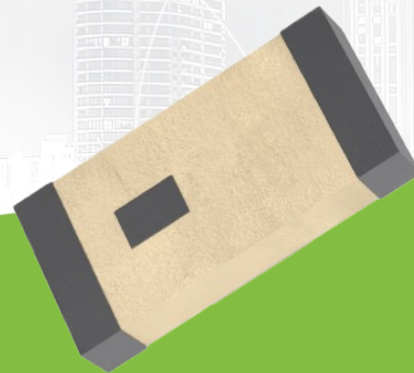




TAOGLAS®

Datasheet



Part No:
GWLA.15

Description

2-in-1 GPS/GALILEO/BeiDou & Dual-Band Wi-Fi Ceramic Loop Antenna

Features:

Small Footprint Embedded Loop Antenna
Omnidirectional Coverage
High Efficiency
Multi-Band GNSS from 1559-1610MHz
Dual Band Wi-Fi with 2.4 and 5.8GHz
Low profile SMD Antenna (Surface-Mount)
Dimensions: 3.2 x 1.6 x 0.5mm
RoHS & Reach Compliant

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1. Introduction



Super Small, GNSS & Wi-Fi Combination Loop Antenna for the Smallest IoT Devices

The GWLA.15 GPS and 2.4/5.8GHz 2in1 Embedded Ceramic Loop antenna is a high efficiency, miniature SMD, edge-mounted ceramic antenna. Covering GPS/GALILEO/BeiDOu and Wi-Fi, WLAN, ZigBee, Bluetooth, and 802.11ac applications the tiny loop antenna is perfect for application where PCB space is limited, such as hand-held devices. Rather than using two separate chip antennas, one for GPS/GALILEO and one for Wi-Fi, the GWLA.15 has two separate antenna feeds in a single antenna structure, making it the ideal choice. The GWLA.15 uses the main PCB as its ground plane, thereby maintaining good efficiency, despite its small size.

The GWLA.15 can be tuned for different PCB sizes/environments by changing the values of the matching circuit, however, this needs to be carefully calculated, contact a regional Taoglas facility for support. It is important to note that smaller ground-planes will reduce the efficiency of the antenna. At 3.2*1.6*0.5mm, the GWLA.15 is one of the smallest antennas available worldwide. This antenna is delivered on tape and reel and manufactured in a TS16949 first tier automotive approved facility. The GNSS performance is excellent, with high efficiency and an omnidirectional pattern. The Wi-Fi performance is incredibly good and delivers stable efficiency and radiation patterns which allow this antenna to be used in a huge variety of devices.

Typical Applications where GNSS and Dual-Band Wi-Fi are required include:

- Navigation or Position Tracking Systems
- Handheld Devices and Tablets
- POS Systems, Gateways and Routers
- Mobile Wireless Camera Systems
- Smart Home

Many module manufacturers specify peak gain limits for any antennas that are to be connected to that module. Those peak gain limits are based on free-space conditions. In practice, the peak gain of an antenna tested in free-space can degrade by at least 1 or 2 dB when put inside a device. So ideally you should go for a slightly higher peak gain antenna than mentioned on the module specification to compensate for this effect, giving you better performance. Upon testing of any of our antennas with your device and a selection of

appropriate layout, integration technique, or cable, Taoglas can make sure any of our antennas' peak gain will be below the peak gain limits.

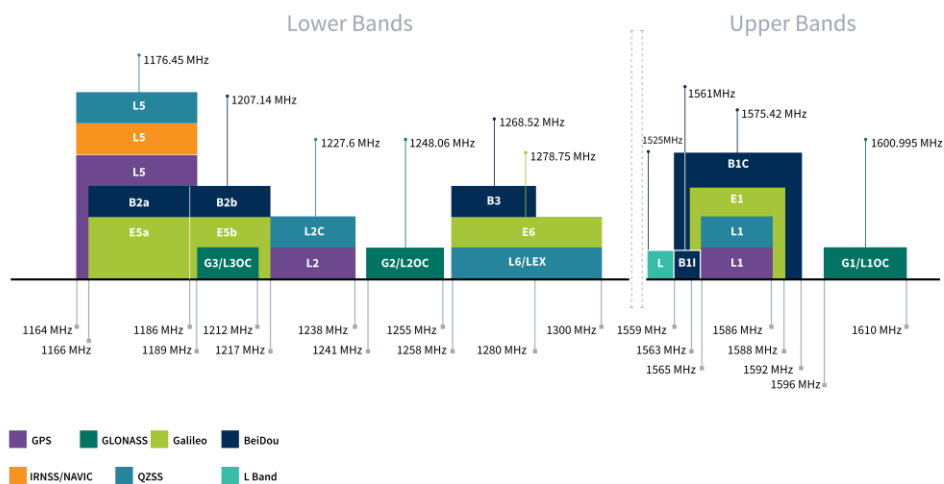
Taoglas can then issue a specification and/or report for the selected antenna in your device that will clearly show it complying with the peak gain limits, so you can be assured you are meeting regulatory requirements for that module. For example, a module manufacturer may state that the antenna must have less than 2 dBi peak gain, but you don't need to select an embedded antenna that has a peak gain of less than 2 dBi in free-space. This will give you a less optimized solution. It is better to go for a slightly higher free-space peak gain of 3 dBi or more if available.

Once that antenna gets integrated into your device, performance will degrade below this 2 dBi peak gain due to the effects of GND plane, surrounding components, and device housing. If you want to be absolutely sure, contact Taoglas and we will test. Choosing a Taoglas antenna with a higher peak gain than specified by the module manufacturer and enlisting our help will ensure you are getting the best performance possible without exceeding the peak gain limits.



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	1603
VSWR (max.)	1:1	1:1	2:1
Antenna Efficiency (%)	47.62	49.48	40.56
Antenna Peak Gain (dBi)	-0.54	-0.16	-0.81
Isolation (dB)	>12		
Polarization	Linear		
Impedance	50 Ω		
Radiation Pattern	Omni		
Max. input power	10W		

Wi-Fi Electrical

Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
Wi-Fi - 2GHz	2400-2500	40.6	-3.91	-0.34	50 Ω	Linear	Omni	2W
Wi-Fi - 5GHz	5150-5850	58.4	-2.33	2.12				

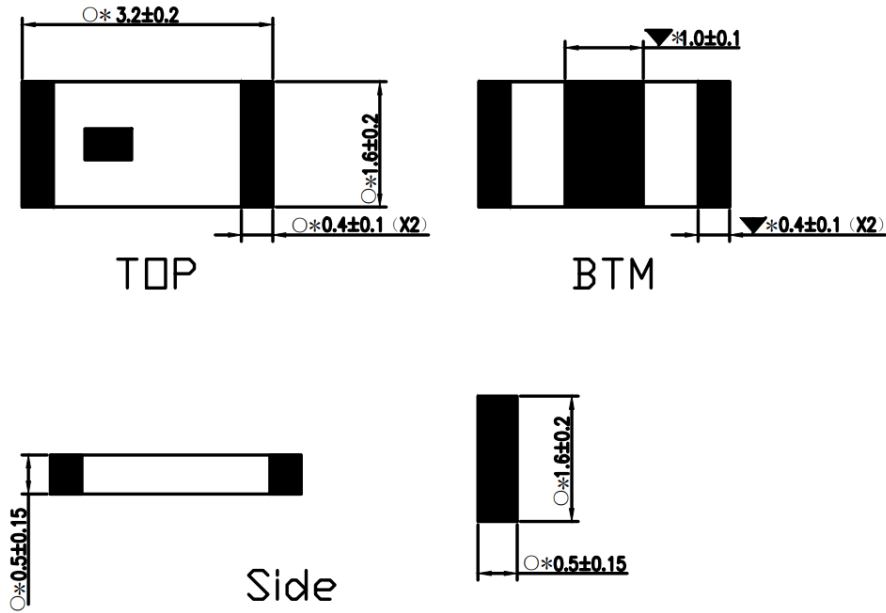
Mechanical

Dimensions	3.2 x 1.6 x 0.5mm
Ground Plane	80*40mm (Standard Evaluation Board)
Weight	0.02g

Environmental

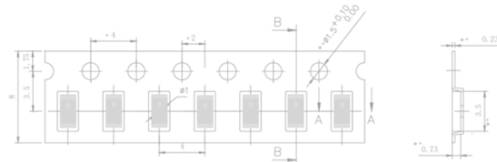
Temperature Range	-40°C to 85°C
Relative Humidity	20% to 70%
Moisture Sensitivity	3 (168 Hours)

3. Mechanical Drawing



4. Packaging

3000 PCS / Tape & Reel



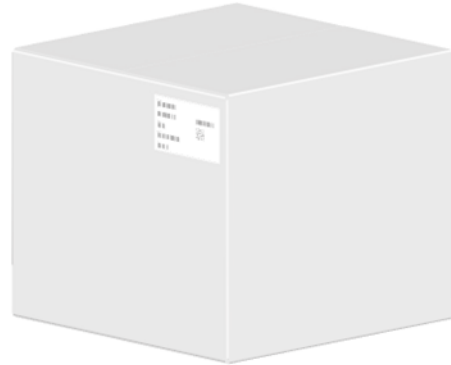
1 PCS / Vacuum bag
Vacuum bag: 225 x 240mm



6000 PCS / Box
Box dimensions: 185 x 185 x 30mm
SPQ Label
Weight: 245g



60000 PCS / Carton
Carton: 330 x 210 x 210mm
Carton Label
Weight: 2.79Kg



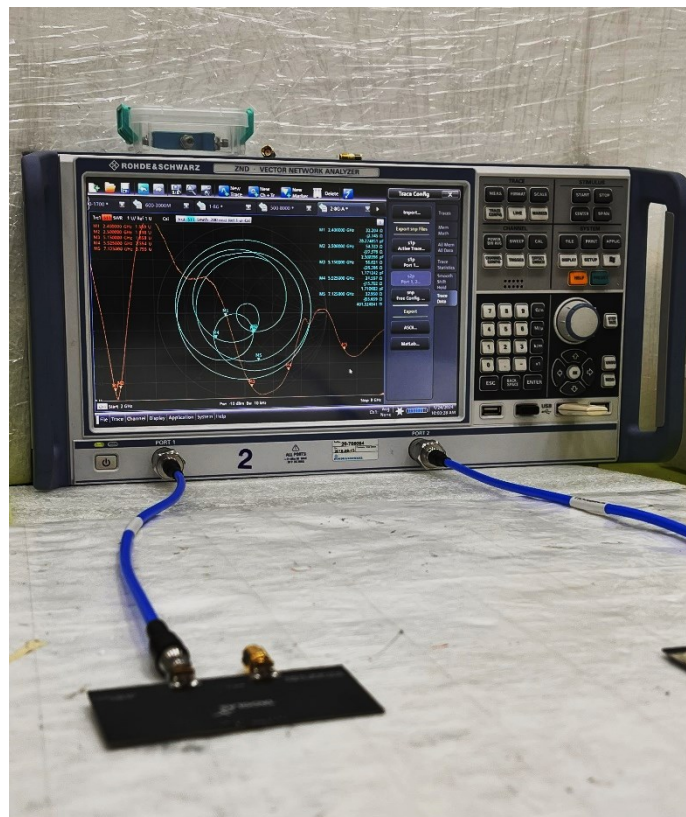
5. Antenna Characteristics

5.1 Test Setup

AUT

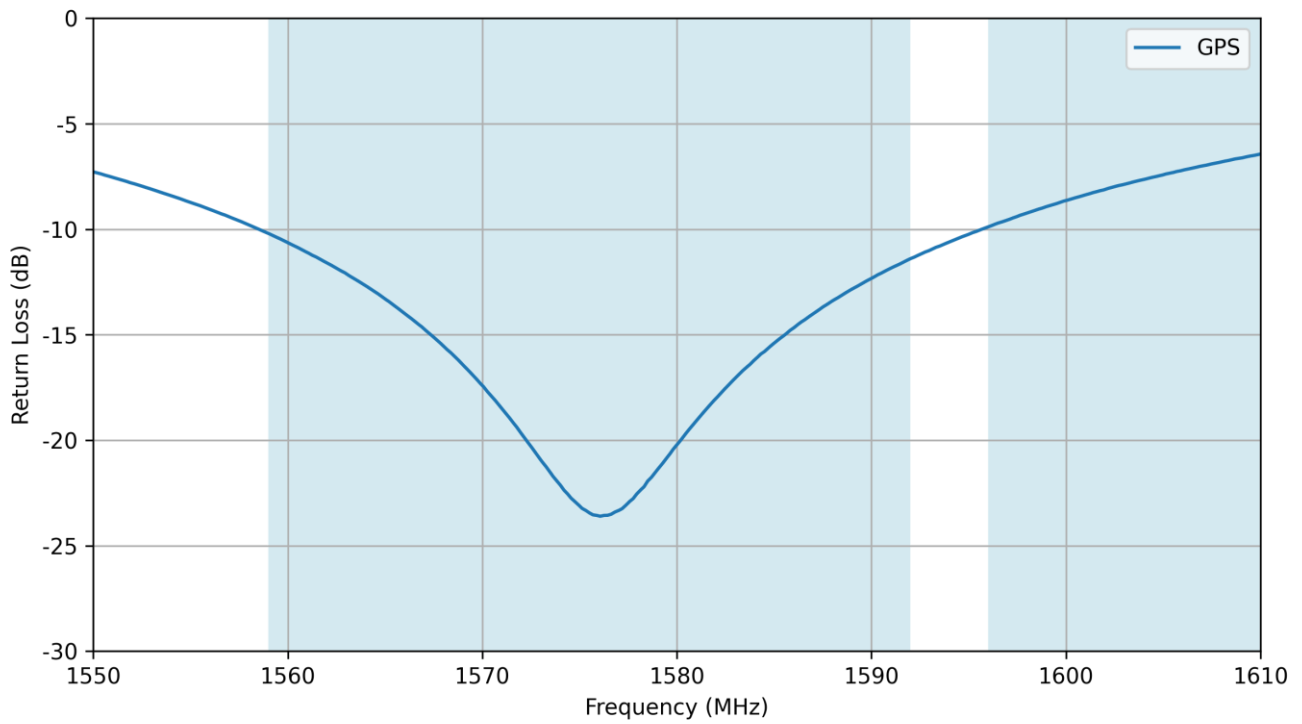


Vector Network Analyzer

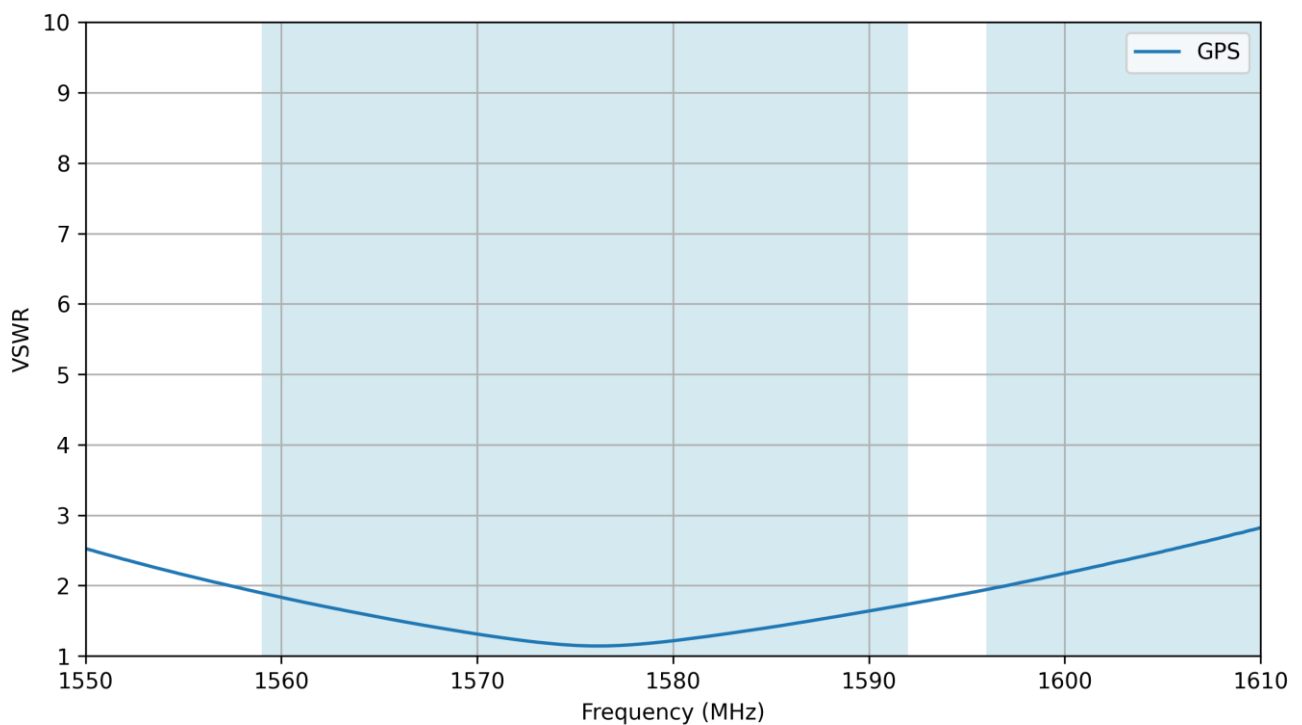


VNA Test Setup

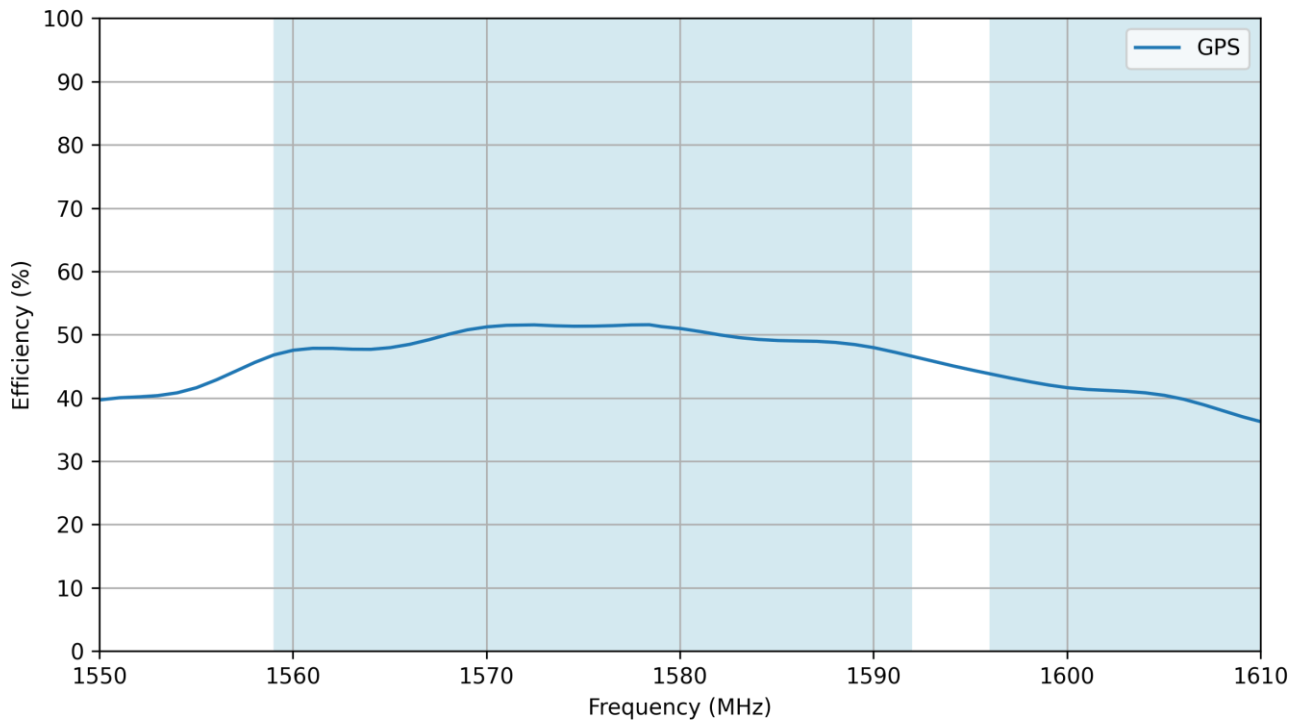
5.2 GNSS - Return Loss



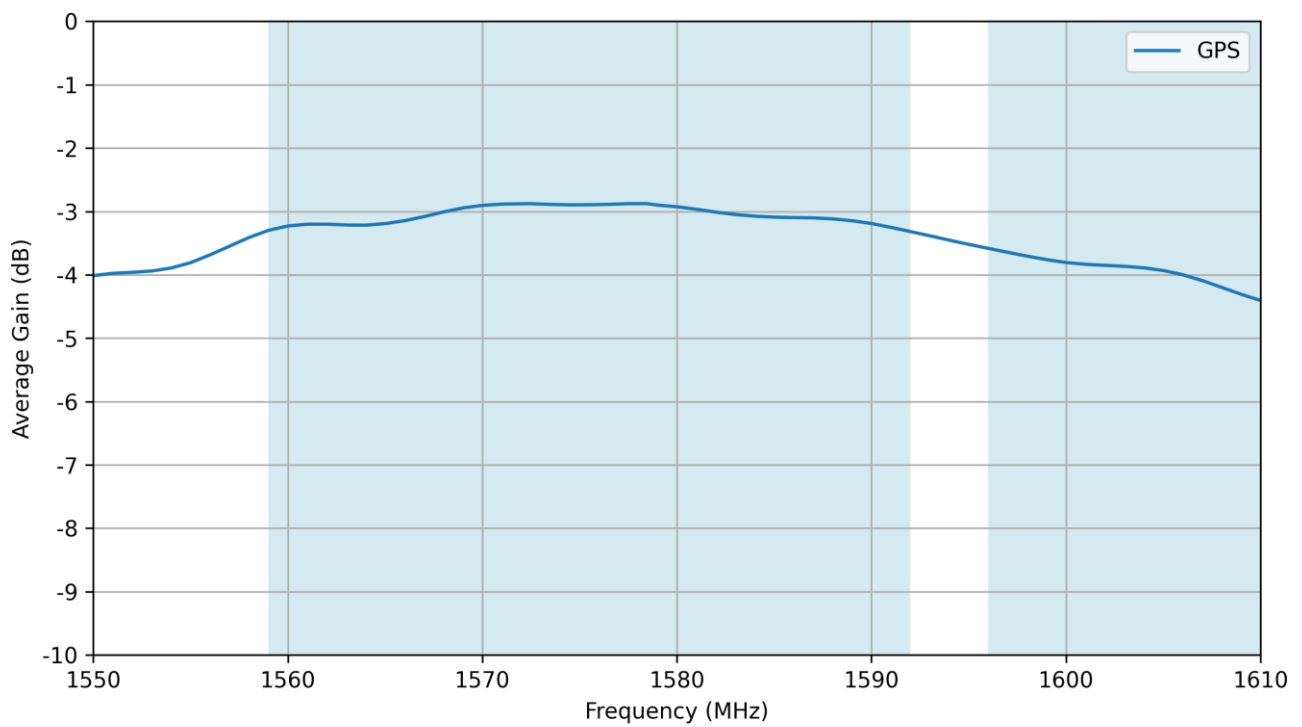
5.3 GNSS - VSWR



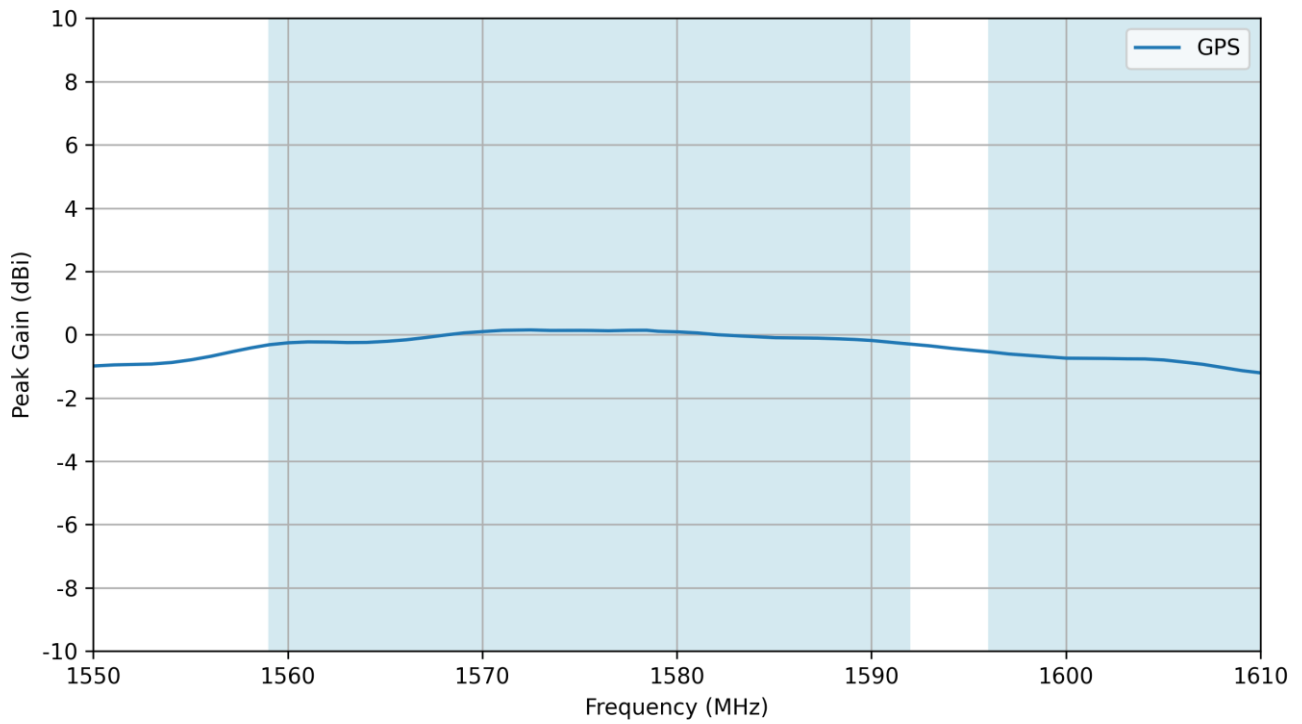
5.4 GNSS - Efficiency



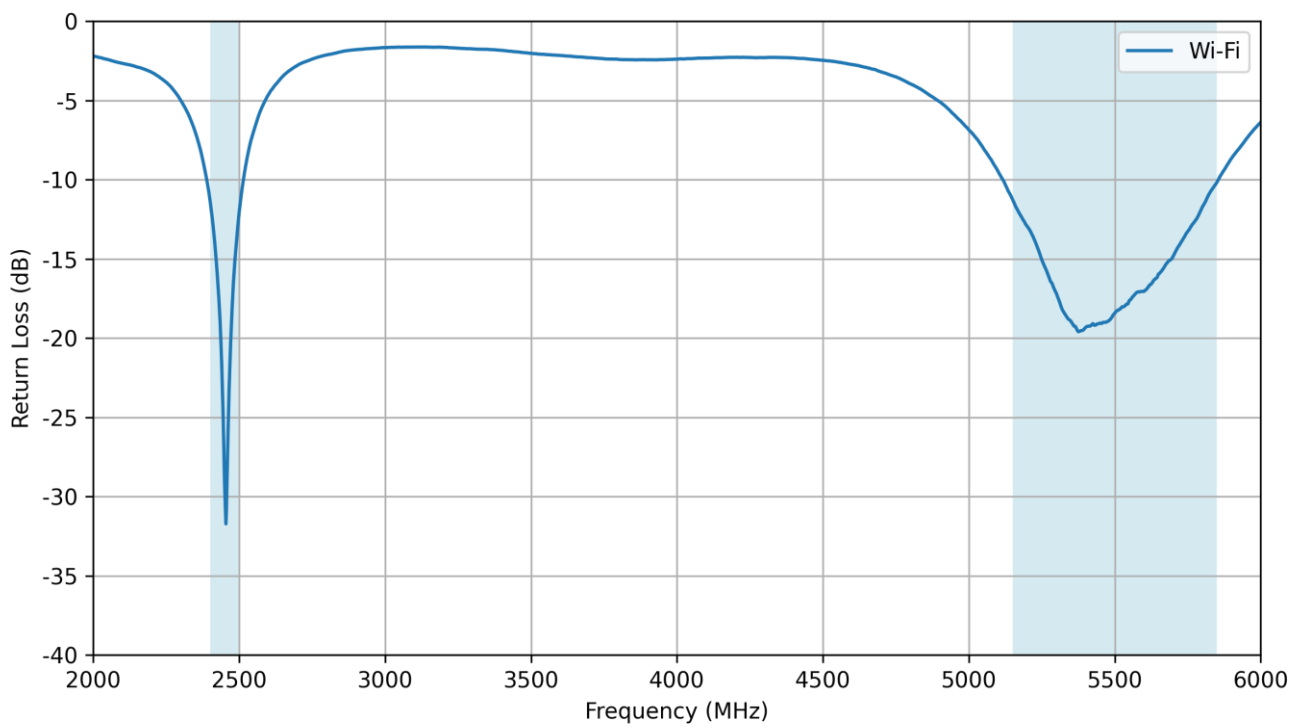
5.5 GNSS - Average Gain



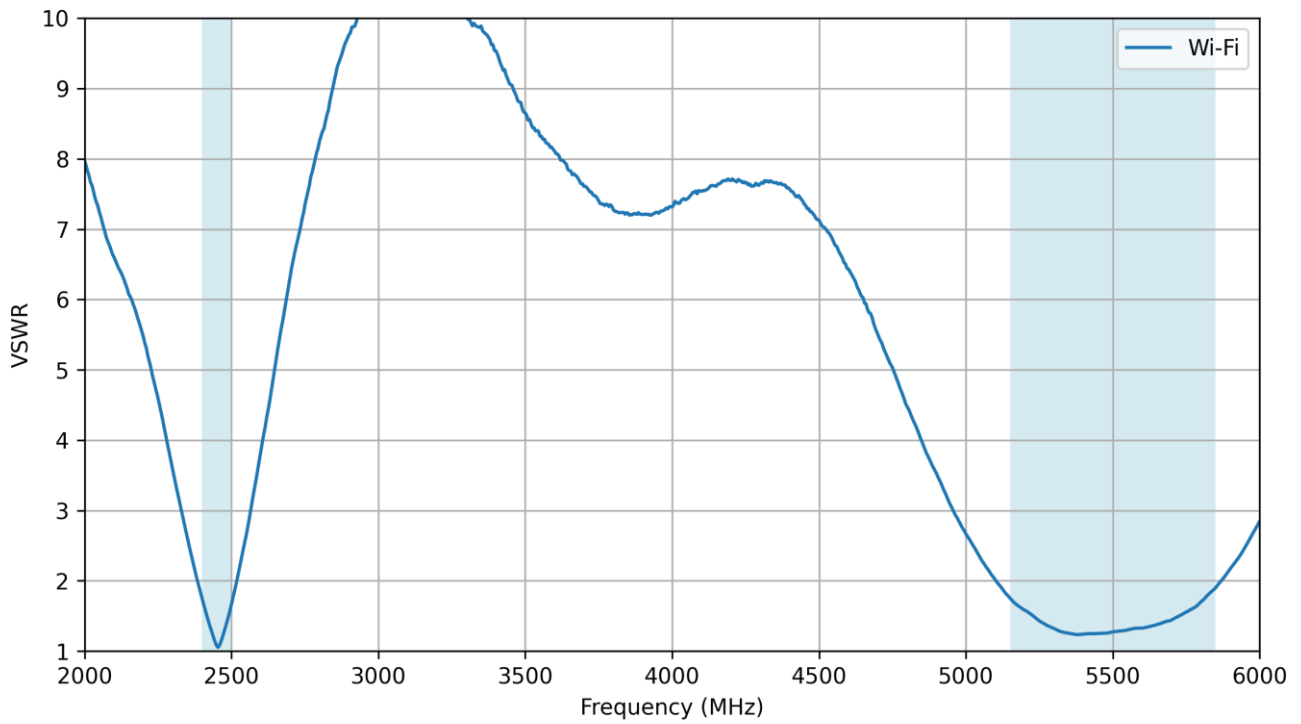
5.6 GNSS - Peak Gain



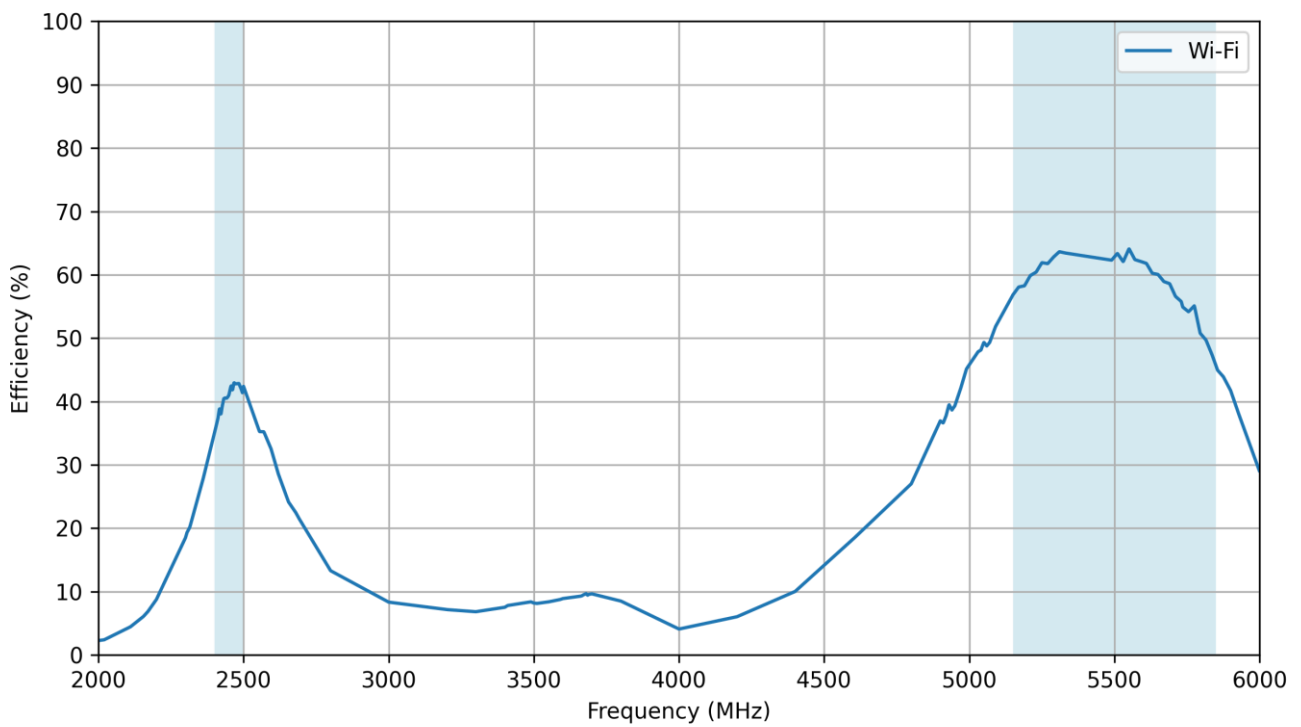
5.7 Wi-Fi - Return Loss



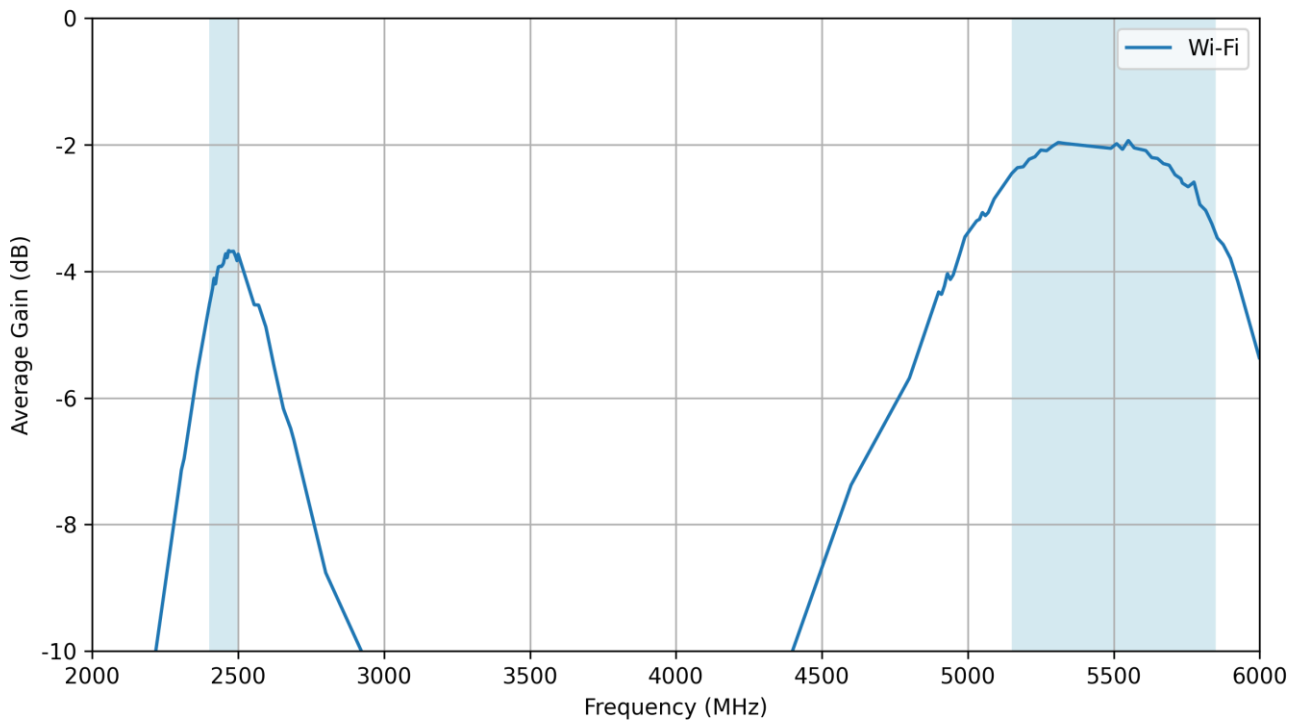
5.8 Wi-Fi - VSWR



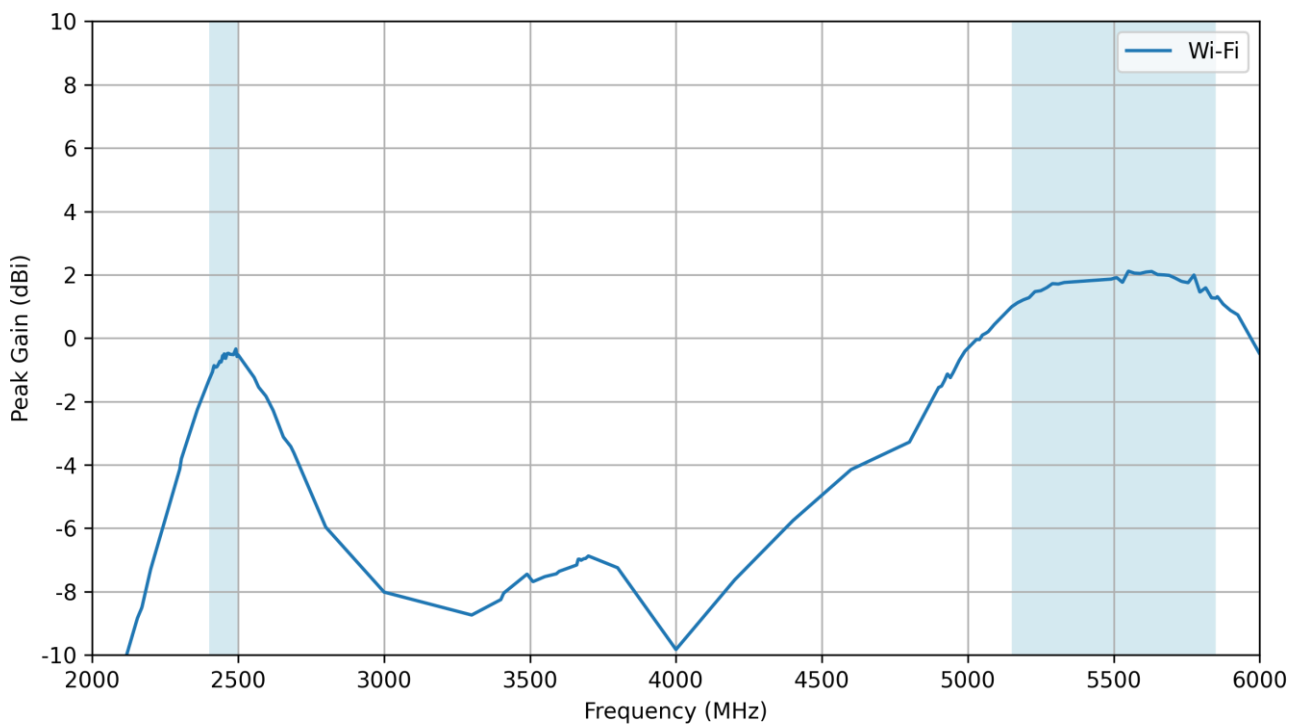
5.9 Wi-Fi - Efficiency



5.10 Wi-Fi - Average Gain

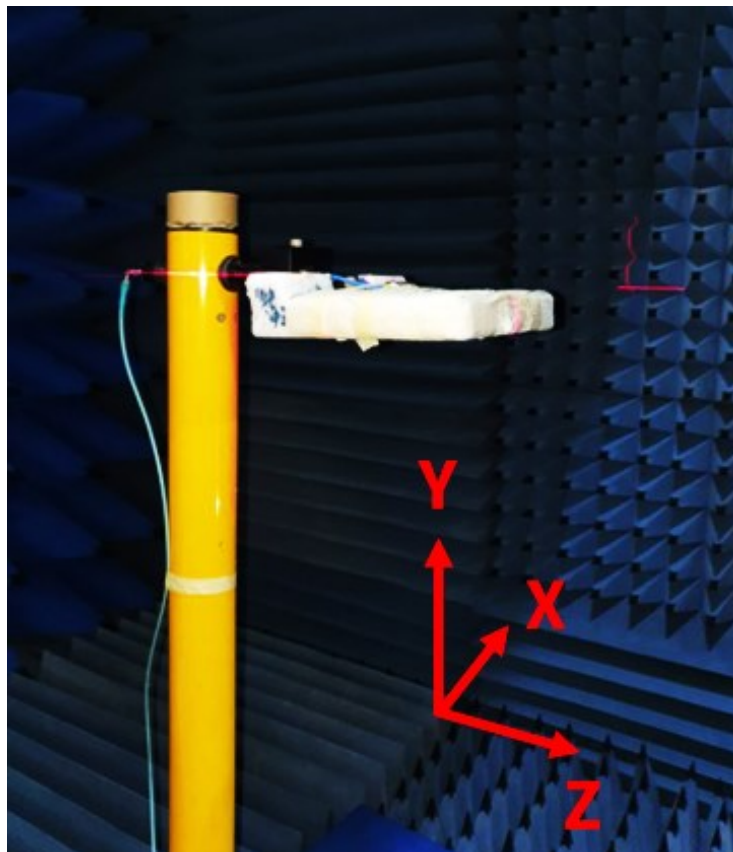
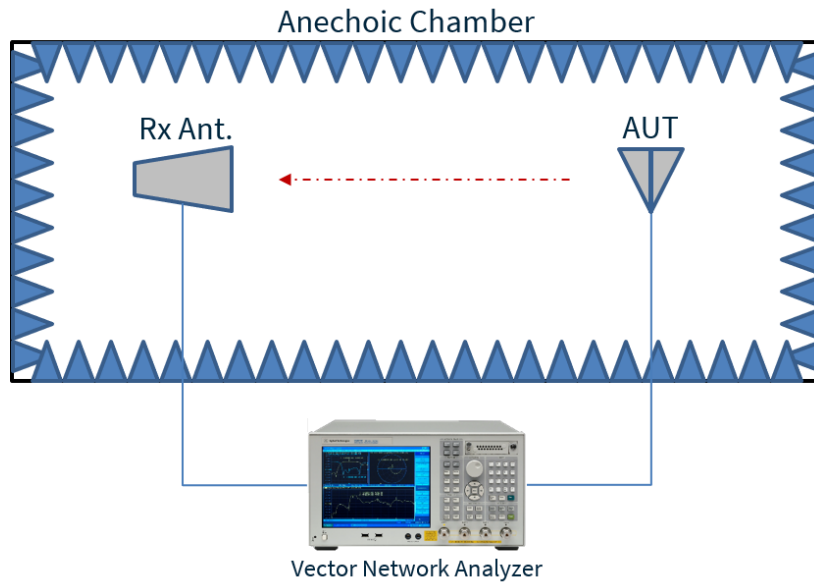


5.11 Wi-Fi - Peak Gain

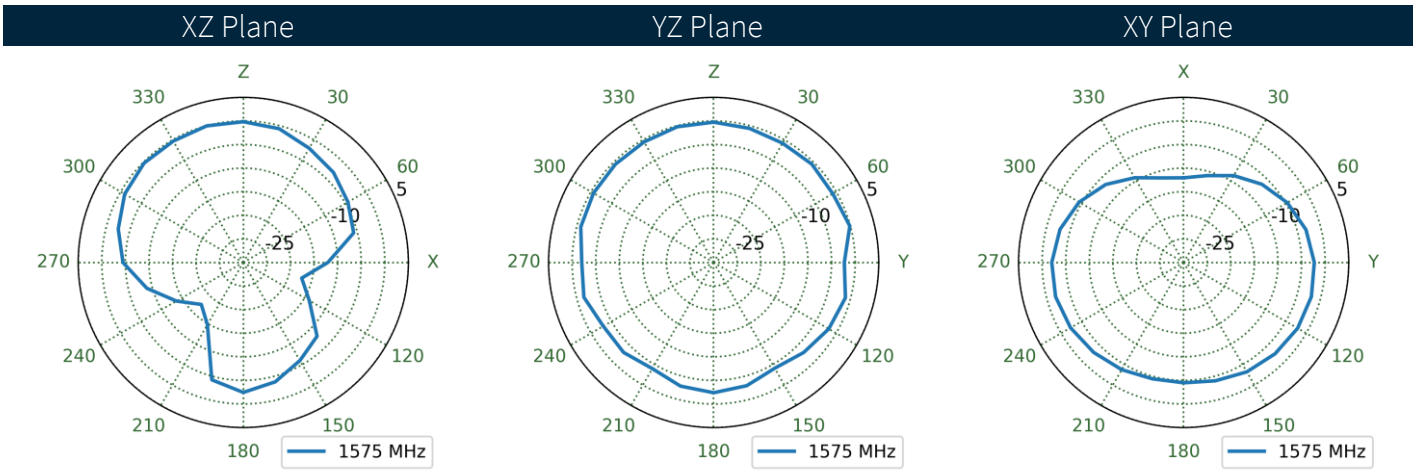
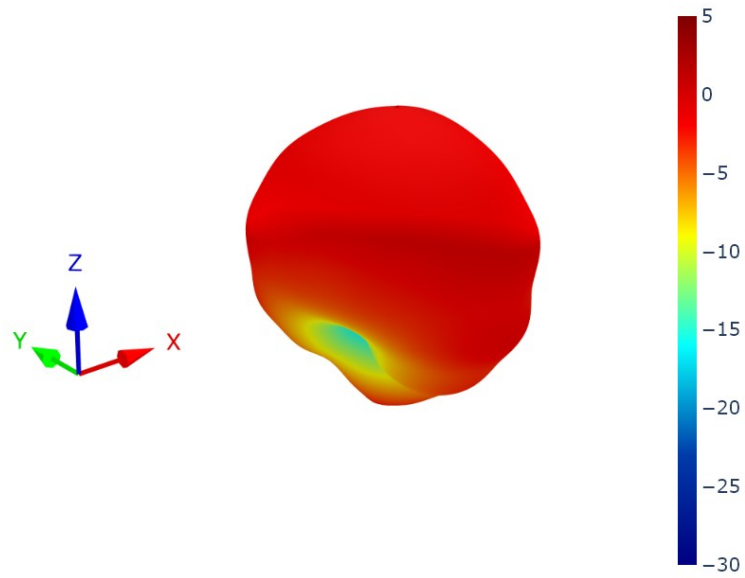


6. Radiation Patterns

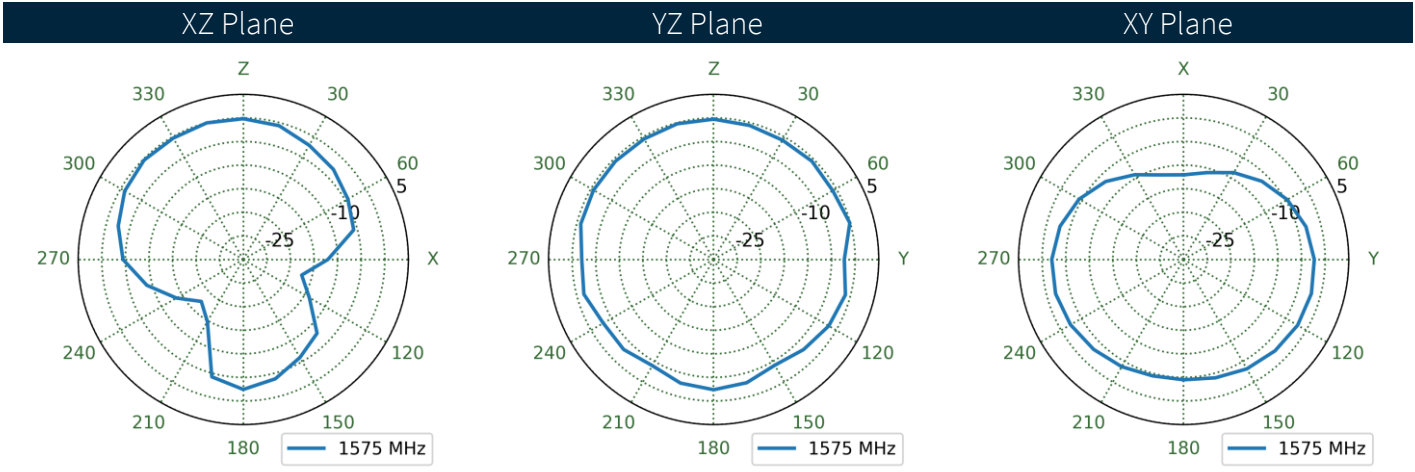
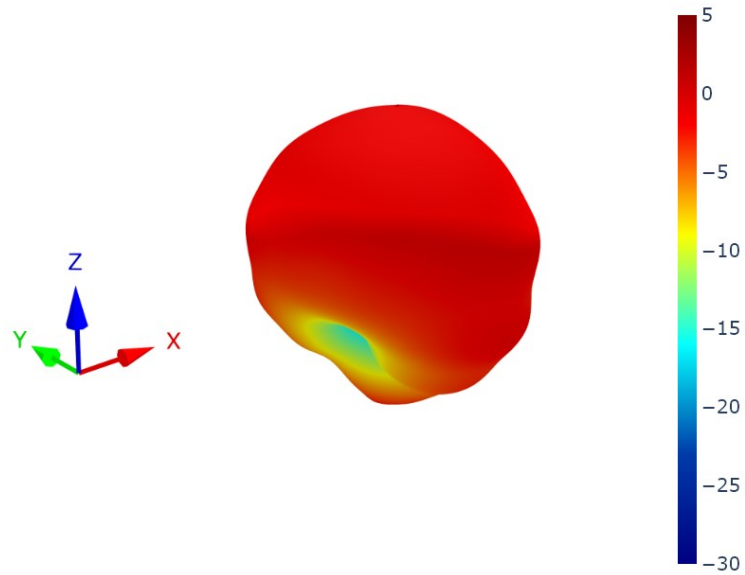
6.1 Test Setup



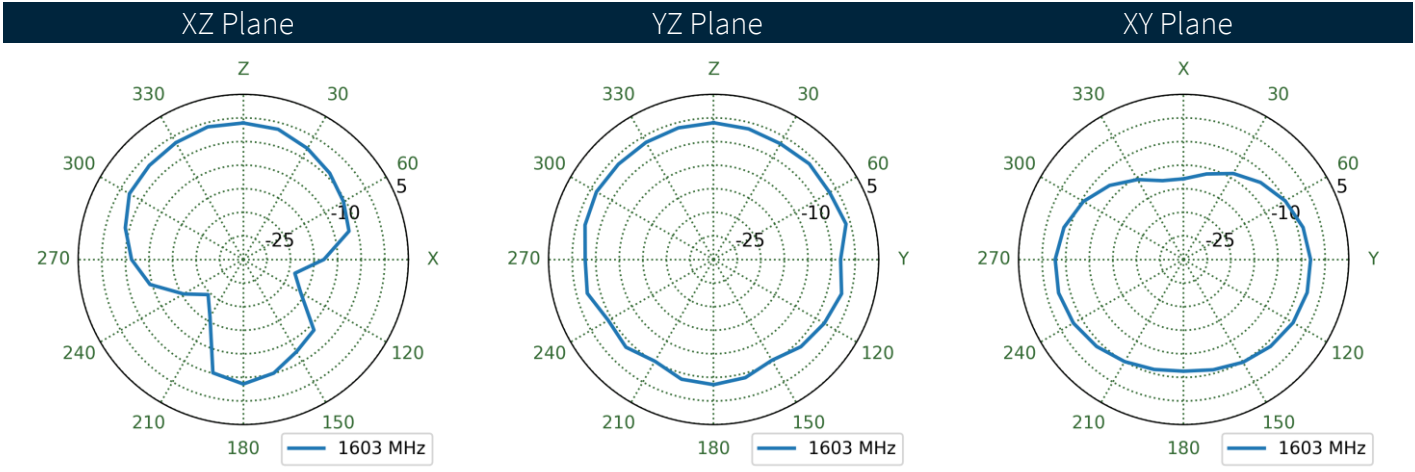
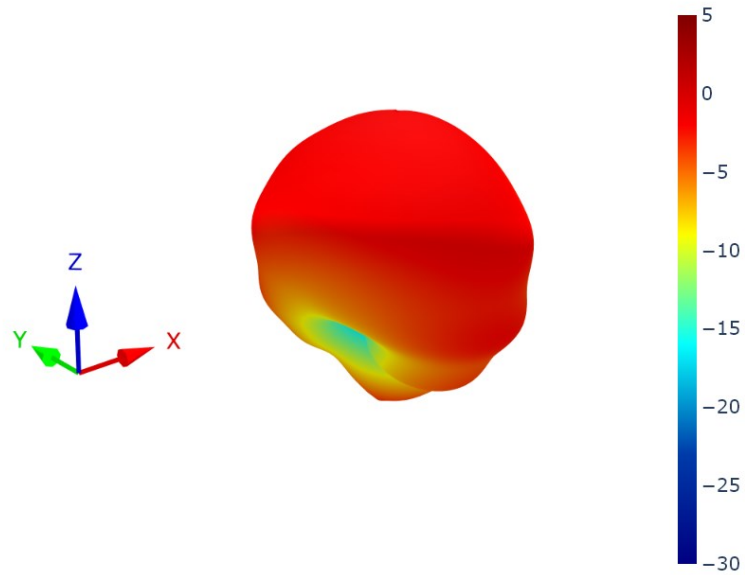
6.2 GNSS - Patterns at 1576 MHz



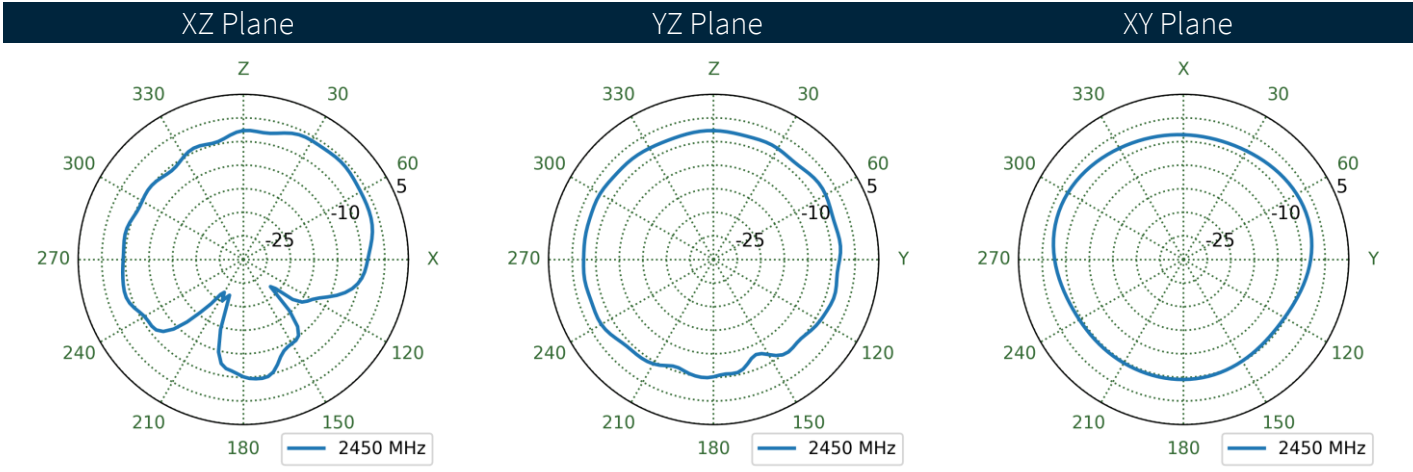
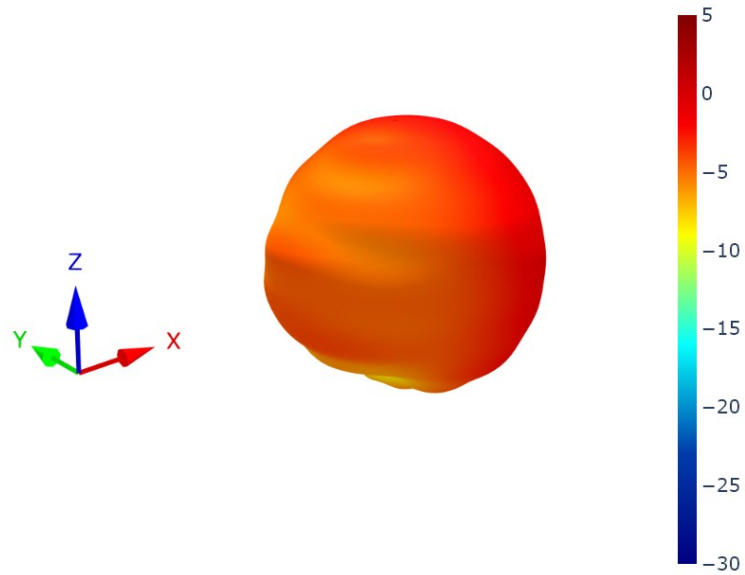
6.3 GNSS - Patterns at 1576 MHz



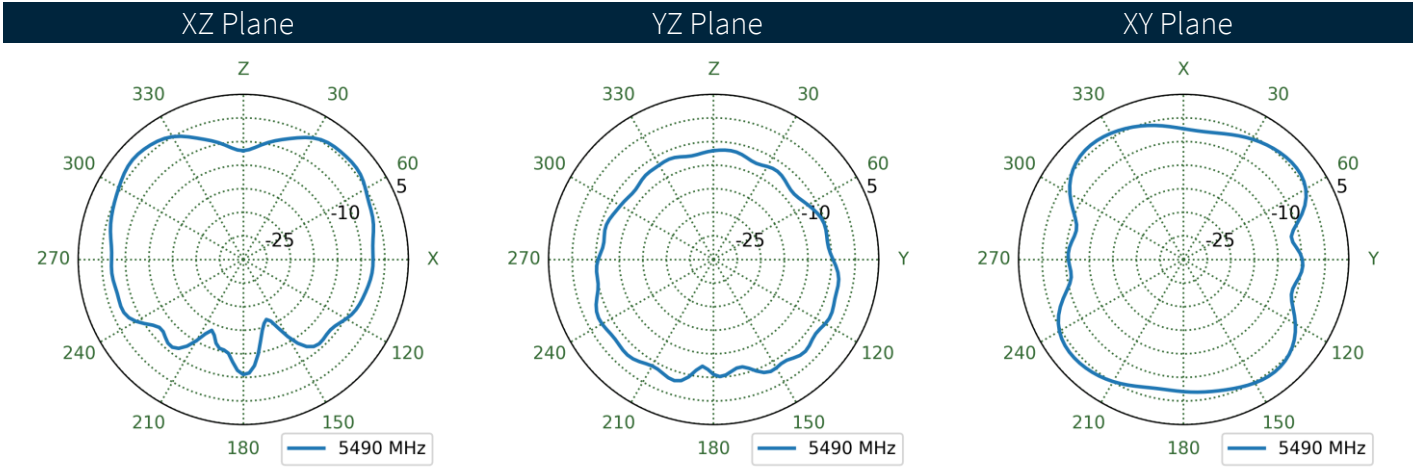
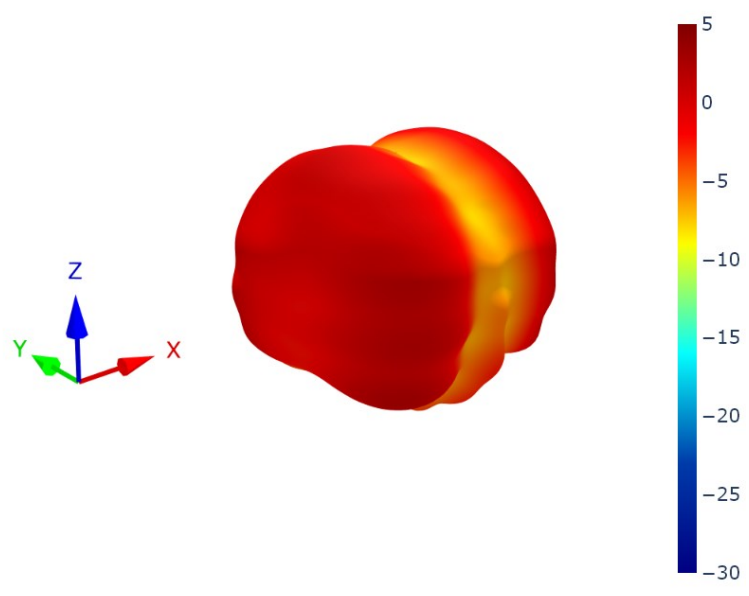
6.4 GNSS - Patterns at 1603 MHz



6.5 Wi-Fi - Patterns at 2450 MHz



6.6 Wi-Fi - Patterns at 5500 MHz



hangelog for the datasheet

SPE-24-8-128 – GWLA.15

Revision: A (Original First Release)

Date: 2024-06-13

Notes: Initial Release

Author: Gary West

Previous Revisions



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