TAOGLAS

Datasheet

Part No:
GGBLA.125.A

Description

GGBLA.125.A – Ceramic Loop Antenna
For cm-Level with RTK, DECT and NTN Applications

Features:

Low Profile, Small Footprint Embedded Loop Antenna
Centimeter-level accuracy achievable with RTK Systems
Covering bands
GPS/QZSS (L1/L2)
GPS/QZSS/IRNSS (L5)
Galileo (E1/E5a/E5b/E6)
GLONASS (G1/G2/G3)
BeiDou (B1/B2a/B2b)

- DECT 1.88 – 1.9GHz
- NTN Band n256

Tuned for SMD Mounting on 80x40mm Ground Plane
High efficiency, up to 80%
Dimensions: 10 * 3.2 * 1.5 mm
RoHS & Reach Compliant

1. Introduction

The Taoglas **GGBLA.125.A** is a unique embedded ceramic miniature loop antenna designed for GNSS, DECT and NTN application. It is designed to cover GPS L1,L2, L5 and L6, as well as GLONASS L1PT, L1CR, L5R, Galileo E1, E2, E5a, E5b, E6, BeiDou B1, B2, B3, IRNSS L5 & QZSS Frequencies. It can also be used for DECT 1.88 – 1.9GHz or NTN Band n256.

With dimensions of just 10 x 3.2 x 1.5mm, a keep out area of just 15 x 9.8mm on the PCB, the GGBLA.125 makes an ideal solution for compact high precision automotive navigation, asset tracking or device communication where board space is at a premium. An SMD component, delivered on tape and reel, the middle edge-of-board mounted antenna, has an omnidirectional radiation pattern that allows customers to use an omnidirectional antenna in devices where orientation of the product may be unknown, or subject to frequent movement.

The wide bandwidth maintains high efficiency and reception stability on all bands from 1164MHz to 2200MHz. The GGBLA.125 exhibits efficiencies of between 60% and 80%, depending on the band used. With a peak gain of 2.6-3.6dBi, the gain performance compares with the ranges of much larger patch antennas of up to 18 x 18mm. Based on the loop antenna electrical effect, this antenna works best when placed in the centre of the edge of the board.

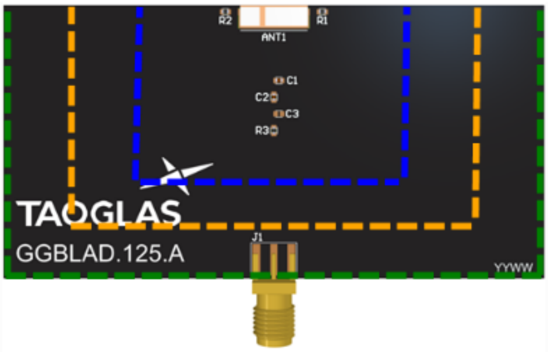
Typical Applications Include:

- Navigation & RTK Systems
- Transportation, Marine & Agriculture
- Autonomous Vehicles
- UAVs and Robotics
- IOT Devices
- Location based applications

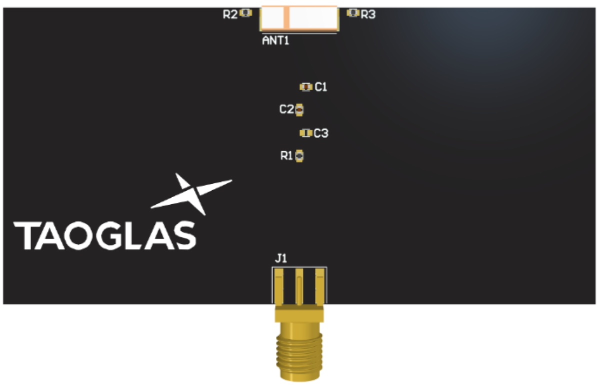
To ensure optimal performance, it is crucial to integrate the antenna correctly into your design.

Taoglas recommends positioning the antenna at the centre of the PCB's longer edge. Please see **section 7** of this datasheet for the recommended integration guide.

Taoglas recommends using an 80x40mm ground plane for optimal performance. However, **Section 10** demonstrates how reducing the ground plane size impacts performance degradation.



Taoglas recommends mounting the GGBLA.125 at the centre of the long side of the ground plane to achieve optimal performance. Alternatively, the antenna can be mounted at the corner of the ground plane. **Section 11** outlines recommended matching guidelines and evaluates the antenna's performance in a corner-mounted configuration. It also includes a recommended footprint specific to this mounting option, which differs from the standard design.

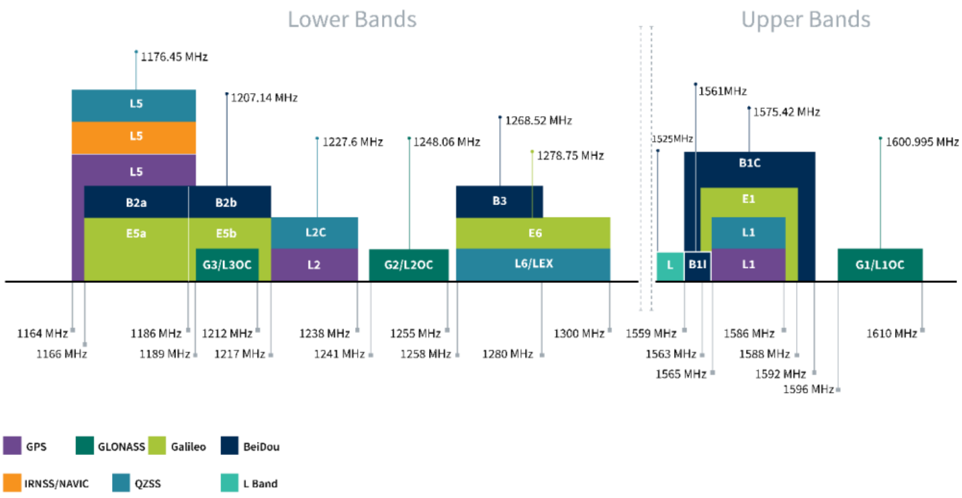


Section 12 of this document covers tuning for DECT/NTN applications, and how to match to ensuring optimal performance across DECT and NTN frequency bands.

For further optimization to customer-specific device environments and for support to integrate and test this antennas performance in your device, contact your regional Taoglas Customer Services Team.

2. Specification

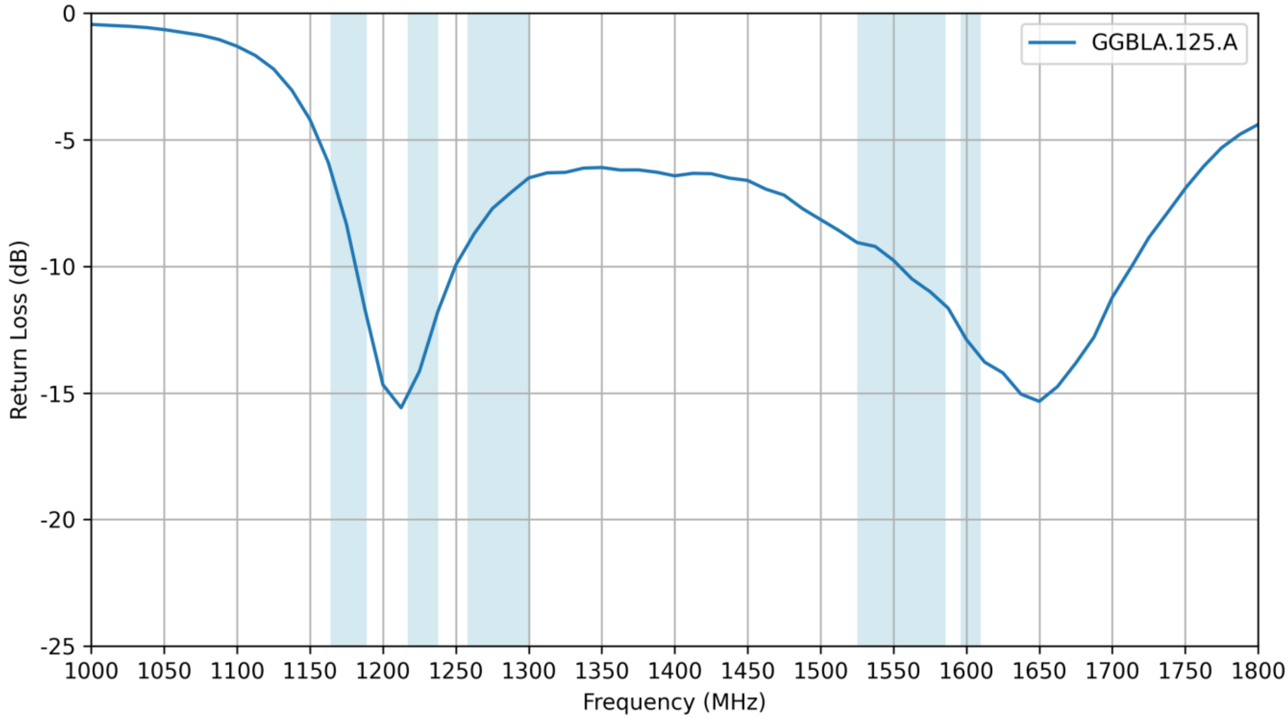
GNSS Frequency Bands					
GPS	L1 1575.42 MHz	L2 1227.6 MHz	L5 1176.45 MHz		
	■	■	■		
GLONASS	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz		
	■	■	■		
Galileo	E1 1575.24 MHz	E5a 1176.45 MHz	E5b 1201.5 MHz	E6 1278.75 MHz	
	■	■	■	■	
BeiDou	B1C 1575.42 MHz	B1I 1561 MHz	B2a 1176.45 MHz	B2b 1207.14 MHz	B3 1268.52 MHz
	■	■	■	■	■
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
	■	■	■	■	■
L-BAND (Correction data)	1525-1559				
	■				



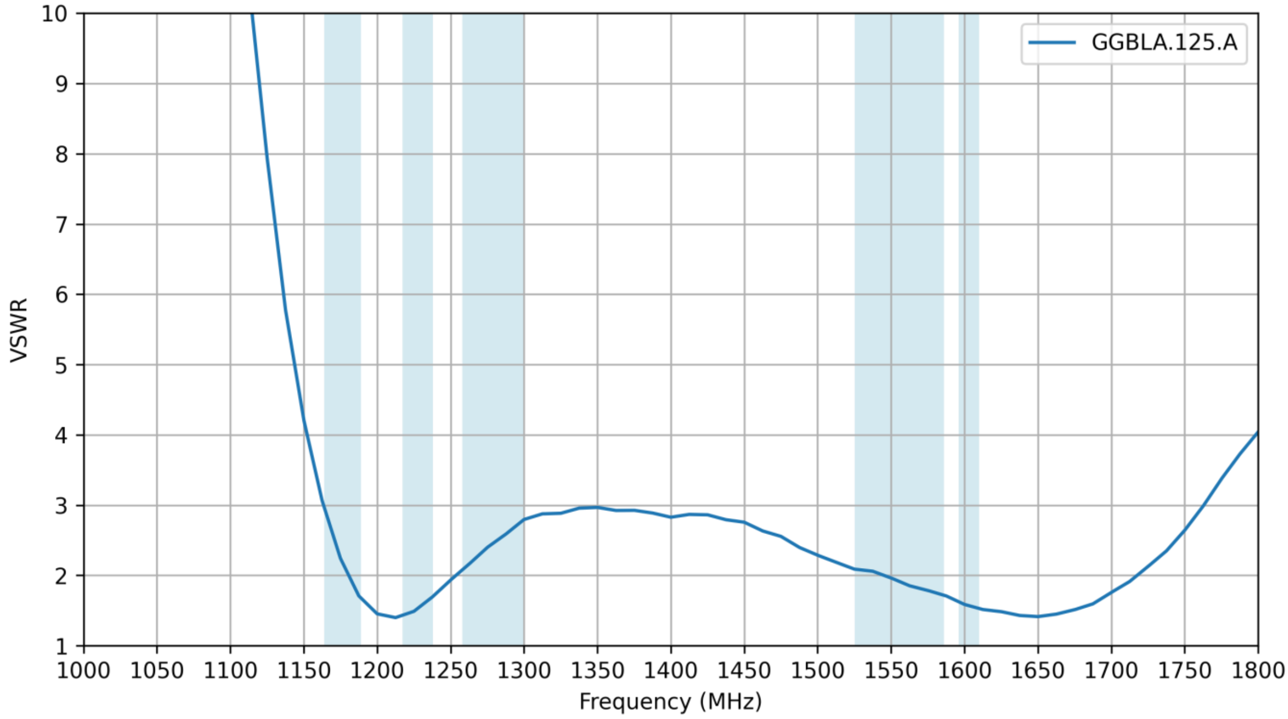
GNSS Electrical							
Frequency (MHz)	**1176.45**	**1227.6**	**1278.75**	**1542**	**1561**	**1575.42**	**1602**
VSWR (max.)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
Efficiency (%)	75	93	82	85	85	83	84
Peak Gain (dBi)	3.95	4.13	3.59	3.69	3.66	3.53	3.57
Average Gain (dB)	-1.23	-0.30	-0.84	-0.69	-0.68	-0.79	-0.72
Impedance	50 Ω						
Polarization	Linear						
Mechanical							
Dimensions (mm)	10mm x 3.2mm x 1.5mm						
Weight (g)	0.17 g						
Environmental							
Operating Temperature	-40°C to 85°C						
Storage Temperature	-25°C to 85°C						
Relative Humidity	20°C to 70°C						
Moisture Sensitivity Level (MSL)	3 (168 Hours)						

3. Antenna Characteristics

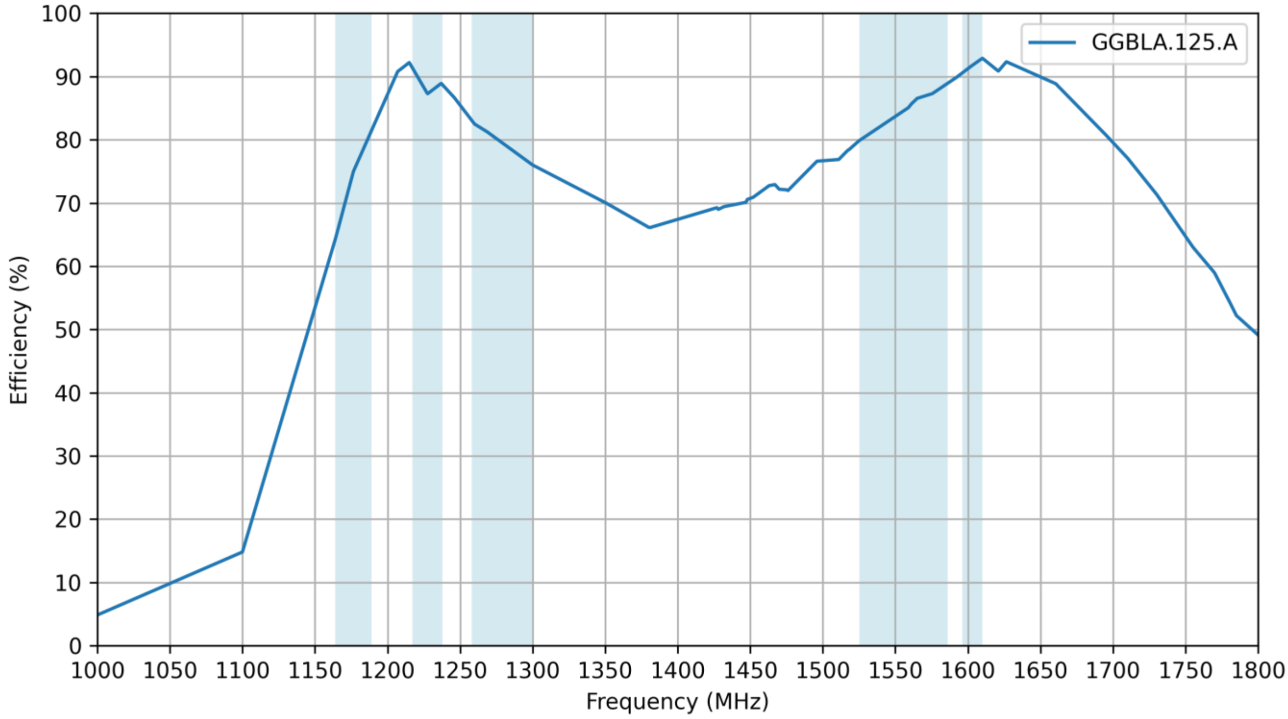
3.1 Return Loss



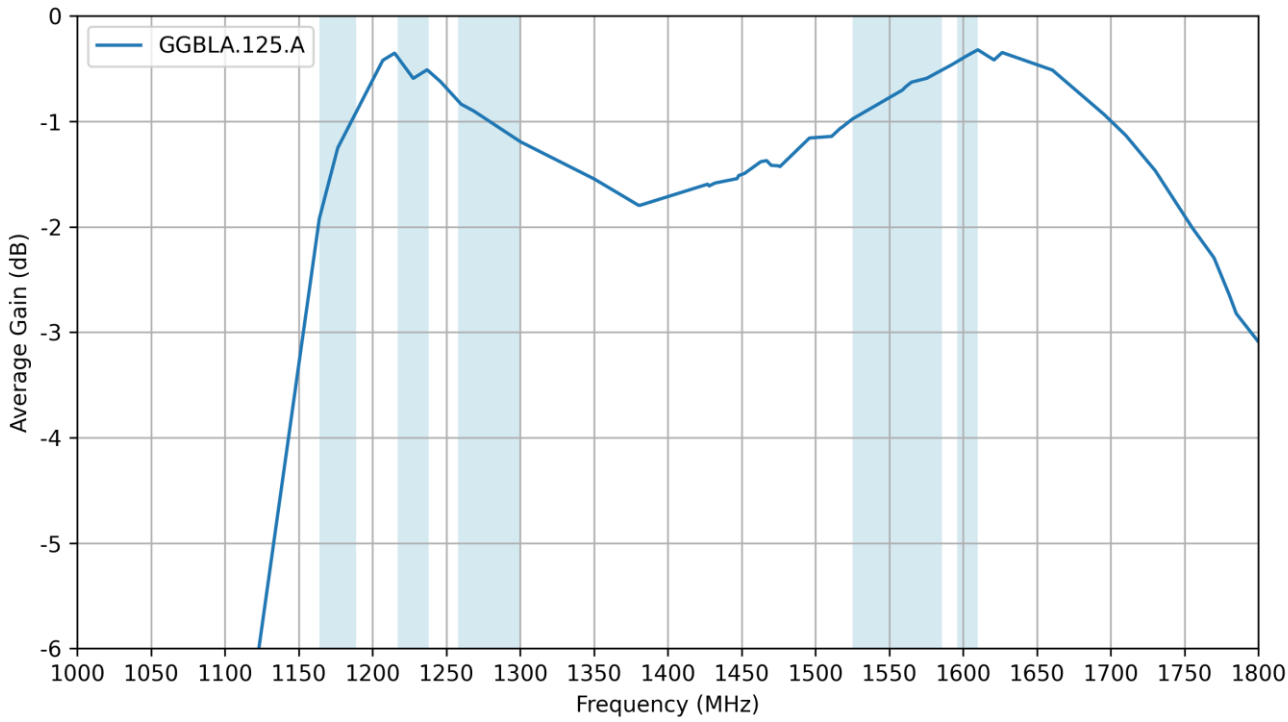
3.2 VSWR



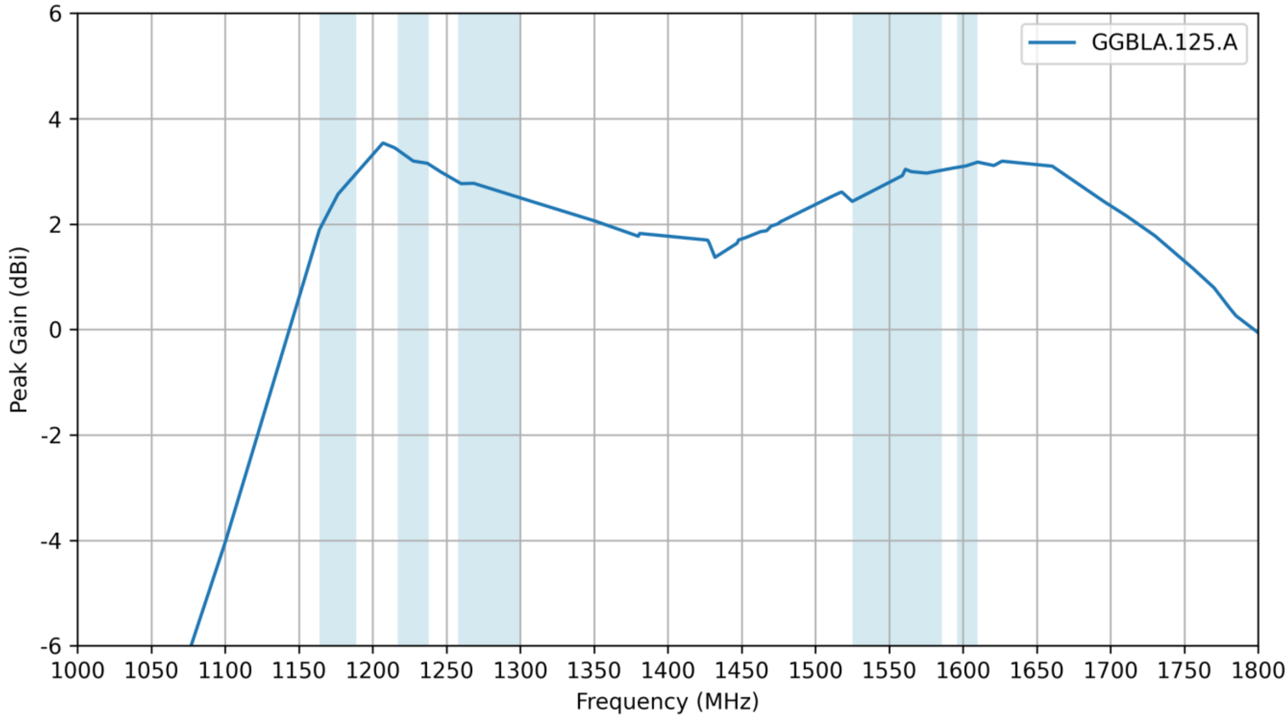
3.3 Efficiency



3.4 Average Gain



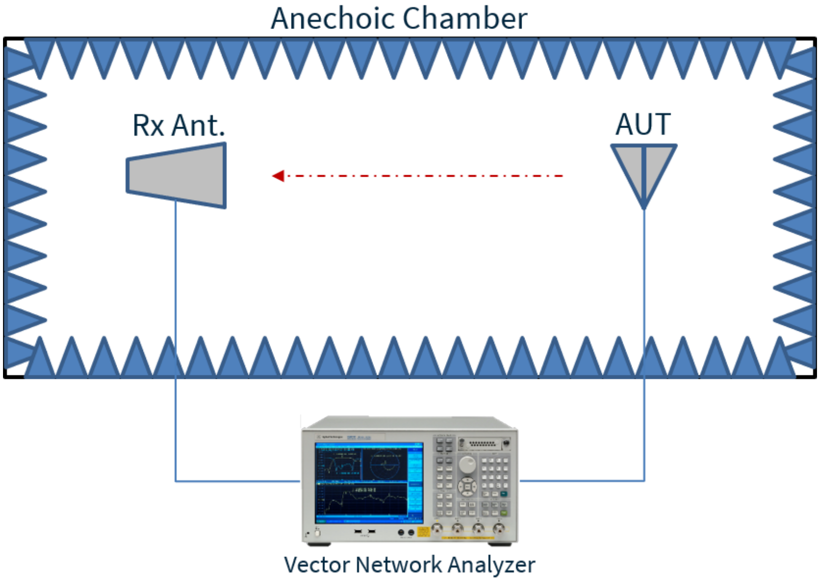
3.5 Peak Gain

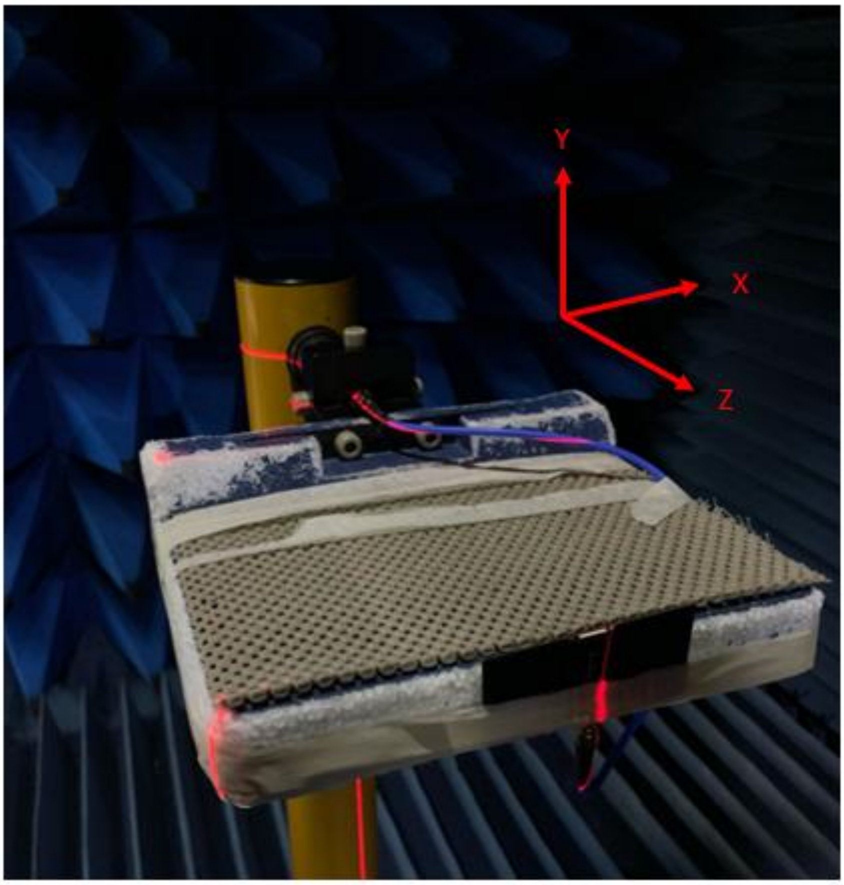


GGBLA.125.A
Peak Gain (dBi)
Frequency (MHz)
6
4
2
0
-2
-4
-6
1000 1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800

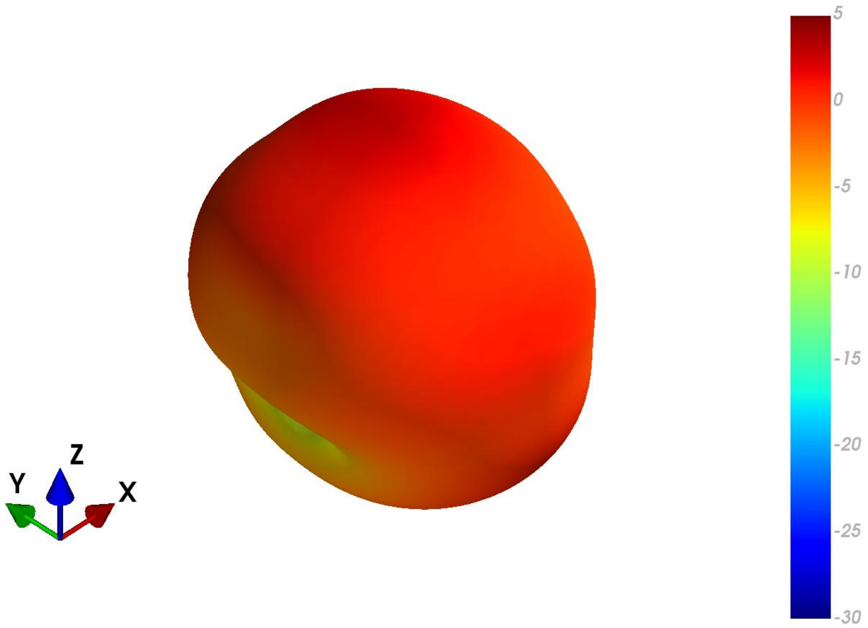
4. Radiation Patterns

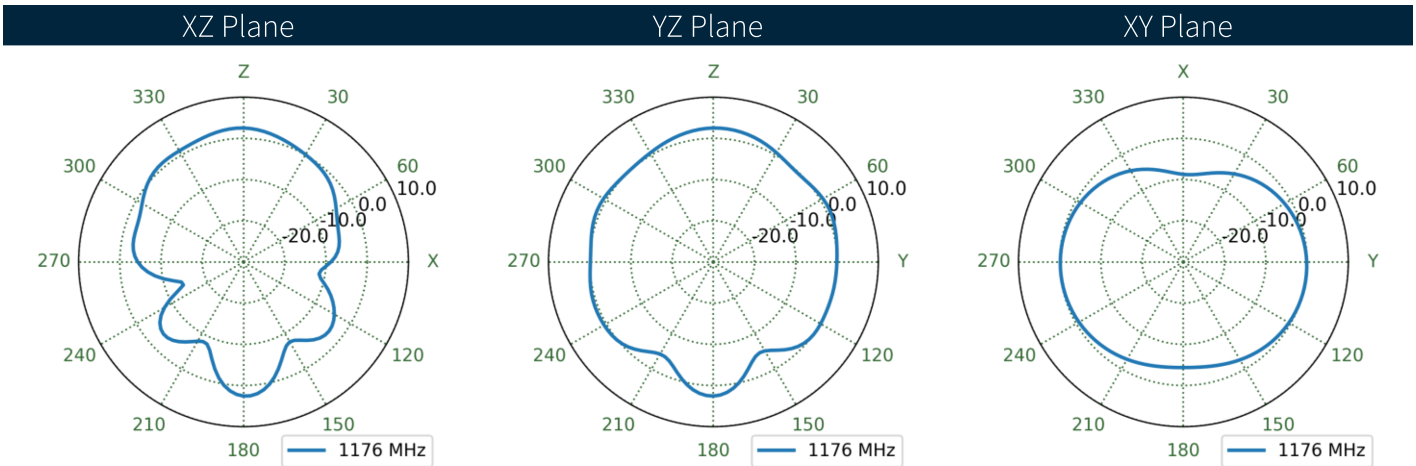
4.1 Test Setup



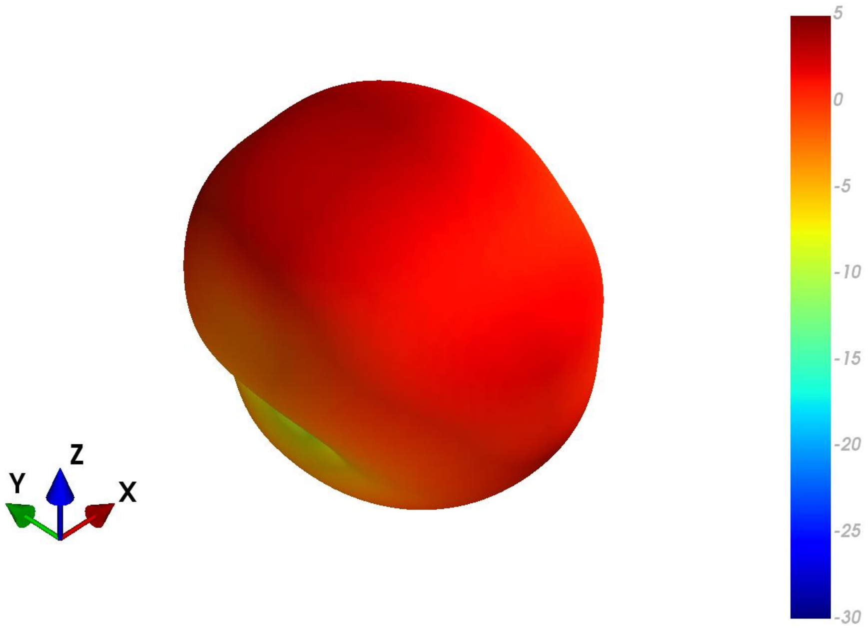


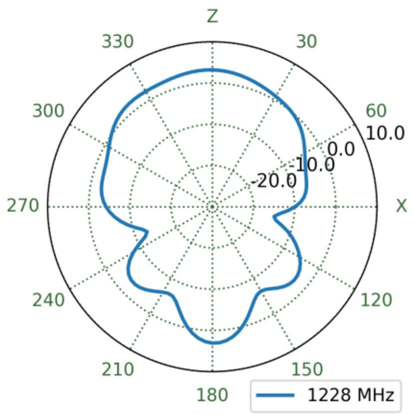
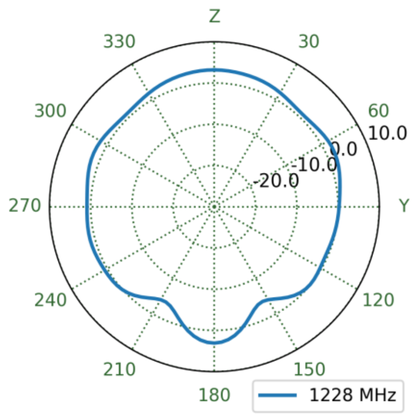
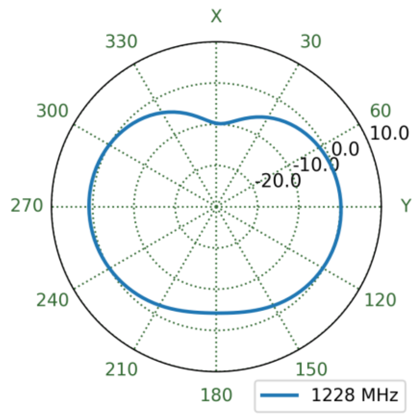
4.2 GGBLA.125.A Patterns at 1176 MHz



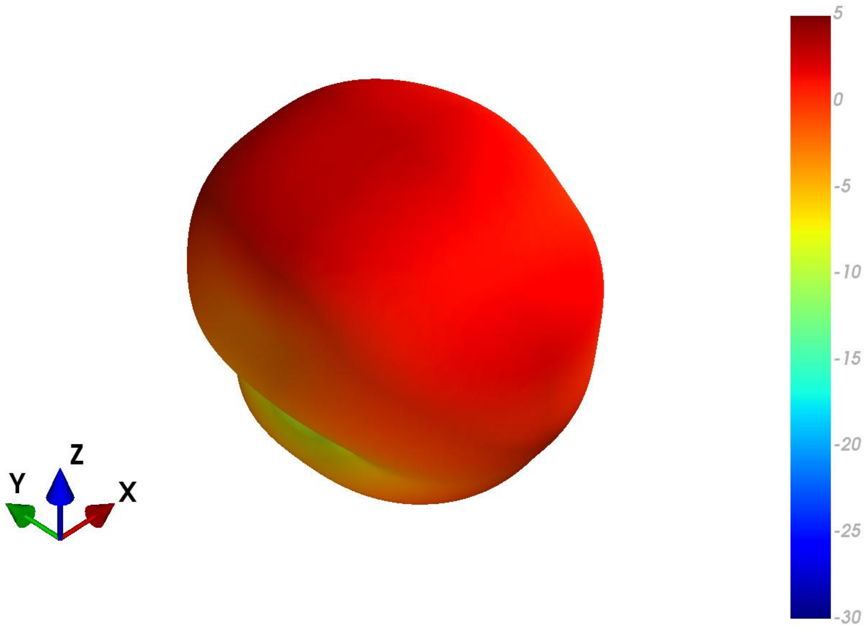


4.3 GGBLA.125.A Patterns at 1228 MHz

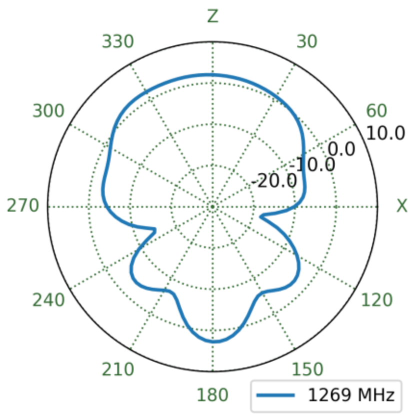


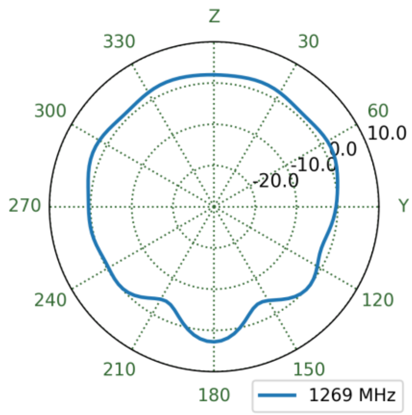
XZ Plane	YZ Plane	XY Plane
		

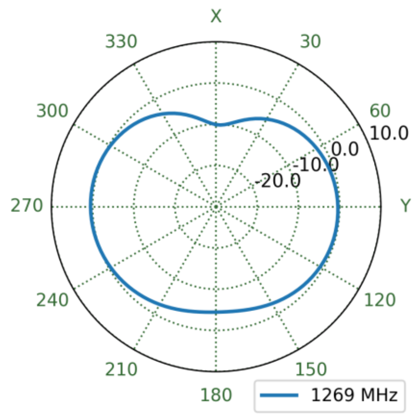
4.4 GGBLA.125.A Patterns at 1269 MHz



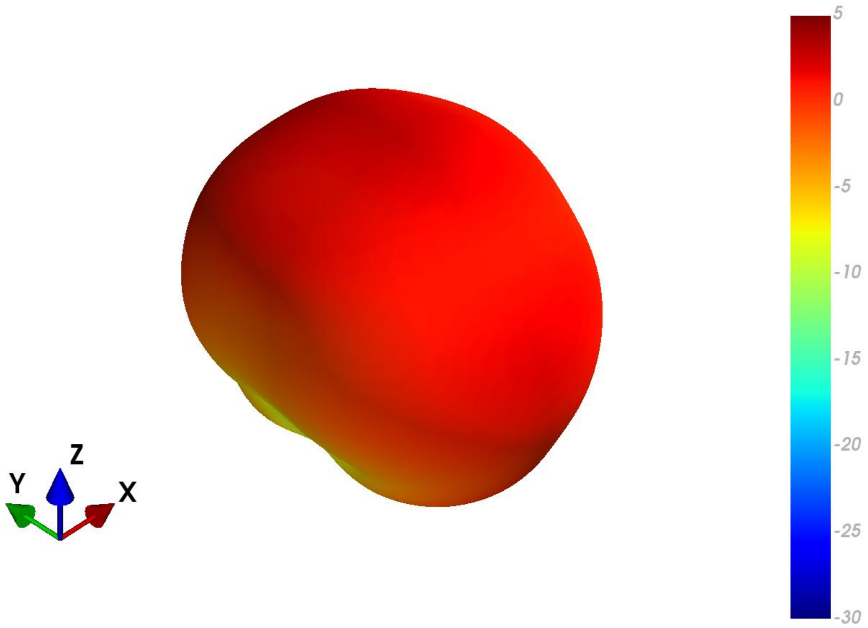
XZ Plane	YZ Plane	XY Plane

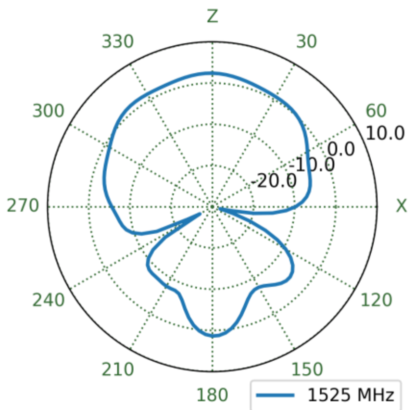
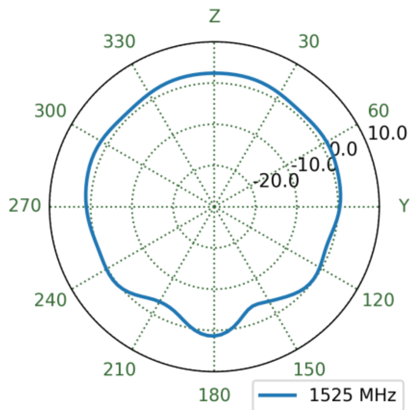
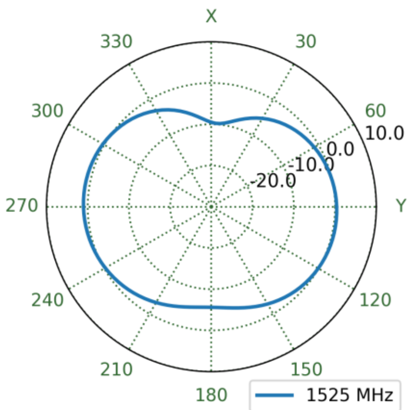




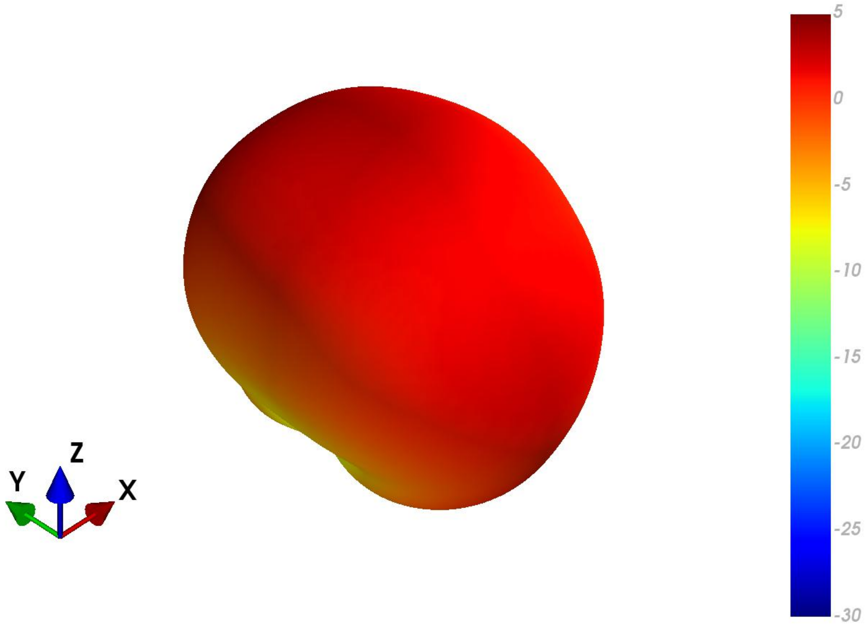


4.5 GGBLA.125.A Patterns at 1525 MHz

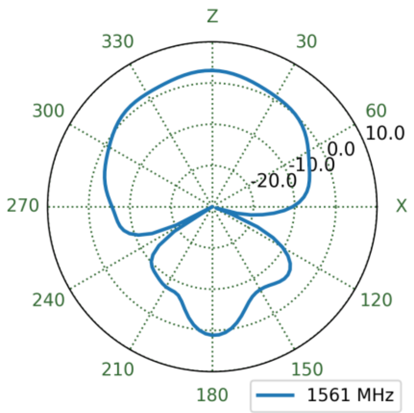


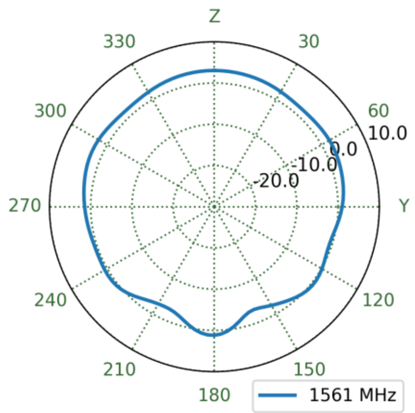
XZ Plane	YZ Plane	XY Plane
		

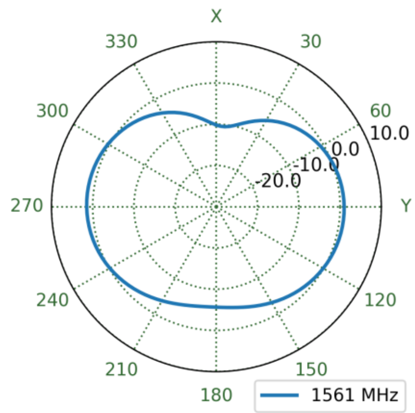
4.6 GGBLA.125.A Patterns at 1561 MHz



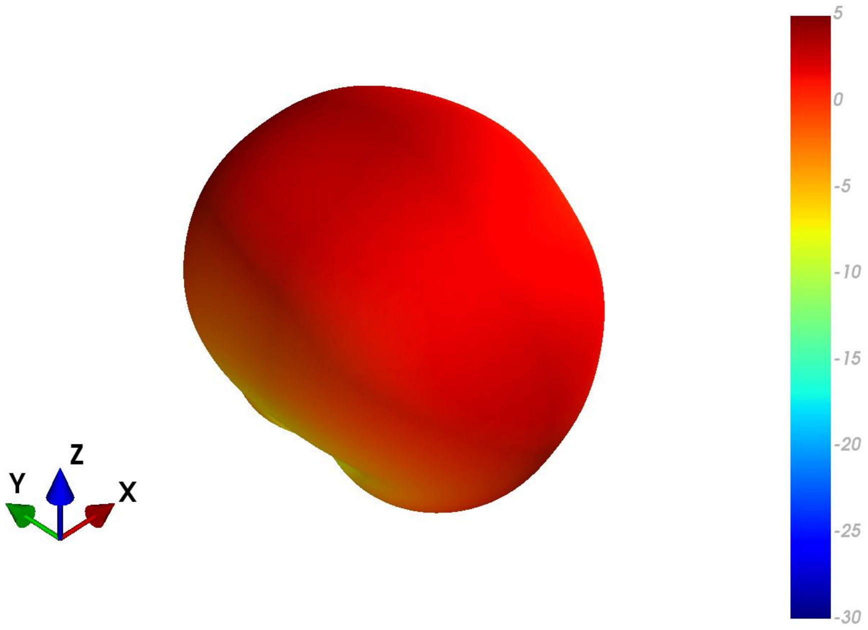
XZ Plane	YZ Plane	XY Plane



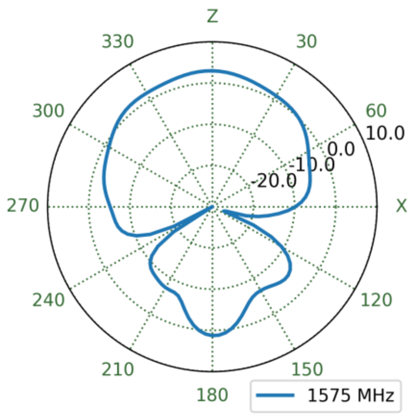


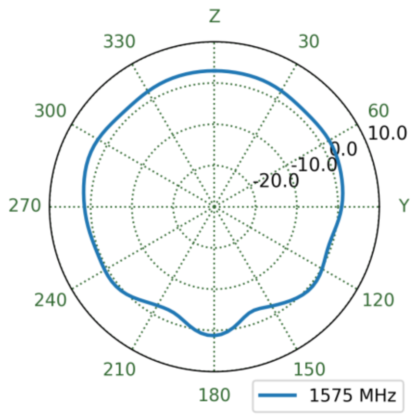


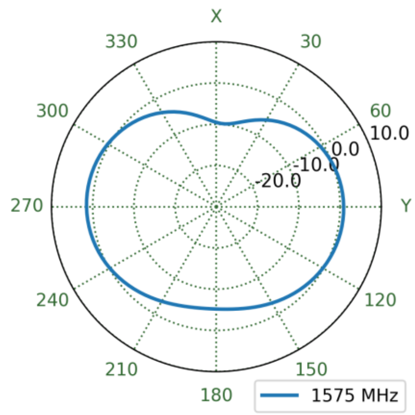
4.7 GGBLA.125.A Patterns at 1575 MHz



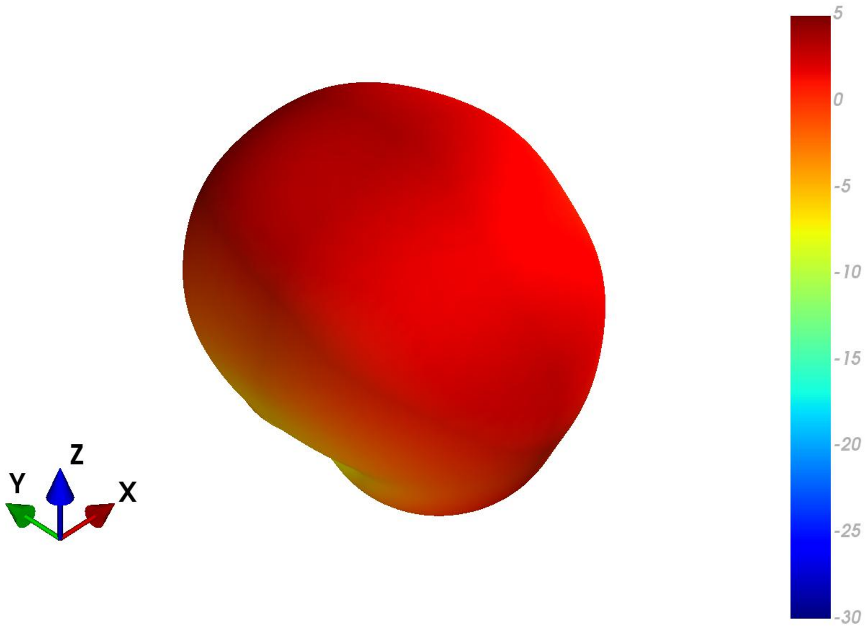
XZ Plane	YZ Plane	XY Plane



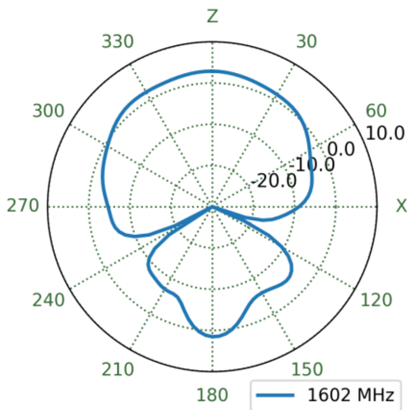


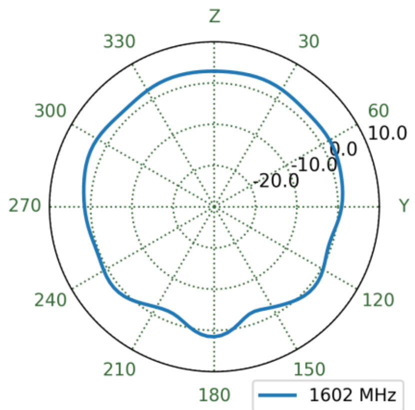


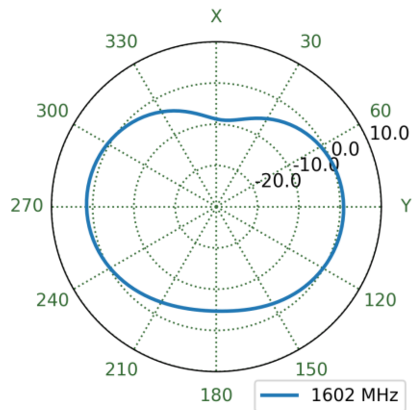
4.8 GGBLA.125.A Patterns at 1602 MHz



XZ Plane	YZ Plane	XY Plane







5. Field Test Results

This section outlines the field test result for GGBLA.125.A antenna. The test was performed when the antenna was mounted on a static rooftop test set up in an open sky environment for a minimum of 6 hours.

Taoglas will show the field test results using the following receivers:

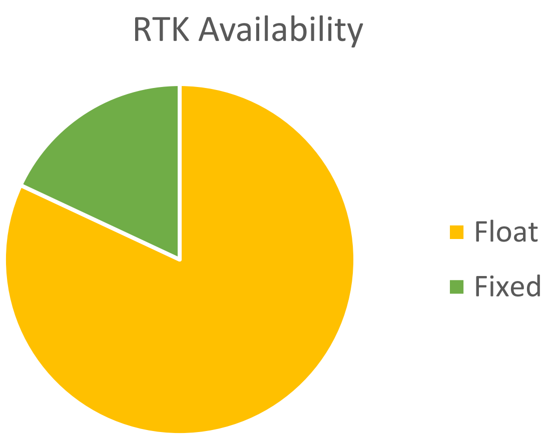
5.1 UBlox ZED-F9P-0XB

Receiver features:

- Multi-band GNSS: 184-channel GPS L1C/A L2C, GLONASS: L1OF L2OF, Galileo: E1B/C E5b, BeiDou: B1I B2I, QZSS: L1C/A L2C
- Multi-band RTK with fast convergence times and reliable performance
- Nav. update rate RTK up to 20 Hz
- Position accuracy = RTK 0.01 m + 1 ppm CEP

Positioning Accuracy Table (2D Accuracy)

Test Condition	Correction Service	CEP (50%)	DRMS (68%)	2DRMS (95-98.2%)	TTFF (sec)
EVB	RTK DISABLED	106.72 cm	134.17 cm	268.34 cm	32
	RTK ENABLED	10.59 cm	12.88 cm	25.75 cm	32



5.2 Ublox NEO-F9P-15B

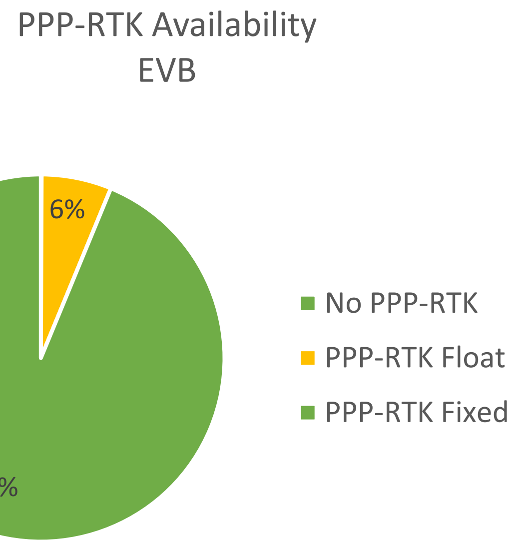
Receiver features:

- Multi-band GNSS: GPS / QZSS (L1C/A, L5) GLONASS (L1OF) Galileo (E1-B/C, E5a) BeiDou (B1I, B2a) NavIC (SPS-L5)
- Multi-band PPP-RTK with fast convergence times and reliable performance
- Nav. update rate RTK up to 25 Hz
- Position accuracy = RTK 0.01 m + 1 ppm CEP

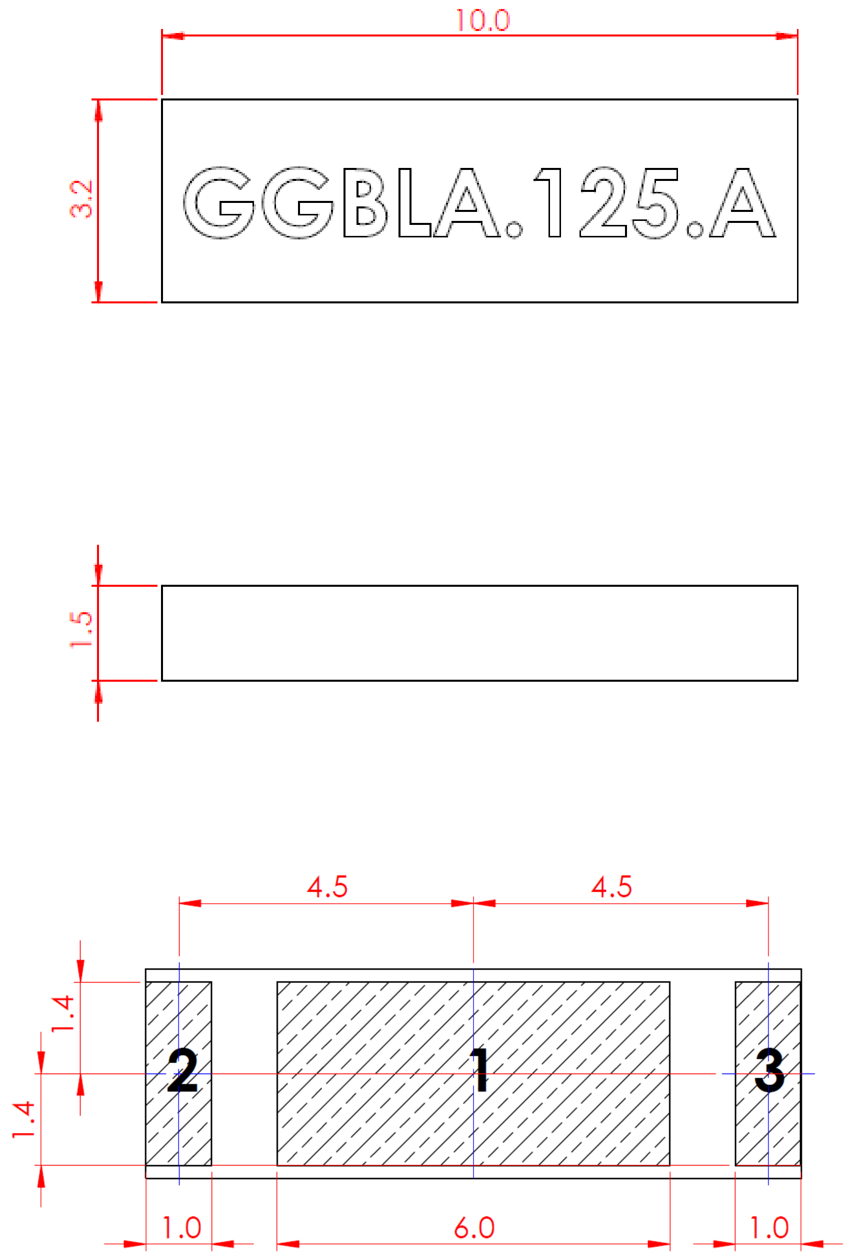
Positioning Accuracy Table (2D Accuracy)

Test Condition		DRMS(cm)	CEP (50%)	DRMS (68%)	2DRMS (95-98.2%)	TTFF (sec)
EVB	PPP-RTK DISABLED	72.58	87.31	174.61	19
	PPP-RTK ENABLED	11.94	14.38	28.76	23

*The RTK correction service used in previous measurements provides superior corrections compared to the PPP-RTK service used for measurements on the NEO-F9P.



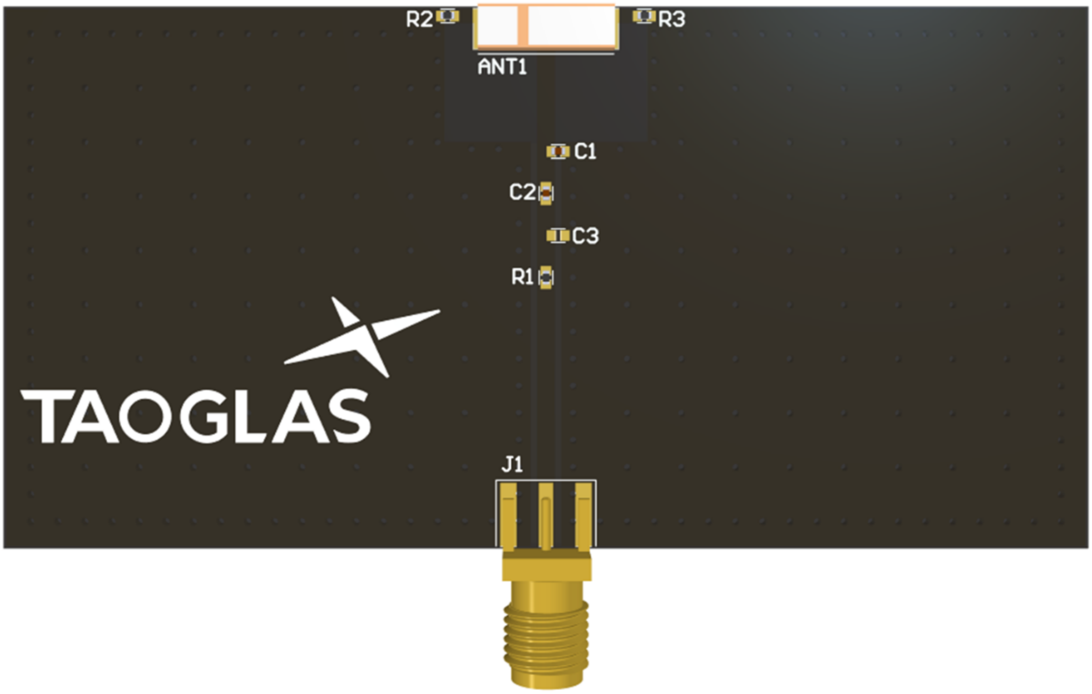
6. Mechanical Drawing



PIN:	DESCRIPTION:
1	Feed (50 ohm)
2,3	Ground

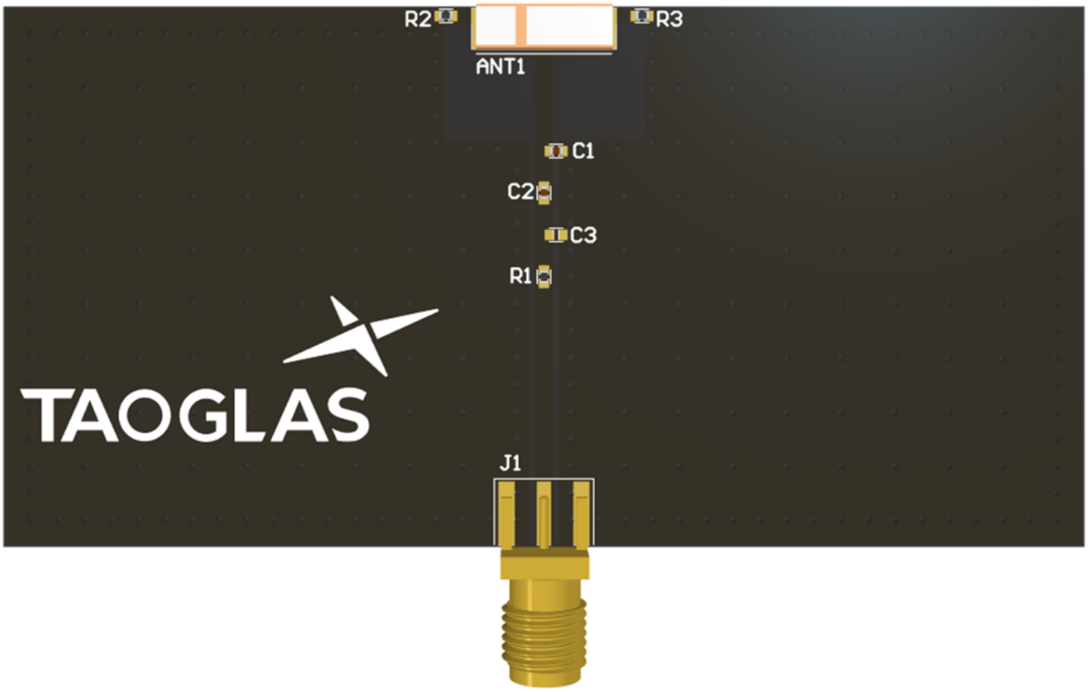
7. Antenna Integration Guide

The following is an example on how to integrate the GGBLA.125.A into a design. This antenna has 3 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 80x40mm ground plane (PCB) to ensure optimal performance.



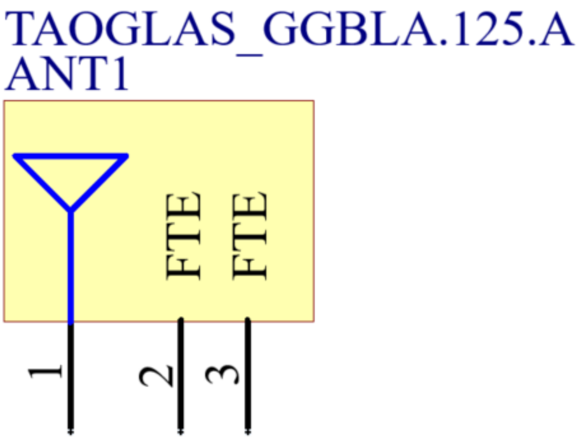
Top view of PCB.

7.1 Schematic Symbol and Pin Definitions



Above is a 3D model of the GGBLA.125.A on a PCB.

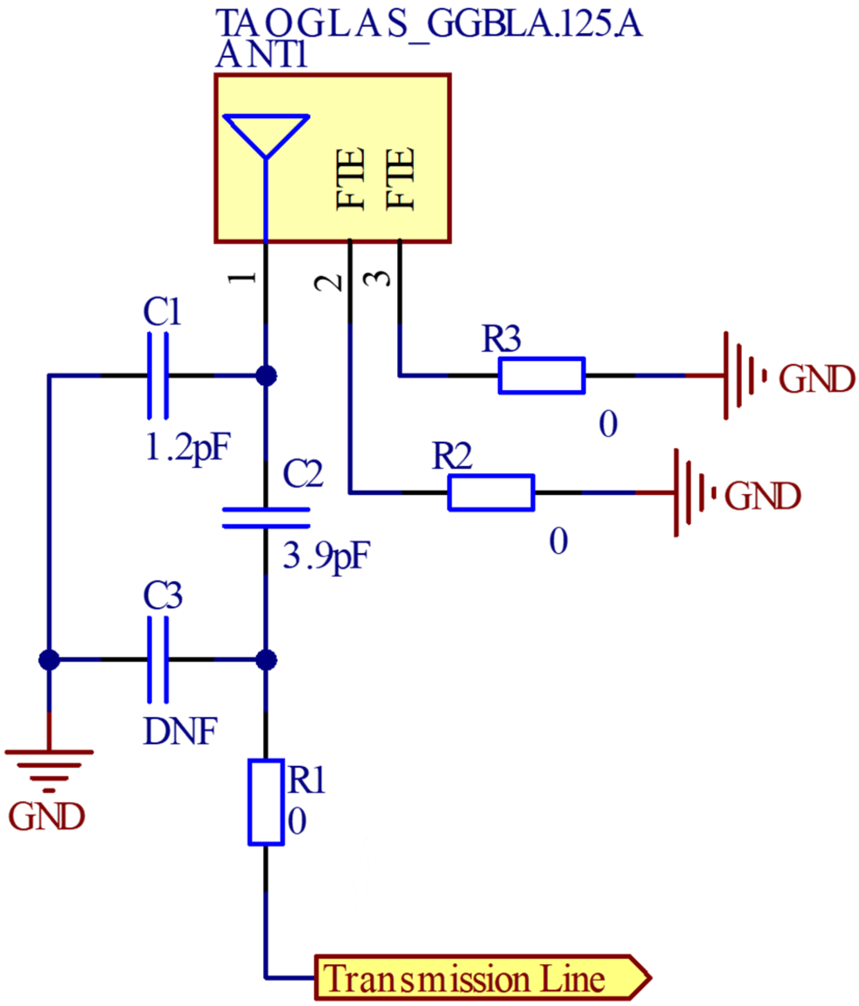
Pin	Description
1	RF Feed
2, 3	FTE (Fine Tuning Element)



Above is a schematic symbol of GGBLA.125.A and a table of the pin definitions.

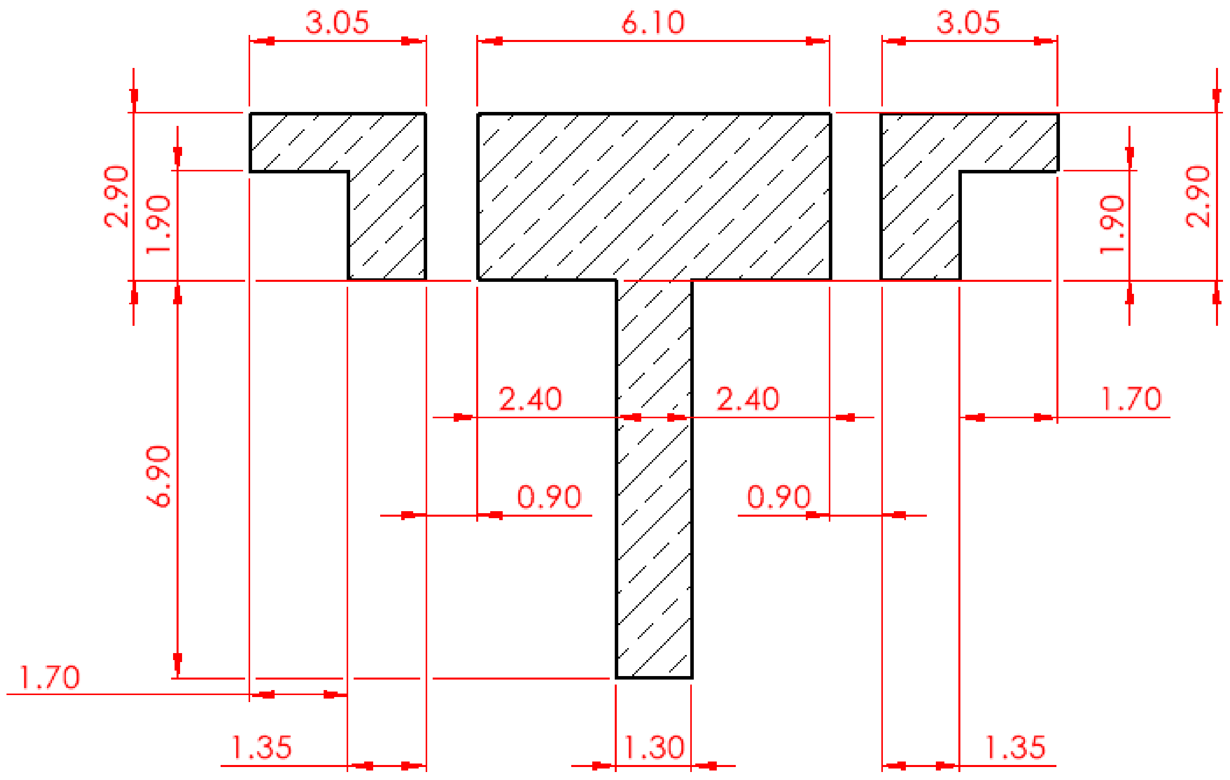
7.2 Schematic Layout

Matching components with the GGBLA.125.A are required for the antenna to have optimal performance in the spaces specified in the schematic below. Additional matching components may be necessary for your device, Taoglas recommends incorporating extra component footprints, forming a "Pi" network, for the GGBLA.125.A.

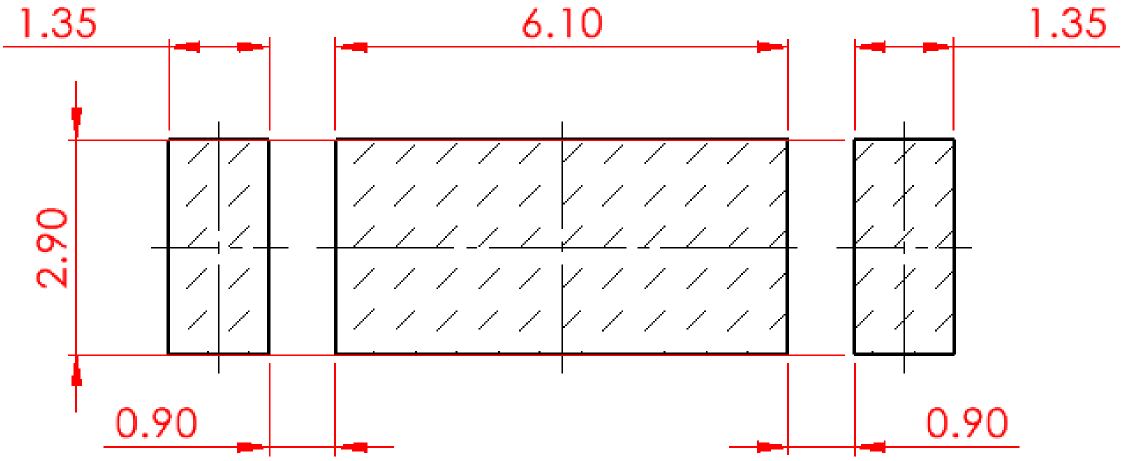


Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	1.2pF	Murata	GRM1555C1H1R2CA01D
C2	Capacitor	3.9pF	Murata	GRM1555C1H3R9CA01D
C3	Capacitor	Not Fitted	-	-
R1, R2, R3	Resistor	0 Ohm	YAGEO	RC0402JR-070RL

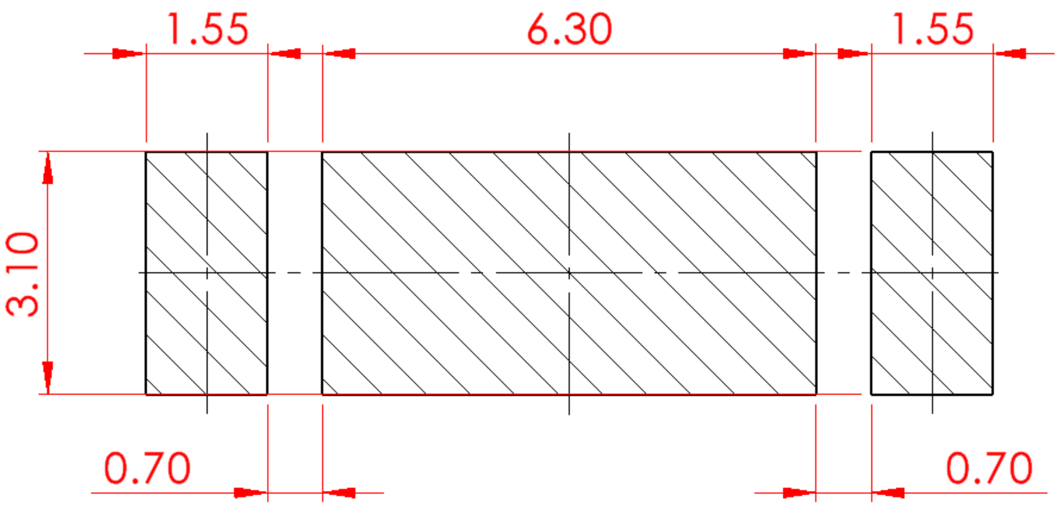
7.3 Antenna Footprint



7.4 Top Solder Paste



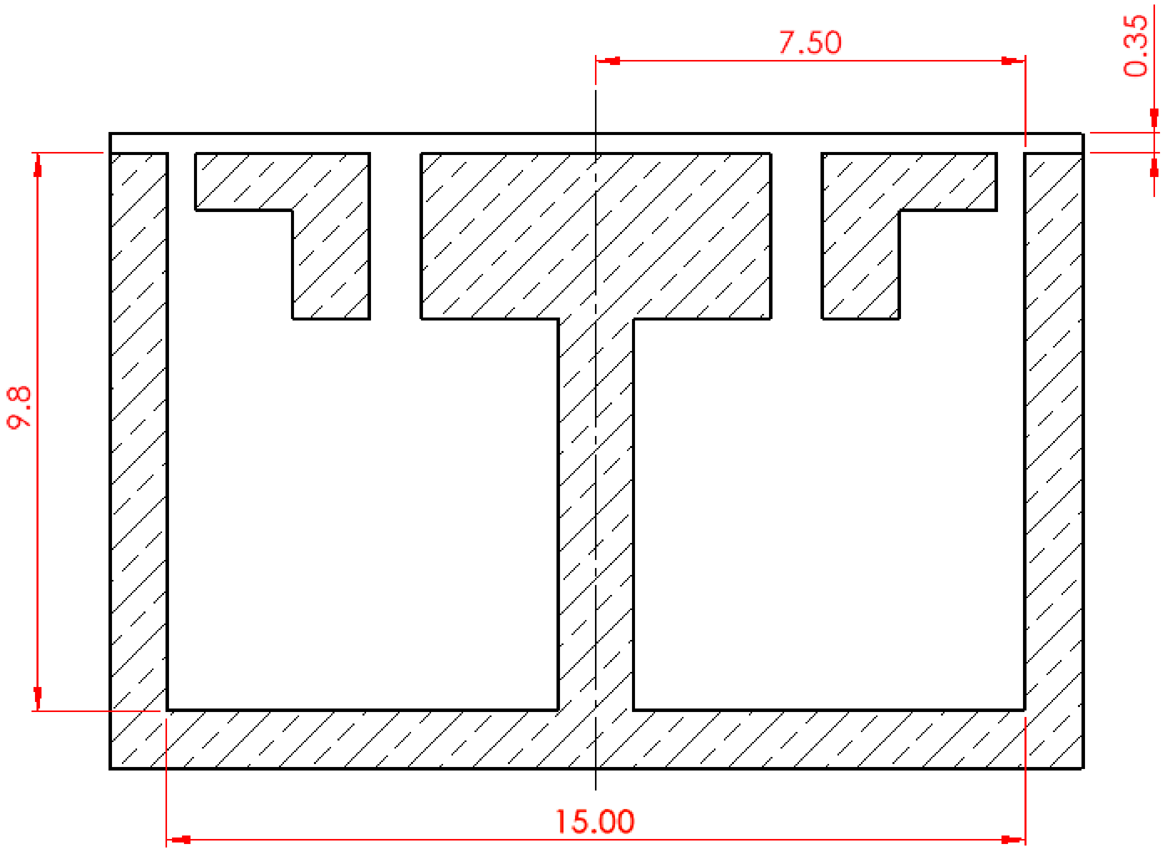
7.5 Top Solder Mask



7.6 Copper Clearance

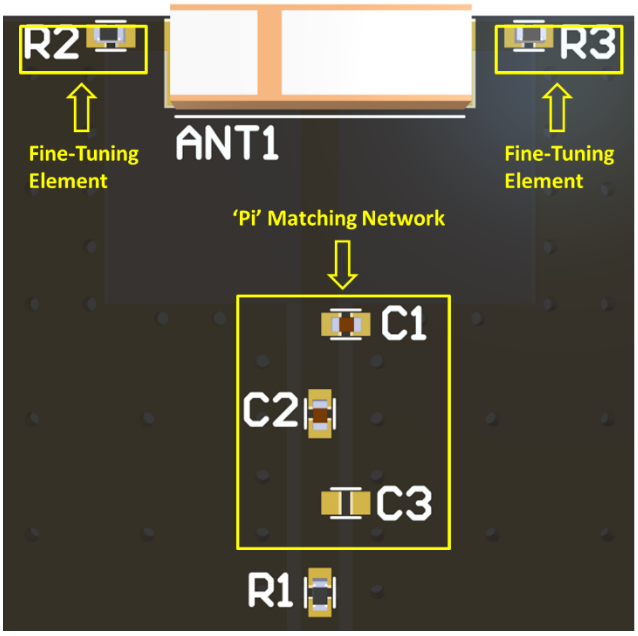
The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the GGBLA.125.A clearance area. The copper keep out area applies to all layers that are below the GGBLA.125.A.

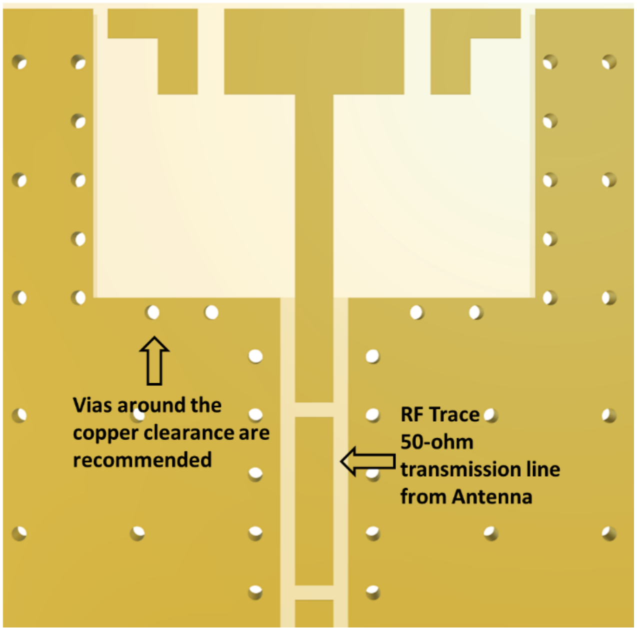
There should be a copper clearance area of 9.8mm in length and 15mm in width around the antenna. The PCB Edge Clearance should be a minimum of 0.1mm.



7.7 Antenna Integration

The GGBLA.125.A should be placed in the centre, as close to the edge on the long side of the PCB as possible, to take advantage of the ground plane. The RF trace must maintain a 50 Ohm transmission line. A "Pi" Matching Network is recommended for the RF transmission line, the values and components for the matching circuit will depend on the tuning needed. Ground vias should be placed around the copper clearance area.

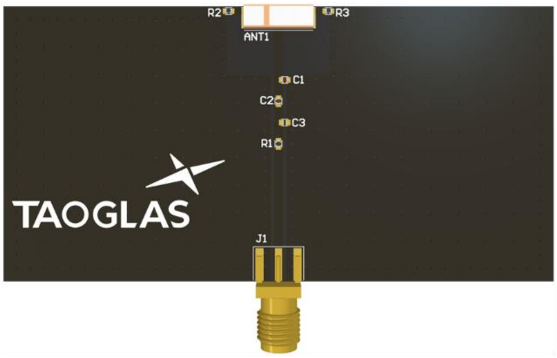


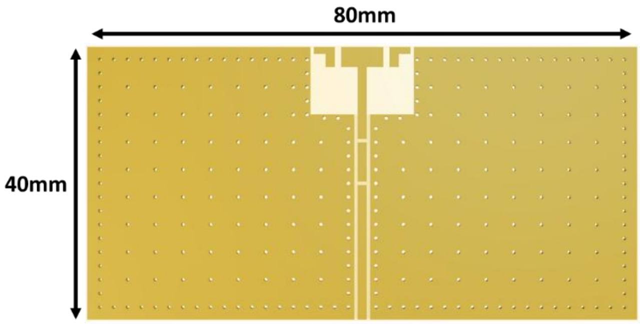


GGBLA.125.A antenna mounted on a PCB refence design, showing transmission lines and integration notes.

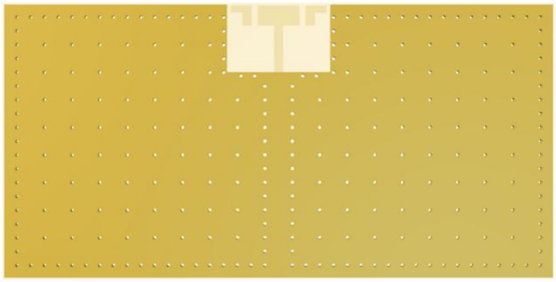
7.8 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 90x50mm ground plane (PCB) to ensure optimal performance.





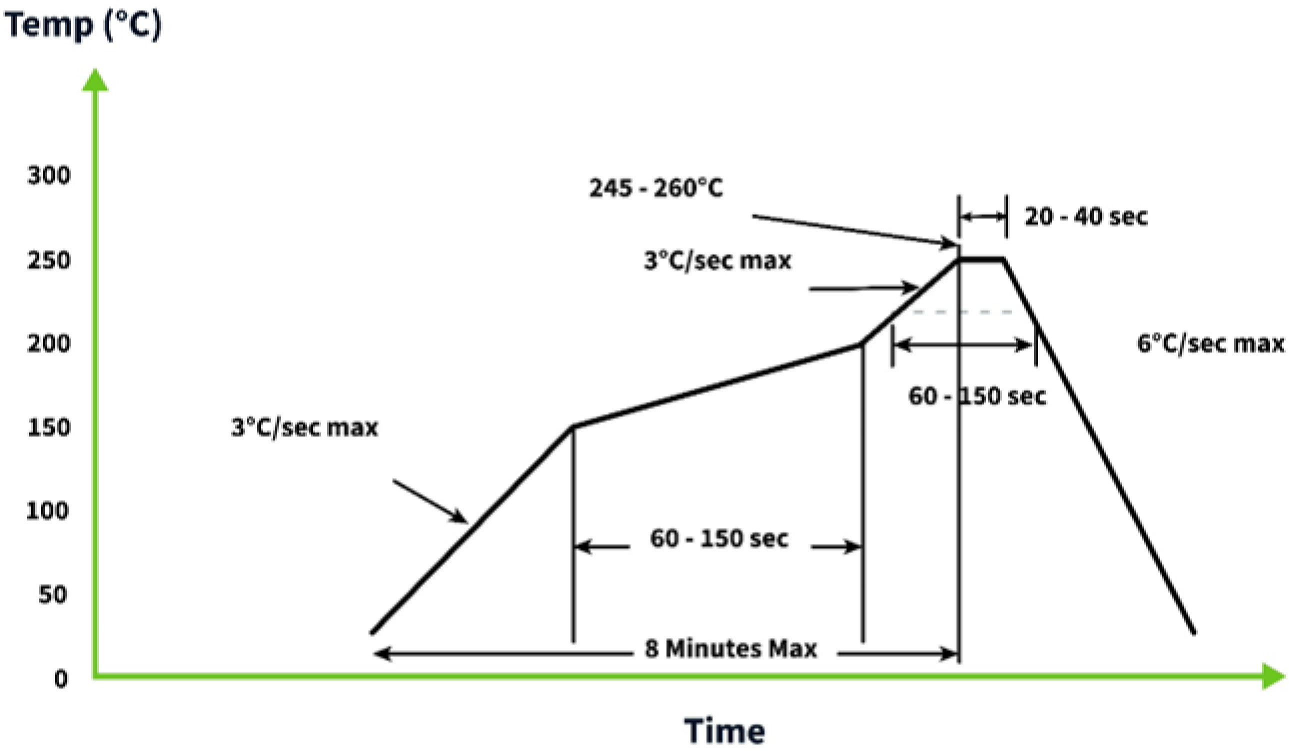
Top Side (GGBLA.125 placement on 80x40mm PCB reference design)



Bottom Side (GGBLA.125 placement on 80x40mm PCB reference design)

8. Soldering Conditions

The GGBLA.125.A can be assembled by following the recommended soldering temperatures are as follows:



*Temperatures listed within a tolerance of +/- 10º C

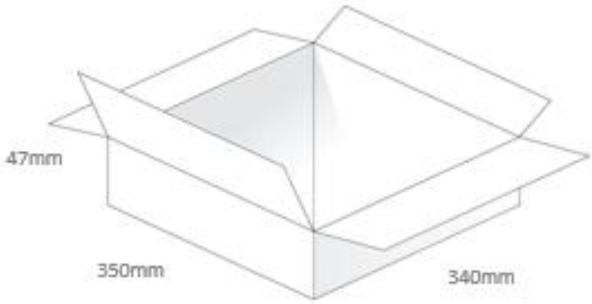
Smaller components are typically mounted on the first pass, however, we do advise mounting the GGBLA.125.A when placing larger components on the board during subsequent reflows.

Note: Soldering flux classified ROL0 under IPC J-STD-004 is recommended.

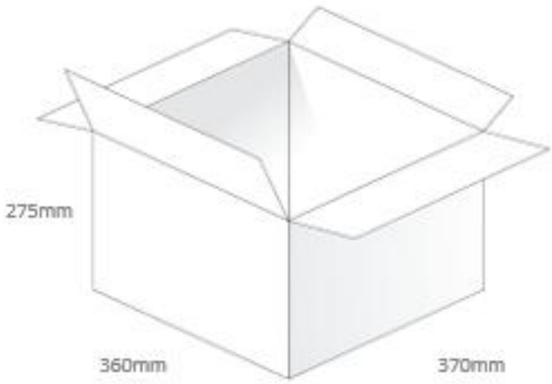
9. Packaging

1000pcs GGBLA.125.A per Tape & Reel
Dimensions - Ø330*28.4
Weight - 700g

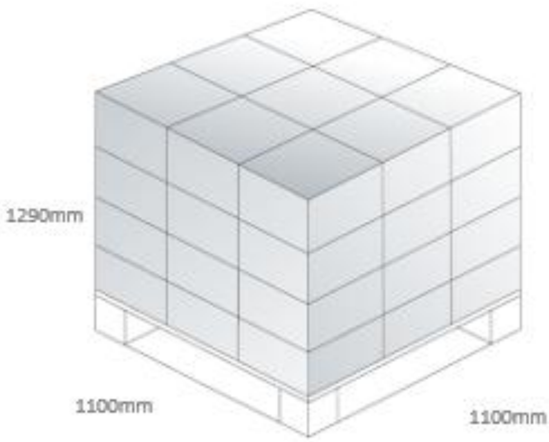
1000pcs GGBLA.125.A per carton
Dimensions - 350*340*47mm
Weight - 900g



5000pcs GGBLA.125.A per carton
Dimensions - 360*370*275mm
Weight – 5.3Kg



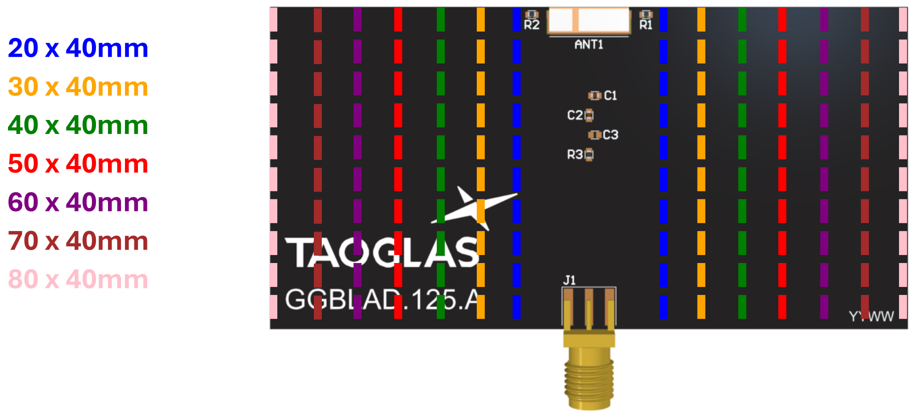
Pallet Dimensions:
1100*1100*1300mm
36 Cartons Per Pallet
9 Cartons Per Layer, 4 Layers



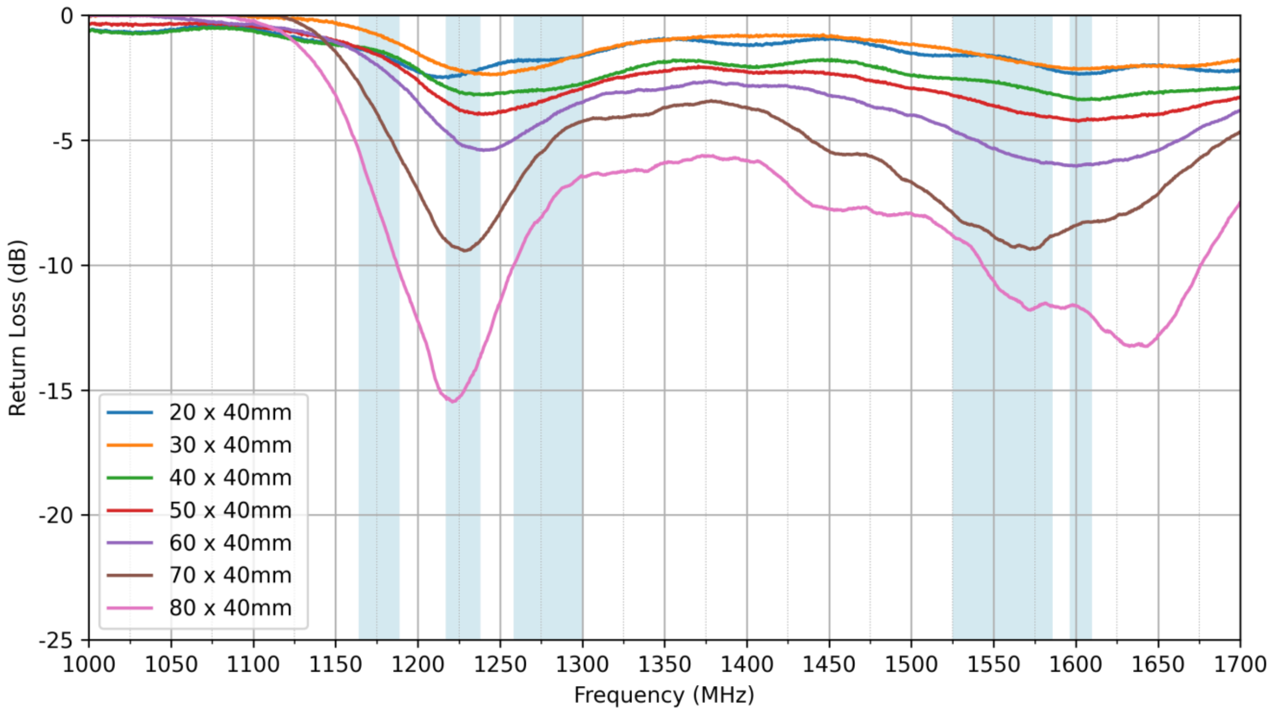
10. Application Note

10.1 Ground Plane Size Evaluation – Long Side

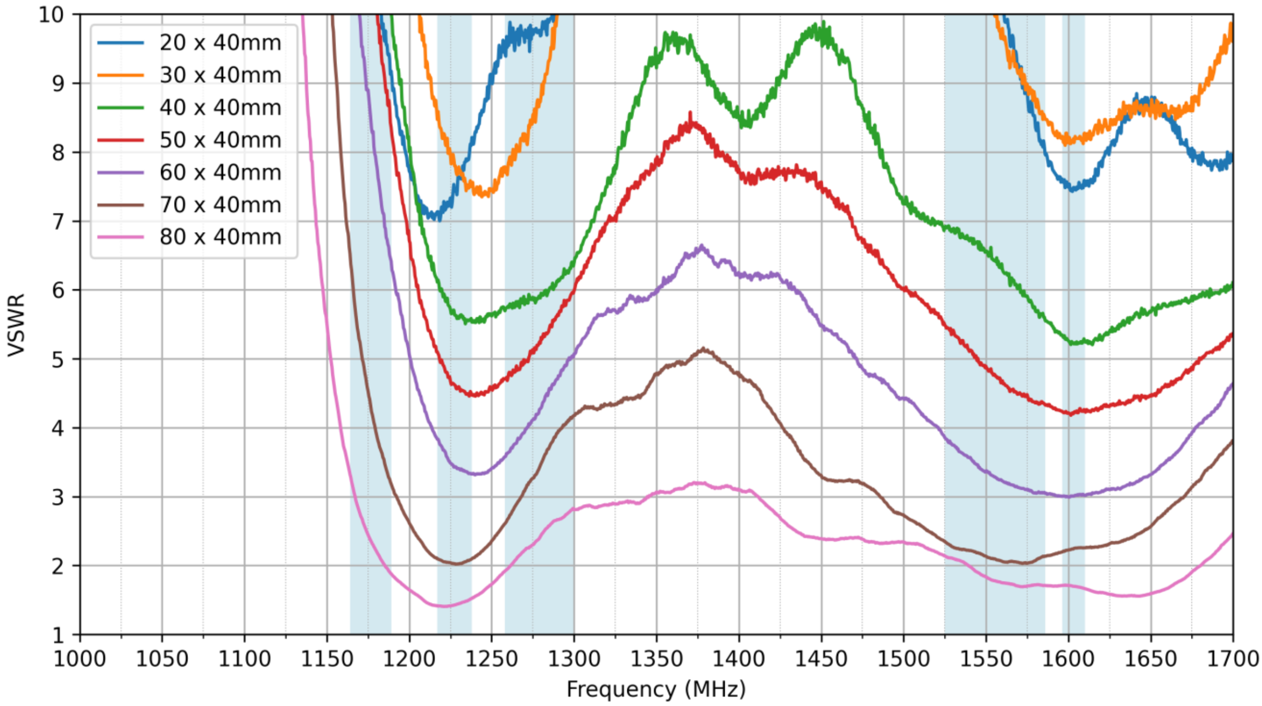
The influence of the long side of the ground plane, while the short side is constantly 40mm, is evaluated following the methodology presented below. The following lengths are tested: 80mm, 70mm, 60mm, 50mm, 40mm, 30mm and 20mm. There was no change to the 'pi' matching network on the PCB, Please refer to section 7.3.



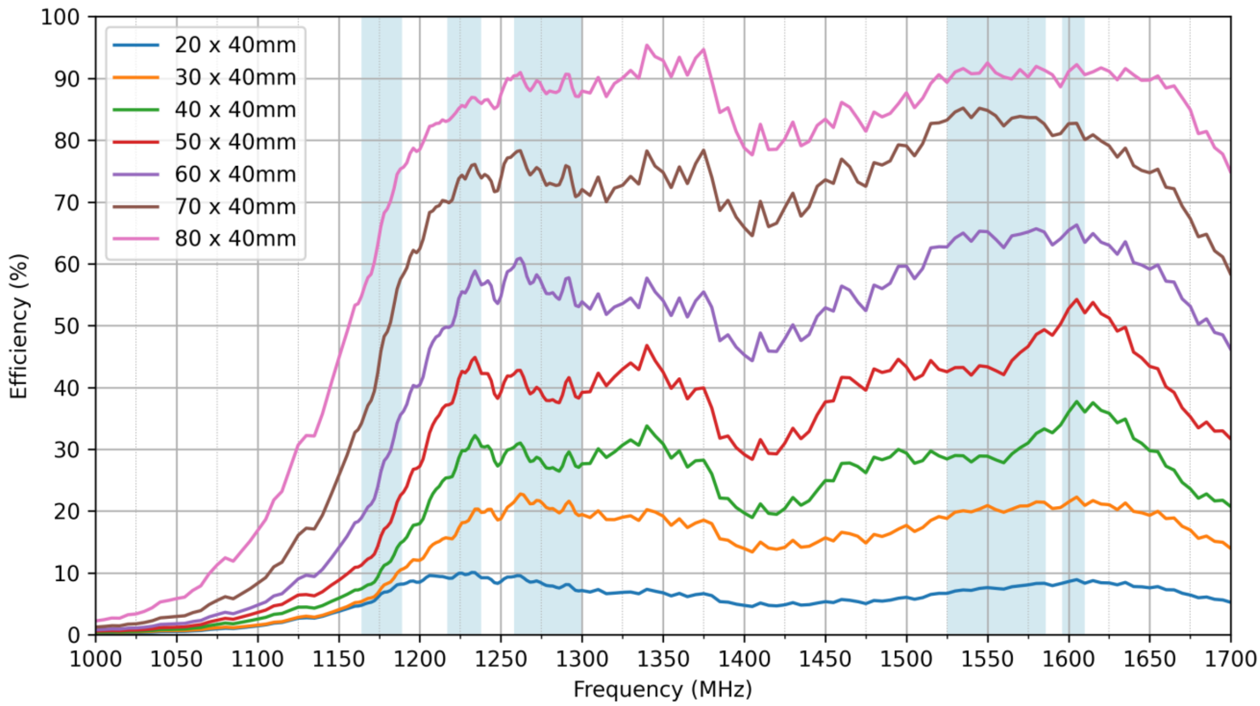
10.2 Return Loss



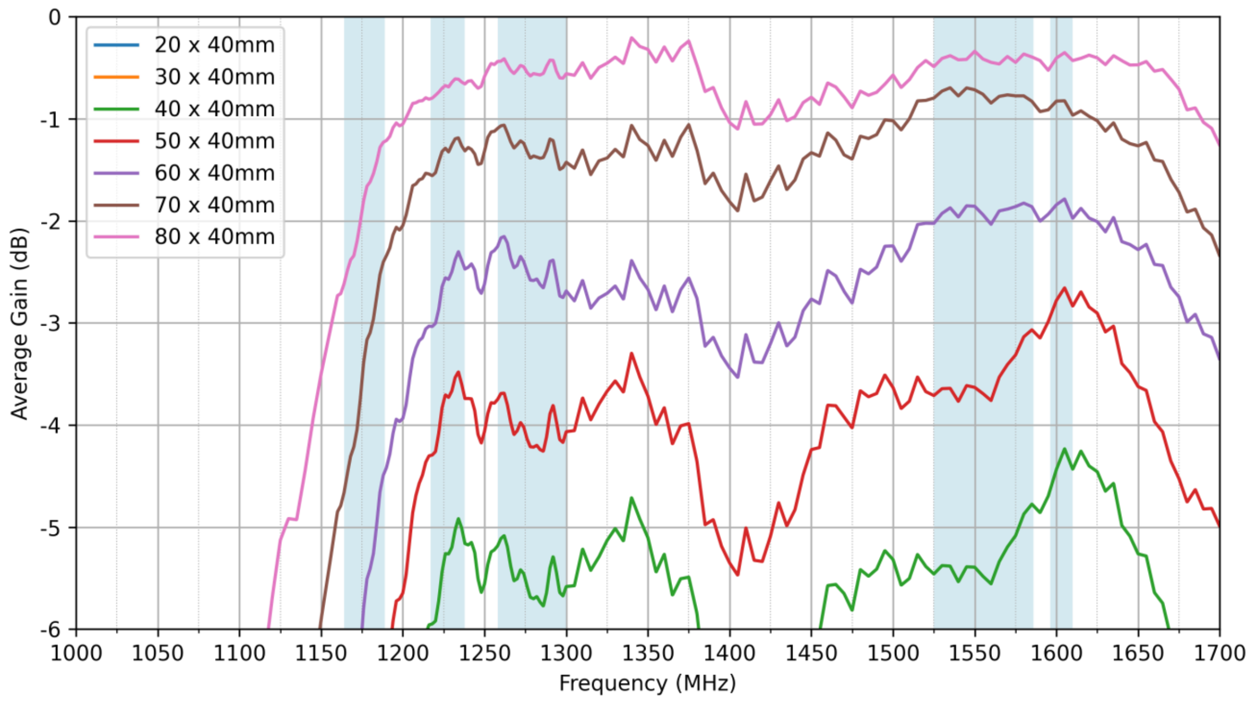
10.3 VSWR



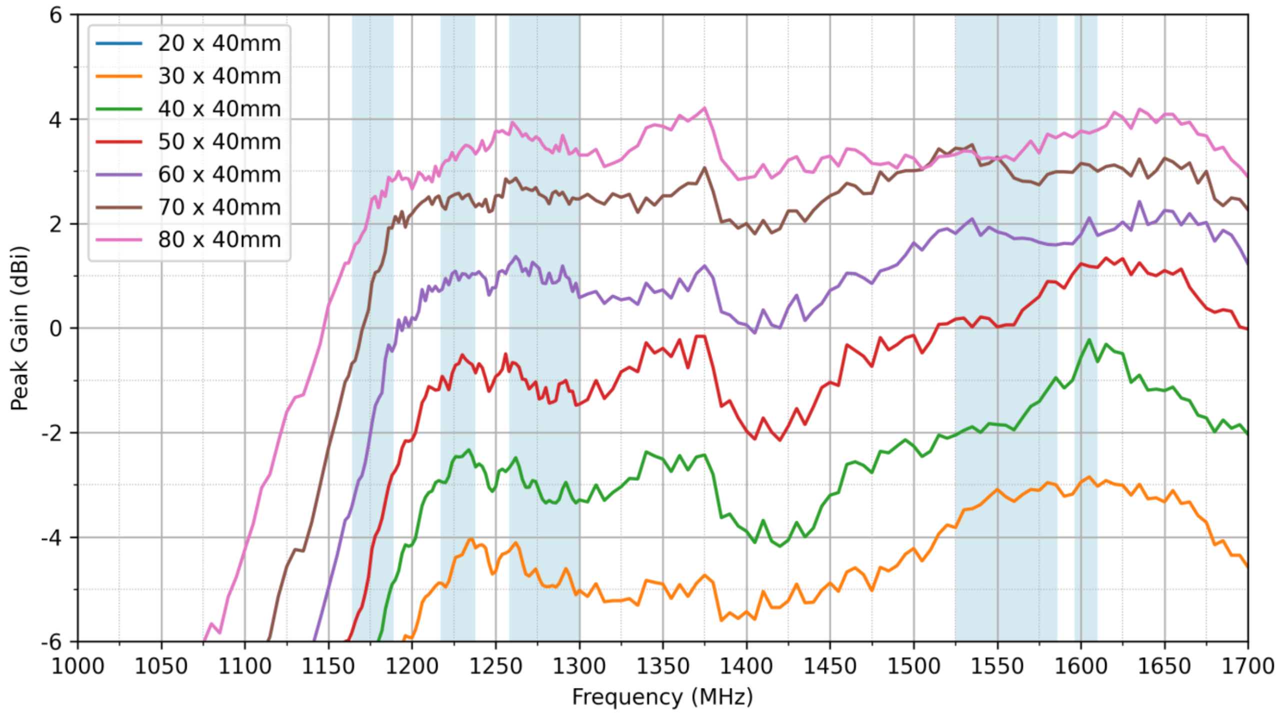
10.4 Efficiency



10.5 Average Gain

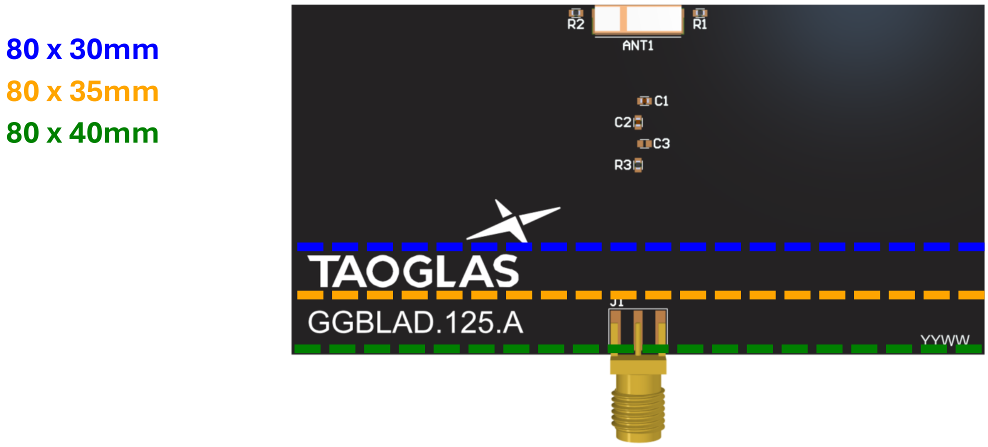


10.6 Peak Gain

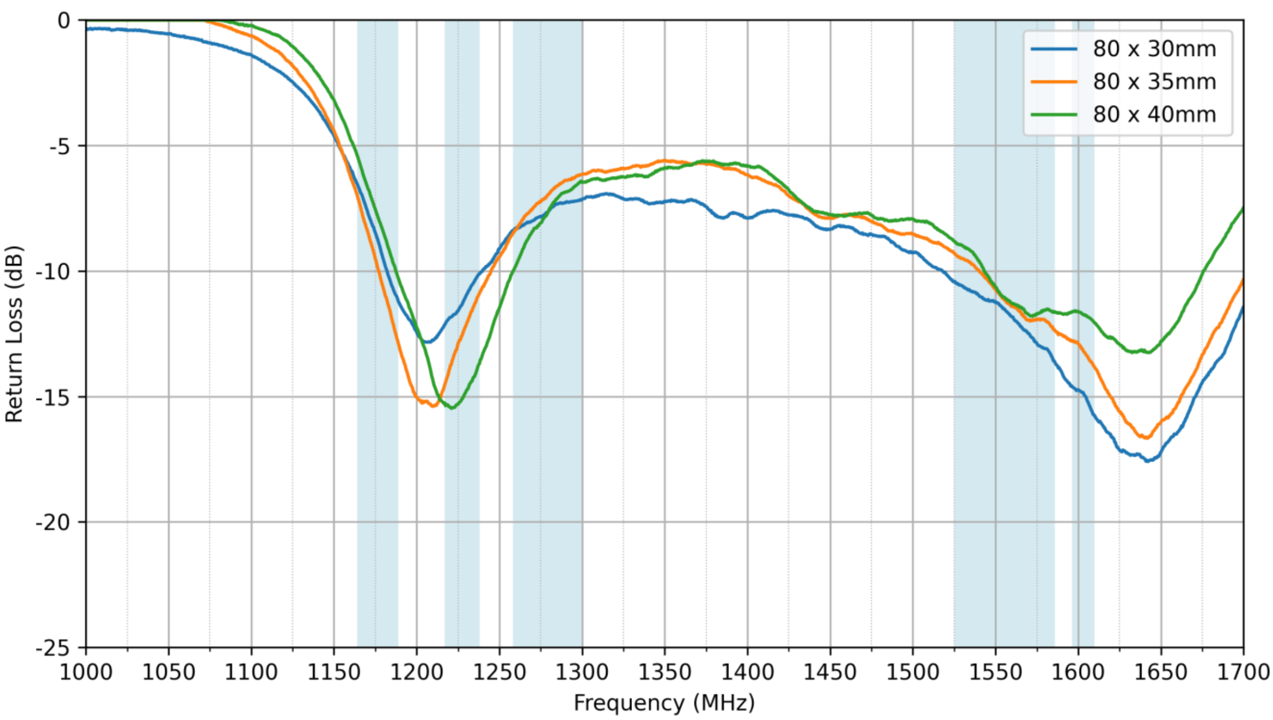


10.7 Ground Plane Size Evaluation – Short Side

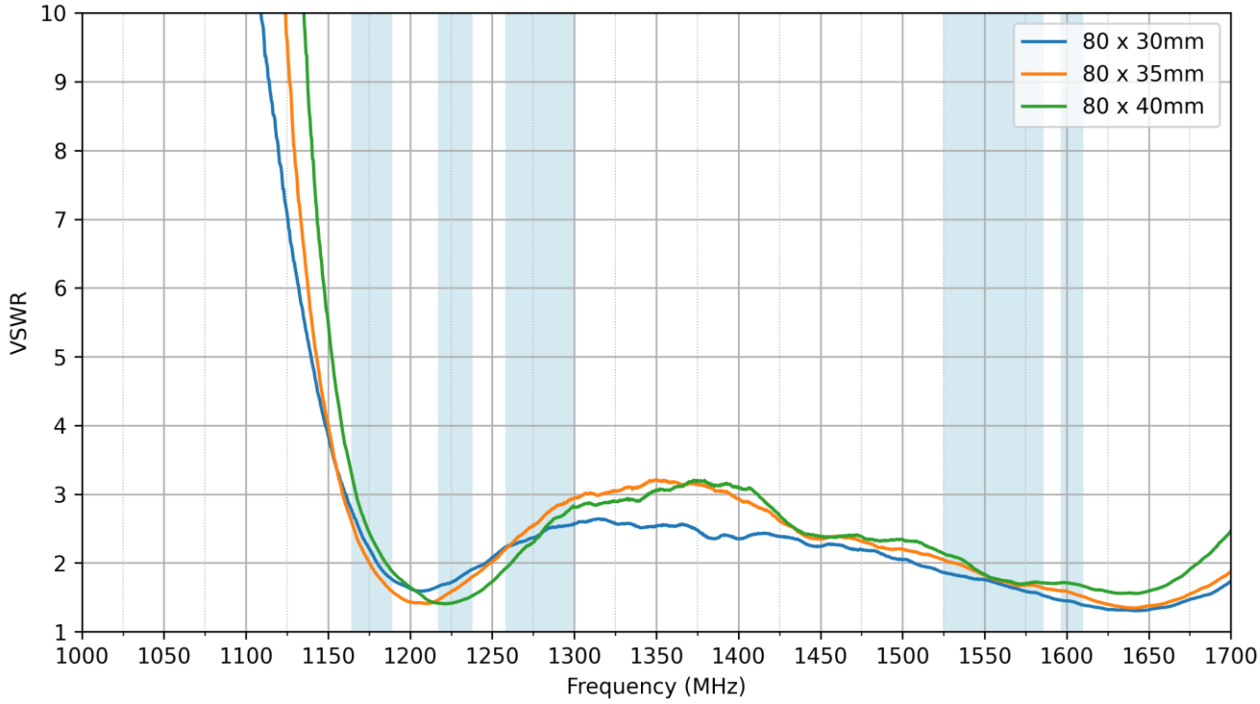
The influence of the short side of the ground plane, while the long side is constantly 80mm, is evaluated following the methodology presented in Figure 8. The following lengths are tested: 40mm, 35mm and 30mm. There was no change to the ‘pi’ matching network on the PCB, Please refer to section 7.3.



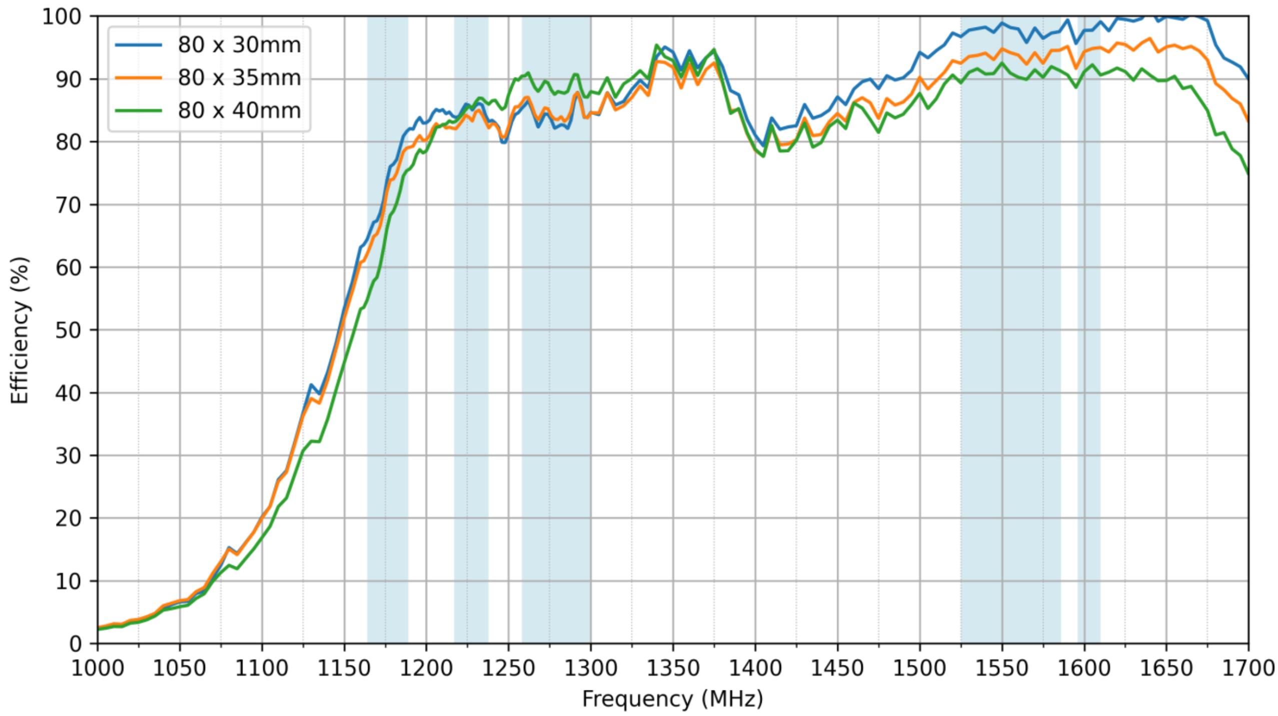
10.8 Return Loss



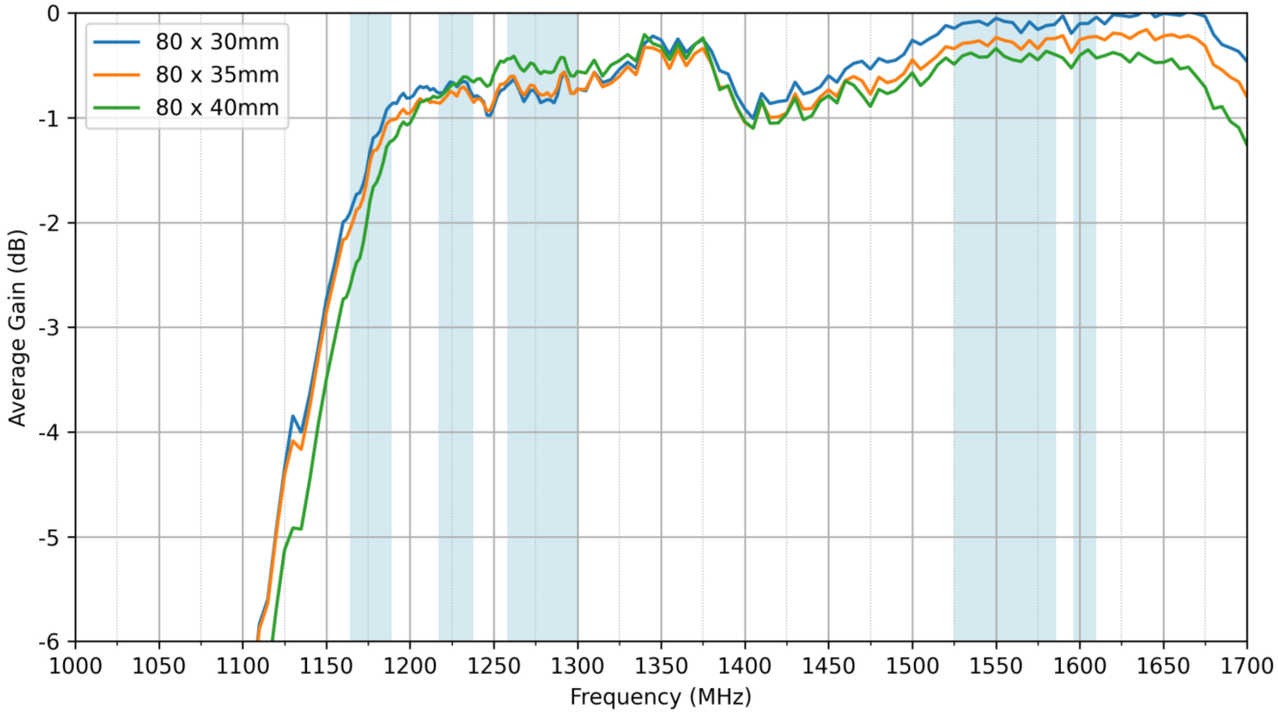
10.9 VSWR



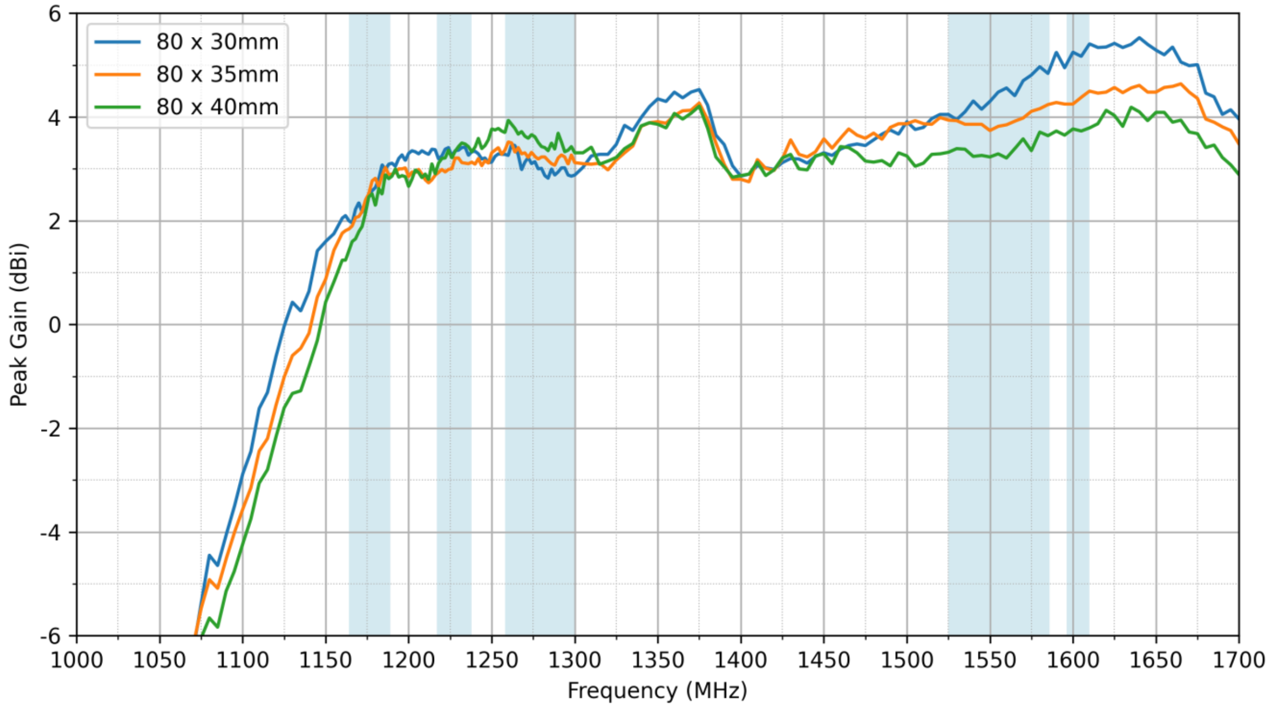
10.10 Efficiency



10.11 Average Gain



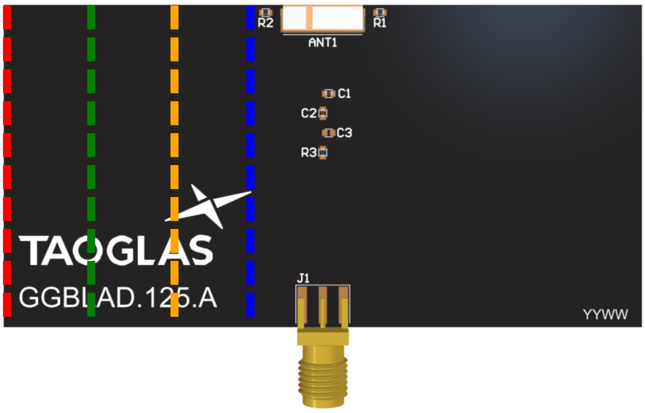
10.12 Peak Gain



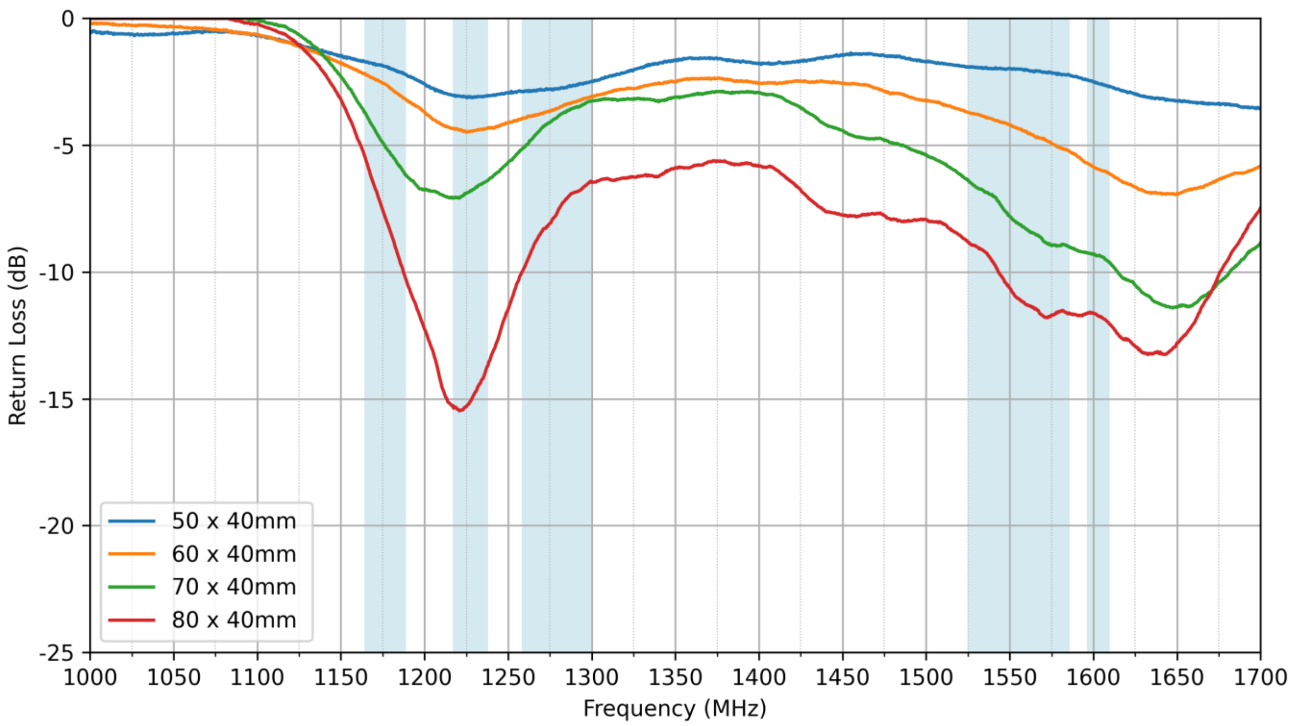
10.13 Ground Plane Size Evaluation – Left Side Corner

The influence of the long side of the ground plane, while the short side is constantly 40mm, is evaluated following the methodology presented below. The following lengths are tested: 80mm, 70mm, 60mm and 50mm.

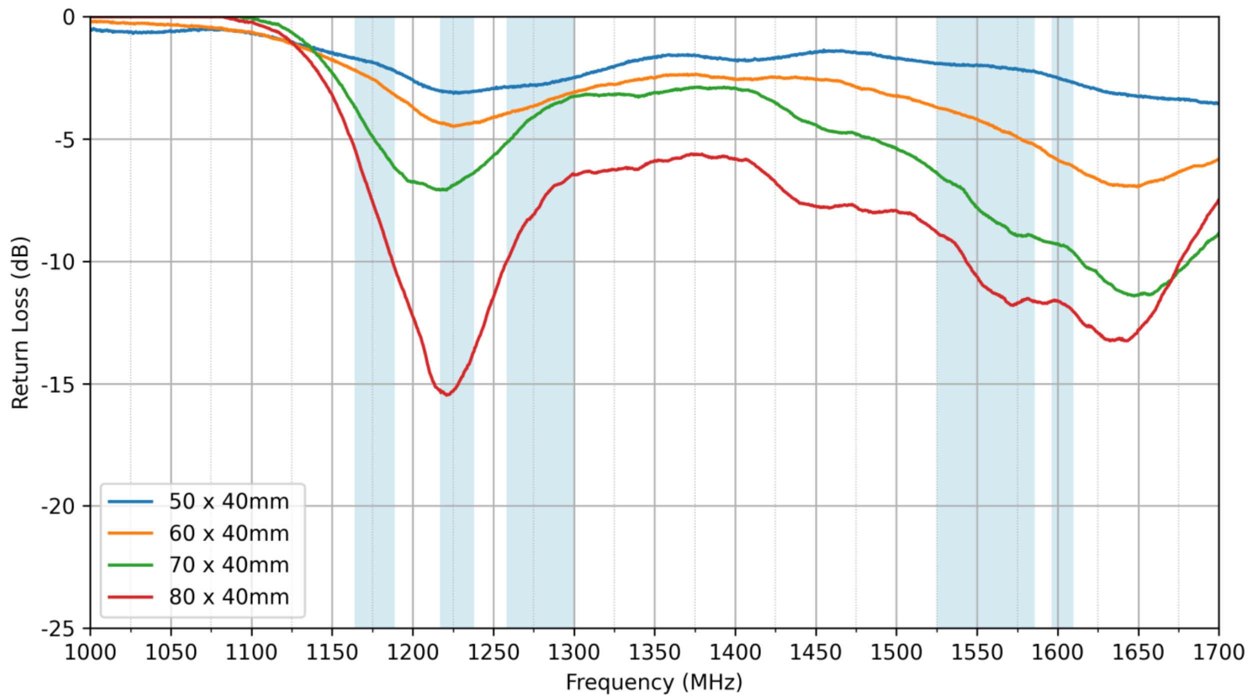
50 x 40mm
60 x 40mm
70 x 40mm
80 x 40mm



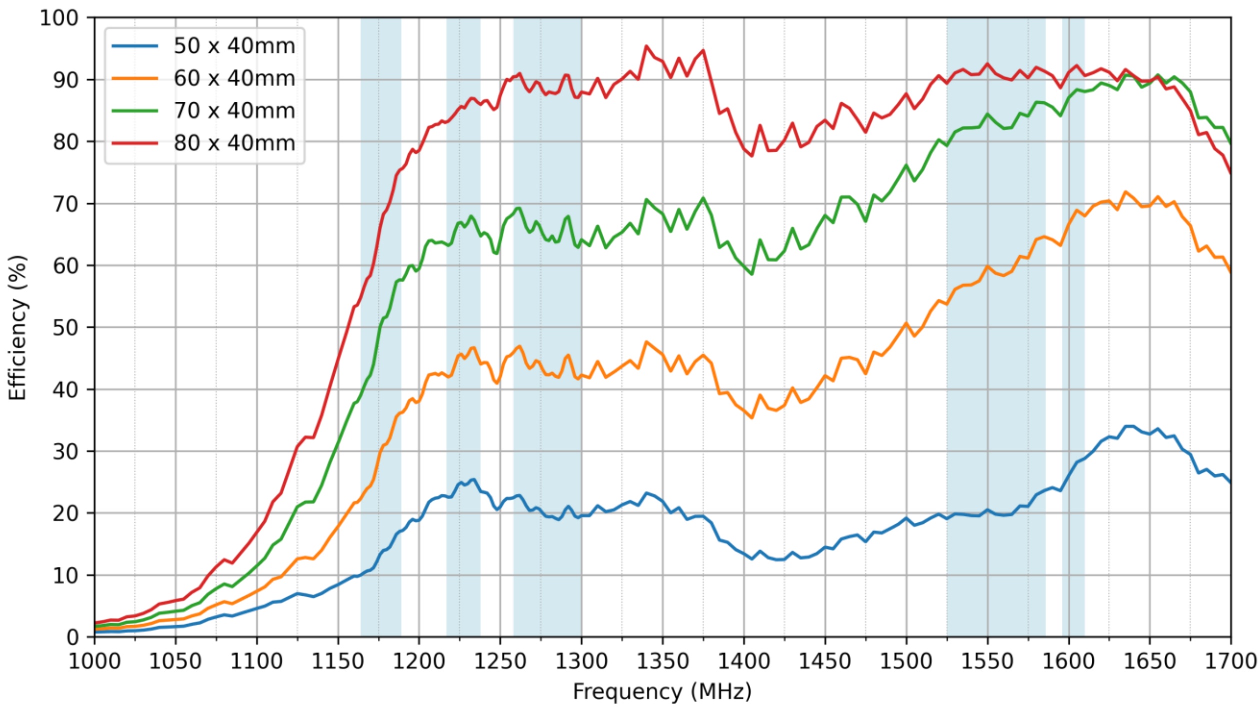
10.14 Return Loss



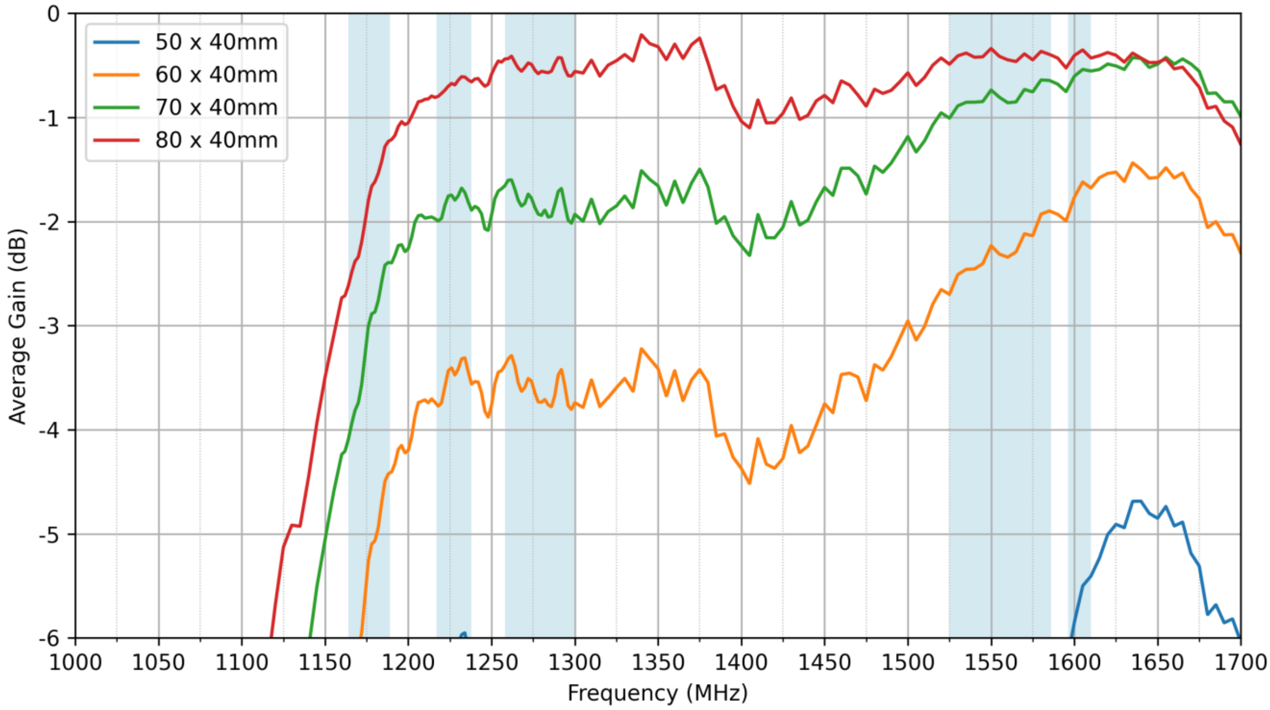
10.15 VSWR



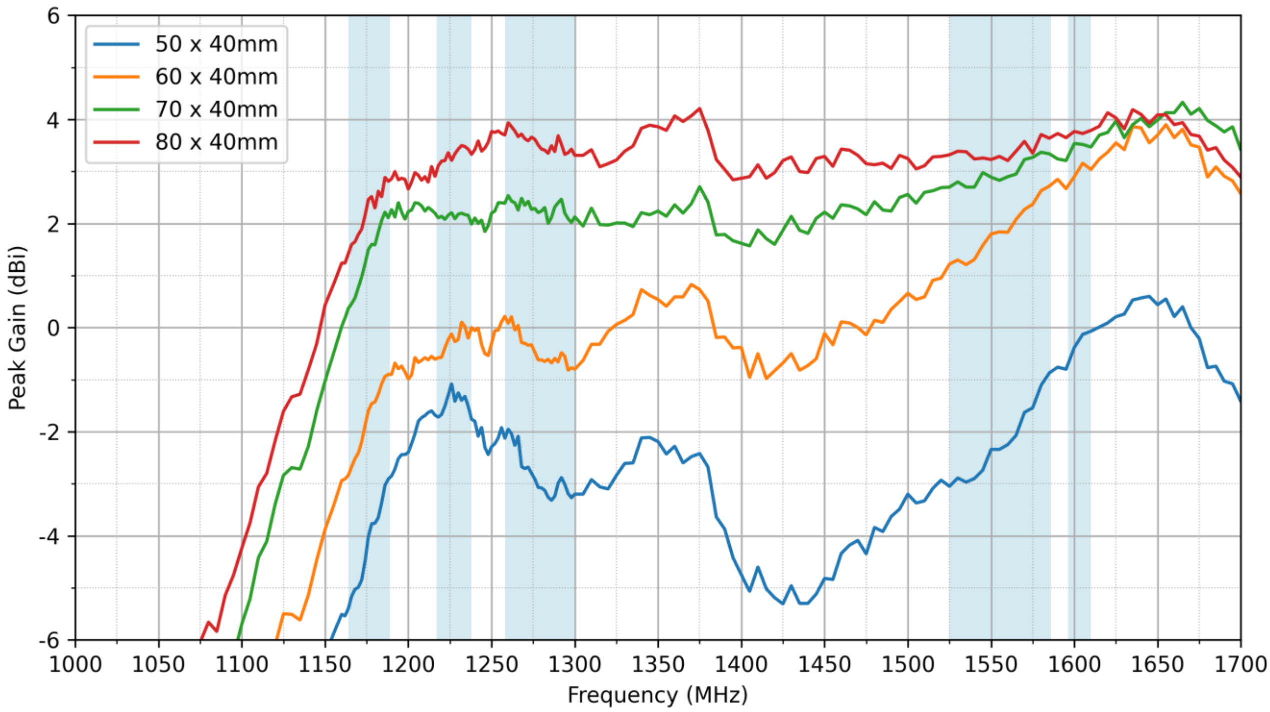
10.16 Efficiency



10.17 Average Gain

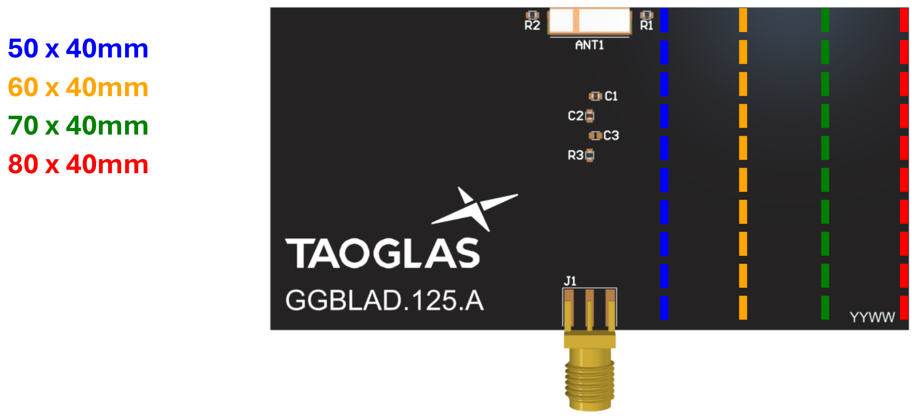


10.18 Peak Gain

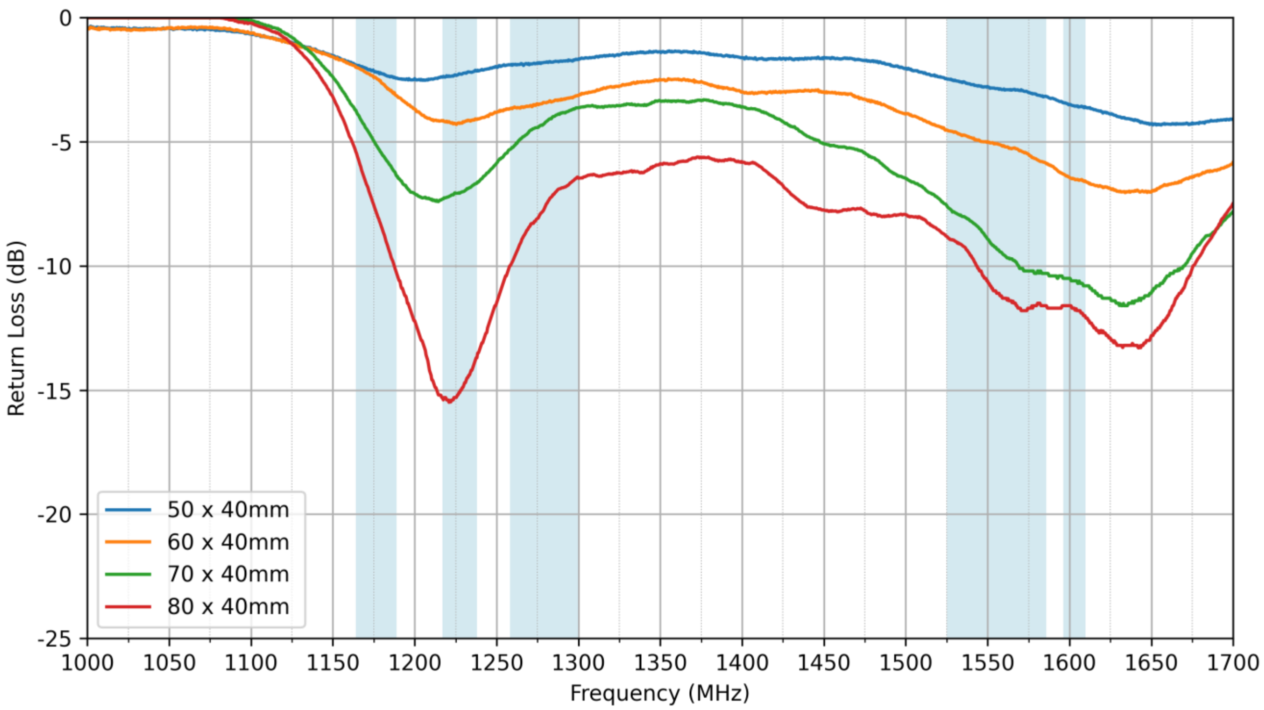


10.19 Ground Plane Size Evaluation – Right Side Corner

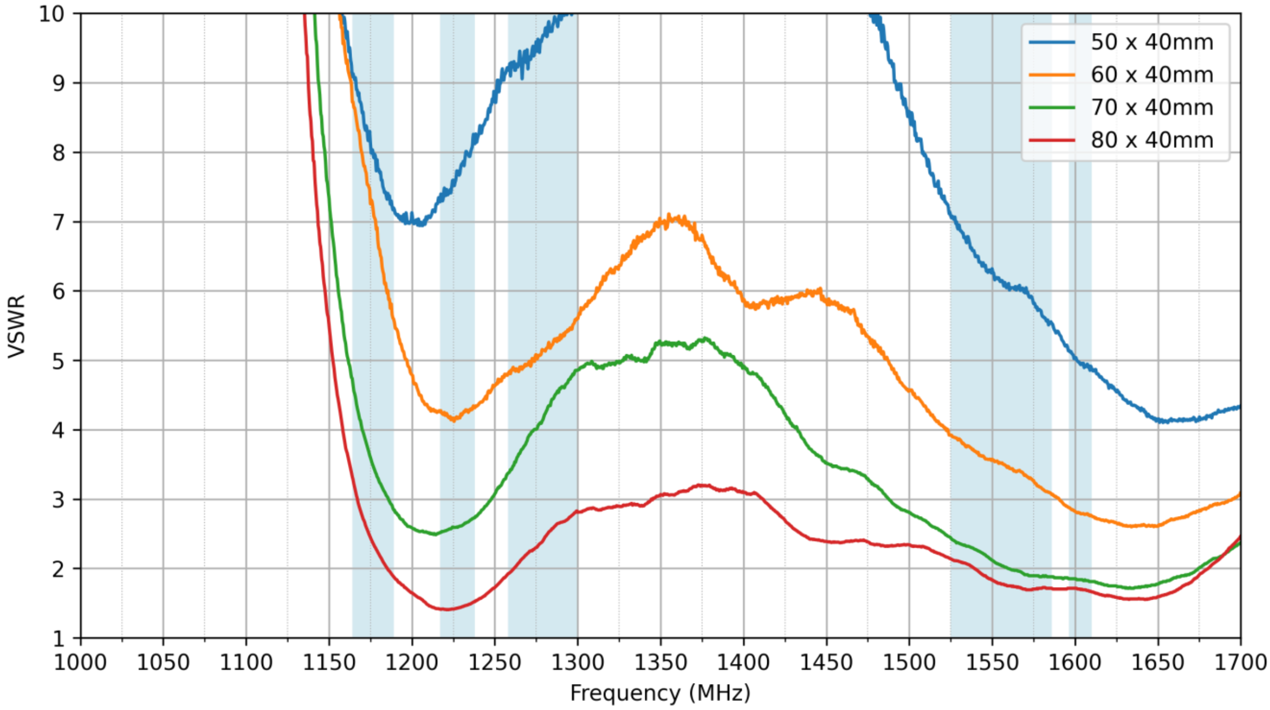
The influence of the long side of the ground plane, while the short side is constantly 40mm, is evaluated following the methodology presented below. The following lengths are tested: 80mm, 70mm, 60mm and 50mm. There was no change to the 'pi' matching network on the PCB, Please refer to section 7.3.



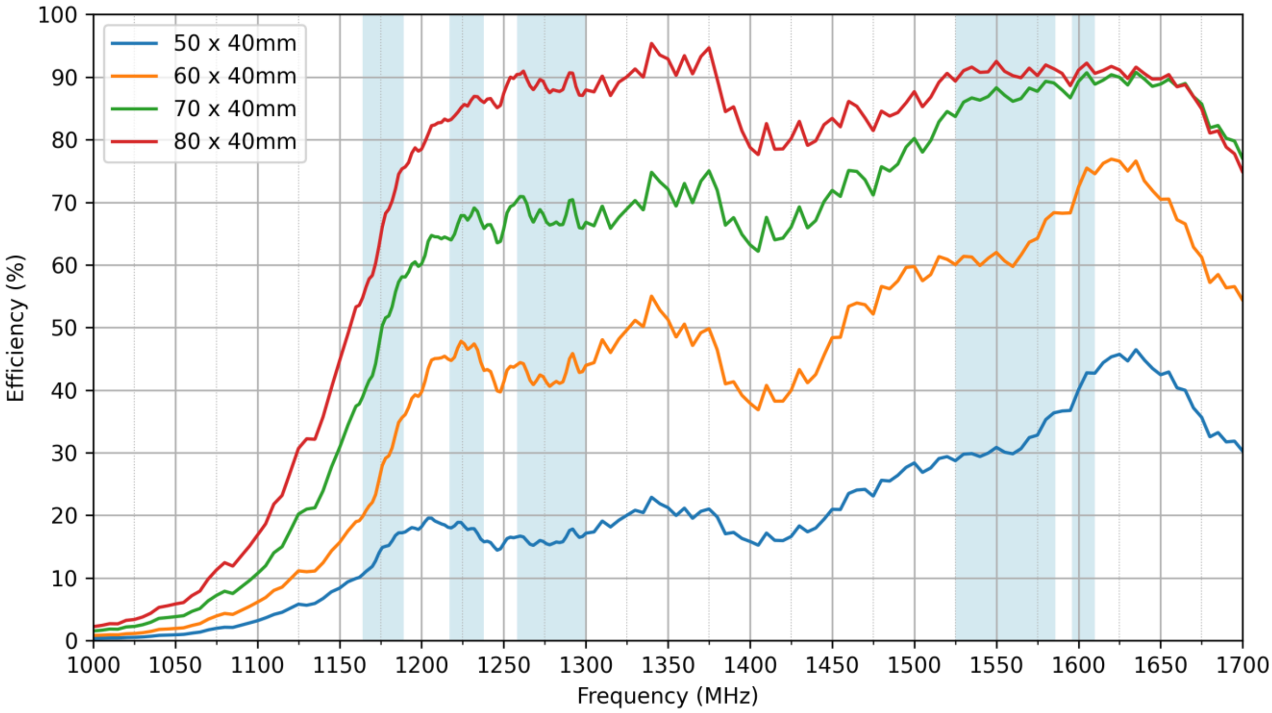
10.20 Return Loss



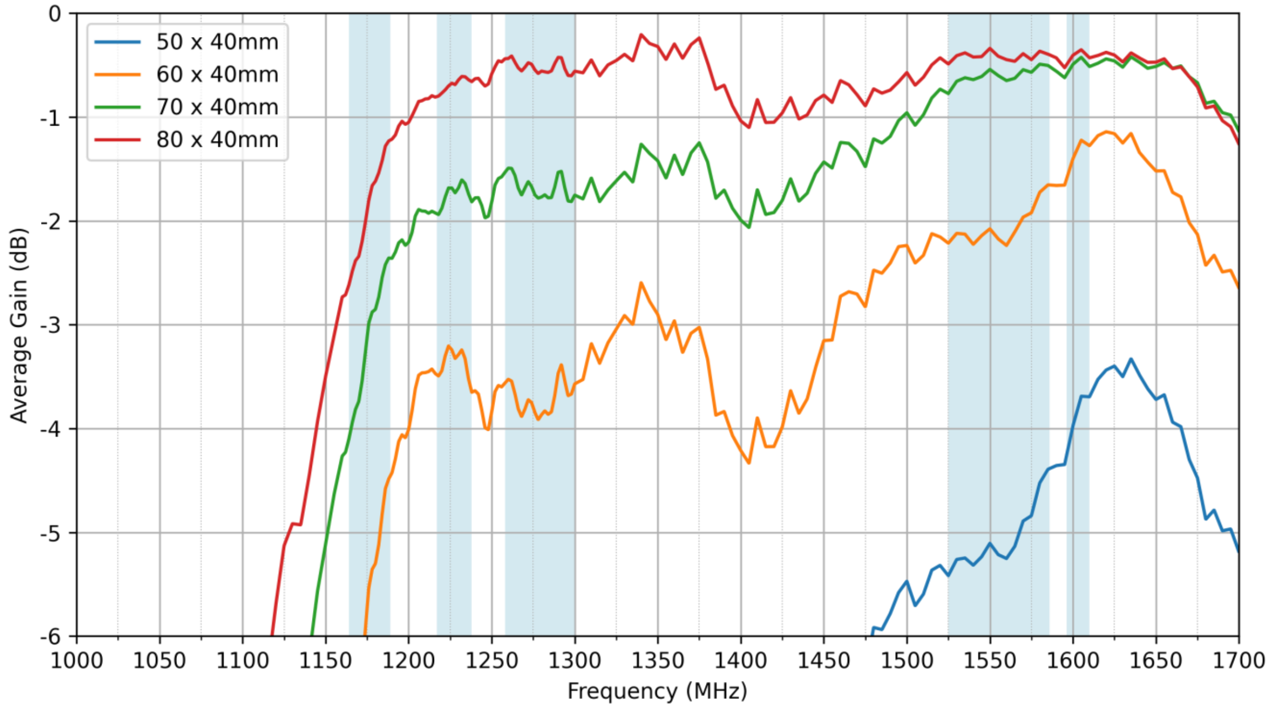
10.21 VSWR



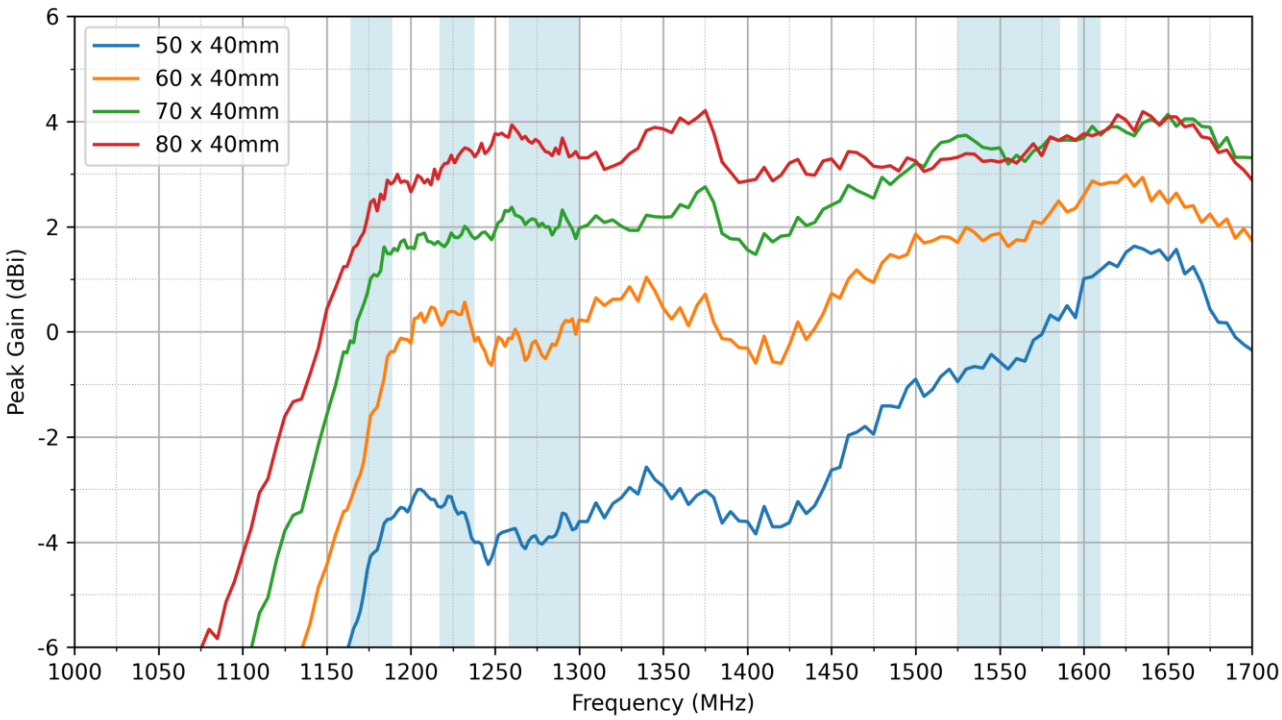
10.22 Efficiency



10.23 Average Gain

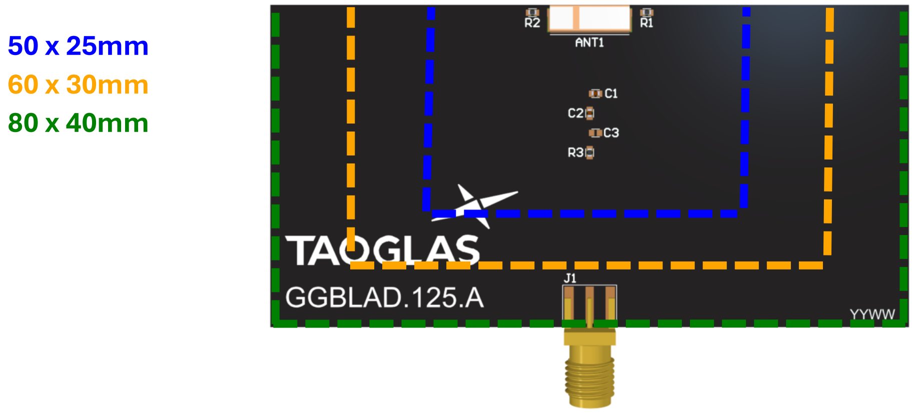


10.24 Peak Gain

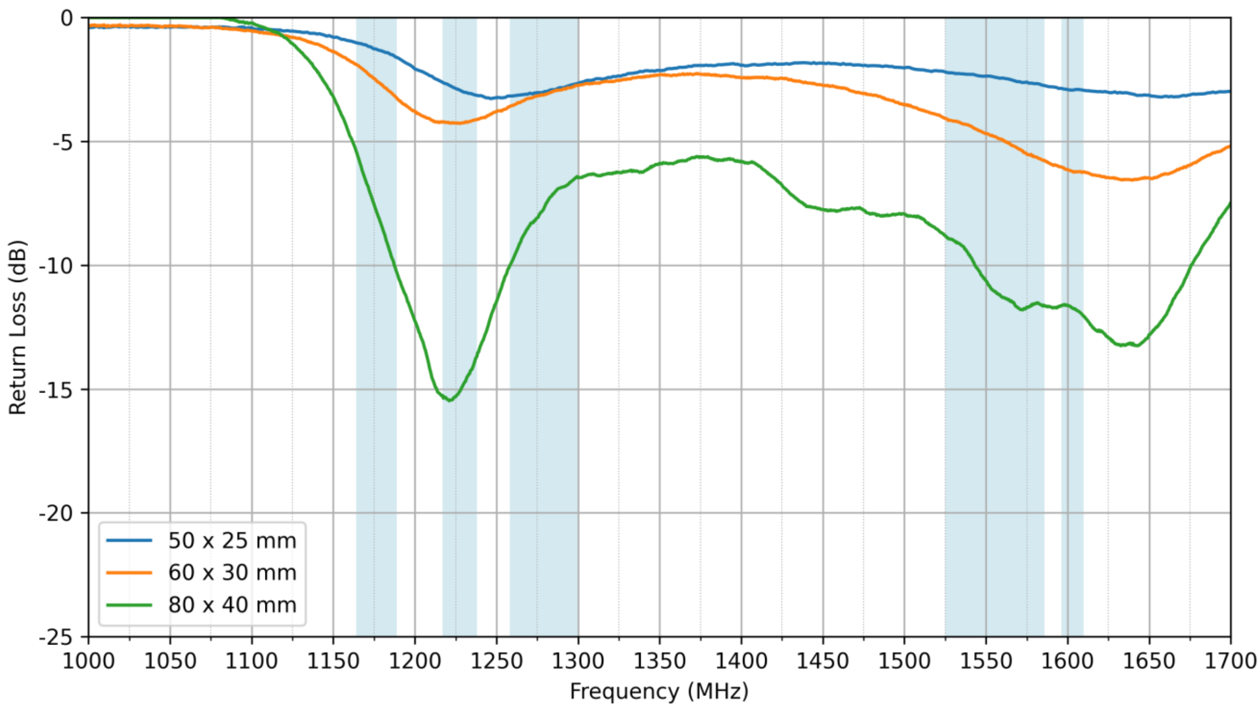


10.25 Ground Plane Size Evaluation – Smaller EVB size

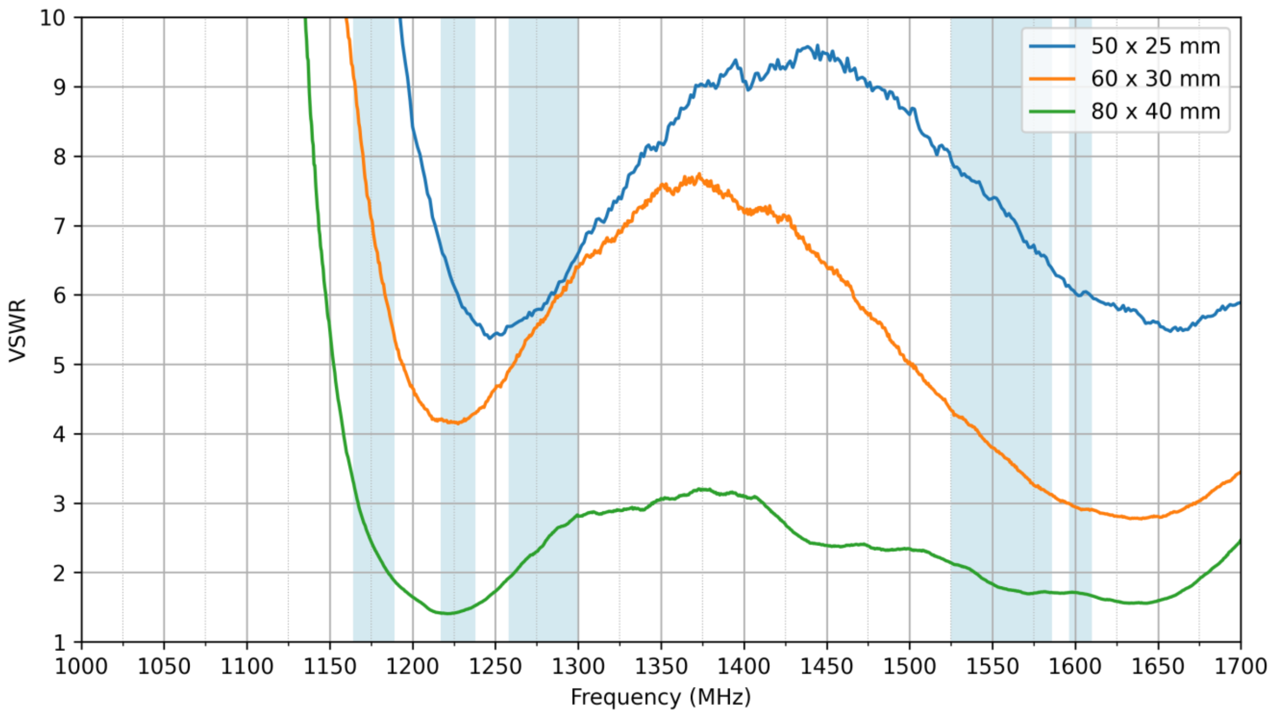
The influence of the long and short side of the ground plane is evaluated following the methodology presented below. The following sizes are tested: 80x40mm, 60x30mm and 50x25mm. There was no change to the 'pi' matching network on the PCB, Please refer to section 7.3.



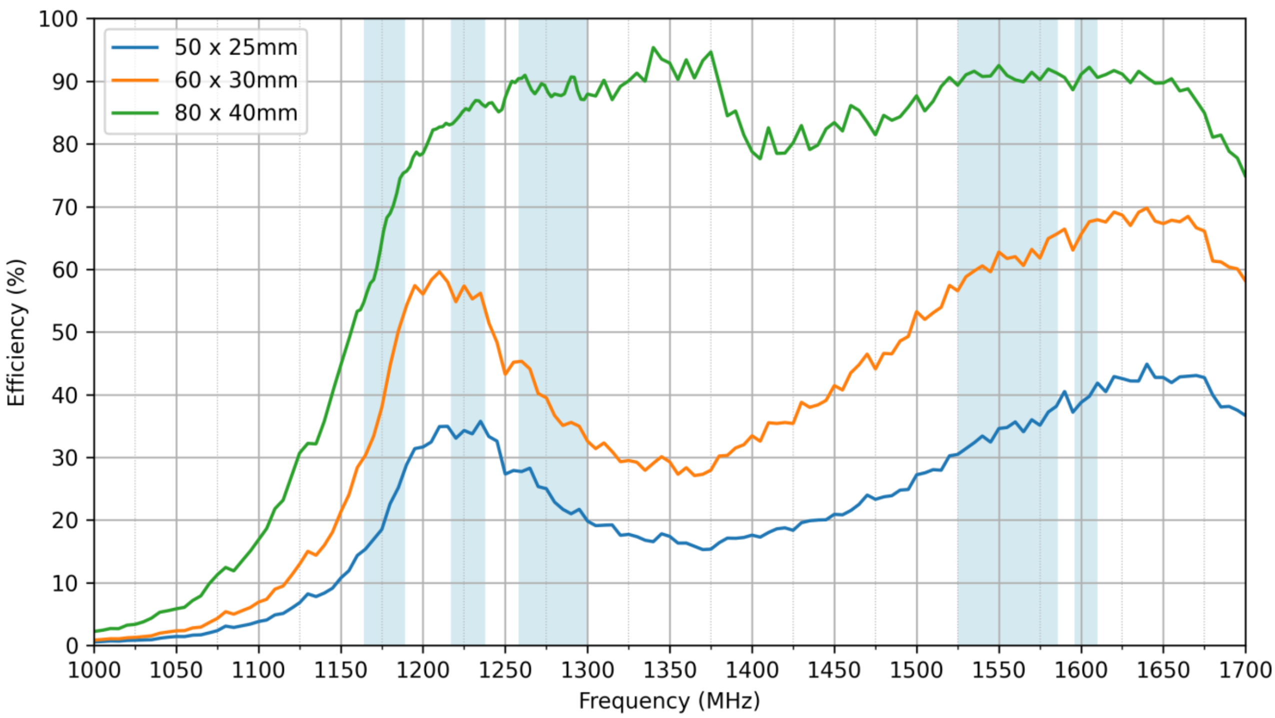
10.26 Return Loss



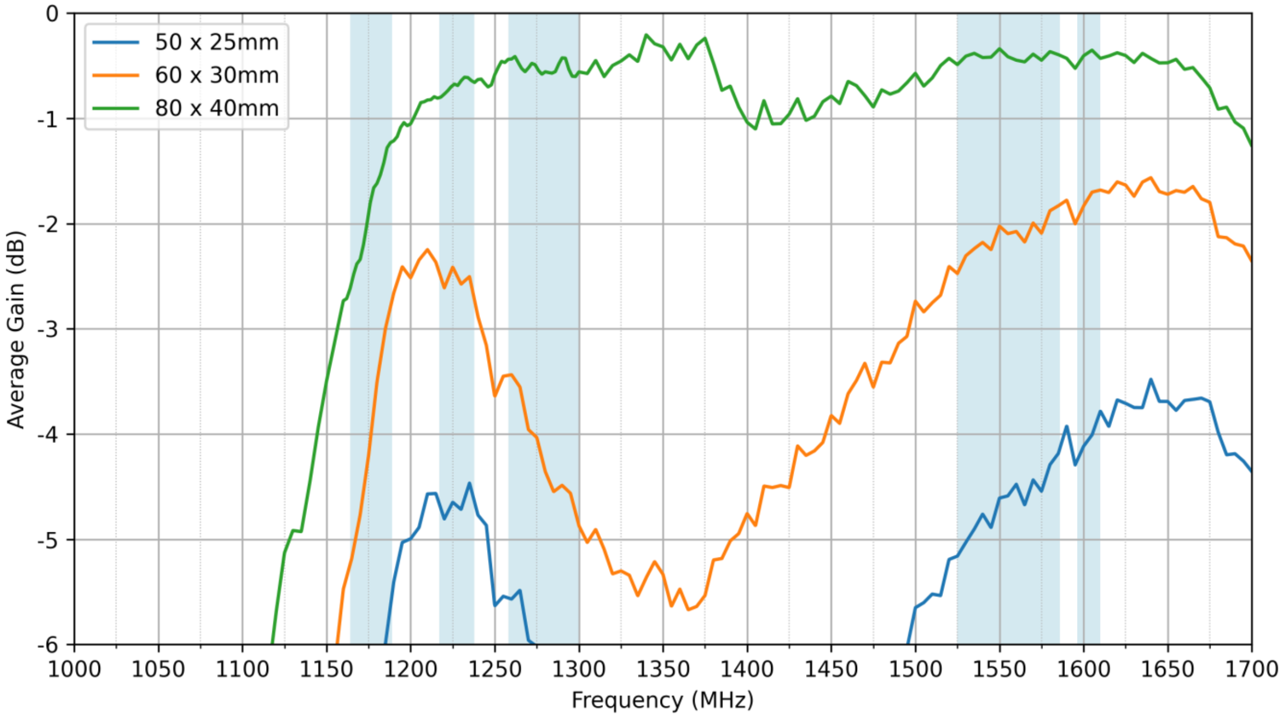
10.27 VSWR



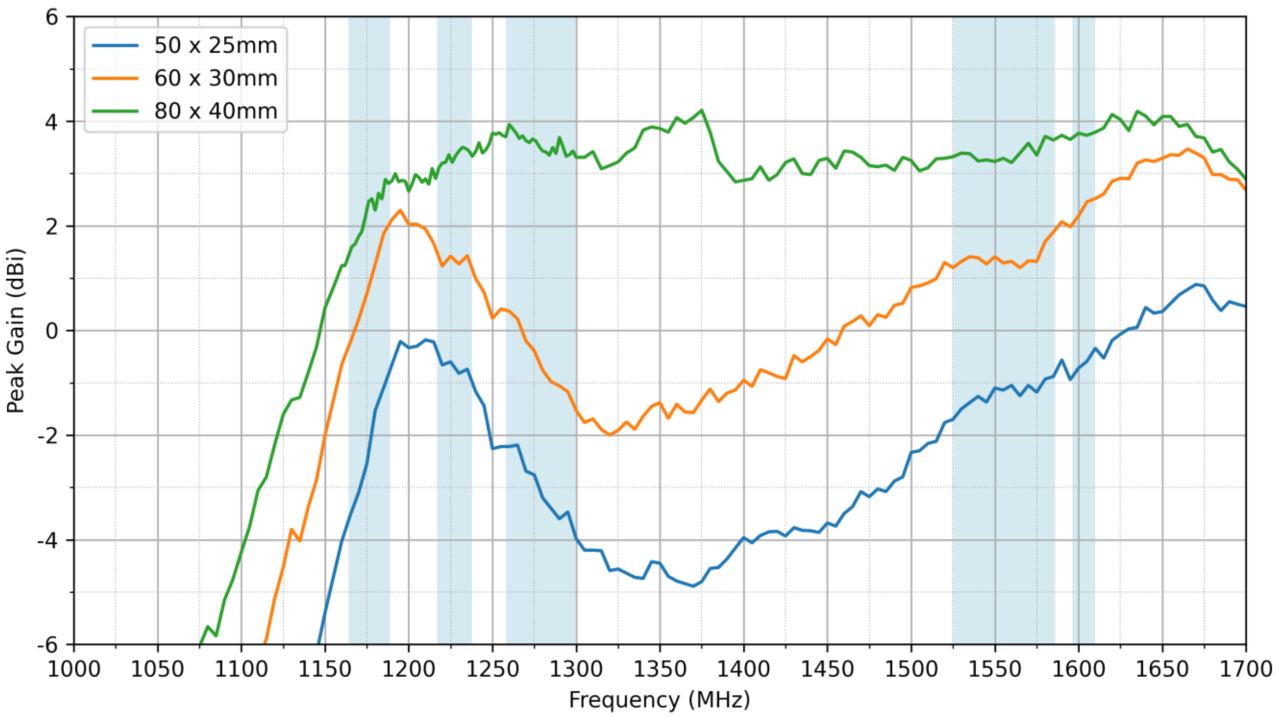
10.28 Efficiency



10.29 Average Gain

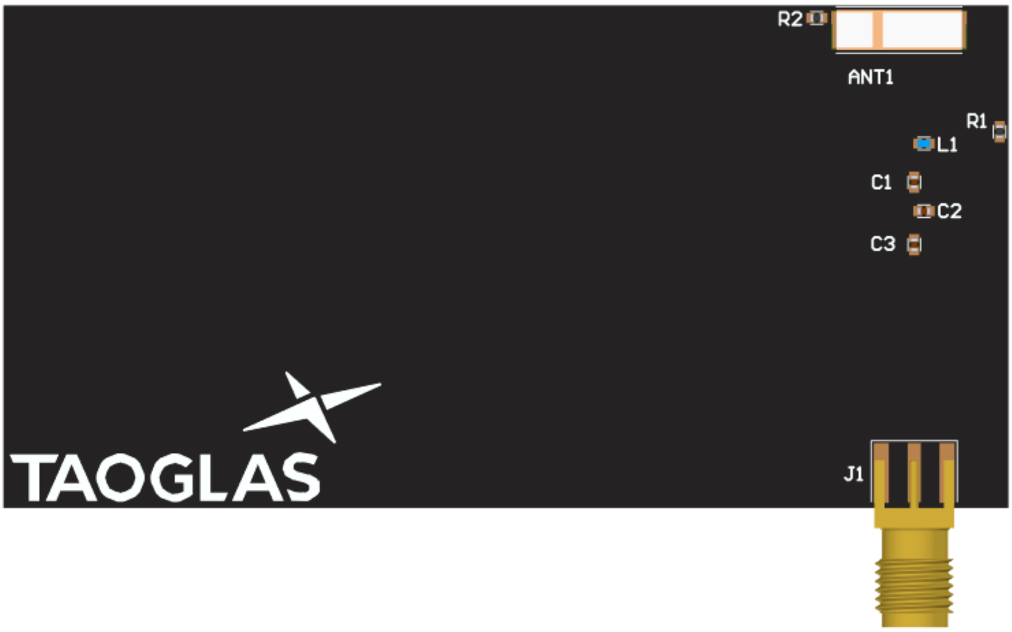


10.30 Peak Gain



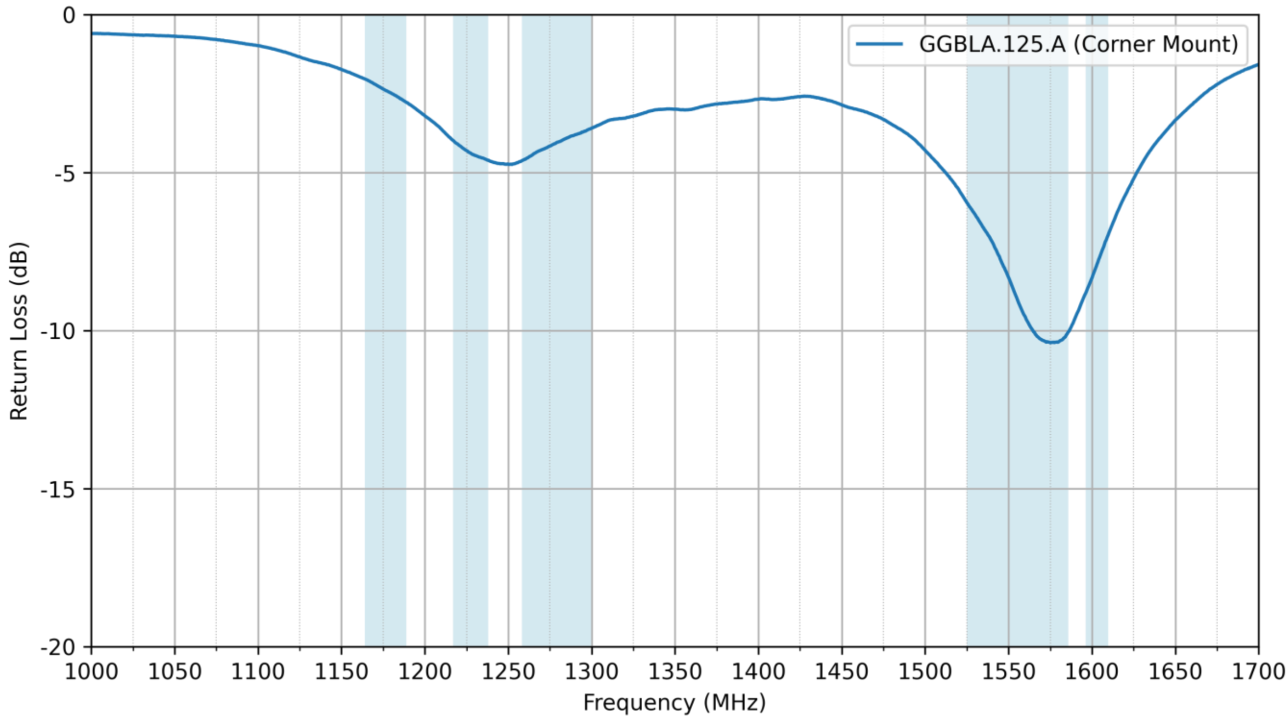
11. Application Note – Corner Mount Integration

The following is an example on how to integrate the GGBLA.125.A when mounting into the corner of a design. This antenna has 3 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 80x40mm ground plane (PCB) to ensure optimal performance.

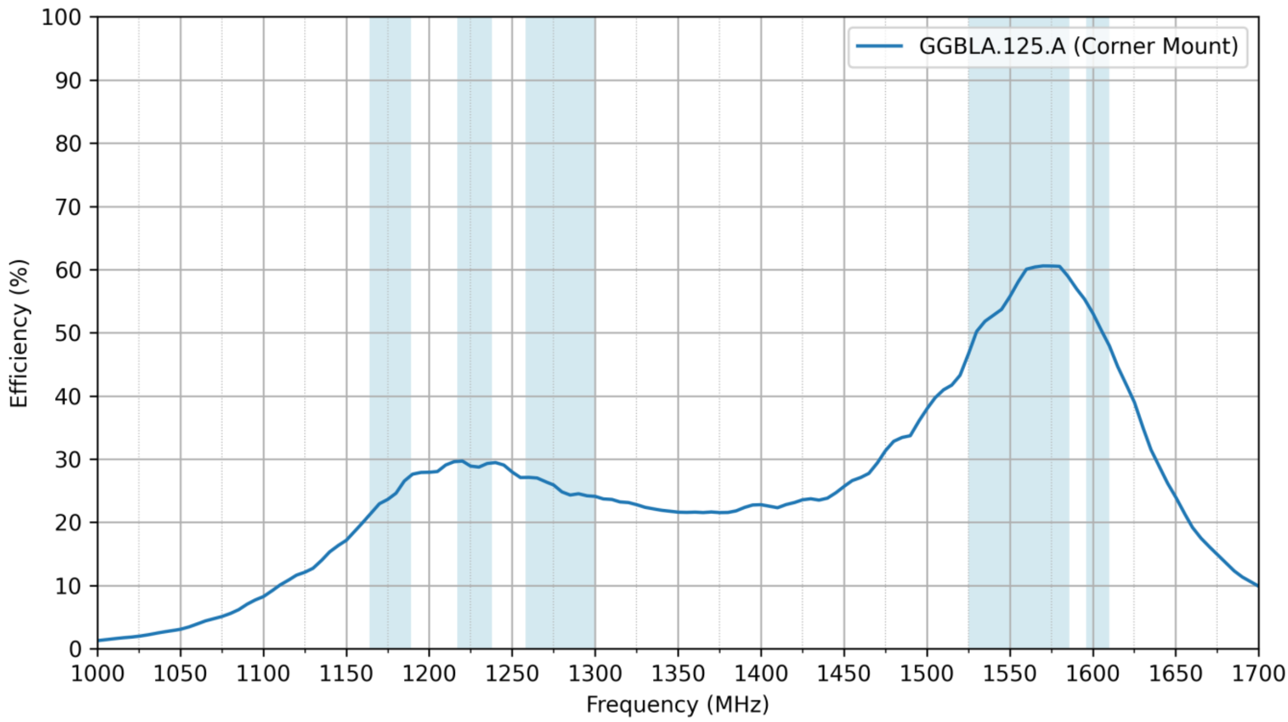


Top view of PCB.

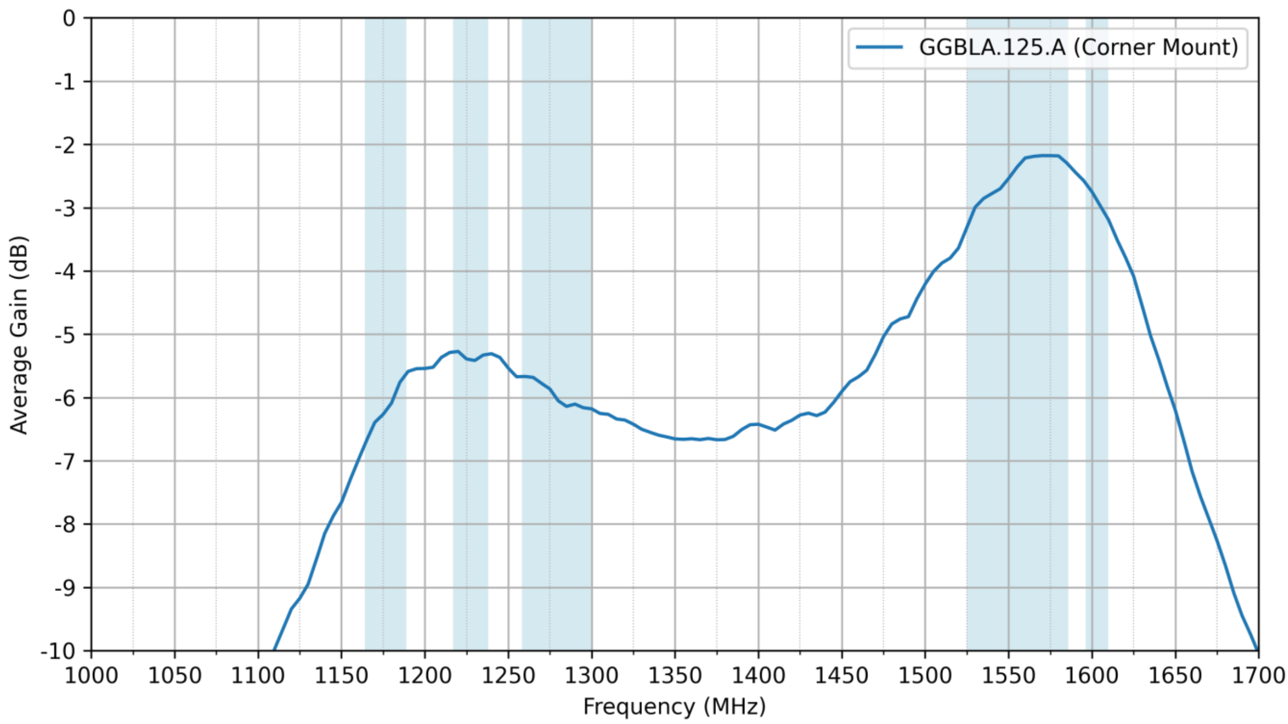
11.1 Return Loss



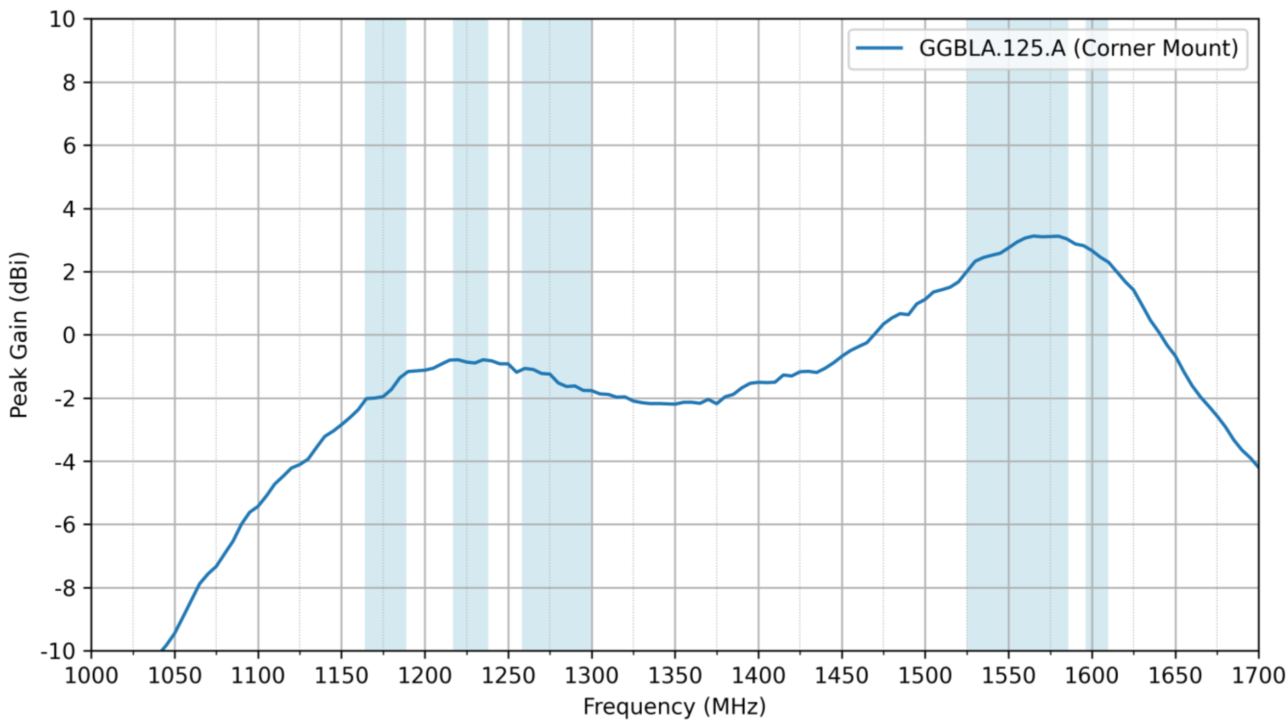
11.2 Efficiency



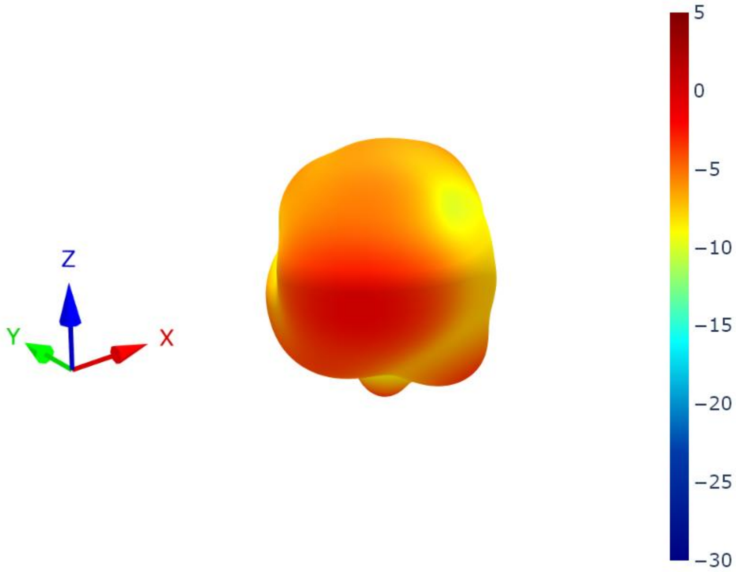
11.3 Average Gain



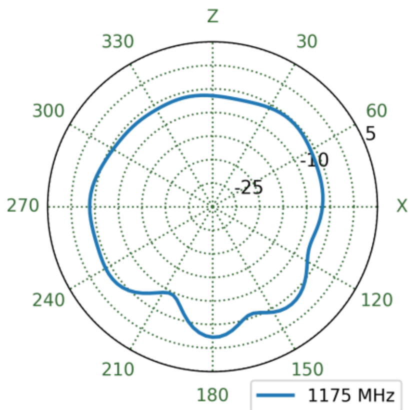
11.4 Peak Gain

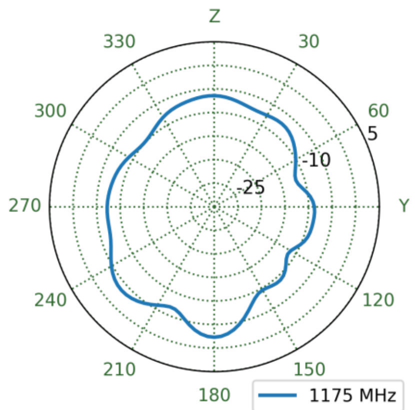


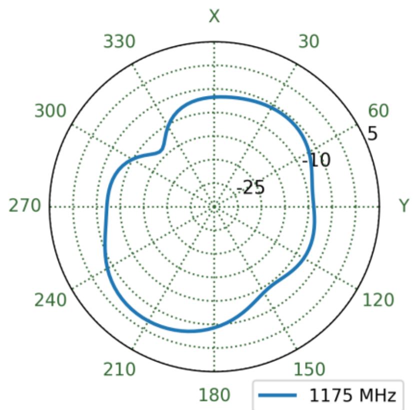
11.5 GGBLA.125.A (Corner Mount) Patterns at 1175 MHz



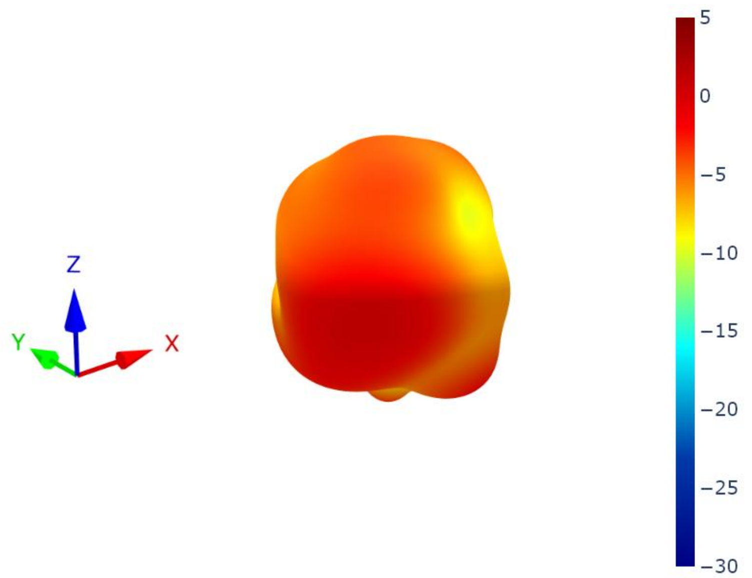
XZ Plane	YZ Plane	XY Plane



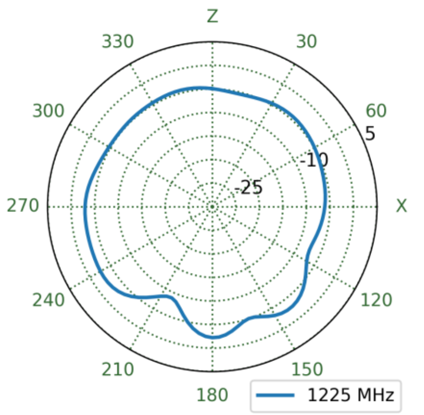


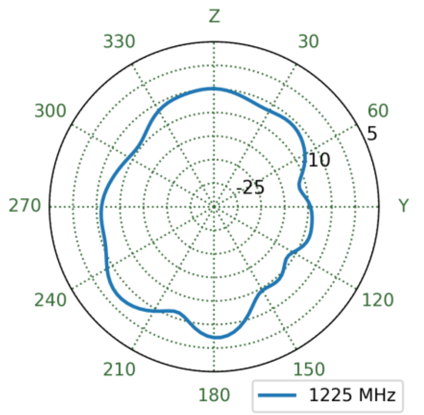


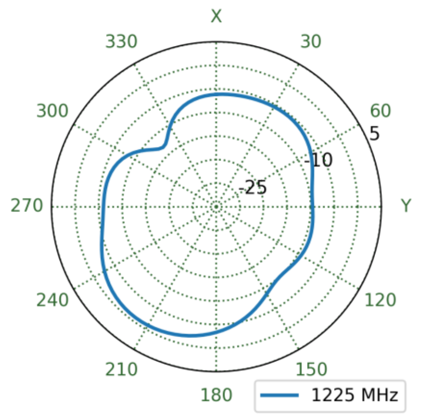
11.6 GGBLA.125.A (Corner Mount) Patterns at 1225 MHz



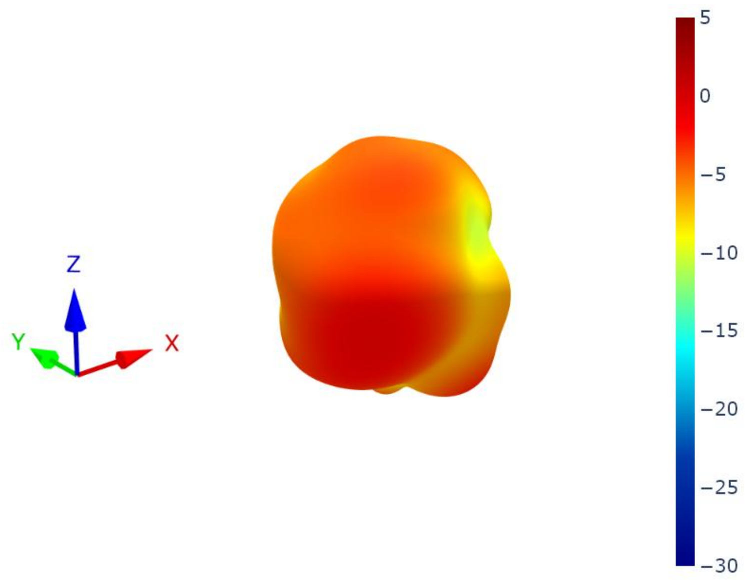
XZ Plane	YZ Plane	XY Plane



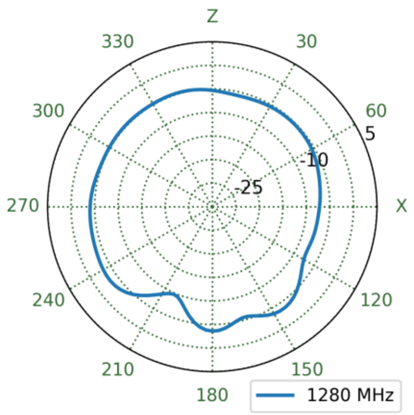


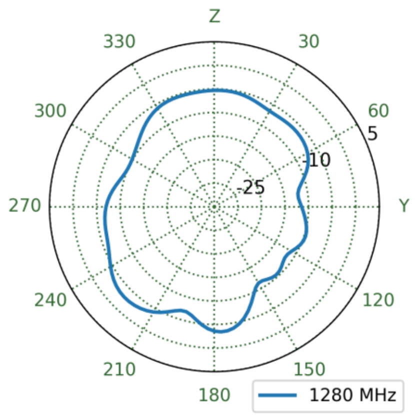


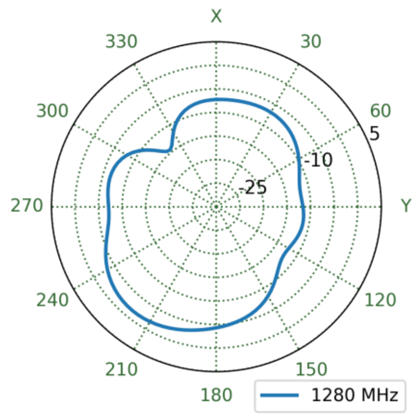
11.7 GGBLA.125.A (Corner Mount) Patterns at 1280 MHz



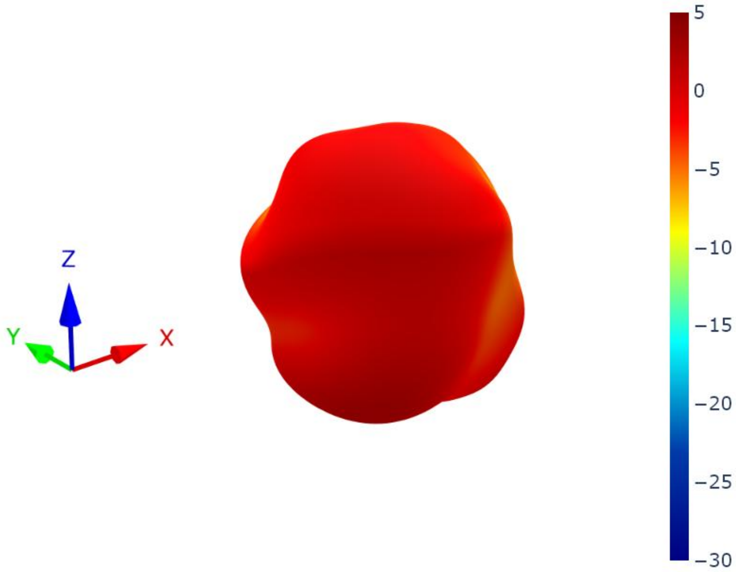
XZ Plane	YZ Plane	XY Plane



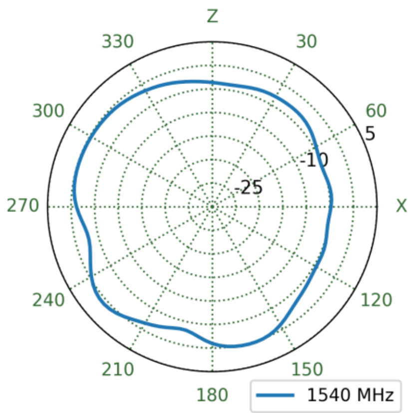


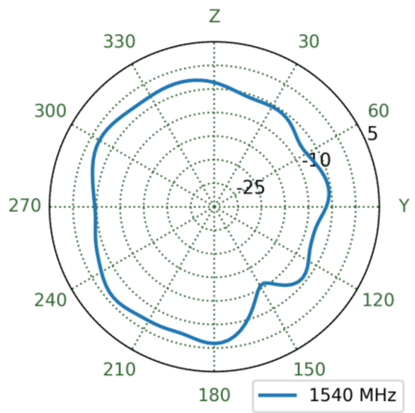


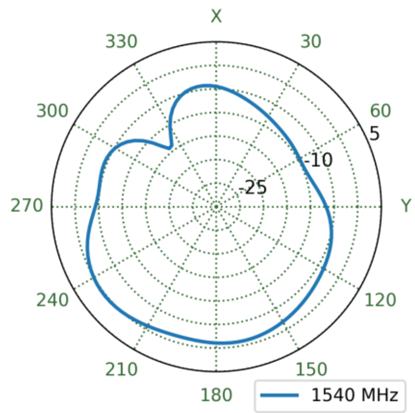
11.8 GGBLA.125.A (Corner Mount) Patterns at 1540 MHz



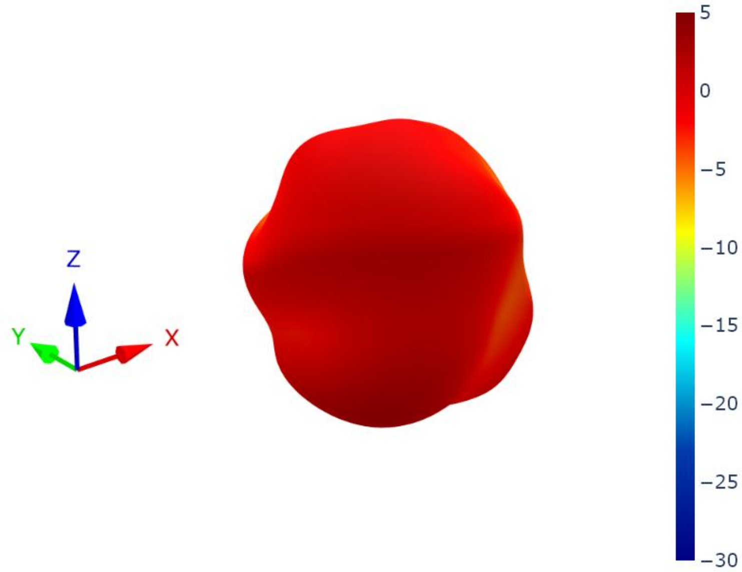
XZ Plane	YZ Plane	XY Plane



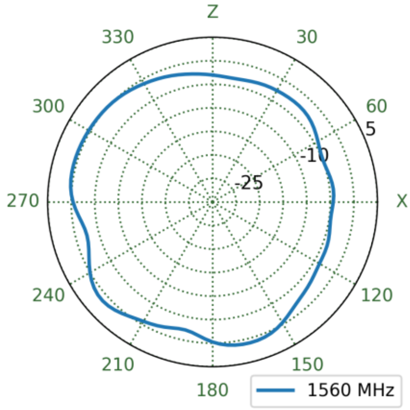


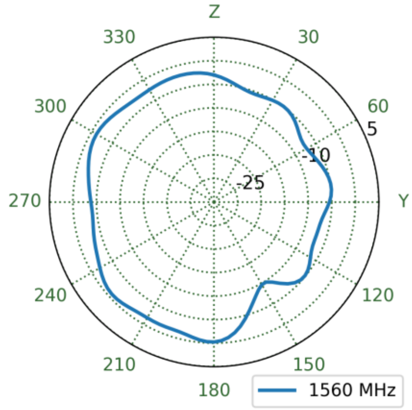


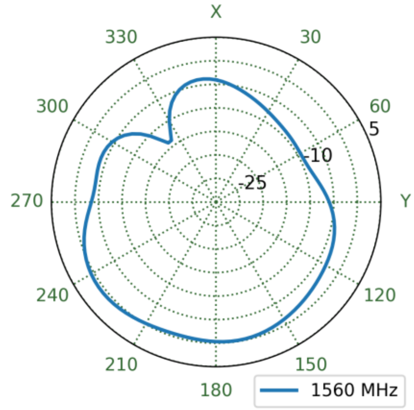
11.9 GGBLA.125.A (Corner Mount) Patterns at 1560 MHz



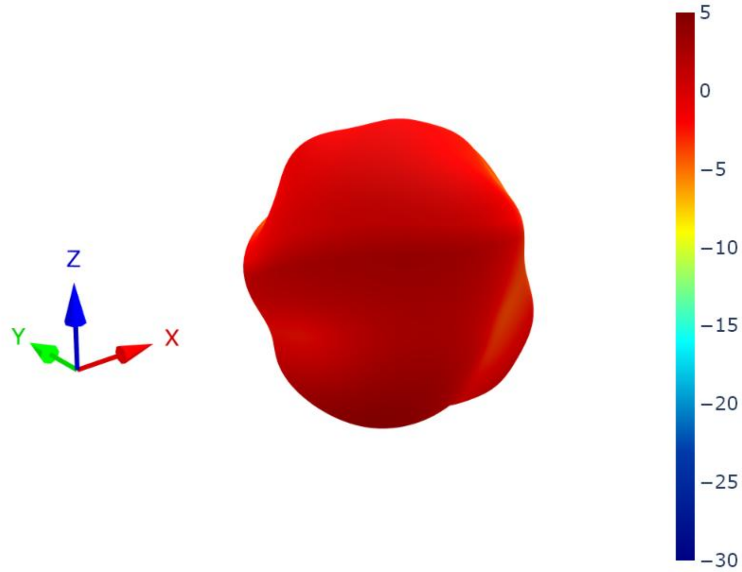
XZ Plane	YZ Plane	XY Plane



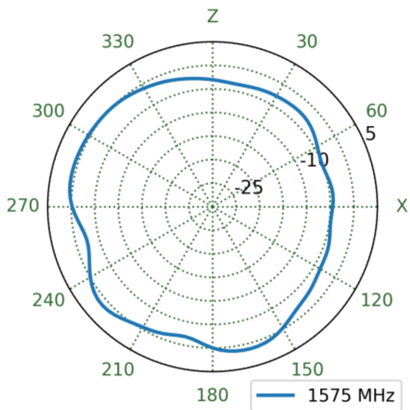


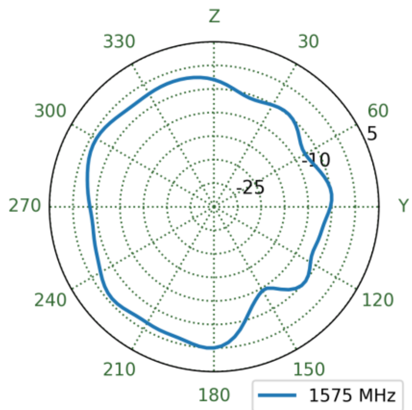


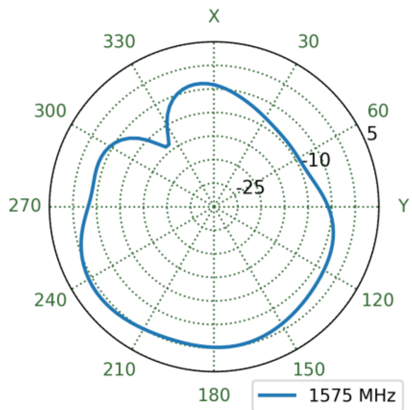
11.10 GGBLA.125.A (Corner Mount) Patterns at 1575 MHz



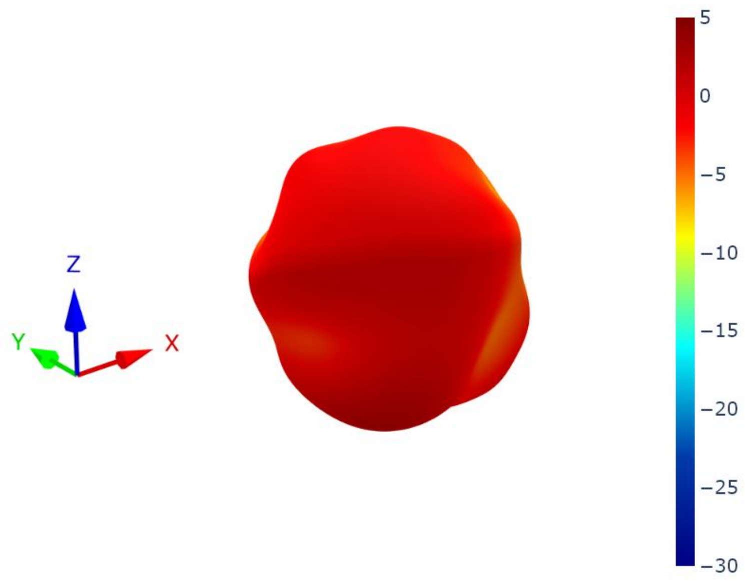
XZ Plane	YZ Plane	XY Plane

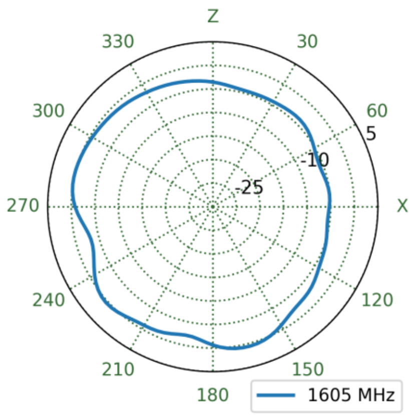
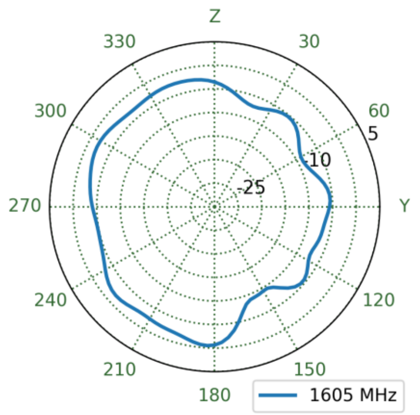
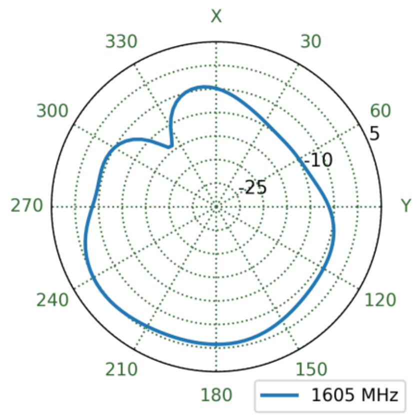






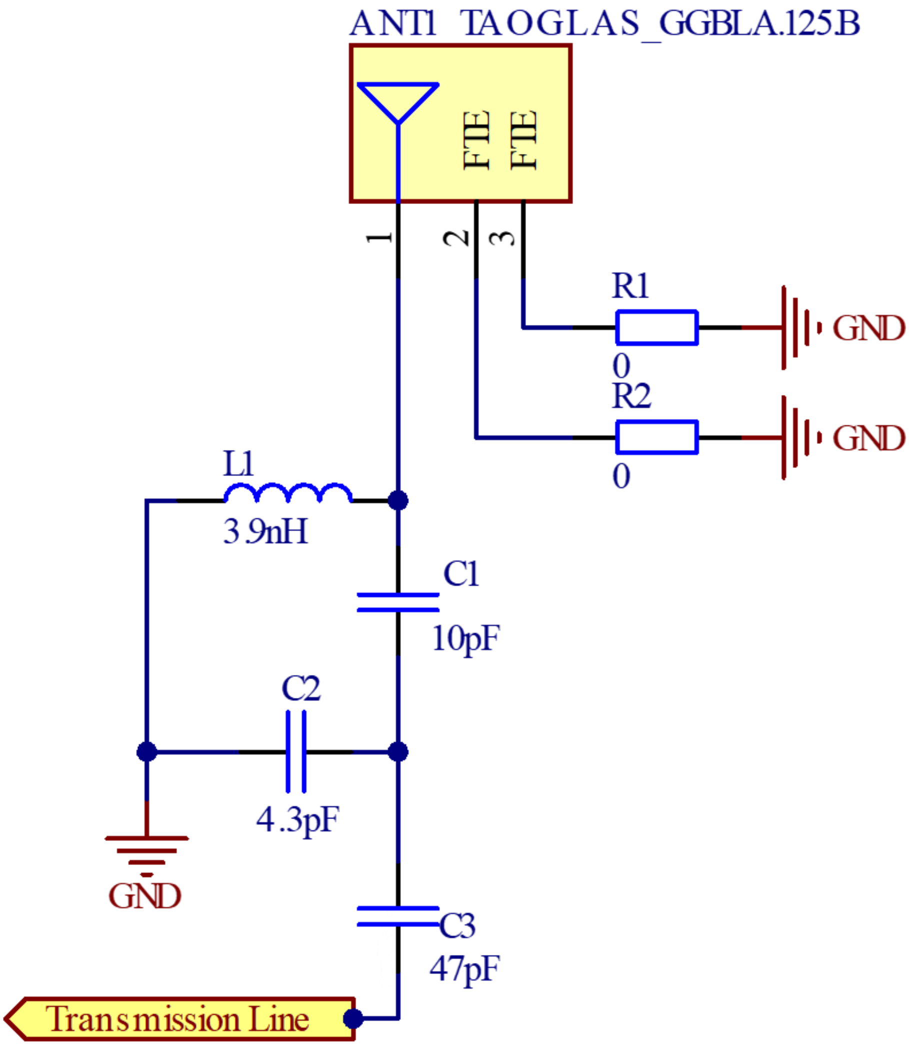
11.11 GGBLA.125.A (Corner Mount) Patterns at 1605 MHz



XZ Plane	YZ Plane	XY Plane
		

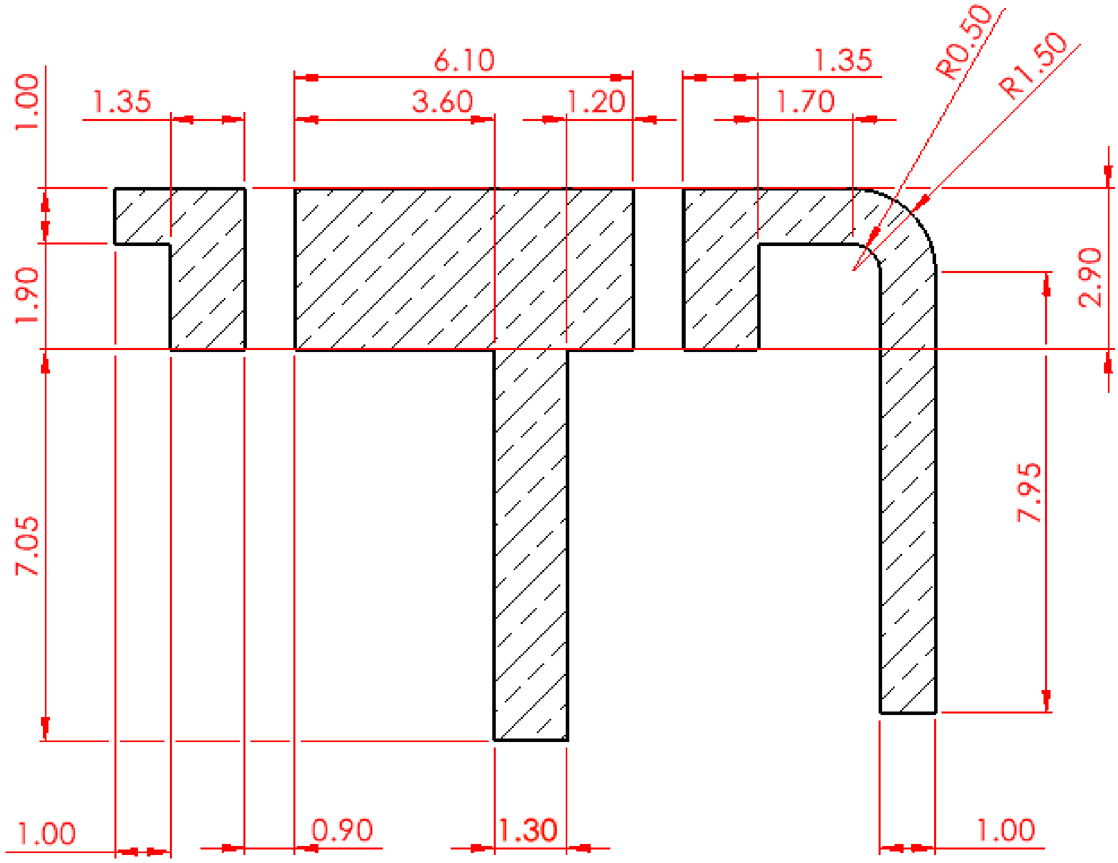
11.12 Schematic Layout

Matching components with the GGBLA.125.A are required for the antenna to have optimal performance in the spaces specified in the schematic below. Additional matching components may be necessary for your device, Taoglas recommends incorporating extra component footprints, forming a “Pi” network, for the GGBLA.125.A.



Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	10pF	Murata	GRM1555C1H100JA01D
C2	Capacitor	4.3pF	Murata	GJM1555C1H4R3BB01D
C3	Capacitor	47pF	Murata	GRM1555C1H470JA01D
L1	Inductor	3.9nH	Murata	LQW15AN3N9B00D
R1, R2	Resistor	0 Ohm	YAGEO	RC0402JR-070RL

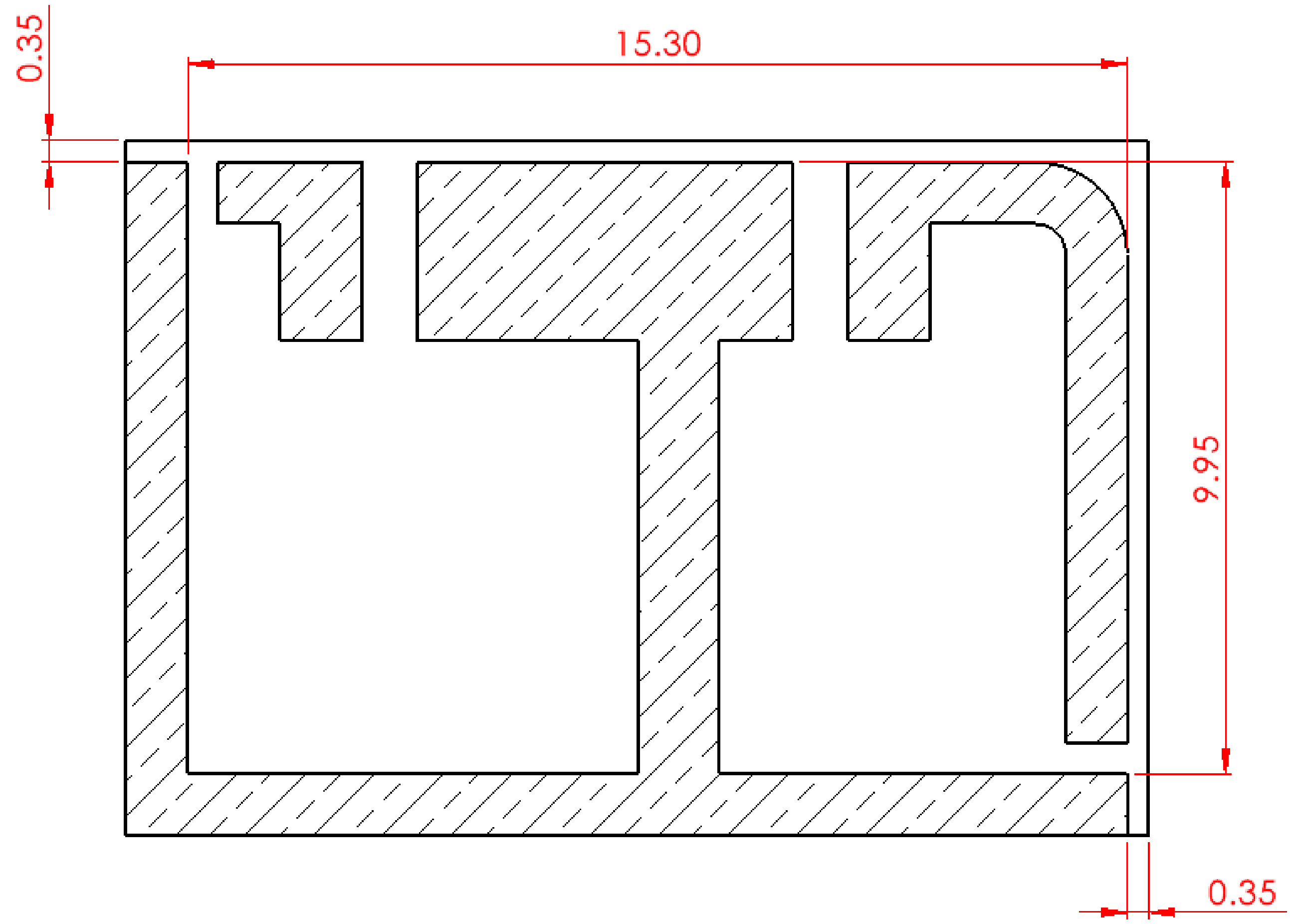
11.13 Antenna Footprint



11.14 Copper Clearance

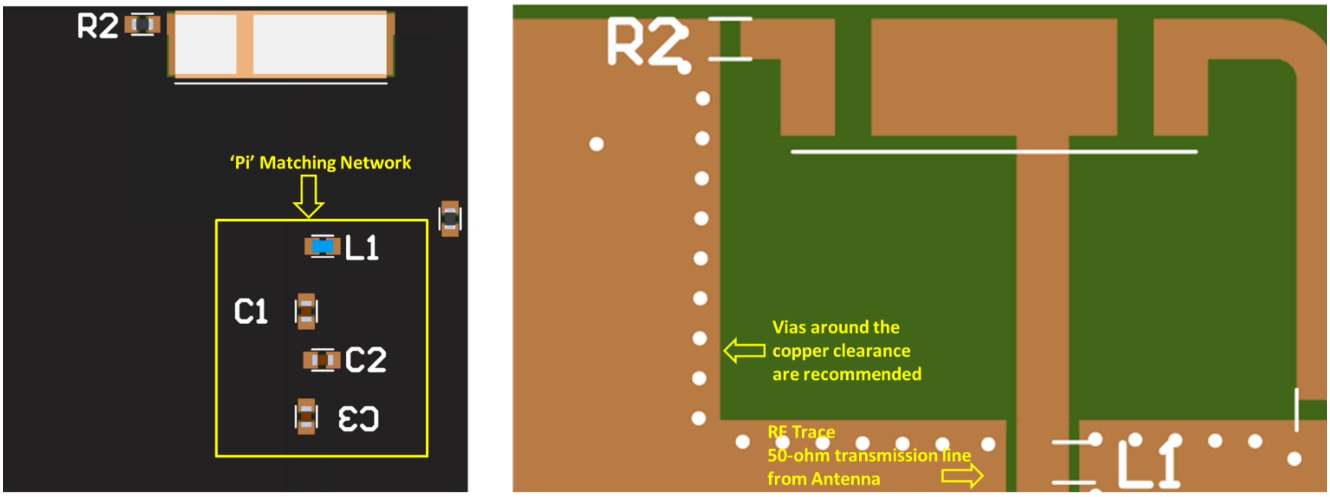
The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagram below demonstrates the GGBLA.125.A clearance area. The copper keep out area applies to all layers that are below the GGBLA.125.A.

There should be a copper clearance area of 9.8mm in length and 14.6mm in width around the antenna. The PCB Edge Clearance should be a minimum of 0.35mm.



11.15 Antenna Integration

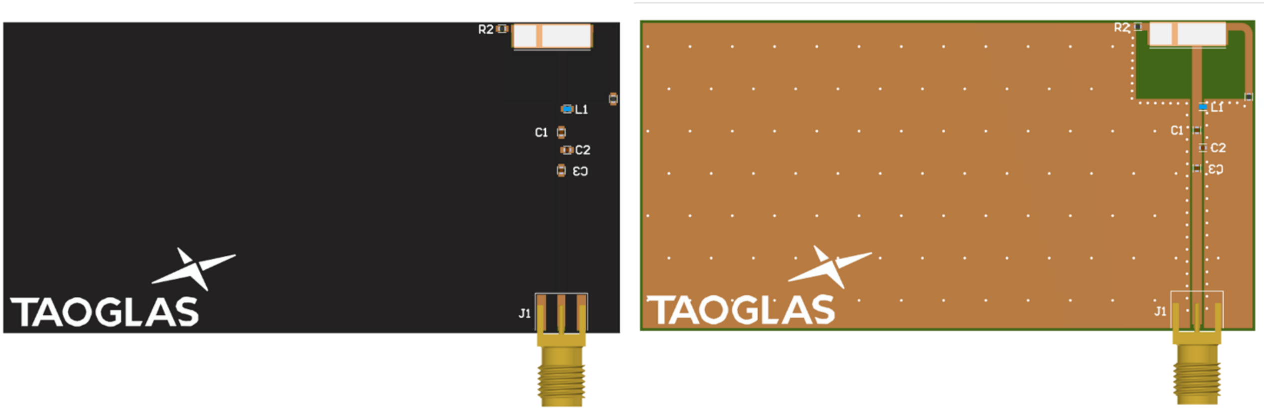
The GGBLA.125.A should be placed in the corner, on the long side of the PCB as possible, to take advantage of the ground plane. The RF trace must maintain a 50 Ohm transmission line. A "Pi" Matching Network is recommended for the RF transmission line, the values and components for the matching circuit will depend on the tuning needed. Ground vias should be placed around the copper clearance area.



GGBLA.125.A antenna mounted on the corner of a PCB, showing transmission lines and integration notes.

11.16 Final Integration

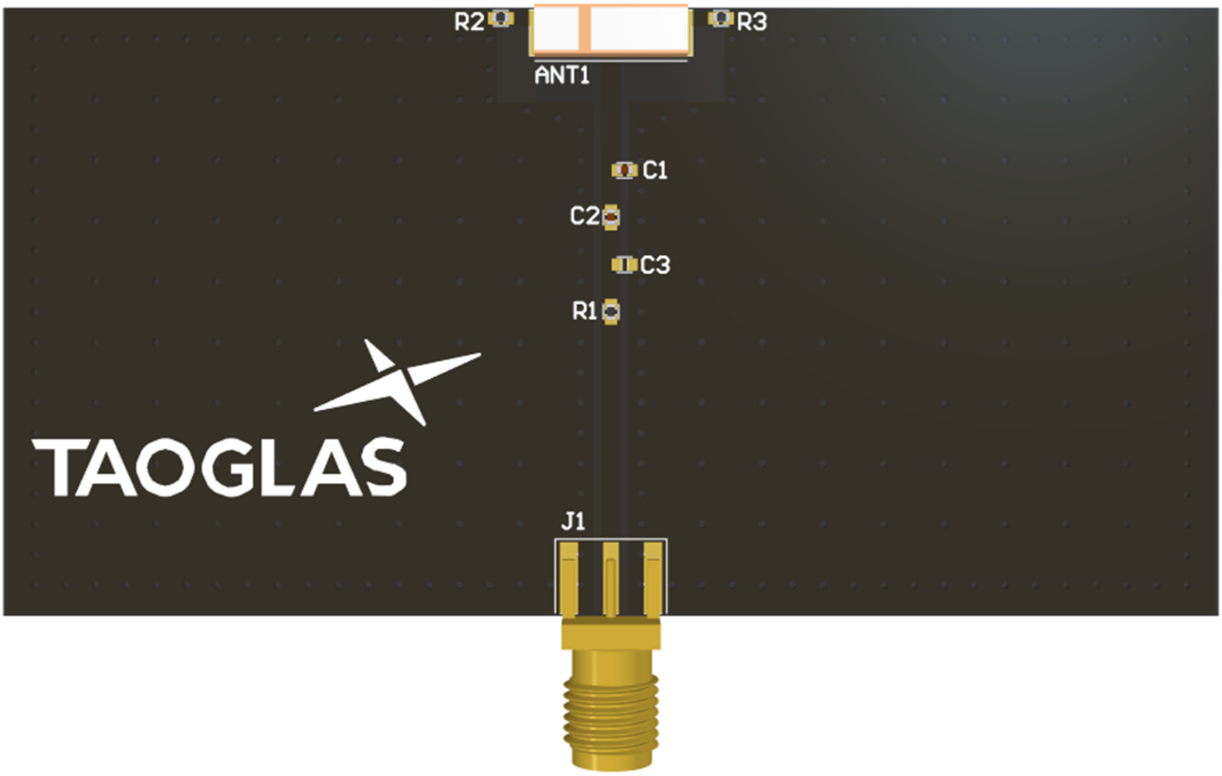
The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 80x40mm ground plane (PCB) to ensure optimal performance.



Top Side (GGBLA.125 placement on corner of 80x40mm PCB)

12. Application Note – DECT/NTN Tuning

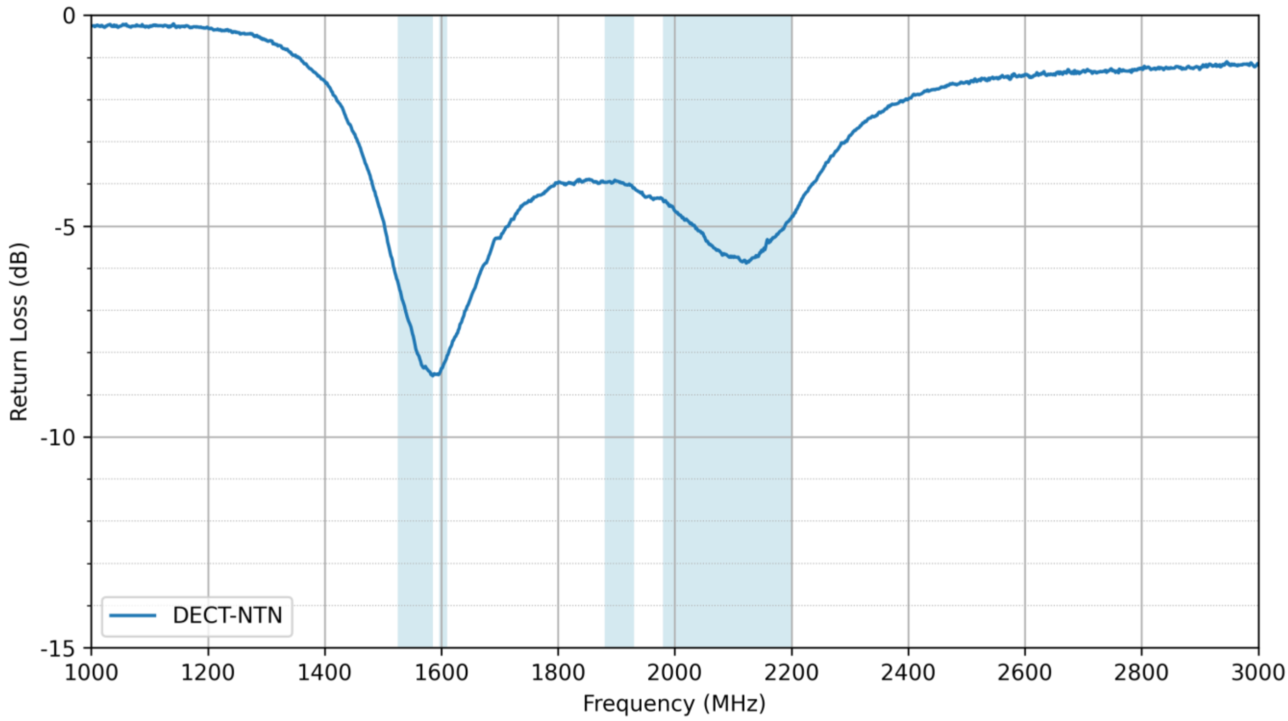
The following is an example of how to integrate the GGBLA.125.A for DECT/NTN (n256) bands. This antenna has 3 pins, where one pin is used for the RF feed. Taoglas recommends using a minimum 80 × 40 mm ground plane (PCB) to ensure optimal performance. The matching components remain the same for this tuning however, the copper keep out area differs from previous standard GGBLA.125.A integration.



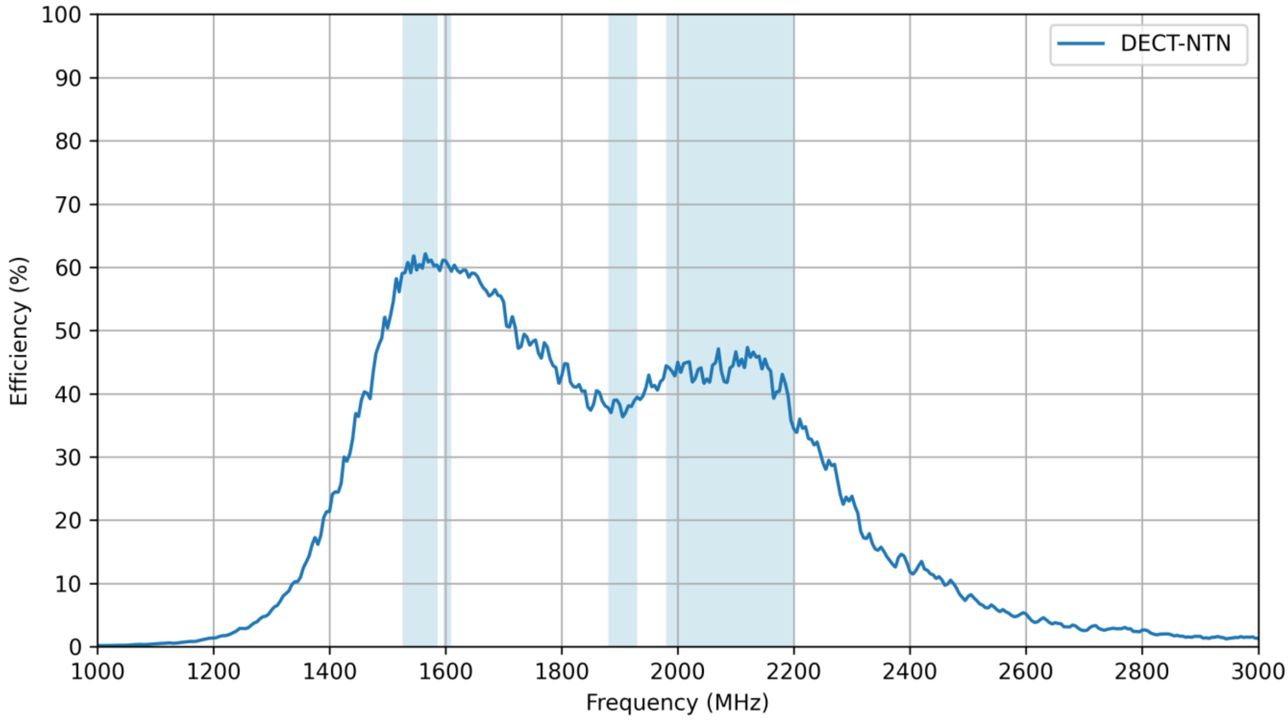
Top view of PCB.

Electrical								
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
GPS L1	1565-1586	61.0	-2.15	2.26	50 Ω	Linear	Omni directional	10W
L-Band	1525-1559	60.0	-2.22	2.20				
BeiDou B1I	1559-1565	61.0	-2.14	2.26				
GLONASS G1/L1OC	1596-1610	60.4	-2.19	2.06				
DECT	1880-1930	38.1	-4.19	0.20				
n256 (S-Band)	1980-2200	43.4	-3.63	0.72				
B23/252 (S-band)	2000-2200	43.3	-3.63	0.72				

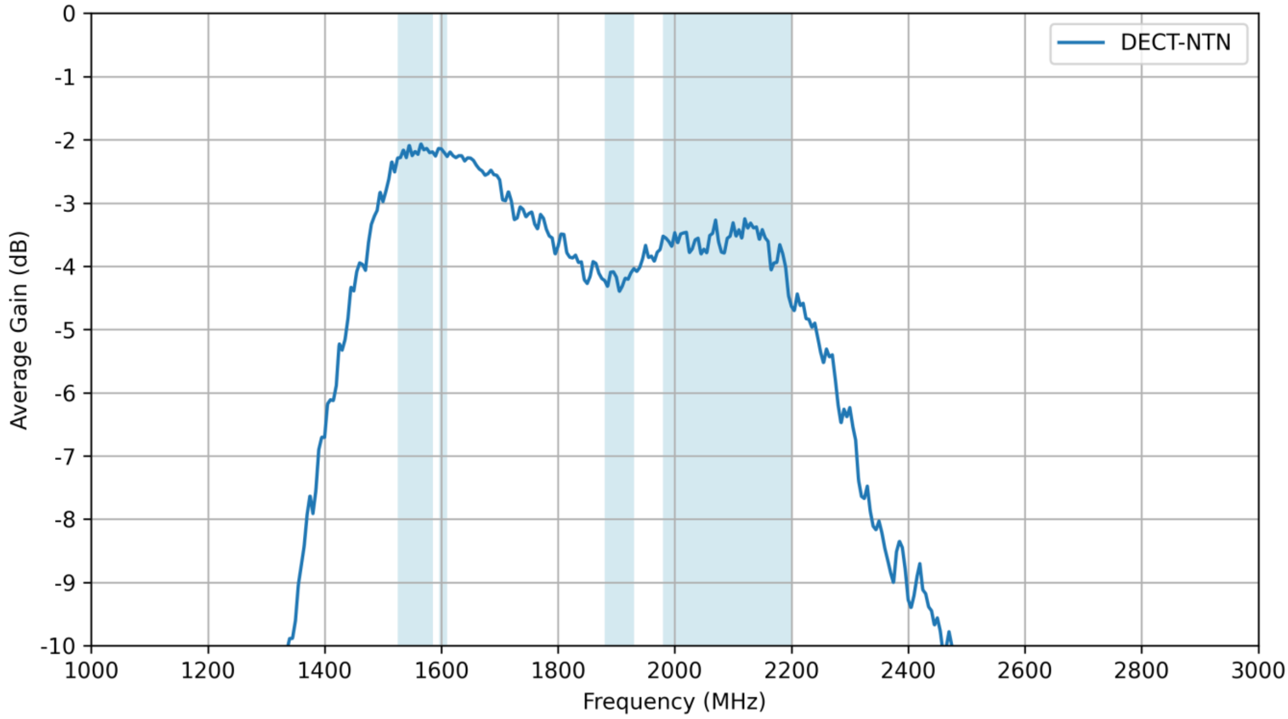
12.1 Return Loss



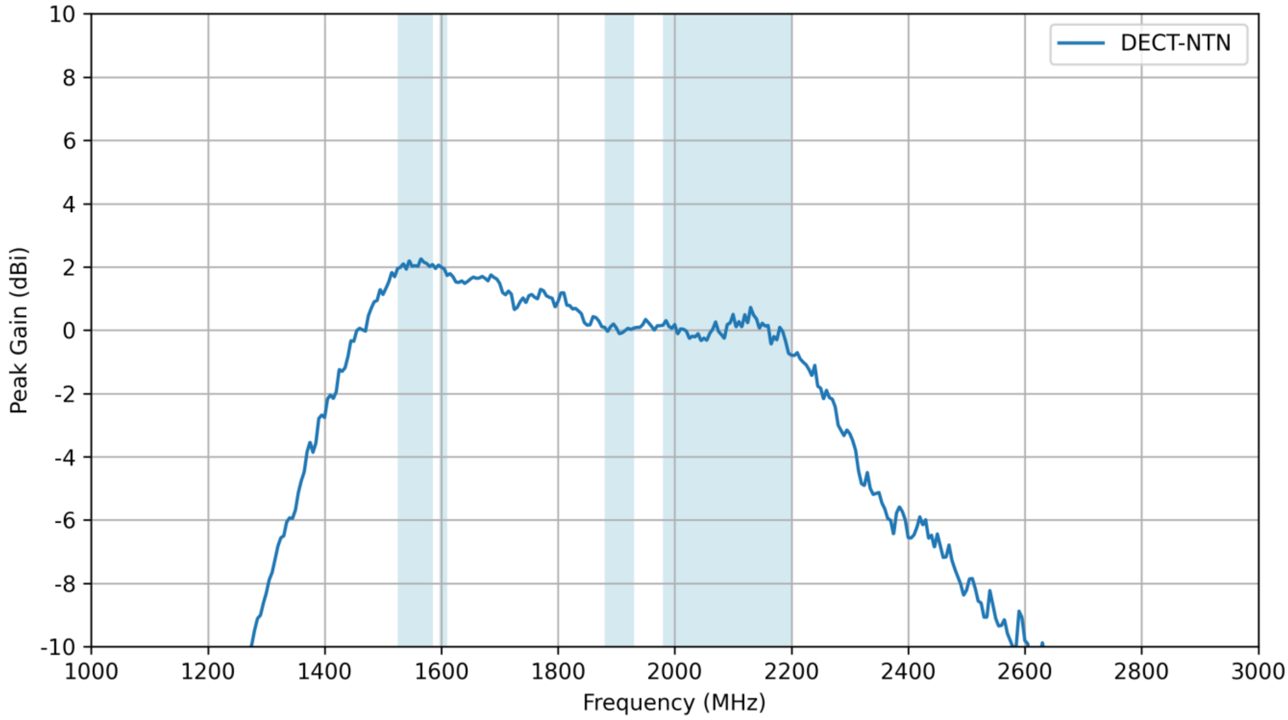
12.2 Efficiency



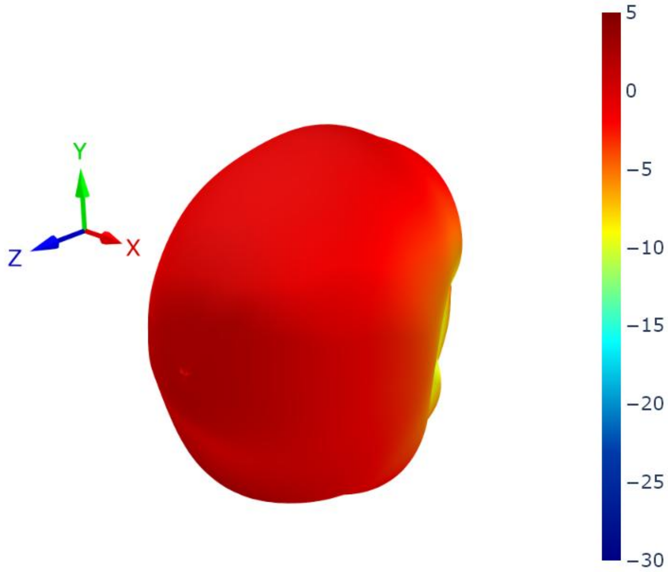
12.3 Average Gain

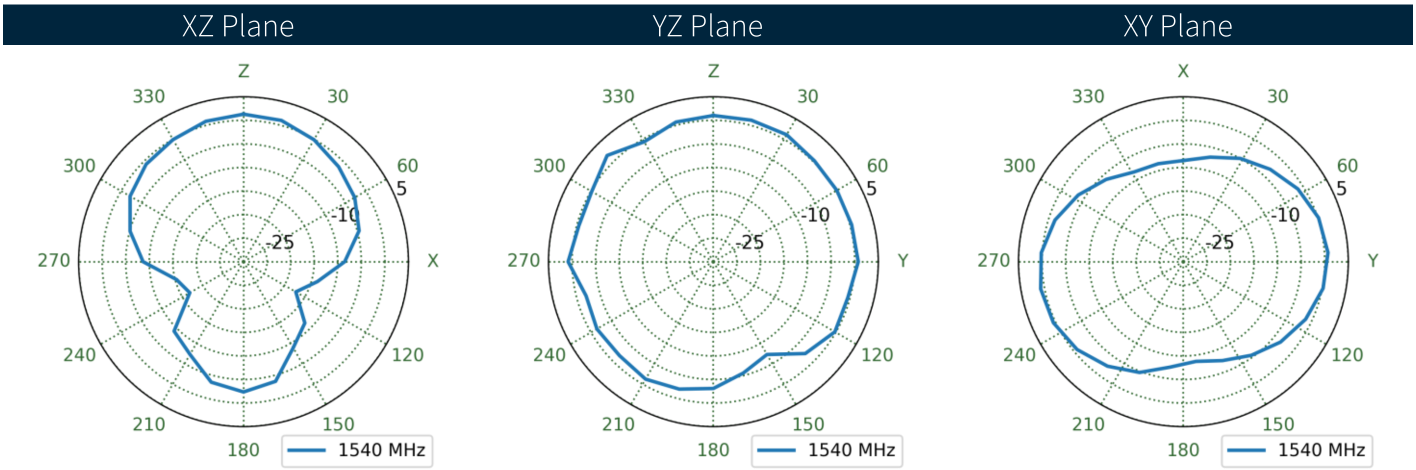


12.4 Peak Gain

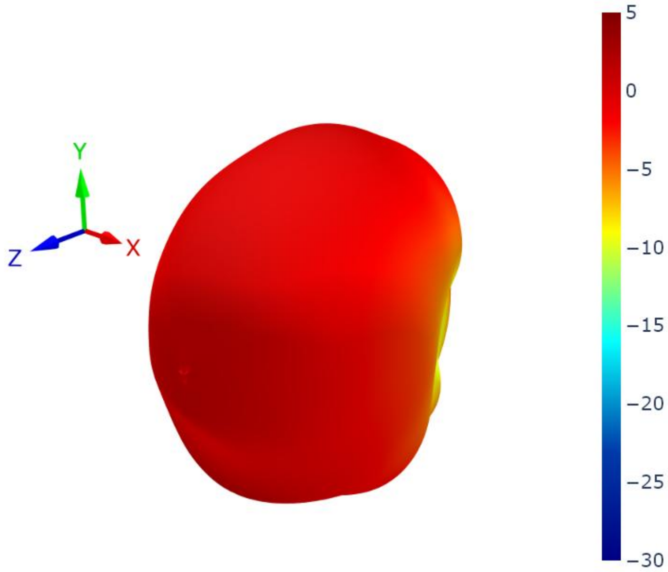


12.5 Patterns at 1540 MHz

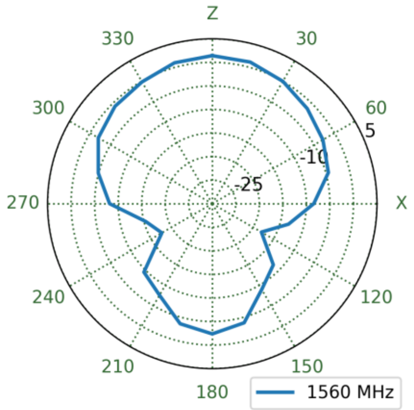


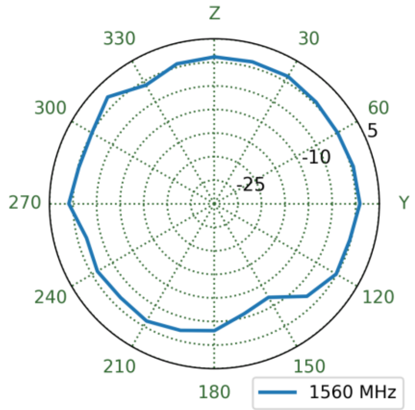


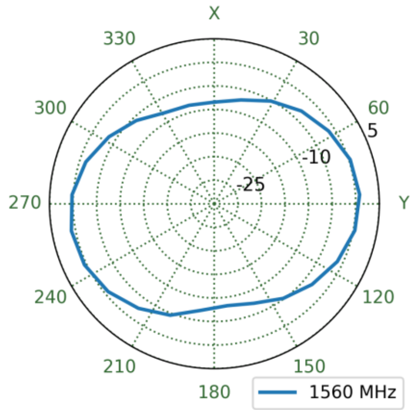
12.6 Patterns at 1560 MHz



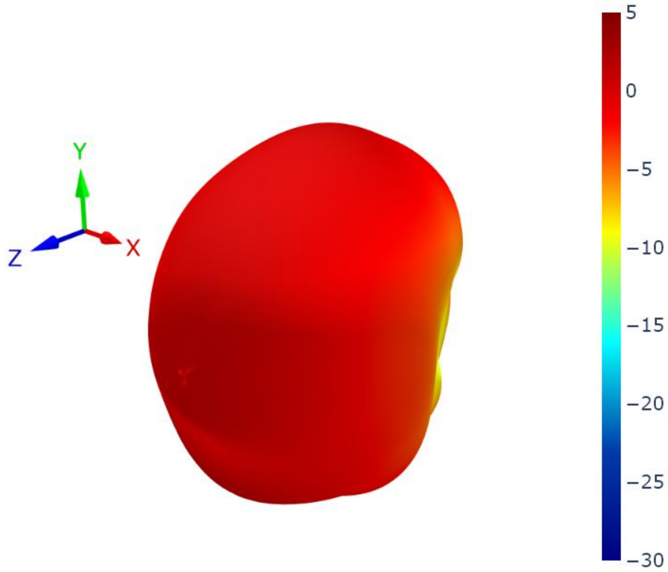
XZ Plane	YZ Plane	XY Plane



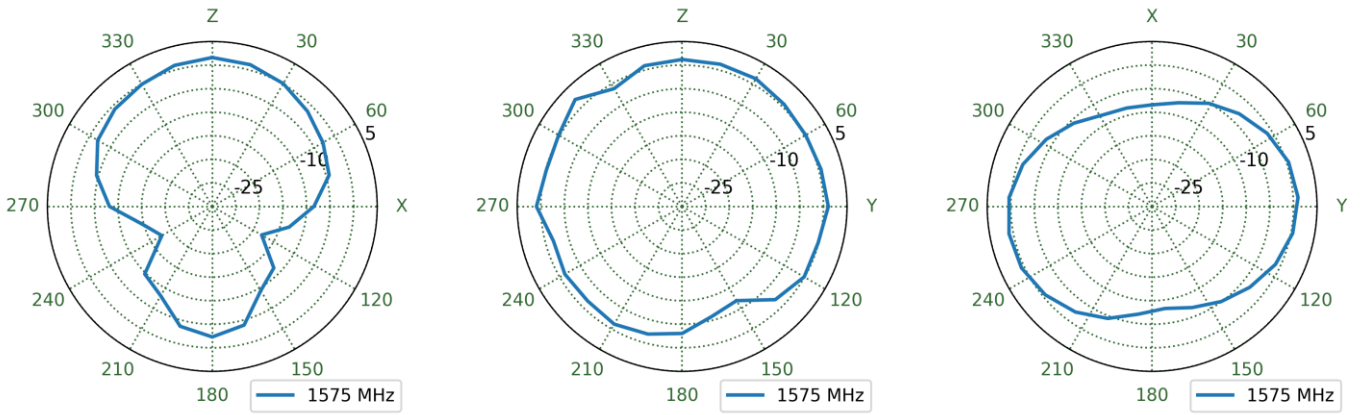




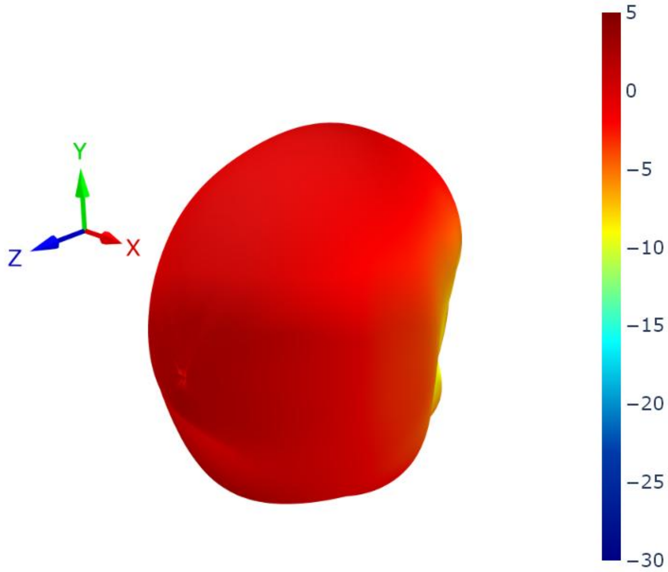
12.7 Patterns at 1575 MHz

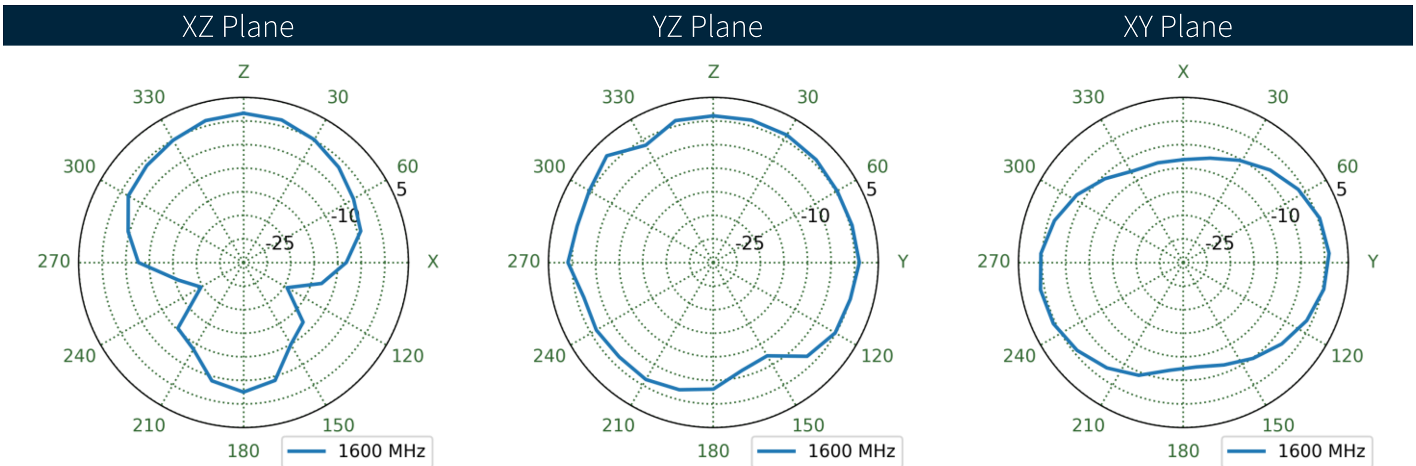


XZ Plane	YZ Plane	XY Plane

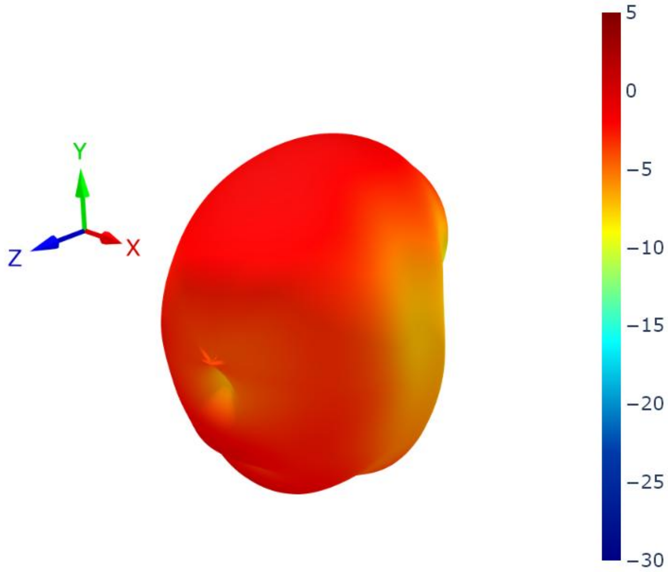


12.8 Patterns at 1600 MHz

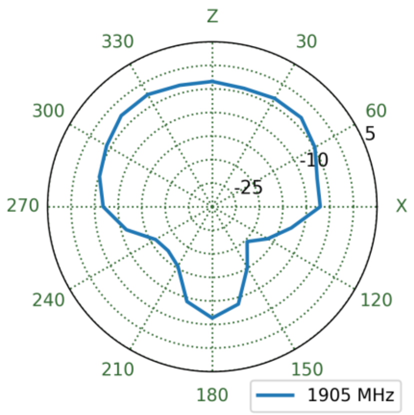


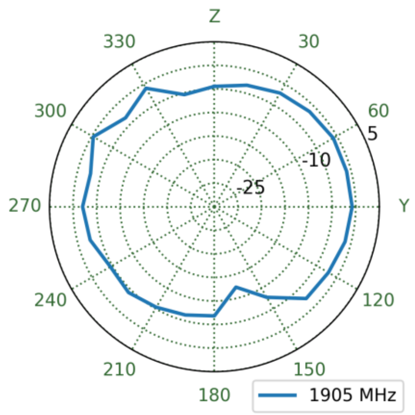


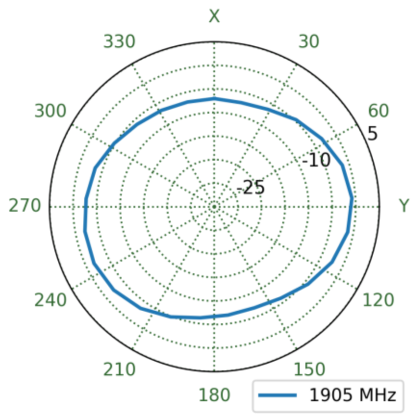
12.9 Patterns at 1905 MHz



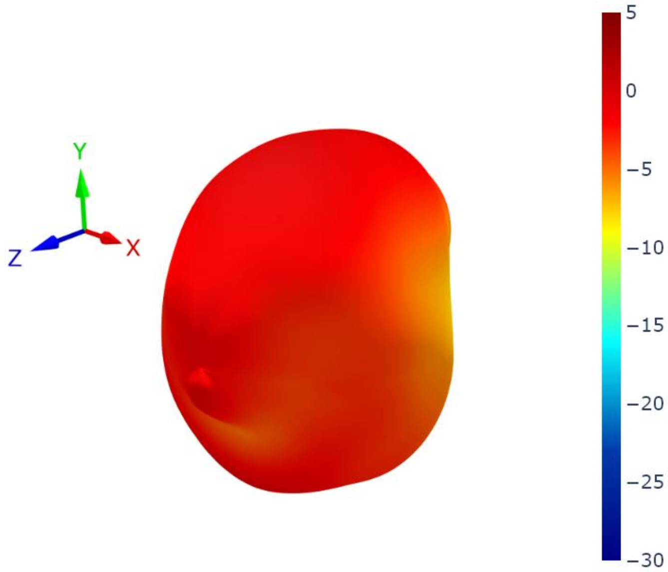
XZ Plane	YZ Plane	XY Plane



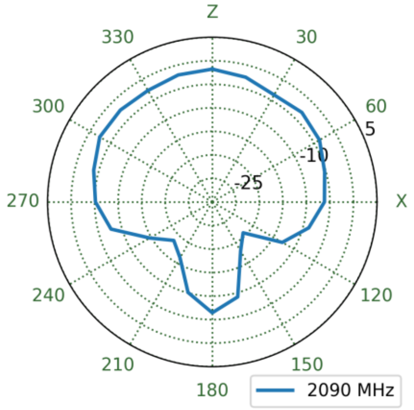


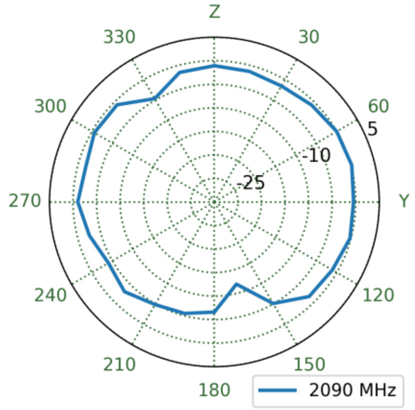


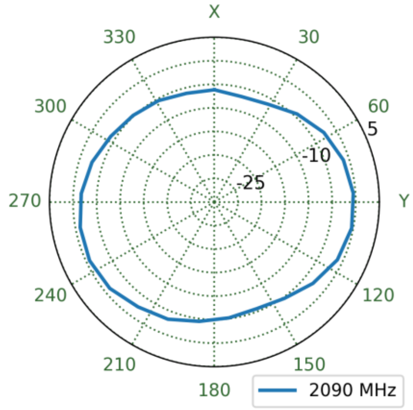
12.10 Patterns at 2090 MHz



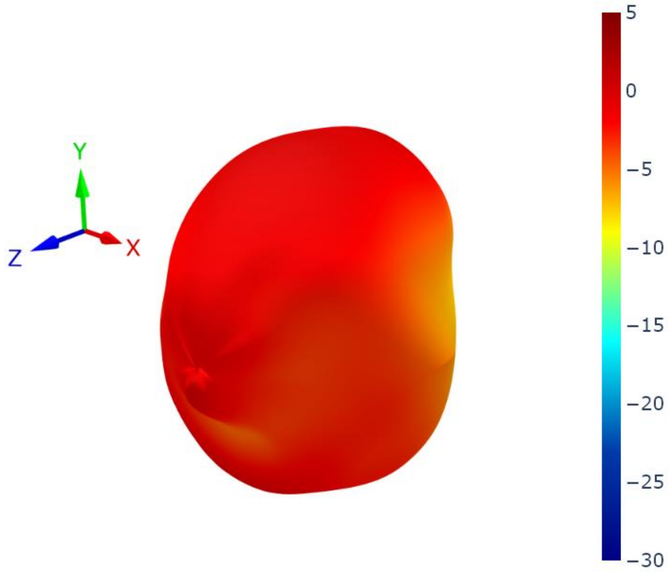
XZ Plane	YZ Plane	XY Plane



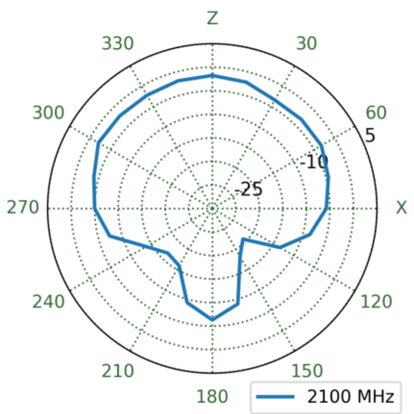


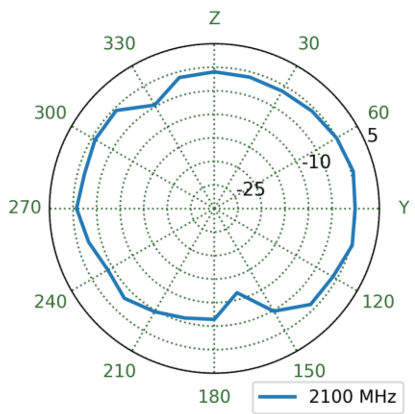


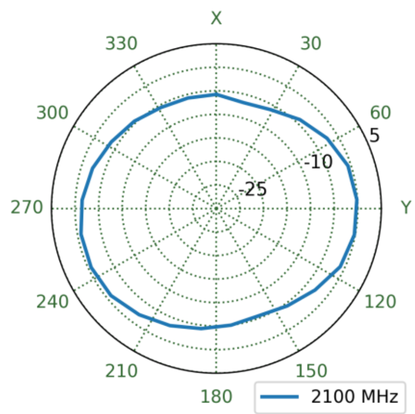
12.11 Patterns at 2100 MHz



XZ Plane	YZ Plane	XY Plane

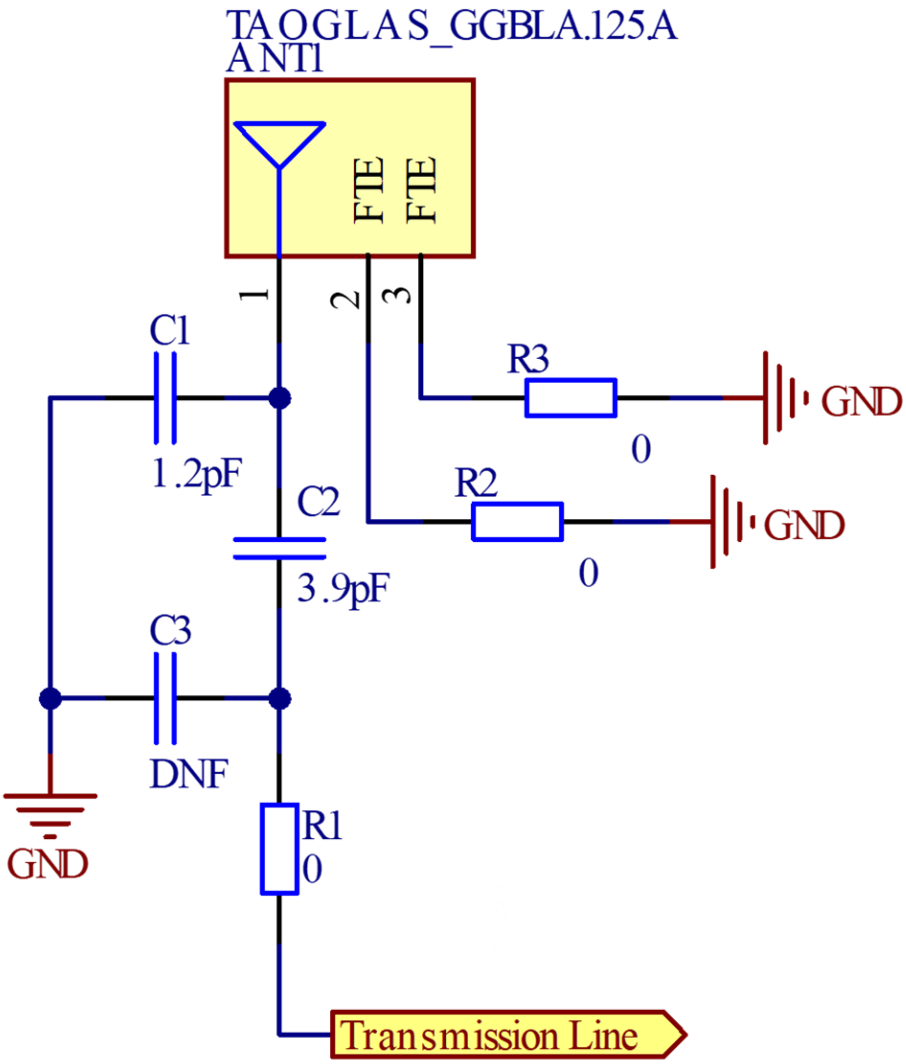






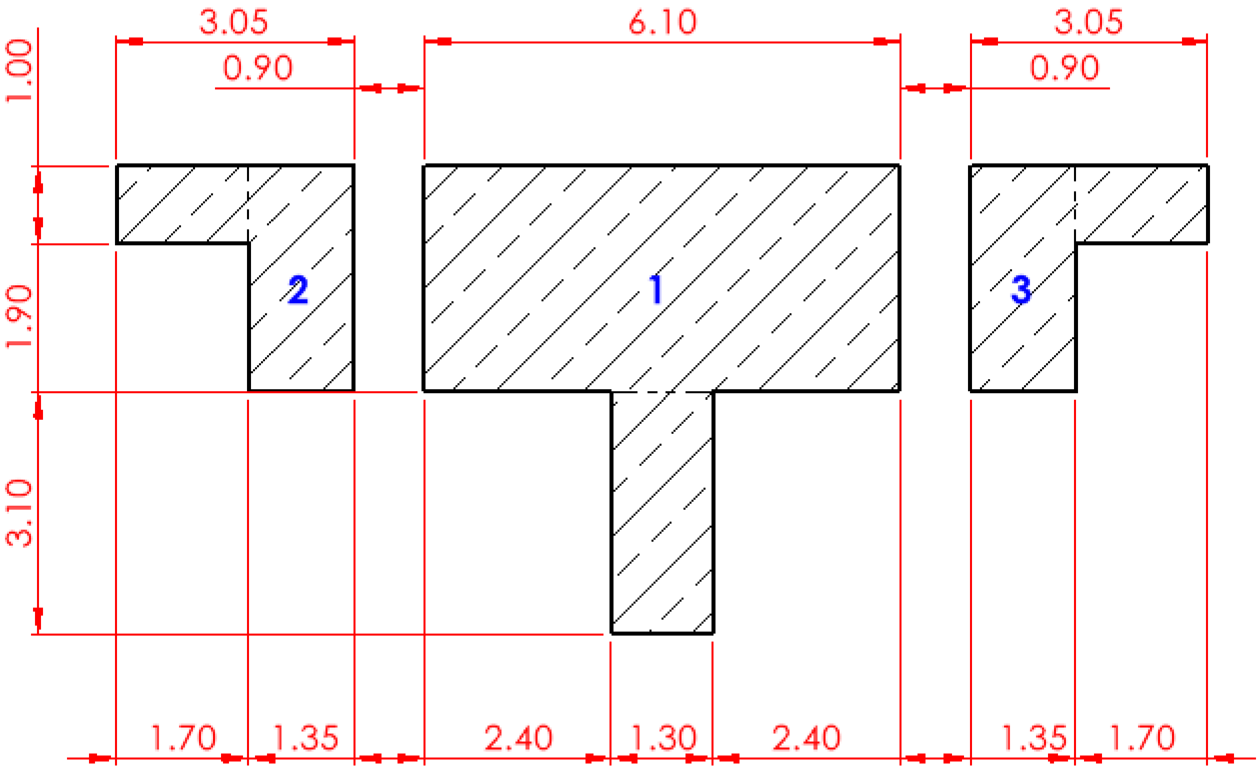
12.12 Schematic Layout

Matching components with the GGBLA.125.A are required for the antenna to have optimal performance in the spaces specified in the schematic below. Additional matching components may be necessary for your device, Taoglas recommends incorporating extra component footprints, forming a "Pi" network, for the GGBLA.125.A.



Designator	Type	Value	Manufacturer	Manufacturer Part Number
C1	Capacitor	1.2pF	Murata	GRM1555C1H1R2CA01D
C2	Capacitor	3.9pF	Murata	GRM1555C1H3R9CA01D
C3	Capacitor	Not Fitted	-	-
R1, R2, R3	Resistor	0 Ohms	YAGEO	RC0402JR-070RL

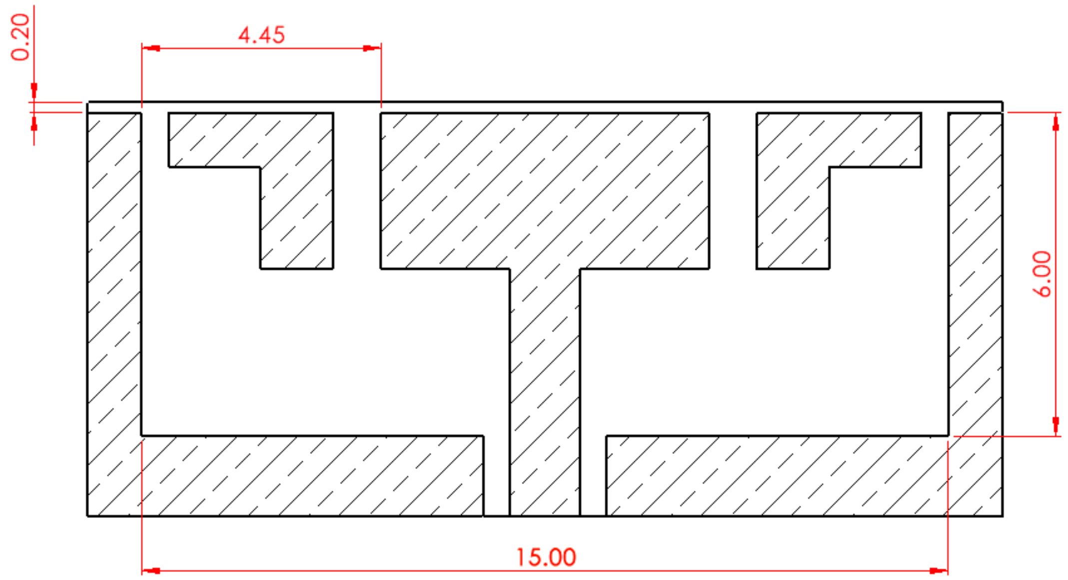
12.13 Antenna Footprint



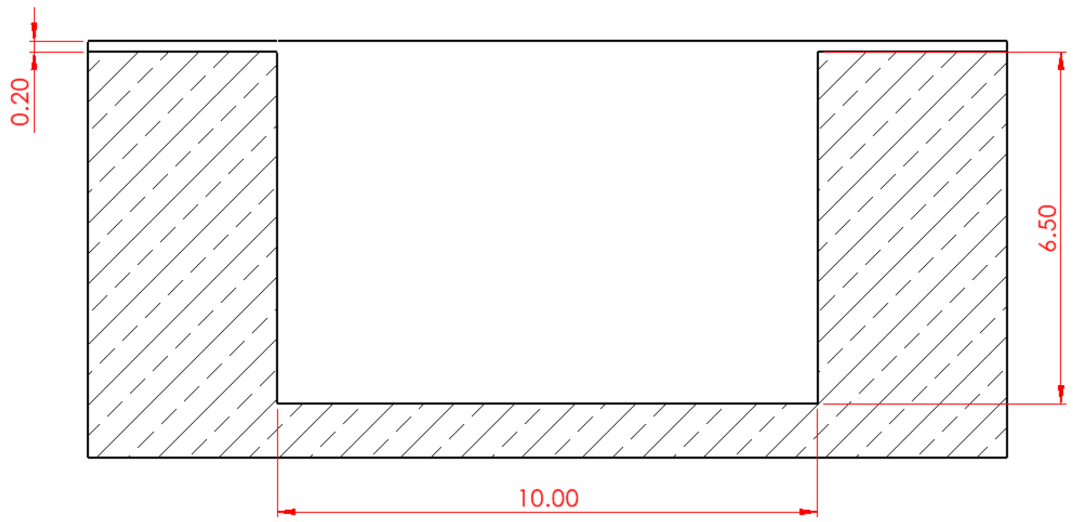
12.14 Copper Clearance

The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the GGBLA.125.A clearance area. The copper keep out area differs between the top layer and all other layers.

There should be a copper keep out area of 6mm in length and 15mm in width on the top layer. The copper keep out area for all other layers should be 6.5mm in length and 10mm in width. The PCB Edge Clearance should be a minimum of 0.1mm.



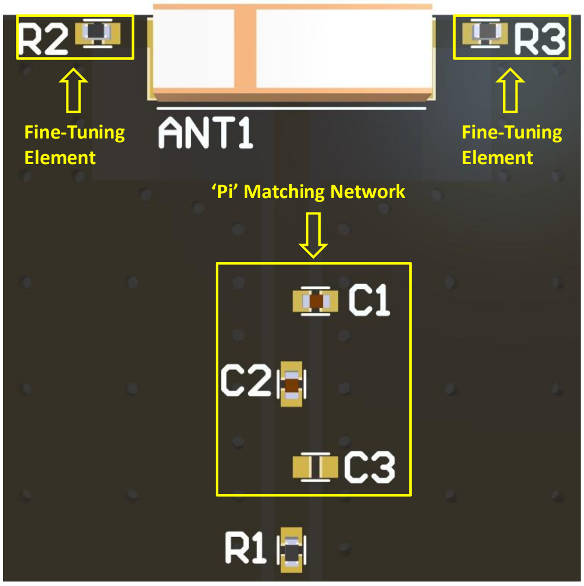
Top side

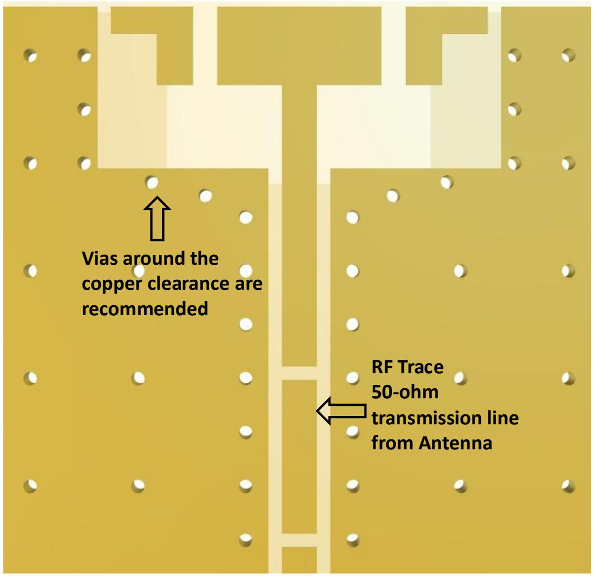


Bottom side

12.15 Antenna Integration

The GGBLA.125.A should be placed in the centre, as close to the edge on the long side of the PCB as possible, to take advantage of the ground plane. The RF trace must maintain a 50 Ohm transmission line. A “Pi” Matching Network is recommended for the RF transmission line, the values and components for the matching circuit will depend on the tuning needed. Ground vias should be placed around the copper clearance area.

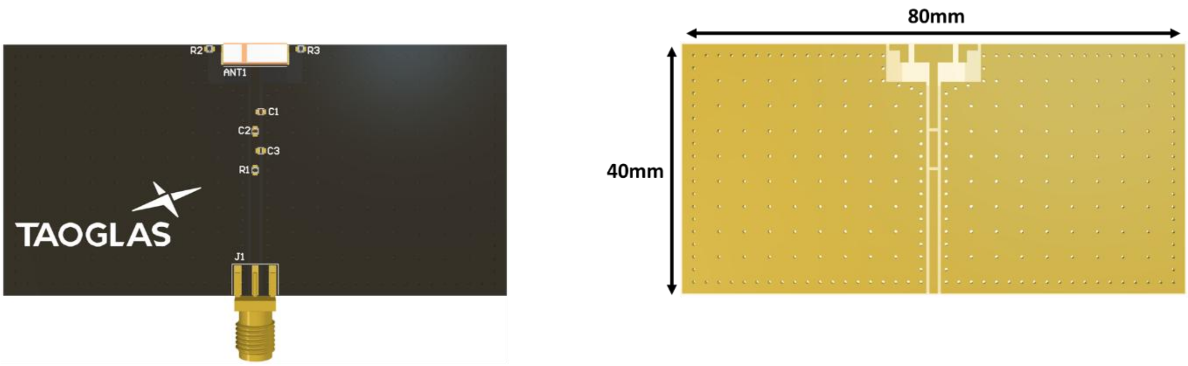




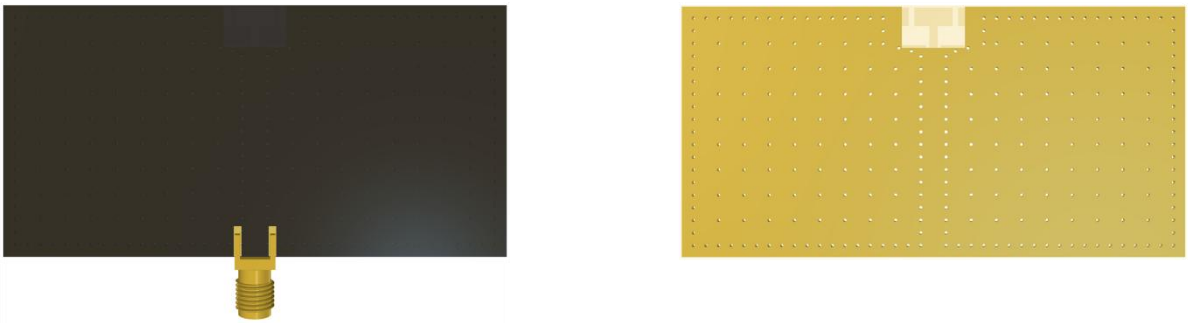
GGBLA.125.A antenna mounted on a PCB refence design, showing transmission lines and integration notes.

12.16 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 80x40mm ground plane (PCB) to ensure optimal performance.



Top Side (GGBLA.125 placement on 80x40mm PCB reference design)



Bottom Side (GGBLA.125 placement on 80x40mm PCB reference design)

Changelog for the datasheet

SPE-19-8-045 – GGBLA.125.A

Revision: N (Current Version)	
Date:	2025-03-12
Changes:	Added Application Note - DECT/NTN Bands Tuning.
Changes Made by:	Gary West

Previous Revisions

Revision: M	
Date:	2025-01-14
Changes:	Updated copper clearance drawing for corner mount application note.
Changes Made by:	Gary West

Revision: L	
Date:	2024-11-29
Changes:	New Integration guide added with corner mount integration.
Changes Made by:	Gary West

Revision: K	
Date:	2024-06-19
Changes:	Added application note.
Changes Made by:	Gary West

Revision: J	
Date:	2023-09-06
Changes:	Updated Solder Reflow Information
Changes Made by:	Cesar Sousa

Revision: I	
Date:	2023-07-25
Changes:	Updated Field Test Results
Changes Made by:	Gary West

Revision: H	
Date:	2023-02-14
Changes:	Added L Band to spec table and updated antenna integration guide.
Changes Made by:	Gary West

Revision: G	
Date:	2022-05-11
Changes:	Updated Packaging Specifications
Changes Made by:	Paul Doyle

Revision: F	
Date:	2021-09-09
Changes:	Added MSL rating, updated frontpage font.
Changes Made by:	Erik Landi

Revision: E	
Date:	2021-05-06
Changes:	Added L6 band to spec table.
Changes Made by:	Gary West

Revision: D	
Date:	2020-06-04
Changes:	Added Field Test Results
Changes Made by:	Victor Pinazo

Previous Revisions

Revision: C	
Date:	2020-03-18
Changes:	Modified RTK Table
Changes Made by:	Yu Kai Yeung

Revision: B	
Date:	2019-12-08
Changes:	Added GNSS Frequency Matrix and RTK Data
Changes Made by:	Yu Kai Yeung

Revision: A (Original First Release)	
Date:	2019-04-04
Notes:	Initial Specification Release
Author:	Yu Kai Yeung

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