TAOGLAS

Datasheet

Part No:
FXP301.A.001

Description

Super Compact Flex PCB Combination Antenna (105x20mm) for Cellular and GNSS with 150mm Black and White 1.37 Cable and I-PEX MHFI Connectors

Features:

Super Compact Flexible PCB Combination Antenna
1 * GNSS covering L1, B1I, G1 and L-Band
1 * Cellular covering 600MHz – 8000MHz
Cable: 150mm of 1.37 Coaxial
Connector: I-PEX MHFI
Dims: 105 x 20 x 0.24 mm
RoHS & Reach Compliant

1. Introduction

The **FXP301** Flexible PCB Combination Antenna is a high-performance, ultra-thin antenna designed to cover Cellular (600 MHz–8000 MHz) and GNSS (L1, B1I, G1, and L-Band) frequencies. With its super compact flexible polymer construction (105 x 20 x 0.24 mm), the FXP301 provides excellent efficiency, ground-plane independence, and easy integration into compact wireless devices ideal for applications requiring robust global connectivity across multiple wireless technologies. Flex PCB material is also a better option for use in devices where vibration may occur such as drones or UAV's.

By integrating Cellular and GNSS capabilities into a single compact plane, designers can incorporate advanced wireless communication and precise positioning into their products without needing multiple antennas with a space-saving and cost-efficient solution. Two cables are easier to manage and reduce clutter and assembly labour time. Replacing two separate antennas also reduces cost and the number of BOM components and reduces potential points of mechanical or electrical failure.

Typical Applications:

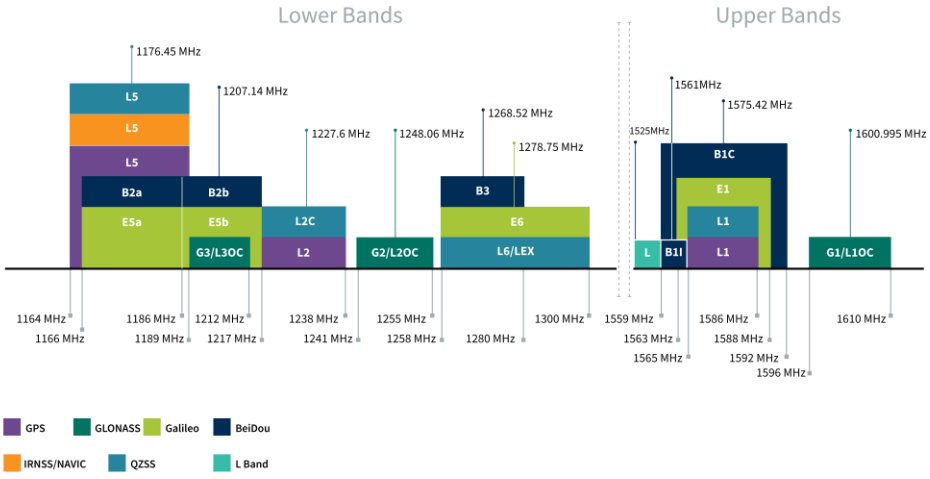
- Asset tracking and Telematics
- E-Mobility
- Smart agriculture
- Connected healthcare devices and Wearables

Installation is quick and simple with a "peel-and-stick" 3M adhesive backing, enabling secure mounting on non-metal surfaces such as plastic or glass. With peak gains ranging from 1 to 4 dBi across Cellular and GNSS bands, the FXP301 allows designers to cover multiple frequency ranges with a single antenna, reducing cost, complexity, and time-to-market.

The antenna is supplied with a pre-assembled cable and connector for plug-and-play integration, both of which can be customized to meet specific project requirements. Different cable colours are available to simplify identification and streamline the assembly process during production, helping ensure efficient installation and minimizing connection errors. For further optimization to customer-specific device environments, and for support in integrating and testing antenna performance within your device, please contact your regional Taoglas Customer Support Team.

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

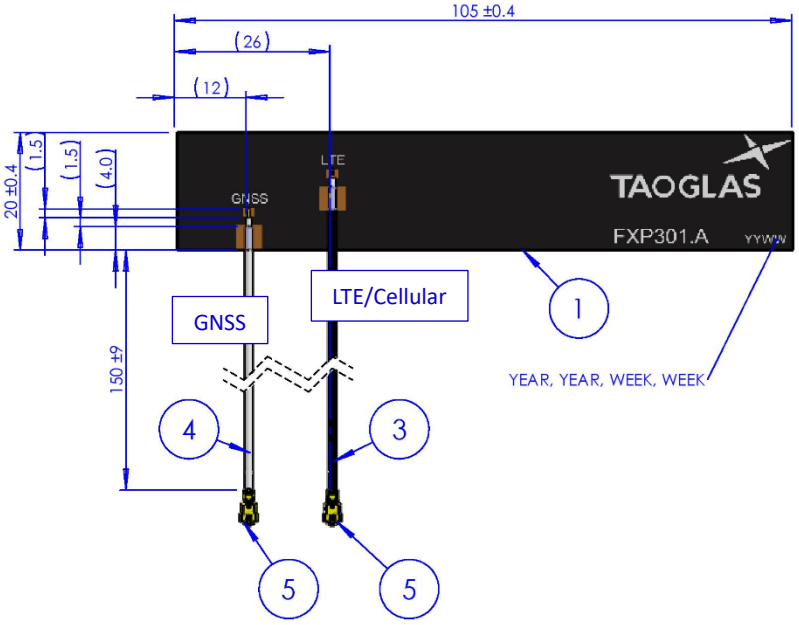
GNSS Electrical				
Frequency (MHz)	**1542**	**1561**	**1575.42**	**1602**
VSWR (max.)	1.5:1	1.5:1	1.5:1	2:1
Efficiency (%)	39.0	38.4	36.2	31.2
Average Gain (dB)	-4.10	-4.16	-4.41	-5.06
Peak Gain (dBi)	0.85	0.90	0.79	0.25
Polarization	Linear			
Impedance	50 Ω			

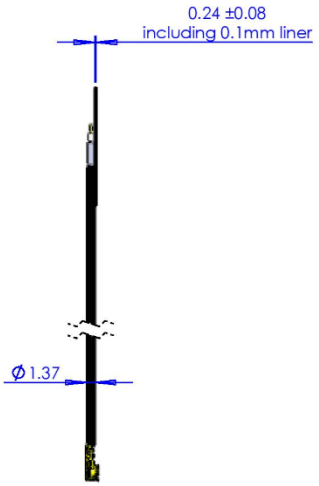
Cellular Electrical								
Band	**Frequency (MHz)**	**Efficiency (%)**	**Average Gain (dB)**	**Peak Gain (dBi)**	**Impedance**	**Polarization**	**Radiation Pattern**	**Max. input power**
5GNR/4G Band71	617-698	34.7	-4.60	-0.38	50 Ω	Linear	Omni directional	5W
4G/3G Band 12,13,14,17,28,29	698-806	39.9	-3.99	-0.06				
4G/3G/NB-IoT/Cat M Band 5,8,18,19,20,26,27	824-960	26.3	-5.80	-0.83				
5GNR/4G Band 21,32,74,75,76	1427-1518	21.4	-6.70	0.96				
4G/3G Band 1,2,3,4,9,23,25,35,39,66	1710-2200	43.3	-3.63	1.39				
4G/3G Band 7,30,38,40,41	2300-2690	38.3	-4.17	2.21				
5GNR/4G Band 22,42,48,77,78,79	3300-5000	43.7	-3.60	3.34				
LTE5200/Wi-Fi5800	5150-5925	39.8	-4.00	3.78				
Wi-Fi - 6GHz	5925-7125	28.3	-5.48	2.42				

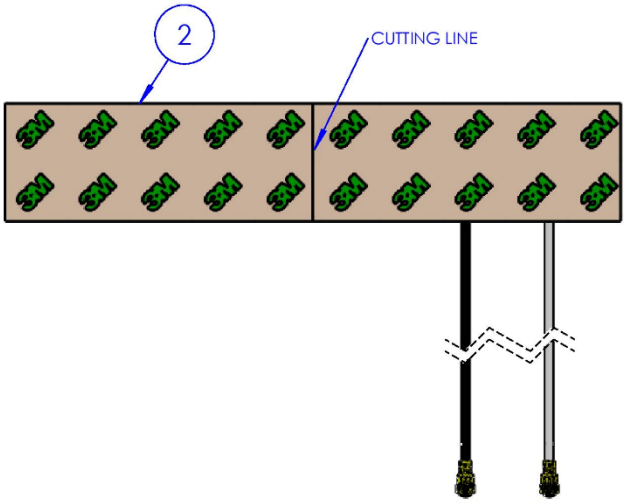
Mechanical	
Dimensions	105mm x 20mm x 0.24 mm
Weight	2.4g
Mount	Adhesive, 3M 467
Material	Polyimide
Connector	I-PEX MHFI
Cable	GNSS: 150 mm of 1.37 (White) Cellular: 150 mm of 1.37 Coaxial (Black)

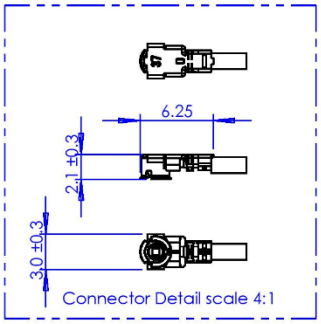
Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Relative Humidity	Non-condensing 65°C 95% RH

3. Mechanical Drawing

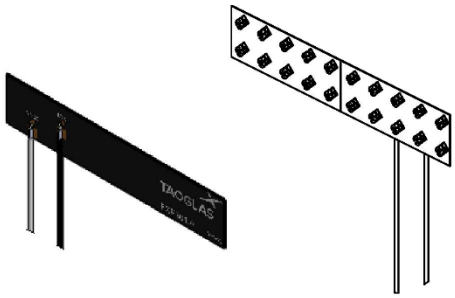








ITEM NO.	DESCRIPTION	MATERIAL	FINISH	QTY.
1	FPCB_FXP301.A_SINGLE LAYER	POLYIMIDE	BLACK	1
2	DOUBLE SIDED ADHESIVE	3M-467	BROWN LINER	1
3	1.37mm MICRO-COAXIAL CABLE -LTE/Cellular	COAX	BLACK	1
4	1.37mm MICRO-COAXIAL CABLE -GNSS	COAX	WHITE	1
5	IPEX MHFHT 1.37_BRASS_AU PLATED	BRASS	GOLD PLATED	2



ISOMETRIC VIEWS

4. Packaging

☑ 50 PCS / PE bag

☑ PE bag(mm): 230x330 (Ref)

☑ Weight (Kg): 0.26 ±3%

☑ SPQ Label

☑ 3000 PCS / Carton

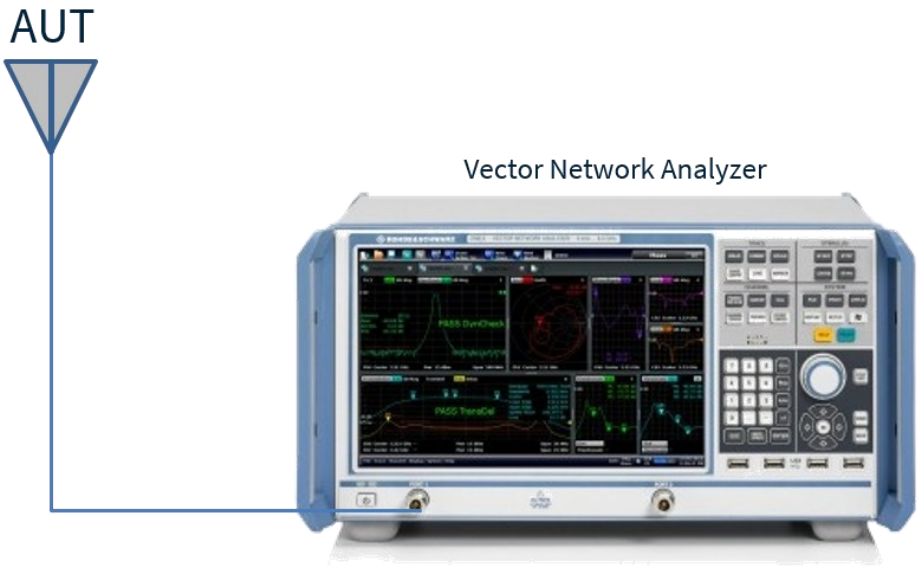
☑ Carton(mm): 360x310x160

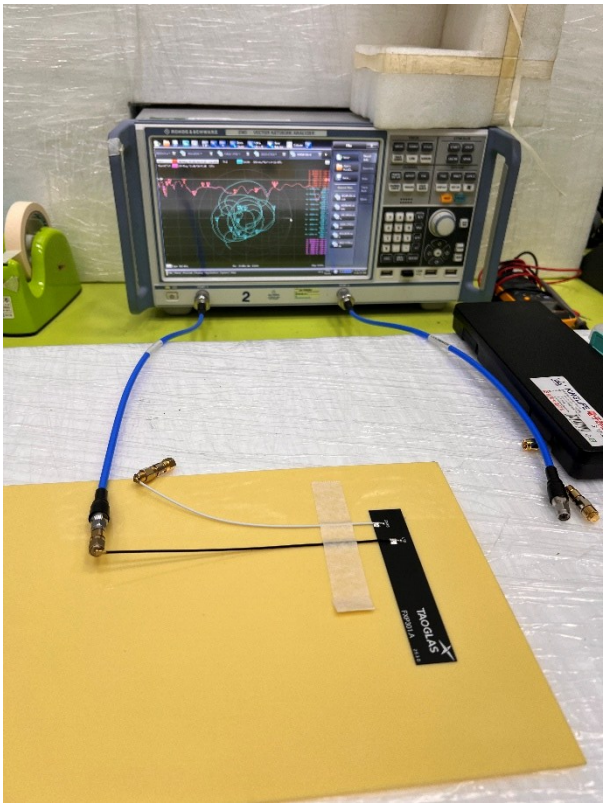
☑ Weight (Kg): 8.34 ±3%

☑ Carton Label

5. Antenna Characteristics

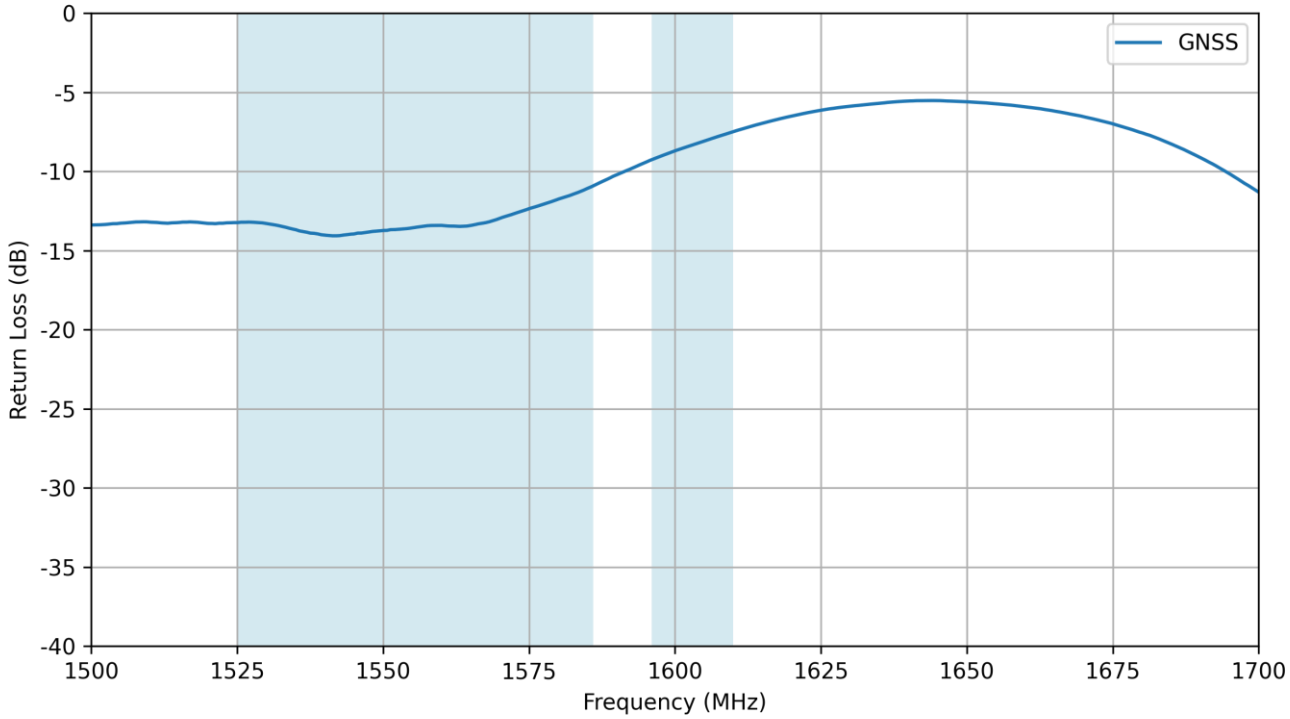
5.1 Test Setup



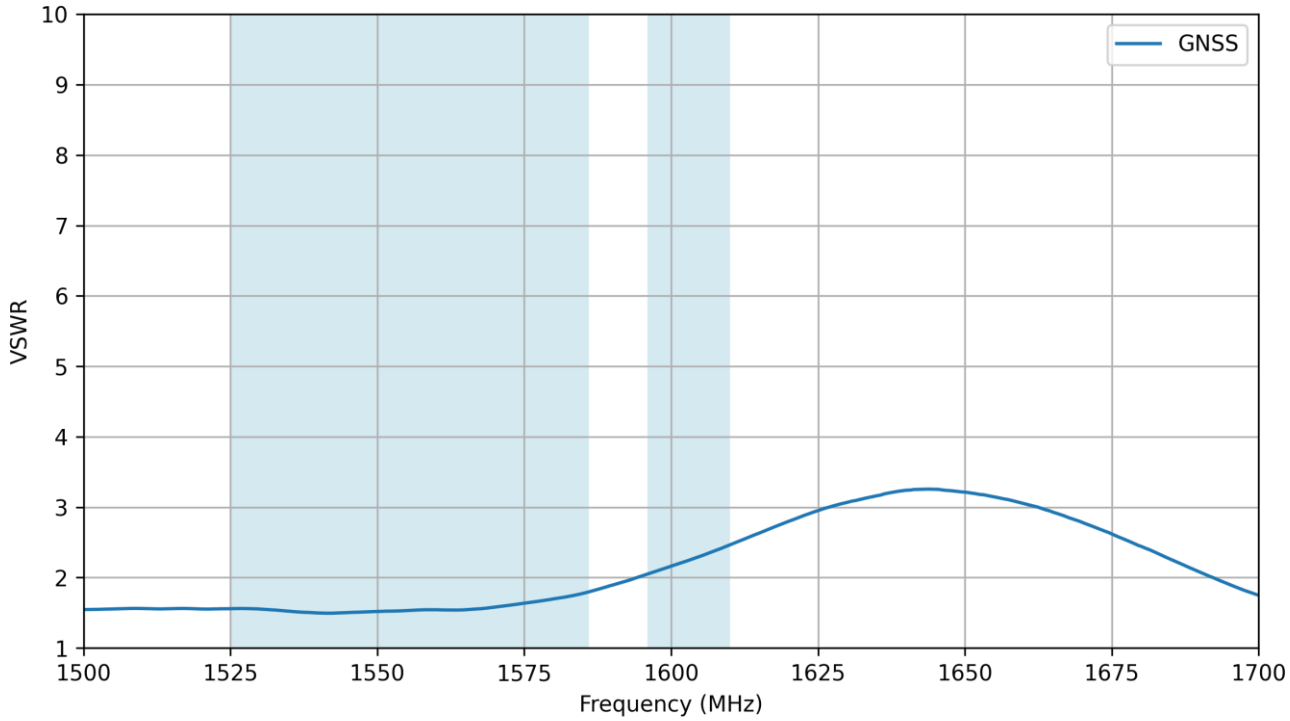


VNA Test Setup on 2mm ABS

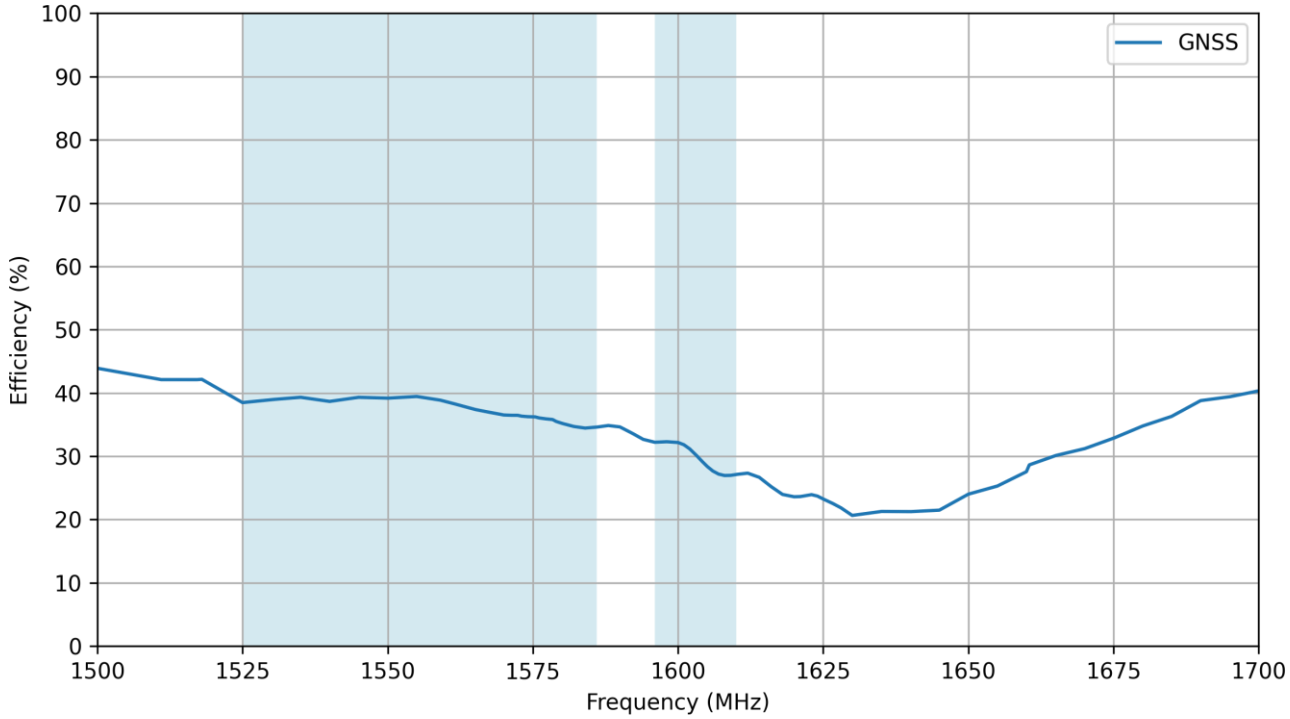
5.2 GNSS - Return Loss



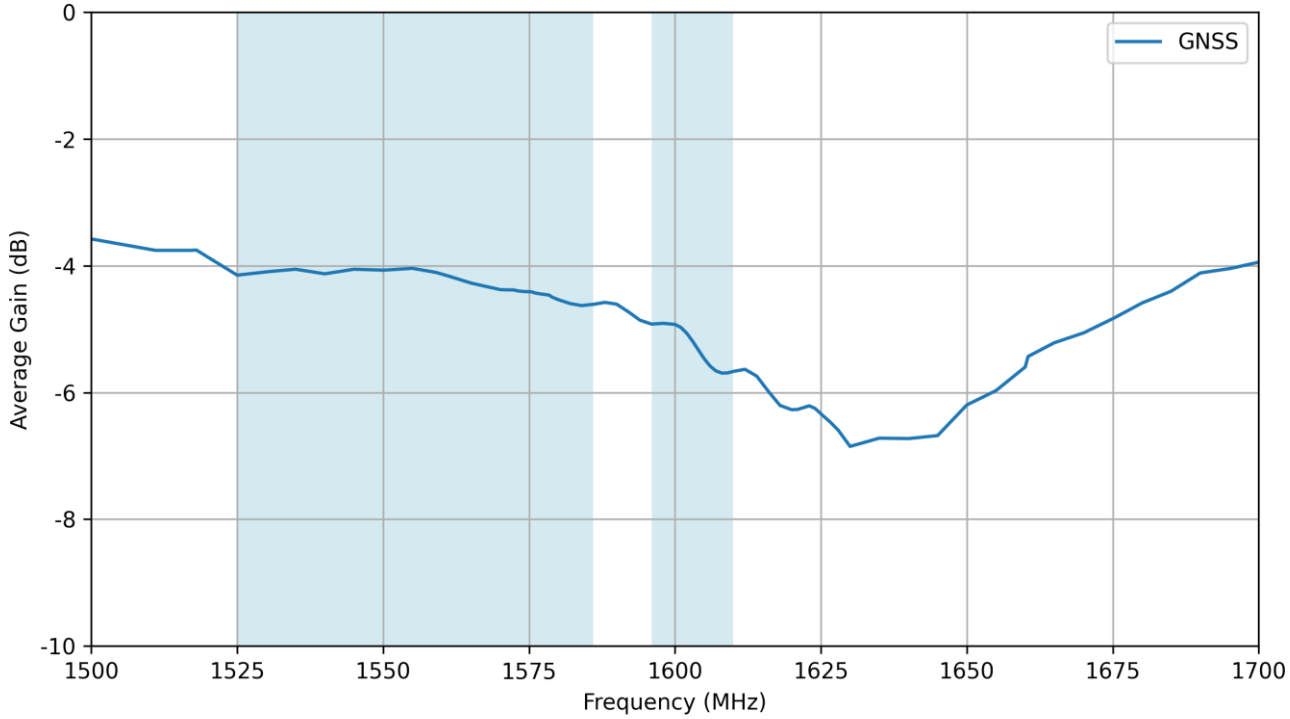
5.3 GNSS - VSWR



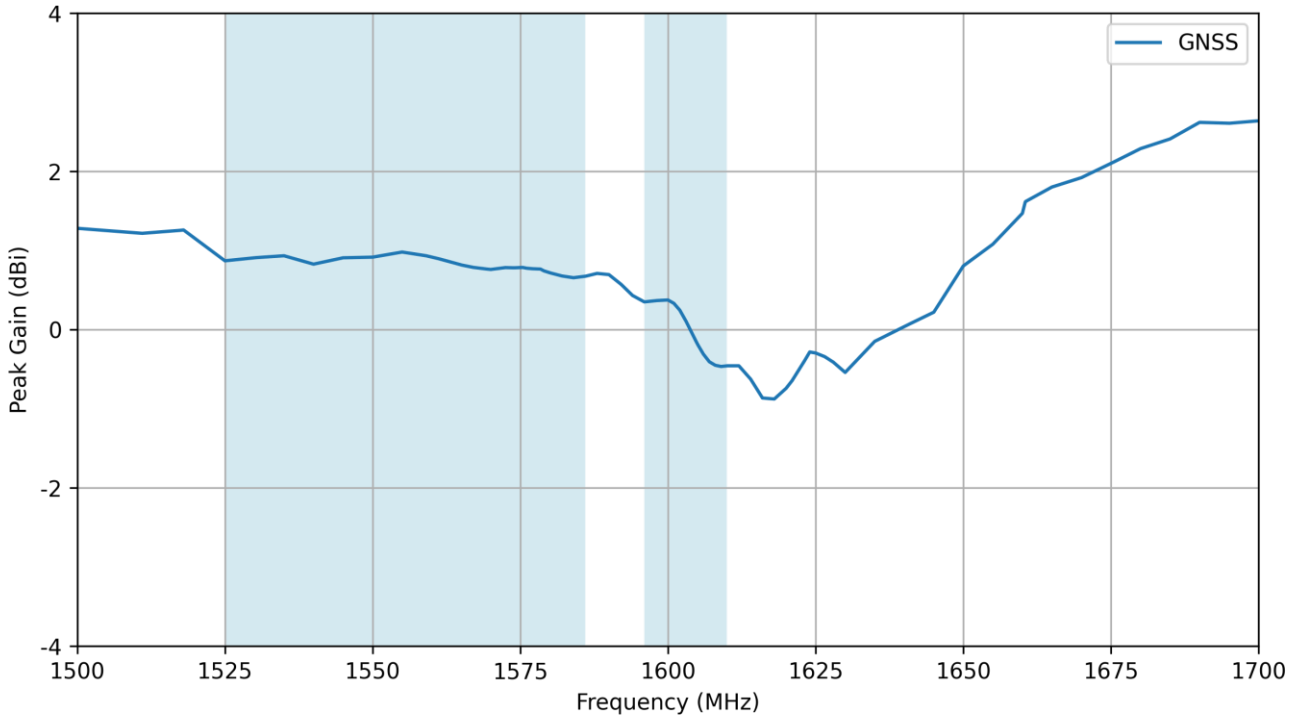
5.4 GNSS - Efficiency



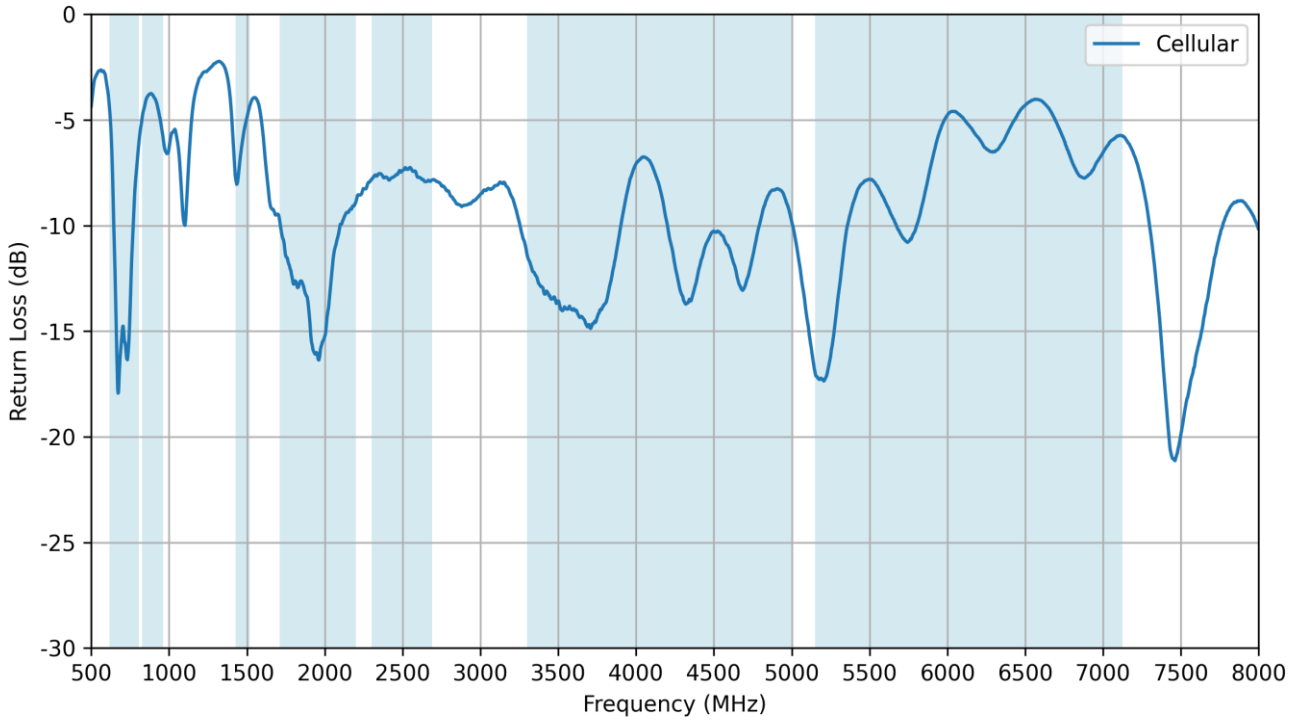
5.5 GNSS - Average Gain



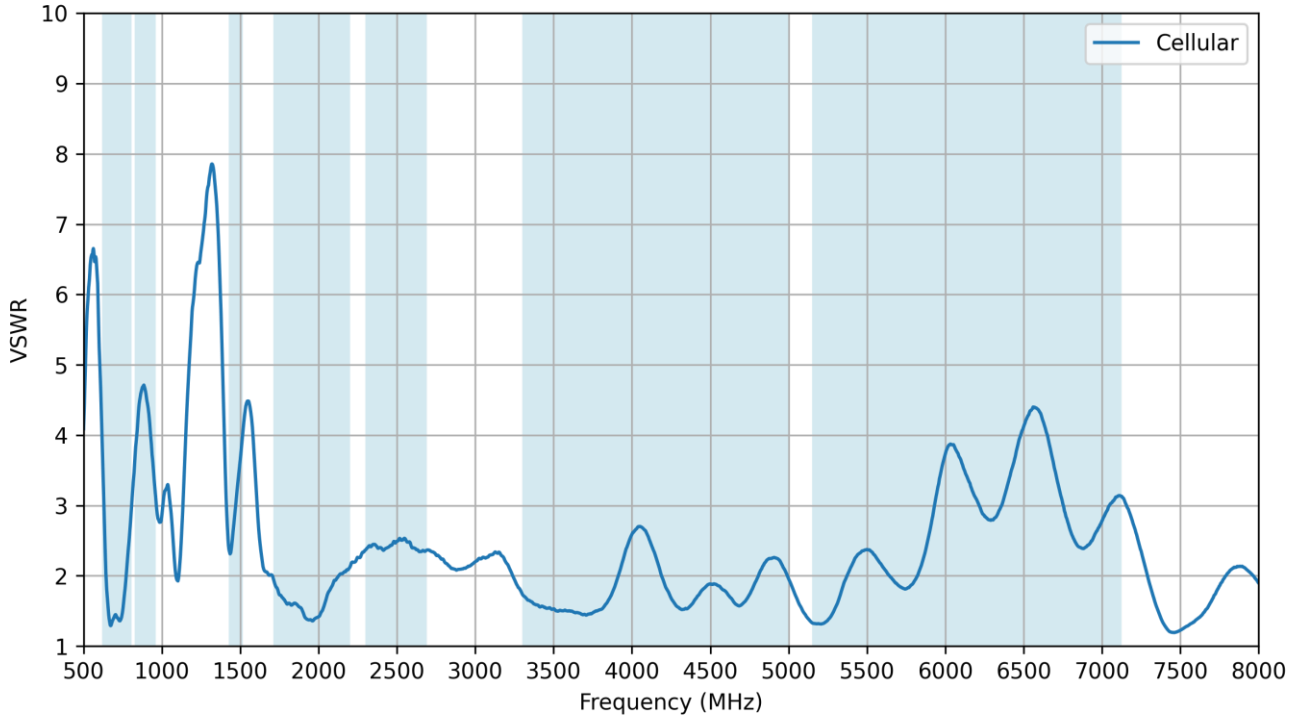
5.6 GNSS - Peak Gain



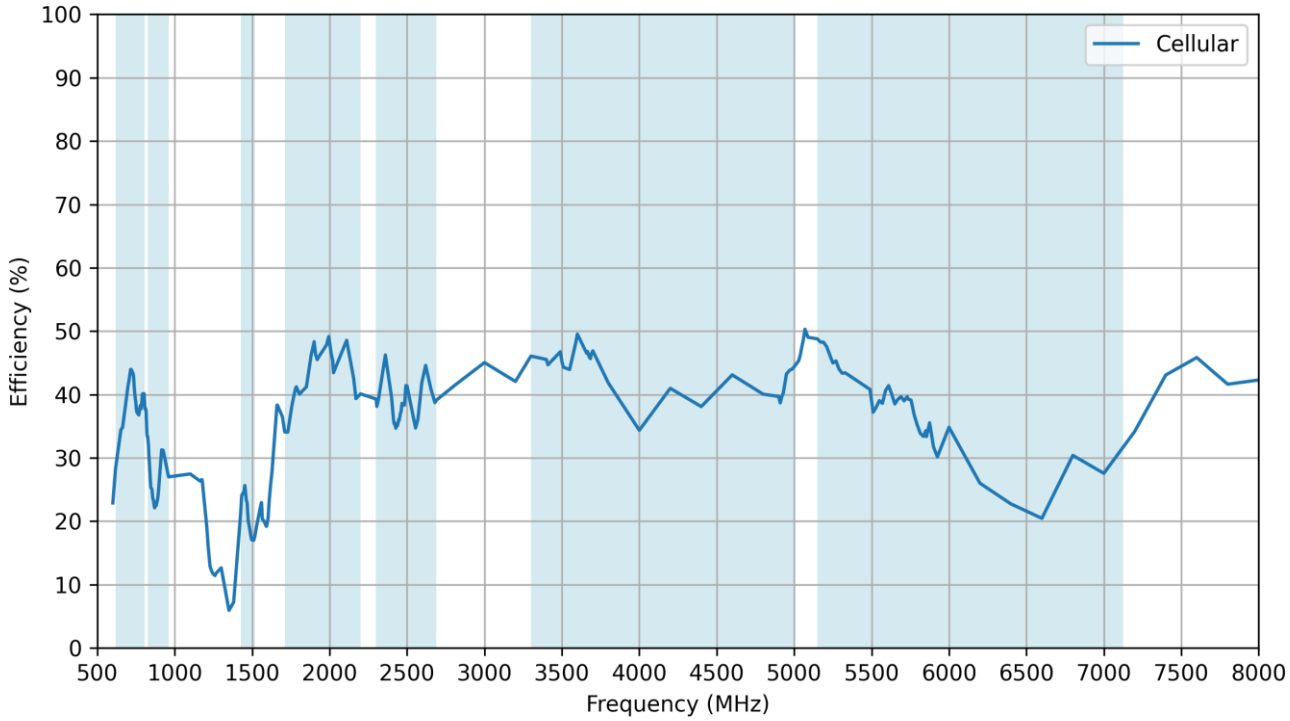
5.7 Cellular - Return Loss



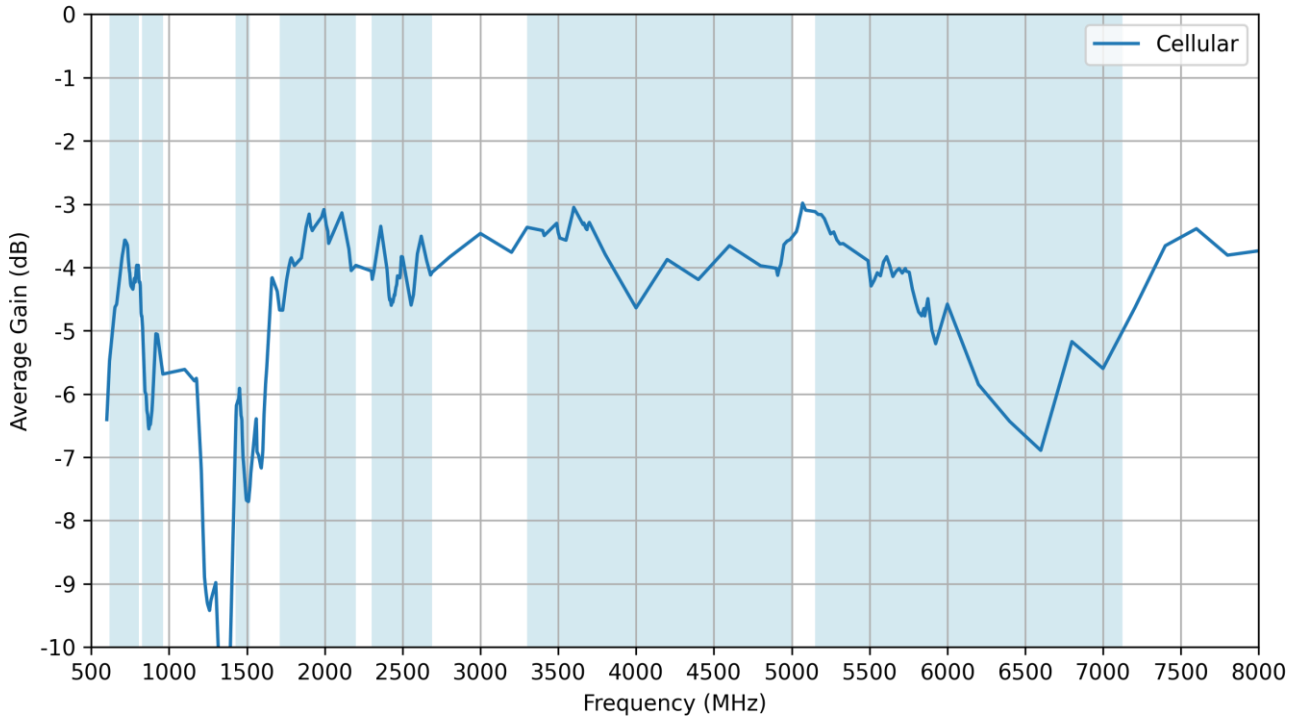
5.8 Cellular - VSWR



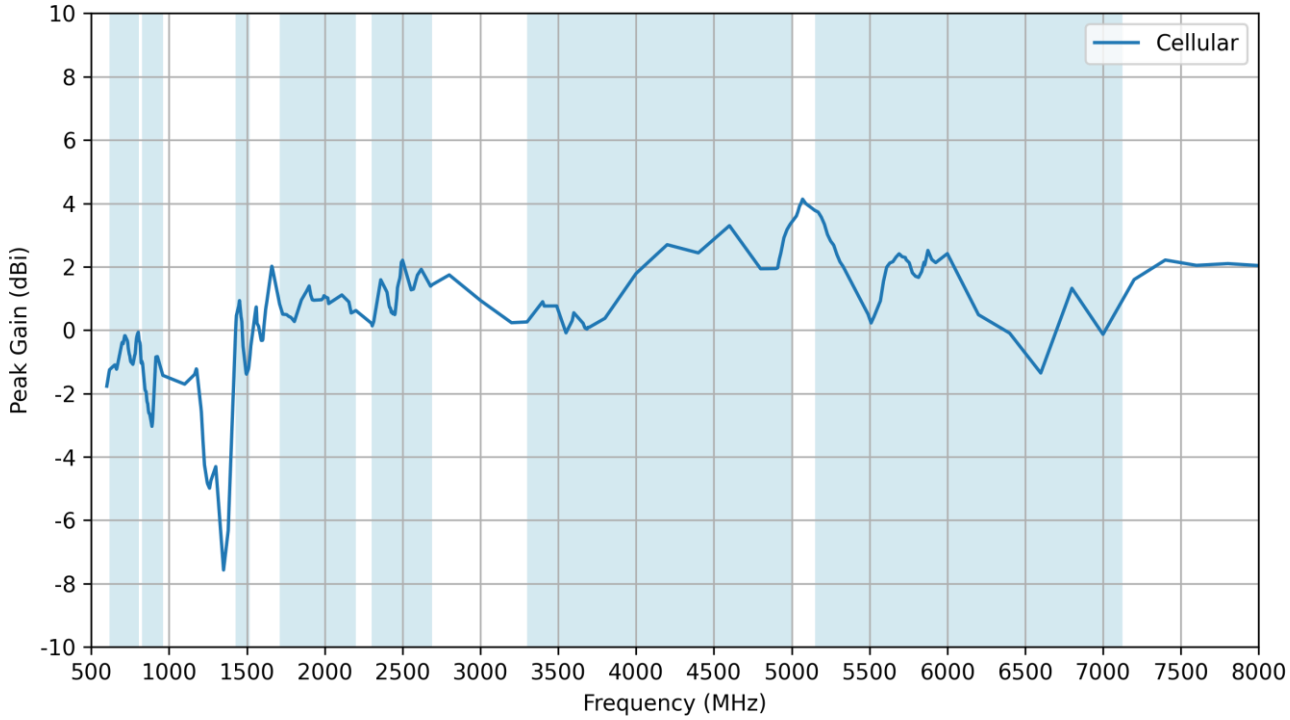
5.9 Cellular - Efficiency



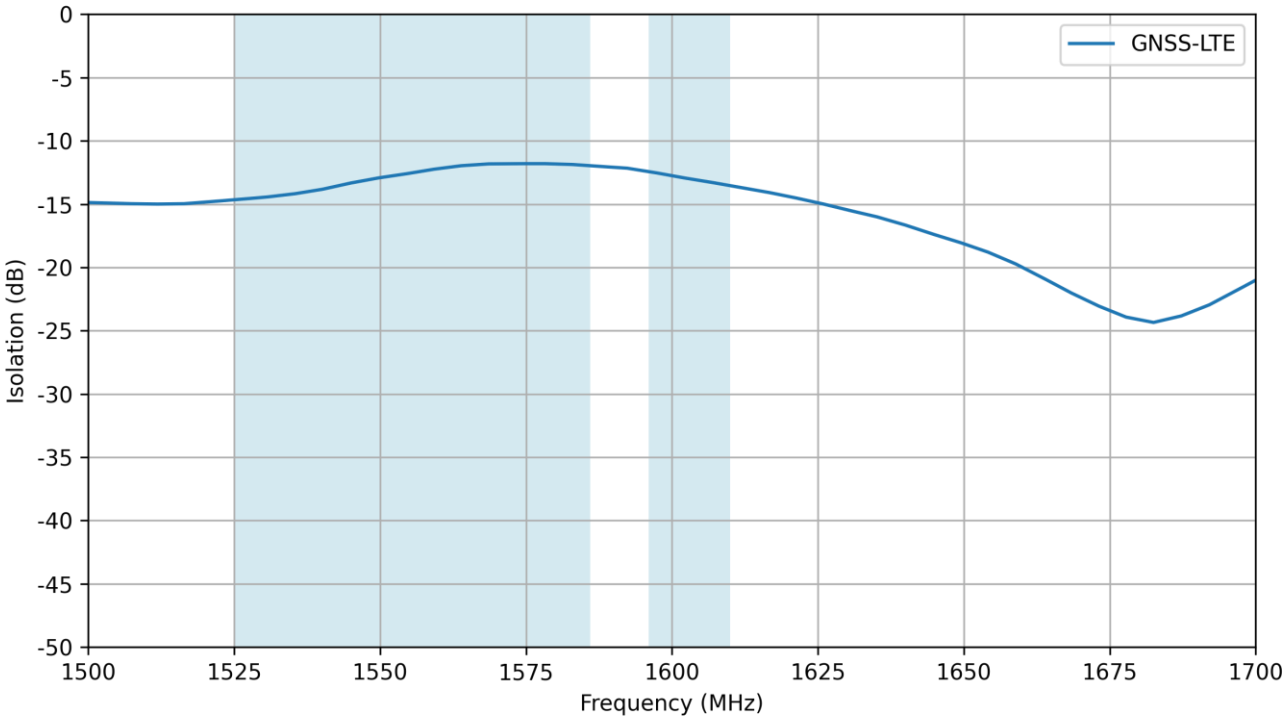
5.10 Cellular - Average Gain



5.11 Cellular - Peak Gain

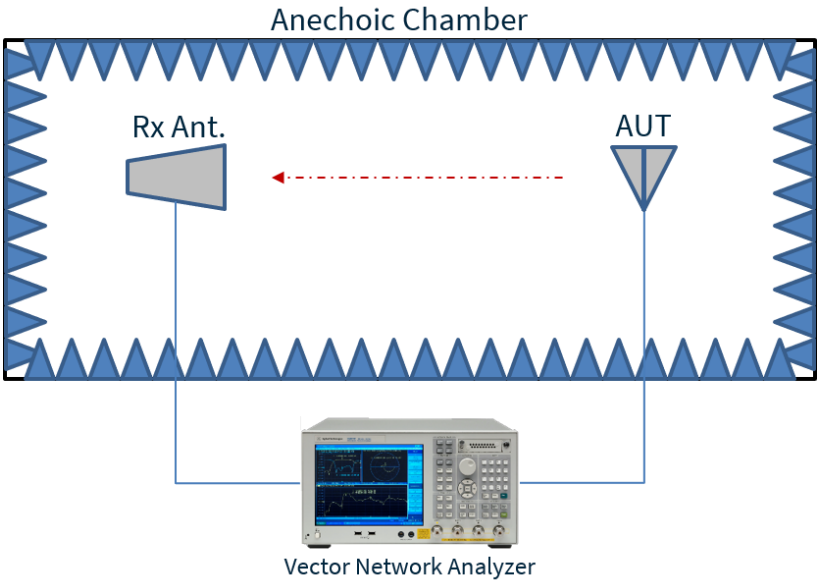


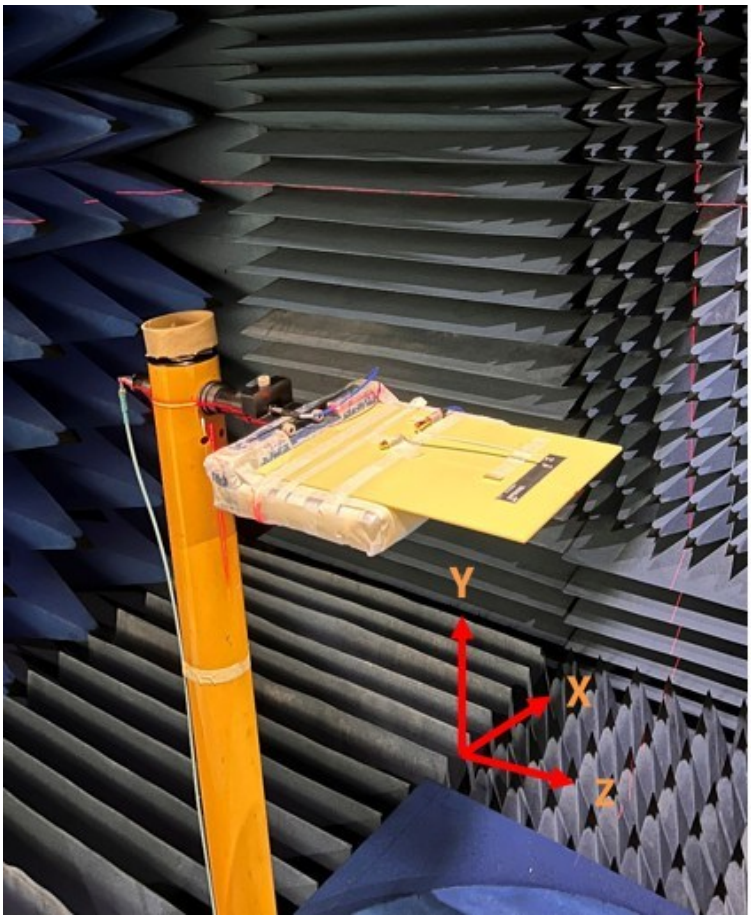
5.12 Isolation



6. Radiation Patterns

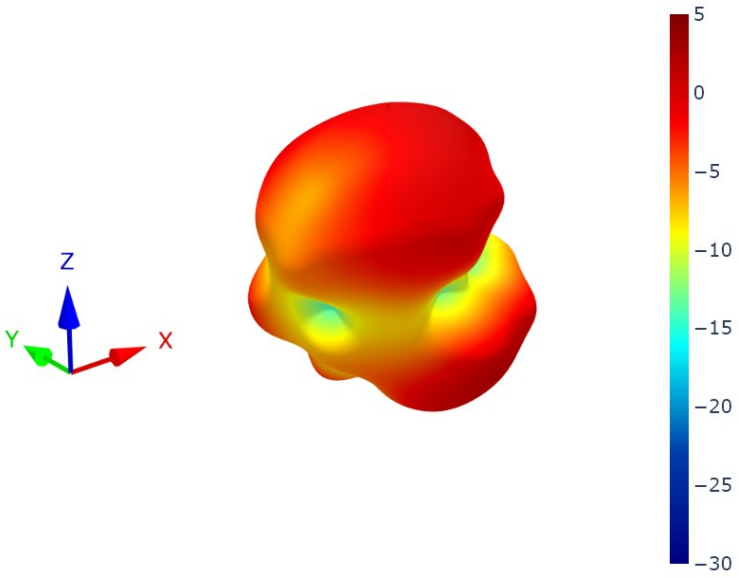
6.1 Test Setup

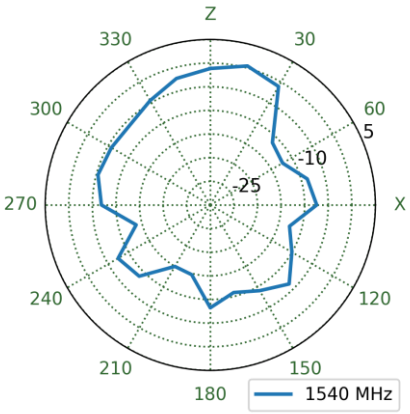
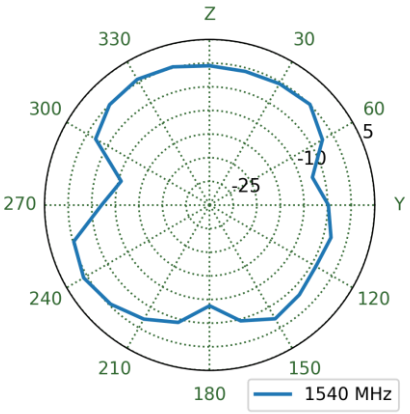
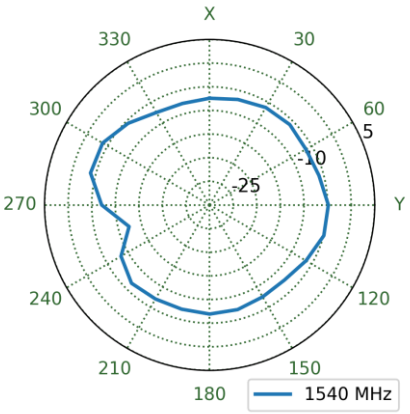




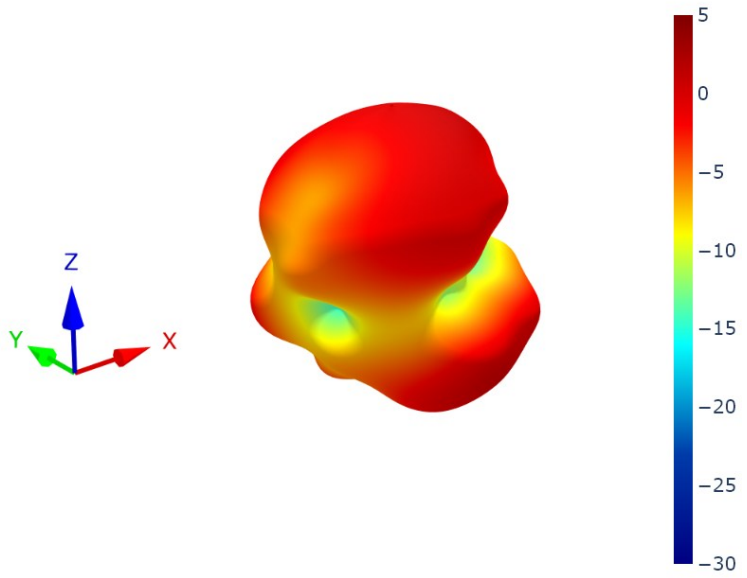
Chamber Test Setup on 2mm ABS

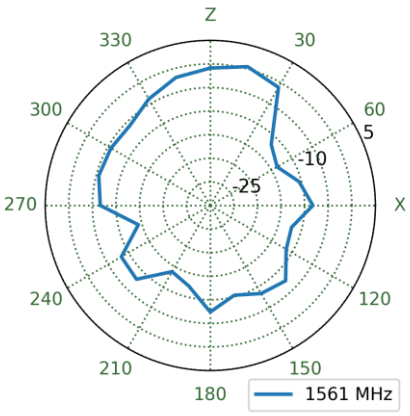
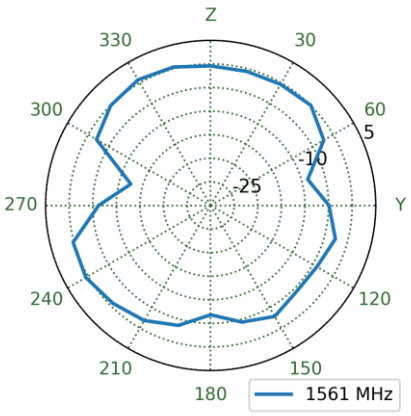
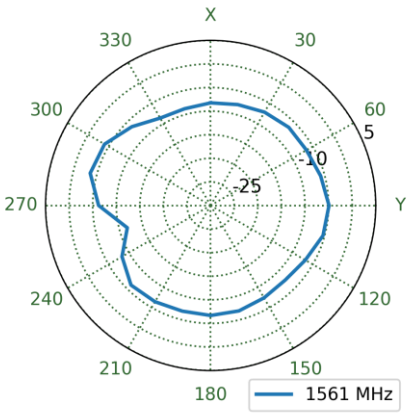
6.2 GNSS Patterns at 1540 MHz



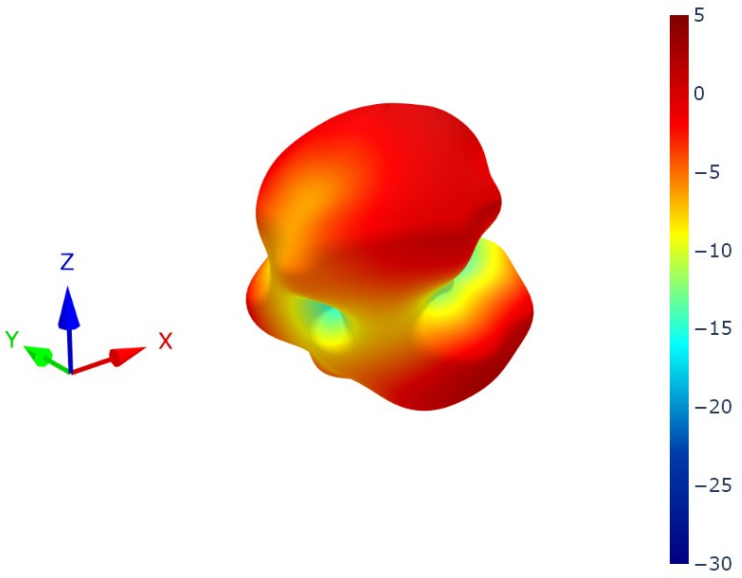
XZ Plane	YZ Plane	XY Plane
		

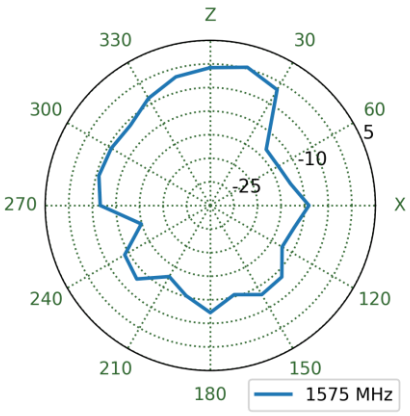
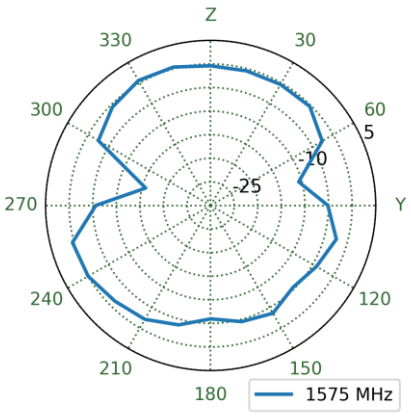
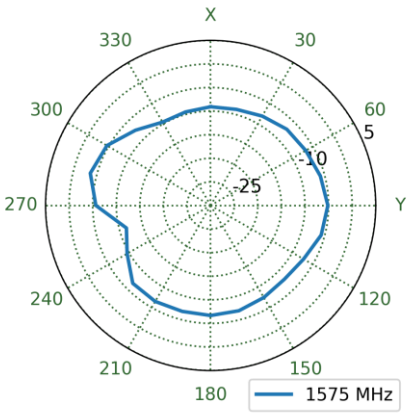
6.3 GNSS Patterns at 1561 MHz



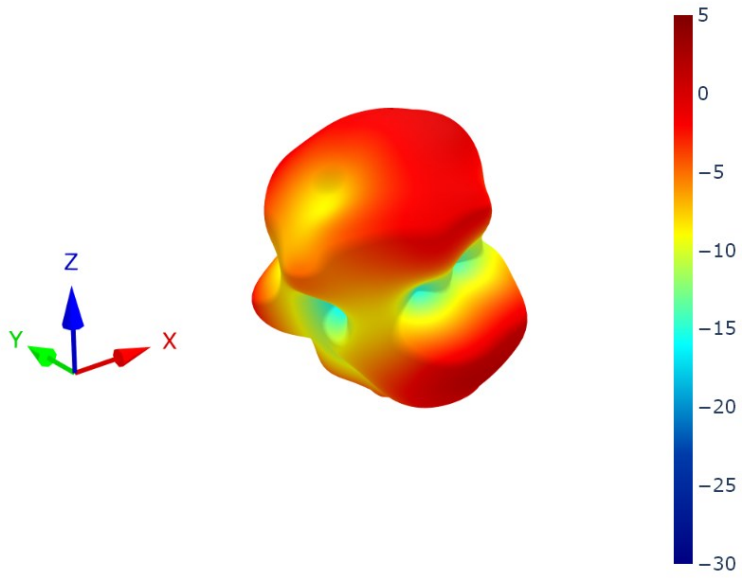
XZ Plane	YZ Plane	XY Plane
		

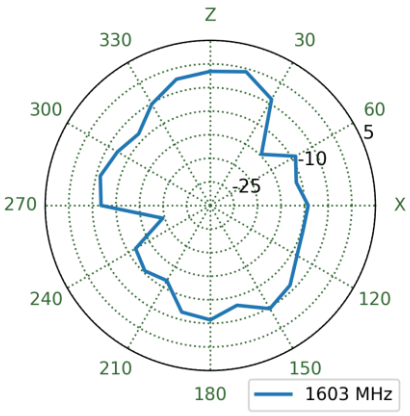
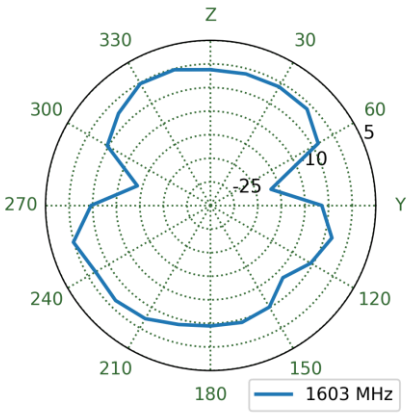
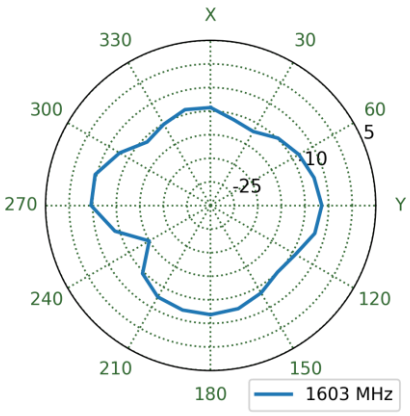
6.4 GNSS Patterns at 1575 MHz



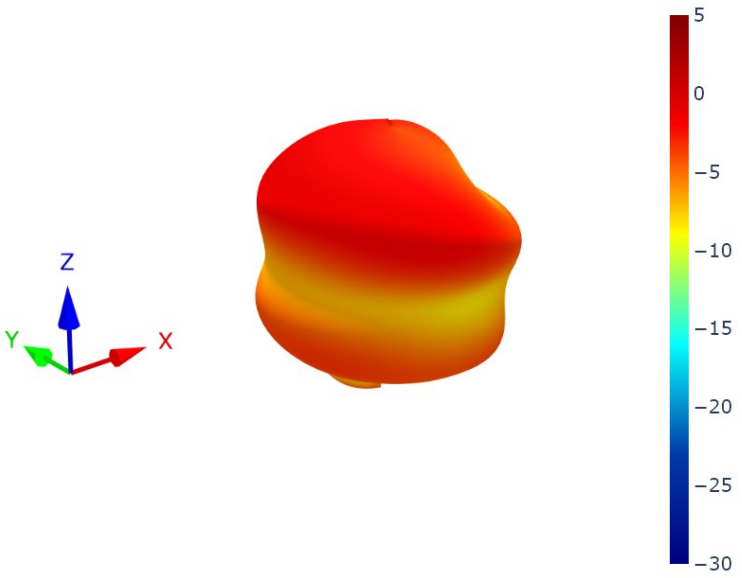
XZ Plane	YZ Plane	XY Plane
		

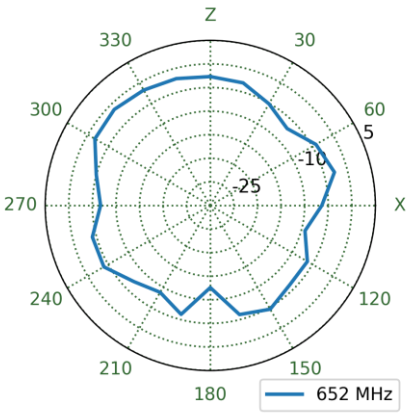
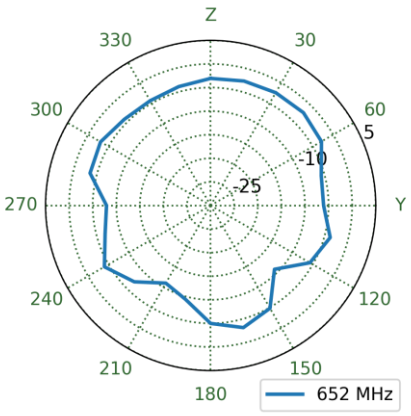
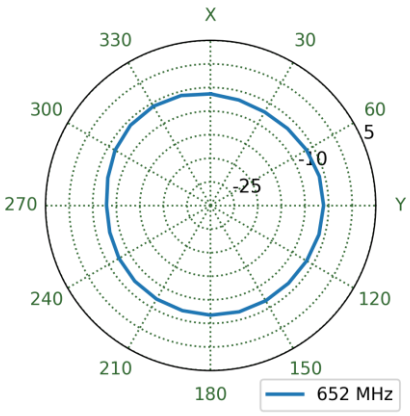
6.5 GNSS Patterns at 1603 MHz



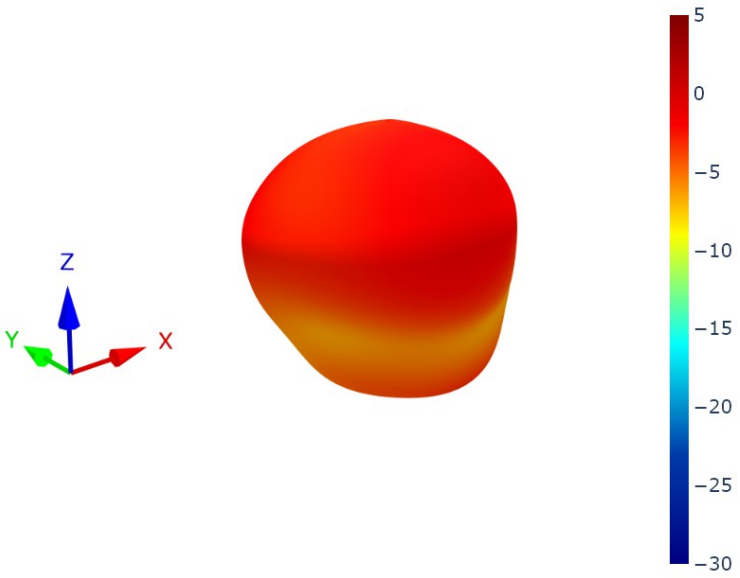
XZ Plane	YZ Plane	XY Plane
		

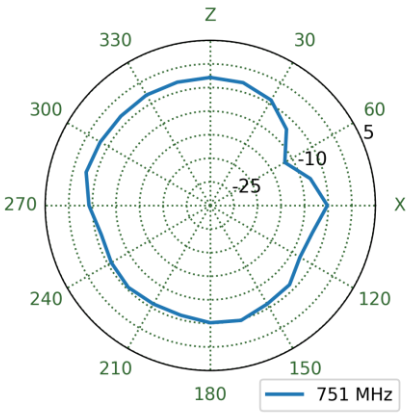
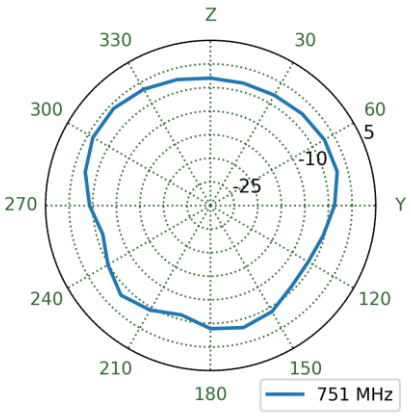
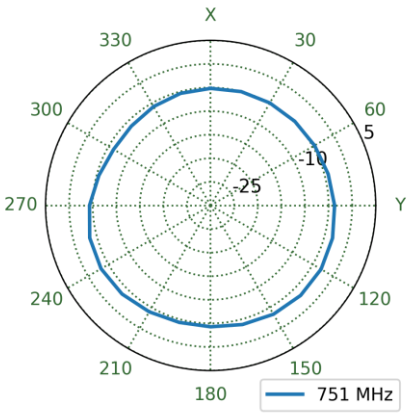
6.6 Cellular Patterns at 652 MHz



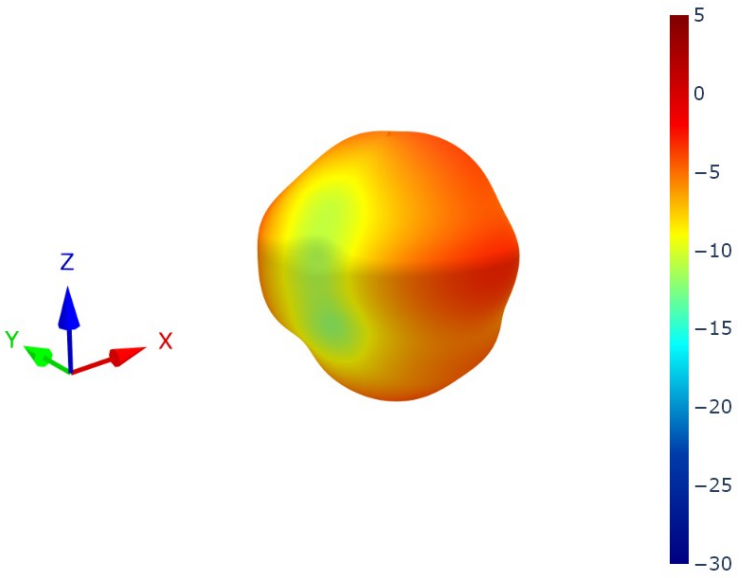
XZ Plane	YZ Plane	XY Plane
		

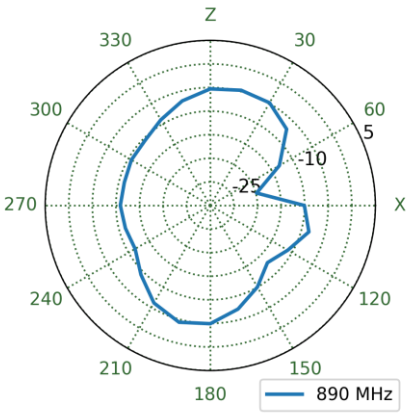
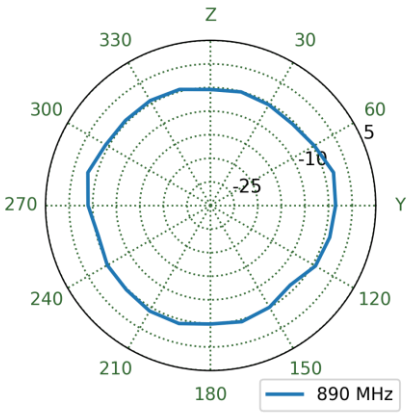
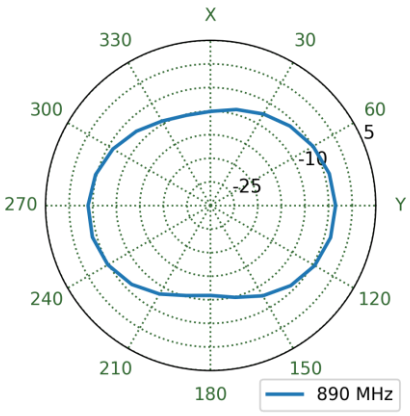
6.7 Cellular Patterns at 751 MHz



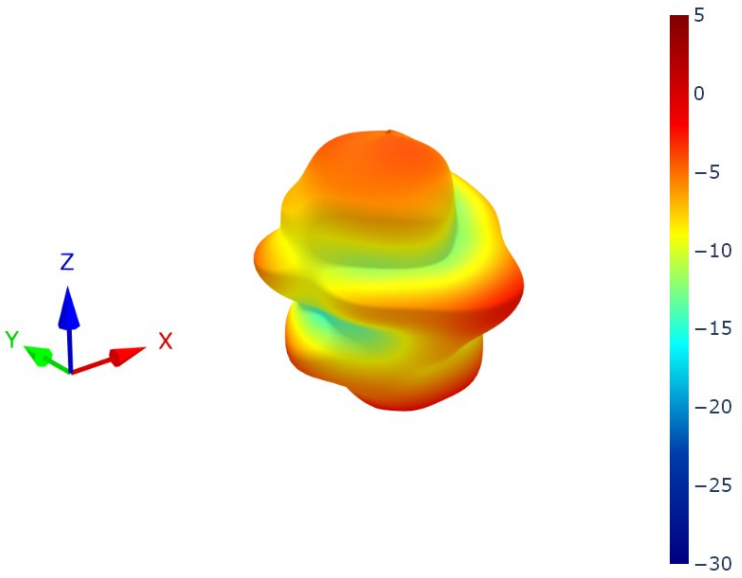
XZ Plane	YZ Plane	XY Plane
		

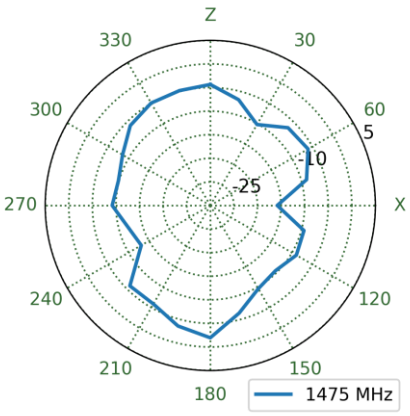
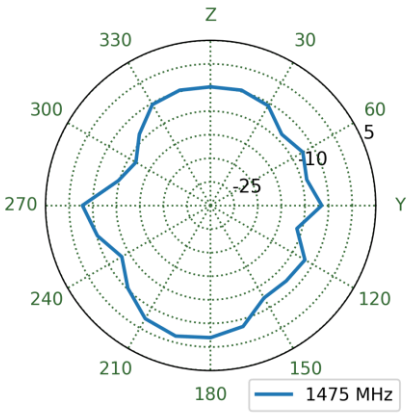
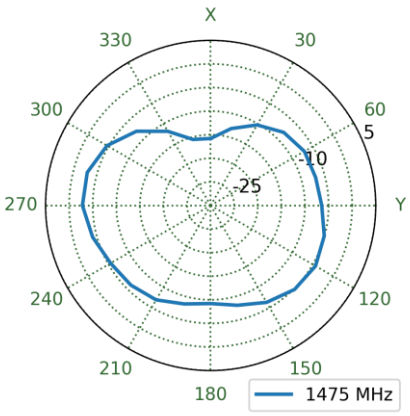
6.8 Cellular Patterns at 890 MHz



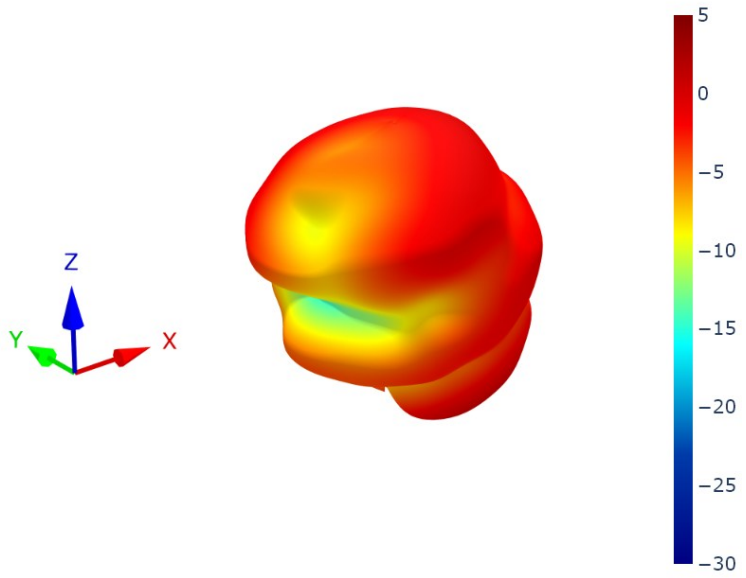
XZ Plane	YZ Plane	XY Plane
		

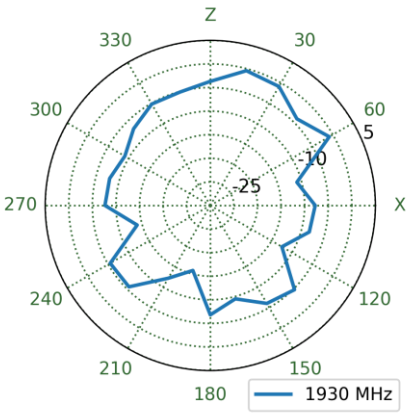
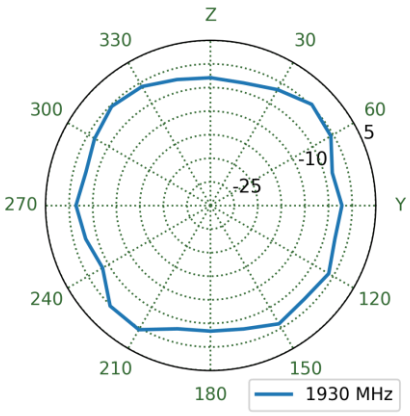
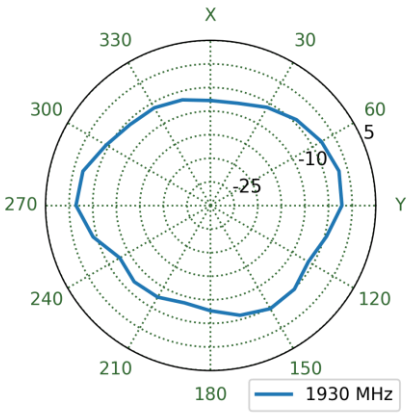
6.9 Cellular Patterns at 1475 MHz



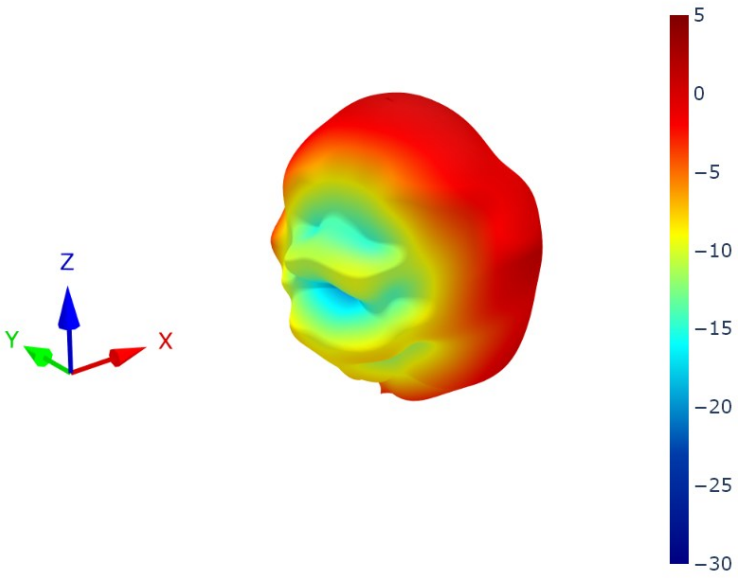
XZ Plane	YZ Plane	XY Plane
		

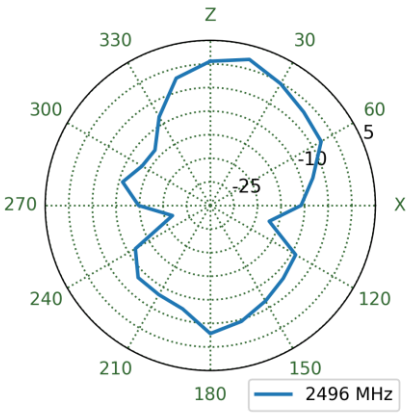
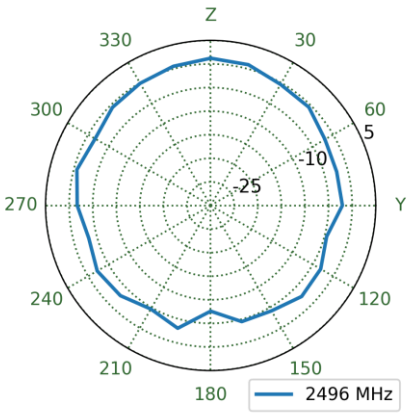
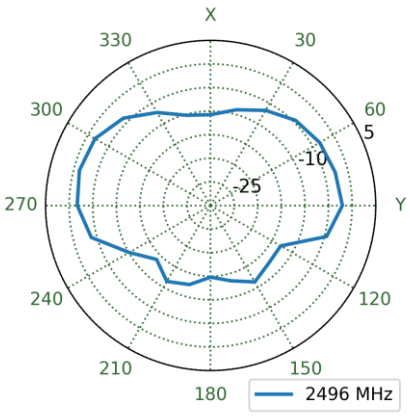
6.10 Cellular Patterns at 1930 MHz



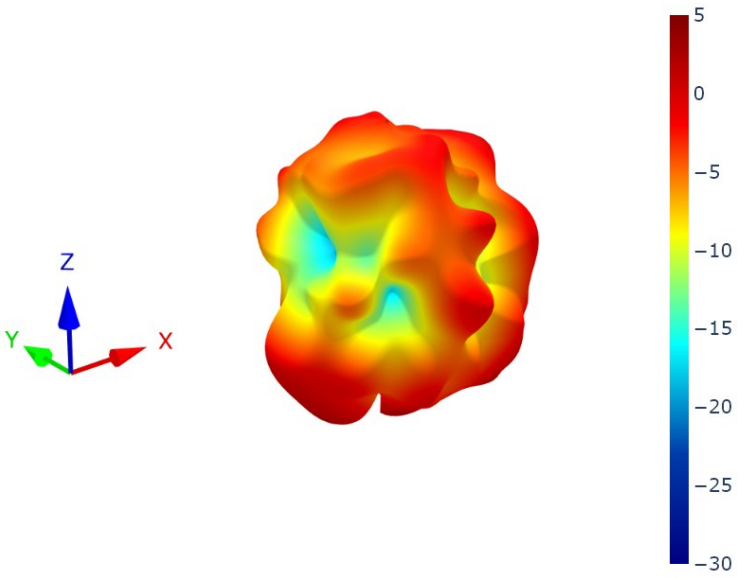
XZ Plane	YZ Plane	XY Plane
		

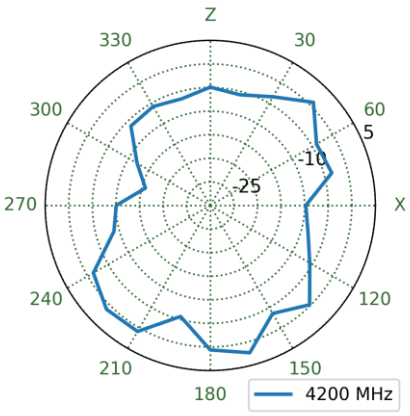
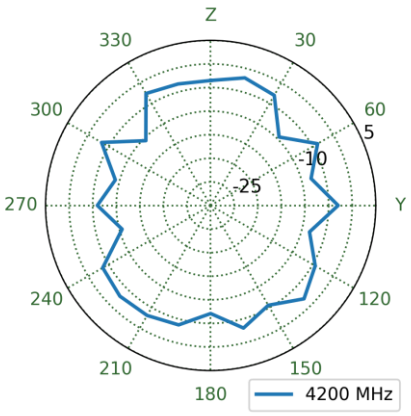
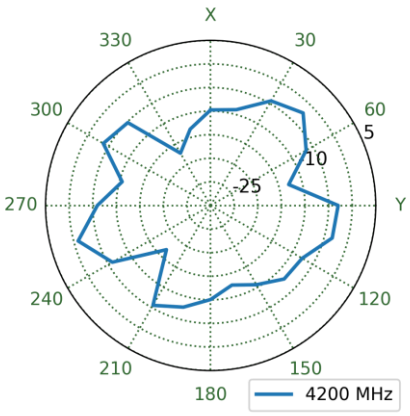
6.11 Cellular Patterns at 2496 MHz



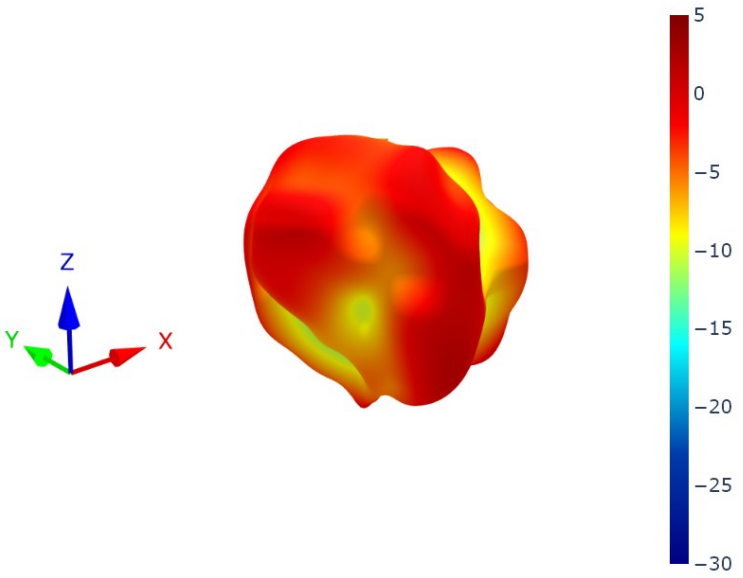
XZ Plane	YZ Plane	XY Plane
		

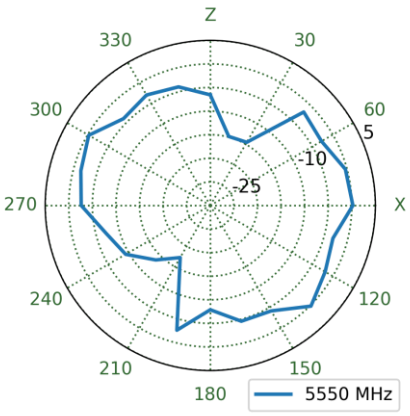
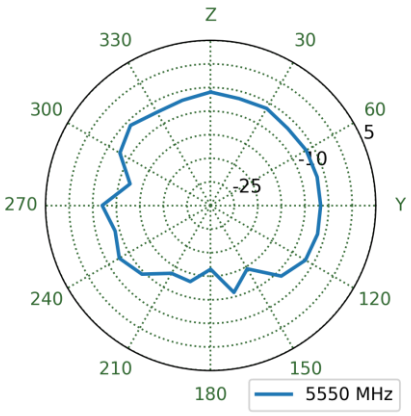
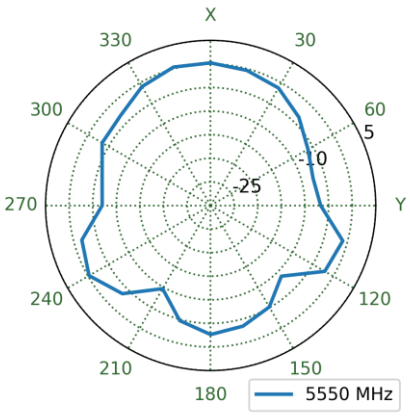
6.12 Cellular Patterns at 4200 MHz



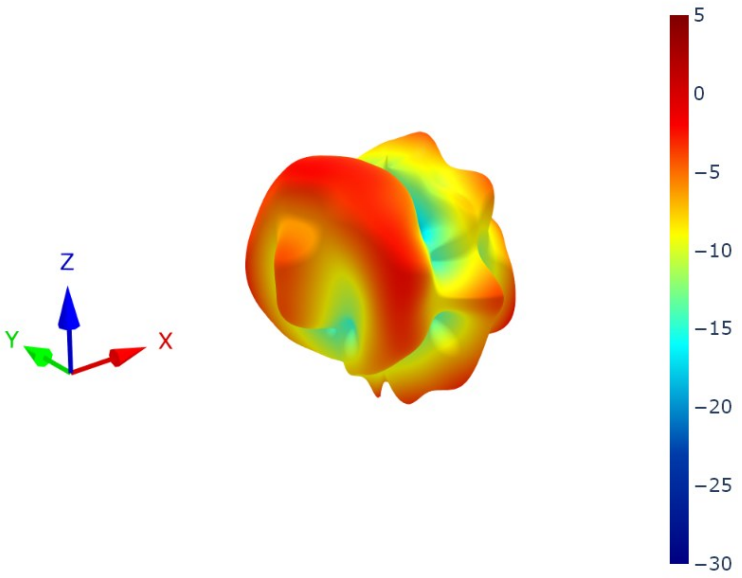
XZ Plane	YZ Plane	XY Plane
		

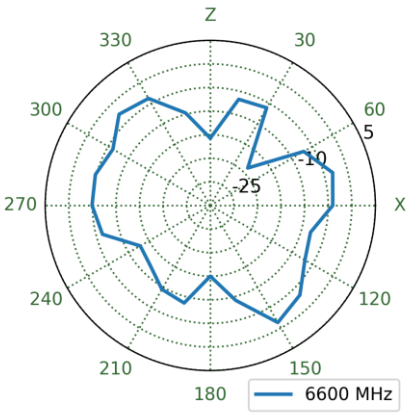
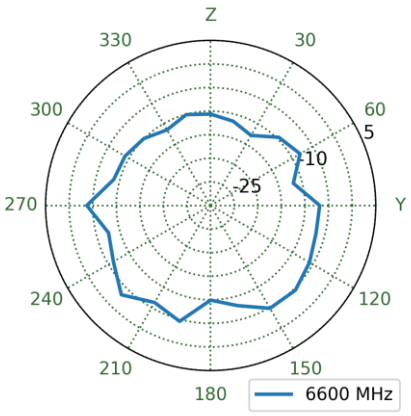
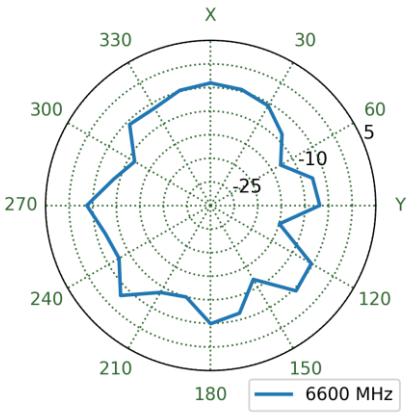
6.13 Cellular Patterns at 5550 MHz



XZ Plane	YZ Plane	XY Plane
		

6.14 Cellular Patterns at 6600 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-25-8-266 - FXP301.A.001

Revision: A (Original First Release)	
Date:	2025-09-26
Notes:	Initial Release
Author:	Gary West

Previous Revisions

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