TAOGLAS

Datasheet

GGBLA.125.A

Description:

GGBLA.125.A – GPS L1/L2/L5/L6, GLONASS, BeiDou Ceramic Loop Antenna for cm-Level with RTK

Features:

- Low Profile, Small Footprint Embedded Loop Antenna
- Centimeter-level accuracy achievable with RTK Systems
- GPS/QZSS (L1/L2)
- GPS/QZSS/IRNSS (L5)
- Galileo (E1/E5a/E5b/E6)
- GLONASS (G1/G2/G3)
- BeiDou (B1/B2a/B2b)
- 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 GPS L1,L2, L5 and L6 applications. It also covers all GNSS requirements including GLONASS (L1PT, L1CR, L5R), Galileo (E1, E2, E5a, E5b, E6), BeiDou (B1, B2, B3), IRNSS(L5) & QZSS Frequencies.

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 multi band GNSS antenna solution for compact high precision automotive navigation or asset tracking devices 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 GNSS bands from 1164MHz to 1602MHz. 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 center of the edge of the board.

Typical Applications Include:

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

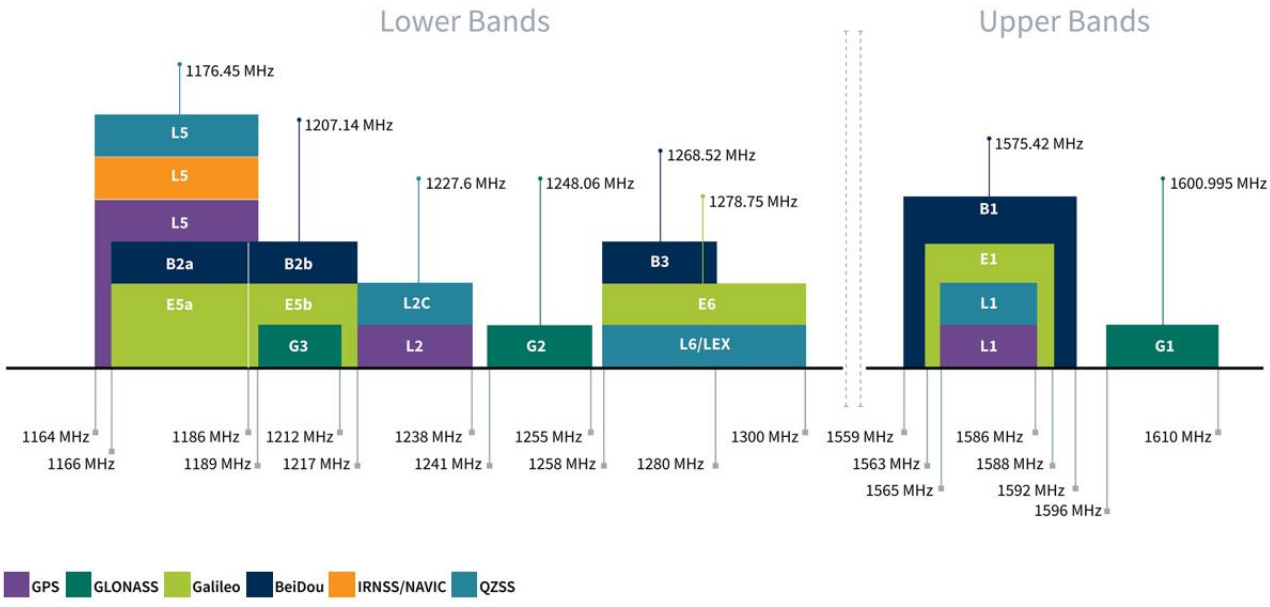
As with all onboard SMD antennas, care must be taken to ensure the device ground-plane layout and antenna matching has been done correctly. At any of our global design and test facilities, Taoglas can offer professional Gerber review, transmission line design, general integration support and final matching services of the GGBLA.125.A on your device board.

Contact your regional Taoglas customer support team for more information about this product, its' integration or immediate support.

2. Specifications

GNSS Frequency Bands Covered						
GPS	L1	L2	L5	L6		
	■	■	■	■		
GLONASS	G1	G2	G3			
	■	■	■			
Galileo	E1	E5a	E5b	E6		
	■	■	■	■		
BeiDou	B1	B2a	B2b	B3		
	■	■	■	■		
QZSS (Regional)	L1	L2C	L5	L6		
	■	■	■	■		
IRNSS (Regional)	L5					
	■					
SBAS	L1/E1/B1	L5/B2a/E5a	G1	G2	G3	
	■	■	■	■	■	

*SBAS systems: WASS(L1/L5), EGNOSS(E1/E5a), SDCM(G1/G2/G3), SNAS(B1/B2a), GAGAN(L1/L5), QZSS(L1/L5), KAZZ(L1/L5).

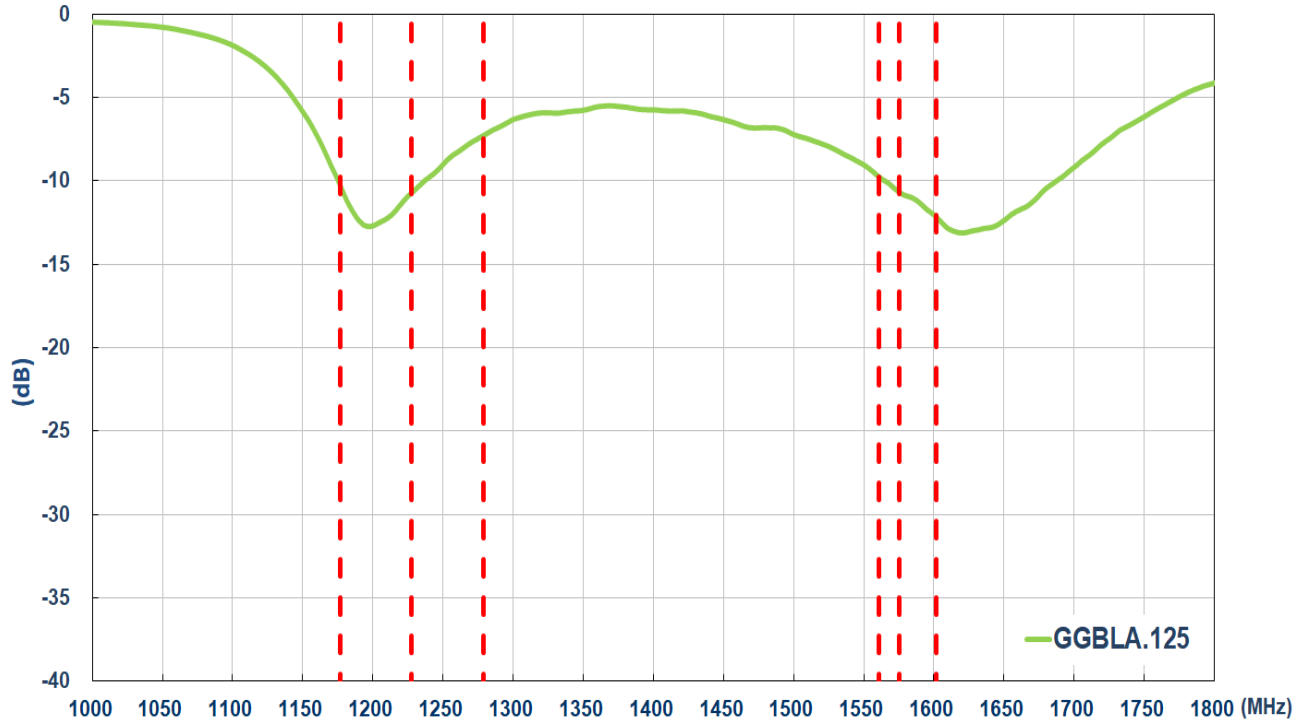


GNSS Bands and Constellations

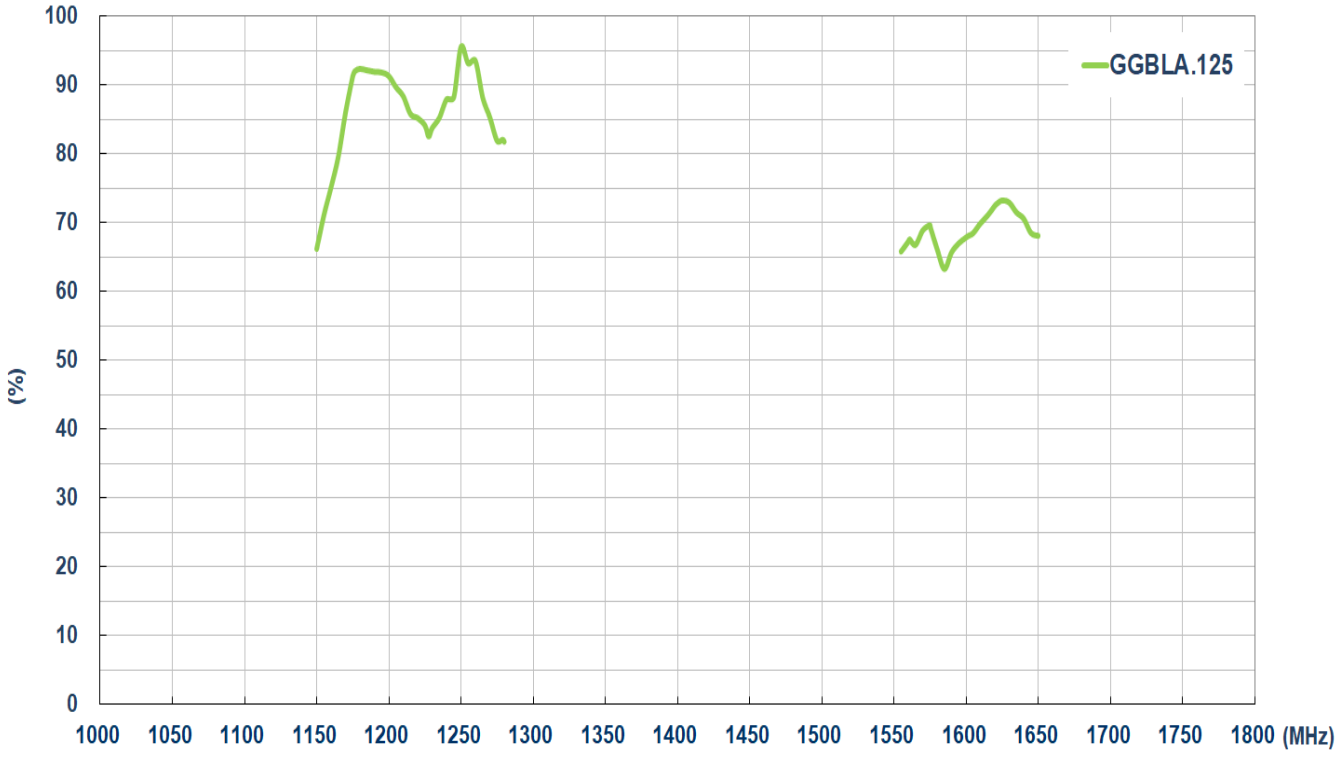
GNSS Electrical						
Frequency (MHz)	**GPS L5/ Galileo E5a**	**GPS L2**	**GPS L6/ Galileo E6**	**BeiDou B1/ Galileo E2**	**GPS L1/ Galileo E1**	**GLONASS L1**
	1176.45	**1227.6**	**1278.8**	**1561**	**1575.42**	**1602**
Efficiency (%)	80 Typ.	80 Typ.	70 Typ.	60 Typ.	60 Typ.	60Typ.
Average Gain (dB)	-0.7	-0.8	-1.2	-2.0	-1.8	-1.7
Peak Gain (dBi)	3.6	3.3	3.3	2.6	2.8	3.0
Return loss (dB)	< -10	< -10	< -5	< -10	< -10	< -10
Group Delay	1	1	1.2	3	3	3
PCO (cm)	1.46	2.44	2.3	0.34	0.34	0.40
PCV (cm)	9.8	10.3	9.5	7	7.2	7.2
Polarization	Linear					
Impedance	50Ω					
Mechanical						
Dimensions (mm)	10 x 3.2 x 1.5 mm					
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

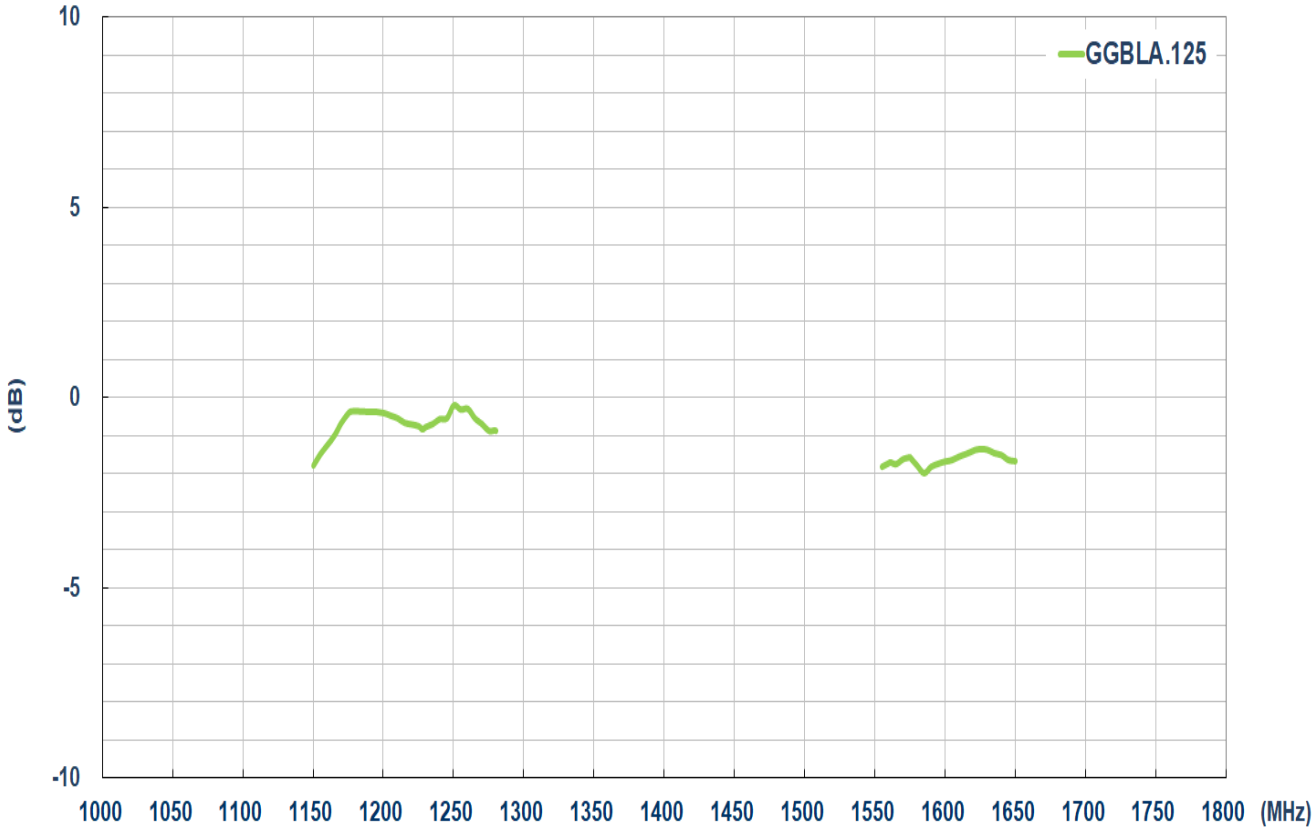
3.1 Return Loss



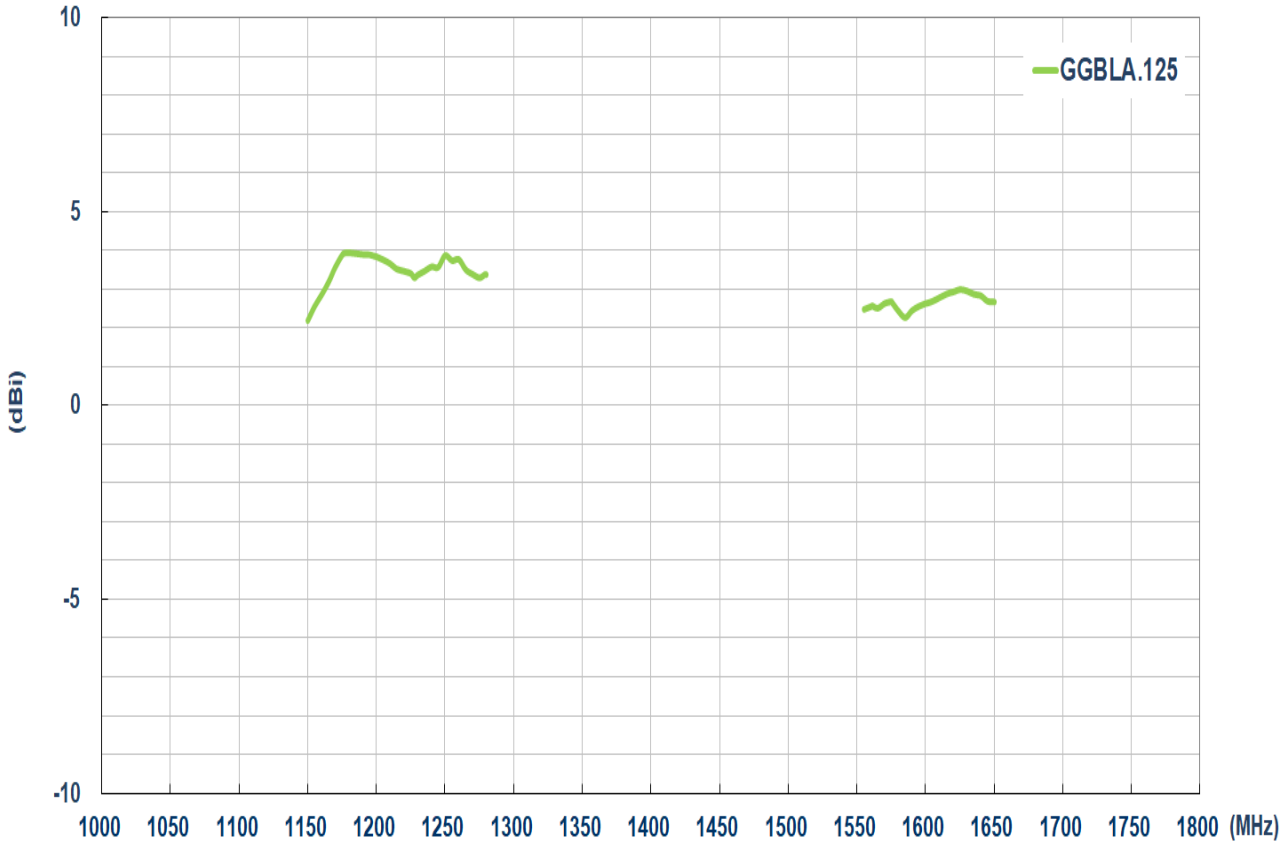
3.2 Efficiency



3.3 Average Gain

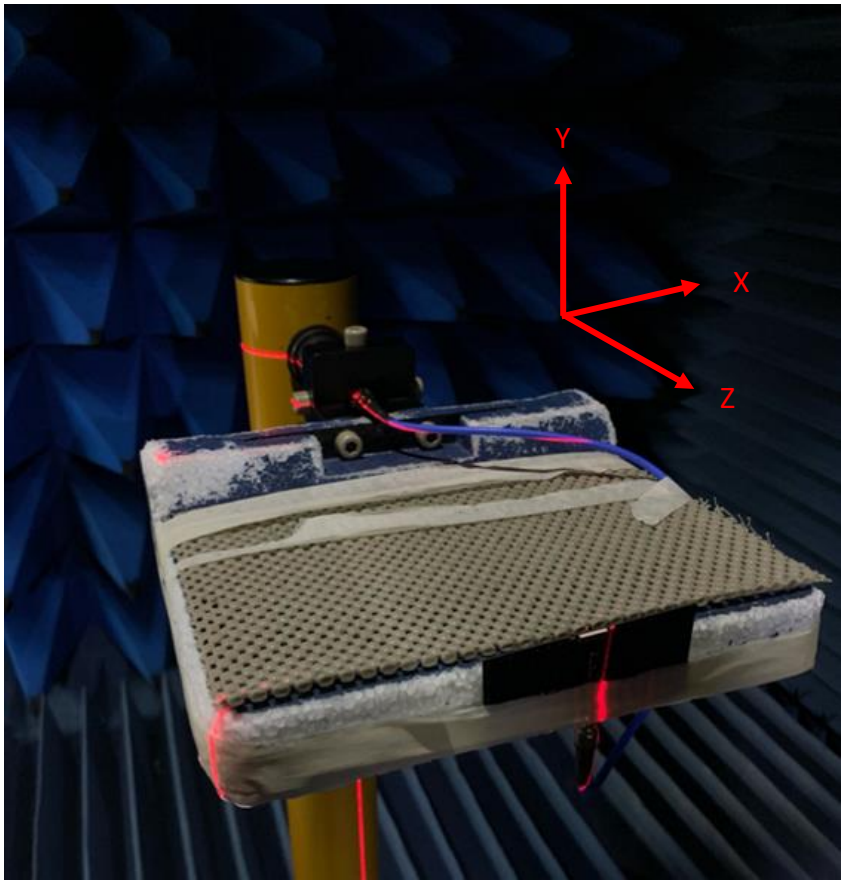


3.4 Peak Gain



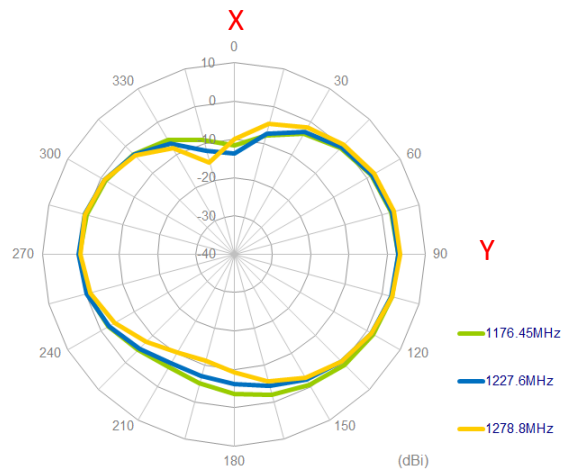
4. 2D Radiation Patterns

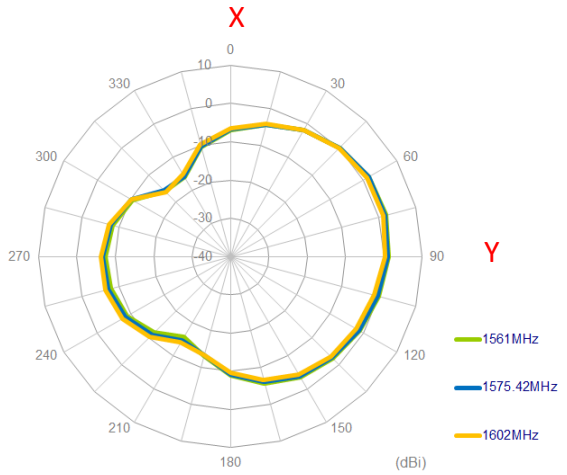
4.1 Test Setup – on 80*40mm Evaluation Board



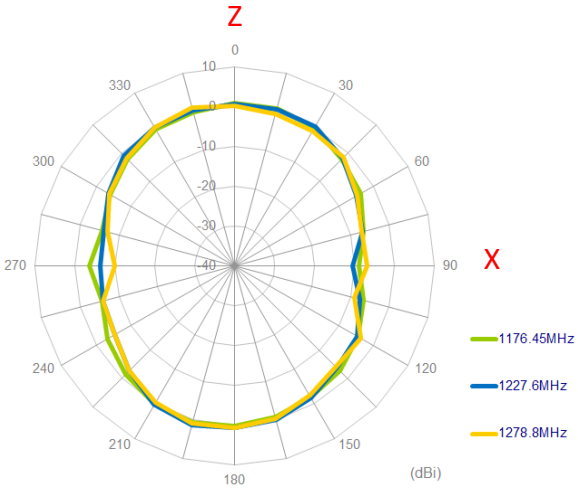
4.2 2D Plots

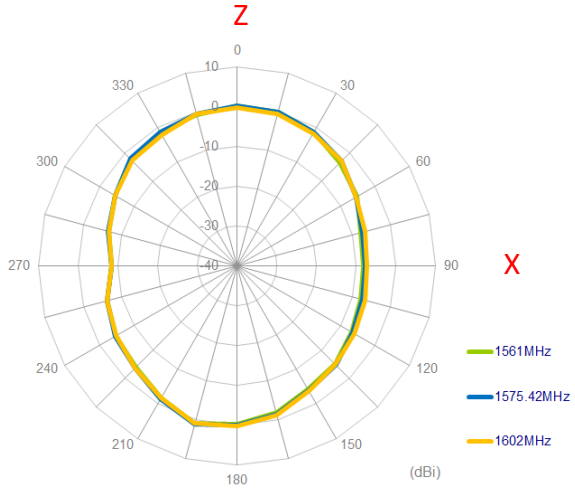
XY Plane



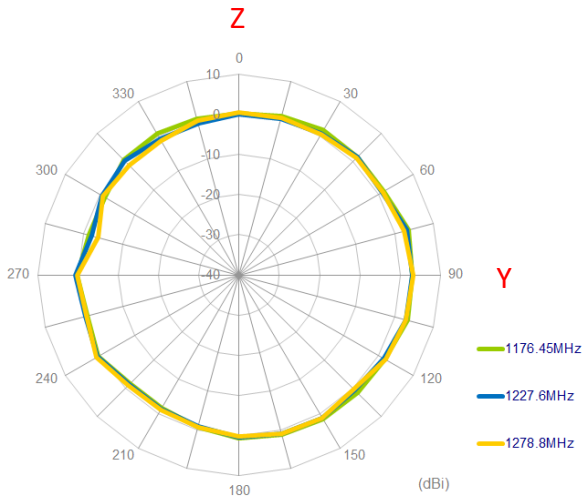


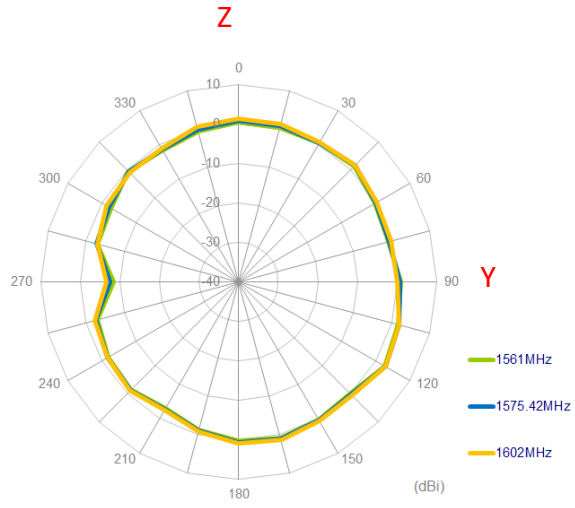
XZ Plane





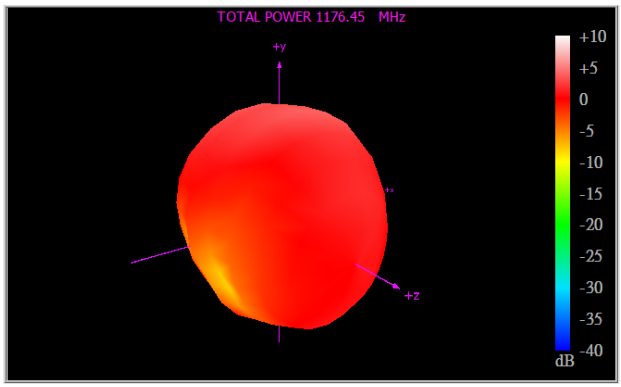
YZ Plane

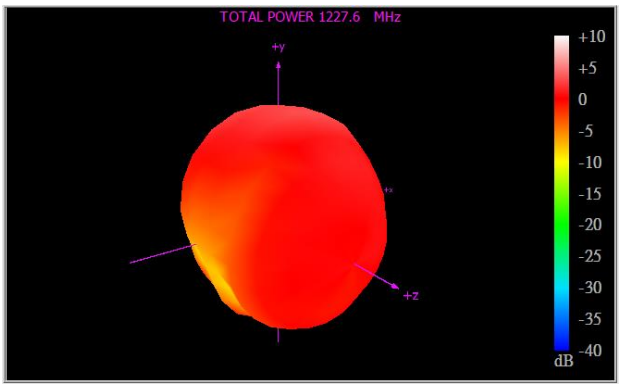


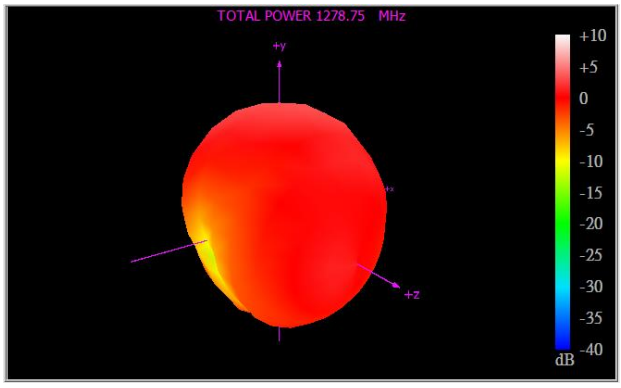


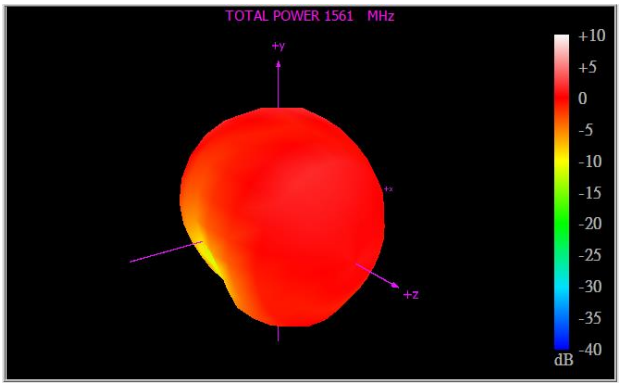
5. 3D Radiation Patterns

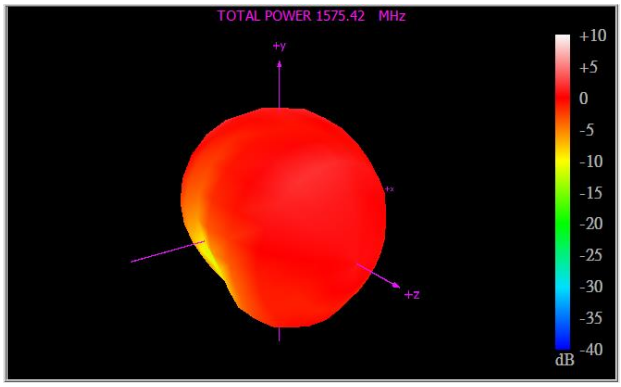
5.1 GGBLA.125.A

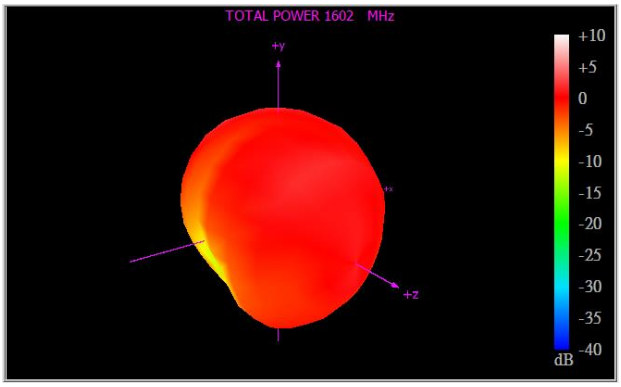












6. Field Test Results

6.1 Rooftop test

In this section Taoglas will present the field test result for GGBLA.125A antenna. The test was performed when the antenna was mounted on a static rooftop test set up in an open sky environment for at least 6 hours.

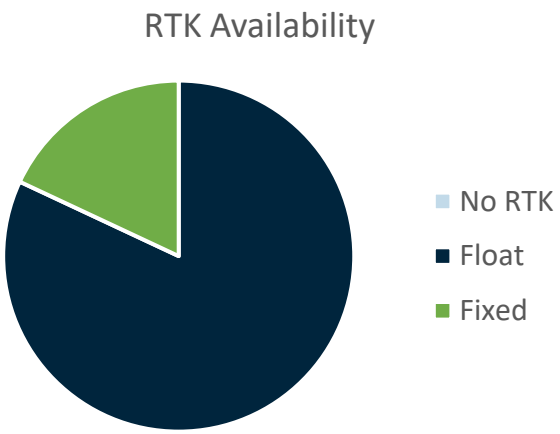
Taoglas will show the field test results using the following receiver:

1. **U-blox ZED-F9P**

   Receiver features:

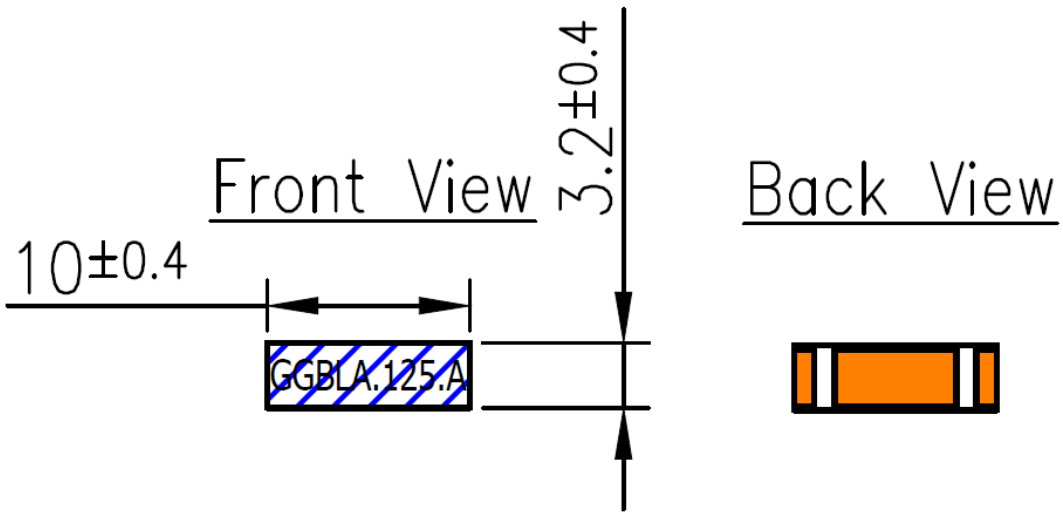
   - Multi-band GNSS: 184-channel GPS L1C/A L2C, GLONASS: L1OF L2OF, Galileo: E1B/C E5b, BeiDou: B1I B2I, QZSS: L1C/A L2C
   - Multi-band RTK with fast convergence times and reliable performance
   - Nav. update rate RTK up to 20 Hz
   - Position accuracy = RTK 0.01 m + 1 ppm CEP

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
	RTL ENABLED	10.59 cm	12.88 cm	25.75 cm	32



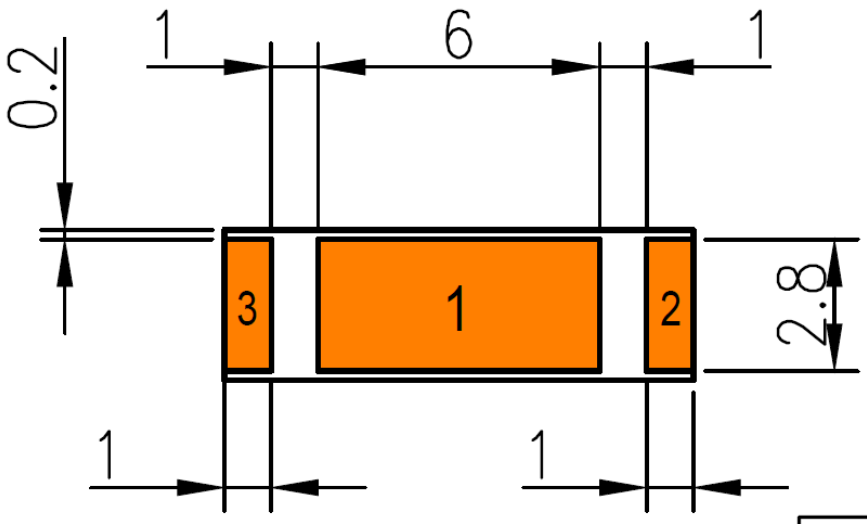
7. Mechanical Drawing (Units: mm)

7.1 Antenna Drawing



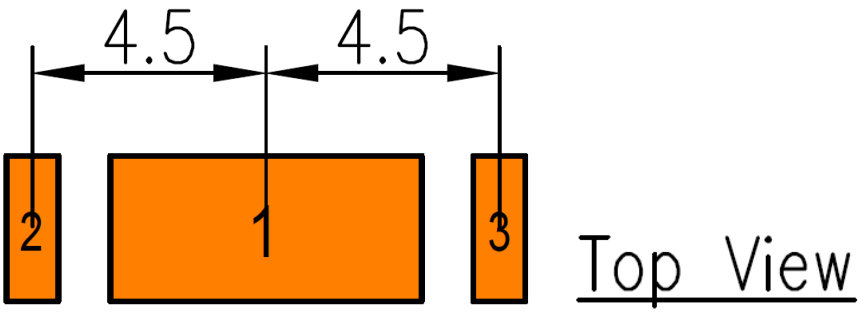
7.2 Antenna Dimensions

Bottom Pin and View Definition – Back View

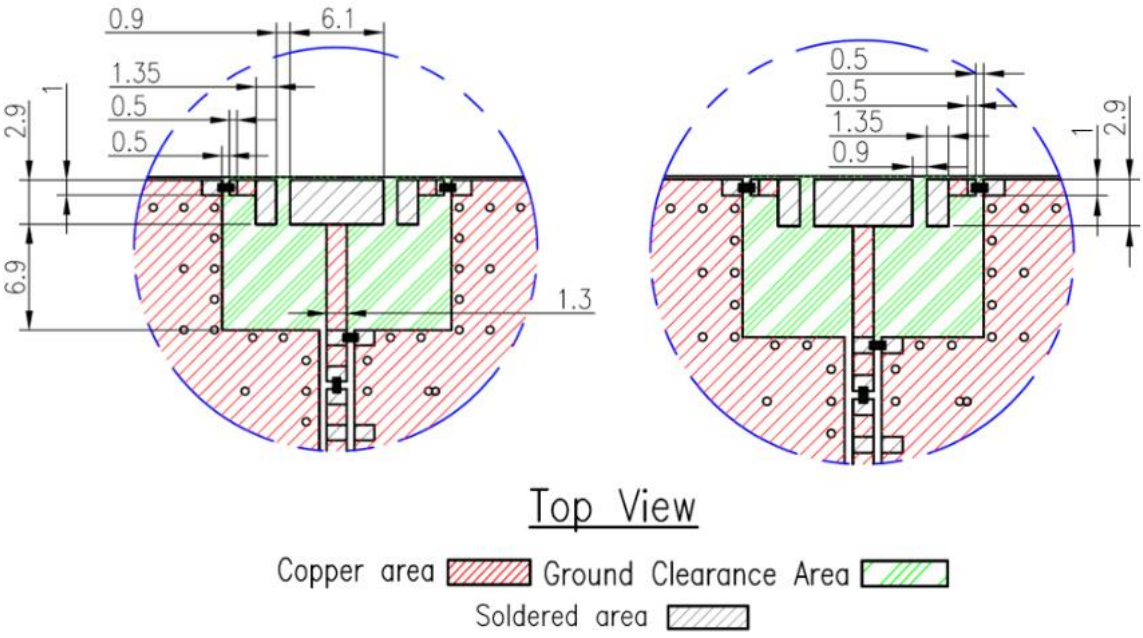


Pin	Description
1	Feed (50 ohm)
2.3	Ground Feed

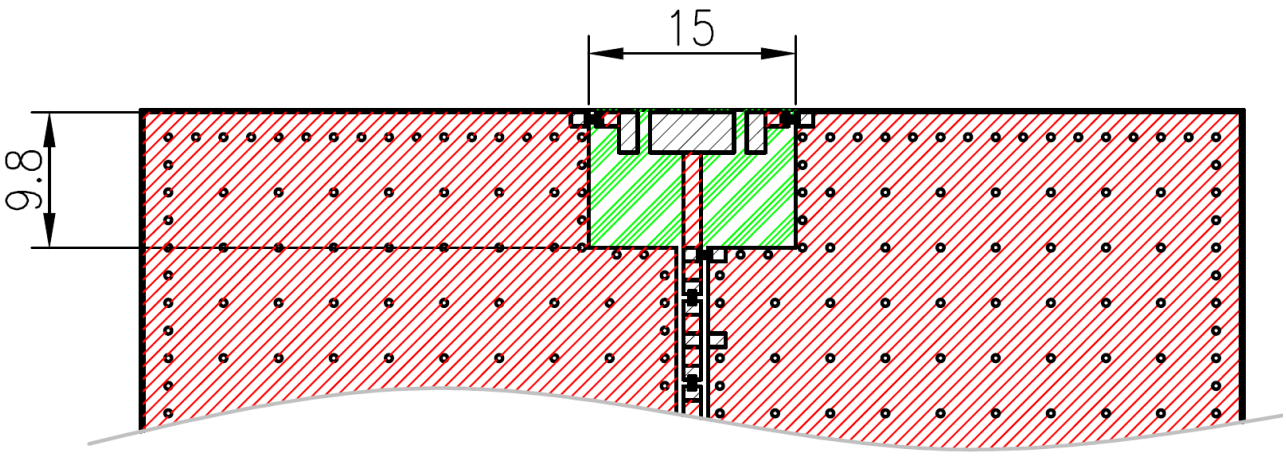
Antenna Footprint - Top View



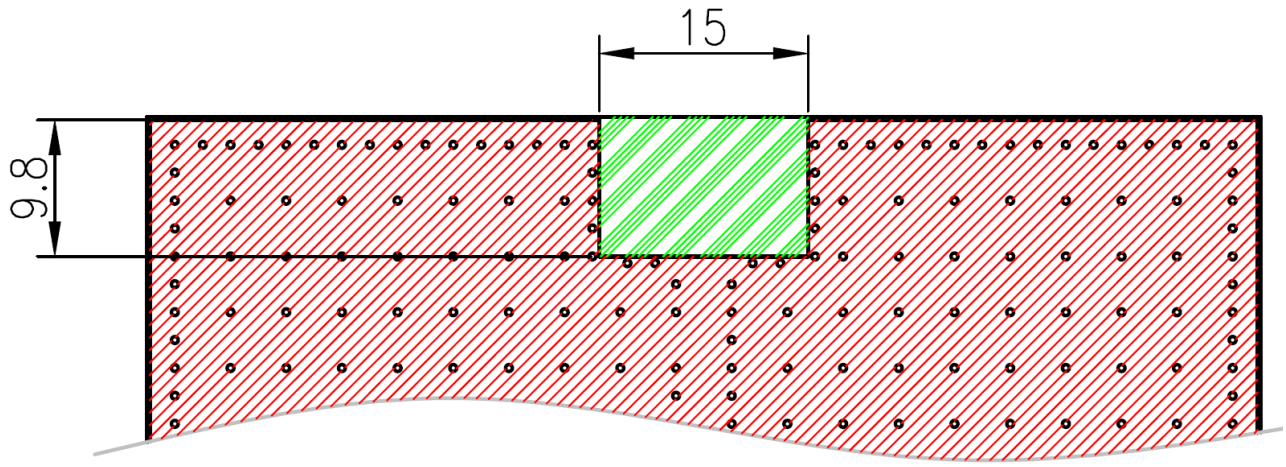
Host PCB Layout – Top View



Clearance Area



Top View

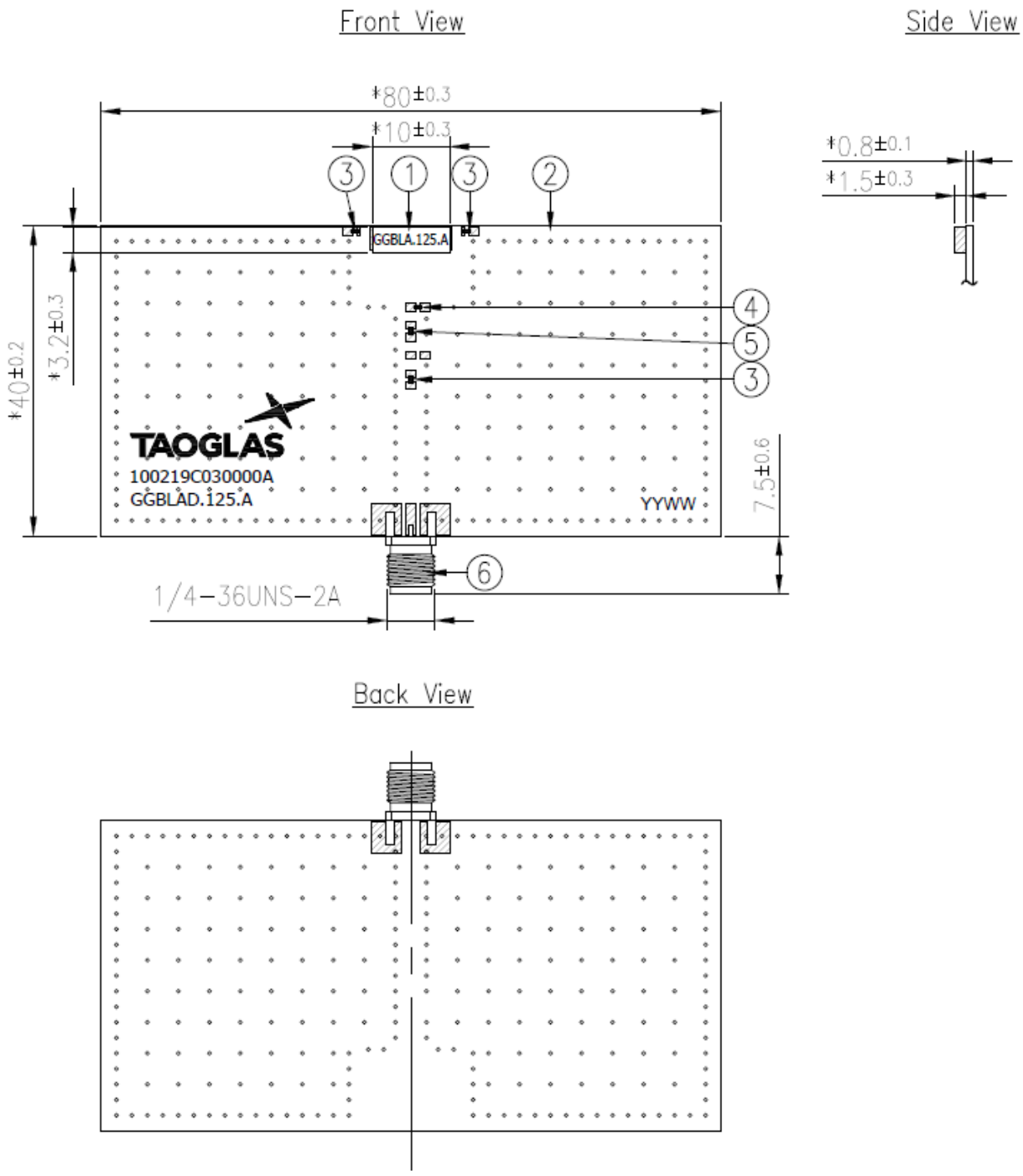


Bottom View

Copper area Ground Clearance Area

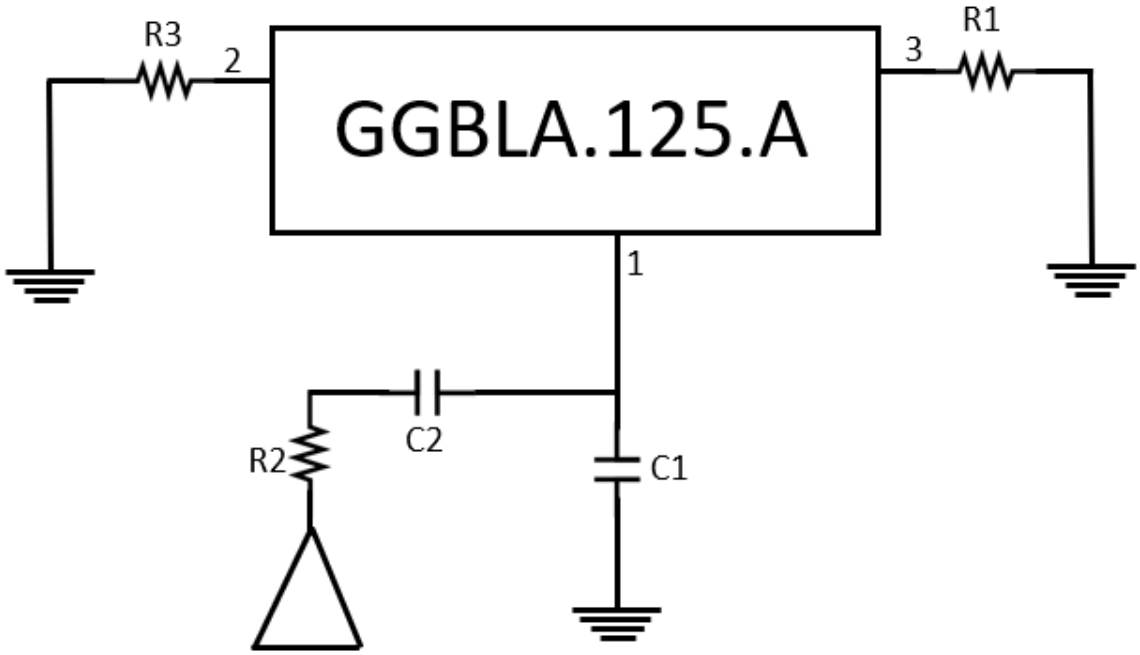
Soldered area

Evaluation Board



	Name
1	GGBLA.125.A Antenna
2	GGBLAD.125.A EVB PCB
3	0 hm Resistor (0402)
4	1.2pF Capacitor (0402)
5	3.9pF Capacitor (0402)
6	SMA(F) ST PCB

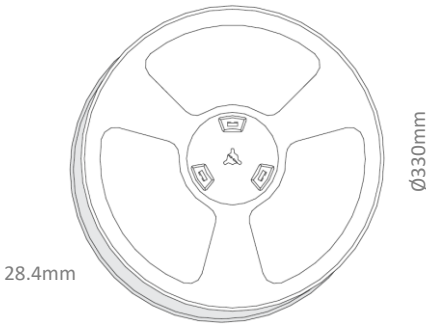
Evaluation Board Matching Circuit



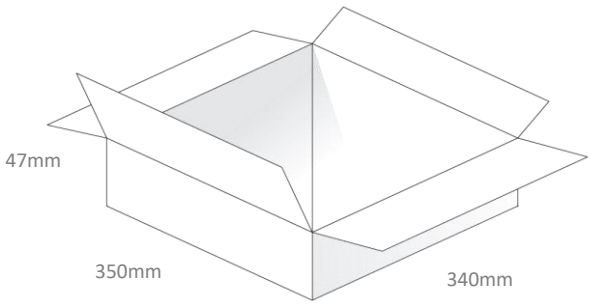
Matching Circuit	
Component	**Component Values**
R1	0 ohm
R2	0 ohm
R3	0 ohm
C1	1.2 pF
C2	3.9 pF

8. Packaging

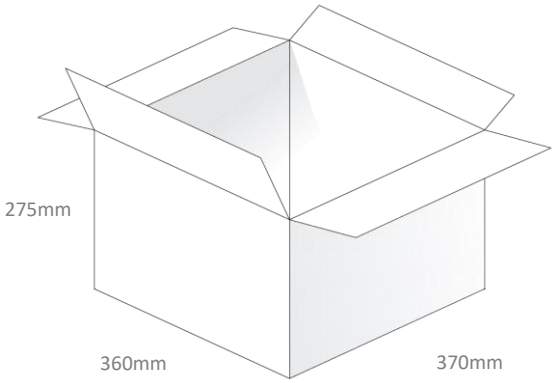
2000pcs GGBLA.125.A per Tape & Reel
Dimensions - Ø330*28.4
Weight - 1Kg



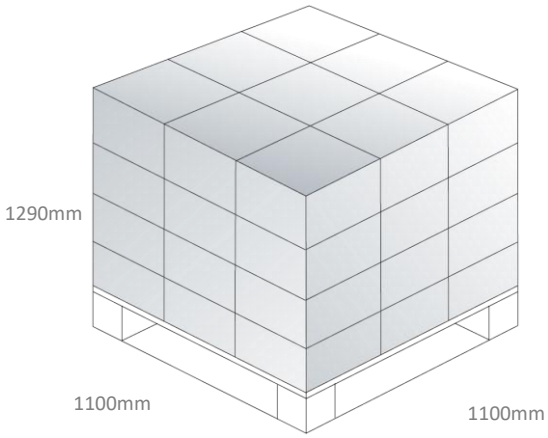
2000pcs GGBLA.125.A per carton
Dimensions - 350*340*47mm
Weight - 1.2Kg



10000pcs GGBLA.125.A per carton
Dimensions - 360*370*275mm
Weight - 6.8Kg



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



Changelog for the datasheet

SPE-19-8-045 – GGBLA.125.A

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

Previous Revisions

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

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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