

Datasheet

Part No:
CRPA.170.H22.A

Description

170 mm circular CRPA antenna board fitted with HP2258.A multi-band GNSS patch antenna and SMA(F) Jack connector

Features:

170 mm circular CRPA antenna board fitted with HP2258.A
Covering Bands

- GPS L1/L2,
- GLONASS G1/G2
- BeiDou B1
- Galileo E1

Connector: SMA(F) Jack
Dims: Ø170 x 20 mm
RoHS & Reach Compliant

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1. Introduction



The Taoglas CRPA.170.H22.A is a compact, four-element Controlled Reception Pattern Antenna (CRPA) reference design developed for L1/L2 GNSS systems requiring enhanced resilience to jamming and interference.

Unlike a conventional single-element GNSS antenna, a CRPA uses multiple antenna elements and independent RF channels to provide the spatial information required by an associated CRPA processor to dynamically control the antenna reception pattern. By applying amplitude and phase weighting across the individual channels, the system can steer reception-pattern nulls toward sources of interference while maintaining useful GNSS reception across the remainder of the visible sky.

This spatial approach is particularly important where interference occurs **within the GNSS operating bands**, where conventional frequency filtering alone cannot remove the interfering signal without potentially affecting wanted satellite signals. CRPA therefore provides an additional layer of GNSS resilience for positioning, navigation and timing (PNT) systems operating in challenging RF environments.

The **CRPA.170.H22.A** provides a 170 mm circular four-element array incorporating four **HP2258.A GNSS L1/L2 patch antennas** in a compact 2 × 2 geometry. The approximately **104 mm × 70 mm element centre-to-centre spacing** enables a compact implementation, while providing four independent antenna channels for connection to the downstream CRPA processing system.

Each antenna channel incorporates the Taoglas **TFM.110A active RF circuitry**, with the four RF channels presented through SMA(F) connectors. An integrated directional-coupler network and dedicated calibration port provide the calibration path required to characterize and manage channel-to-channel amplitude and phase relationships. Accurate RF-channel matching and calibration are important because amplitude, phase and group-delay mismatch can directly reduce the achievable depth and accuracy of spatial nulls.

The CRPA.170.H22.A is designed as an **antenna and RF reference platform rather than a complete anti-jam solution**. Overall interference-mitigation performance depends on the complete system, including the antenna array, RF-channel characteristics, calibration accuracy, receiver dynamic range and the adaptive processing performed by the associated CRPA processor.

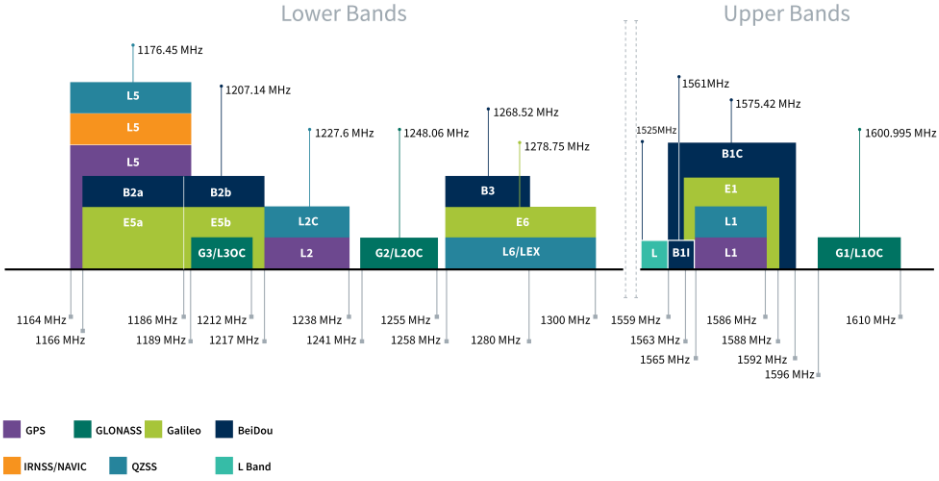
Typical Applications

- High-Precision GNSS & PNT Systems
- GNSS Anti-Jam / Interference-Resilient Platforms
- UAVs & Autonomous Systems
- Defence & Mission-Critical Systems
- Robotics & Uncrewed Platforms
- Surveying & Mapping
- Timing & Synchronization Infrastructure

Detailed integration procedures and design files are provided in the CRPA Series Application Note and dedicated webpage. For further information or queries, please reach out to Taoglas technical support team. www.taoglas.com.

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
	■	□	■	■	□



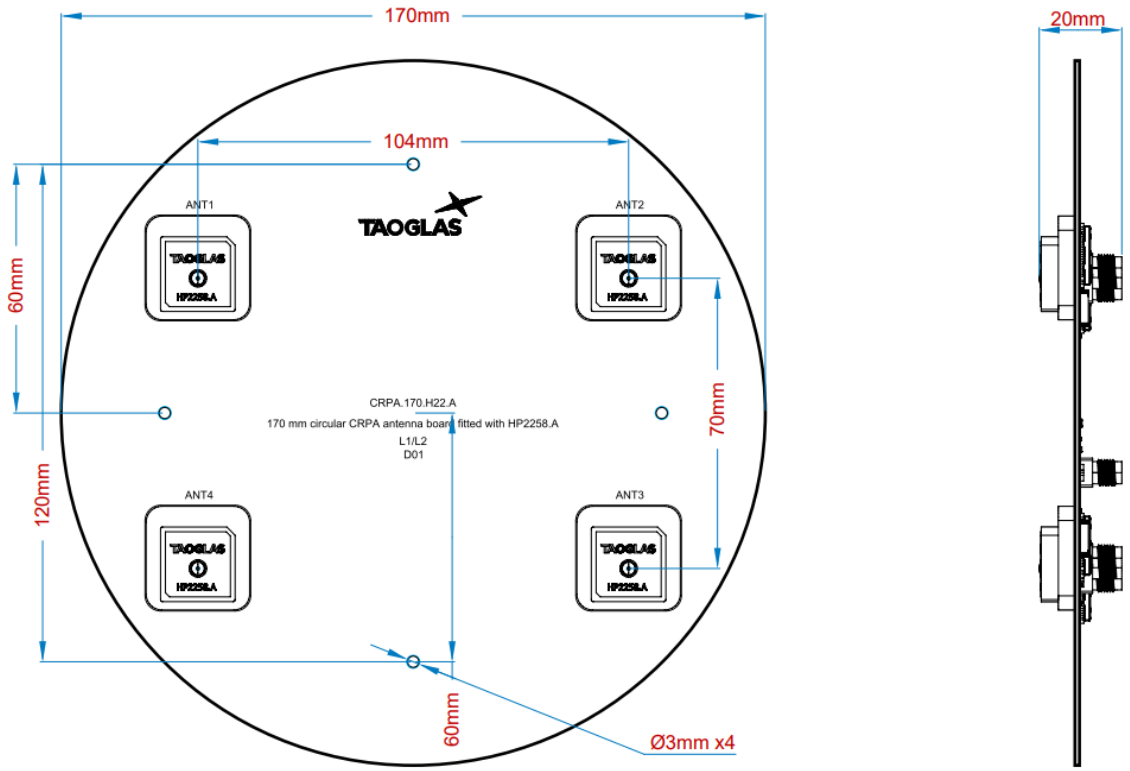
GNSS Bands and Constellations

GNSS Electrical						
Frequency (MHz)	Antenna	**1227.6**	**1248**	**1561**	**1575.42**	**1602**
Efficiency (%)	Antenna 1	23.0	34.7	49.9	47.9	59.4
	Antenna 2	32.2	25.6	58.7	59.4	59.0
	Antenna 3	28.8	37.1	48.6	46.2	58.5
	Antenna 4	39.5	29.6	54.2	62.3	59.3
Average Gain (dB)	Antenna 1	-6.38	-4.59	-3.02	-3.19	-2.26
	Antenna 2	-4.92	-5.91	-2.32	-2.26	-2.29
	Antenna 3	-5.41	-4.31	-3.14	-3.35	-2.33
	Antenna 4	-4.03	-5.29	-2.66	-2.05	-2.27
Peak Gain (dBi)	Antenna 1	0.60	2.71	3.78	3.78	3.87
	Antenna 2	2.17	1.00	2.81	2.81	3.35
	Antenna 3	1.18	1.74	3.00	3.00	4.11
	Antenna 4	2.43	2.07	3.41	4.14	3.40
Polarization	RHCP					
Impedance	50 Ω					

Mechanical	
Dimensions	Ø170 x 20 mm
Weight	142g
Material	Ceramic
Connector	SMA(F) Jack Connector

Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C

3. Mechanical Drawing

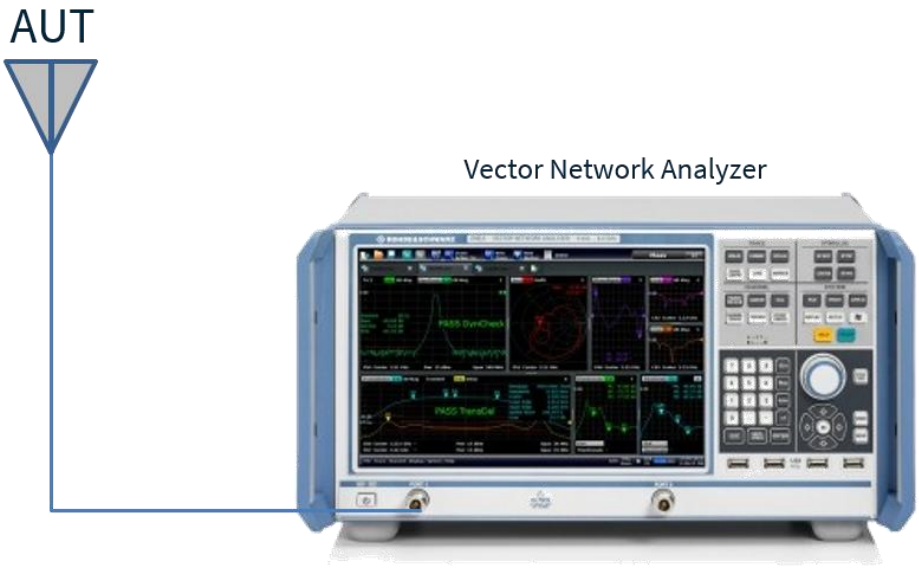


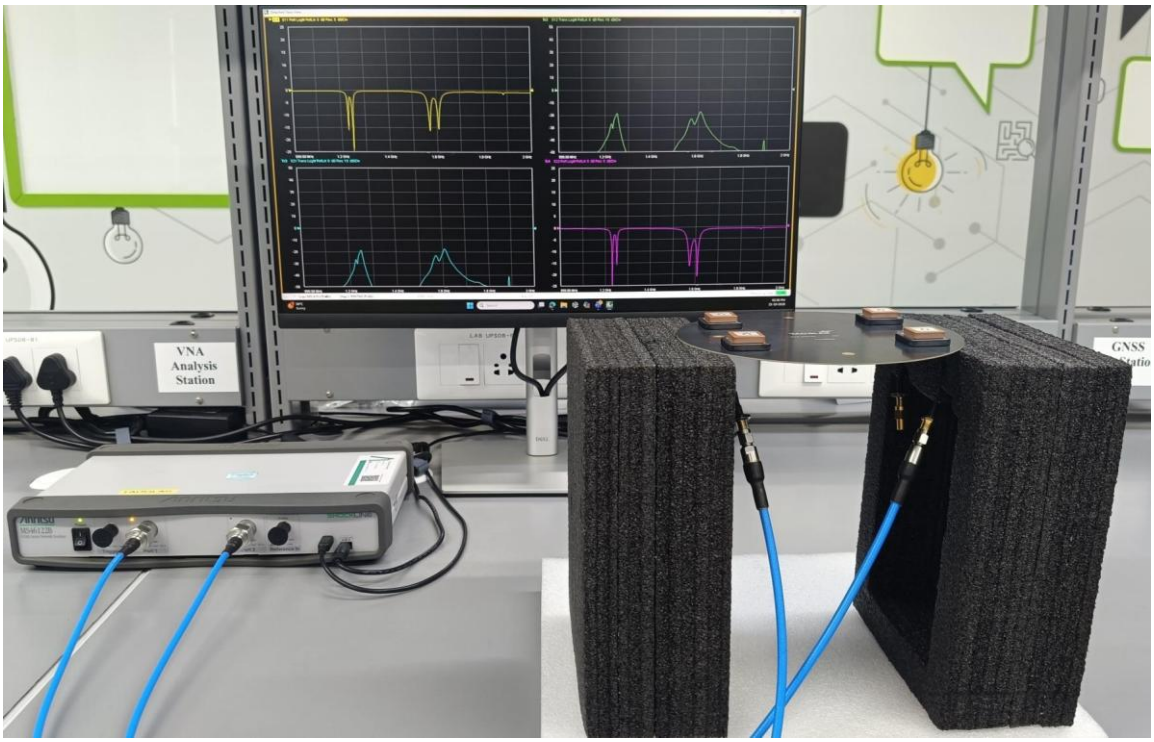
3.1 BOM Table

Part Name	Needed per circuit	Needed per Board
HP2258.A	1	4
TFM.110A	1	4
PCB.SMAFSTJ.B.HT	1	5
XC1500A-20S	1	4
RC0402JR-070RL	2	8
MLG1005S39NJT000	1	4
GRM1555C1H101JA01	1	4
ESD245B1W0201E6327XTSA1	1	4
RCW0603100RFKEC	-	3
PD0922J5050S2HF	-	3

4. Antenna Characteristics

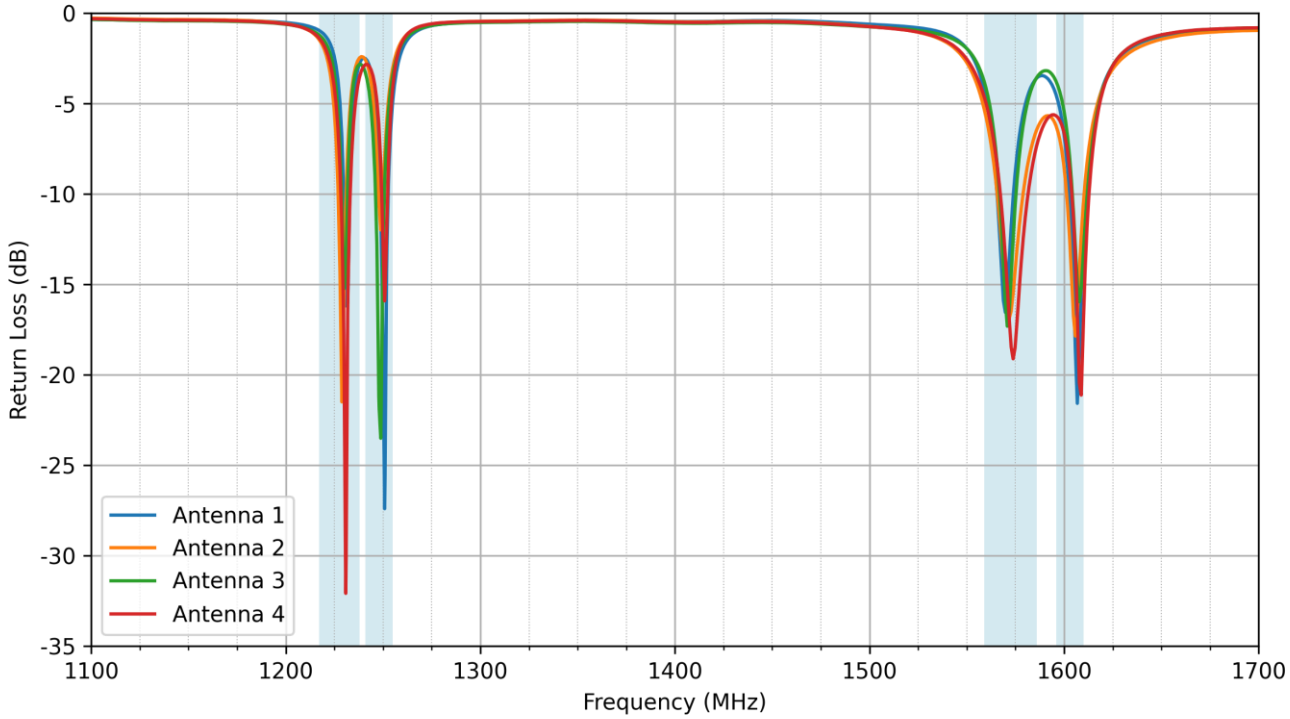
4.1 Test Setup



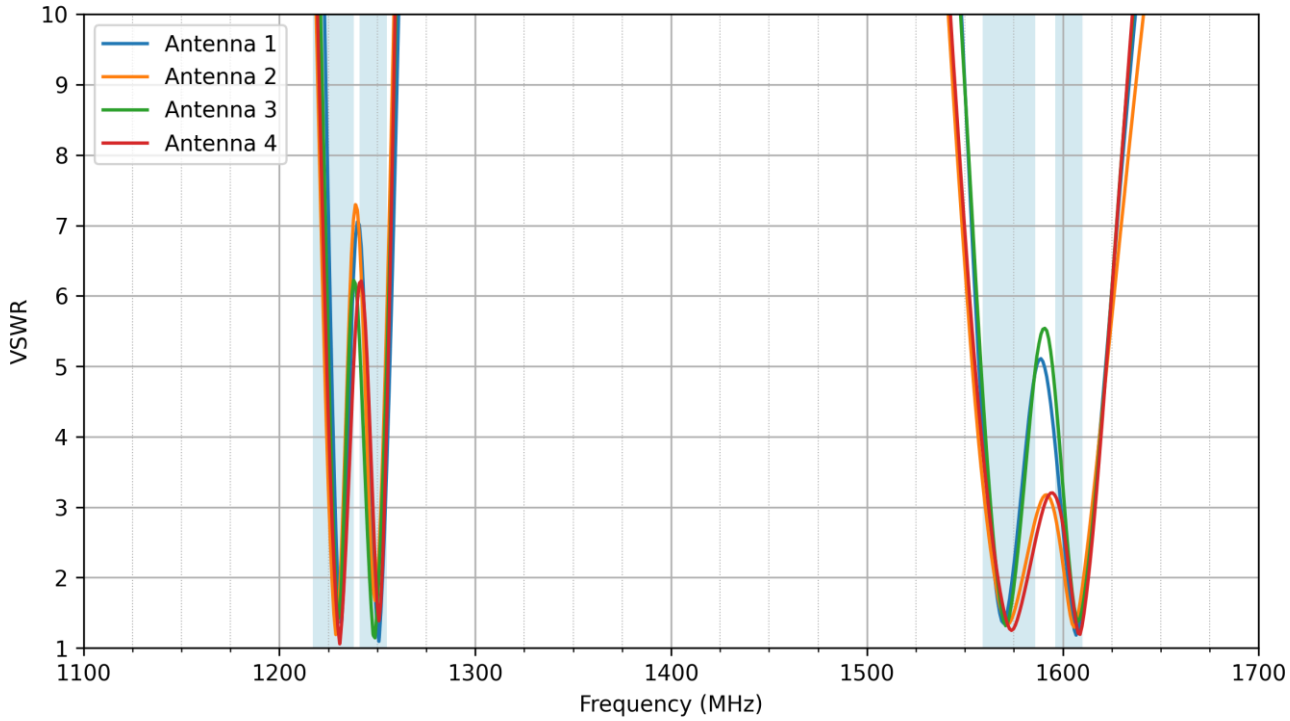


VNA Test Set-up

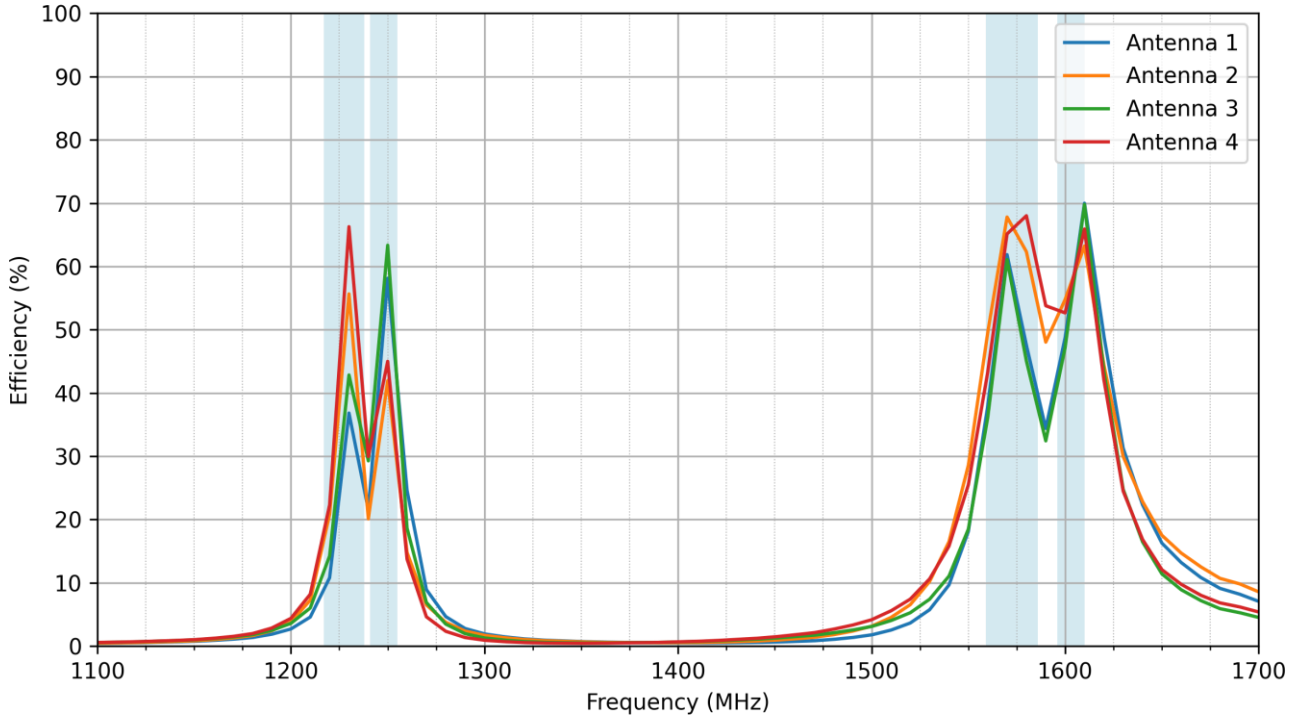
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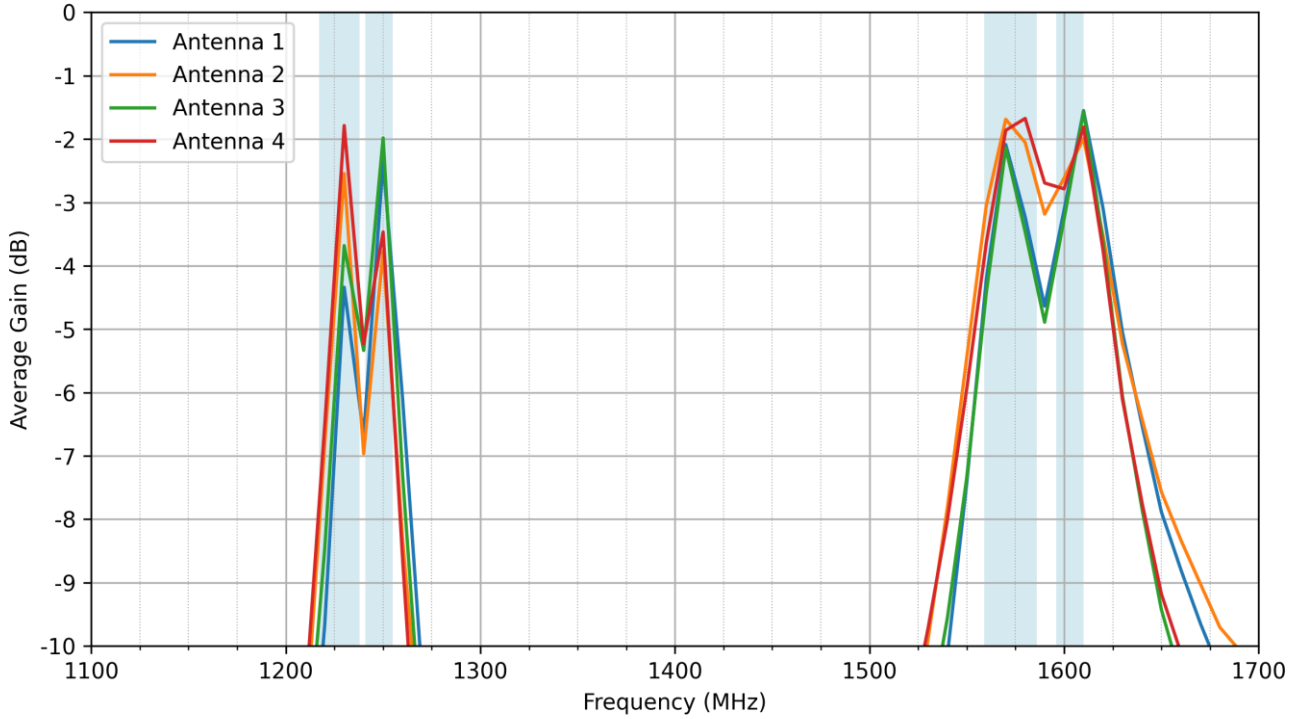
4.3 VSWR



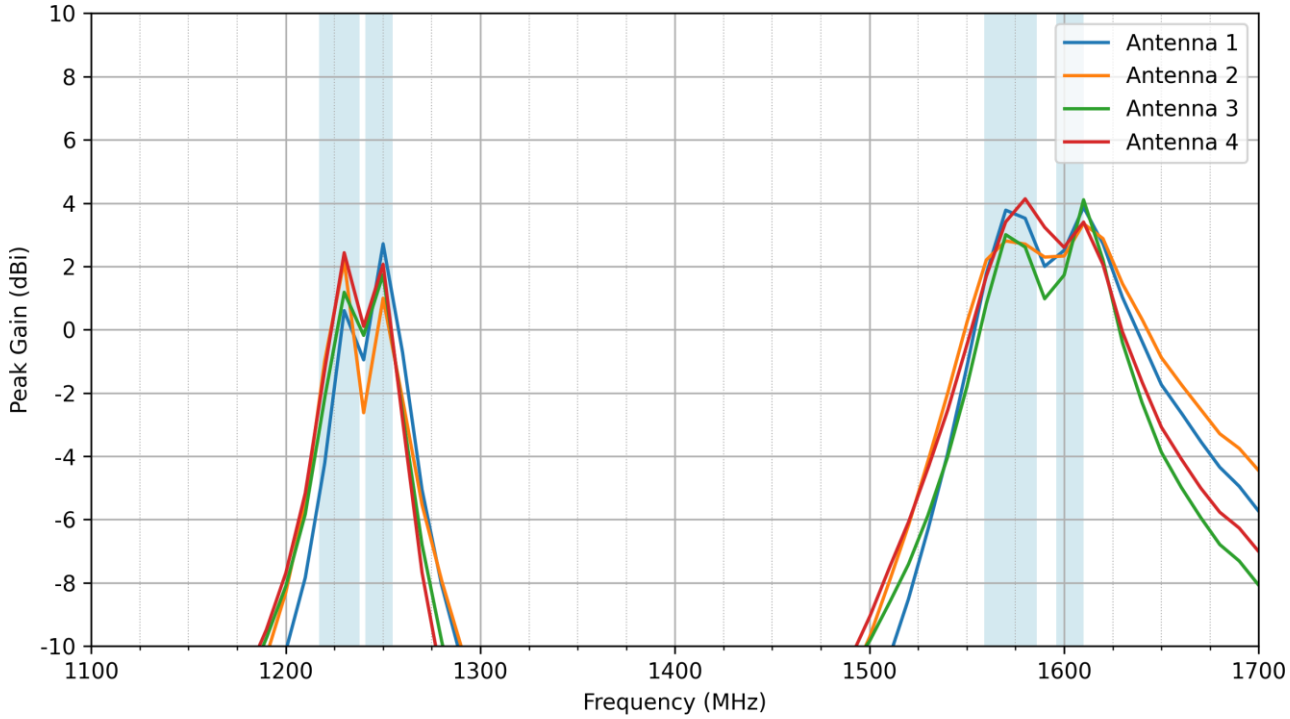
4.4 Efficiency



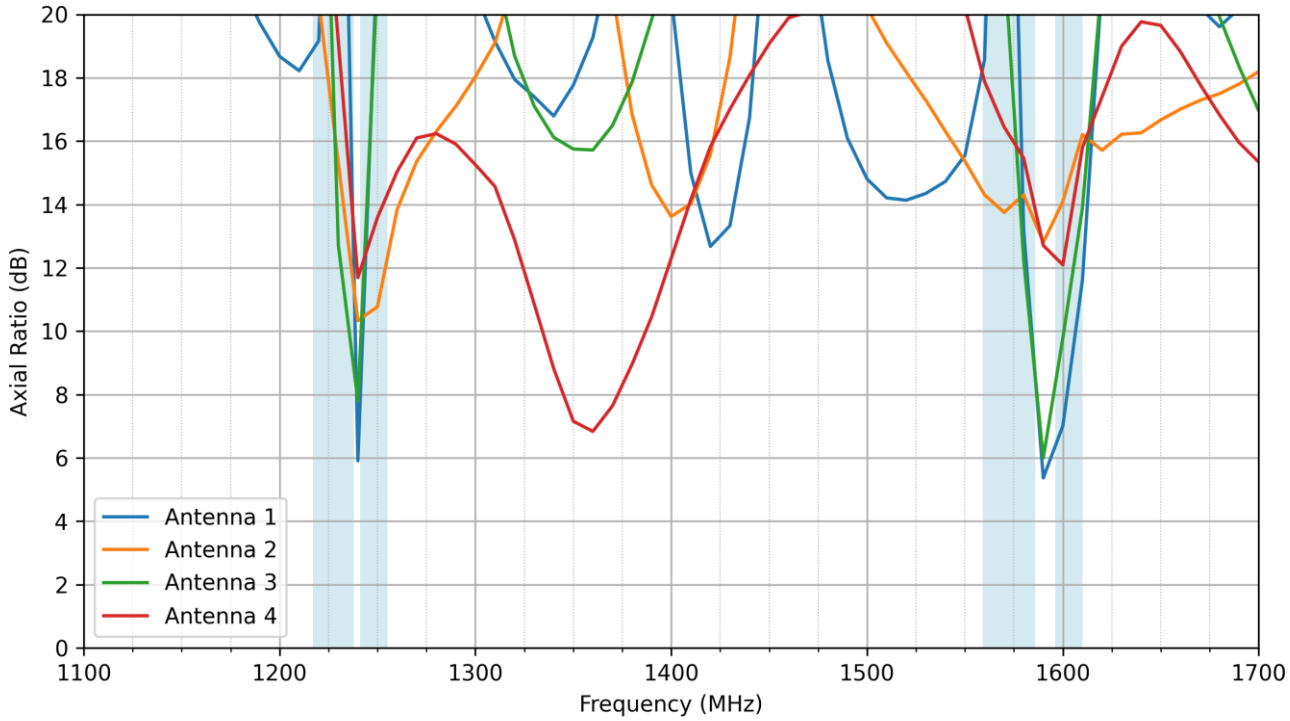
4.5 Average Gain



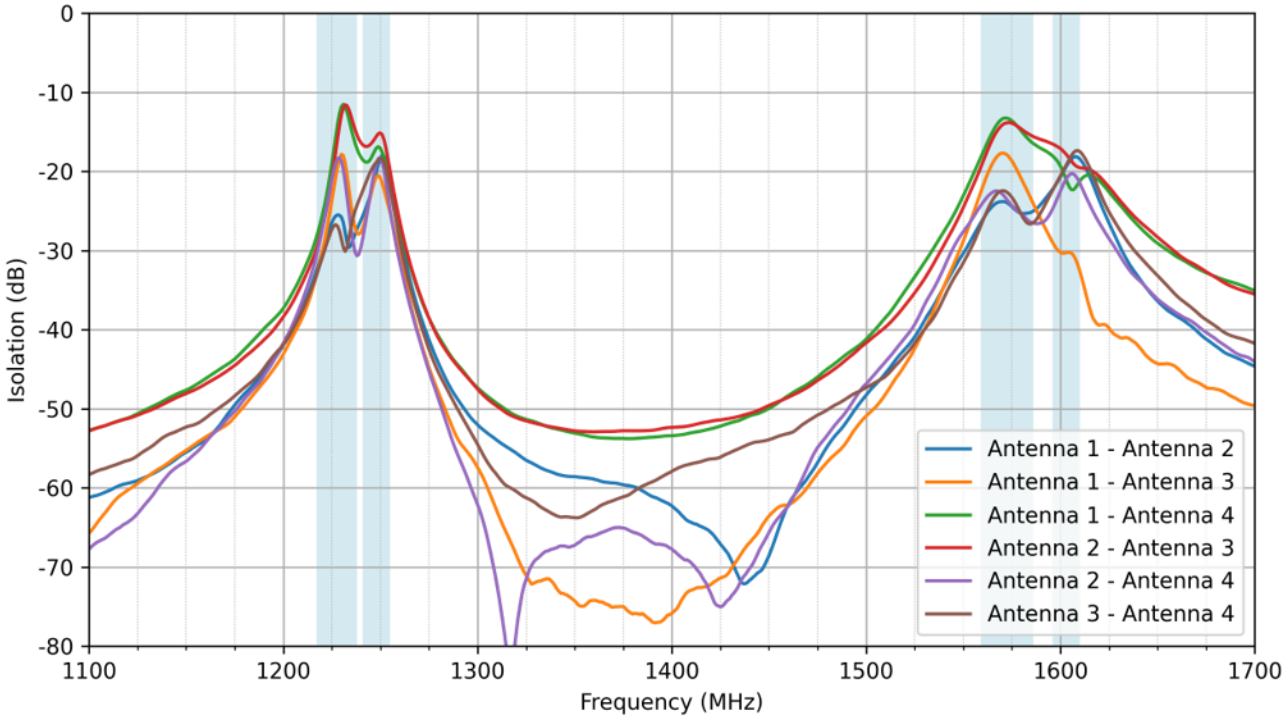
4.6 Peak Gain



4.7 Axial Ratio

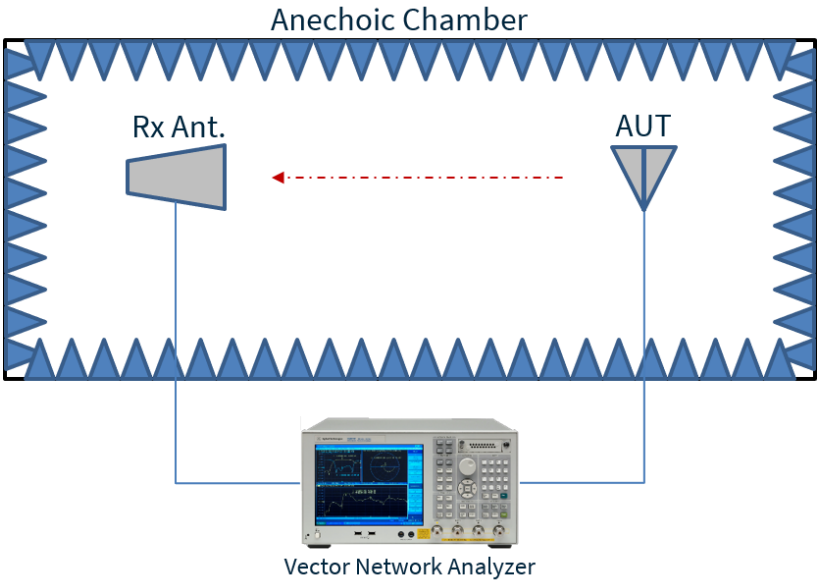


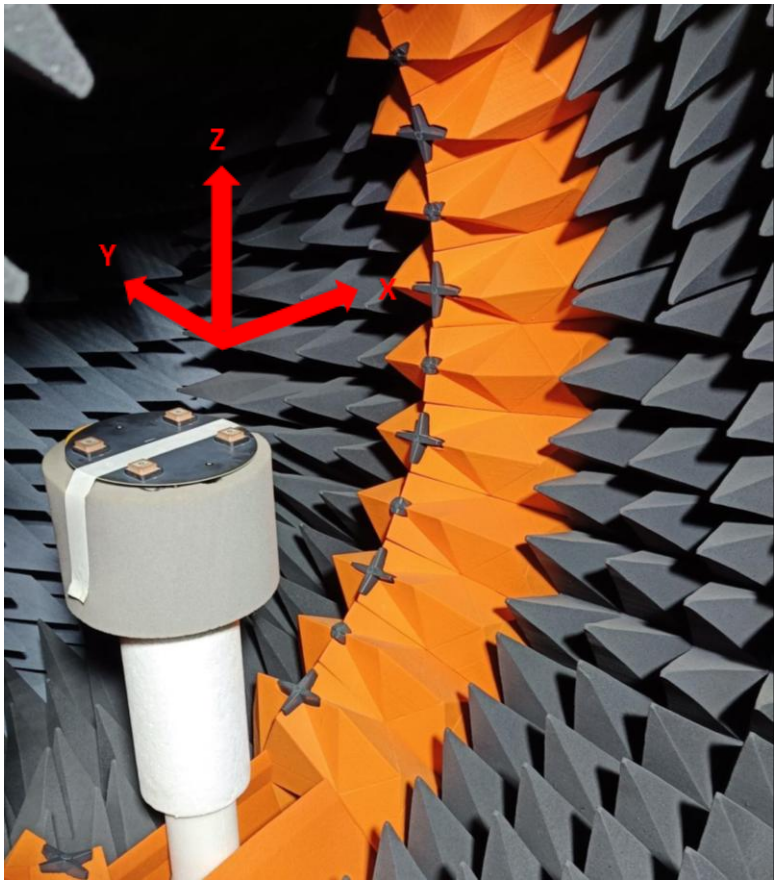
4.8 Isolation



5. Radiation Patterns

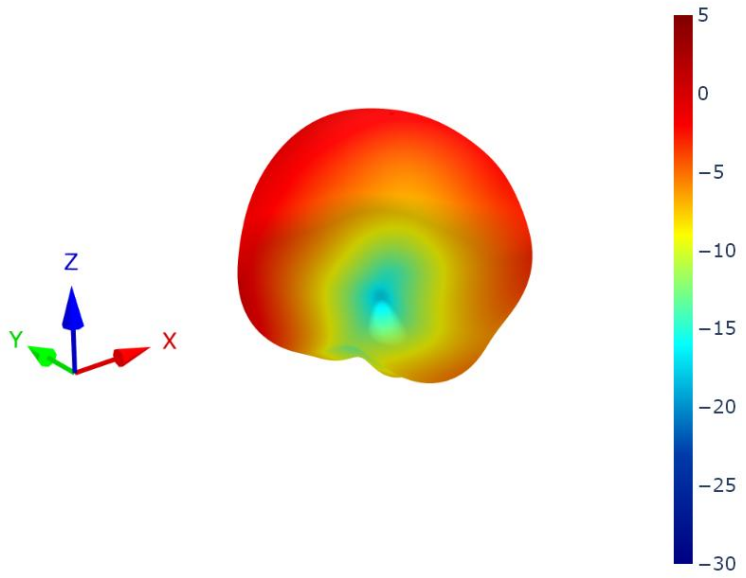
5.1 Test Setup

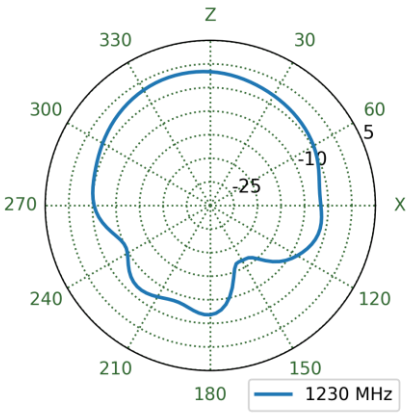
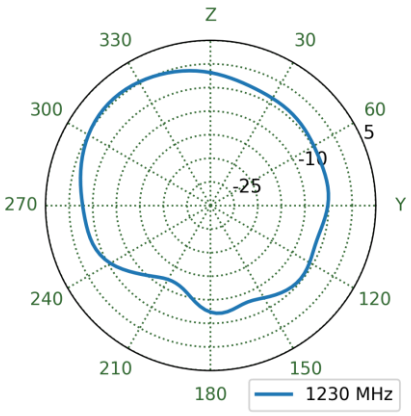
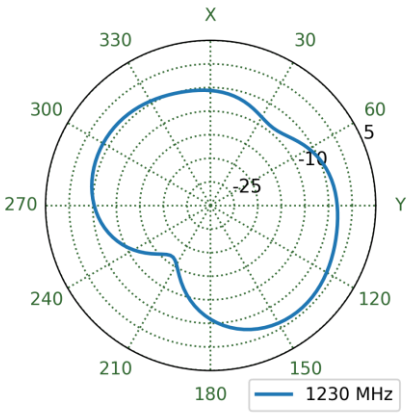




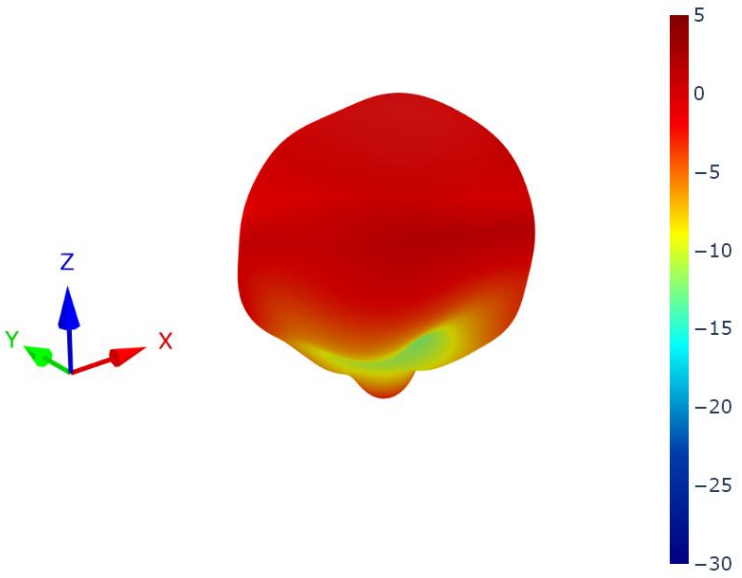
Chamber Test Set-up

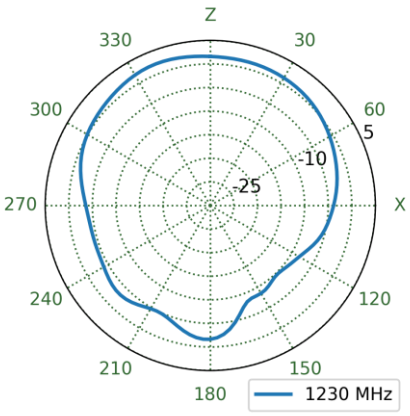
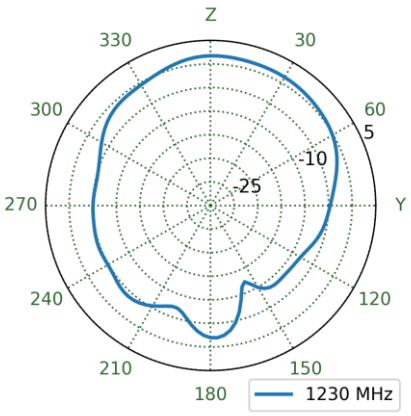
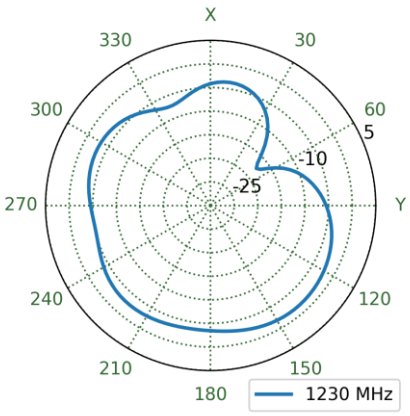
5.2 Antenna 1 Patterns at 1230 MHz



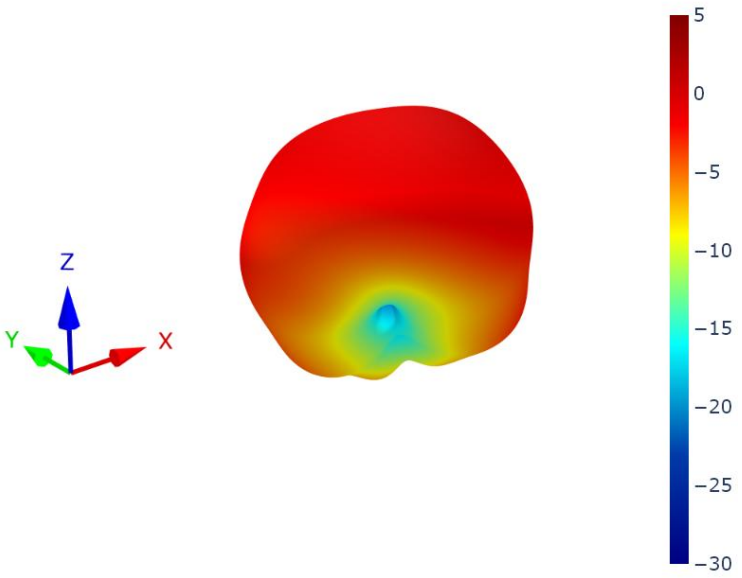
XZ Plane	YZ Plane	XY Plane
		

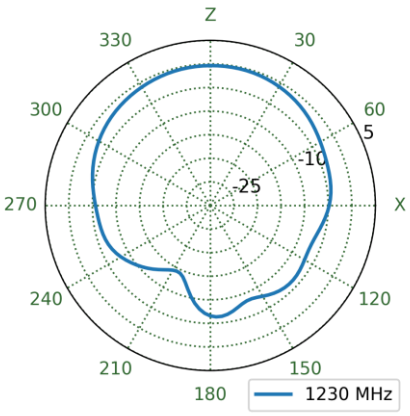
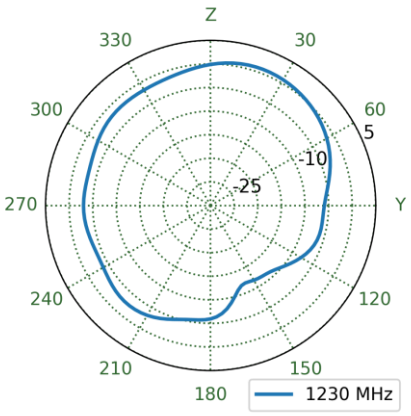
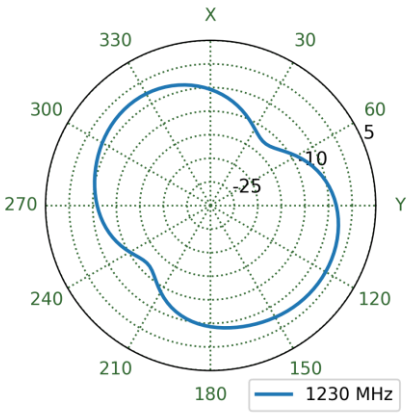
5.3 Antenna 2 Patterns at 1230 MHz



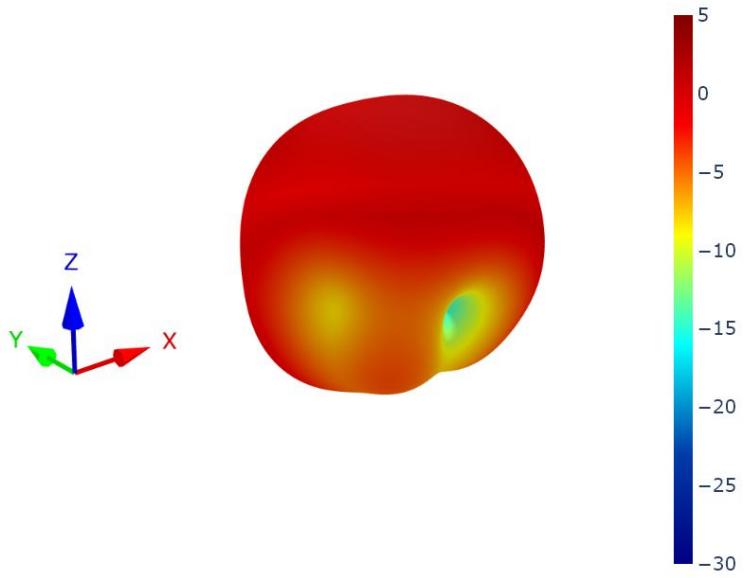
XZ Plane	YZ Plane	XY Plane
		

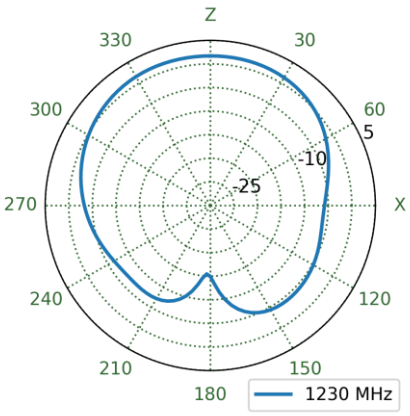
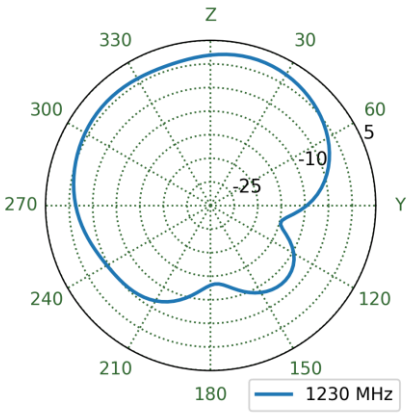
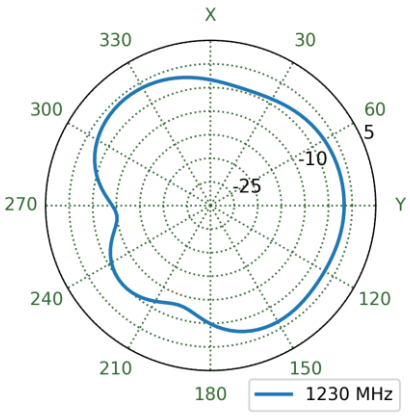
5.4 Antenna 3 Patterns at 1230 MHz



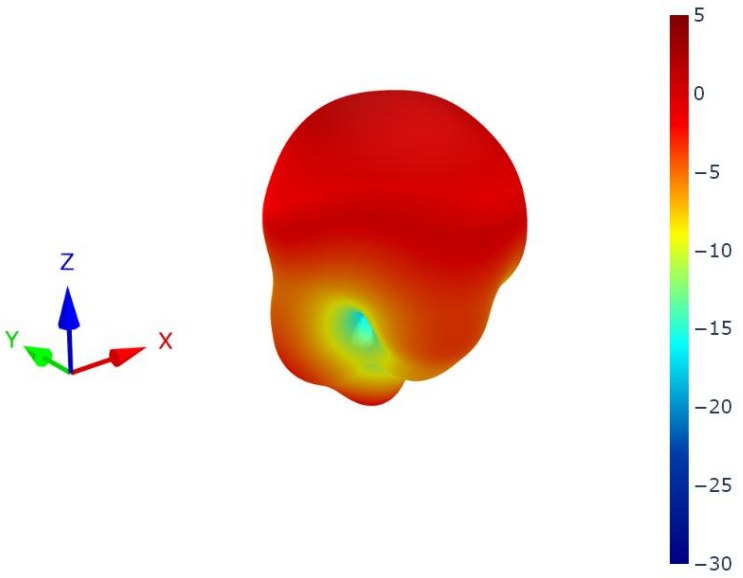
XZ Plane	YZ Plane	XY Plane
		

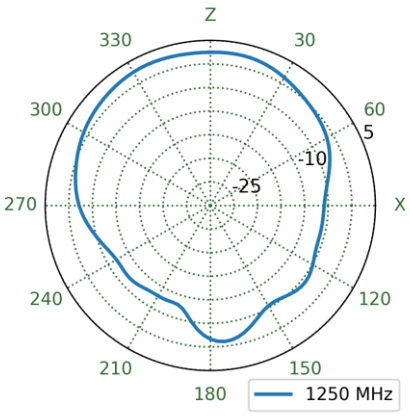
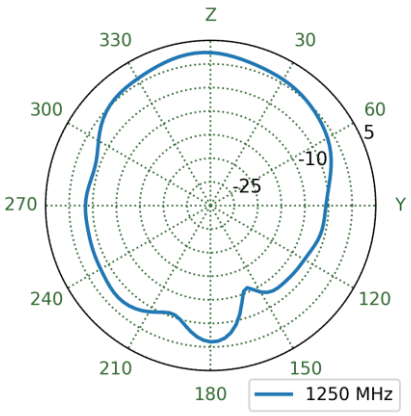
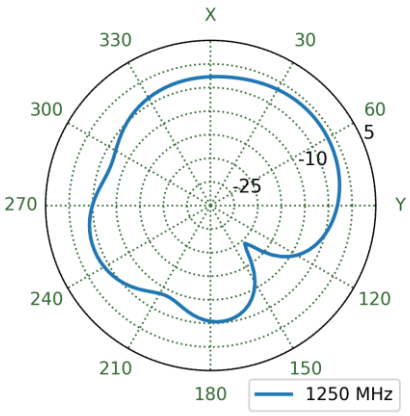
5.5 Antenna 4 Patterns at 1230 MHz



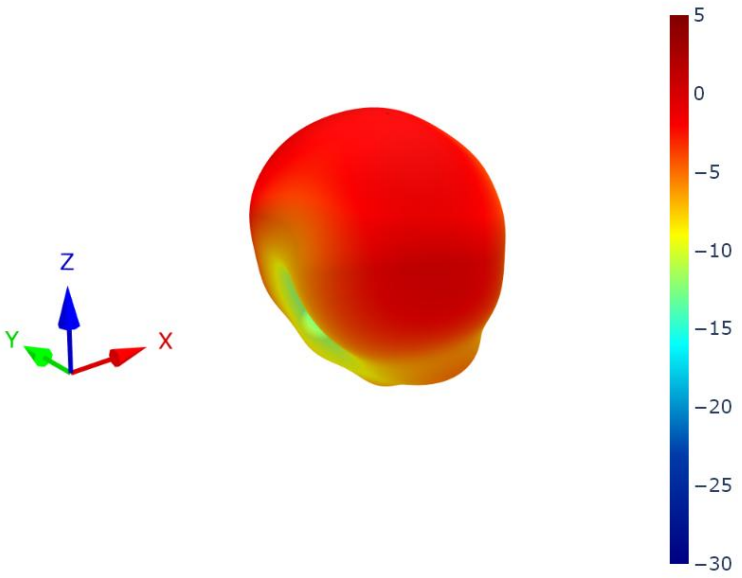
XZ Plane	YZ Plane	XY Plane
		

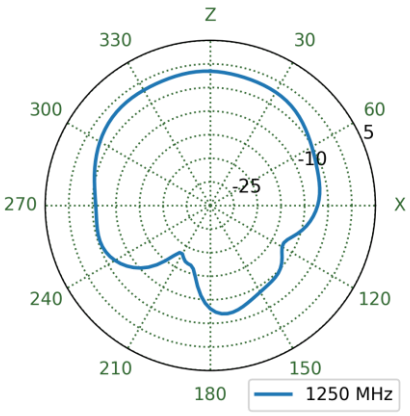
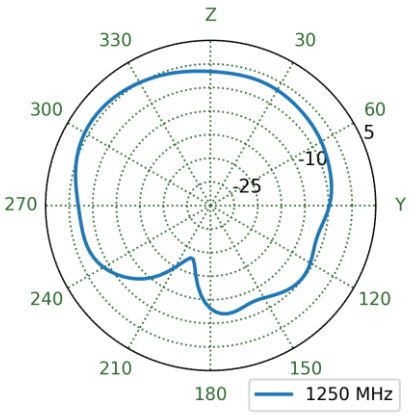
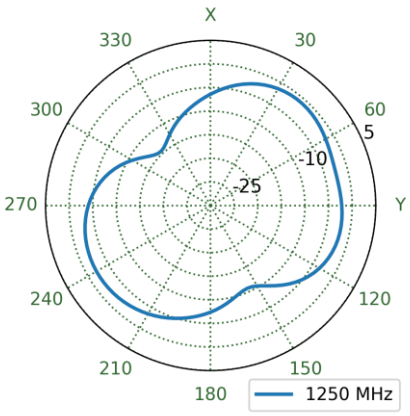
5.6 Antenna 1 Patterns at 1250 MHz



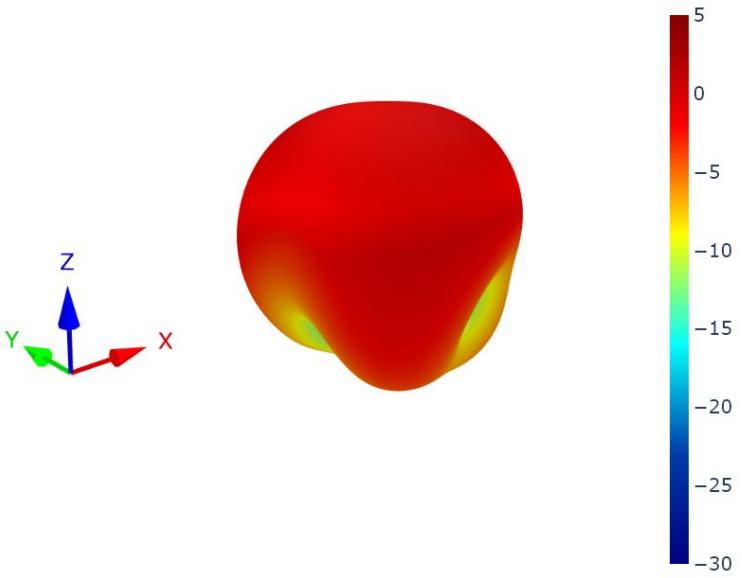
XZ Plane	YZ Plane	XY Plane
		

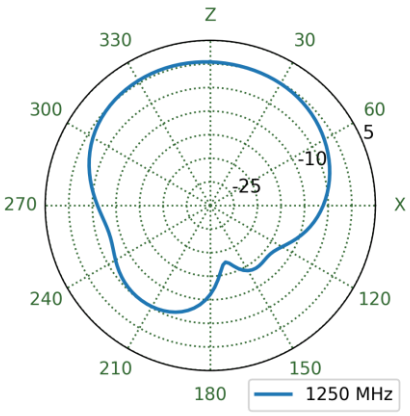
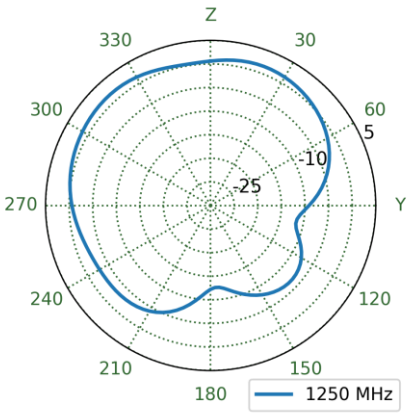
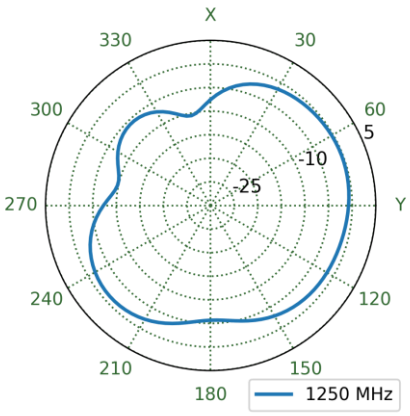
5.7 Antenna 2 Patterns at 1250 MHz



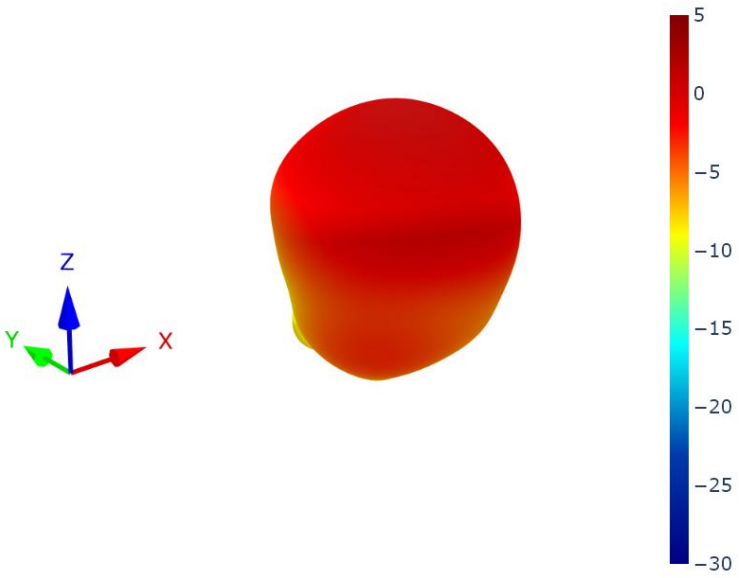
XZ Plane	YZ Plane	XY Plane
		

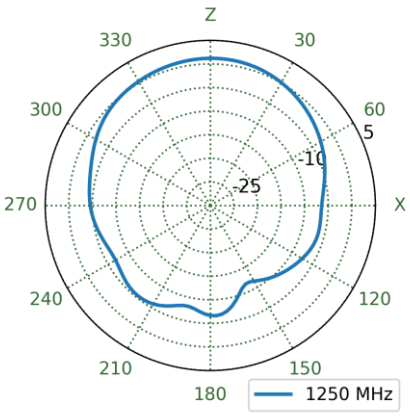
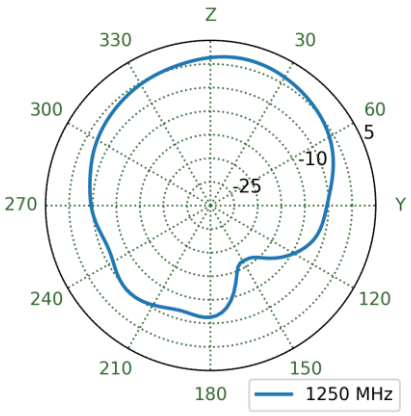
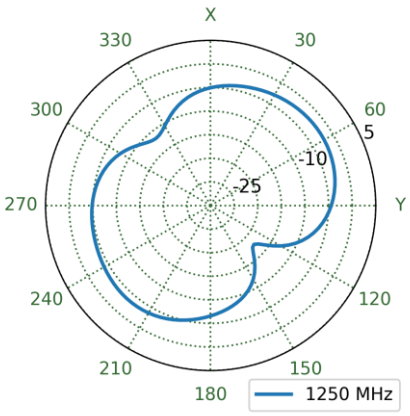
5.8 Antenna 3 Patterns at 1250 MHz



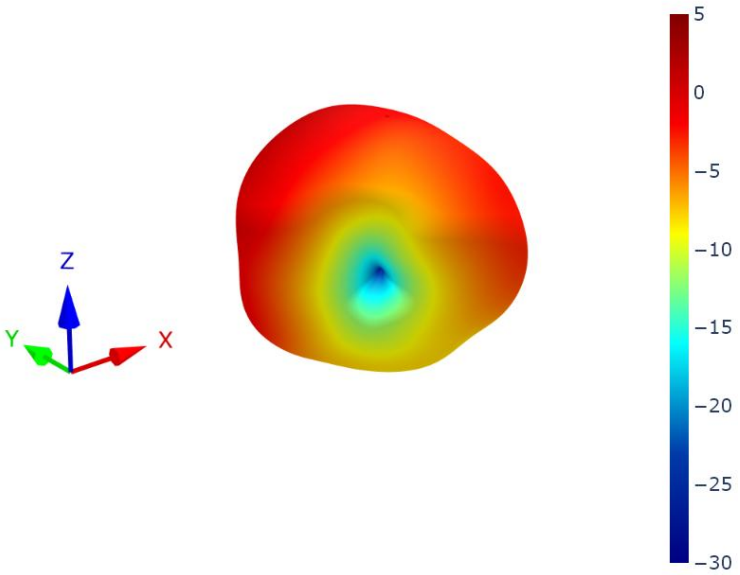
XZ Plane	YZ Plane	XY Plane
		

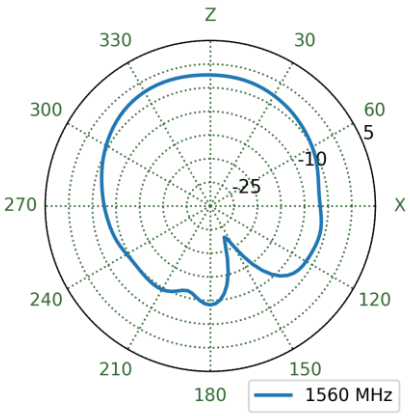
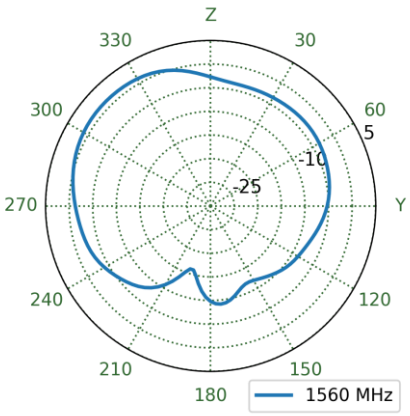
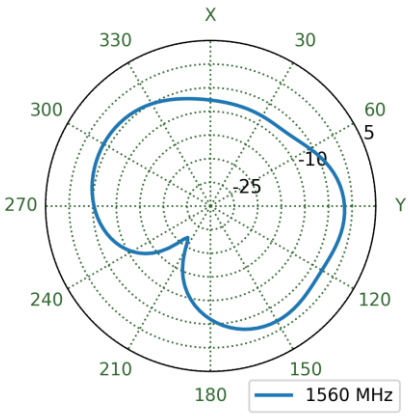
5.9 Antenna 4 Patterns at 1250 MHz



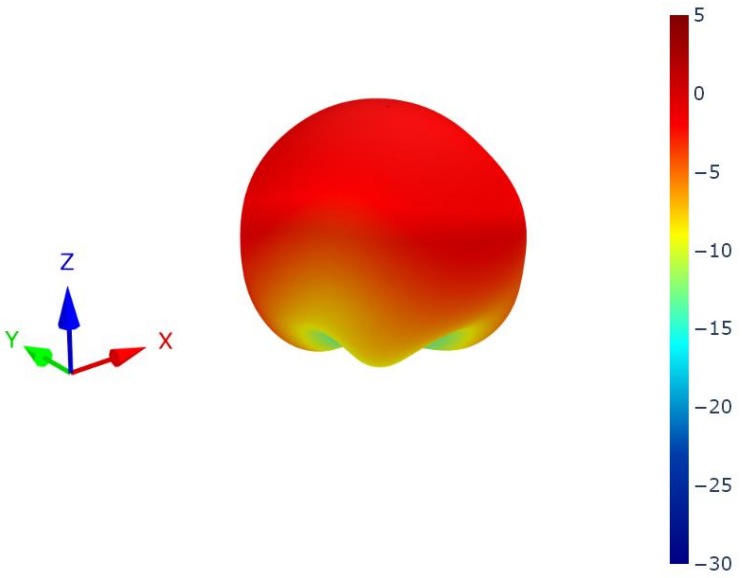
XZ Plane	YZ Plane	XY Plane
		

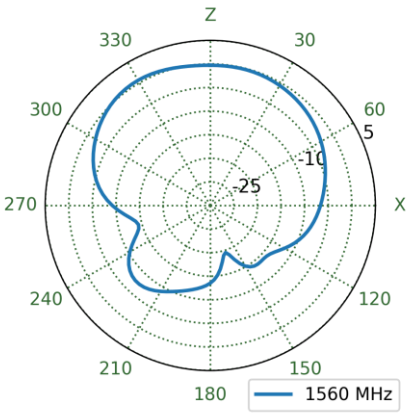
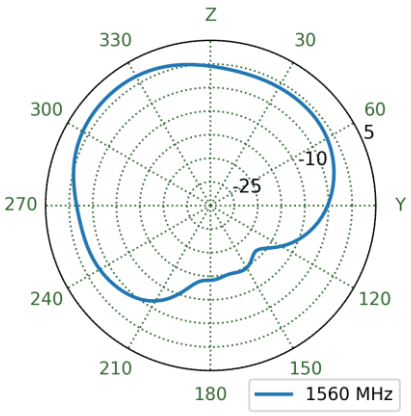
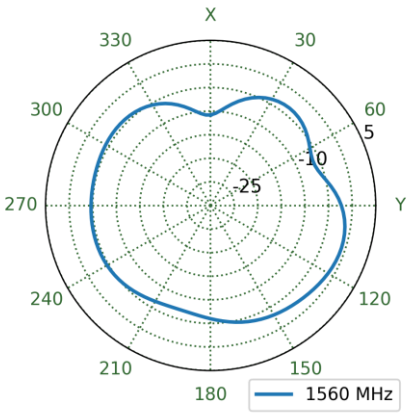
5.10 Antenna 1 Patterns at 1560 MHz



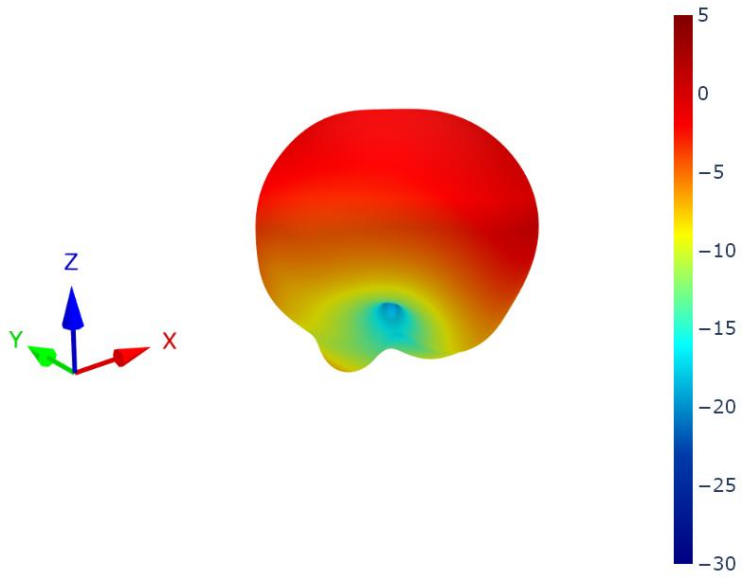
XZ Plane	YZ Plane	XY Plane
		

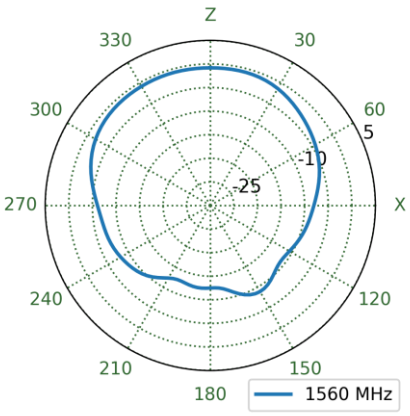
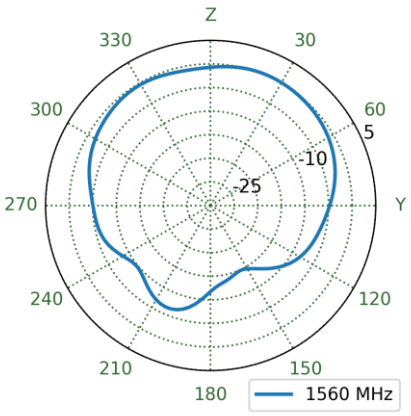
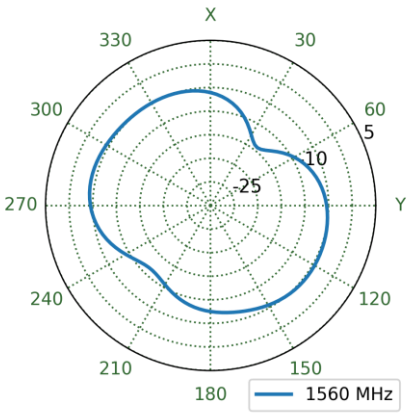
5.11 Antenna 2 Patterns at 1560 MHz



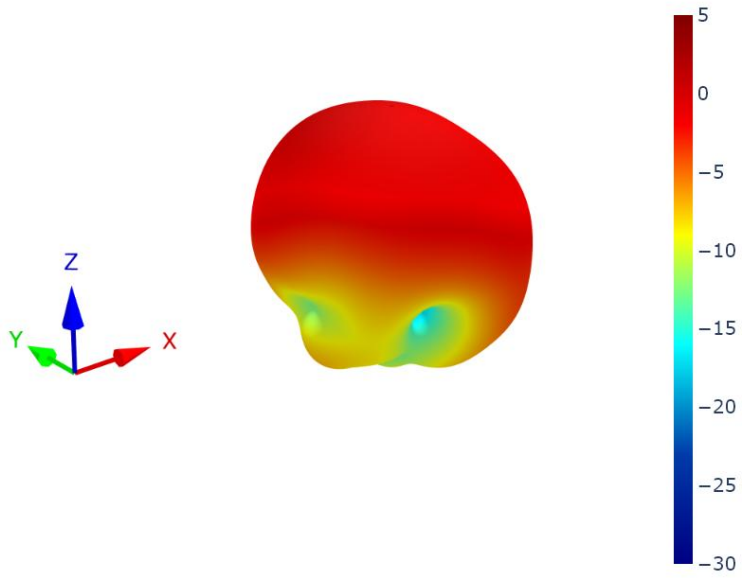
XZ Plane	YZ Plane	XY Plane
		

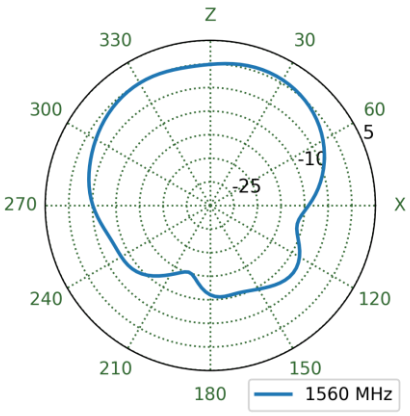
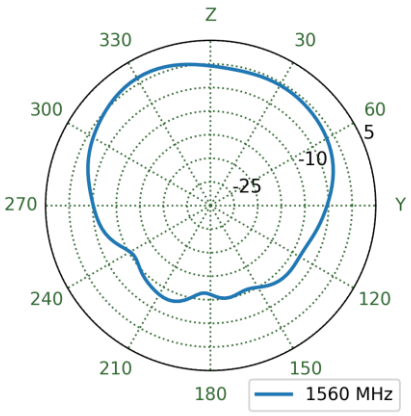
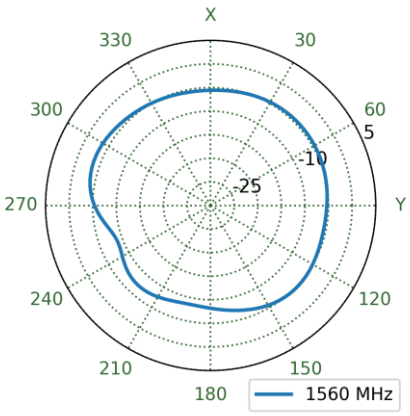
5.12 Antenna 3 Patterns at 1560 MHz



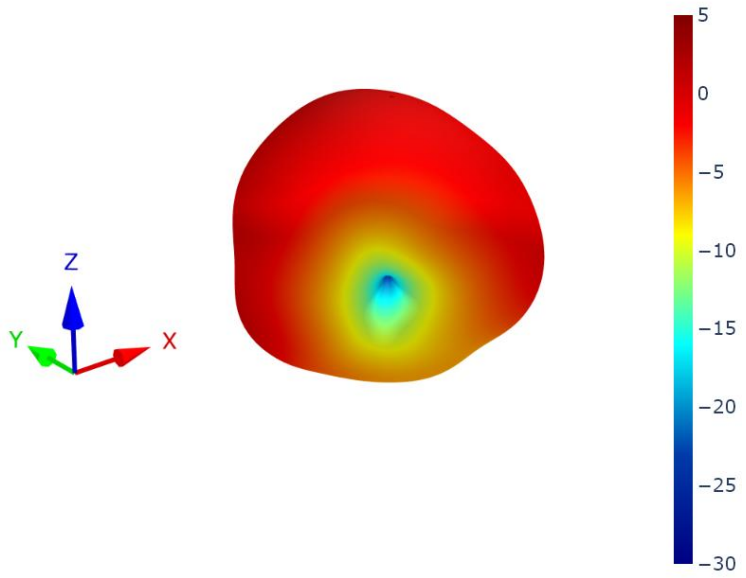
XZ Plane	YZ Plane	XY Plane
		

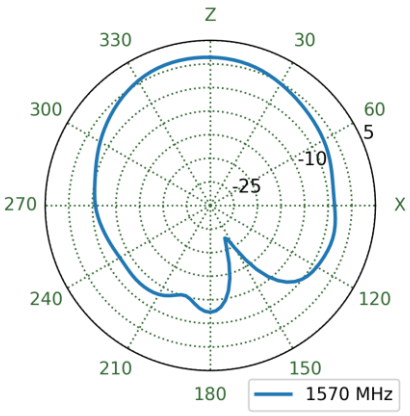
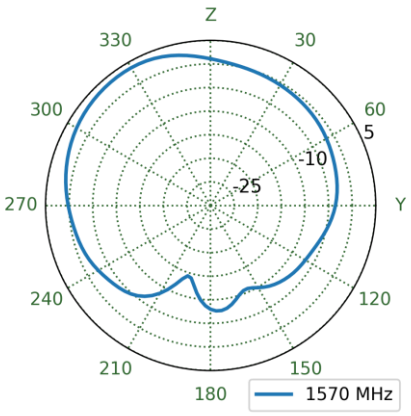
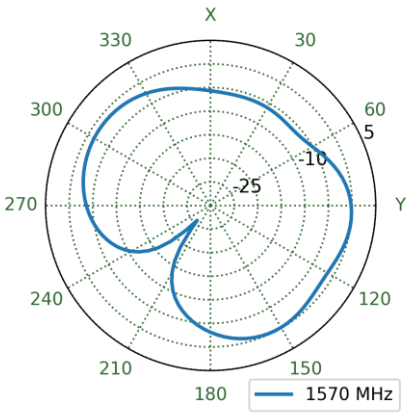
5.13 Antenna 4 Patterns at 1560 MHz



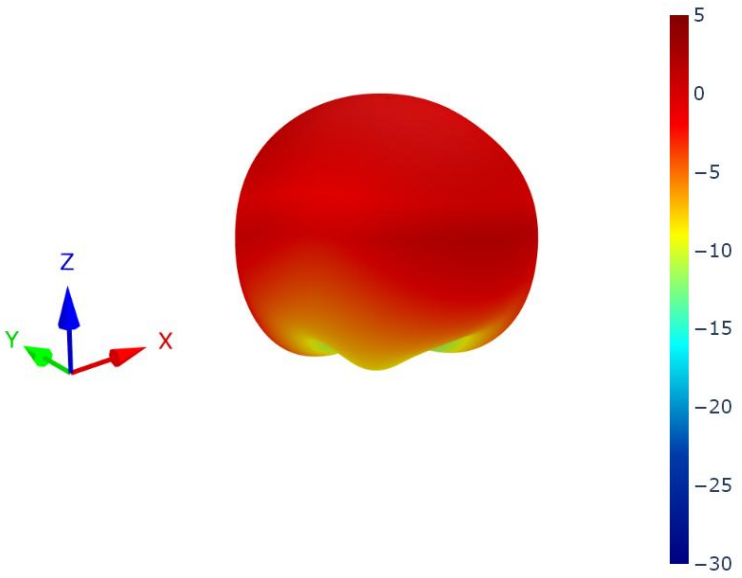
XZ Plane	YZ Plane	XY Plane
		

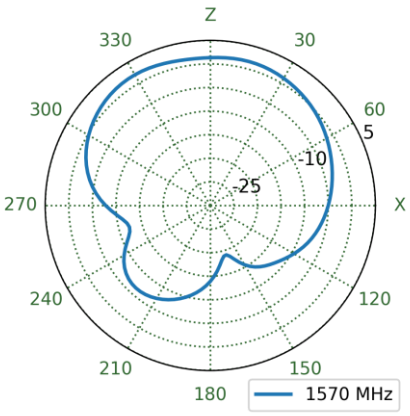
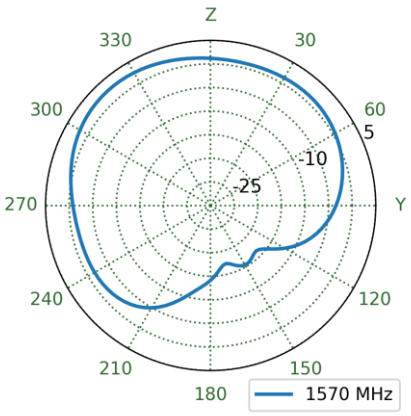
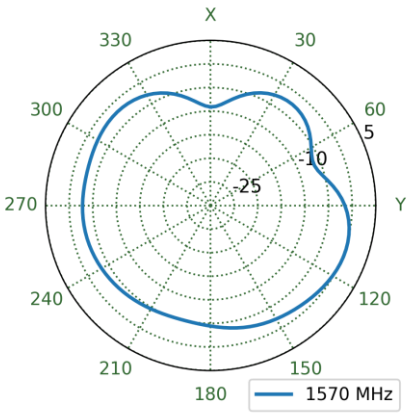
5.14 Antenna 1 Patterns at 1570 MHz



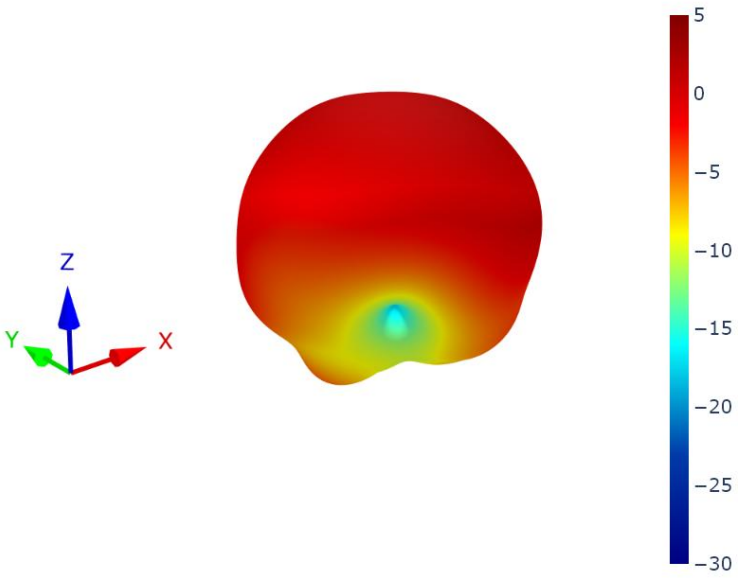
XZ Plane	YZ Plane	XY Plane
		

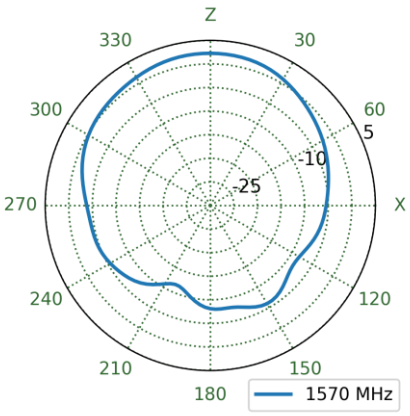
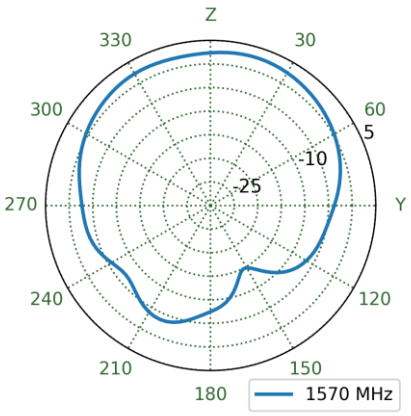
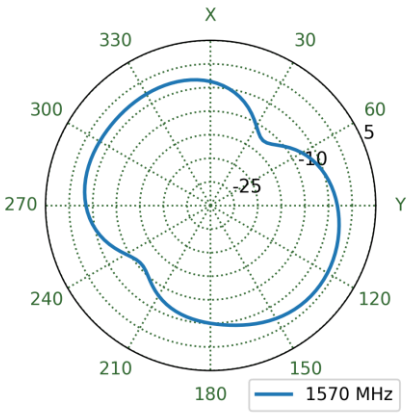
5.15 Antenna 2 Patterns at 1570 MHz



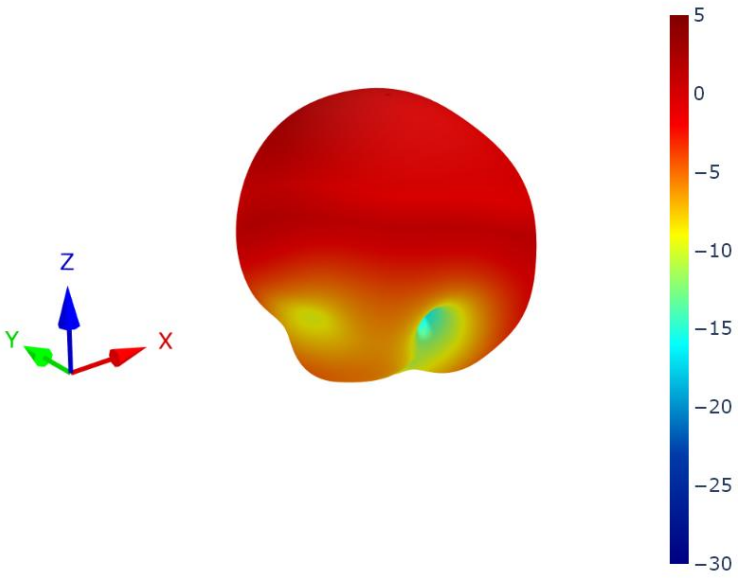
XZ Plane	YZ Plane	XY Plane
		

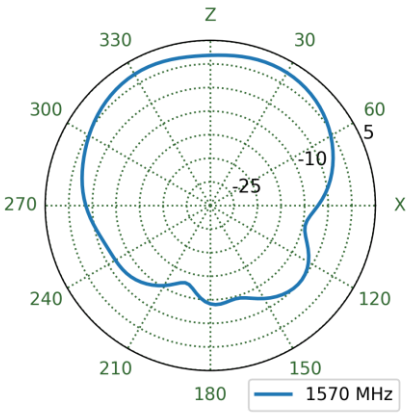
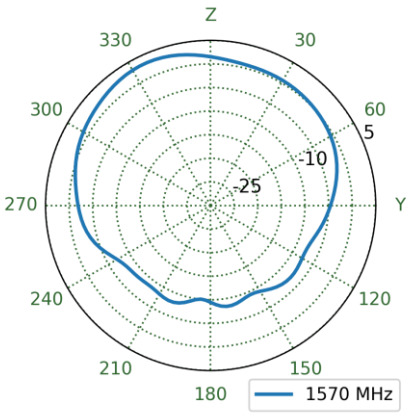
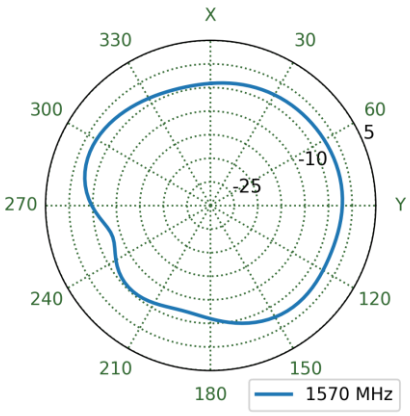
5.16 Antenna 3 Patterns at 1570 MHz



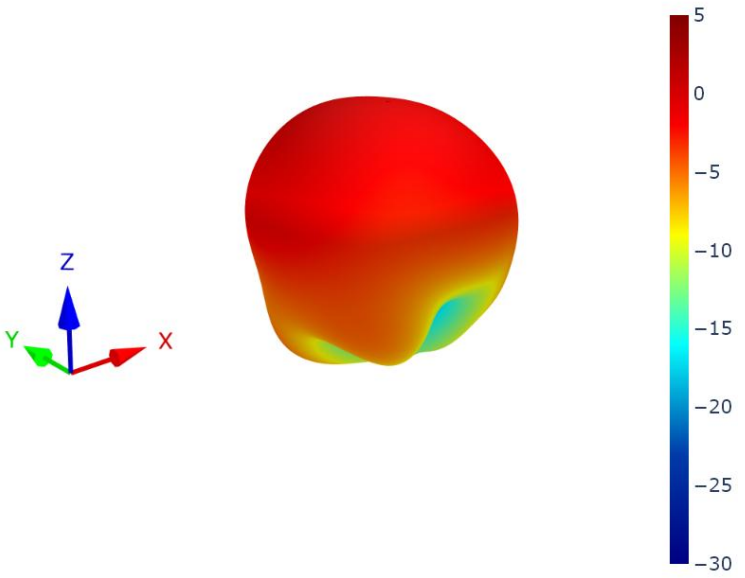
XZ Plane	YZ Plane	XY Plane
		

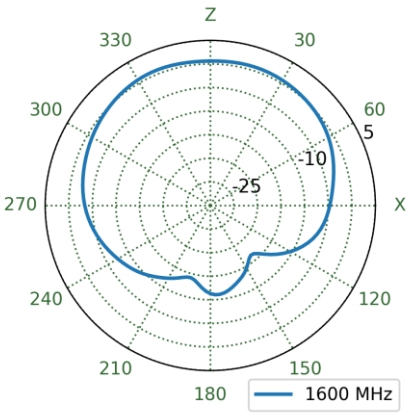
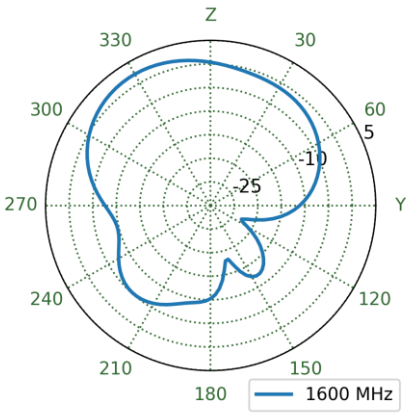
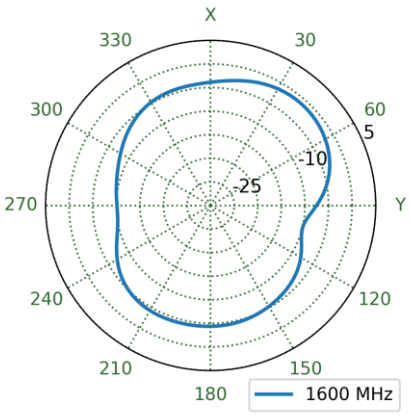
5.17 Antenna 4 Patterns at 1570 MHz



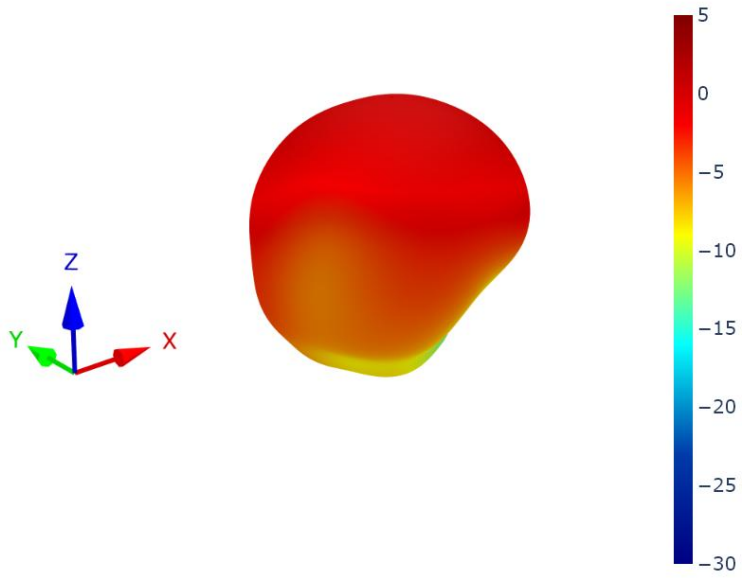
XZ Plane	YZ Plane	XY Plane
		

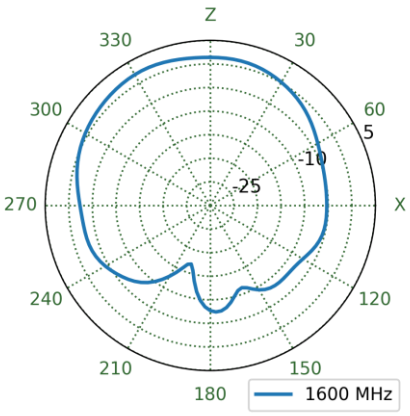
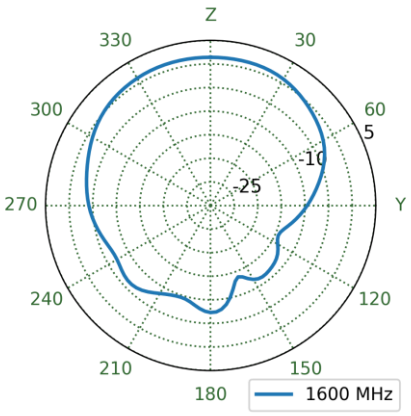
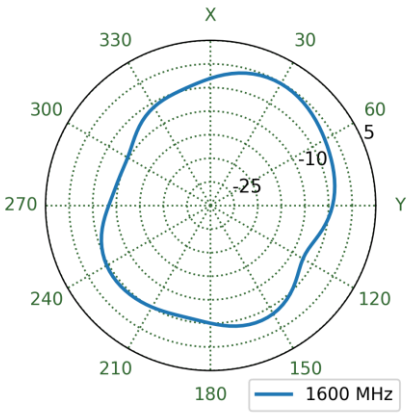
5.18 Antenna 1 Patterns at 1600 MHz



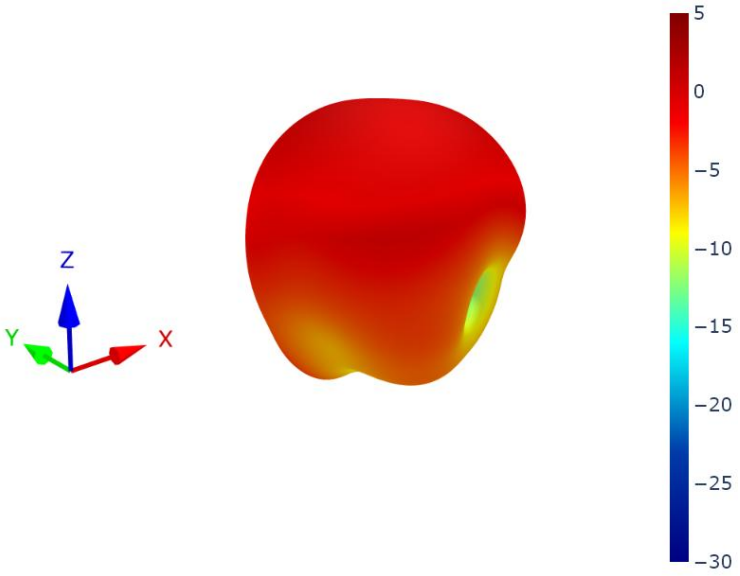
XZ Plane	YZ Plane	XY Plane
		

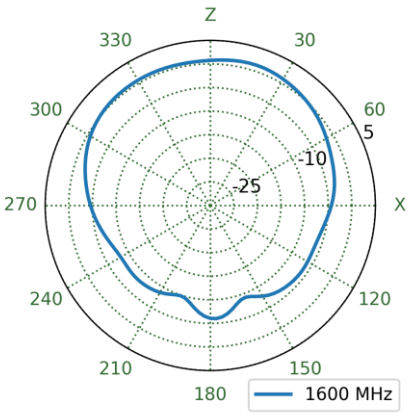
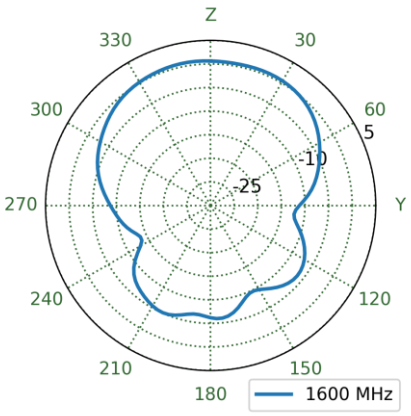
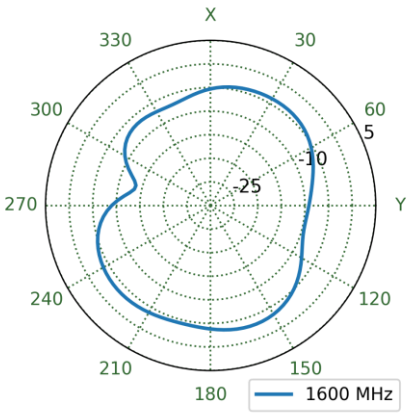
5.19 Antenna 2 Patterns at 1600 MHz



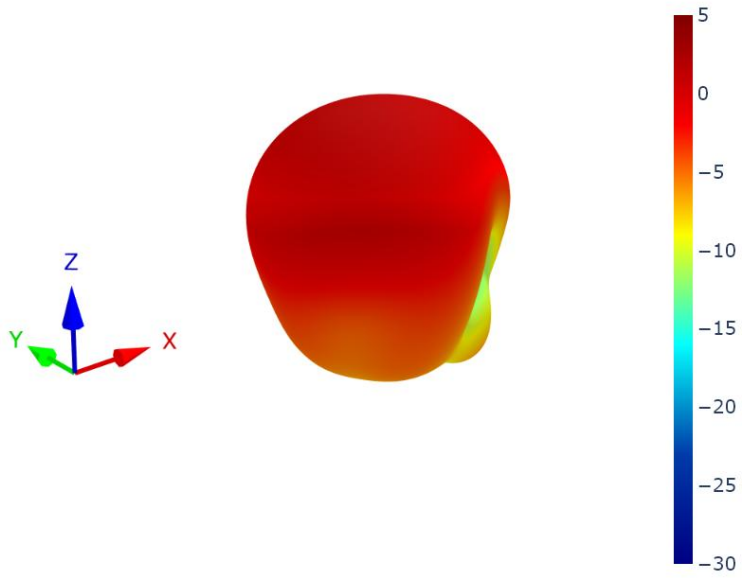
XZ Plane	YZ Plane	XY Plane
		

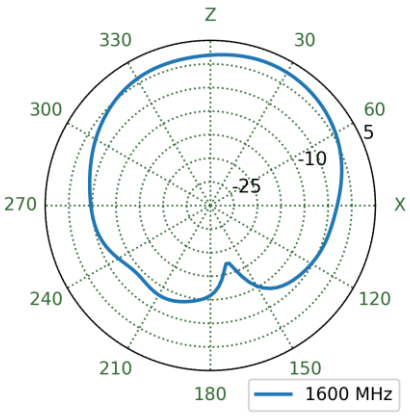
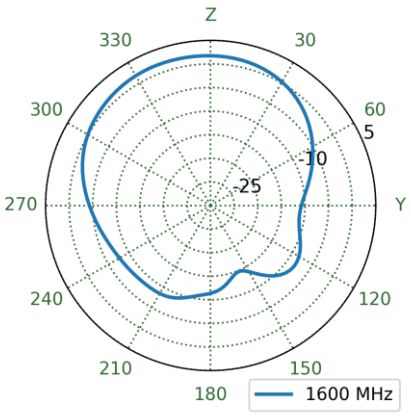
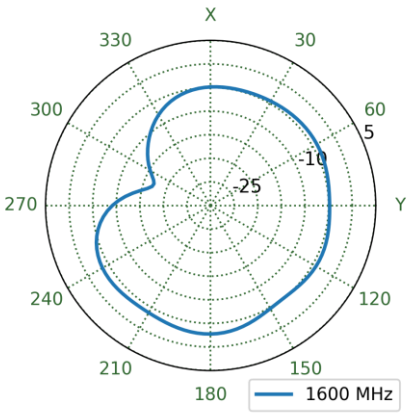
5.20 Antenna 3 Patterns at 1600 MHz



XZ Plane	YZ Plane	XY Plane
		

5.21 Antenna 4 Patterns at 1600 MHz



XZ Plane	YZ Plane	XY Plane
		

Changelog for the datasheet

SPE-26-8-236 – CRPA.170.H22.A

Revision: A (Original First Release)	
Date:	2026-11-03
Notes:	Initial Release
Author:	Gary West

Previous Revisions

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