



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 (L1, L2, L5, L6), GLONASS (L1PT, L1CR, L5R),
 Galileo (E1, E2, E5a, E5b, E6), BeiDou (B1, B2, B3), IRNSS(L5) & QZSS
 Tuned for SMD Mounting on 80x40mm Ground Plane
 High efficiency, up to 80%
 Dimensions: 10 * 3.2 * 1.5 mm
 RoHS & Reach Compliant

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1. Introduction



The Taoglas GG BLA.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, 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 Band							
GPS/QZSS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	L6 1278.75MHz			
	■	■	■	■			
GLONASS	L5R 1176.45MHz	L3PT 1201.5MHz	L2PT 1246MHz	L1CR 1575.42MHz	L1PT 1602MHz		
	■	■	■	■	■		
Galileo	E5a 1176.45MHz	E5b 1201.5MHz	E4 1215MHz	E3 1256MHz	E6 1278.75MHz	E2 1561MHz	E1 1575.42MHz
	■	■	■	■	■	■	■
BeiDou	B1 1561MHz	B2 1207.14MHz	B3 1268.52MHz				
	■	■	■				
Compass	E5B(B2)/ E6(B3) 1268.56MHz	E2(B1) 1561MHz					
	■	■					
SBAS	Omnistar 1542.5MHz	WAAS/EGN OS 1575.42MHz					
	■	■					
IRNSS	L5 1176.45MHz	S-Band 2483.778MHz					
	■	□					

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
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					

Field Test Result On Evaluation Board

Frequency	GPS L1	GPS L2	Galileo E1	Galileo E5b	GLONASS G1	GLONASS G2	BeiDou B1I	BeiDou B2I
	1563-1587	1215-1239.6	1559-1591	1189-1214	1598-1605	1242-1249	1559-1563	1200-1214
Carrier-to-Noise Values(dB-Hz)	45.6	35.6	43.8	32.1	28.75	26	39.5	30
2*DRMS Positioning Accuracy (cm) without RTK	102	102	102	102	102	102	102	102
2*DRMS Positioning Accuracy (cm) with RTK	10	10	10	10	10	10	10	10
TTF(s)	32	32	32	32	32	32	32	32
Group Delay @ Zenith Variation Across Single Constellation(ns)	3	1	3	1	3	1	3	1
Phase Centre Offset PCO (cm)	0.34	2.44	0.34	1.46	0.34	2.44	0.34	1.02
Phase Centre Variation PCV (mm)	72	103	72	103	72	103	72	103
Axial Ratio (dB)	20	20	20	20	20	20	20	20

* All outdoor measurements performed on the roof top of the Taoglas R&D Labs facility in Dublin Ireland.

** Recommended Minimum C/No for Standard Precision Acquisition/ Tracking (dB-Hz): 26-30/ 12-15.

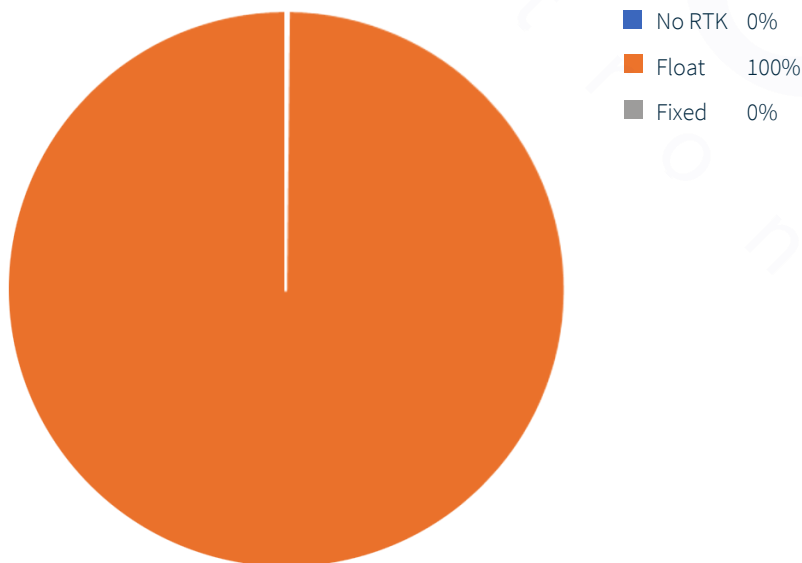
*** Data Measured in Free Space.

**** Group Delay, PCO, PCV and Axial Ratio values includes Active Circuitry.

***** Ublox C099-F9P application board is used for Field test Measurements.

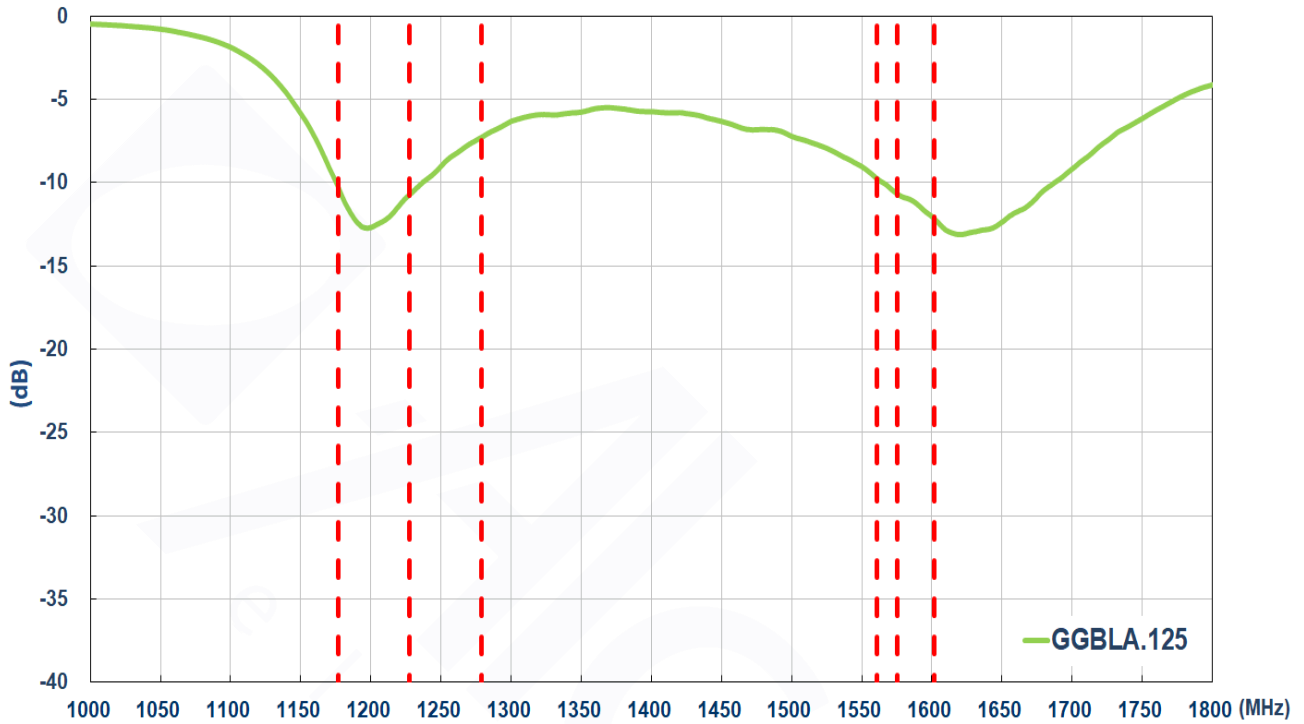
***** Evaluation Board size: 80*40*0.8mm

RTK AVAILABILITY

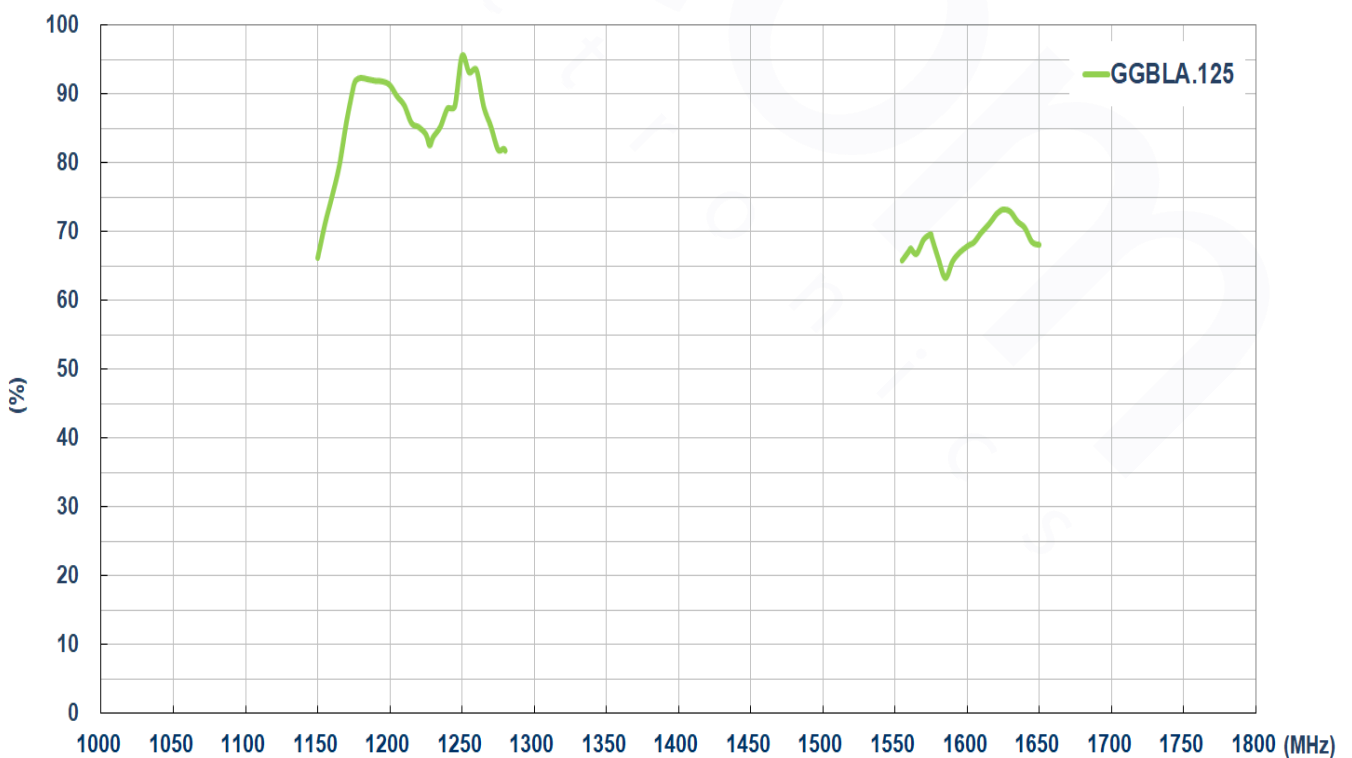


3. Antenna Characteristics

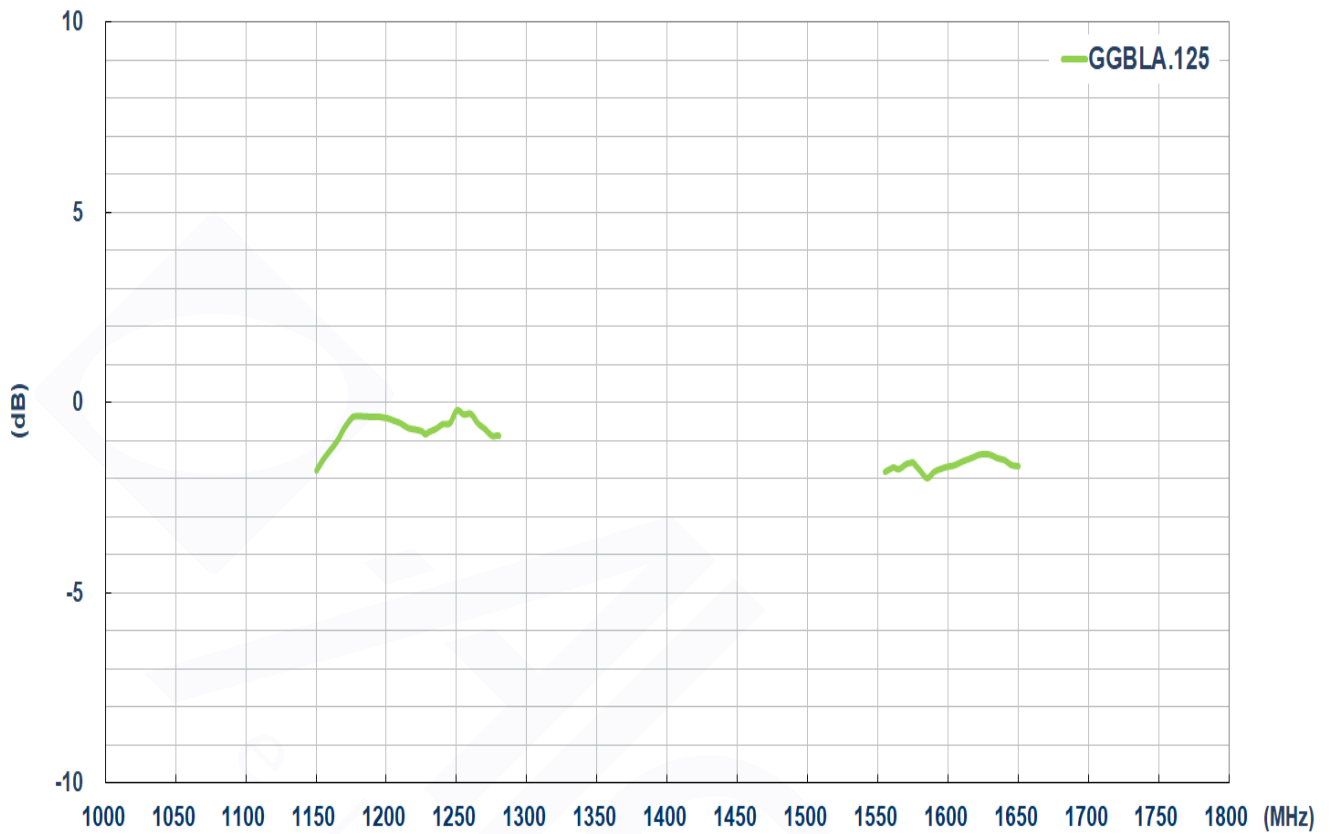
3.1 Return Loss



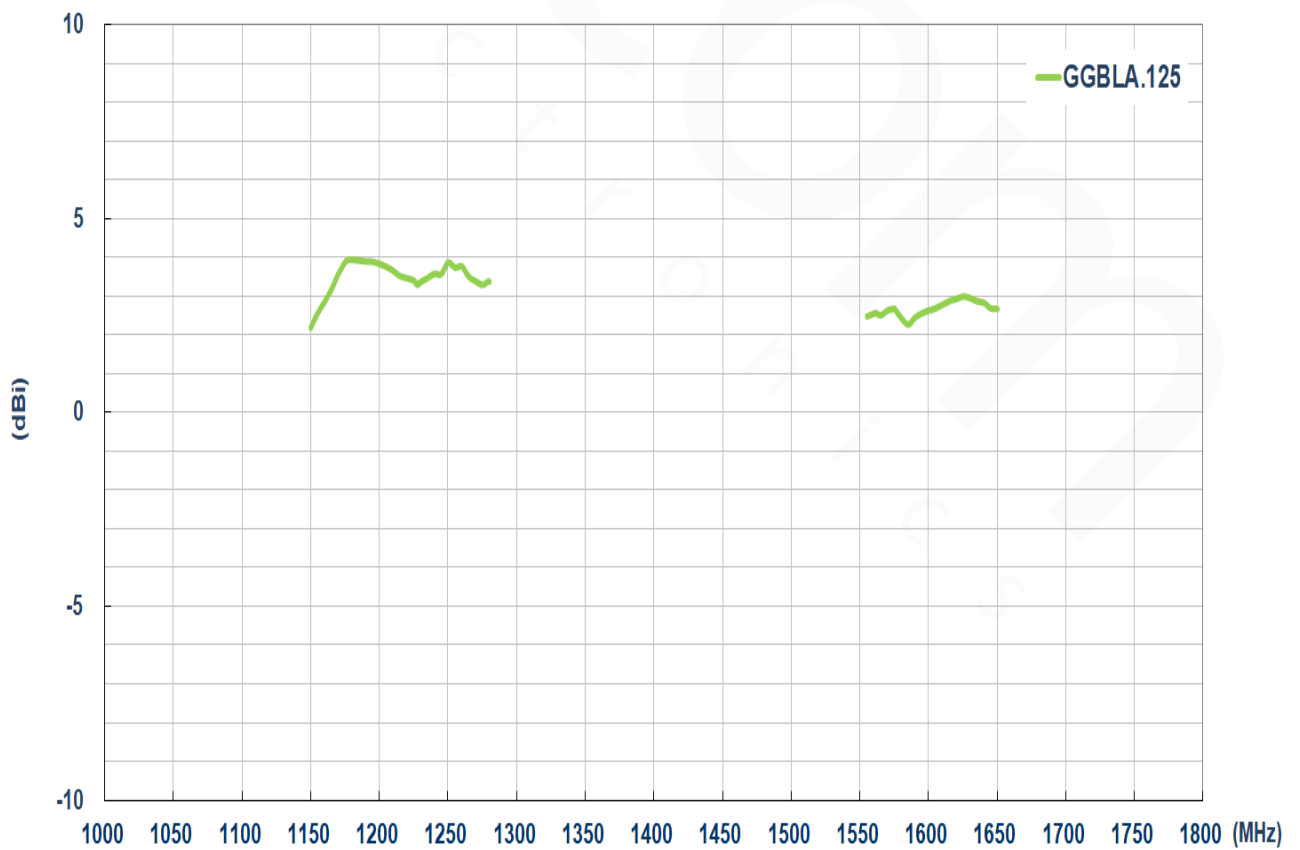
3.2 Efficiency



3.3 Average Gain

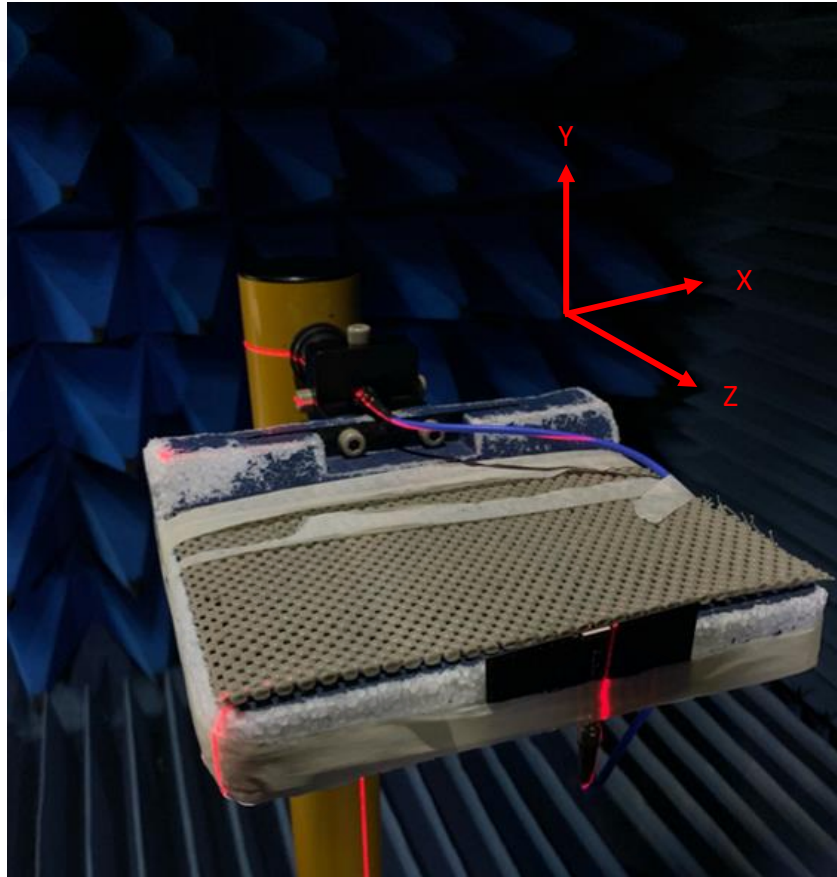


3.4 Peak Gain



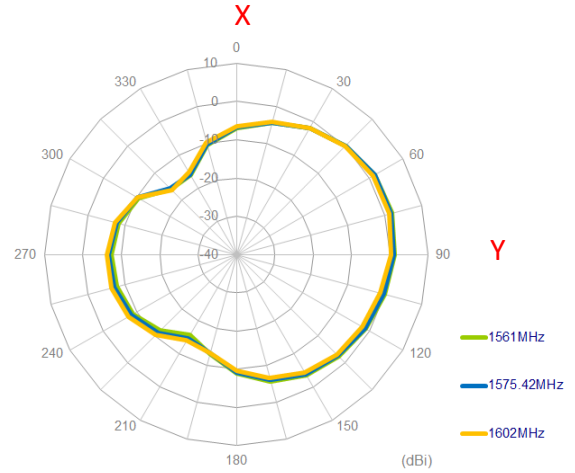
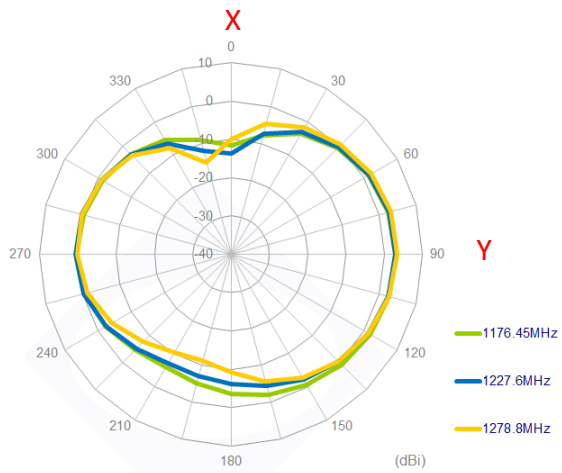
4. 2D Radiation Patterns

4.1 Test Setup – on 80*40mm Evaluation Board

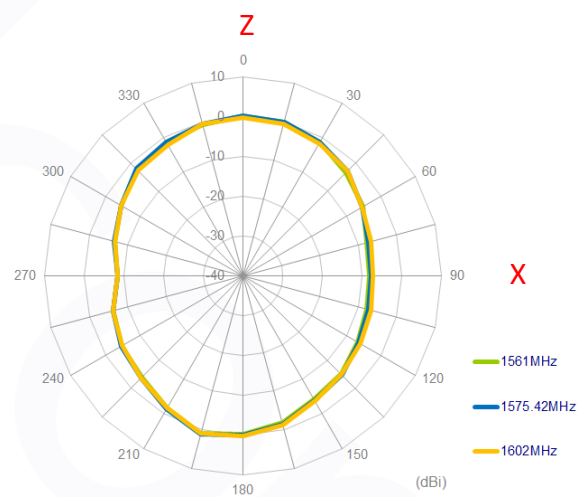
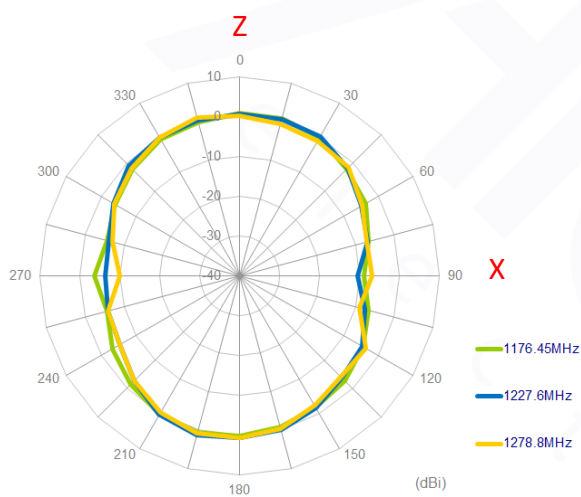


4.2 2D Plots

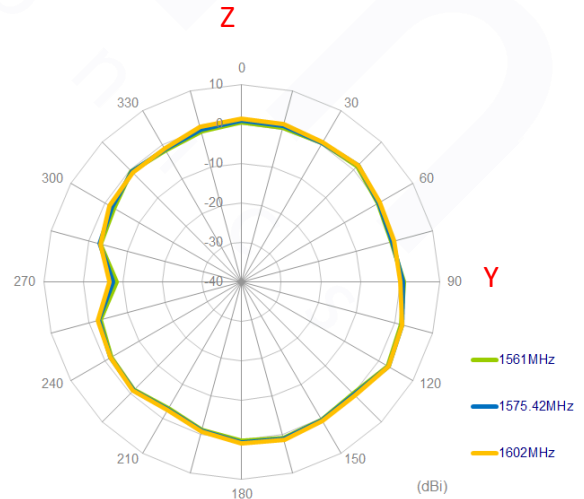
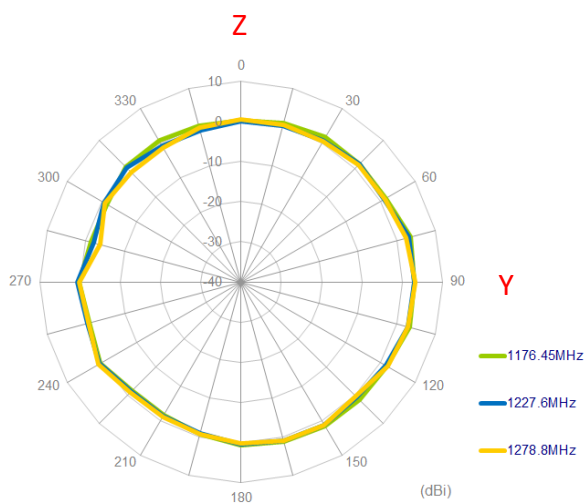
XY Plane



XZ Plane

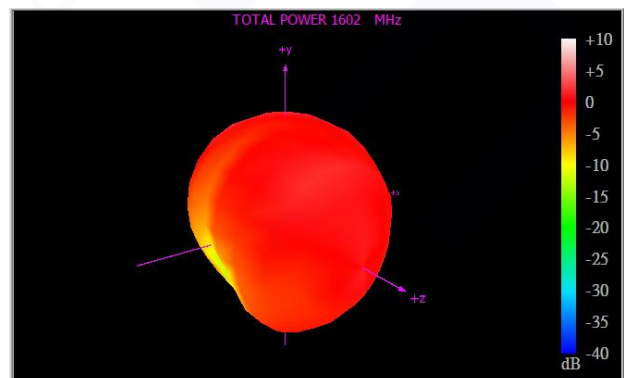
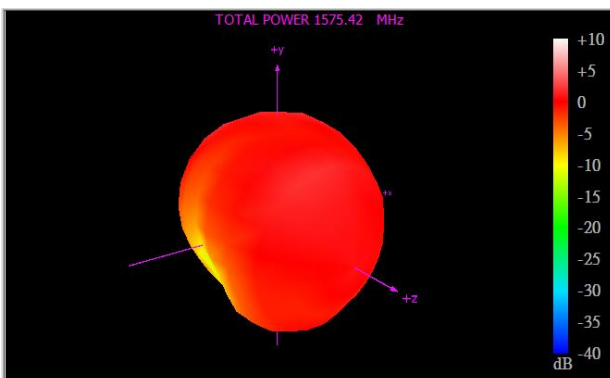
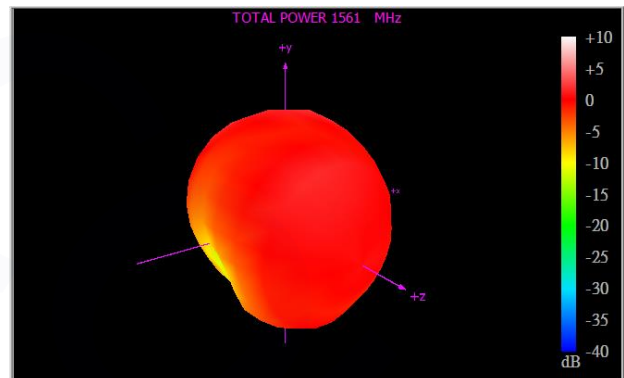
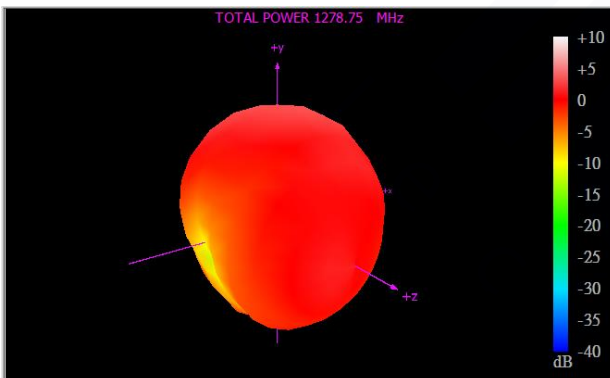
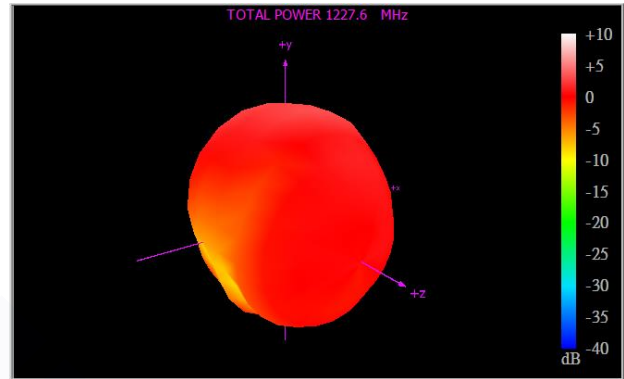
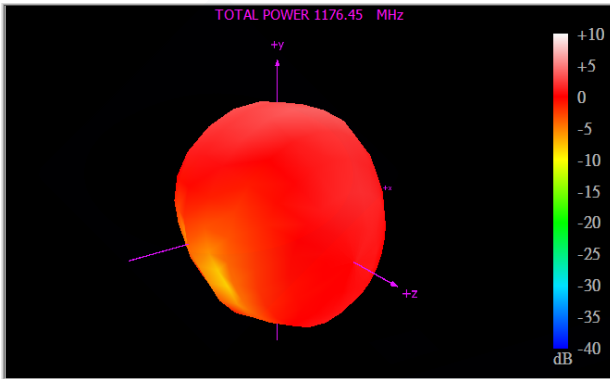


YZ Plane



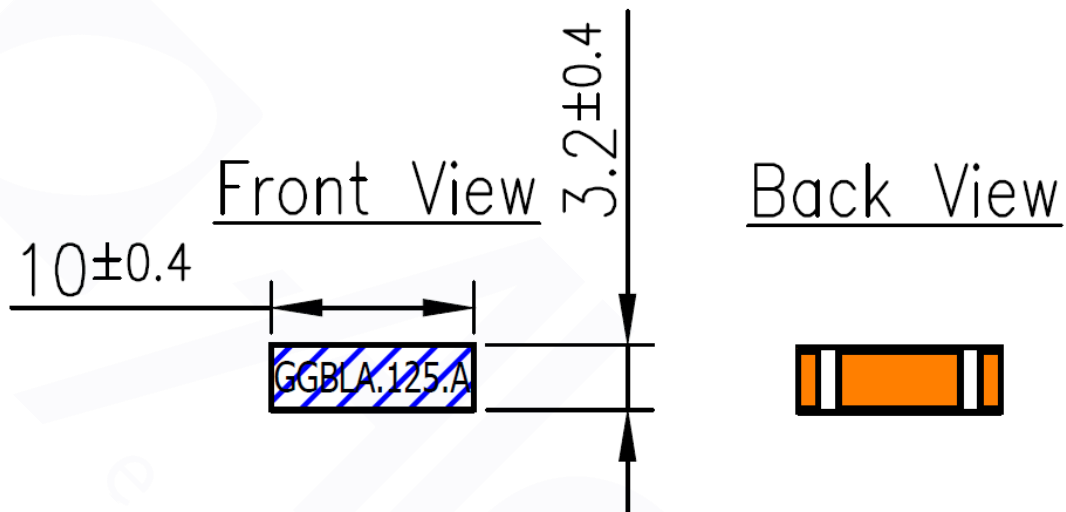
5. 3D Radiation Patterns

5.1 GGBLA.125.A



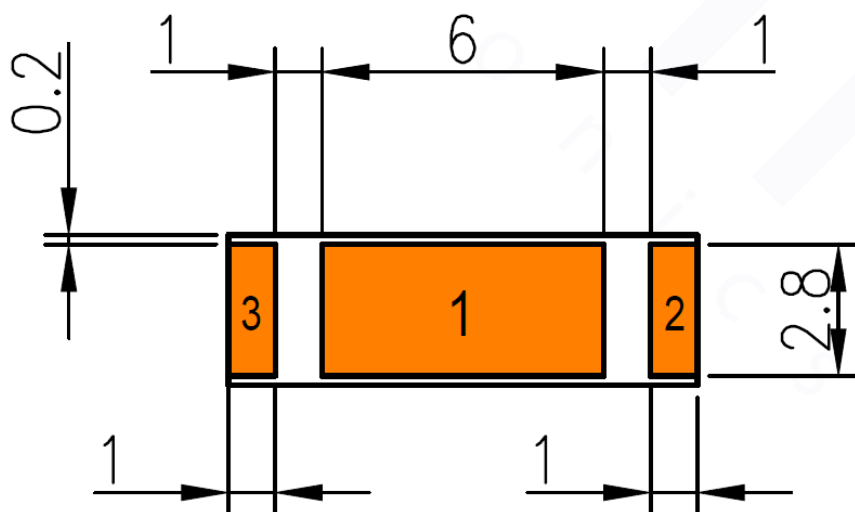
6. Mechanical Drawing (Units: mm)

6.1 Antenna Drawing



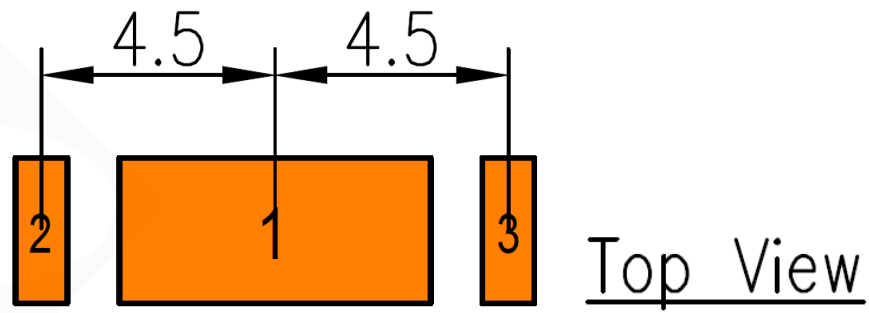
6.2 Antenna Dimensions

Bottom Pin and View Definition – Back View

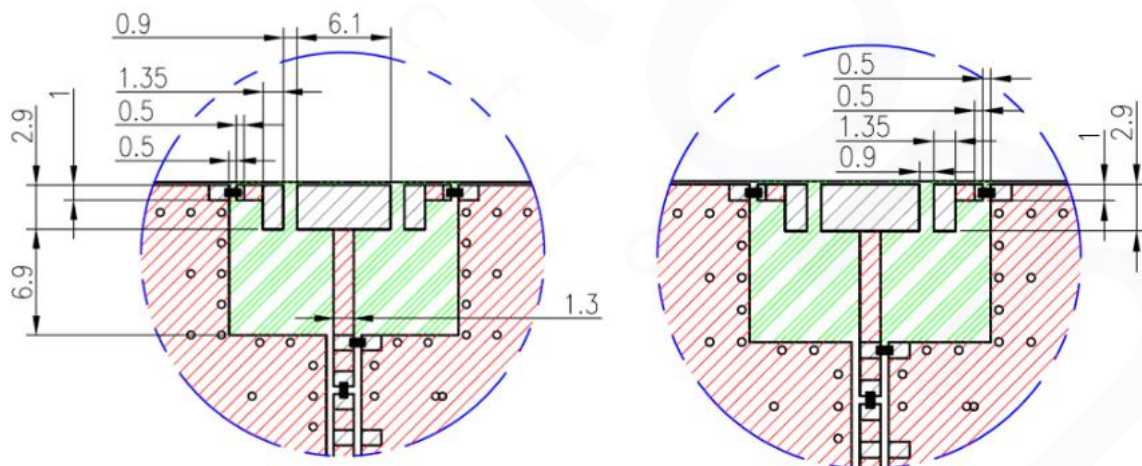


Pin	Description
1	Feed (50 ohm)
2.3	Ground Feed




Antenna Footprint - Top View



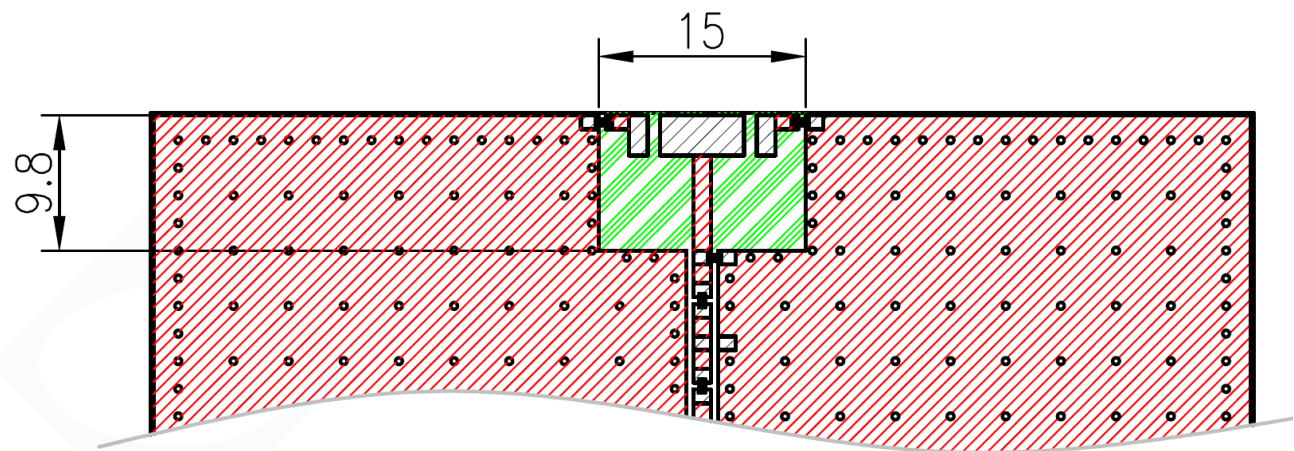
Host PCB Layout – Top View



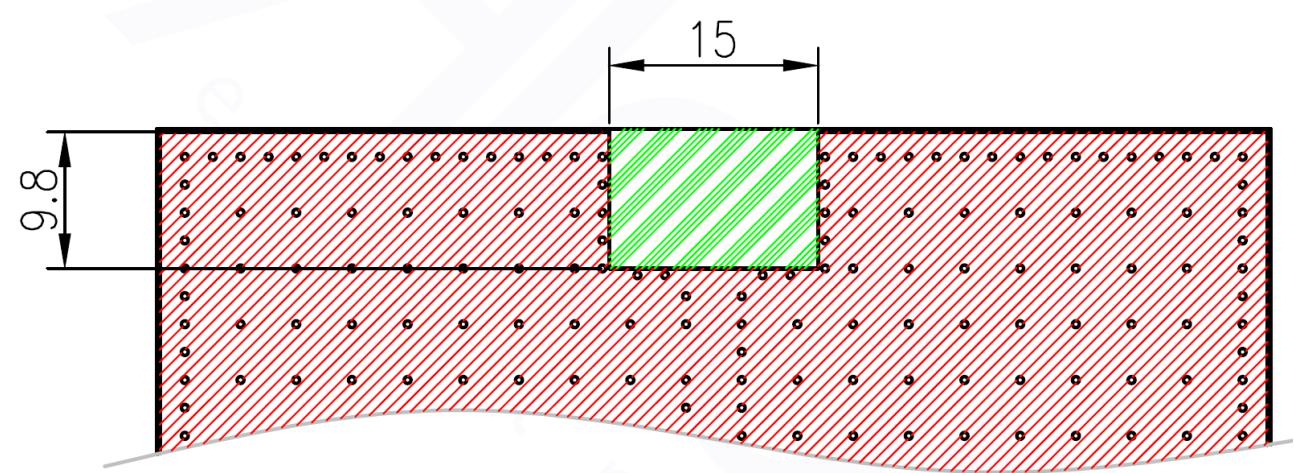
Top View

Copper area  Ground Clearance Area 
 Soldered area 




Clearance Area



Top View



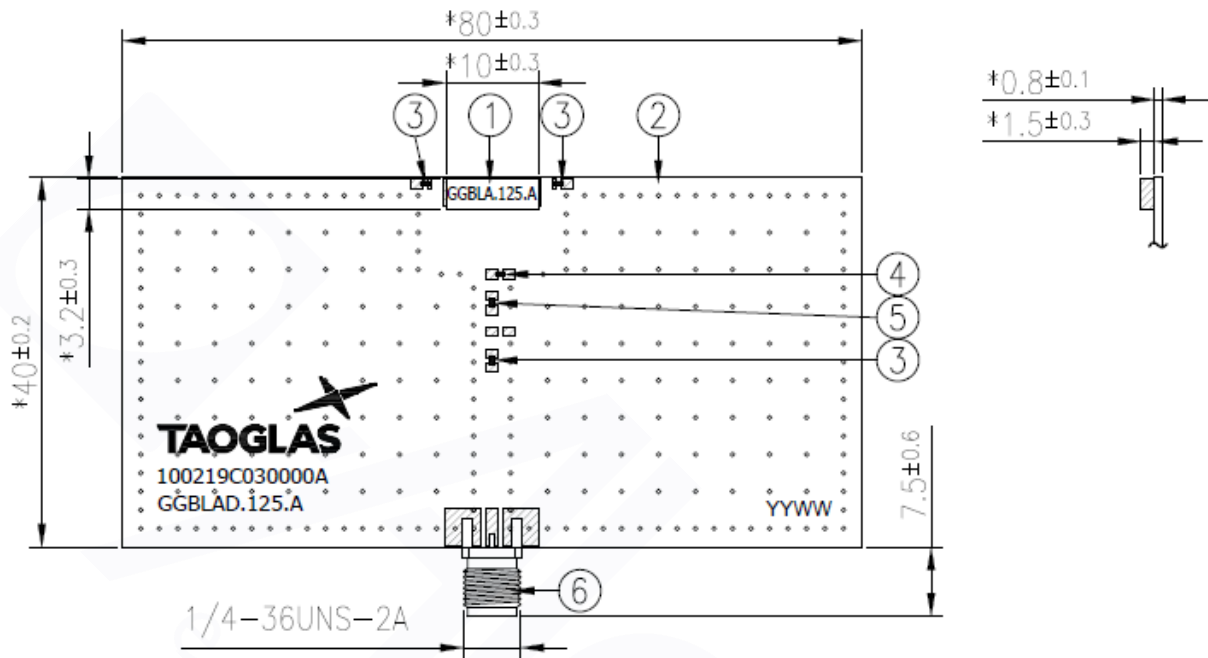
Bottom View

Copper area  Ground Clearance Area 
 Soldered area 

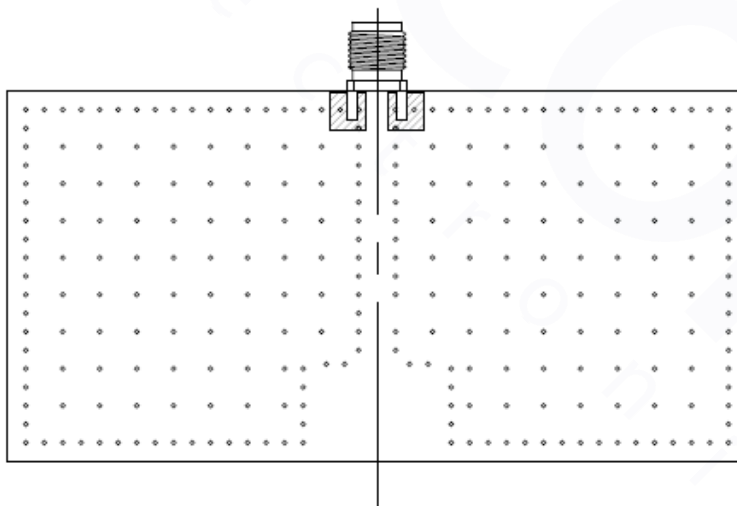
Evaluation Board

Front View

Side View

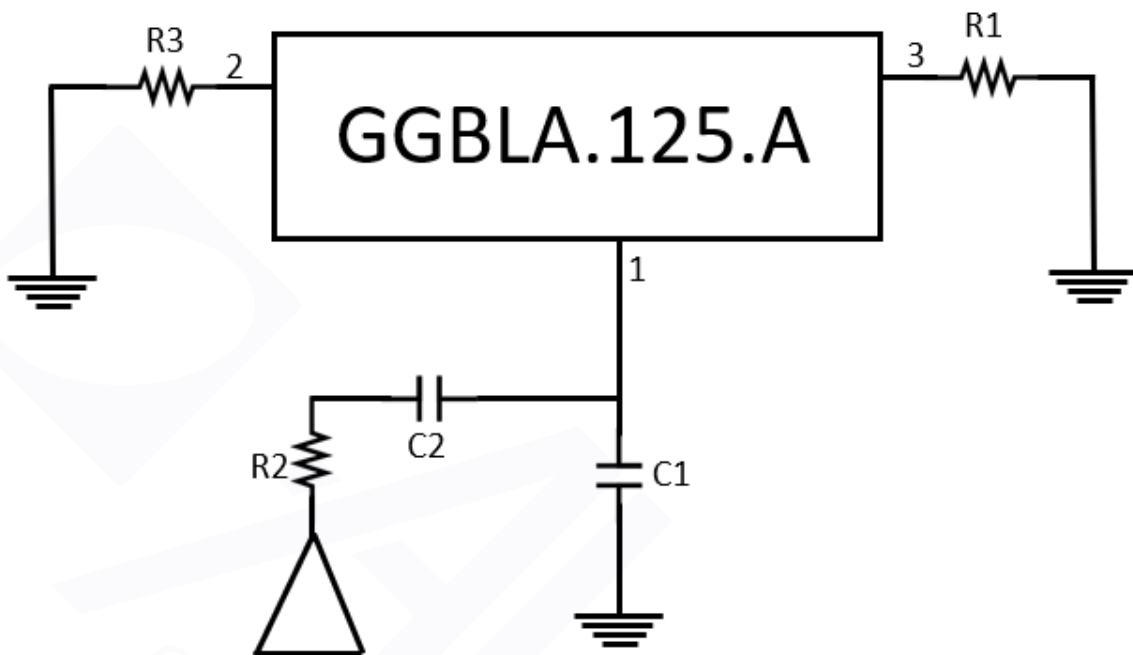


Back View



	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

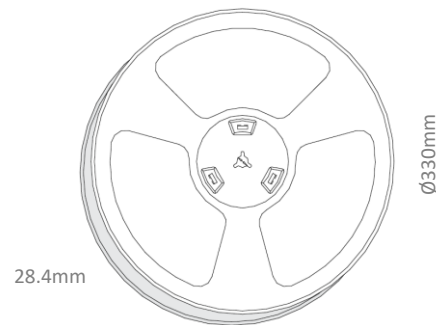
Evaluation Board Matching Circuit



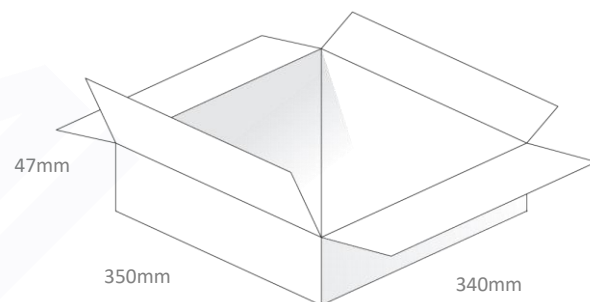
Matching Circuit	
Component	Component Values
R1	0 ohm
R2	0 ohm
R3	0 ohm
C1	1.2 pF
C2	3.9 pF

7. Packaging

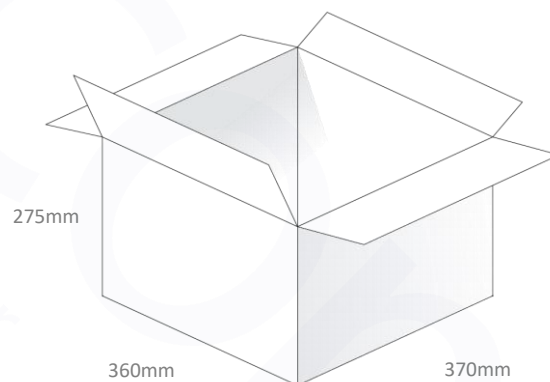
2000pcs GGBLA.125.A per Tape & Reel
 Dimensions - $\varnothing 330 \times 28.4$
 Weight - 1Kg



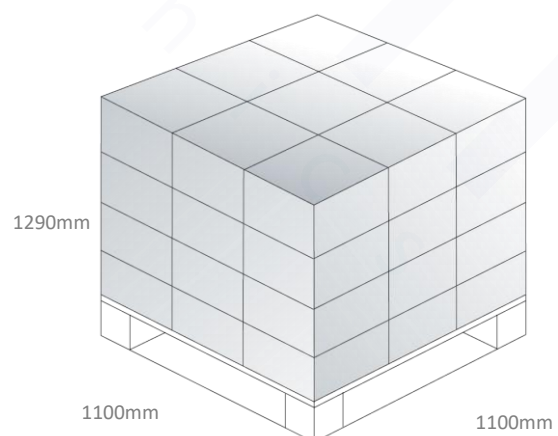
2000pcs GGBLA.125.A per carton
 Dimensions - 350*340*47mm
 Weight - 1.2Kg



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: C (Current Version)

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

Previous Revisions

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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