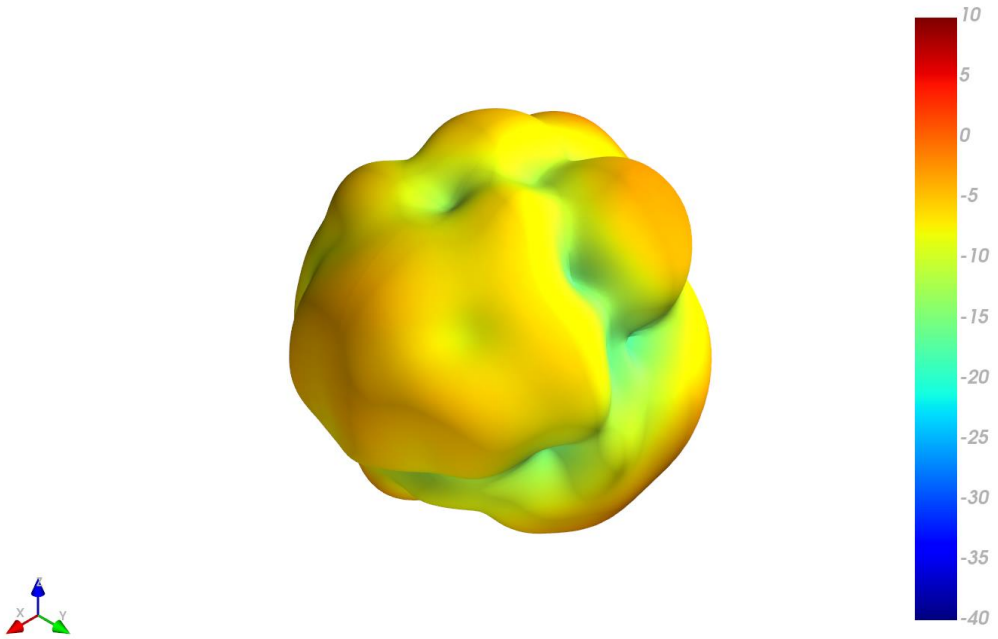
XY Plane	XZ Plane	YZ Plane



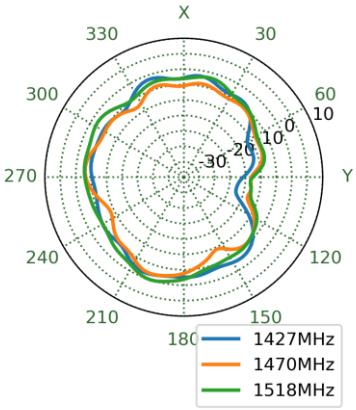


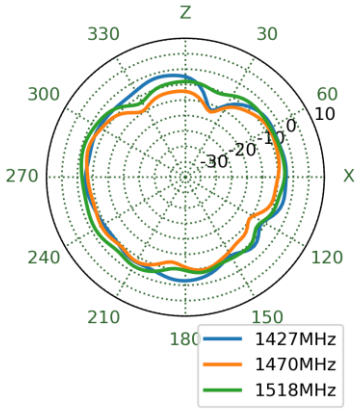


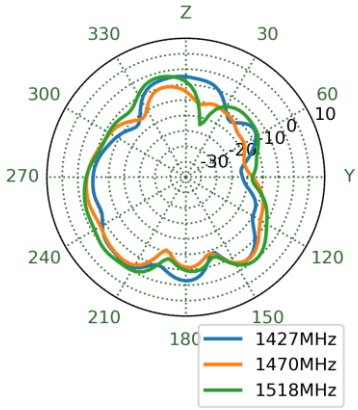
4.28 LTE 1 on 30x30cm Ground Plane Patterns at 1470 MHz



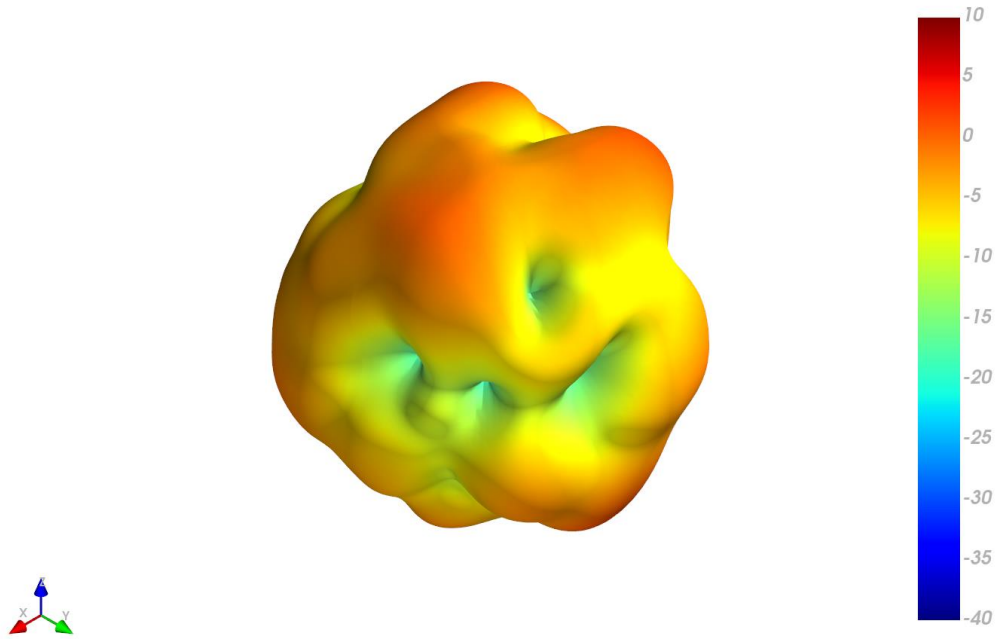
XY Plane	XZ Plane	YZ Plane



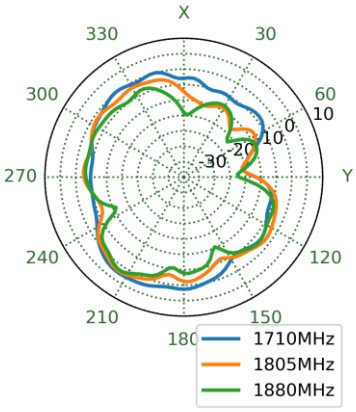


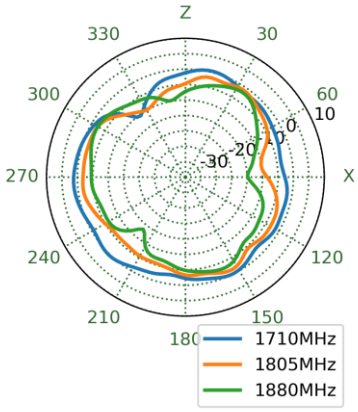


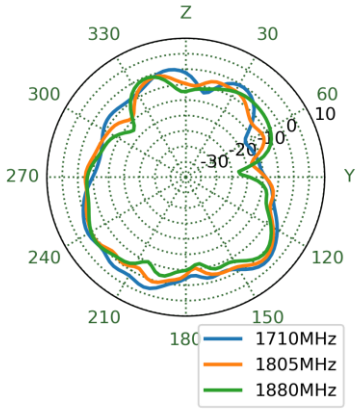
4.29 LTE 1 on 30x30cm Ground Plane Patterns at 1805 MHz



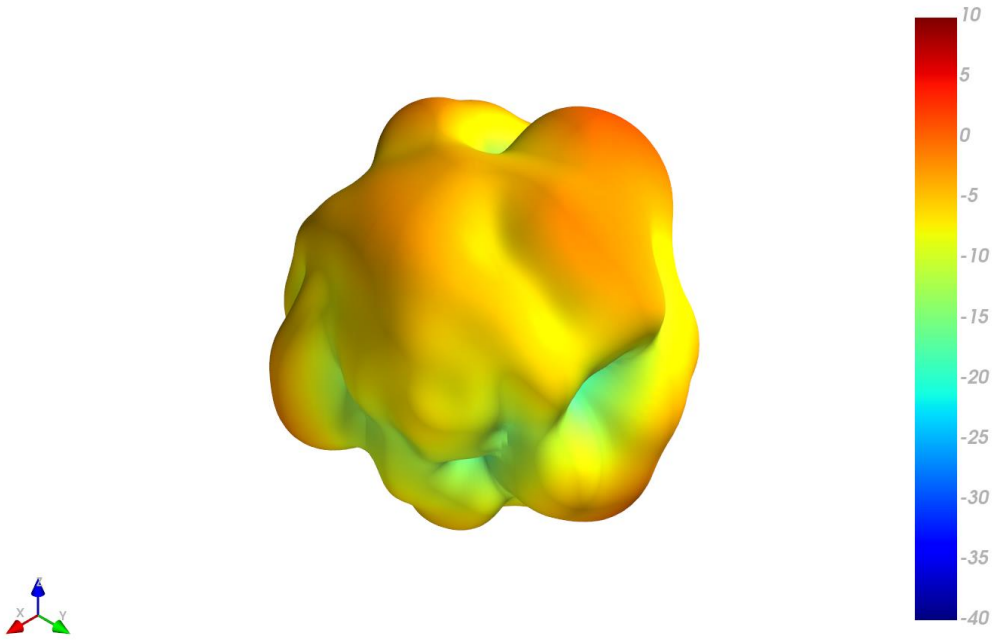
XY Plane	XZ Plane	YZ Plane



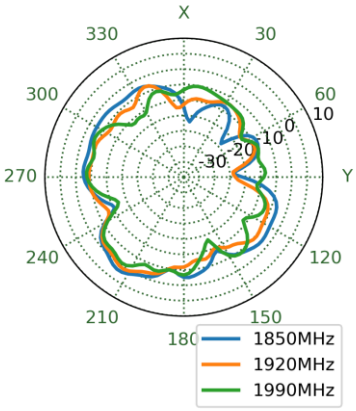


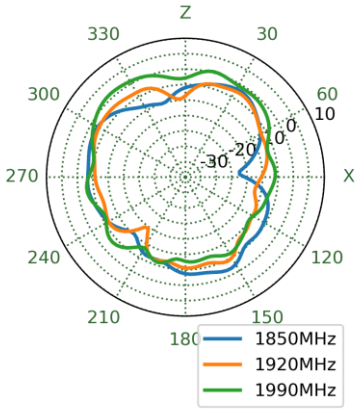


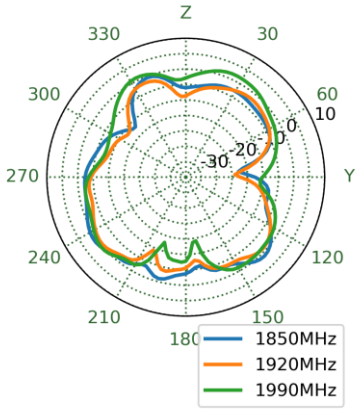
4.30 LTE 1 on 30x30cm Ground Plane Patterns at 1920 MHz



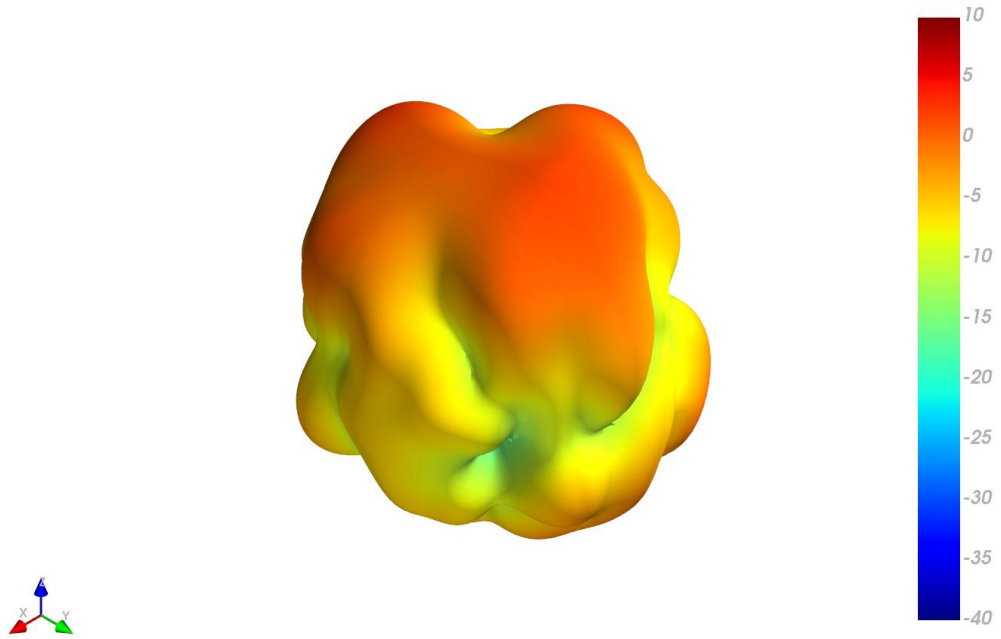
XY Plane	XZ Plane	YZ Plane



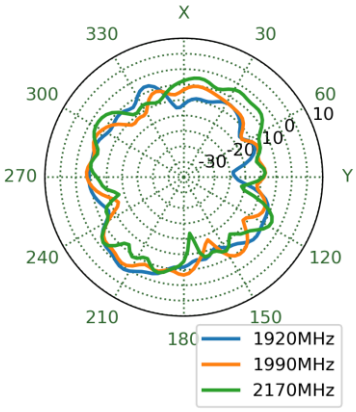


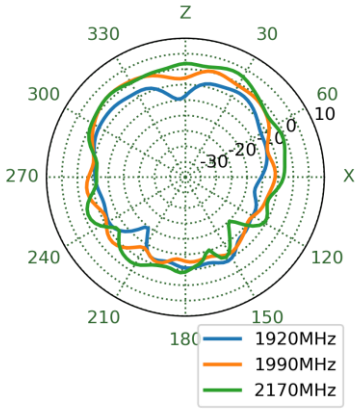


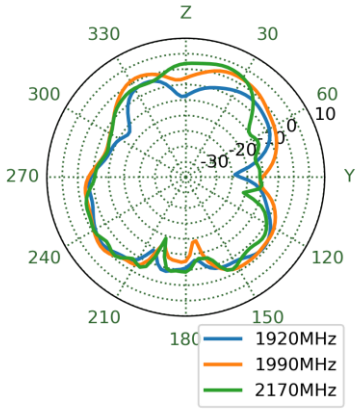
4.31 LTE 1 on 30x30cm Ground Plane Patterns at 1990 MHz



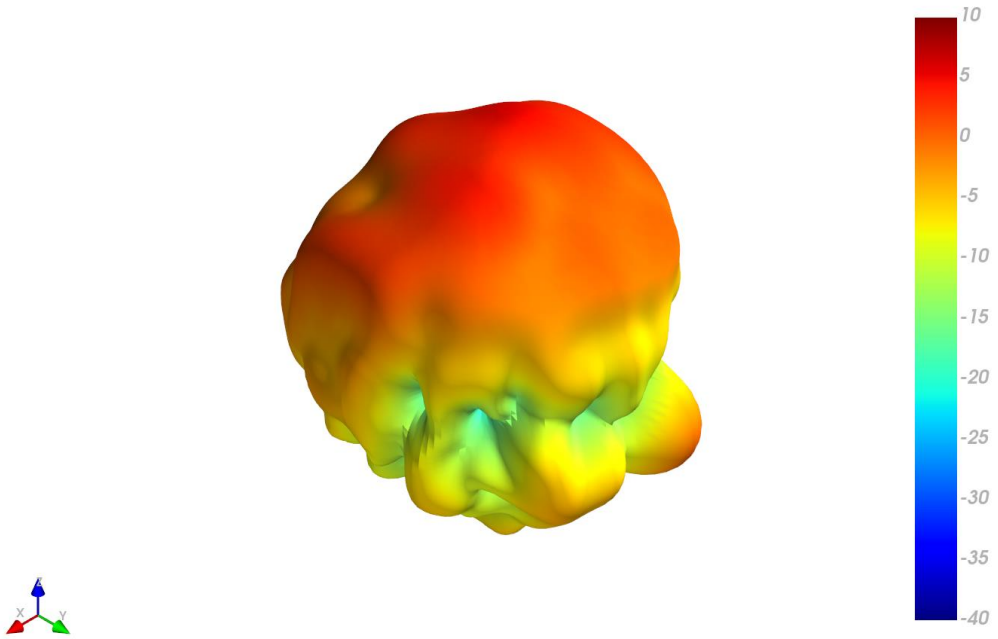
XY Plane	XZ Plane	YZ Plane



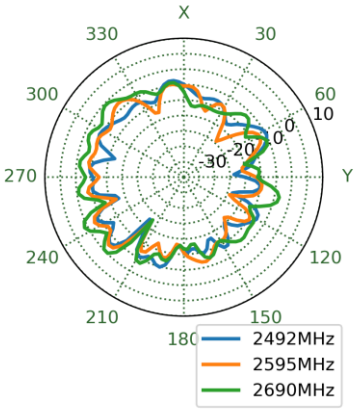


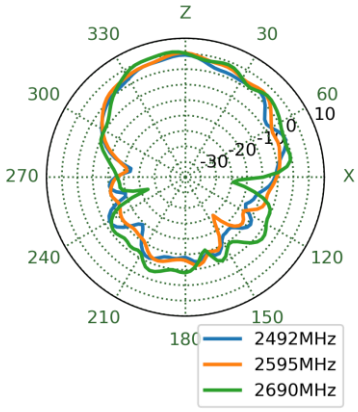


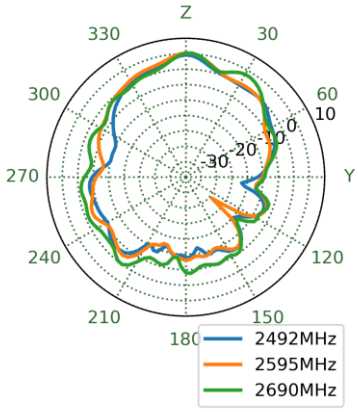
4.32 LTE 1 on 30x30cm Ground Plane Patterns at 2595 MHz



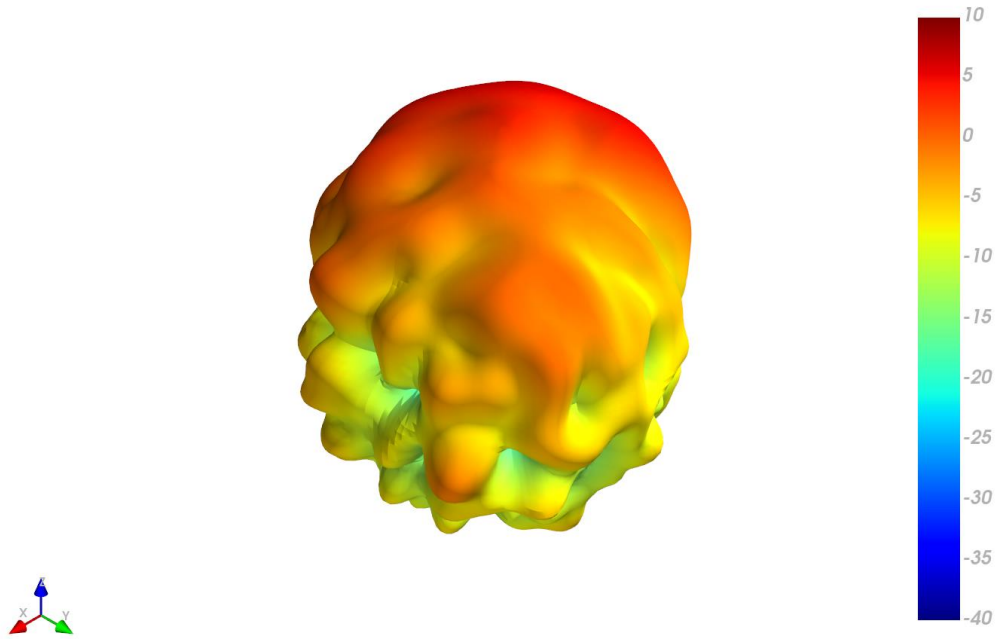
XY Plane	XZ Plane	YZ Plane



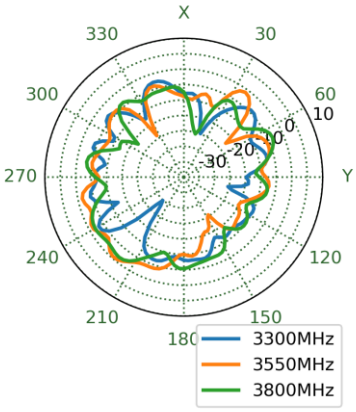


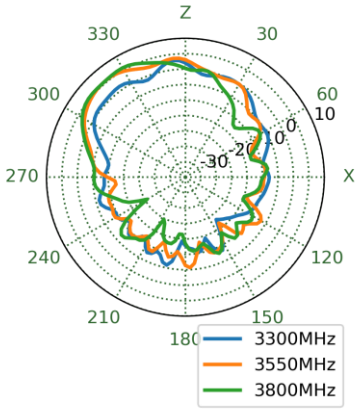


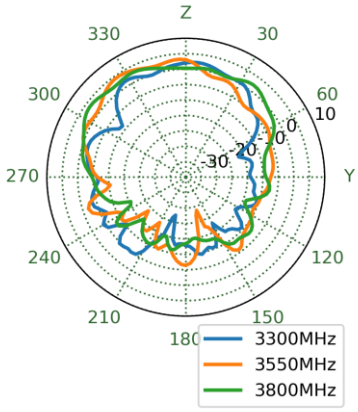
4.33 LTE 1 on 30x30cm Ground Plane Patterns at 3550 MHz



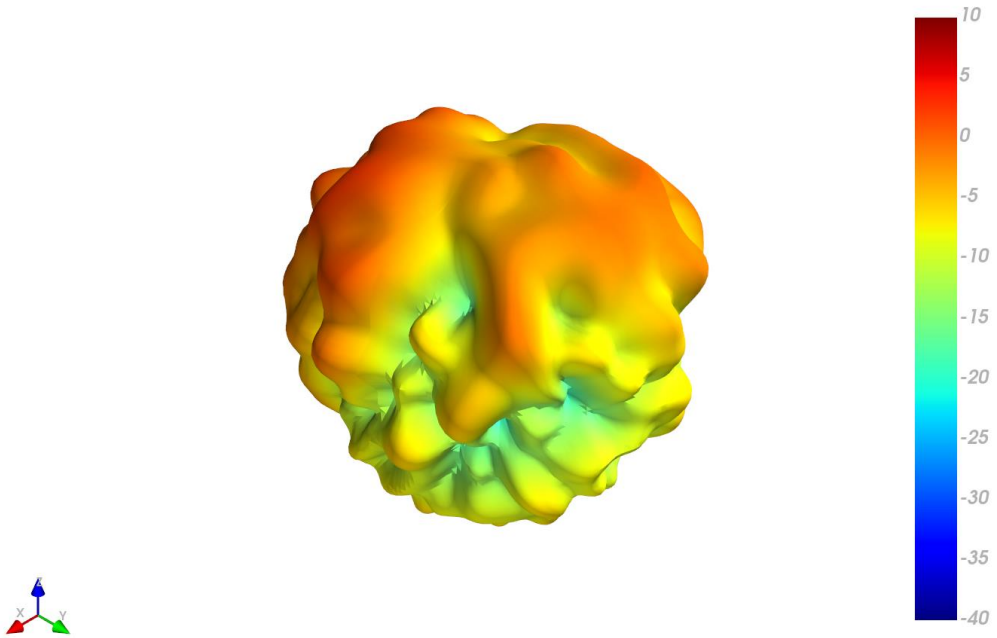
XY Plane	XZ Plane	YZ Plane



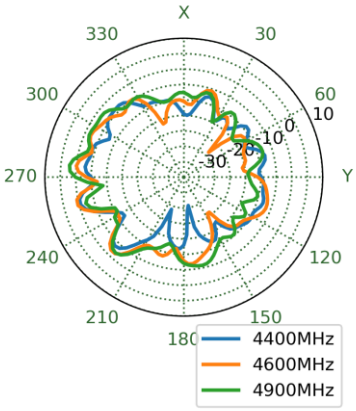


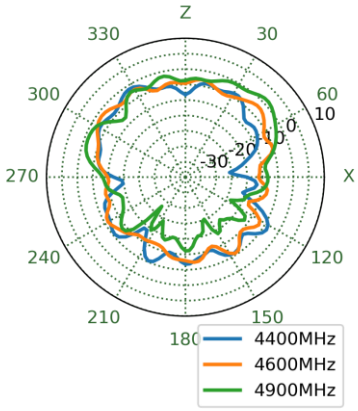


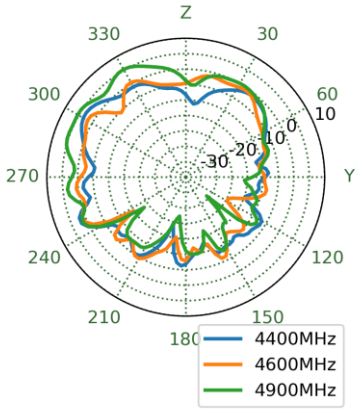
4.34 LTE 1 on 30x30cm Ground Plane Patterns at 4600 MHz



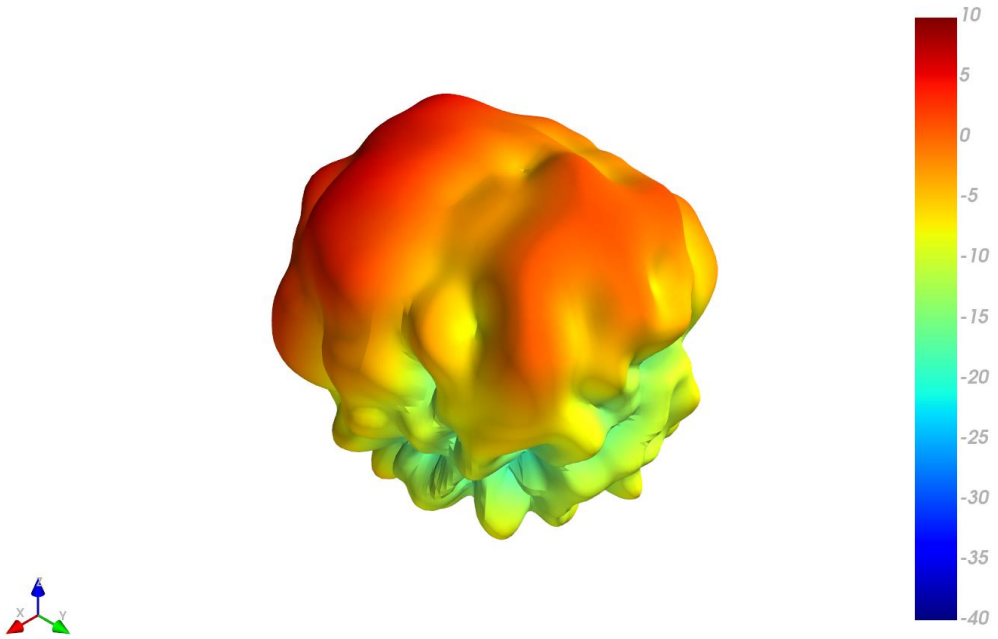
XY Plane	XZ Plane	YZ Plane



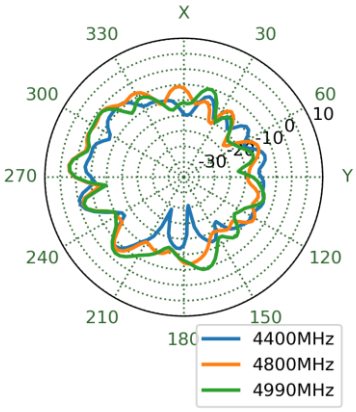


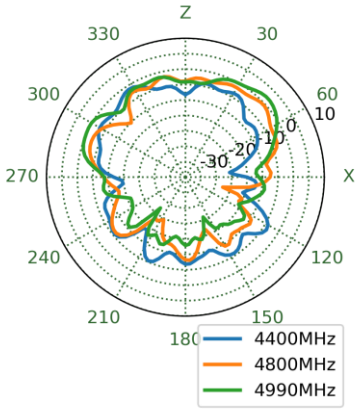


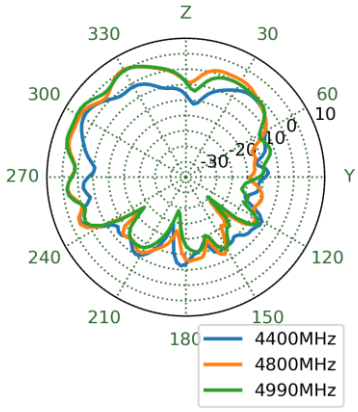
4.35 LTE 1 on 30x30cm Ground Plane Patterns at 4800 MHz



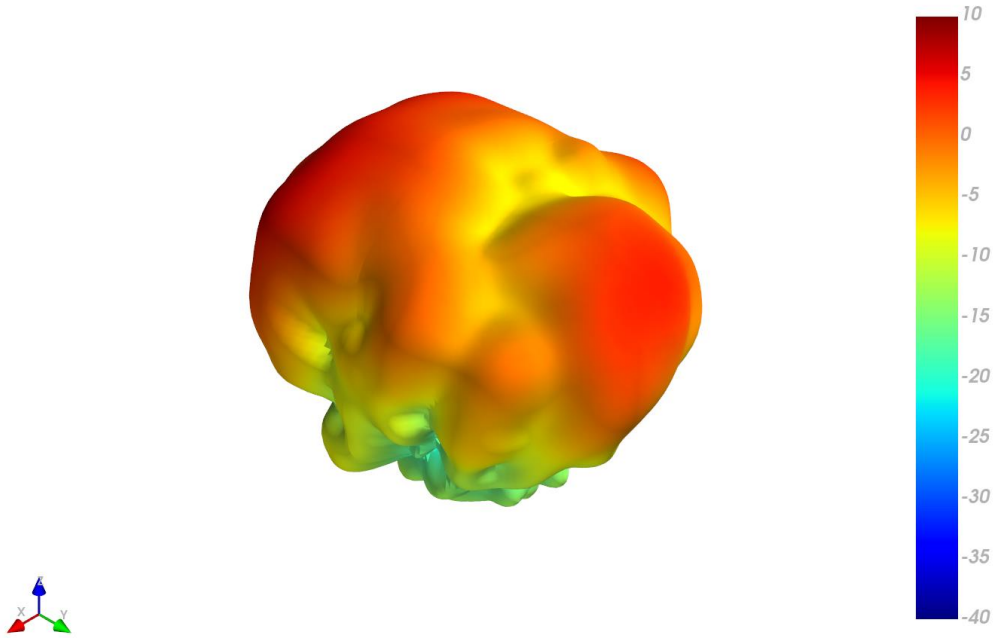
XY Plane	XZ Plane	YZ Plane



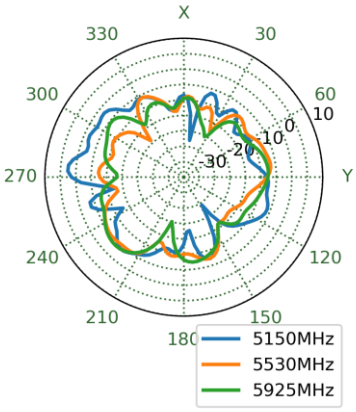


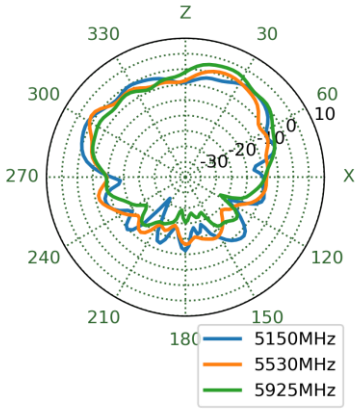


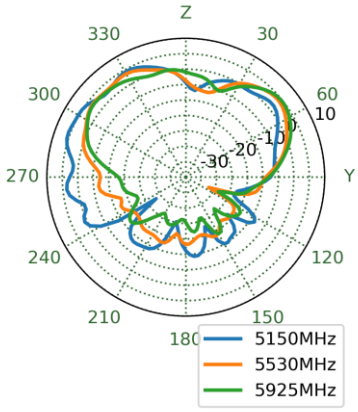
4.36 LTE 1 on 30x30cm Ground Plane Patterns at 5530 MHz



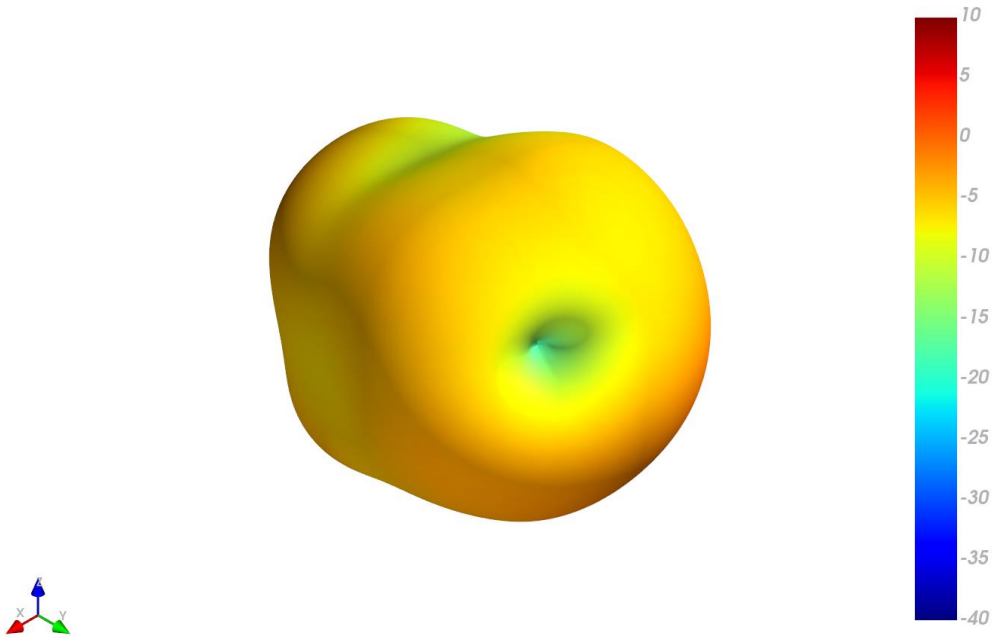
XY Plane	XZ Plane	YZ Plane



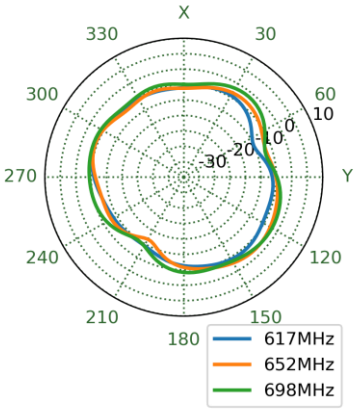


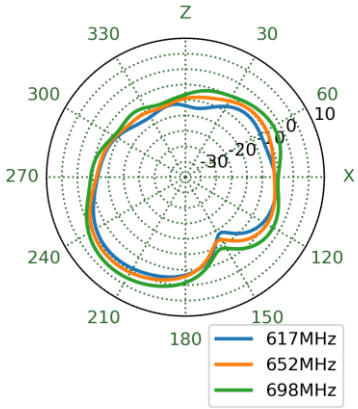


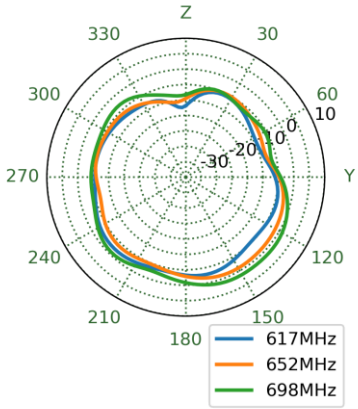
4.37 LTE 2 on 30x30cm Ground Plane Patterns at 652 MHz



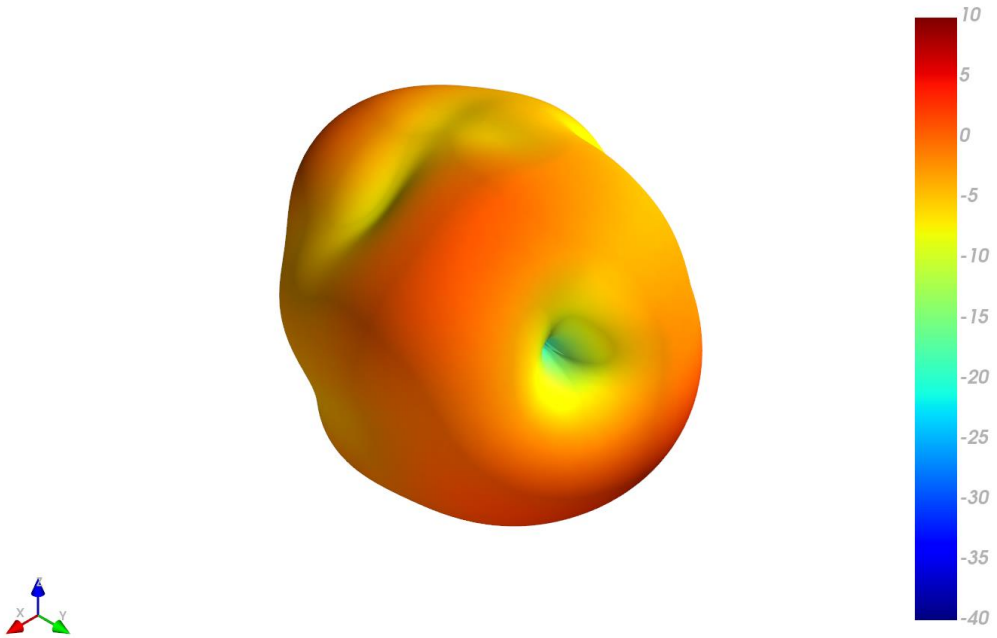
XY Plane	XZ Plane	YZ Plane



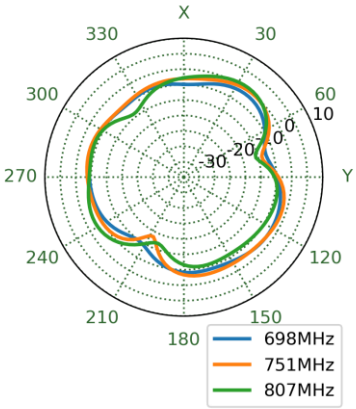


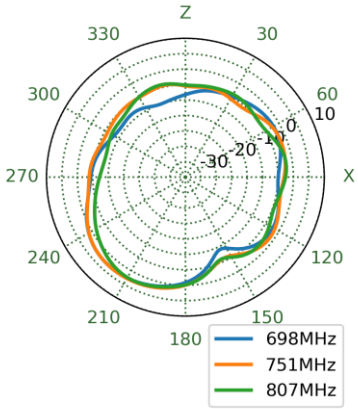


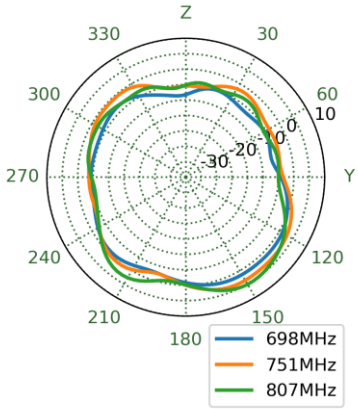
4.38 LTE 2 on 30x30cm Ground Plane Patterns at 751 MHz



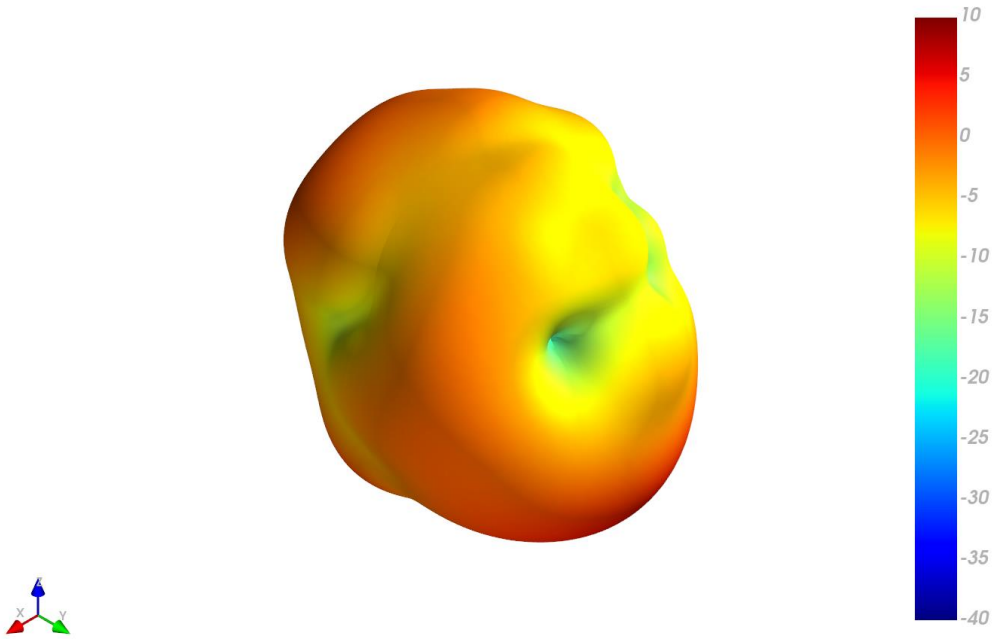
XY Plane	XZ Plane	YZ Plane



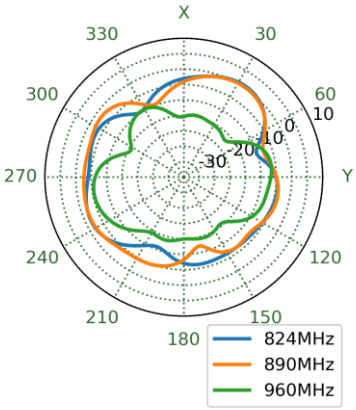


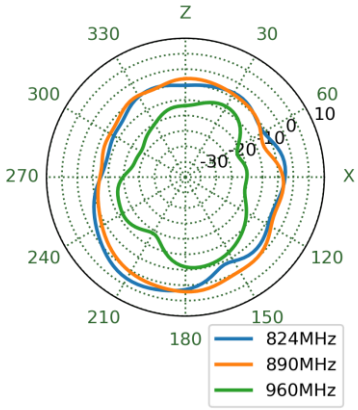


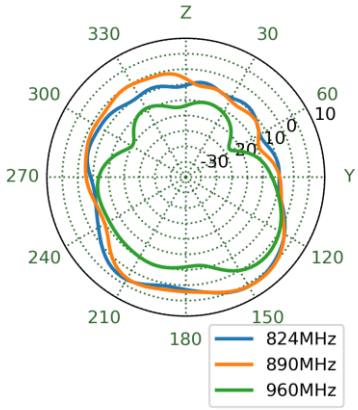
4.39 LTE 2 on 30x30cm Ground Plane Patterns at 890 MHz



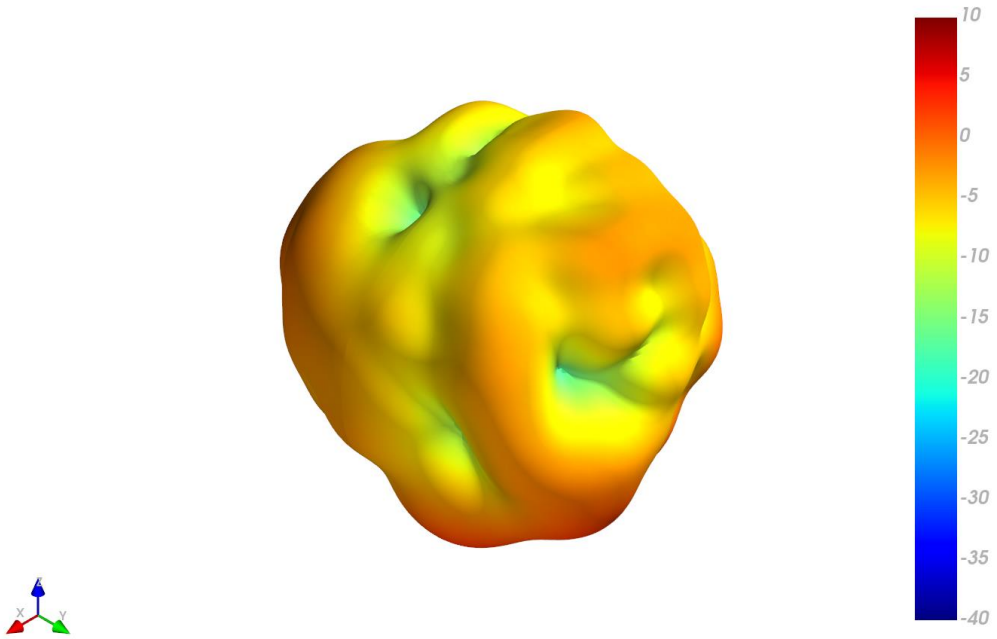
XY Plane	XZ Plane	YZ Plane



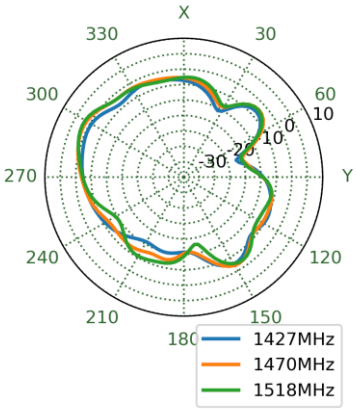


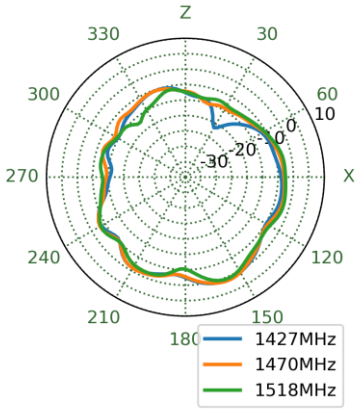


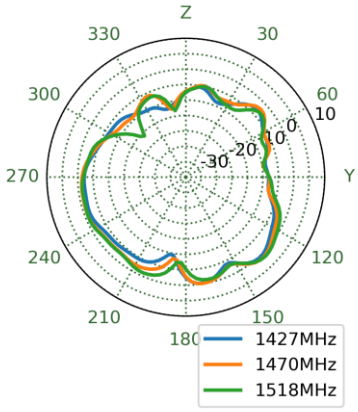
4.40 LTE 2 on 30x30cm Ground Plane Patterns at 1470 MHz



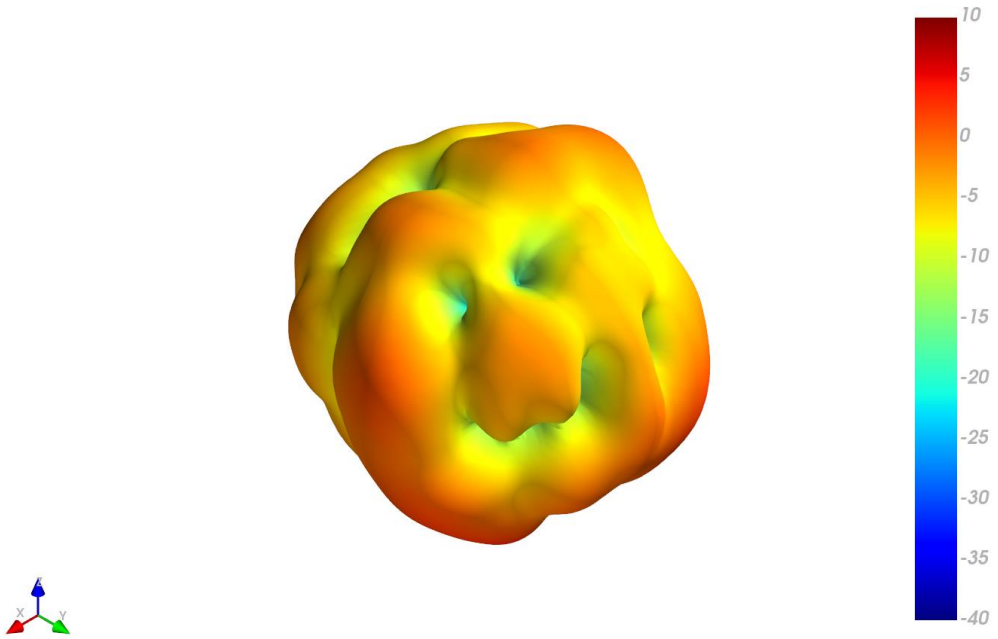
XY Plane	XZ Plane	YZ Plane



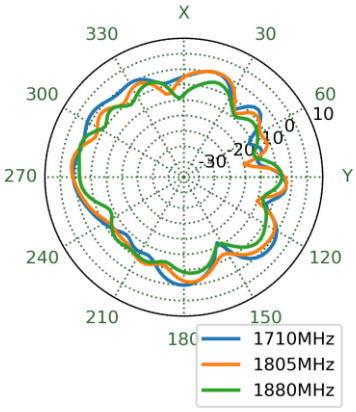


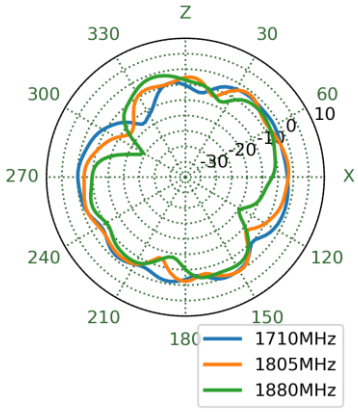


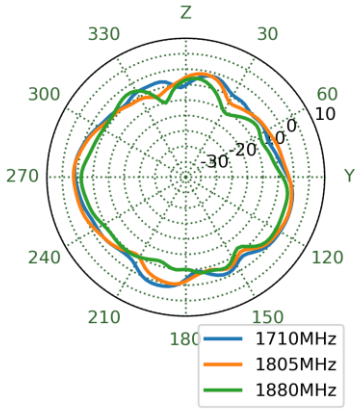
4.41 LTE 2 on 30x30cm Ground Plane Patterns at 1805 MHz



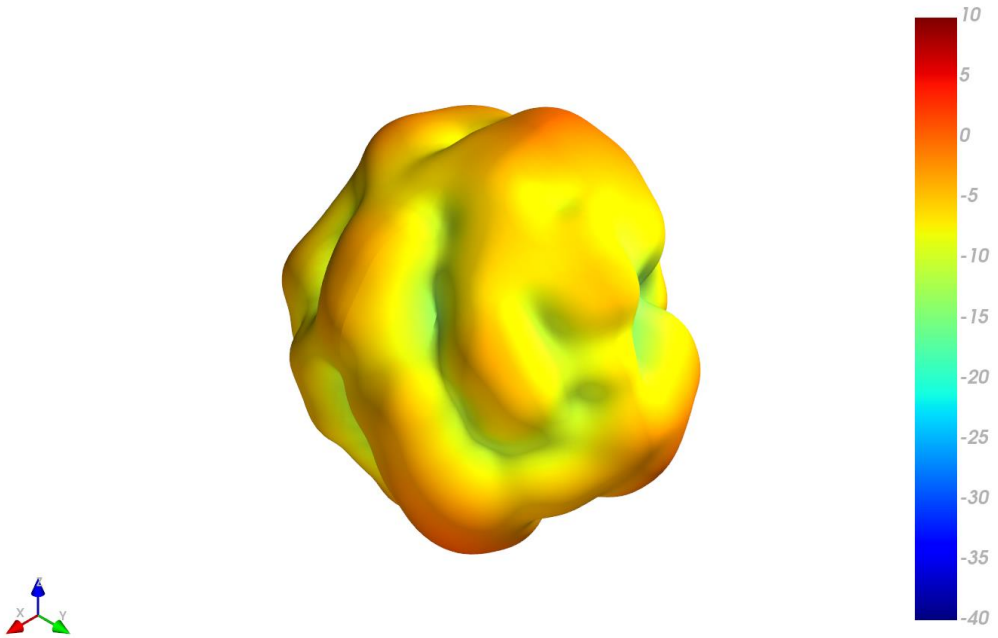
XY Plane	XZ Plane	YZ Plane



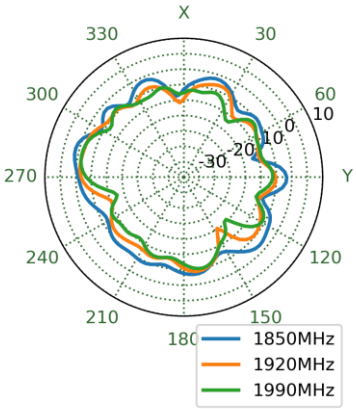


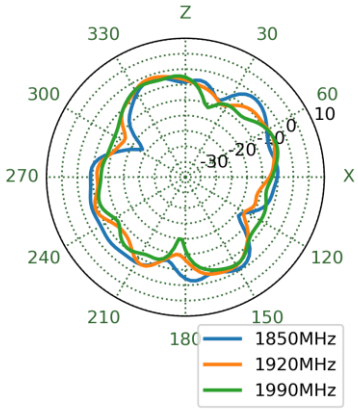


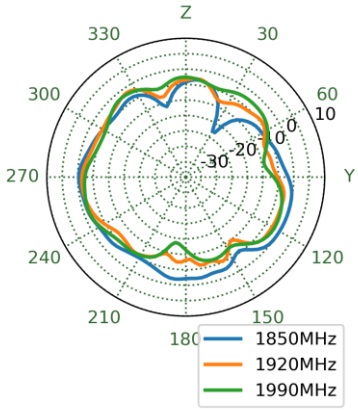
4.42 LTE 2 on 30x30cm Ground Plane Patterns at 1920 MHz



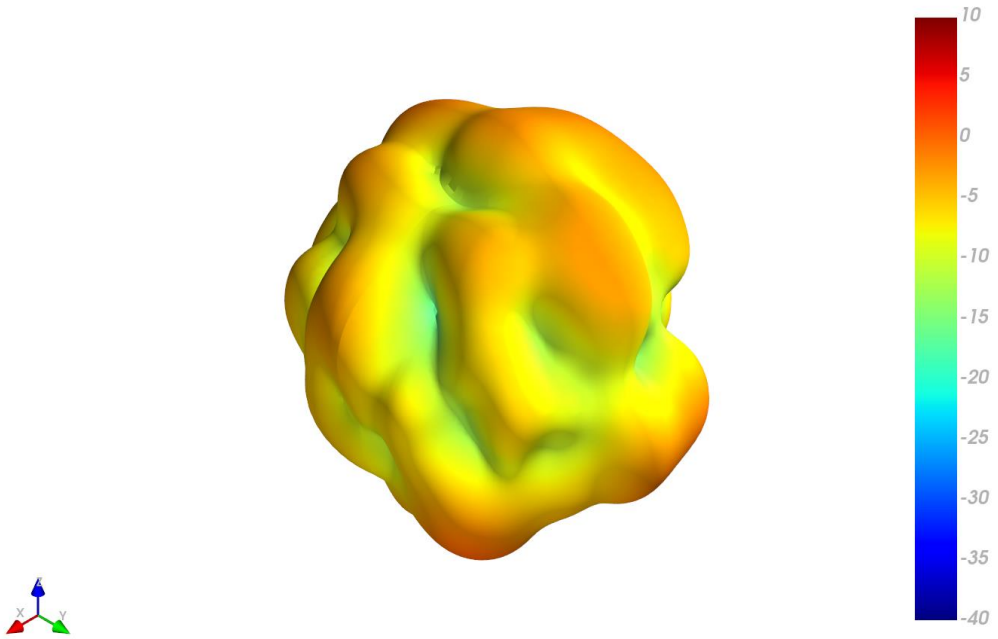
XY Plane	XZ Plane	YZ Plane



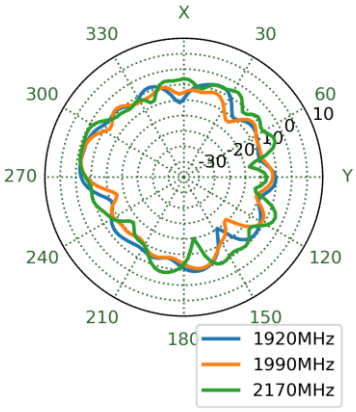


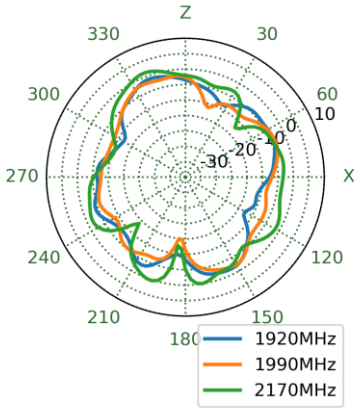


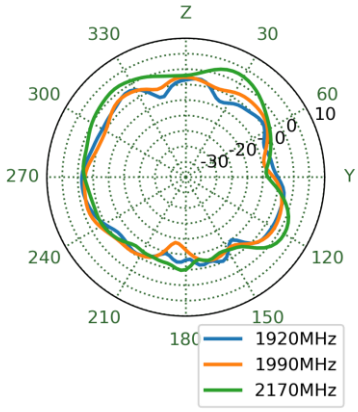
4.43 LTE 2 on 30x30cm Ground Plane Patterns at 1990 MHz



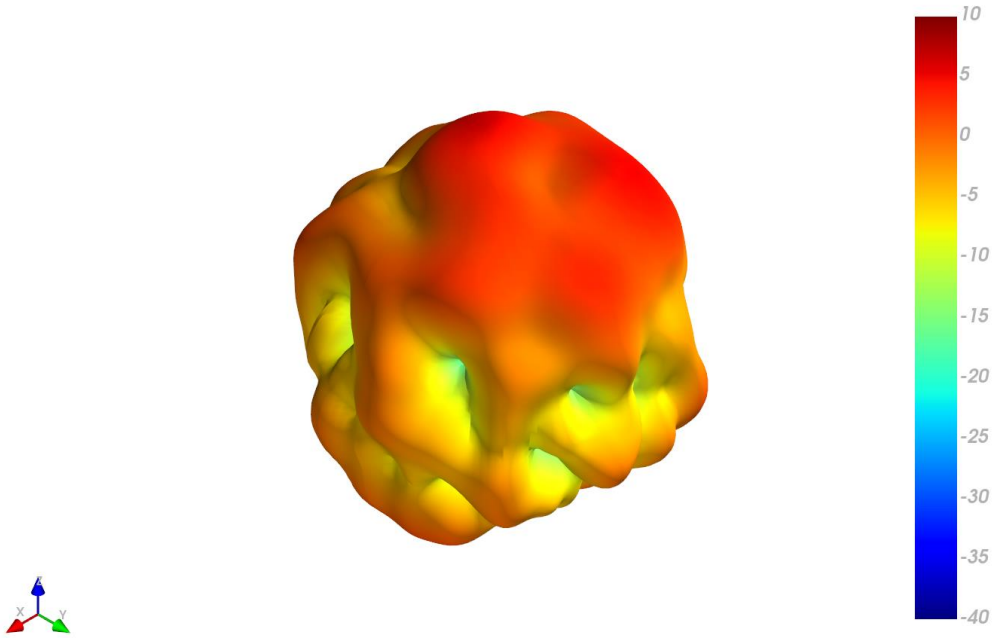
XY Plane	XZ Plane	YZ Plane



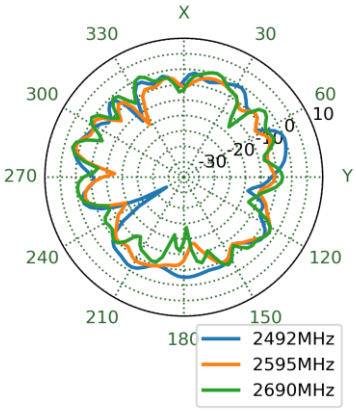


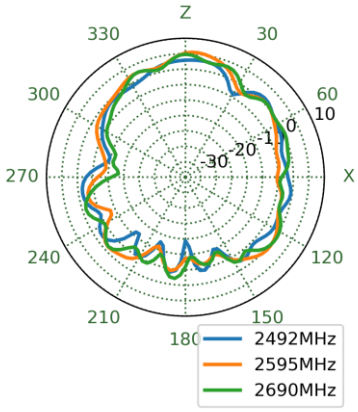


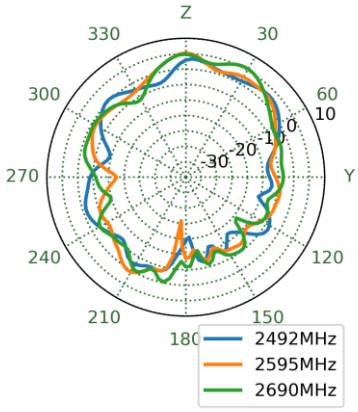
4.44 LTE 2 on 30x30cm Ground Plane Patterns at 2595 MHz



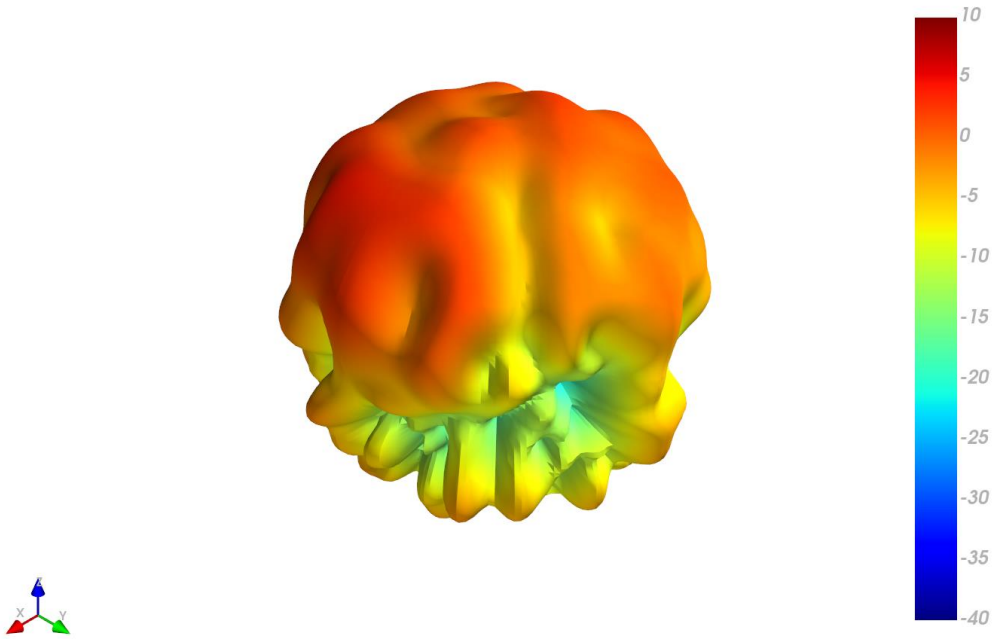
XY Plane	XZ Plane	YZ Plane



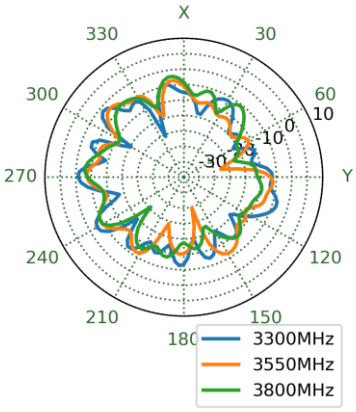


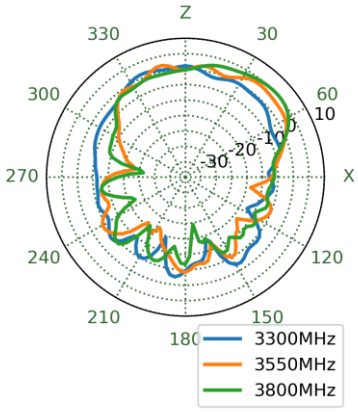


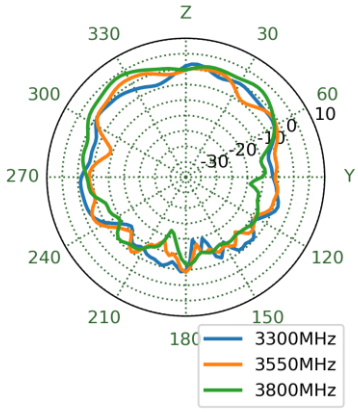
4.45 LTE 2 on 30x30cm Ground Plane Patterns at 3550 MHz



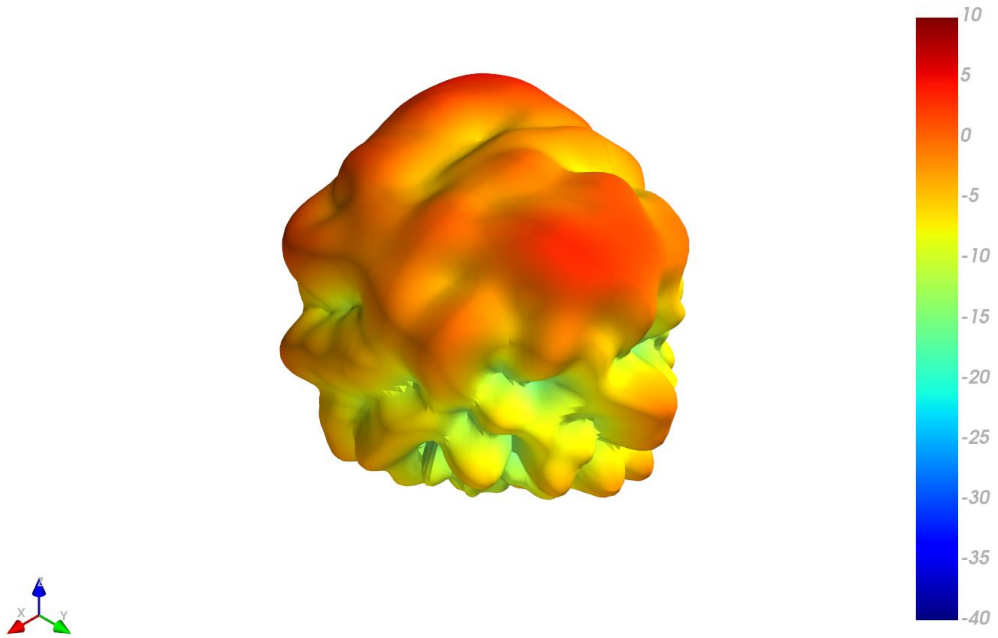
XY Plane	XZ Plane	YZ Plane



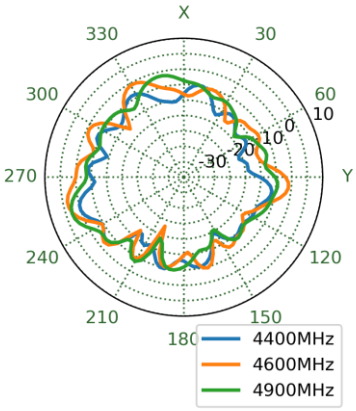


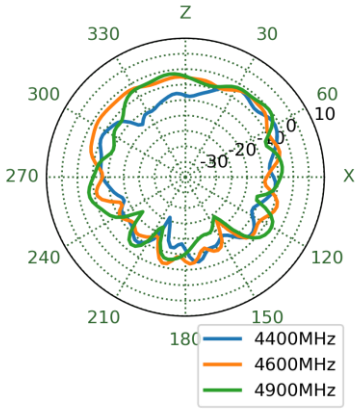


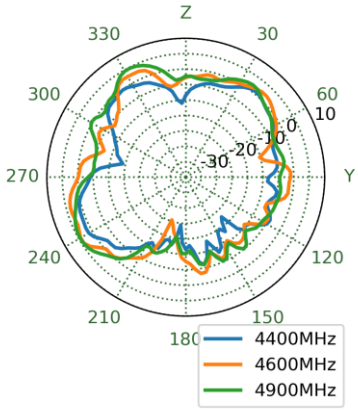
4.46 LTE 2 on 30x30cm Ground Plane Patterns at 4600 MHz



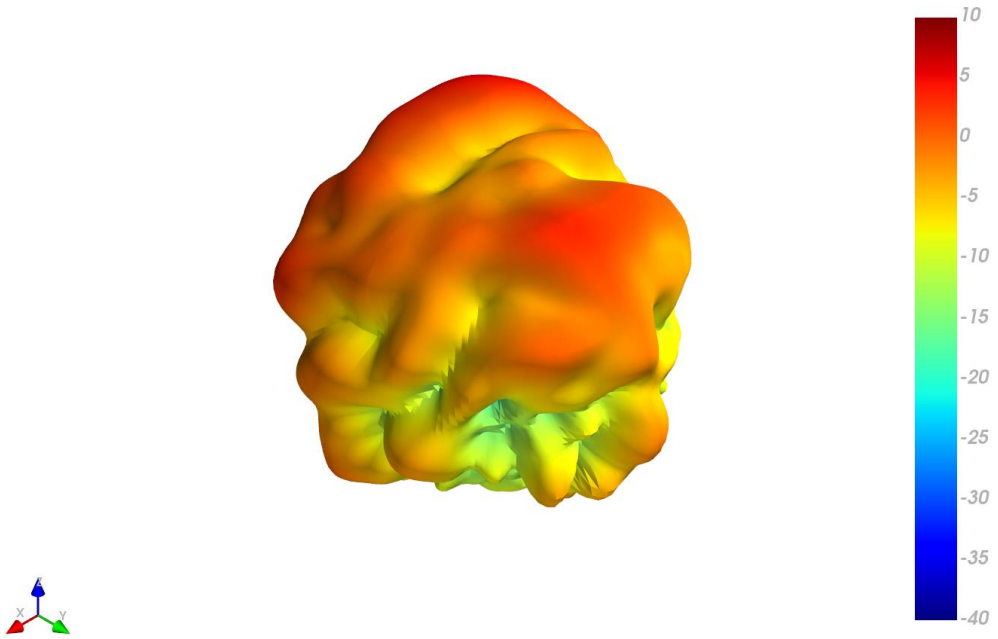
XY Plane	XZ Plane	YZ Plane



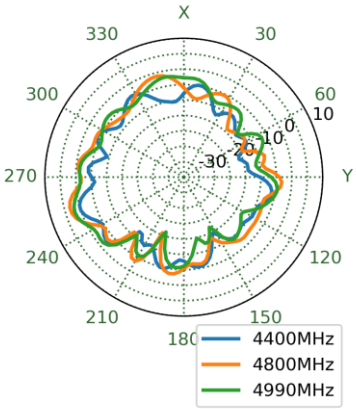


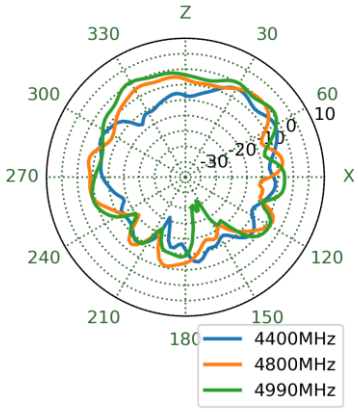


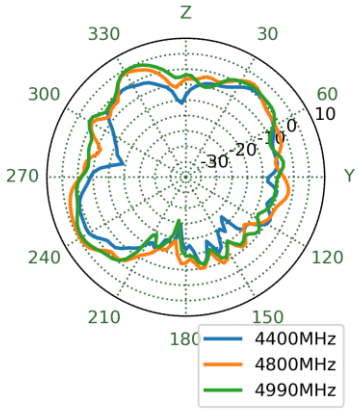
4.47 LTE 2 on 30x30cm Ground Plane Patterns at 4800 MHz



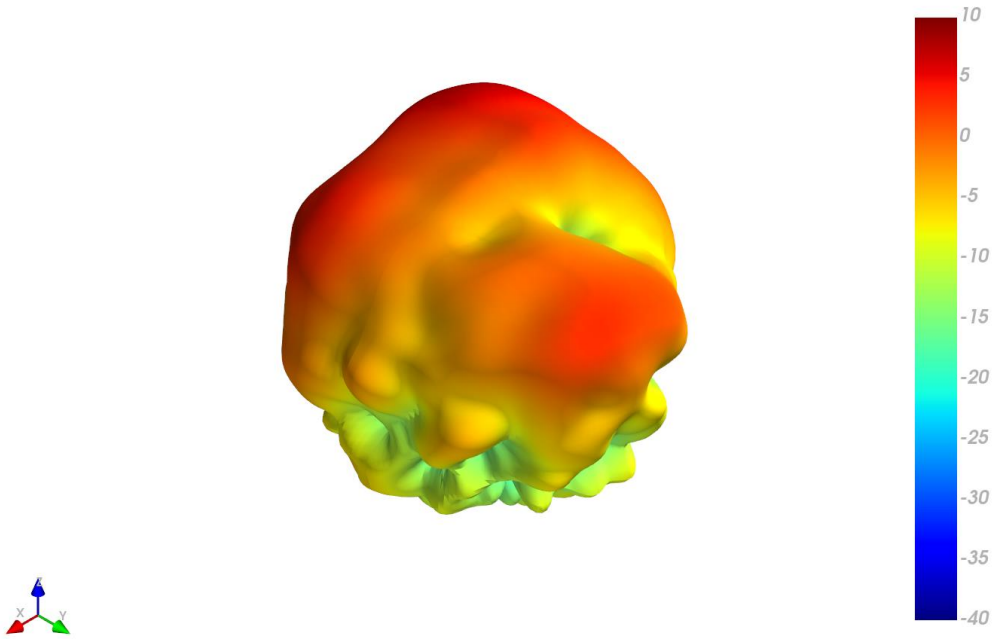
XY Plane	XZ Plane	YZ Plane



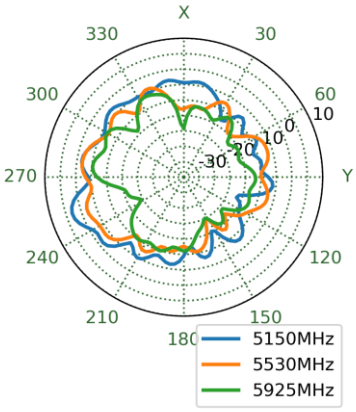


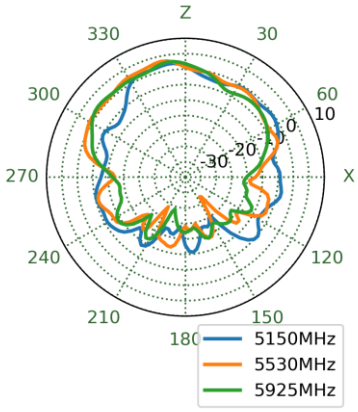


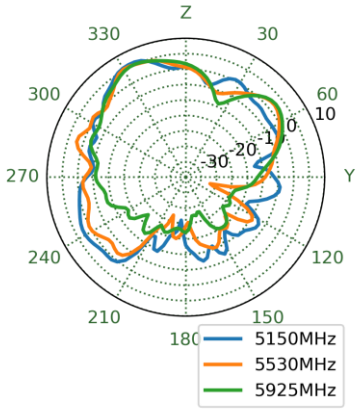
4.48 LTE 2 on 30x30cm Ground Plane Patterns at 5530 MHz



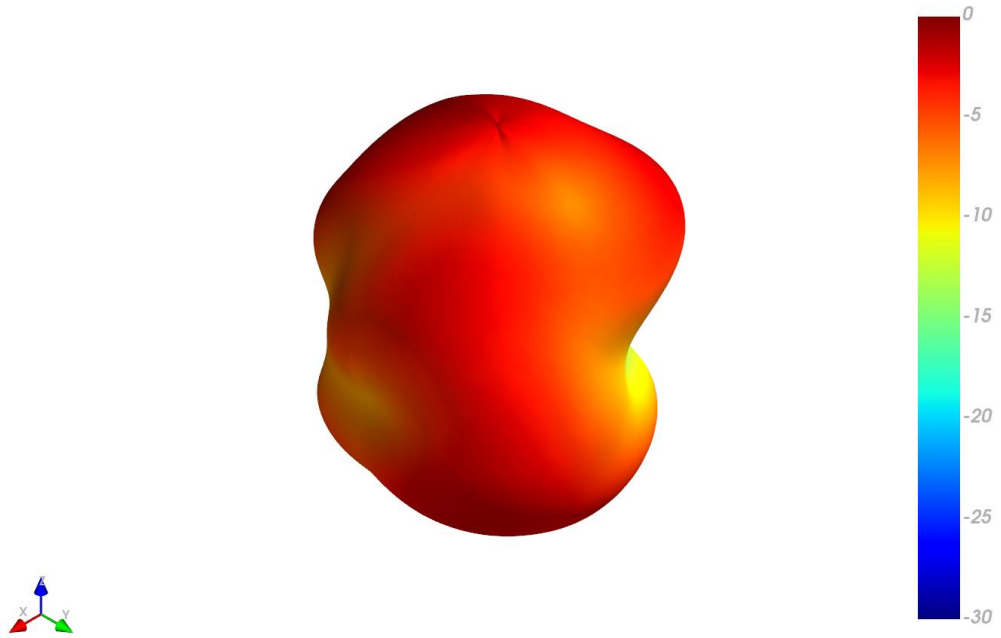
XY Plane	XZ Plane	YZ Plane



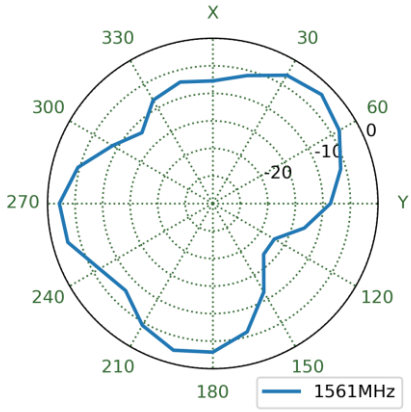


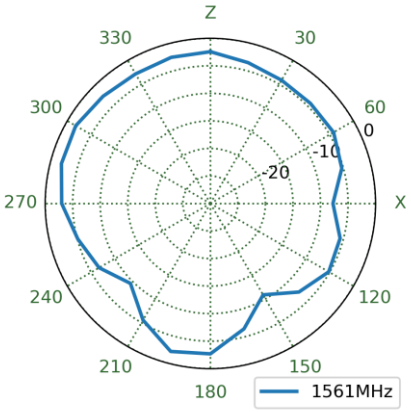


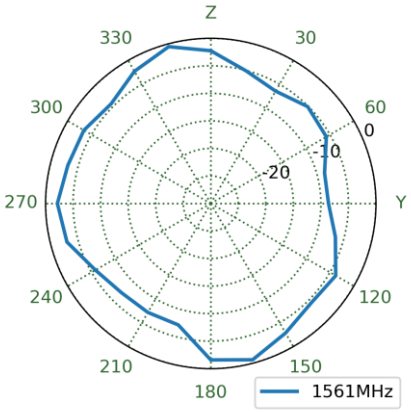
4.49 GNSS in Free Space Patterns at 1561 MHz



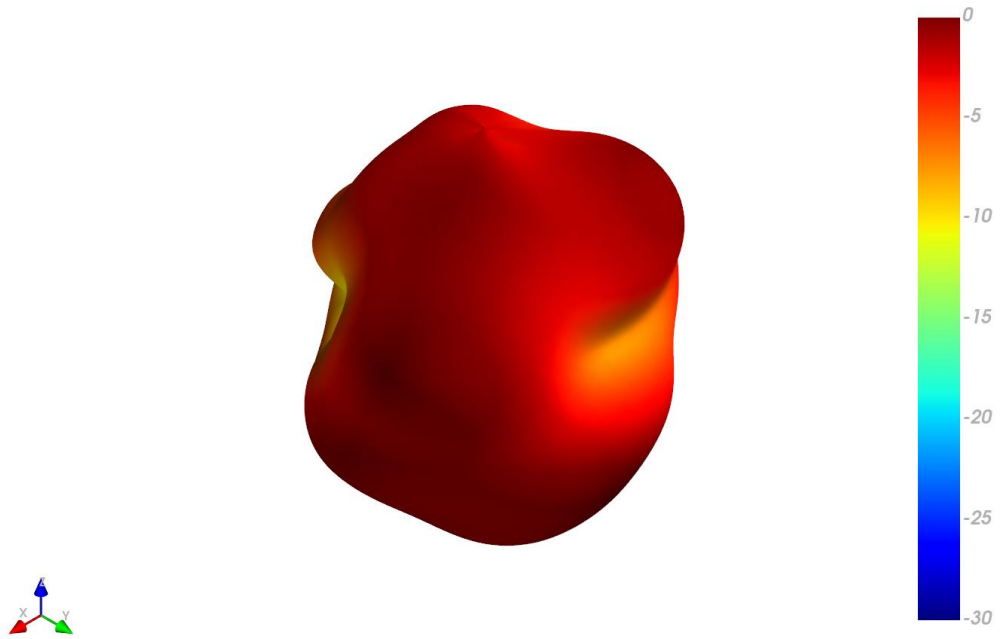
XY Plane	XZ Plane	YZ Plane



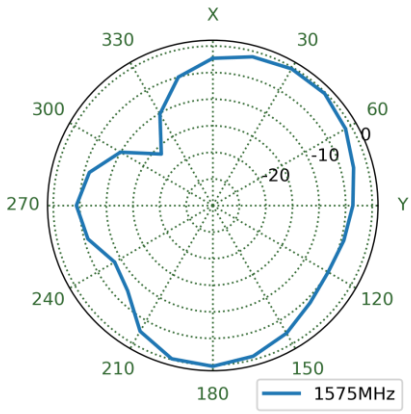


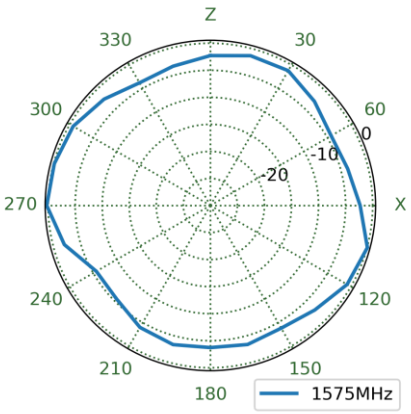


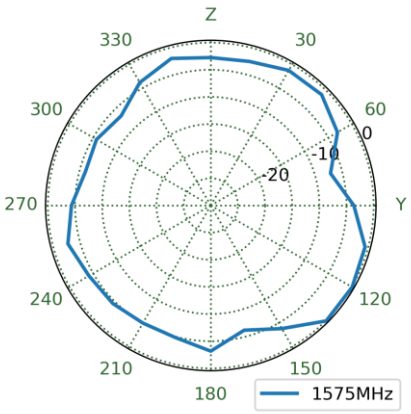
4.50 GNSS in Free Space Patterns at 1575 MHz



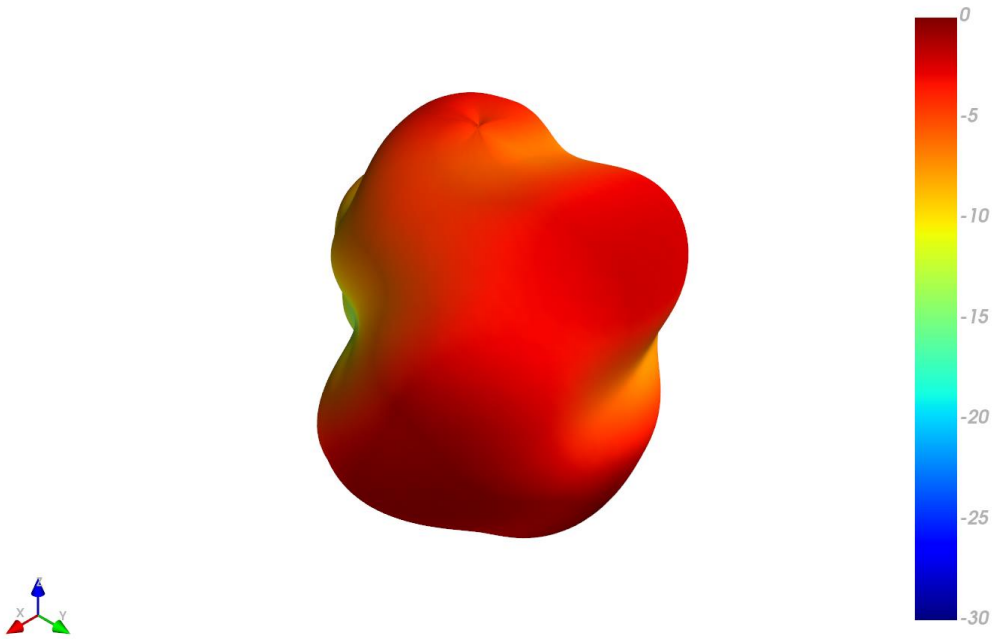
XY Plane	XZ Plane	YZ Plane



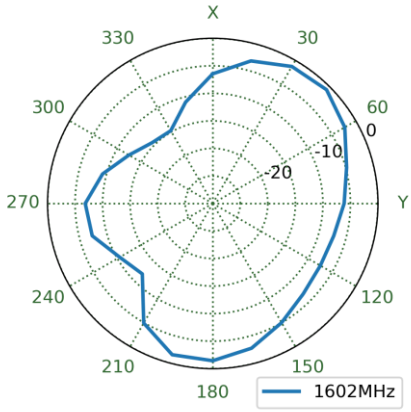


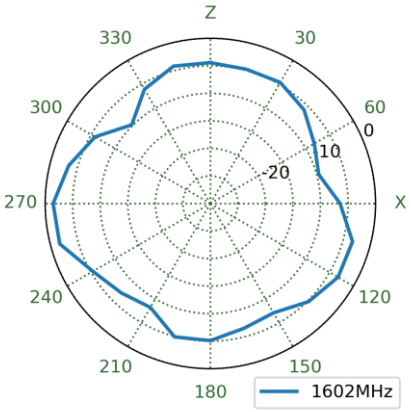


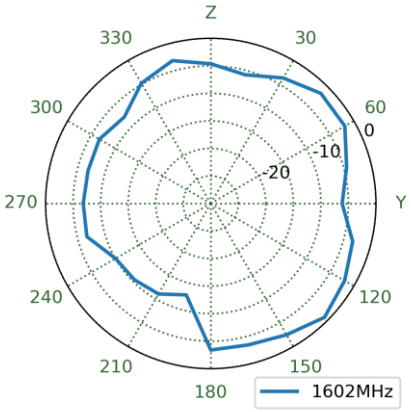
4.51 GNSS in Free Space Patterns at 1602 MHz



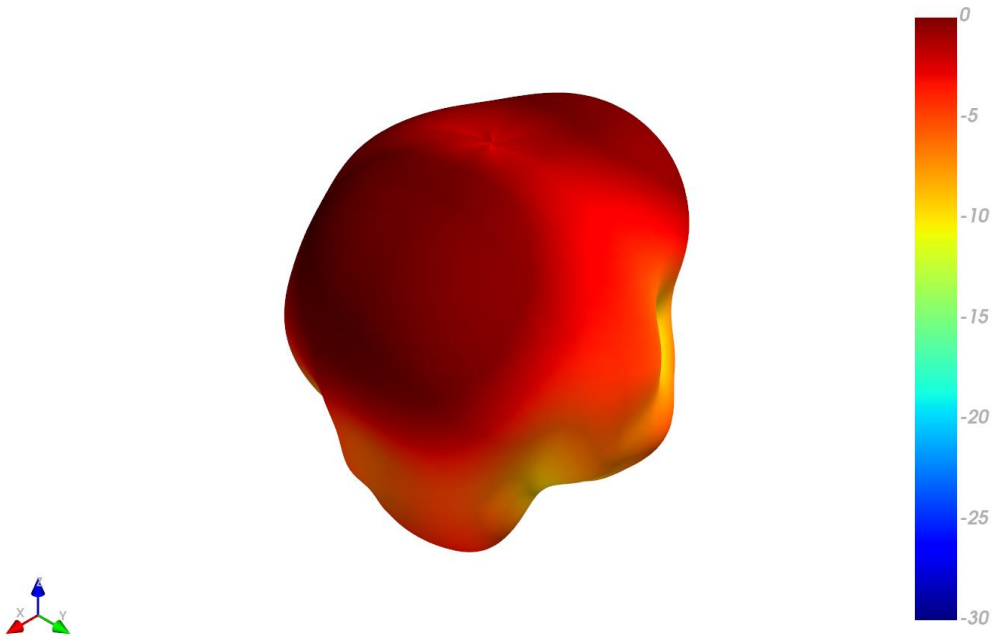
XY Plane	XZ Plane	YZ Plane



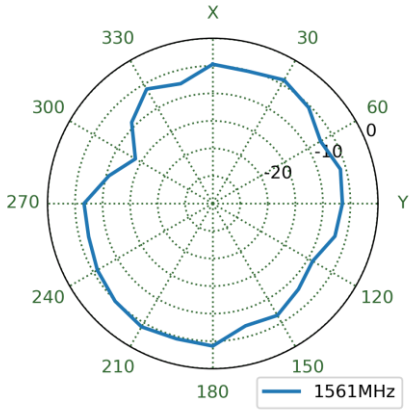


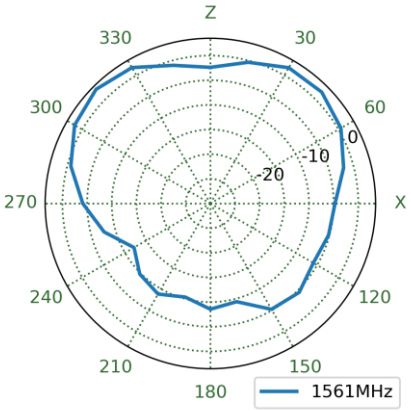


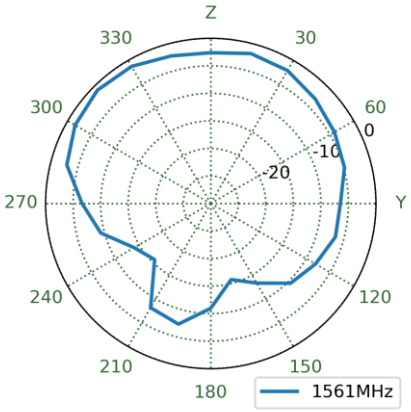
4.52 GNSS on 30x30cm Ground Plane Patterns at 1561 MHz



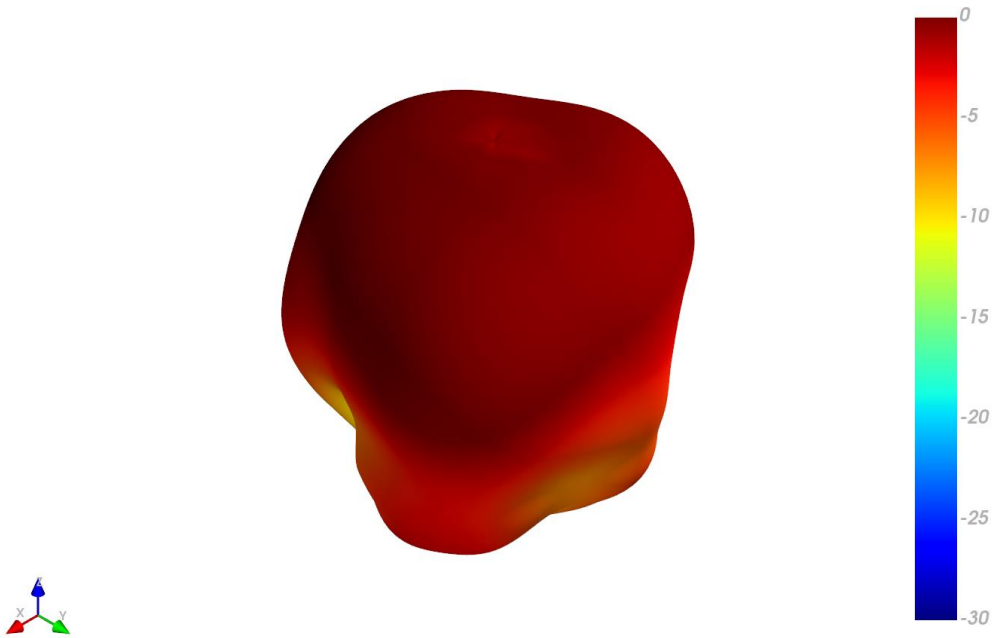
XY Plane	XZ Plane	YZ Plane



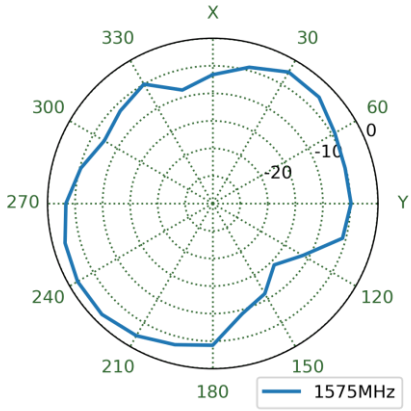


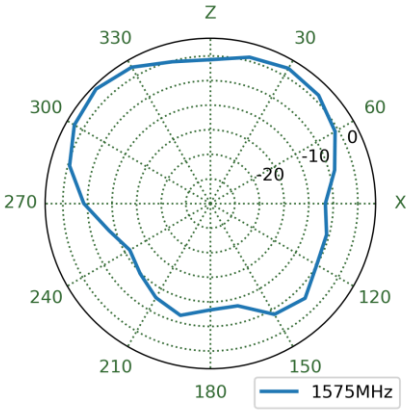


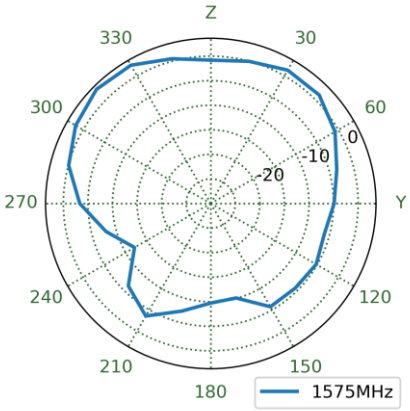
4.53 GNSS on 30x30cm Ground Plane Patterns at 1575 MHz



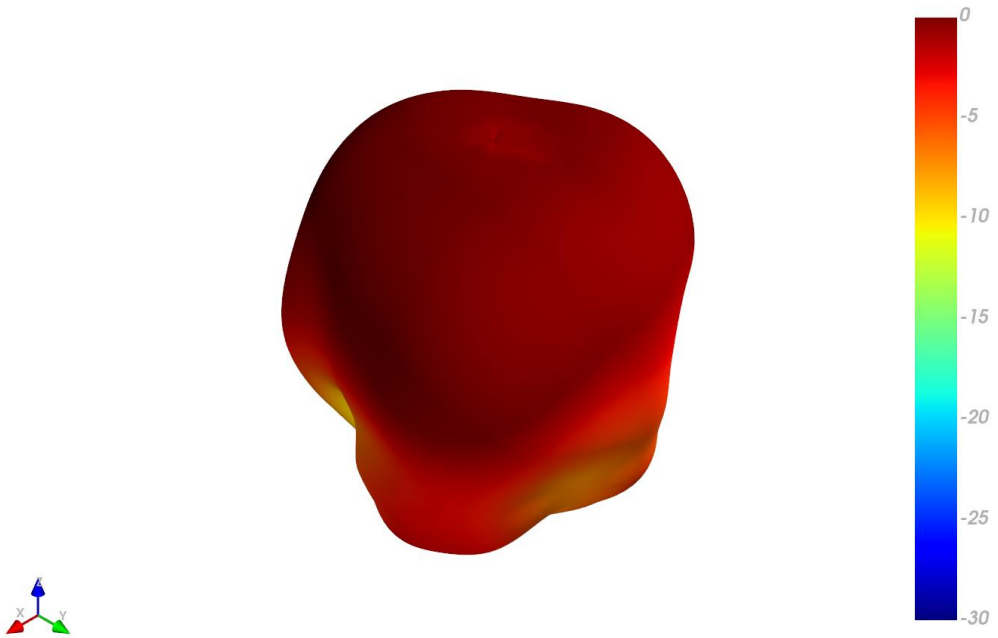
XY Plane	XZ Plane	YZ Plane



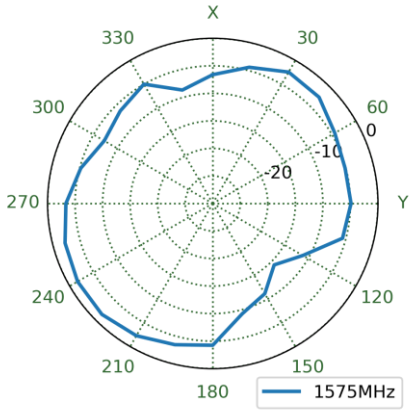


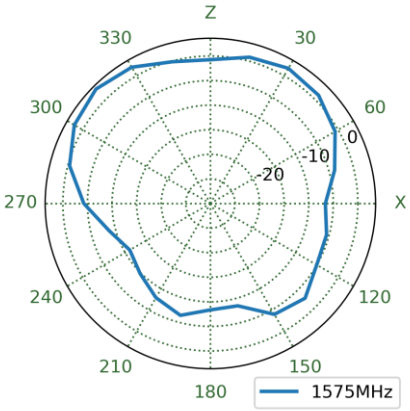


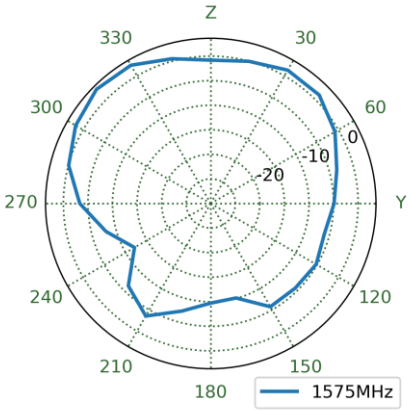
4.54 GNSS on 30x30cm Ground Plane Patterns at 1602 MHz



XY Plane	XZ Plane	YZ Plane

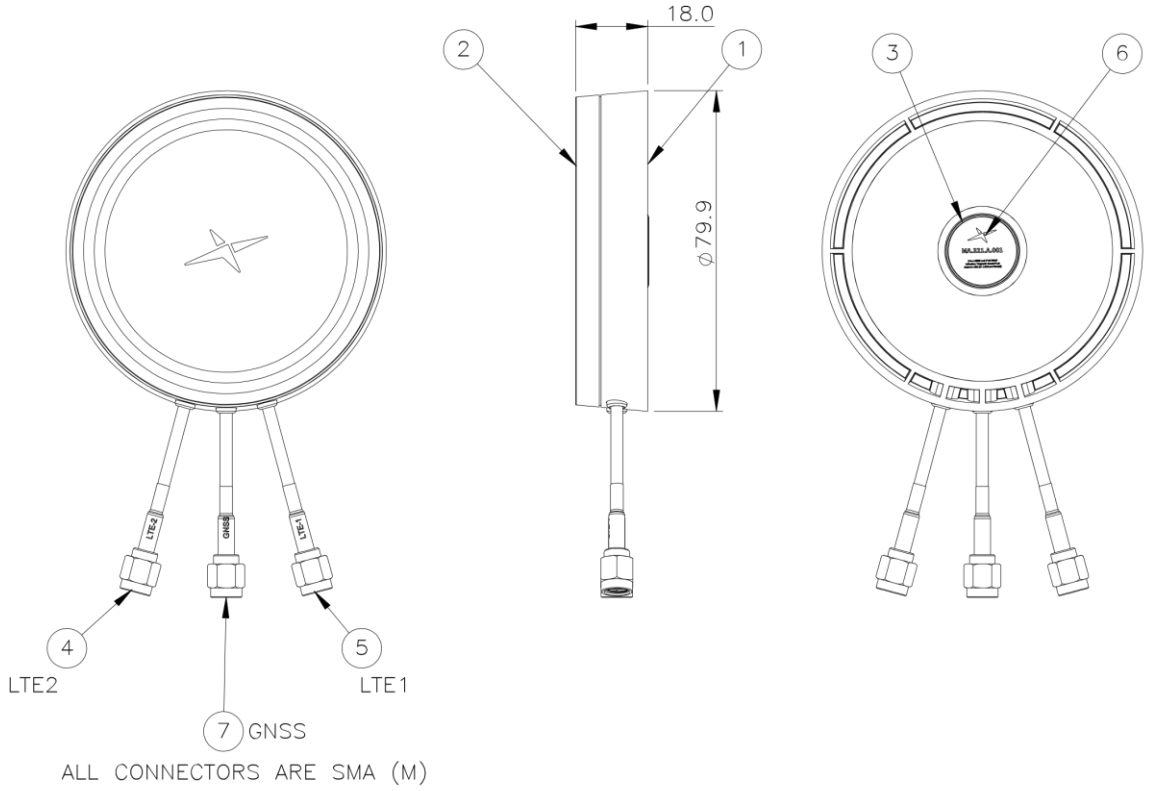


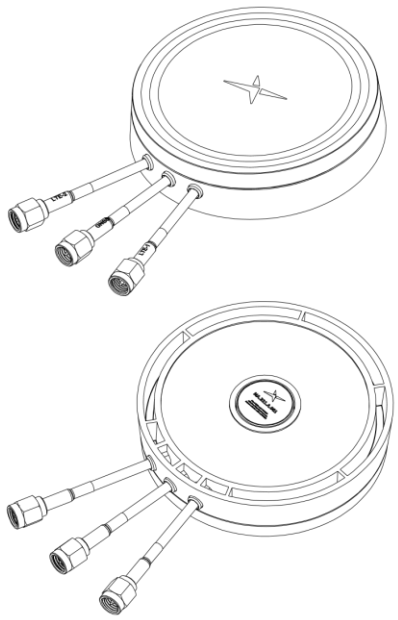




5. Mechanical Drawing

ISO NO.: EDW-23-8-0280
STATE: Released
NOTES:
1. All material must be RoHS compliant.
2. Use this drawing together with the corresponding 3D CAD database file to fully describe the part.
3. Critical Dimensions are indicated by the inspection symbol ⬭ .
4. Glue magnet to base using Super-X SILICONE ADHESIVE. PART SURFACES MUST BE CLEANED PRIOR TO ASSEMBLY. ASSEMBLY MAGNET AFTER HEAT STAKING AND ULTRSONIC WELDING PROCESSES





FN	DESCRIPTION	MATERIAL	FINISH	QTY
1	Bottom Housing 3 Hole	ASA	BLACK	1
2	Top Housing	ASA	BLACK	1
3	Magnet pack/N48	N48	Ni	1
4	Cable Assy 2m 1.5DS LTE2	NA	NA	1
5	Cable Assy 2m 1.5DS LTE1	NA	NA	1
6	PRODUCT LABEL MA321.A.001	Polyester	NA	1
7	Cable Assy 2m 1.5DS GNSS	NA	NA	1

6. Packaging

☑ 1 PCS / Zipper bag

☑ Zipper bag(mm): 70x100

☑ 1 PCS / PE Bag

☑ PE bag(mm): 380x110

☑ Weight (g): 149.5±3%

☑ SPQ Label

☑ 70 PCS / Carton

☑ Carton(mm): 370x370x300

☑ Weight (kg): 11.3±3%

☑ Carton Label

Changelog for the datasheet

SPE-23-8-284- MA321.A.001

Revision: C (Current Version)	
Date:	2024-11-05
Notes:	Removed the application note
Changes made by:	Paul Liu

Previous Revisions

Revision: B	
Date:	2024-09-04
Notes:	Updated packaging dimensions and specifications.
Changes made by:	Conor McGrath

Revision: A (Original First Release)	
Date:	2023-29-09
Notes:	
Author:	Cesar Sousa

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