TAOGLAS®

Datasheet

Comet

Part No:
Black – MA581.A.001
White - MA581.W.001

Description

3-in-1 GNSS and 2x5G/4G MIMO White Permanent Mount Puck Antenna with 2m 1.5DS and SMA(M)

Features:

Permanent Mount Puck Antenna
2* 4G-5G Antenna 617 – 6000MHz
1* GPS-GLONASS- Antenna
IP67 Waterproof Enclosure
Dims: 101 x 101 x 20 mm
Cables: 2m of TGC 1.5 DS
Connectors: SMA (M)
RoHS & Reach Compliant

1.	Introduction	3
2.	Specification	4
3.	Mechanical Drawing	8
4.	Installation Recommendation	9
5.	Packaging	11
6.	Antenna Characteristics	12
7.	Radiation Patterns	19
	Changelog	58

1. Introduction

The Taoglas Comet MA581 is a low-profile, puck-style, screw-mount antenna that integrates two high-performance 5G/4G MIMO cellular elements and one GNSS element. Covering all worldwide cellular frequencies from 600 MHz to 6 GHz, along with GPS, GLONASS, and BeiDou bands, it achieves stable gain and efficiency that are typically difficult to realize in such a compact 101 × 101 × 20 mm form factor.

A key differentiator of the Comet MA58x series is its ability to maintain strong performance when mounted directly on metallic enclosures. Competing antennas typically experience severe efficiency losses in the lower 5G/4G bands (617–960 MHz), but the Comet was designed specifically to overcome this challenge. Leveraging Taoglas' proprietary all-metal PIFA design and advanced bandwidth optimization techniques, the MA58x Series delivers consistently higher efficiency and more reliable radiation even when installed on metal housings with feed cables routed inside.

This robust design ensures dependable connectivity where other low-profile antennas fail, making the Comet series particularly well-suited for fleet and transport telematics, public safety, gateways, and other mission-critical applications that demand both a discreet form factor and reliable operation on metallic or equipment surfaces.

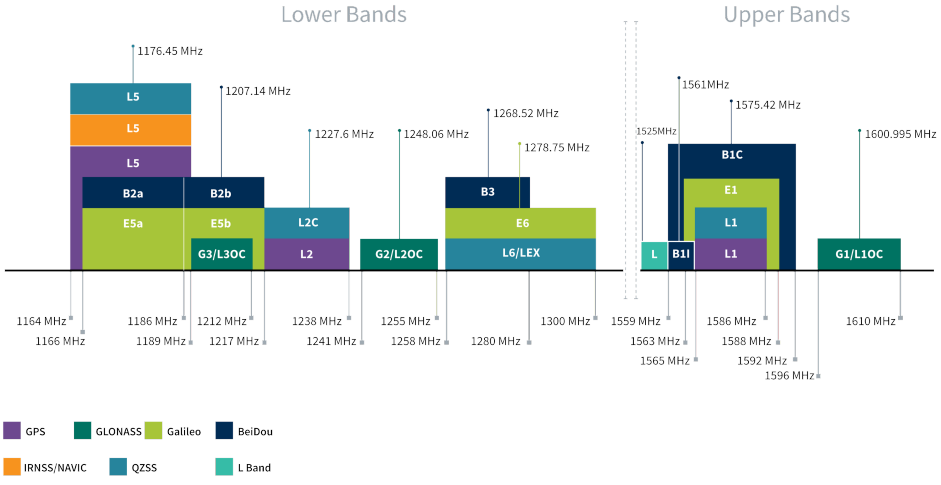
Typical Applications Include:

- Telematics, Transport and Fleet Management
- Gateways and Routers
- Digital Signage, Smart Kiosks and Point of Sale Terminals
- First Responders, Public Safety and Critical Communications
- Construction, Mining, and Heavy Equipment

The Comet has been designed to be permanent mount/screw mount. This allows it to be utilized and installed in applications where a strong and secure mechanical attachment is required, ensuring reliable performance even in high-vibration or harsh environments. 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

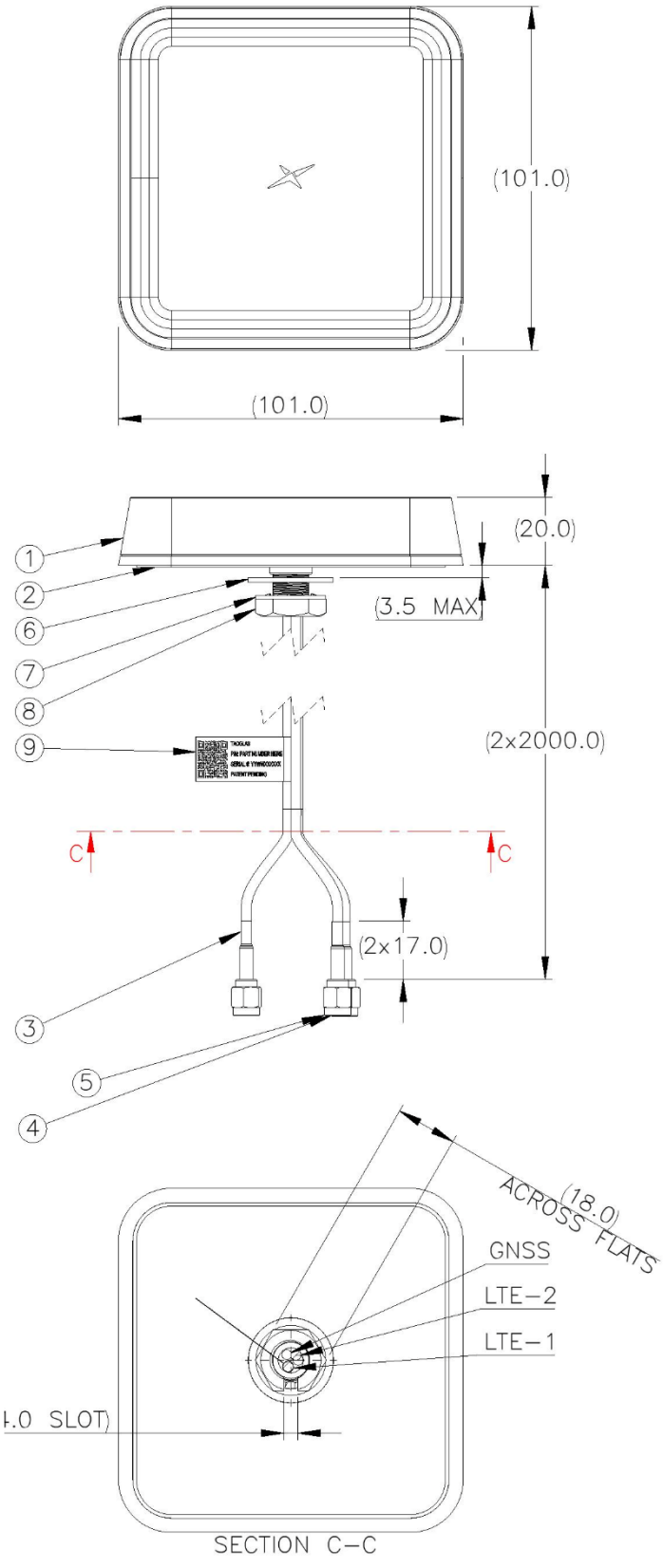
GNSS Electrical			
Frequency (MHz)	**1561**	**1575.42**	**1602**
VSWR (max.)	1.5:1	1.5:1	2:1
Passive Antenna Efficiency (%) (Without cable loss)	27.07	25.64	32.49
Passive Antenna Gain at Zenith (dBic) (Without cable loss)	-3.15	-1.91	-2.69
Axial Ratio (dB)	17.56	29.52	20.31
Polarization	RHCP		
Impedance	50 Ω		
Cable	1.5DS		
Connector	SMA(M)		

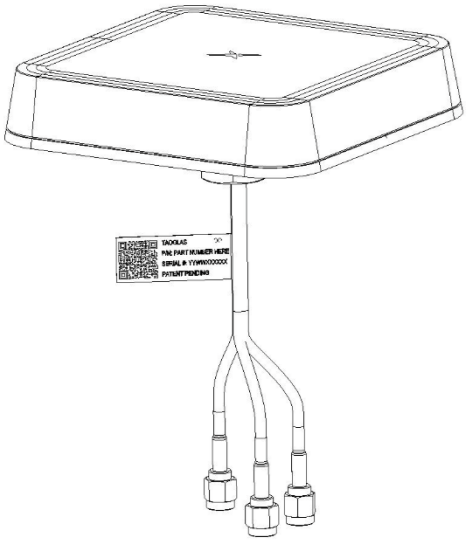
4G-5G Electrical									
Band	Frequency (MHz)	Measurement	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
5GNR/4G Band71	617-698	4G-5G 1 Free Space	20.5	-6.87	0.01	50 Ω	Linear	Omni directional	10W
		4G-5G 1 Ground Plane	17.1	-7.68	-0.12				
		4G-5G 2 Free Space	20.1	-6.96	0.84				
		4G-5G 2 Ground Plane	24.3	-6.14	3.55				
4G/3G Band 12,13,14,17,28,29	698-824	4G-5G 1 Free Space	22.0	-6.58	1.51				
		4G-5G 1 Ground Plane	32.4	-4.89	4.25				
		4G-5G 2 Free Space	34.4	-4.63	5.10				
		4G-5G 2 Ground Plane	27.5	-5.60	4.00				
4G/3G/NB-IoT/Cat M Band 5,8,18,19,20,26,27	824-960	4G-5G 1 Free Space	38.0	-4.20	2.60				
		4G-5G 1 Ground Plane	29.2	-5.35	1.50				
		4G-5G 2 Free Space	44.0	-3.56	6.05				
		4G-5G 2 Ground Plane	39.6	-4.02	5.17				
5GNR/4G Band 21,32,74,75,76	1427-1518	4G-5G 1 Free Space	30.8	-5.11	3.86				
		4G-5G 1 Ground Plane	48.5	-3.14	6.72				
		4G-5G 2 Free Space	39.6	-4.02	5.42				
		4G-5G 2 Ground Plane	34.8	-4.59	3.77				
4G/3G Band 1,2,3,4,9,23,25,35,39, 66	1710-2200	4G-5G 1 Free Space	35.6	-4.49	4.51				
		4G-5G 1 Ground Plane	51.2	-2.91	7.57				
		4G-5G 2 Free Space	40.7	-3.90	4.38				
		4G-5G 2 Ground Plane	34.7	-4.60	4.99				
4G/3G Band 7,30,38,40,41	2300-2690	4G-5G 1 Free Space	41.5	-3.82	5.75				
		4G-5G 1 Ground Plane	32.9	-4.82	7.53				
		4G-5G 2 Free Space	39.8	-4.00	5.59				
		4G-5G 2 Ground Plane	33.3	-4.77	5.29				
LTE5200/Wi-Fi5800	5150-5925	4G-5G 1 Free Space	31.4	-5.03	6.86				
		4G-5G 1 Ground Plane	23.7	-6.26	5.26				
		4G-5G 2 Free Space	27.9	-5.54	2.86				
		4G-5G 2 Ground Plane	29.6	-5.29	3.77				
5GNR/4G Band 22,42,48,77,78,79	3300-5000	4G-5G 1 Free Space	28.5	-5.45	5.79				
		4G-5G 1 Ground Plane	26.0	-5.85	5.13				
		4G-5G 2 Free Space	21.0	-6.77	2.20				
		4G-5G 2 Ground Plane	19.7	-7.05	2.66				

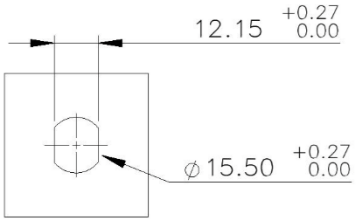
Mechanical	
Dimensions	101 x 101 x 20mm
Weight	185g
Material	ASA
Connector	SMA(M)
Cable	2m of TGC 1.5DS
Thead Diameter	M12

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 & REACH Compliant	Yes

3. Mechanical Drawing







MOUNTING HOLE REQUIREMENTS

ITEM NO.	DESCRIPTION	Color	QTY.
1	Antenna	RAL 9003-P Signal White, Logo Pantone 2965C Navy Blue	1
2	Foam Gasket with Two Sided PSA-Comet	Black	1
3	Cable Assy SMA(M) LTE-1	Cable Black, Heat Shrink Red With White Text	1
4	Cable Assy SMA(M) LTE-2	Cable Black, Heat Shrink Red With White Text	1
5	Cable Assy SMA (M) ST GNSS	Cable Black, Heat Shrink Blue With White Text	1
6	G30 Gasket POM/MITSUBISHI ENGINEERING-PLASTICS CORP-F20-03 PANTONE Red(199C)	Red	1
7	M12 Internal Tooth Washer	N/A	1
8	Hex Nut, M12 x 1P x 5mm, 4.0mm Slot	N/A	1
9	QR Label	White	1

Installation Instructions

Comet MA58x Series

Low Profile Permanent Mount Combination Antenna

A Introduction

The **Taoglas Comet MA58x Series** is a low-profile, puck-style, screw-mount antenna that integrates two high-performance 5G/4G MIMO cellular elements and one GNSS element. Covering all worldwide cellular frequencies from 600 MHz to 6 GHz, along with GPS, GLONASS, and BeiDou bands, it achieves stable gain and efficiency that are typically difficult to realize in such a compact 101 × 101 × 20 mm form factor.

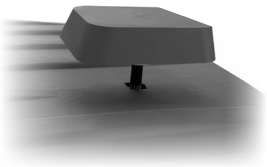
Electrical Safety
The Comet can contains an active GPS/GNSS antenna.
Rated voltage: 1.8-5.5VDC Rated current: 10mA maximum
The supply to this device must be provided with overcurrent protection of 1A maximum.

Power consumption @ 1.8-5.5V ; 10 mA

B Mounting & Location

Secured via a ø12mm diameter threaded mounting stud, The Comet is recommended to be fitted by drilling a ø13mm hole will need to be drilled in the roof or enclosure surface.

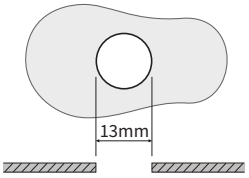
When mounting on a vehicle roof panel ensure to mount on a flat surface, and measure for a central position. Care should be taken to mount the Comet antenna as far as possible from other roof-mounted features such as the aircon unit, light bar etc.



Sealing
In order to ensure that the installation is properly sealed against the mounting surface care must be taken regarding curvature of the mounting panel. It is highly recommended to install the antenna on a clean, flat and level surface. After installation the compression of the foam gasket and adhesive against the mounting panel should be checked and a small bead of neutral cure silicone sealant can be applied around the periphery of the enclosure if required.

C Surface Preparation

When preparing to drill the hole, mask the area around the hole position to protect the surface. If an existing OEM antenna mounting hole is not present, drill a pilot hole and increase the hole size to ø12mm (0.472”). Ensure the drill bit does not contact the headliner. Then deburr and clean the area around the hole carefully removing all waste.



Remove paint and primer from under panel surface to ensure adequate earth contact by washer and nut. Apply petroleum jelly or paint around cut edge of the hole to prevent corrosion

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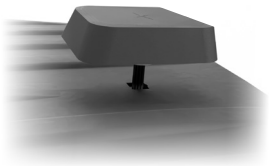
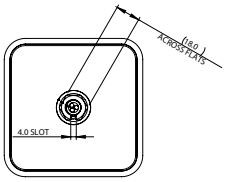
D Adhesive Foam Gasket

On the underside of the antenna there is a 3M adhesive foam gasket. Peel away the 3M adhesive protection and feed the cables through the hole. Position the antenna over the hole and press down onto the panel with pressure. This adhesion will ensure the antenna is securely mounted and will also allow for extremely minimal curvature on the roof of a vehicle.



E Securing the Mount

A split nut is used to easily fit onto the thread through the cables. The nut is attached from the underside of the panel, it should easily twist onto the thread and then secured in place with a final tighten with a spanner. After tightening, double check the antenna to make sure that it is properly secured.



F Cable Routing and Connection

The cables supplied are RG-174 and TGC-1.5DS for all feeds. The heatshrink will denote which cable is which for ease of installation. Connect each individual connector to the correct port of the router, if any cable is unused please fit a 50Ω terminator to the individual connection.

G Notices

Caution
To comply with FCC RF Exposure requirements in section 1.1310 of the FCC Rules, antennas used with this device must be installed to provide a separation distance of at least 20 cm from all persons to satisfy RF exposure compliance.

Warning
Do not operate the equipment in an explosive atmosphere.

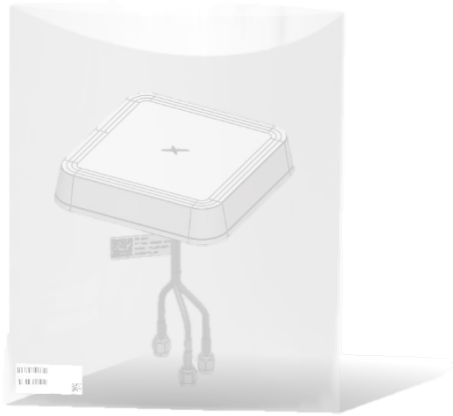
European Waste Electronic Equipment Directive 2012/19/EU
Please ensure that your old Waste Electricals and Electronics are recycled do not throw them away into standard waste.

Hazardous Substances Directive (RoHS) 2011/65/EU / 2015/863/EU
Directive 2014/53/EU Radio Equipment Directive (RED)

View CE Certificate online:
www.taoglas.com/assets/ce/CE-Declaration-of-Conformity-RoHS-RED-Patriot-Series.pdf

Harmonised Standards and References:
EN 301 489-1 (V2.2.3): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 1: Common technical requirements. Referencing CENELEC EN 55032 Class B.

5. Packaging



☑ 1 PCS / PE bag

☑ PE bag(mm): 200x130 (Ref)

☑ Weight (g): 220 ±3%

☑ SPQ Label

☑ 40 PCS / Carton

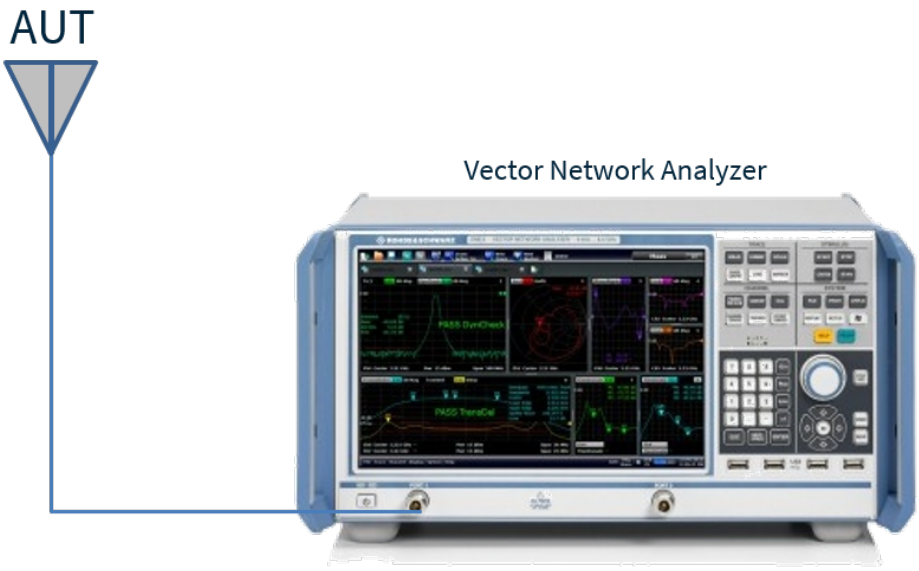
☑ Carton(mm): 370x370x300

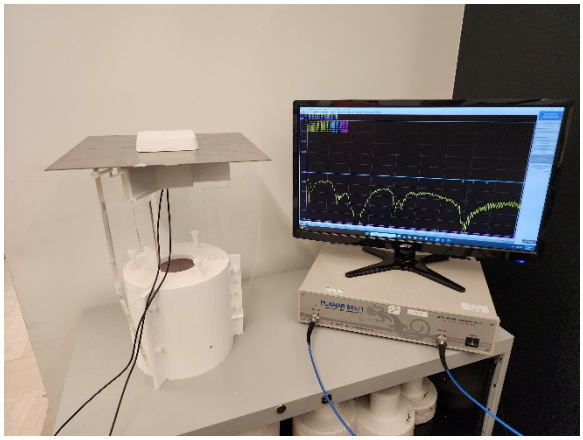
☑ Weight (Kg): 9.7 ±3%

☑ Carton Label

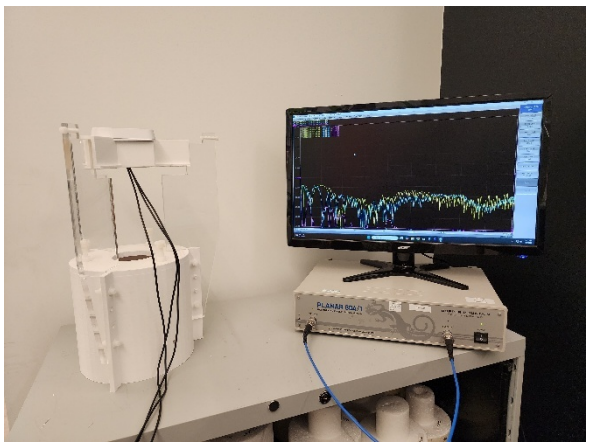
6. Antenna Characteristics

6.1 Test Setup



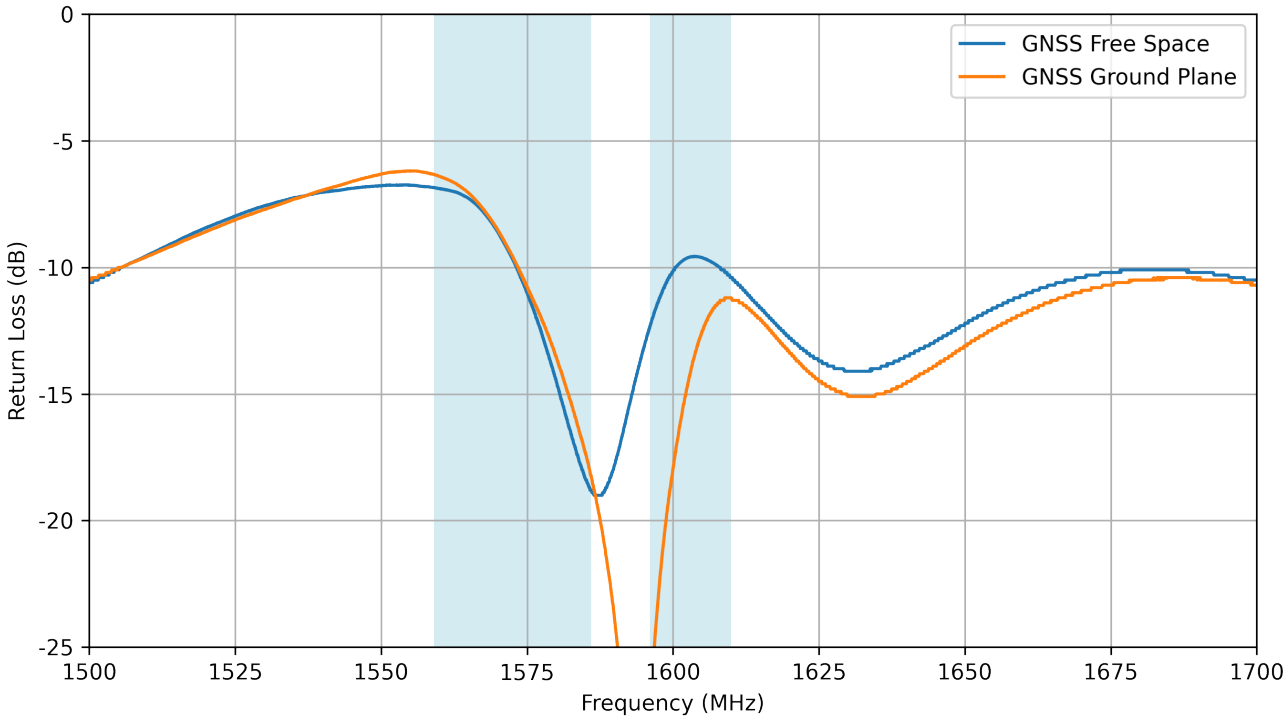


Set-up on a 30x30cm Ground Plane

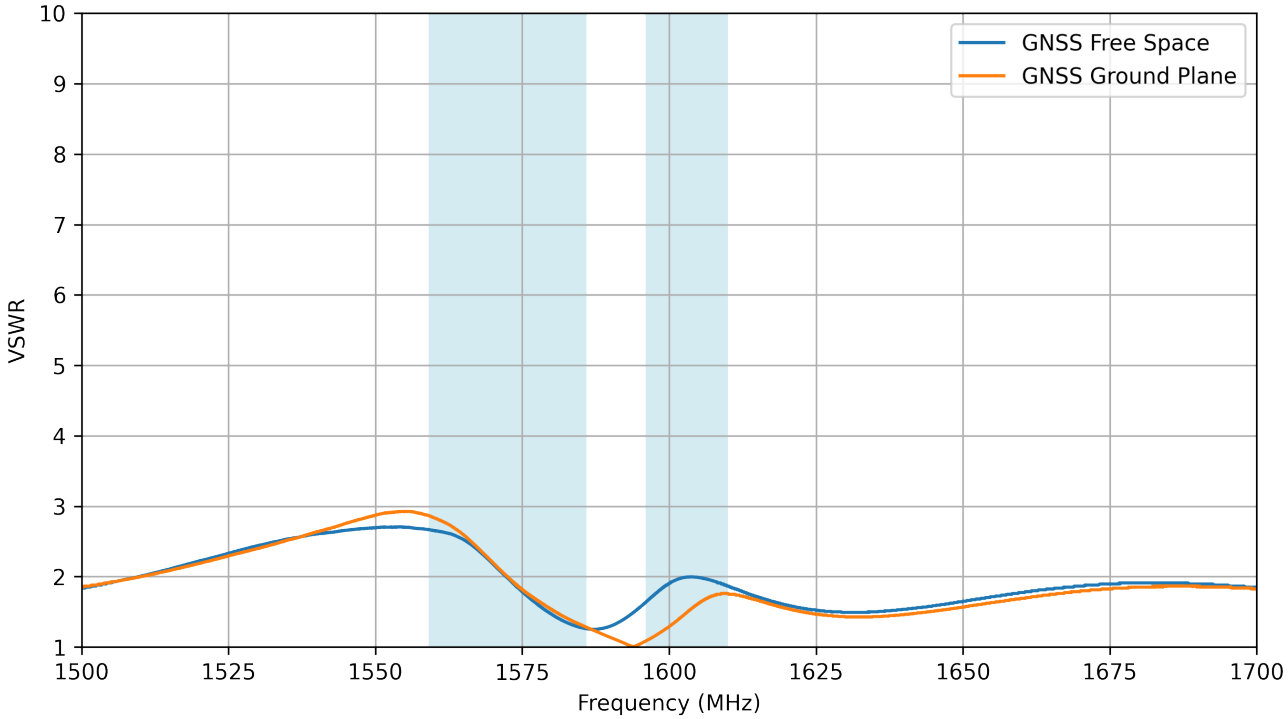


Set-up in Free Space

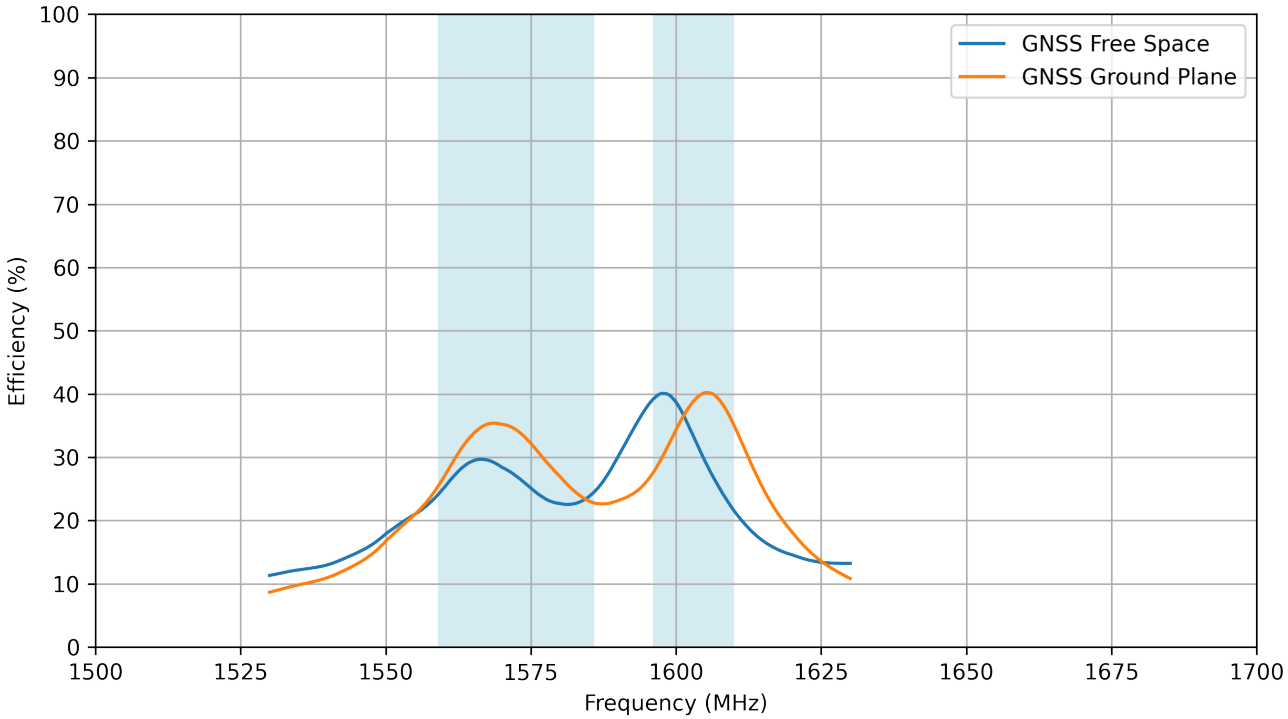
6.2 GNSS - Return Loss



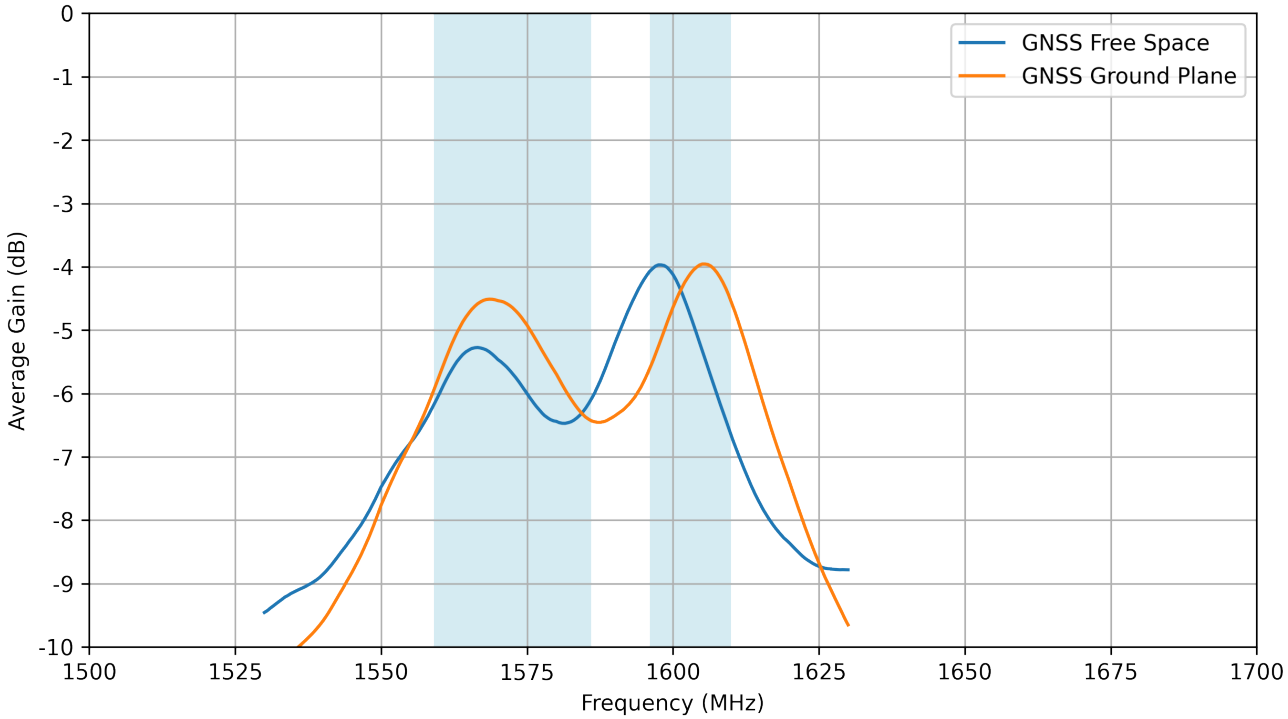
6.3 GNSS - VSWR



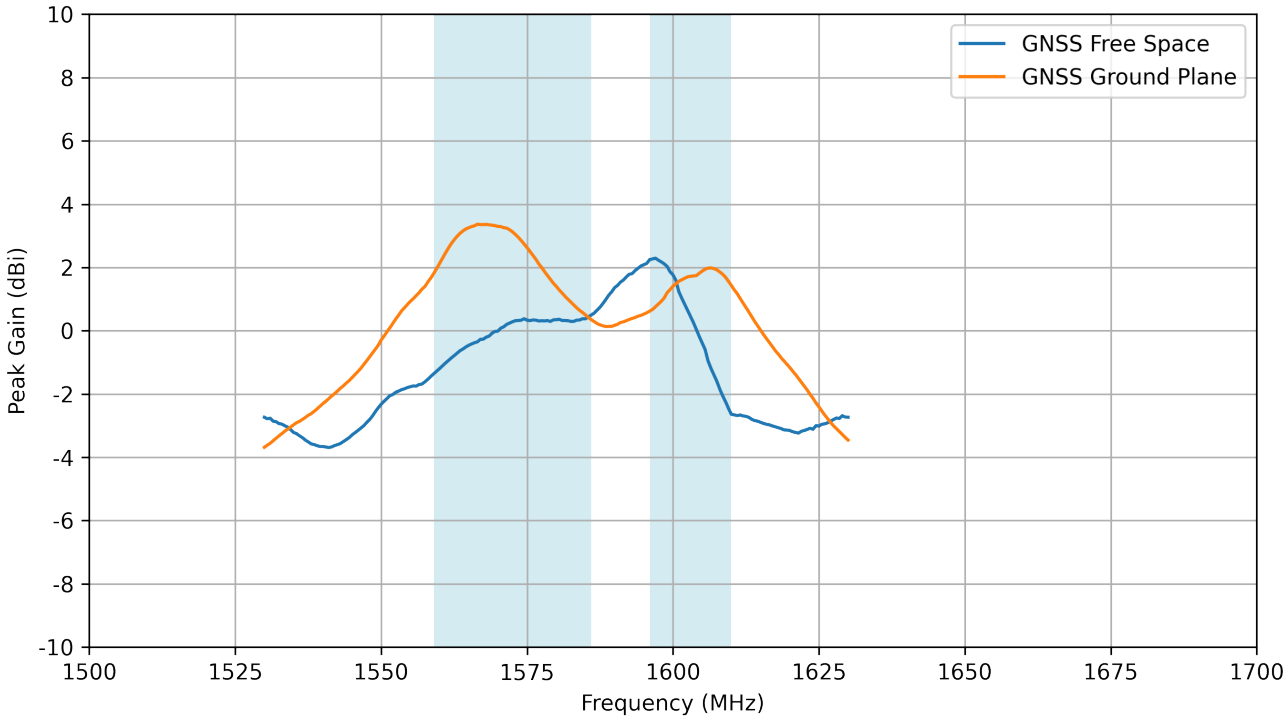
6.4 GNSS - Efficiency



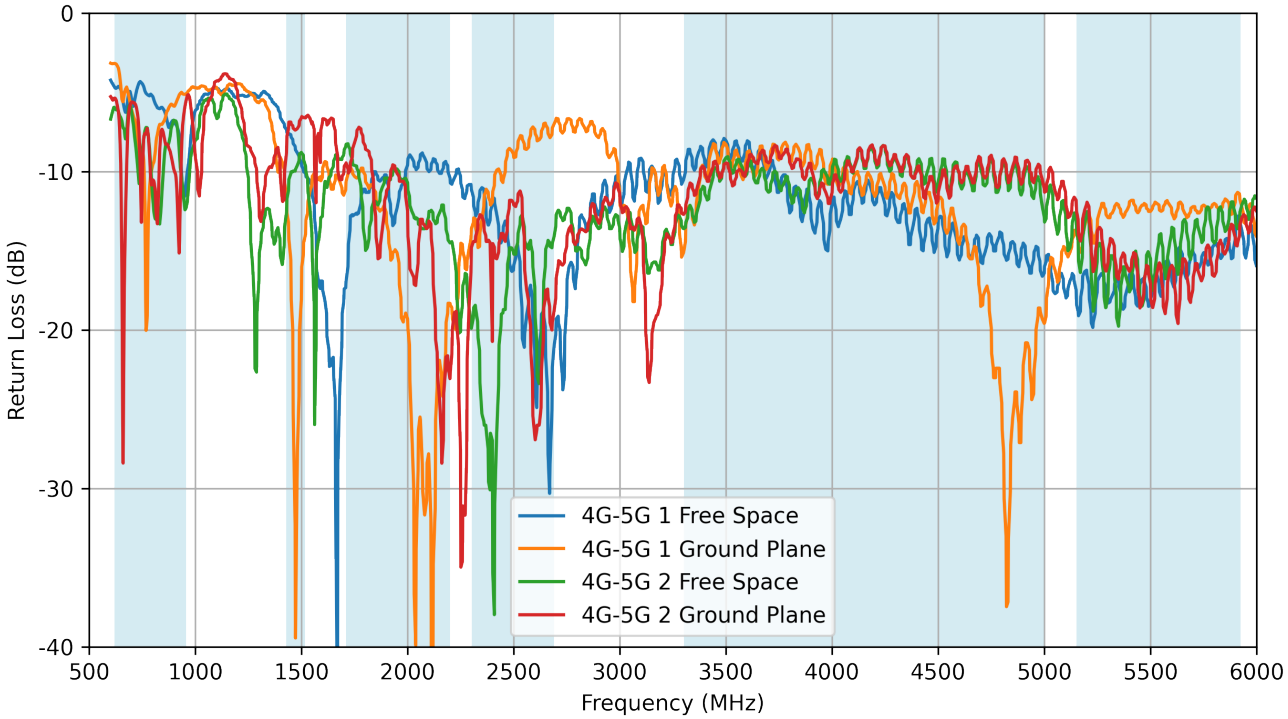
6.5 GNSS - Average Gain



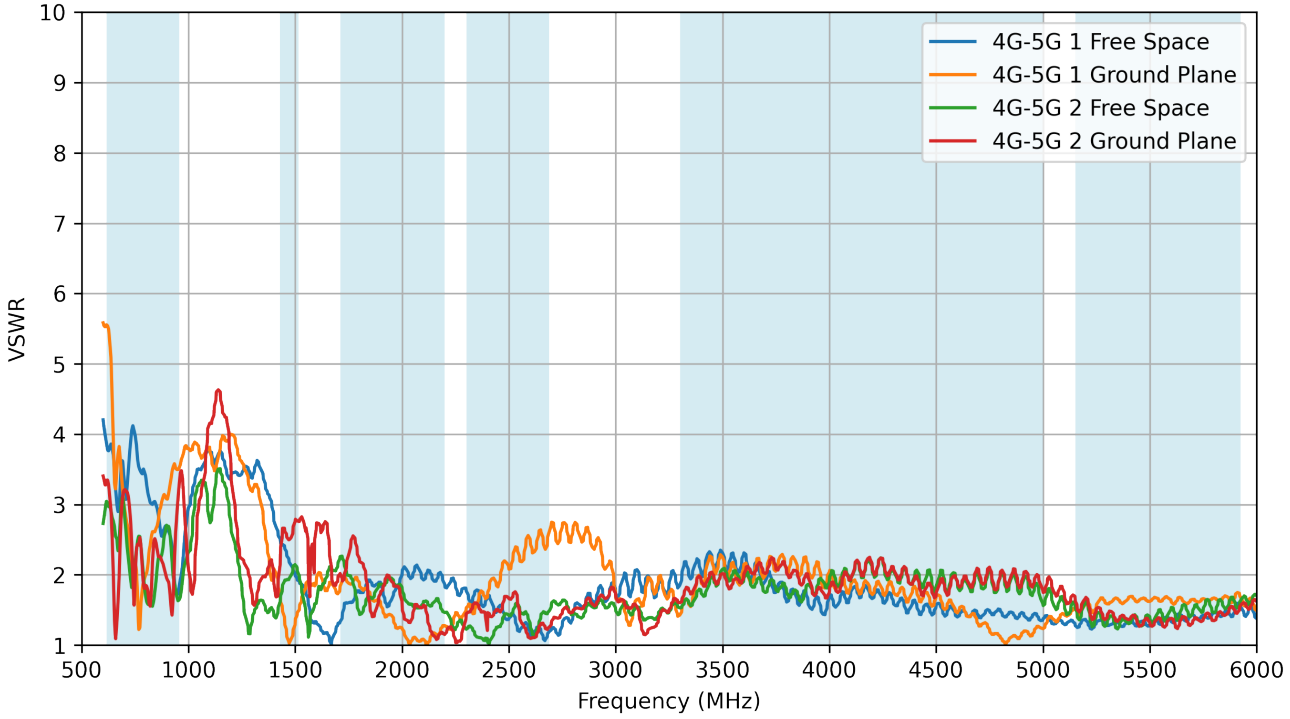
6.6 GNSS - Peak Gain



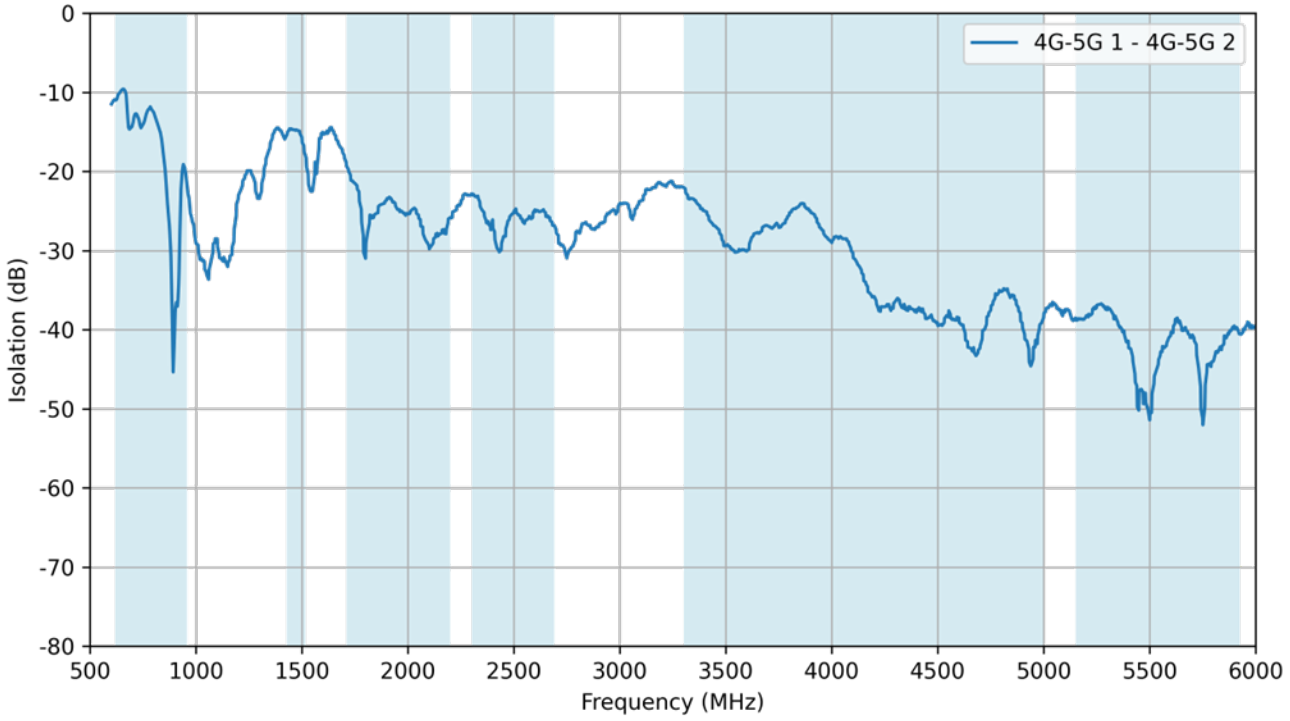
6.7 4G-5G - Return Loss



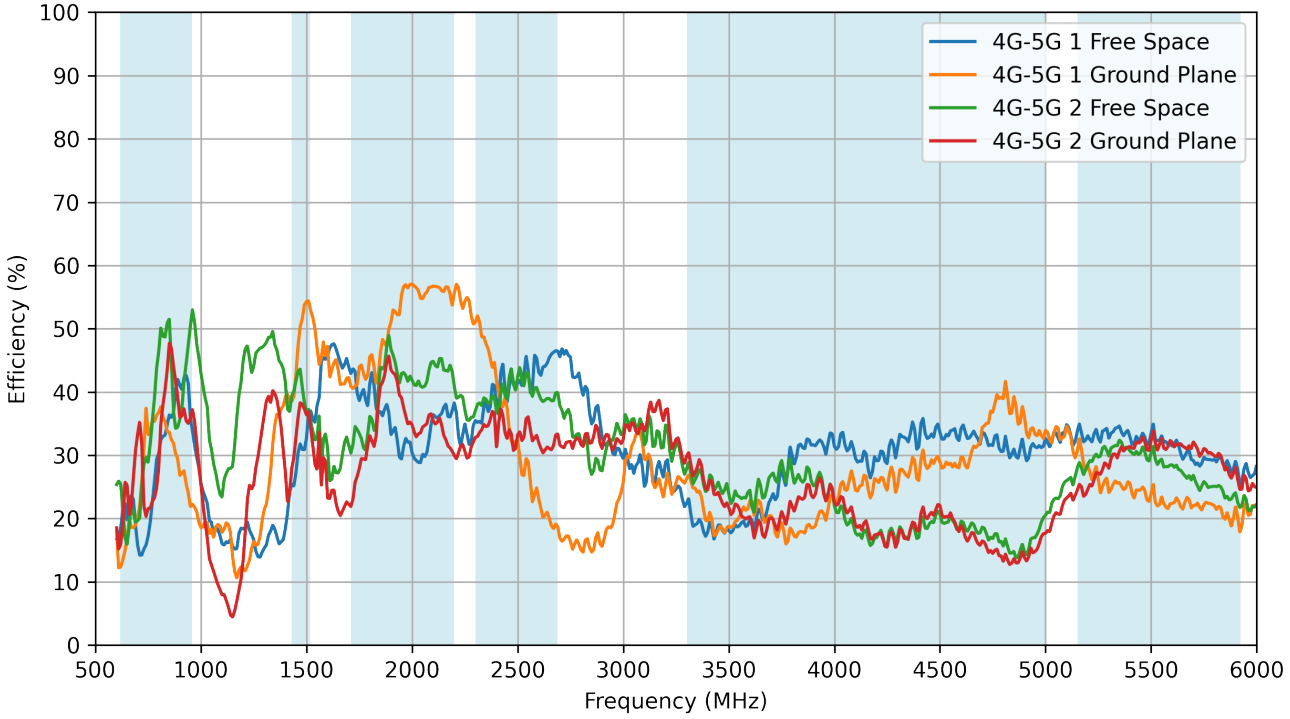
6.8 4G-5G - VSWR



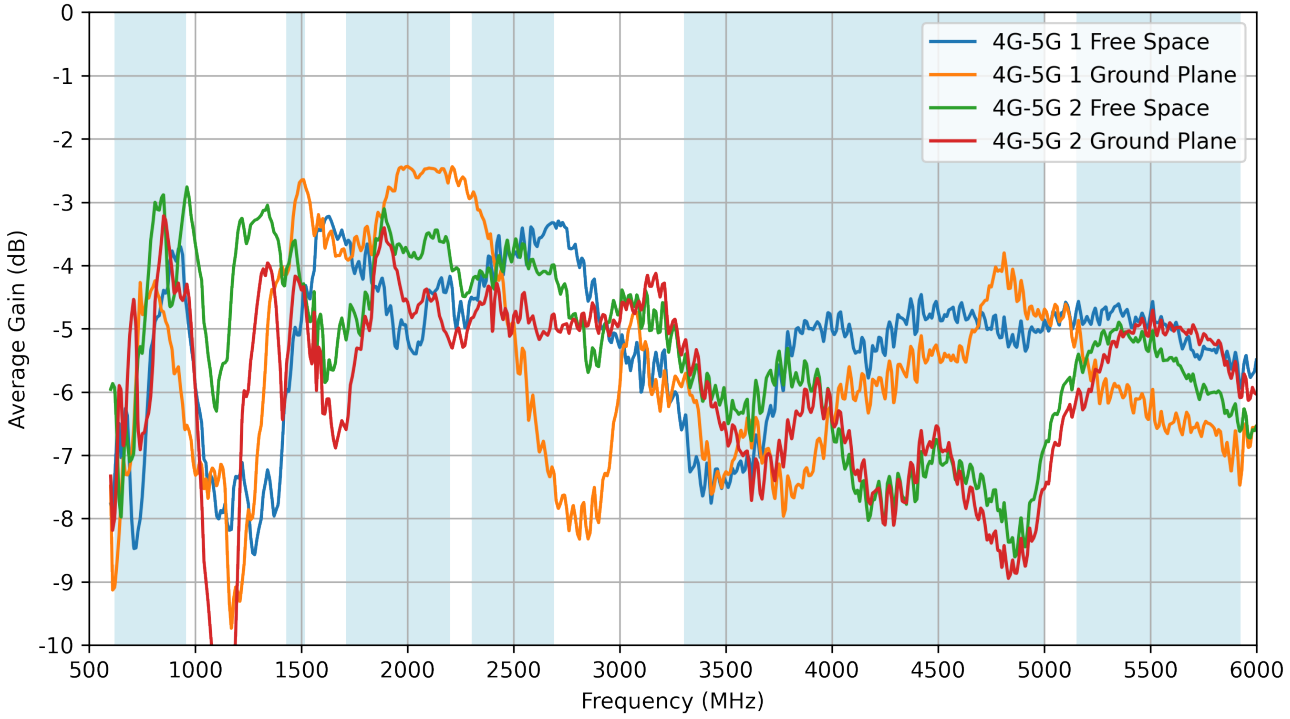
6.9 4G-5G - Isolation



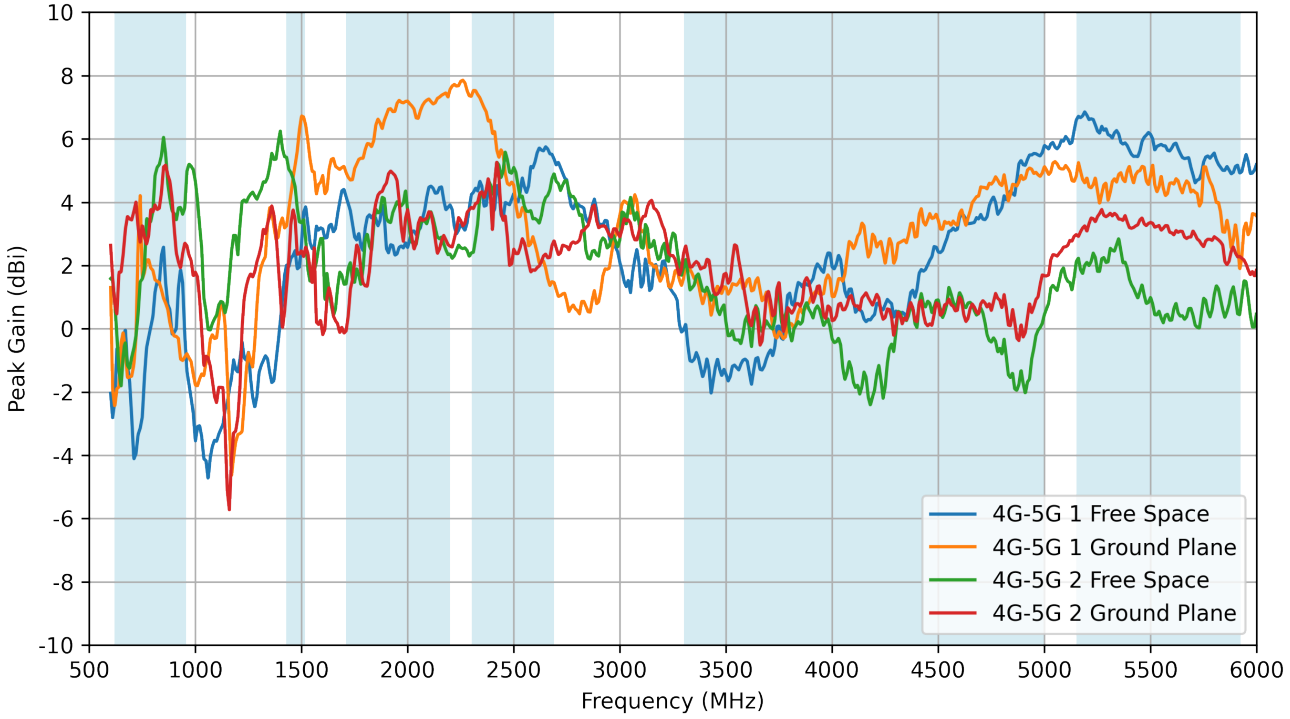
6.10 4G-5G - Efficiency



6.11 4G-5G - Average Gain

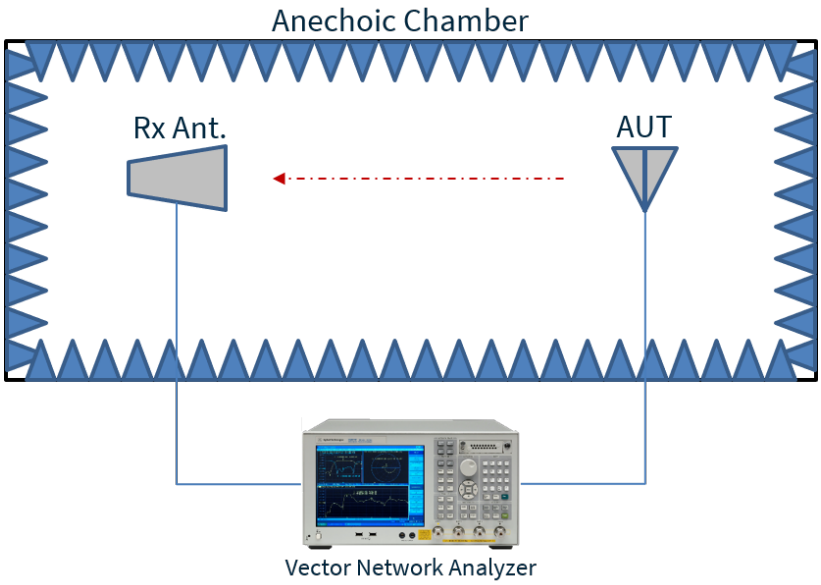


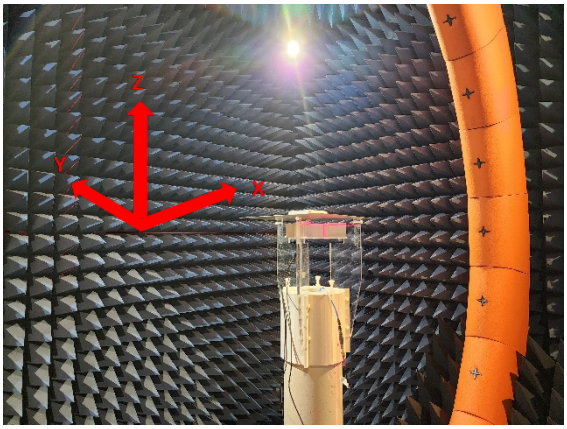
6.12 4G-5G - Peak Gain



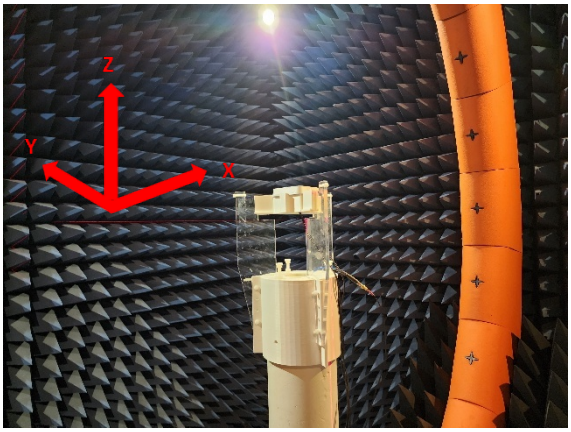
7. Radiation Patterns

7.1 Test Setup



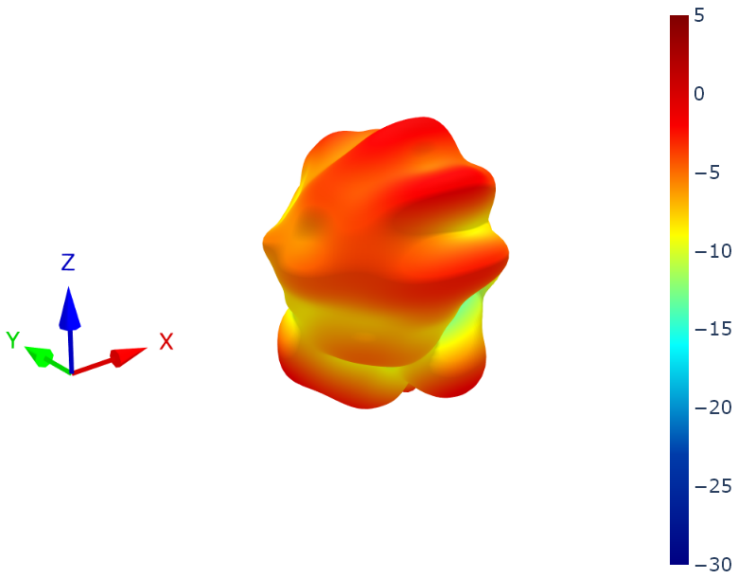


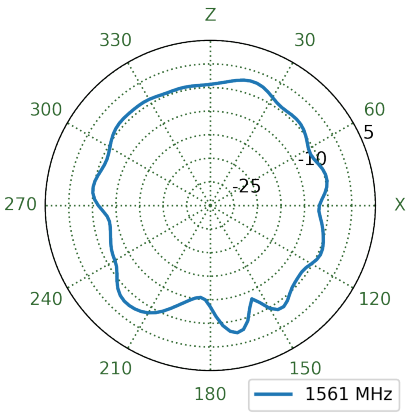
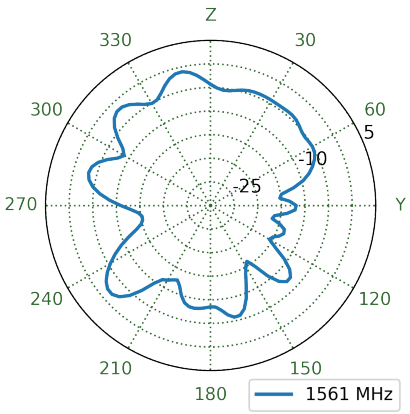
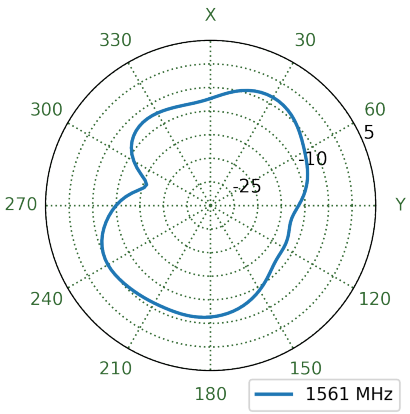
Set-up on a 30x30cm Ground Plane



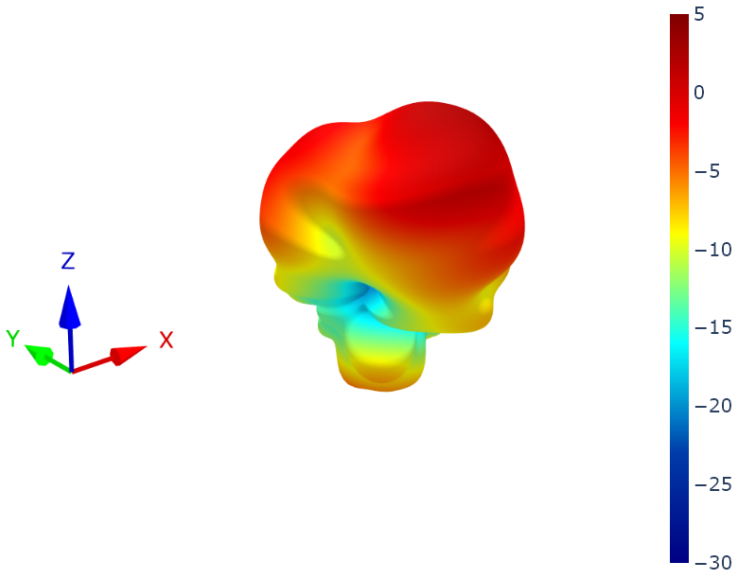
Set-up in Free Space

7.2 GNSS Free Space Patterns at 1561 MHz

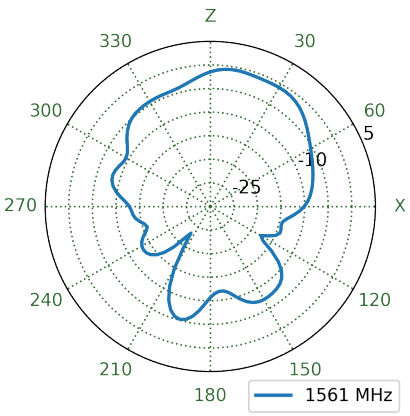


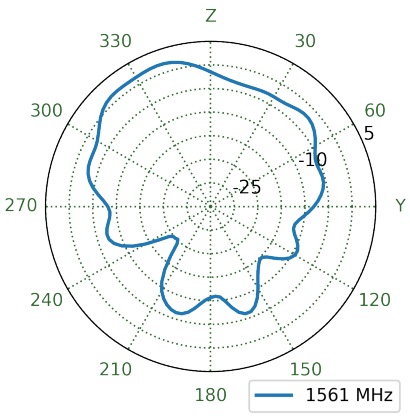
XZ Plane	YZ Plane	XY Plane
		

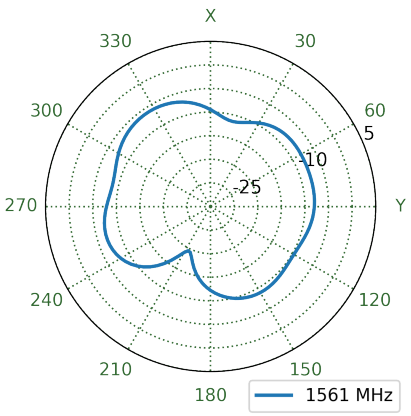
7.3 GNSS Ground Plane Patterns at 1561 MHz



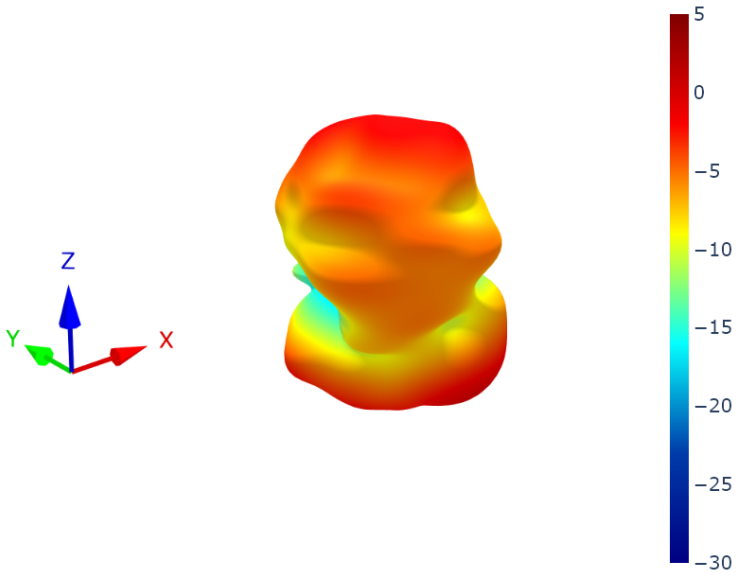
XZ Plane	YZ Plane	XY Plane

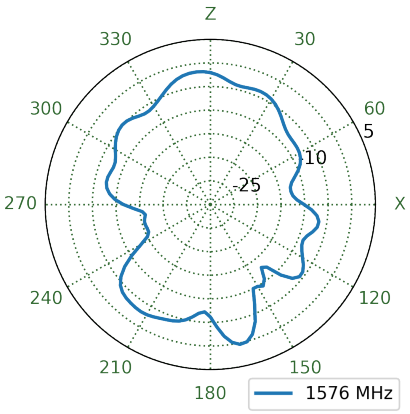
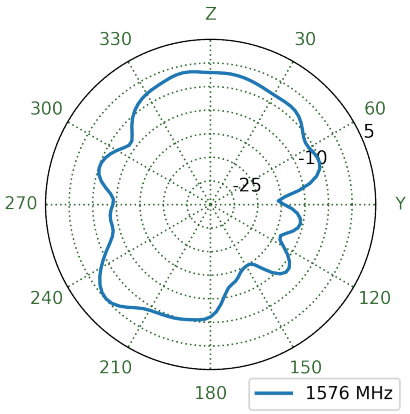
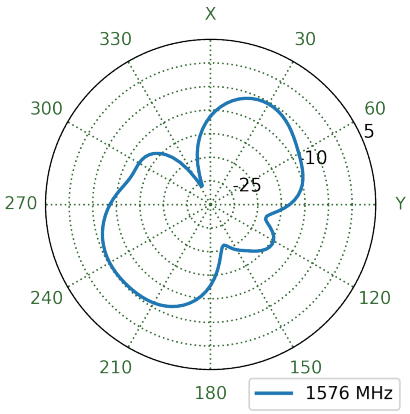




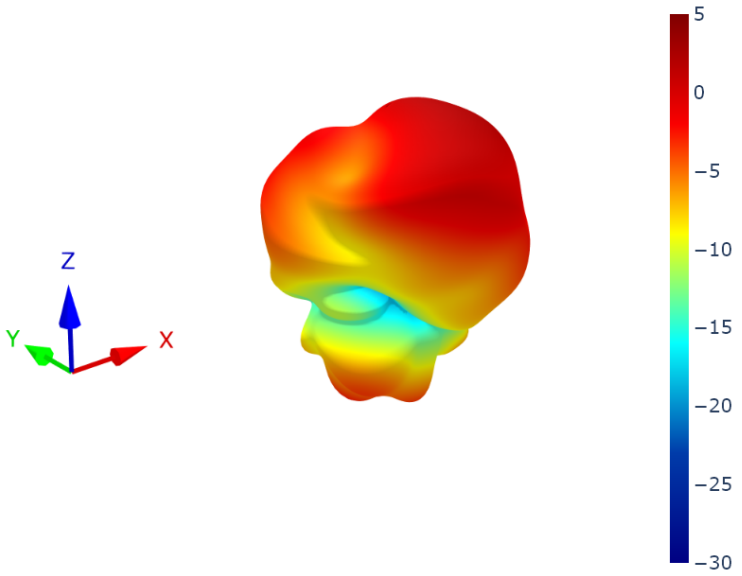


7.4 GNSS Free Space Patterns at 1576 MHz

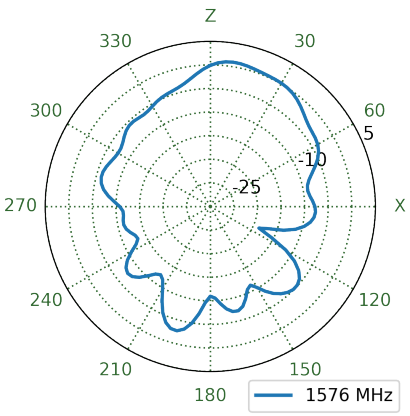


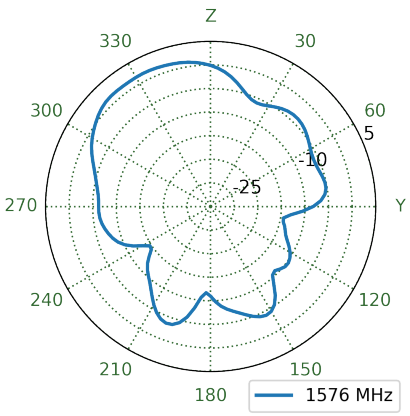
XZ Plane	YZ Plane	XY Plane
		

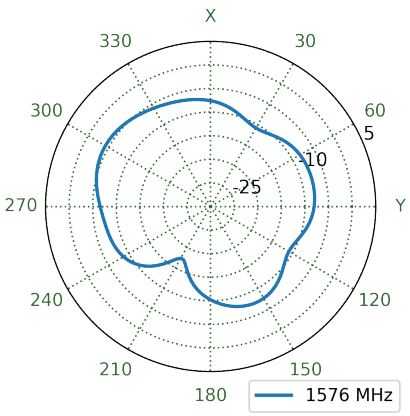
7.5 GNSS Ground Plane Patterns at 1576 MHz



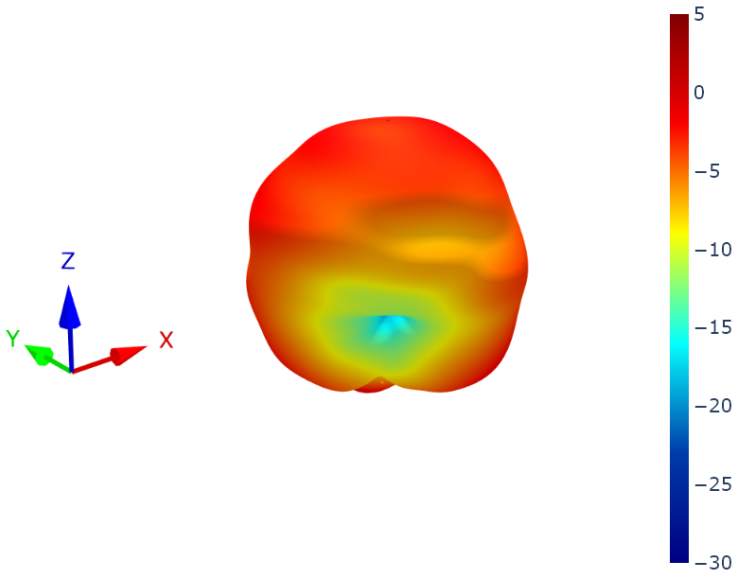
XZ Plane	YZ Plane	XY Plane

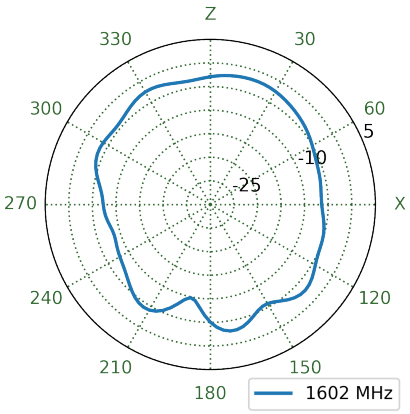
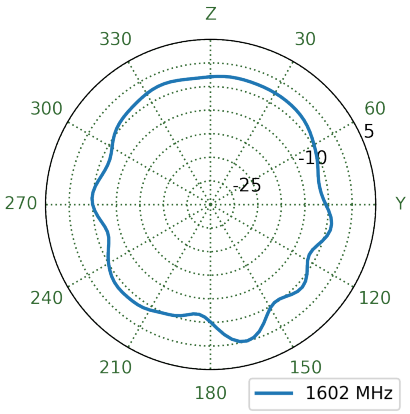
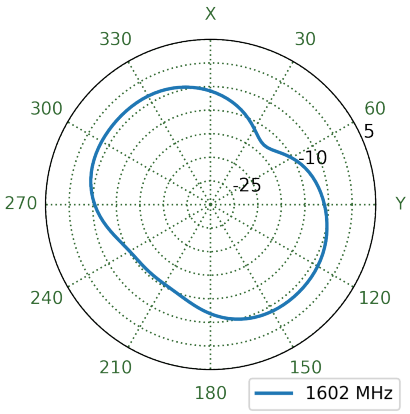




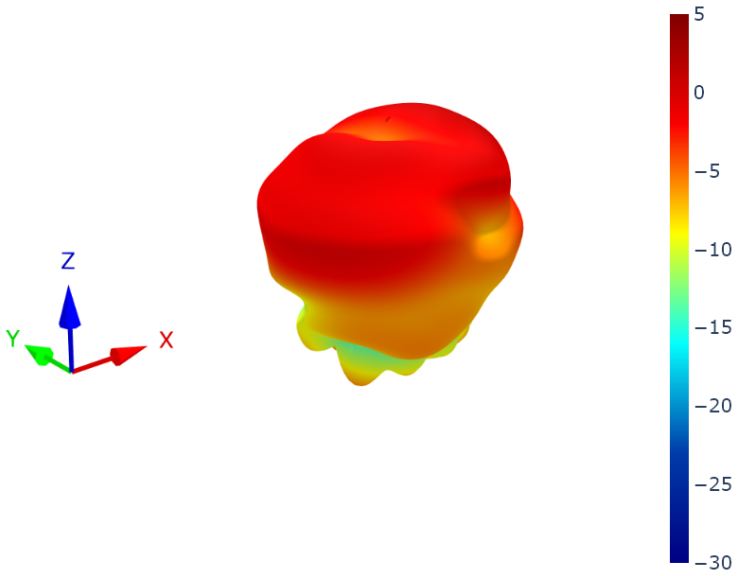


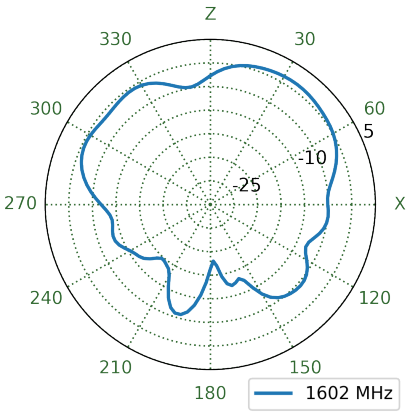
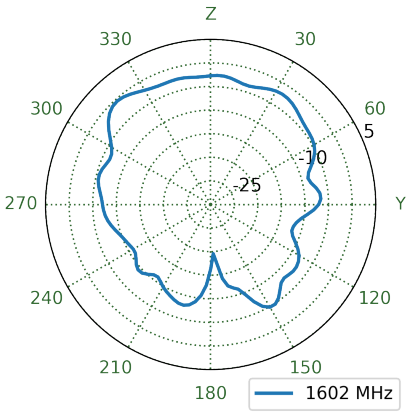
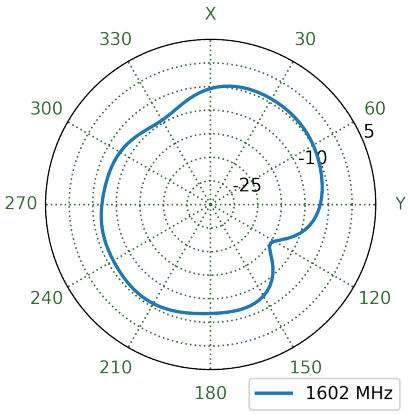
7.6 GNSS Free Space Patterns at 1602 MHz



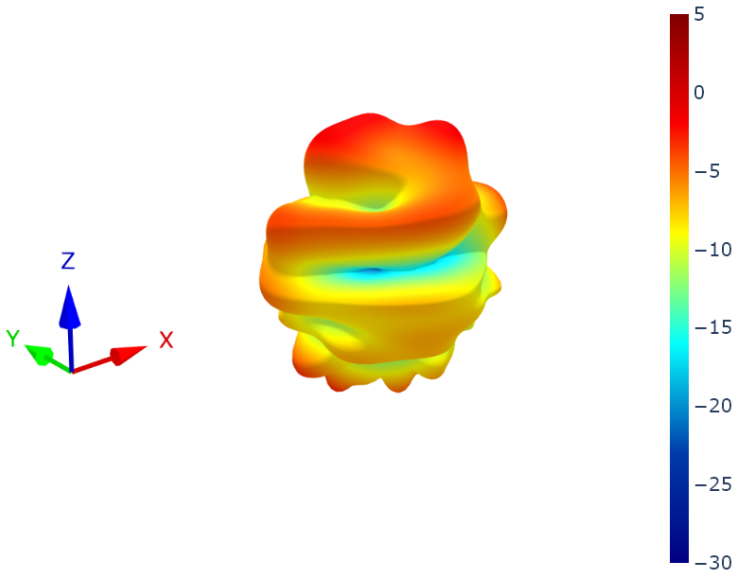
XZ Plane	YZ Plane	XY Plane
		

7.7 GNSS Ground Plane Patterns at 1602 MHz

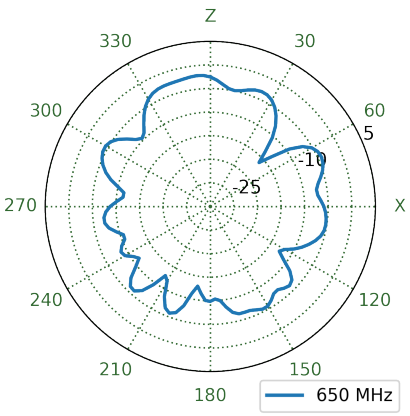


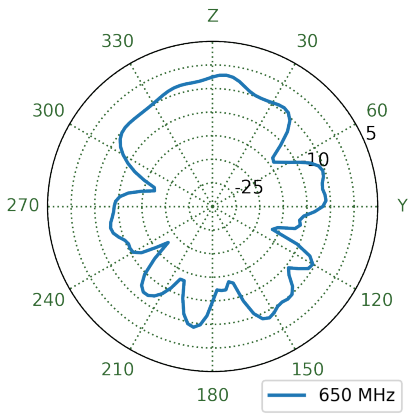
XZ Plane	YZ Plane	XY Plane
		

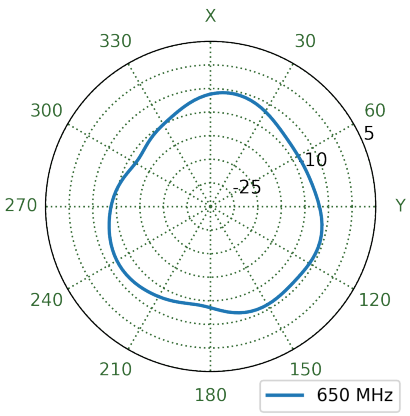
7.8 4G-5G 1 Free Space Patterns at 650 MHz



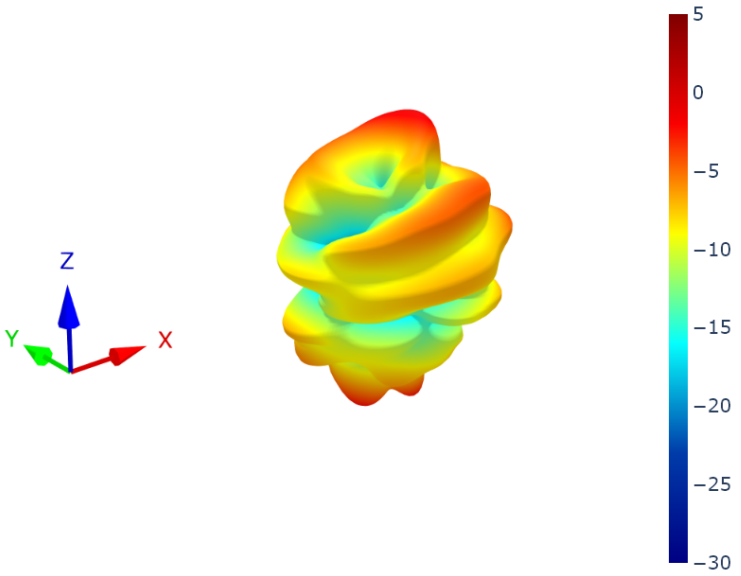
XZ Plane	YZ Plane	XY Plane

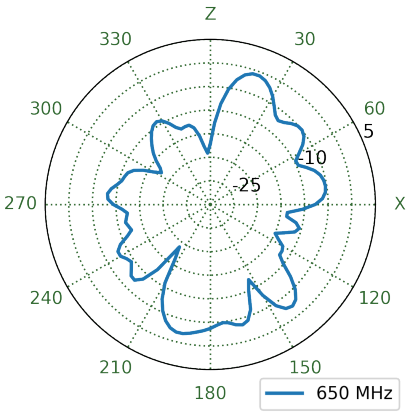
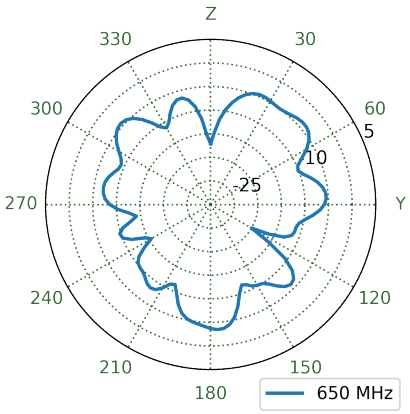
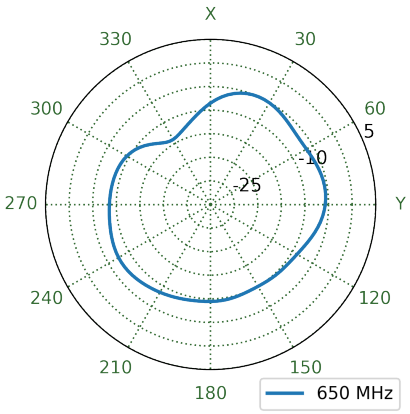




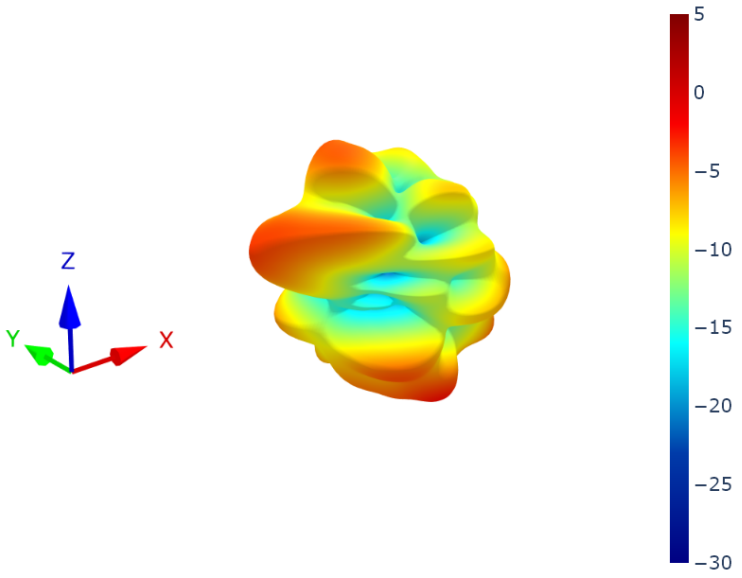


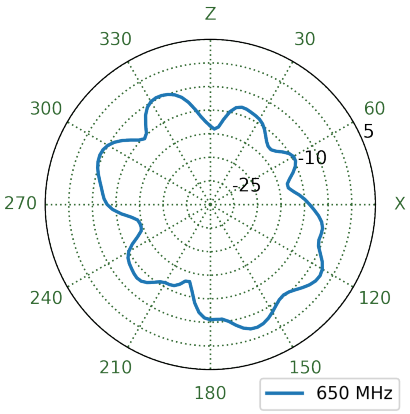
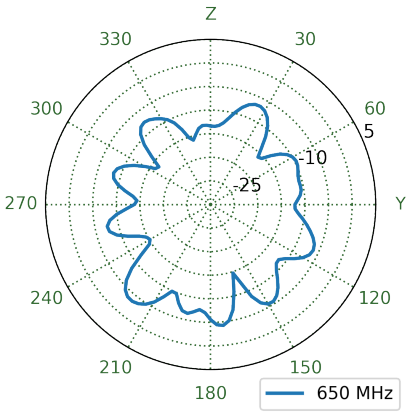
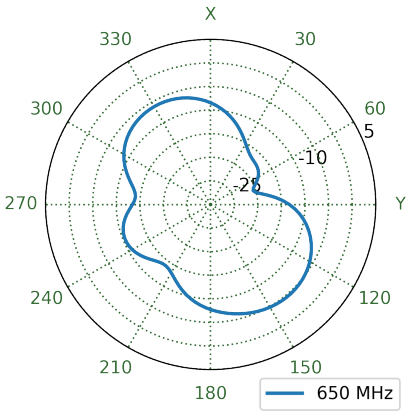
7.9 4G-5G 1 Ground Plane Patterns at 650 MHz



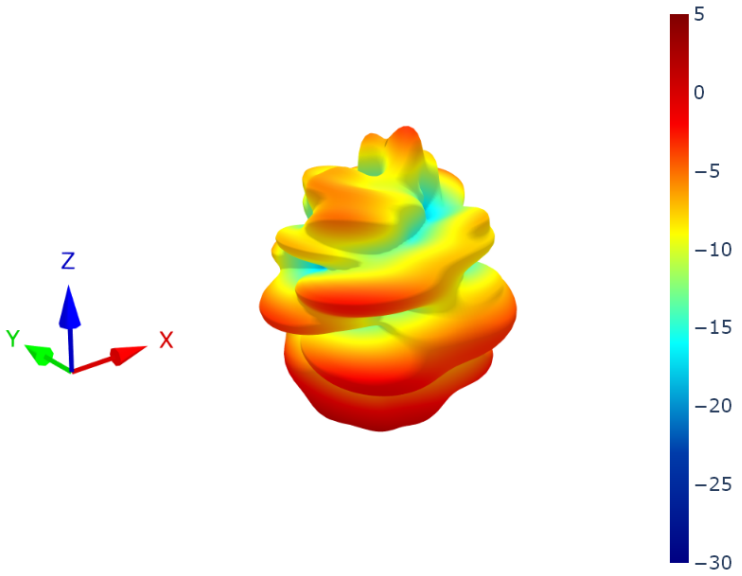
XZ Plane	YZ Plane	XY Plane
		

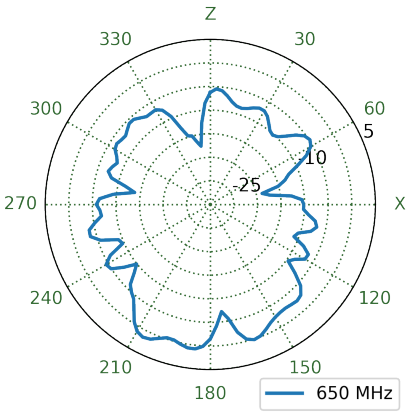
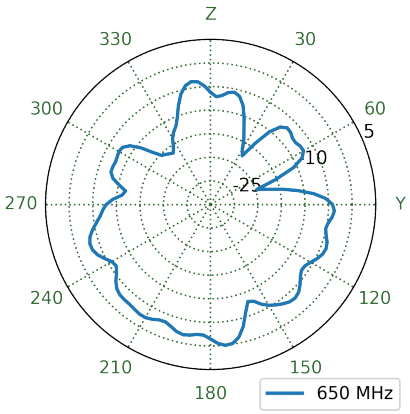
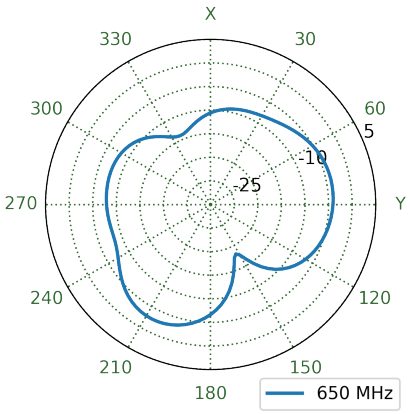
7.10 4G-5G 2 Free Space Patterns at 650 MHz



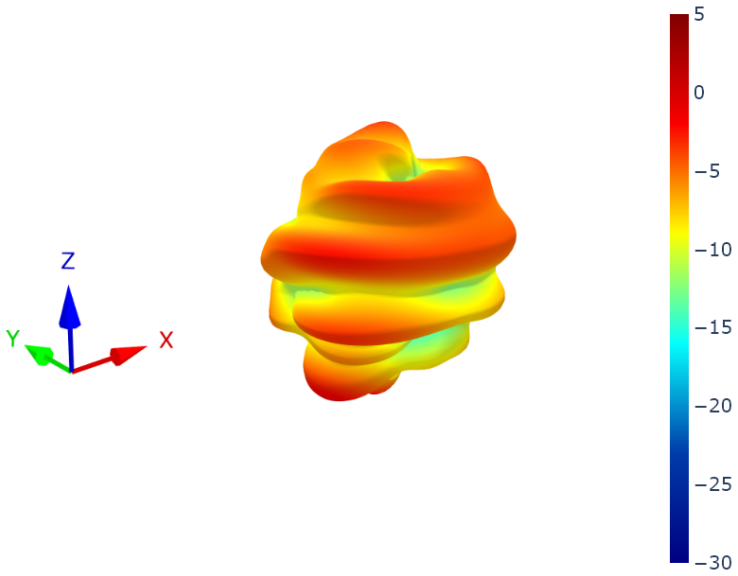
XZ Plane	YZ Plane	XY Plane
		

7.11 4G-5G 2 Ground Plane Patterns at 650 MHz

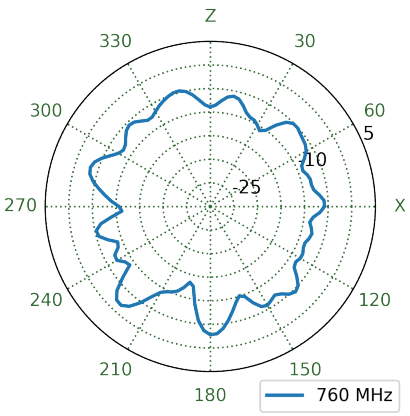


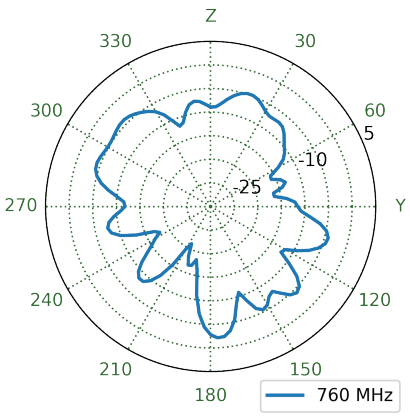
XZ Plane	YZ Plane	XY Plane
		

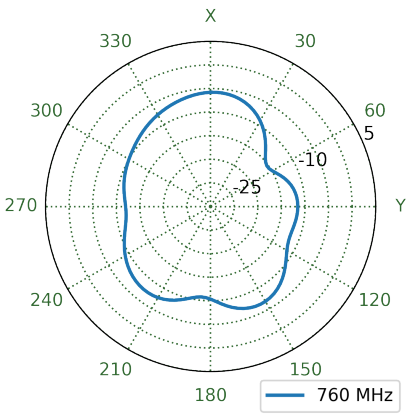
7.12 4G-5G 1 Free Space Patterns at 760 MHz



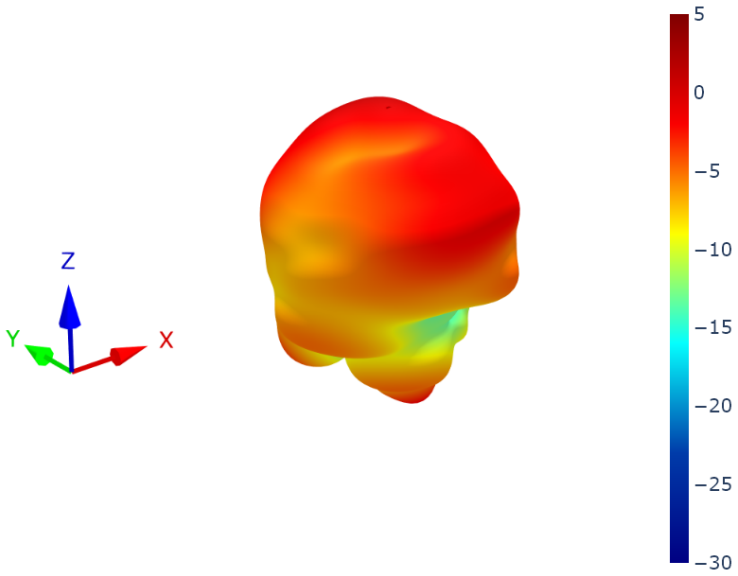
XZ Plane	YZ Plane	XY Plane



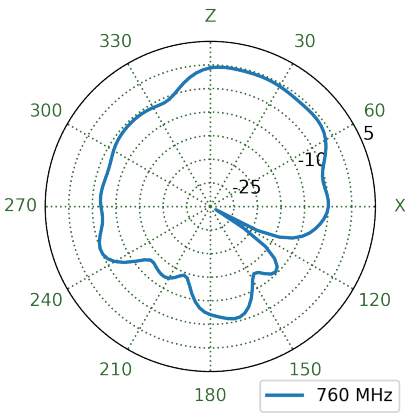


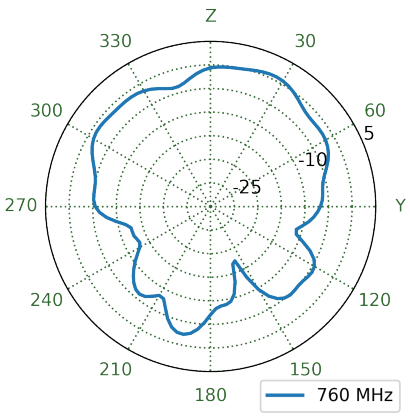


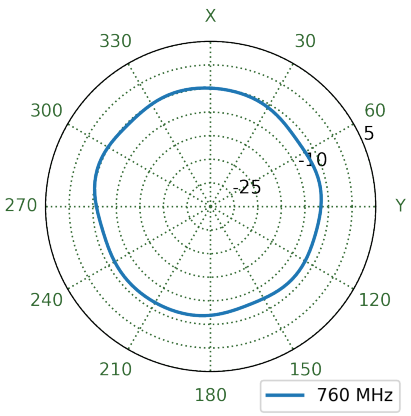
7.13 4G-5G 1 Ground Plane Patterns at 760 MHz



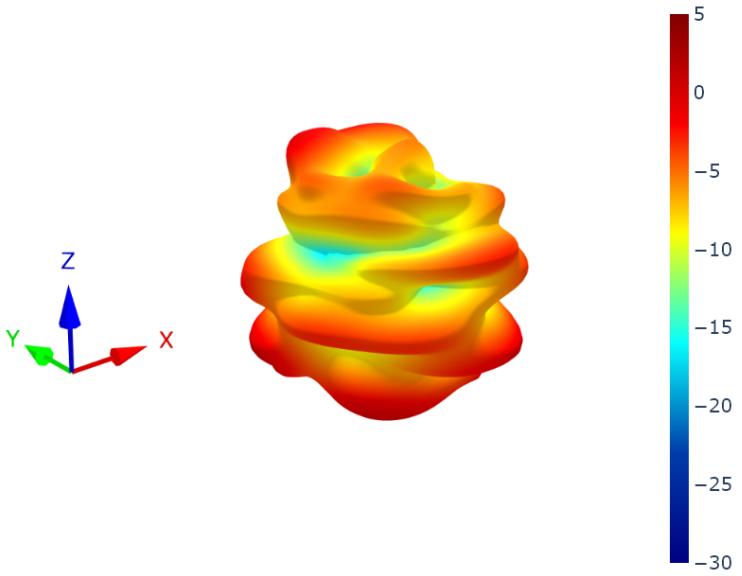
XZ Plane	YZ Plane	XY Plane

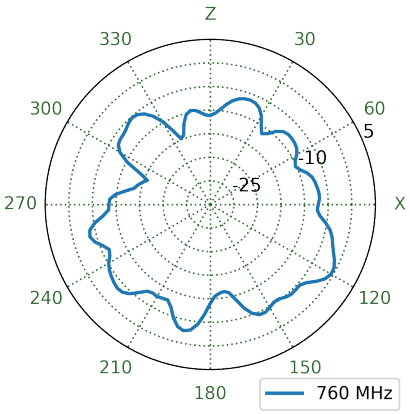
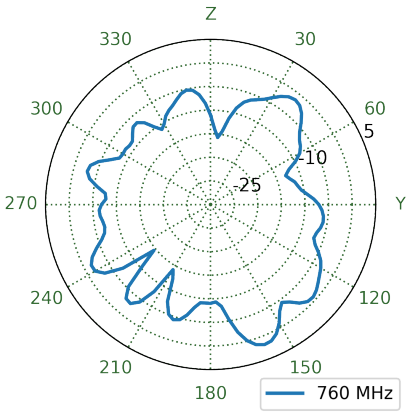
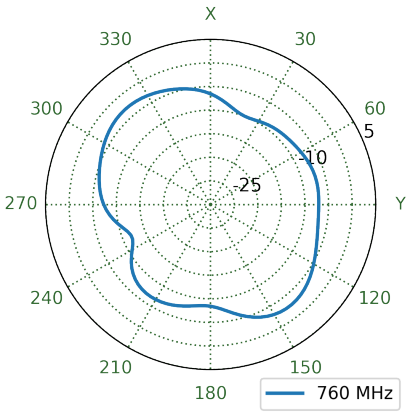




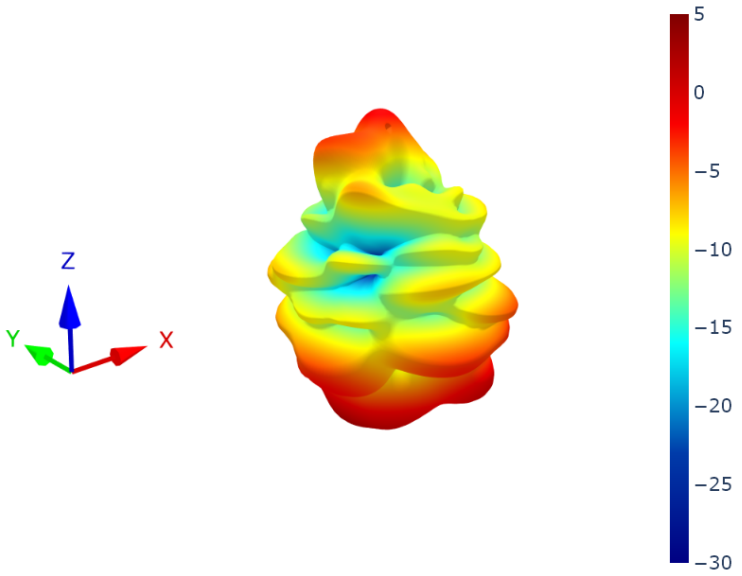


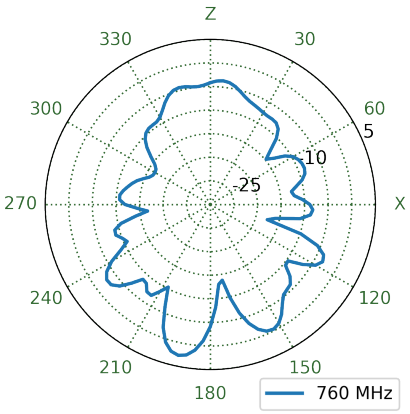
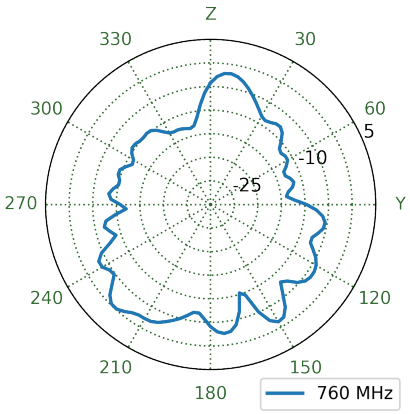
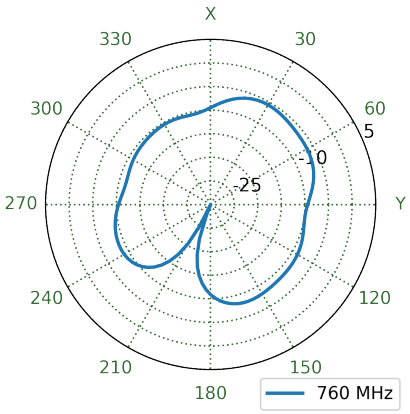
7.14 4G-5G 2 Free Space Patterns at 760 MHz



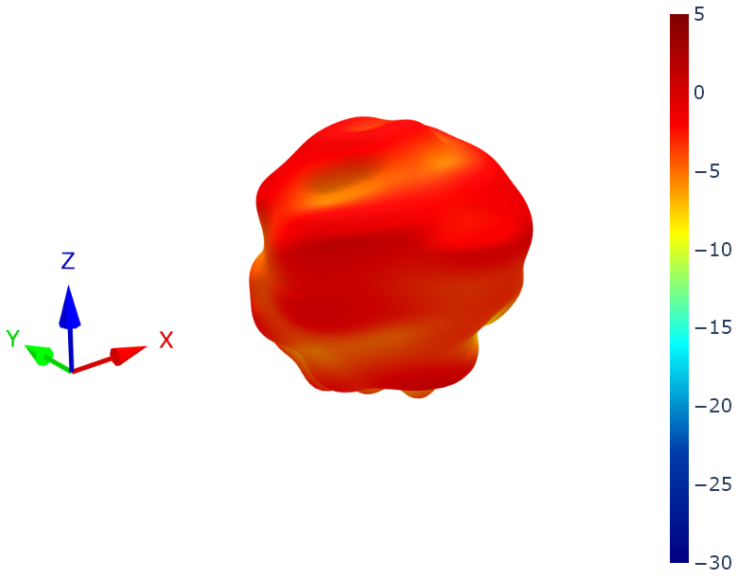
XZ Plane	YZ Plane	XY Plane
		

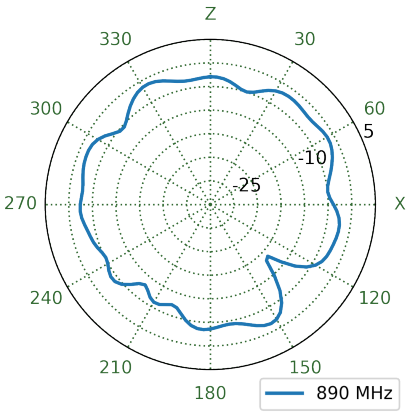
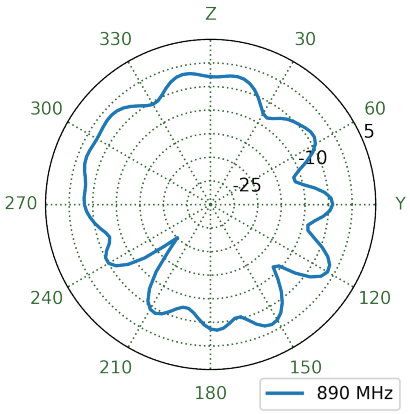
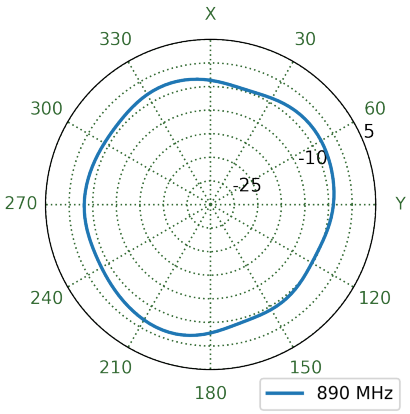
7.15 4G-5G 2 Ground Plane Patterns at 760 MHz



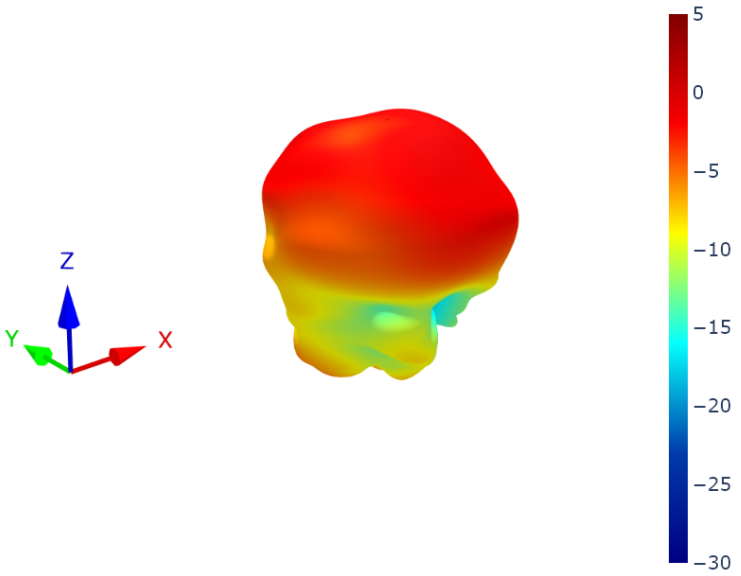
XZ Plane	YZ Plane	XY Plane
		

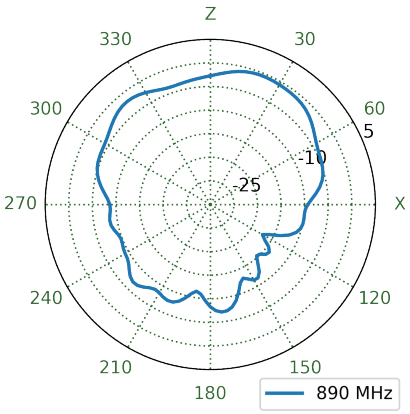
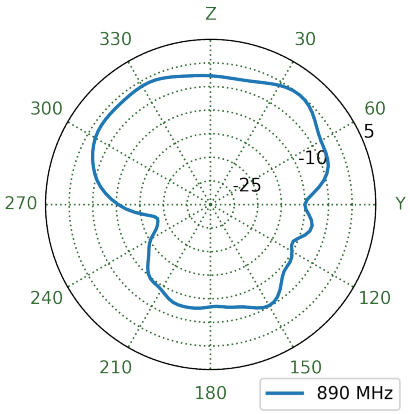
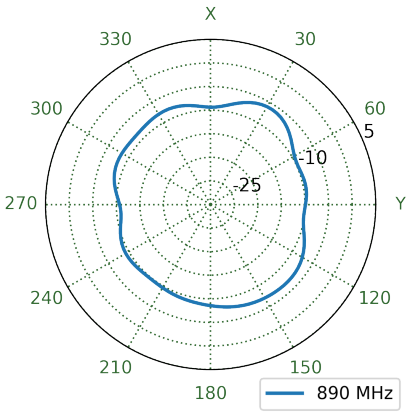
7.16 4G-5G 1 Free Space Patterns at 890 MHz



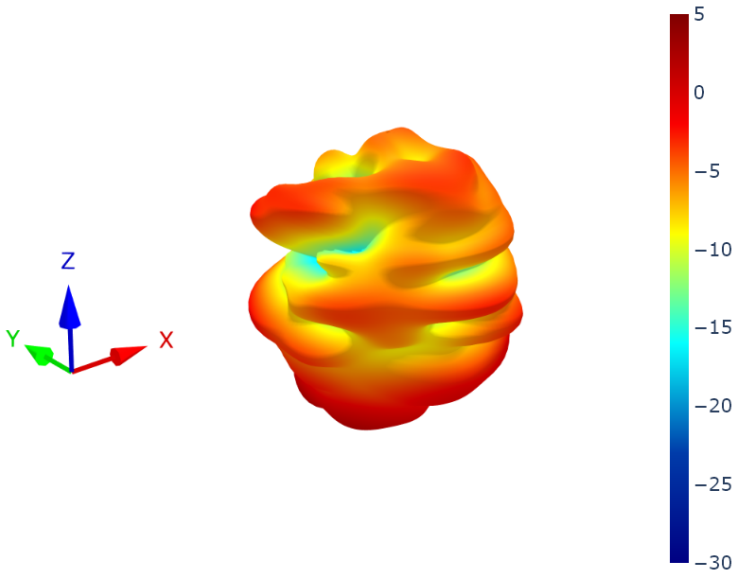
XZ Plane	YZ Plane	XY Plane
		

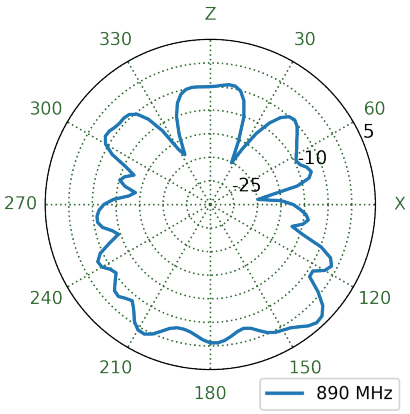
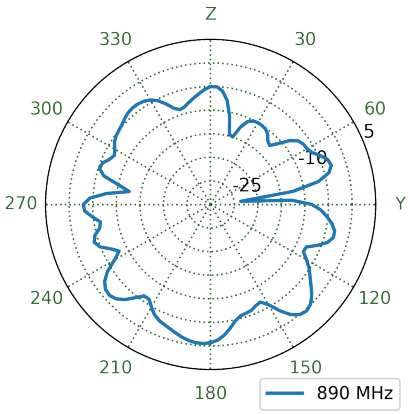
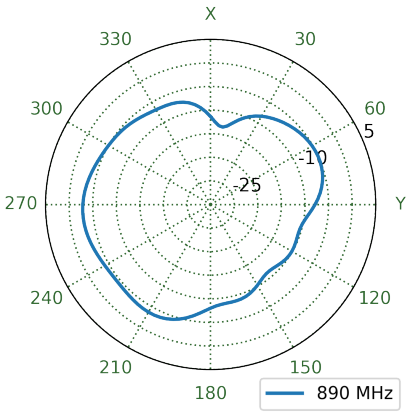
7.17 4G-5G 1 Ground Plane Patterns at 890 MHz



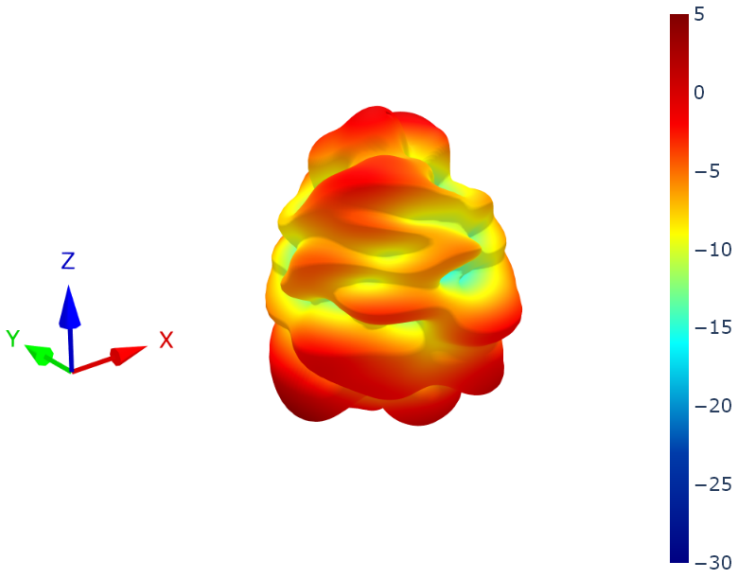
XZ Plane	YZ Plane	XY Plane
		

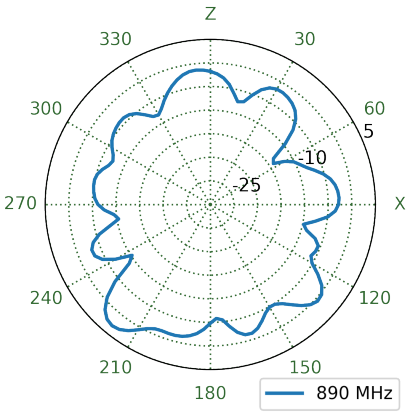
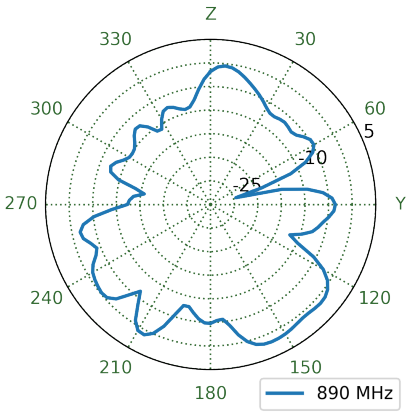
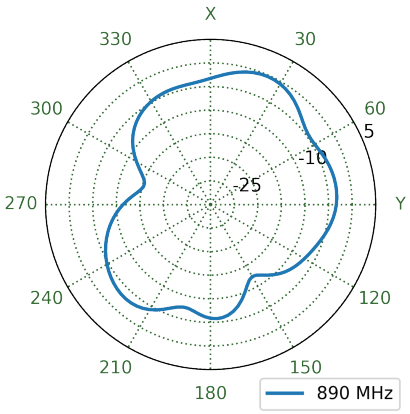
7.18 4G-5G 2 Free Space Patterns at 890 MHz



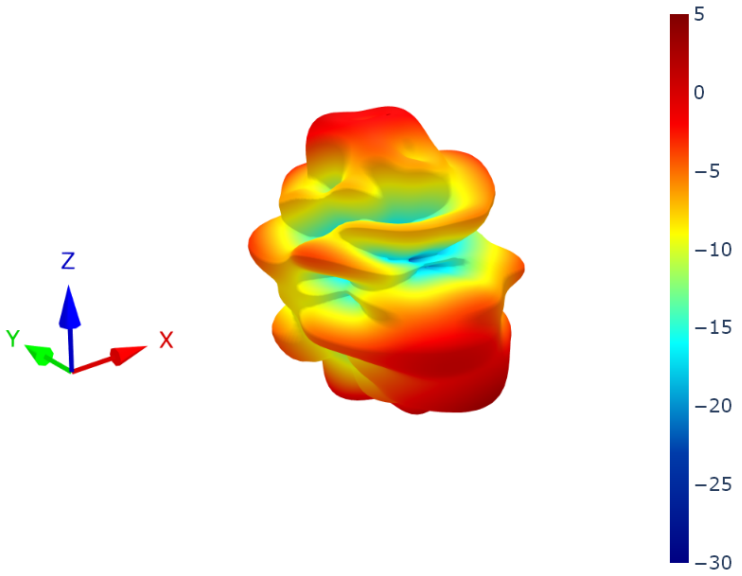
XZ Plane	YZ Plane	XY Plane
		

7.19 4G-5G 2 Ground Plane Patterns at 890 MHz

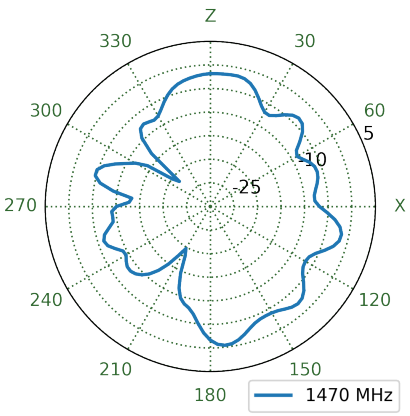


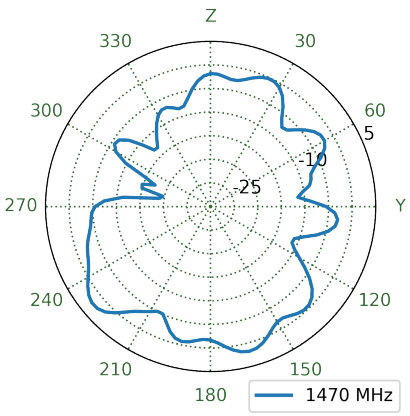
XZ Plane	YZ Plane	XY Plane
		

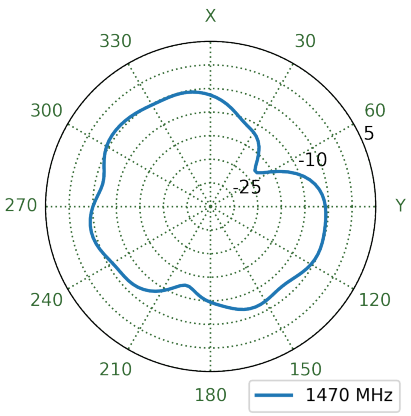
7.20 4G-5G 1 Free Space Patterns at 1470 MHz



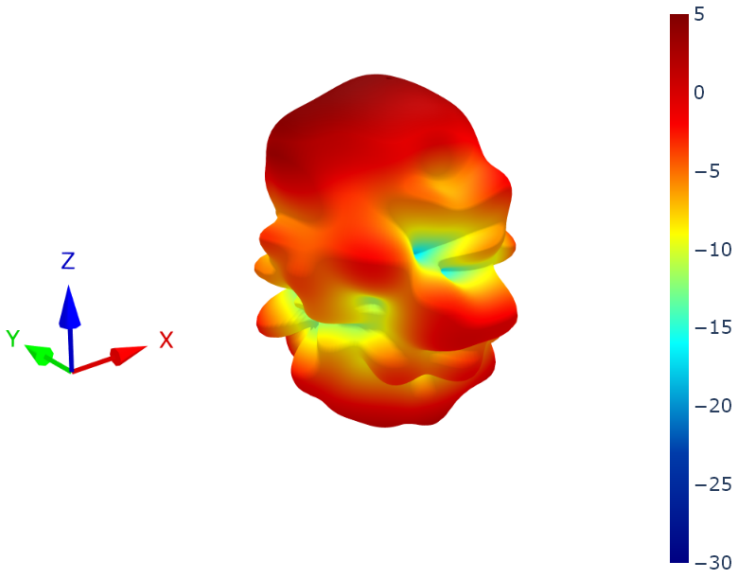
XZ Plane	YZ Plane	XY Plane

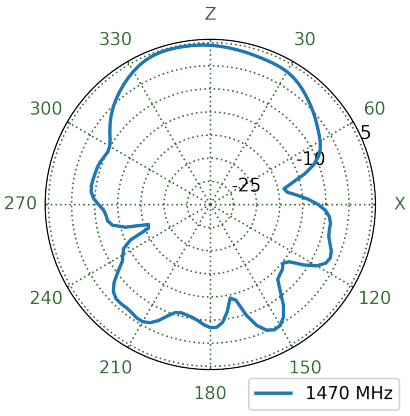
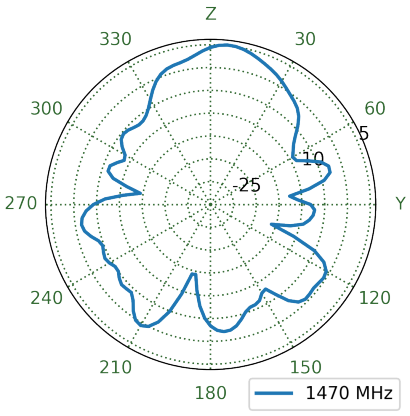
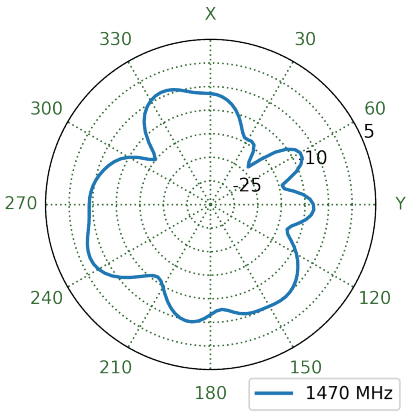




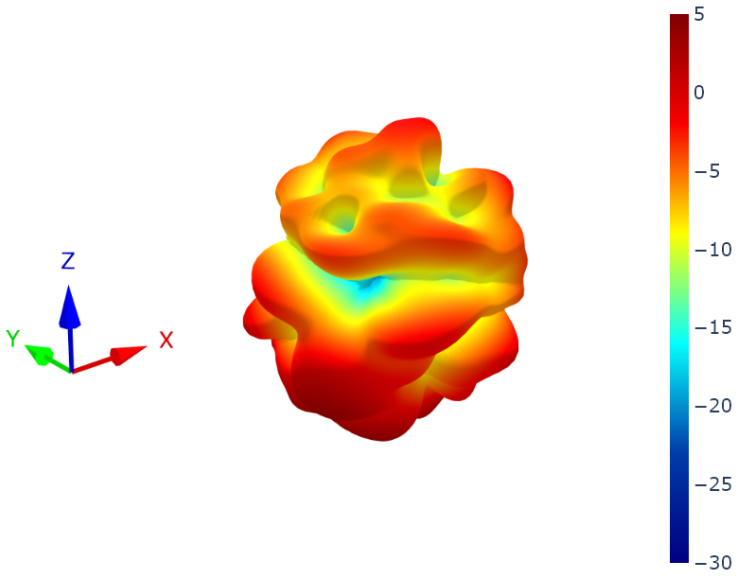


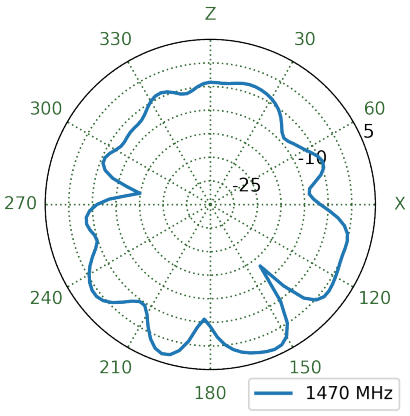
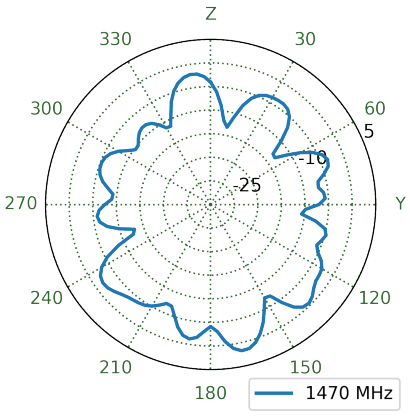
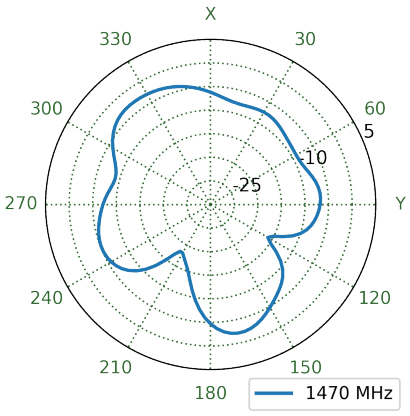
7.21 4G-5G 1 Ground Plane Patterns at 1470 MHz



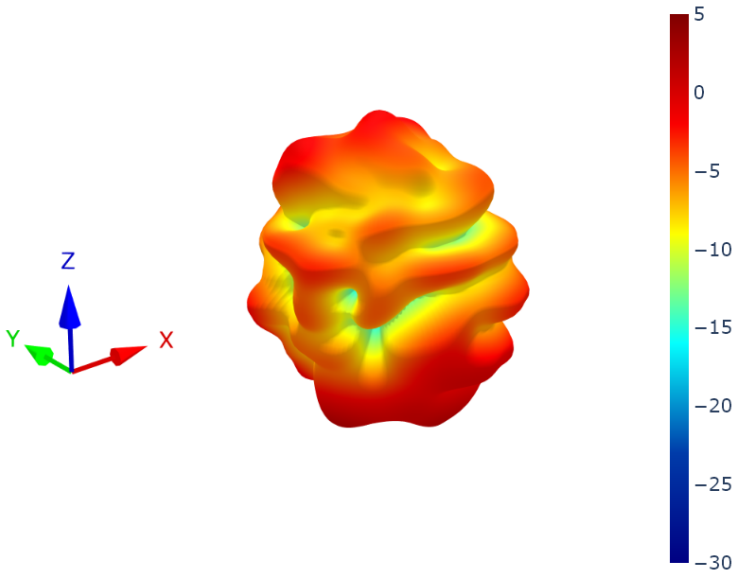
XZ Plane	YZ Plane	XY Plane
		

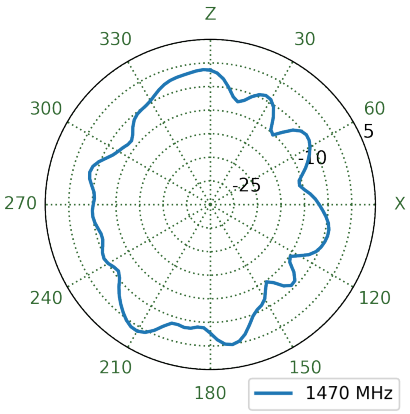
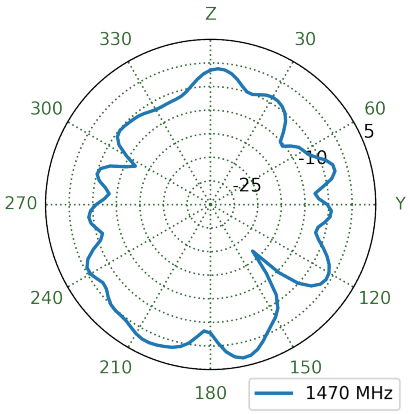
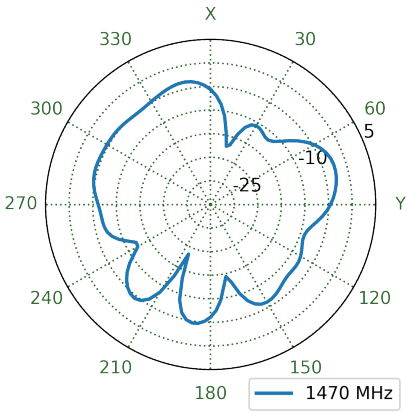
7.22 4G-5G 2 Free Space Patterns at 1470 MHz



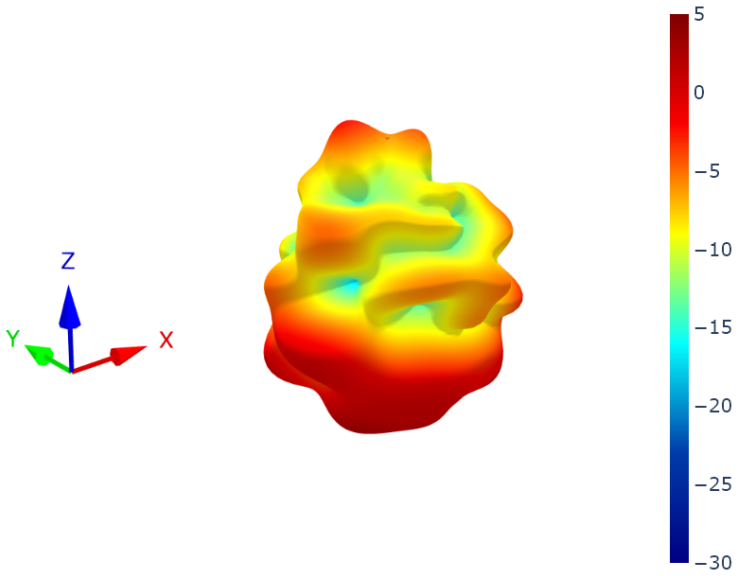
XZ Plane	YZ Plane	XY Plane
		

7.23 4G-5G 2 Ground Plane Patterns at 1470 MHz

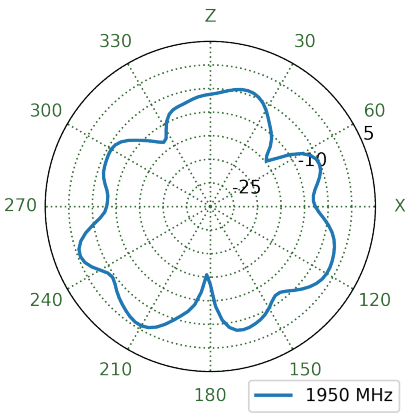


XZ Plane	YZ Plane	XY Plane
		

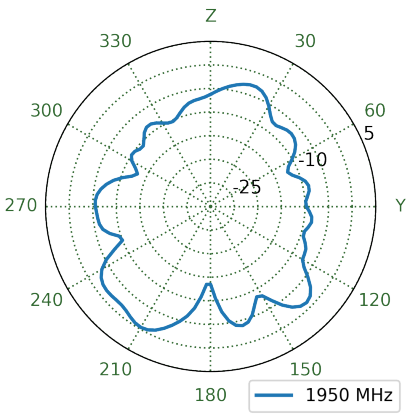
7.24 4G-5G 1 Free Space Patterns at 1950 MHz



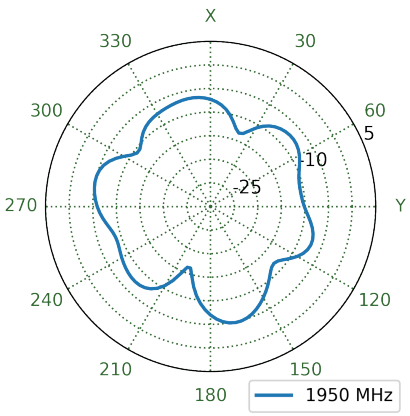
XZ Plane



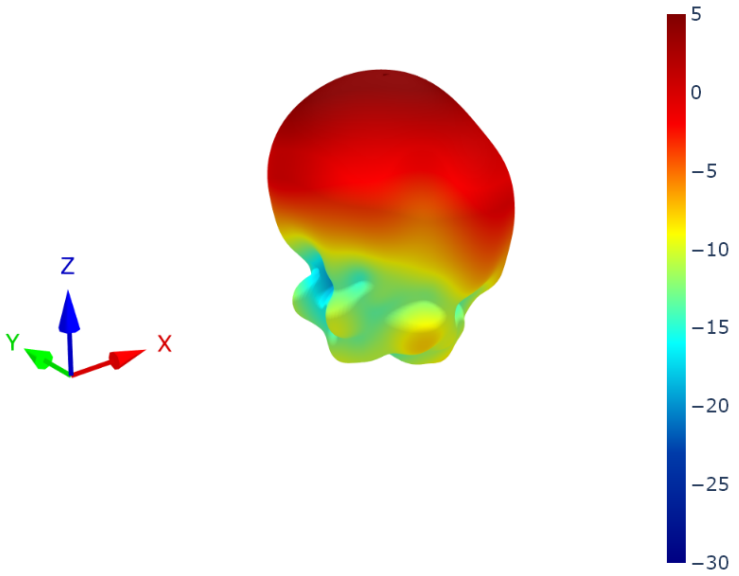
YZ Plane



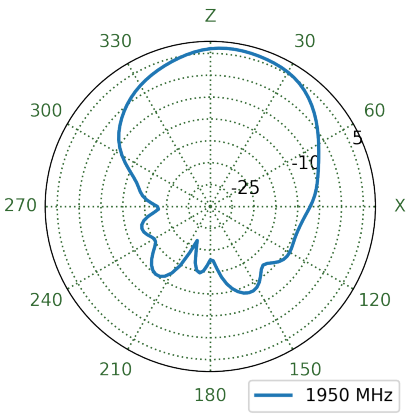
XY Plane

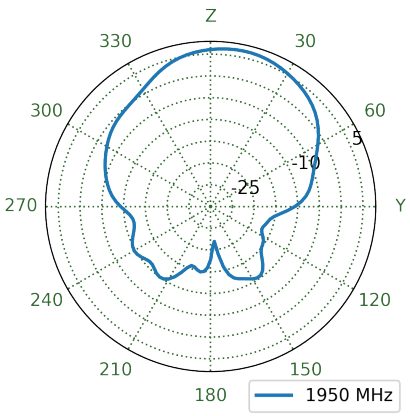


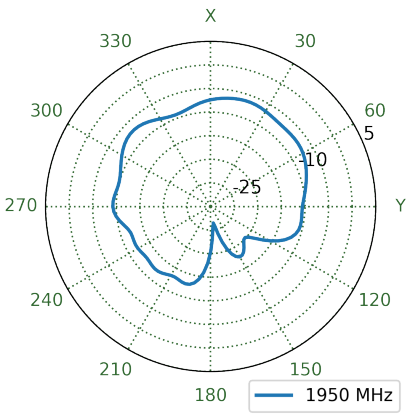
7.25 4G-5G 1 Ground Plane Patterns at 1950 MHz



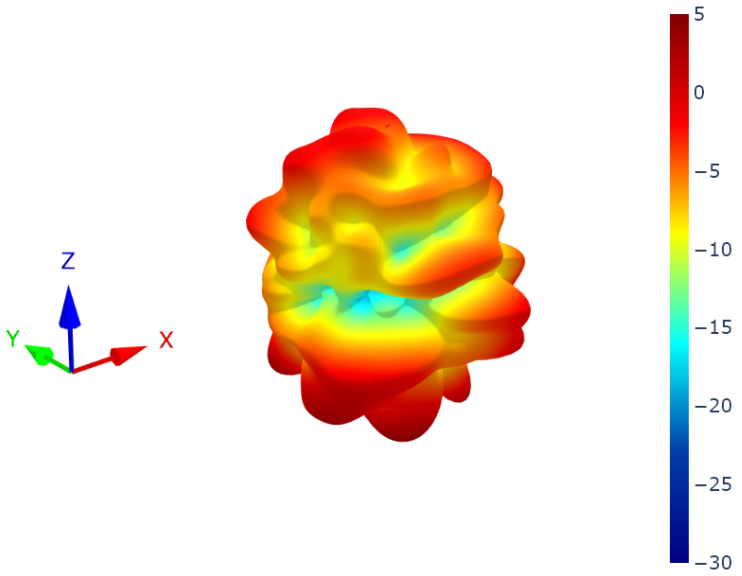
XZ Plane	YZ Plane	XY Plane

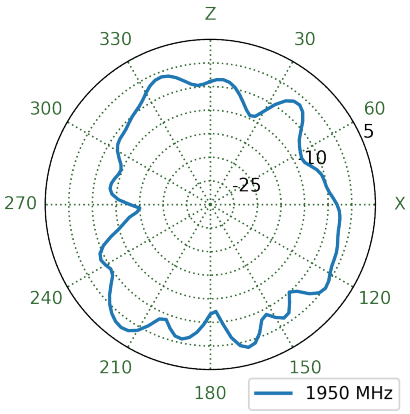
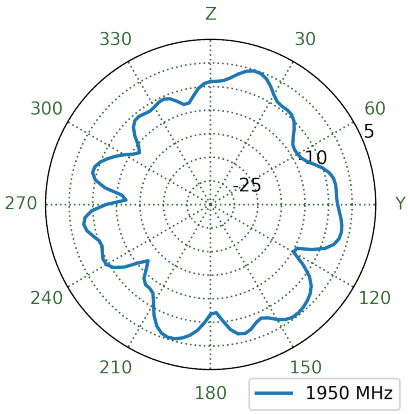
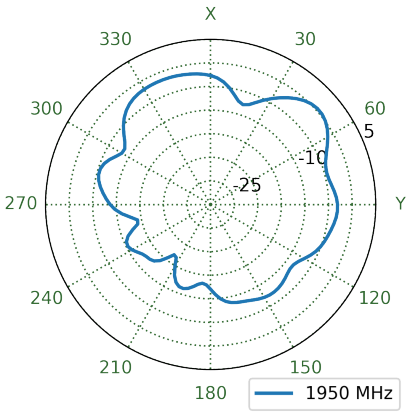




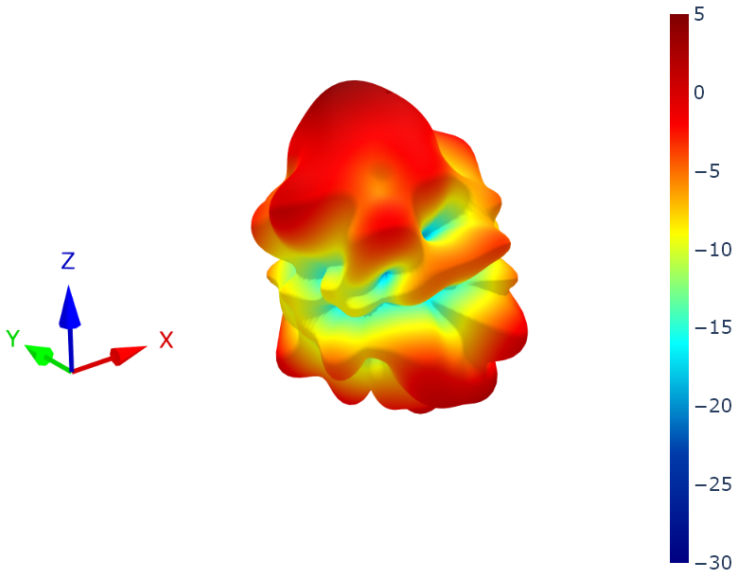


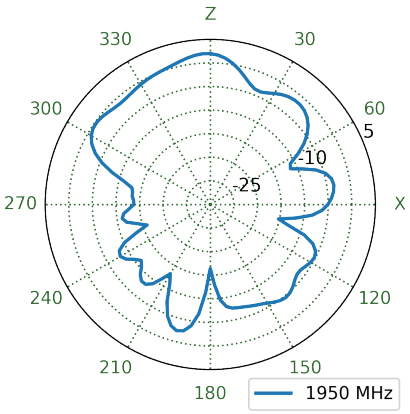
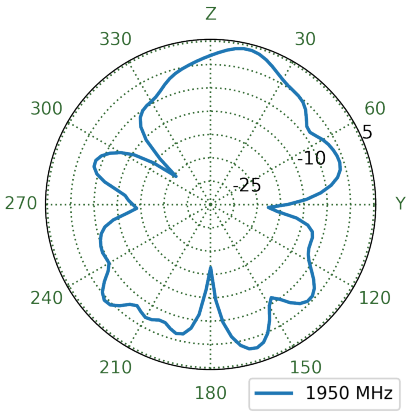
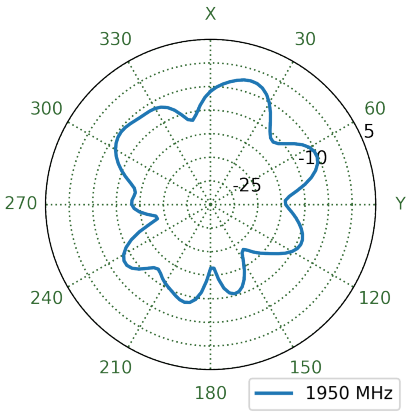
7.26 4G-5G 2 Free Space Patterns at 1950 MHz



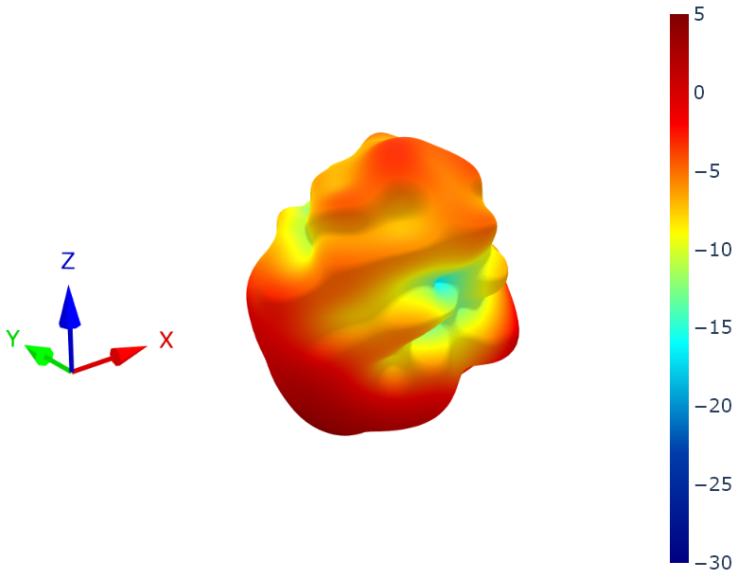
XZ Plane	YZ Plane	XY Plane
		

7.27 4G-5G 2 Ground Plane Patterns at 1950 MHz

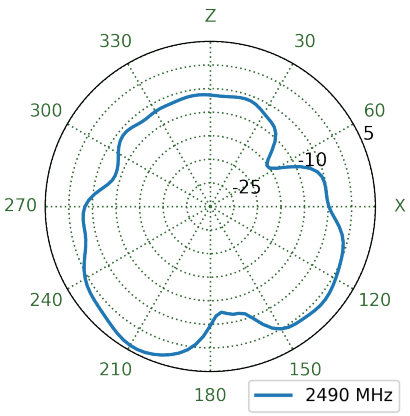


XZ Plane	YZ Plane	XY Plane
		

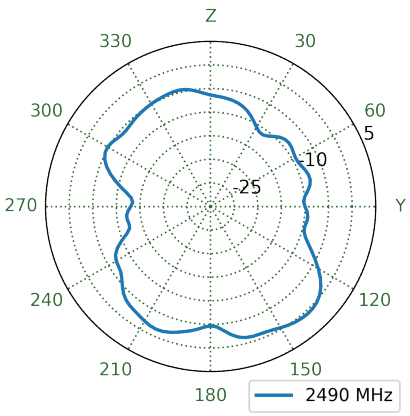
7.28 4G-5G 1 Free Space Patterns at 2490 MHz



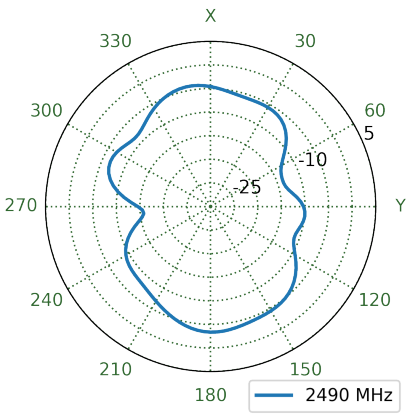
XZ Plane



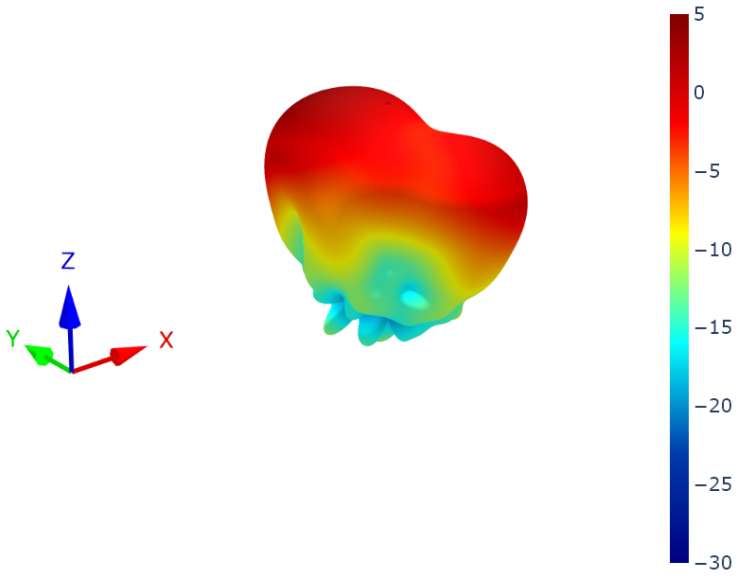
YZ Plane



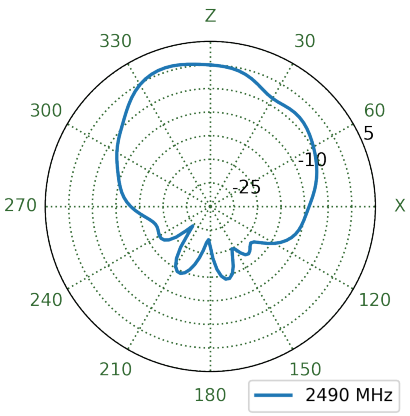
XY Plane

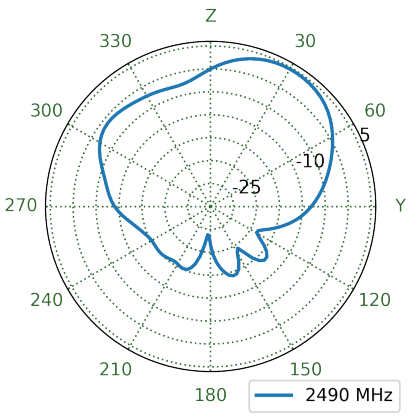


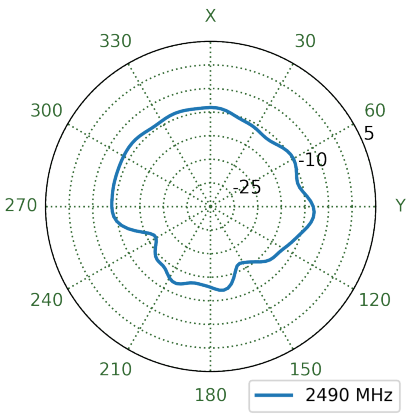
7.29 4G-5G 1 Ground Plane Patterns at 2490 MHz



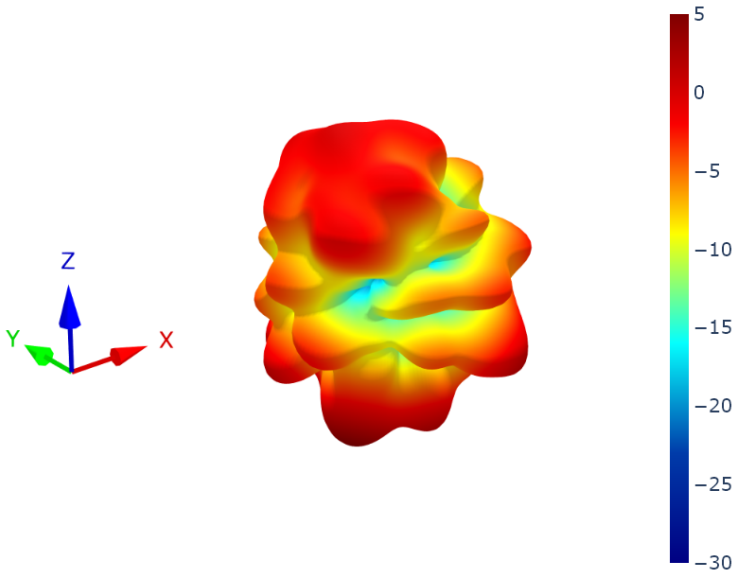
XZ Plane	YZ Plane	XY Plane



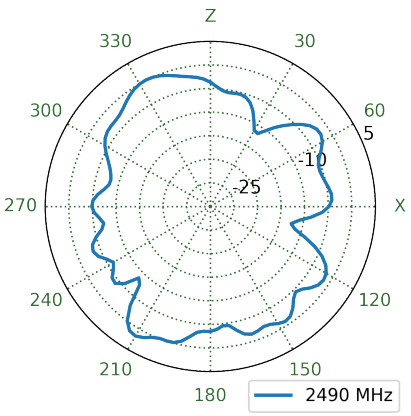


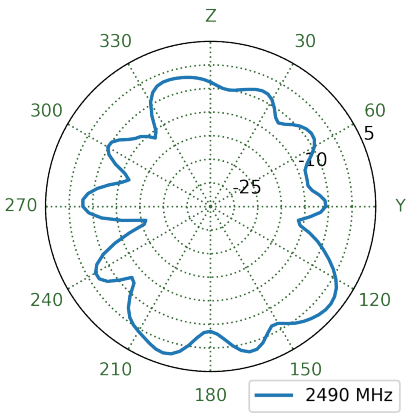


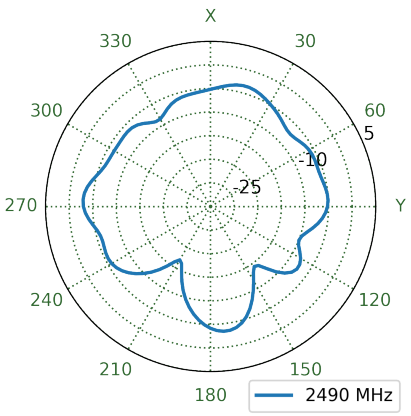
7.30 4G-5G 2 Free Space Patterns at 2490 MHz



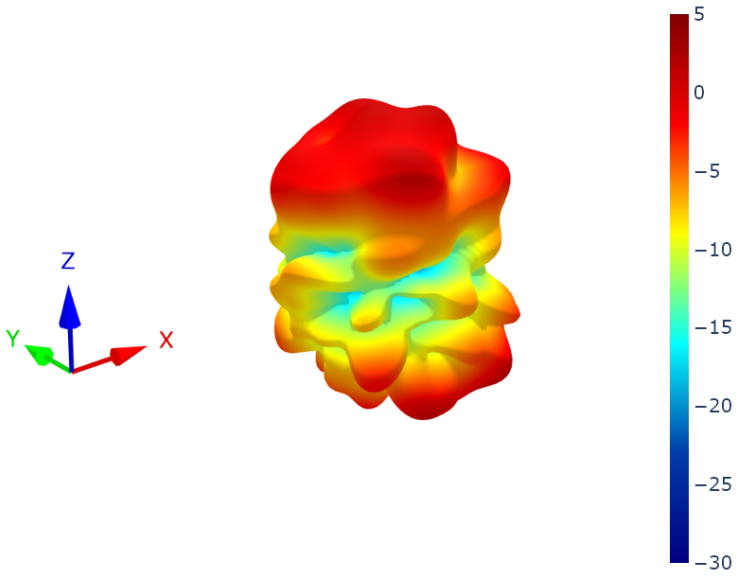
XZ Plane	YZ Plane	XY Plane



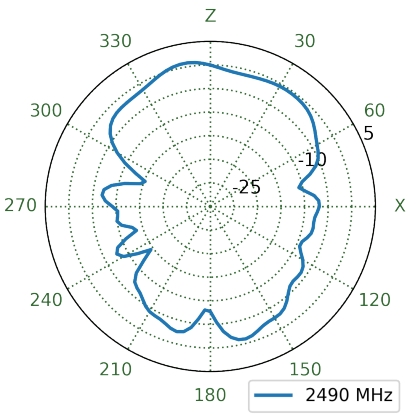


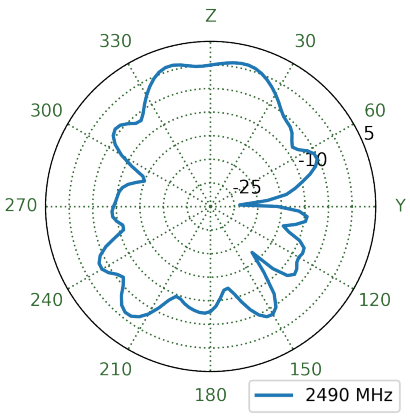


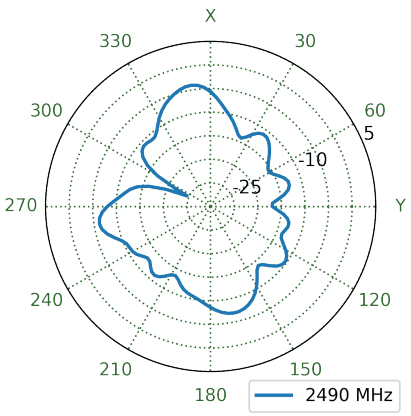
7.31 4G-5G 2 Ground Plane Patterns at 2490 MHz



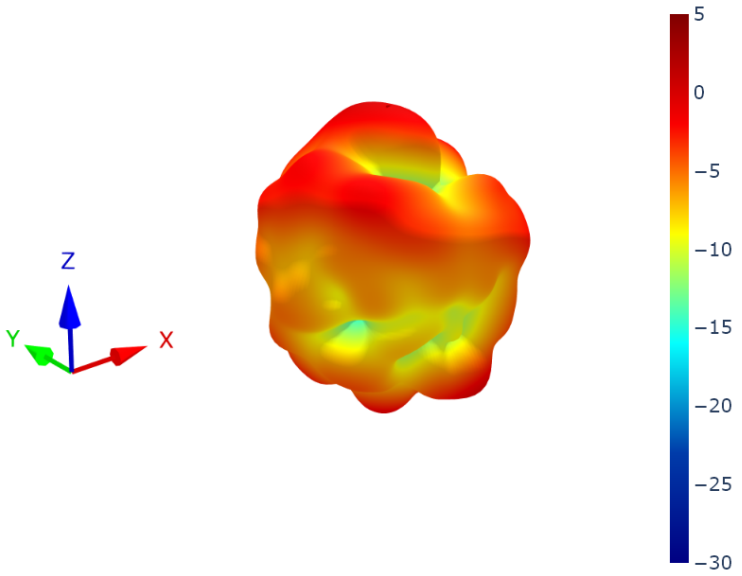
XZ Plane	YZ Plane	XY Plane

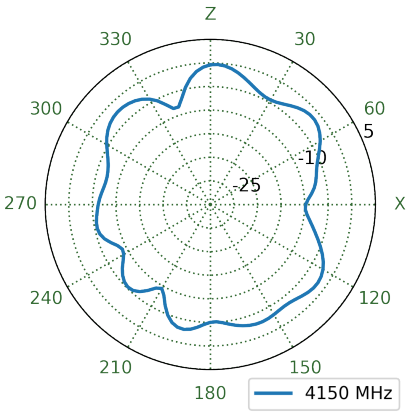
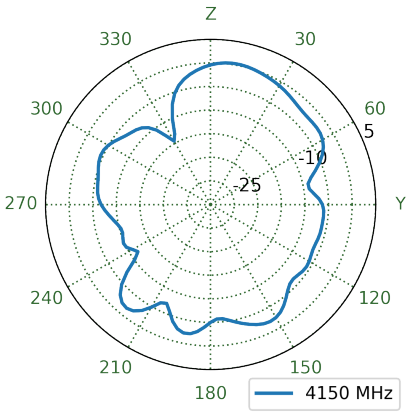
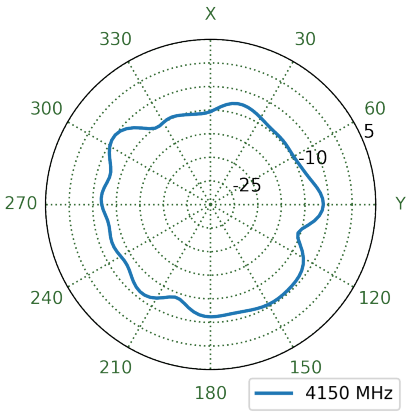




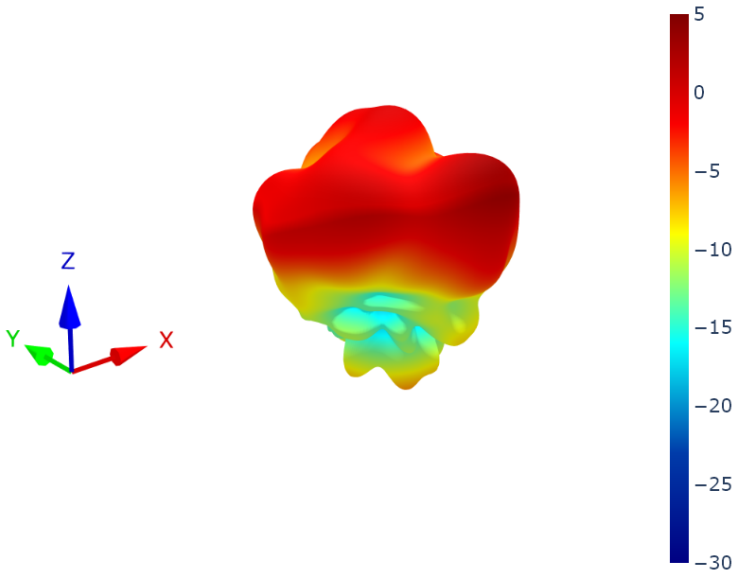


7.32 4G-5G 1 Free Space Patterns at 4150 MHz

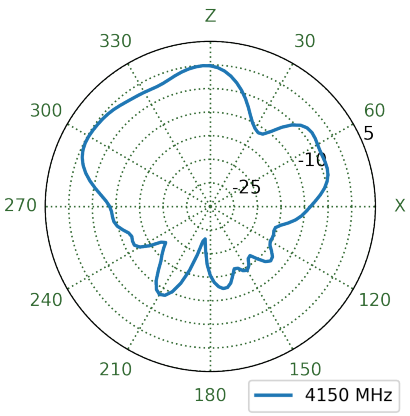


XZ Plane	YZ Plane	XY Plane
		

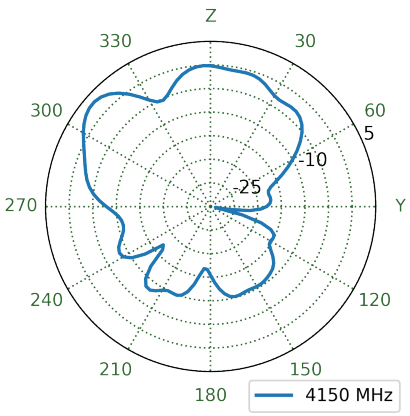
7.33 4G-5G 1 Ground Plane Patterns at 4150 MHz



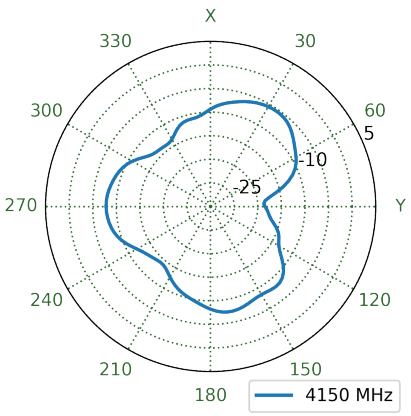
XZ Plane



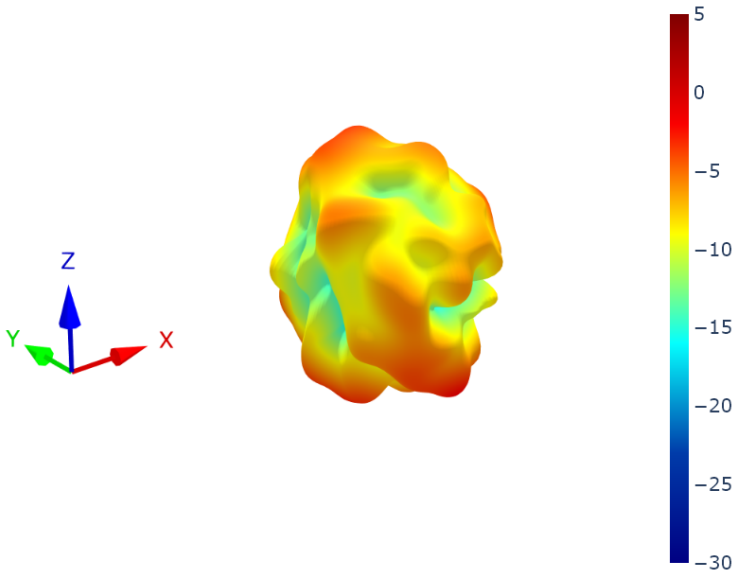
YZ Plane



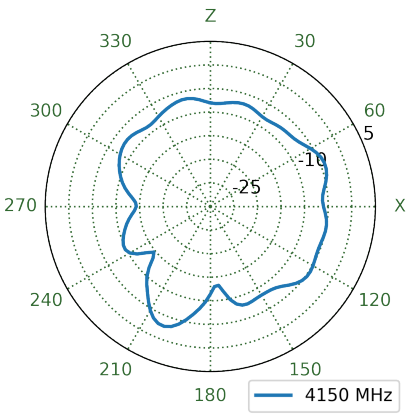
XY Plane

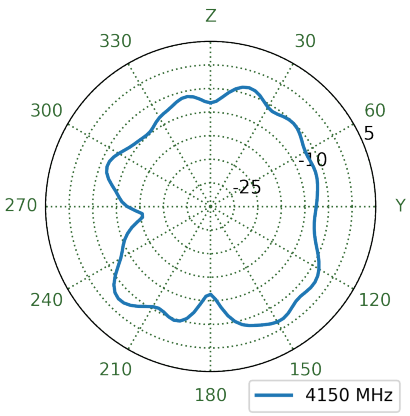


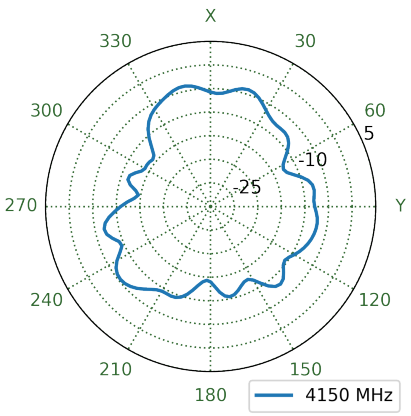
7.34 4G-5G 2 Free Space Patterns at 4150 MHz



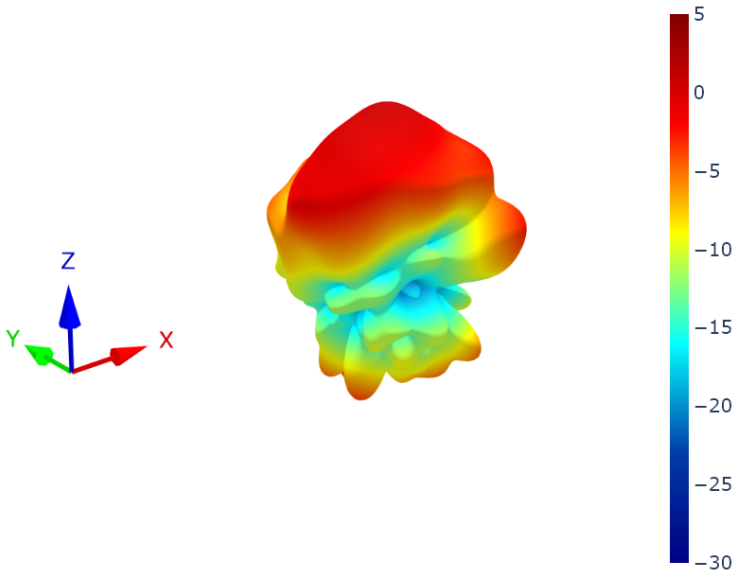
XZ Plane	YZ Plane	XY Plane

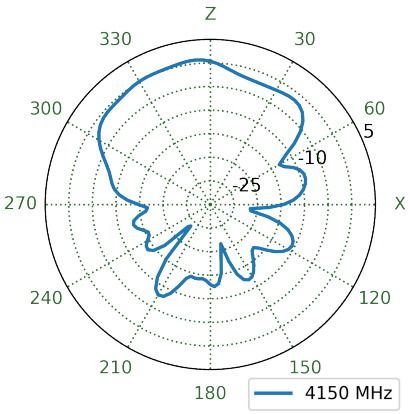
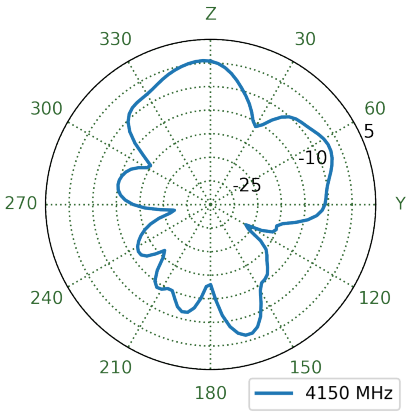
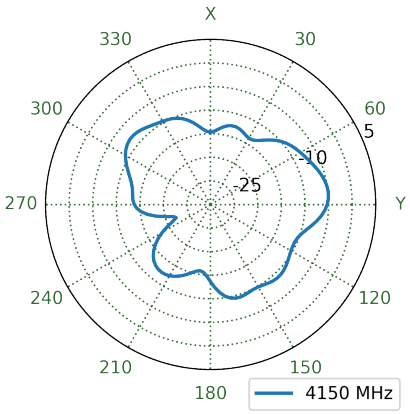




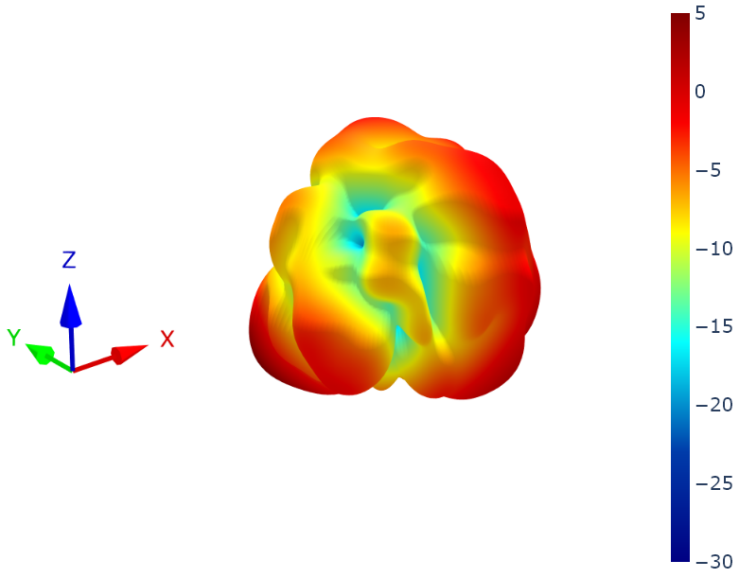


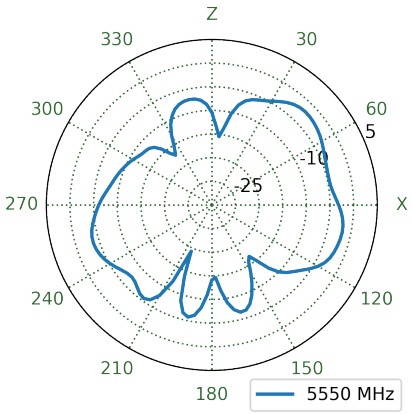
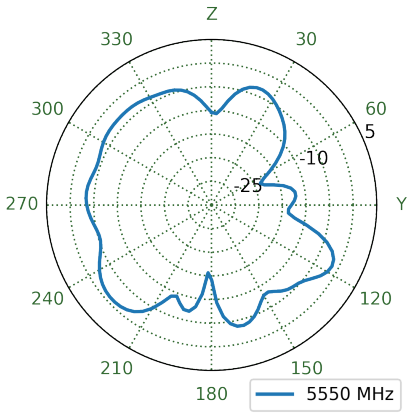
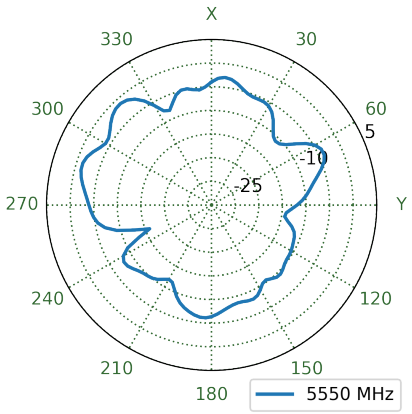
7.35 4G-5G 2 Ground Plane Patterns at 4150 MHz



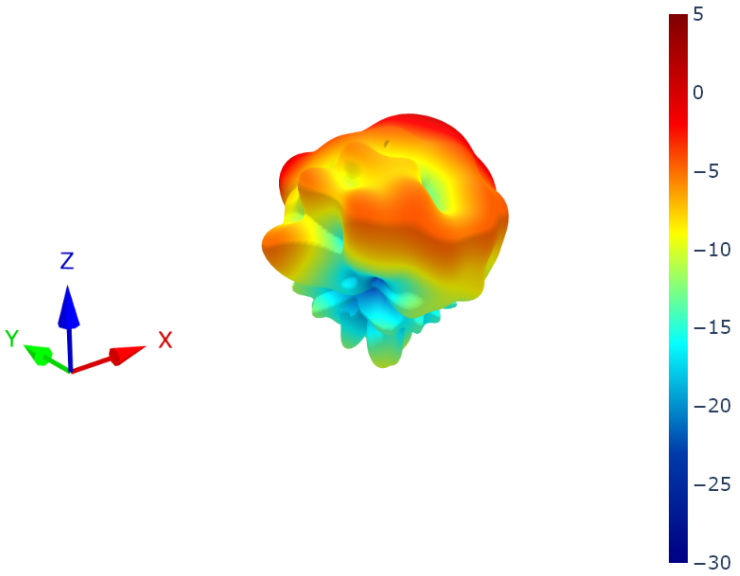
XZ Plane	YZ Plane	XY Plane
		

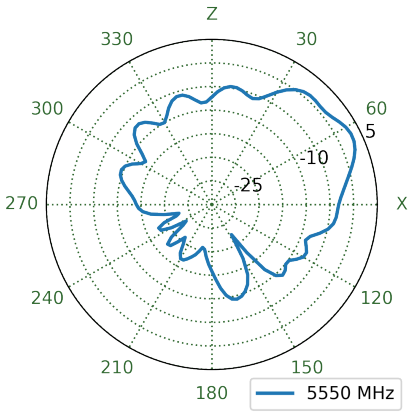
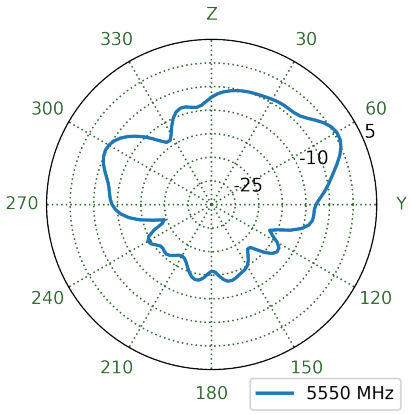
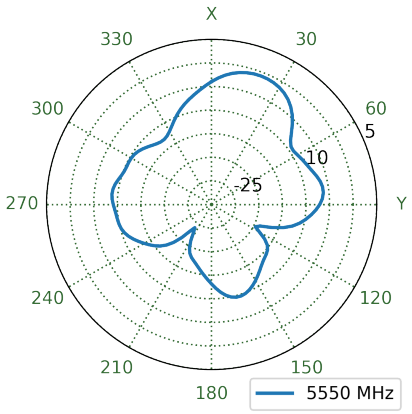
7.36 4G-5G 1 Free Space Patterns at 5550 MHz



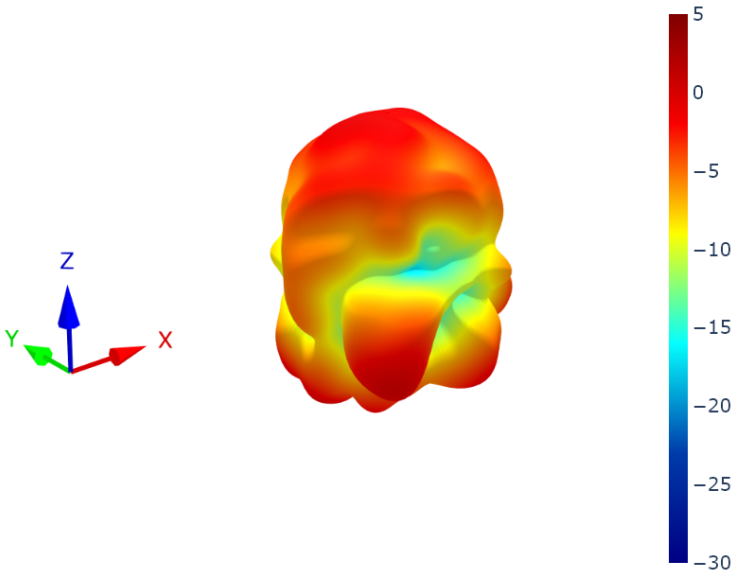
XZ Plane	YZ Plane	XY Plane
		

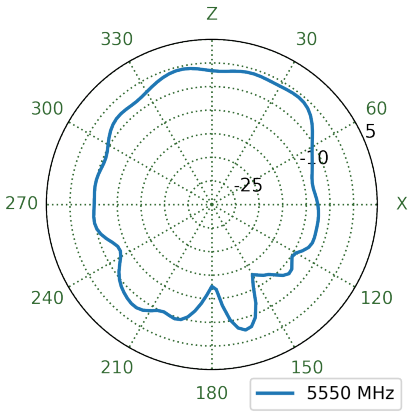
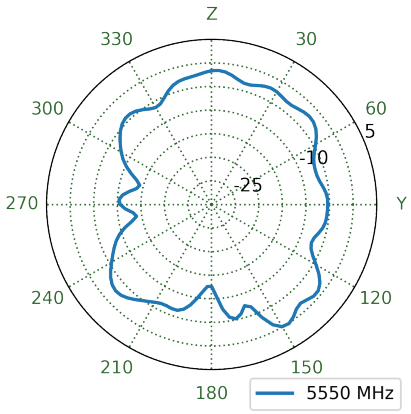
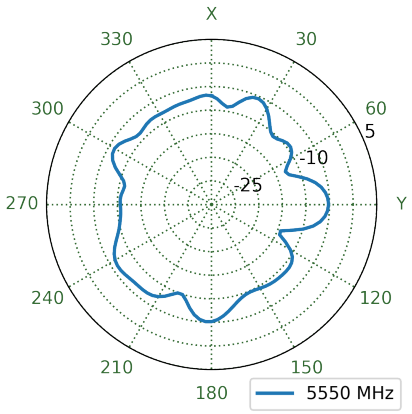
7.37 4G-5G 1 Ground Plane Patterns at 5550 MHz



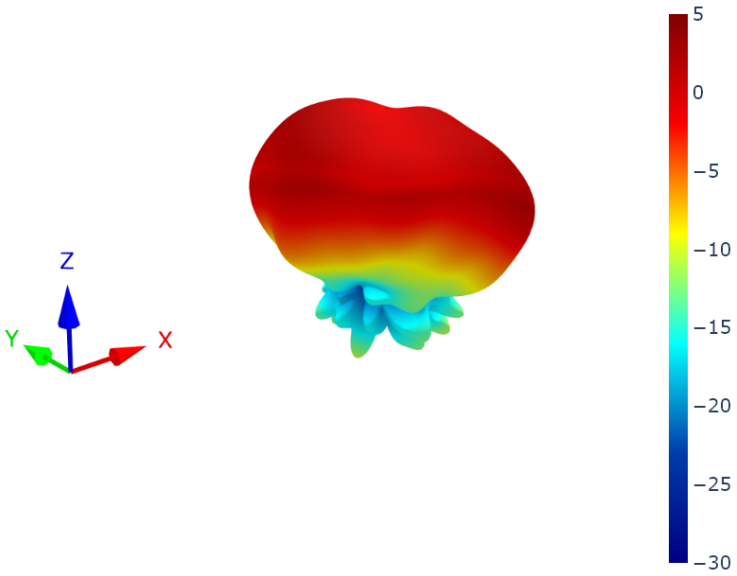
XZ Plane	YZ Plane	XY Plane
		

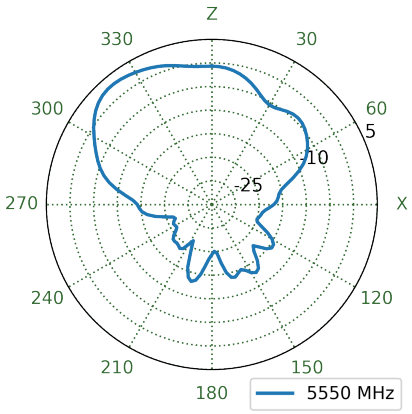
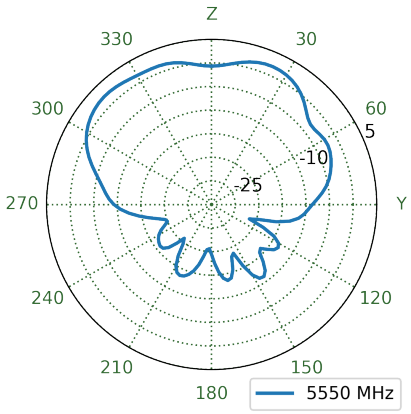
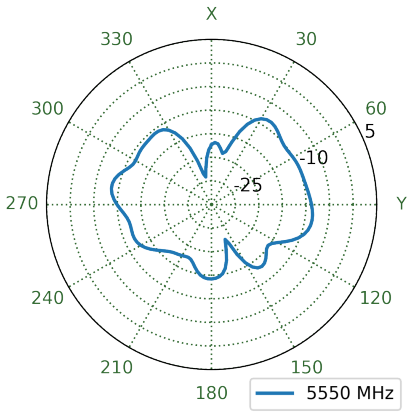
7.38 4G-5G 2 Free Space Patterns at 5550 MHz



XZ Plane	YZ Plane	XY Plane
		

7.39 4G-5G 2 Ground Plane Patterns at 5550 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-25-8-194 – MA581.A.001_MA581.W.001

Revision: A (Initial Release)	
Date:	2025-07-14
Notes:	Initial Datasheet Release
Author:	Gary West

Previous Revisions

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