TAOGLAS

Datasheet

GPS/Galileo Patch Antenna for 1575MHz

Part No:
GP.1575.12.4.A.02

Description

12mm GPS/Galileo Patch Antenna

Features:

Passive GPS/Galileo Patch Antenna
Centre Frequency: 1575MHz
Mounted with pin and adhesive tape
Dimensions: 12mm*12mm*4mm
RoHS & REACH Compliant

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1. Introduction

This miniaturized ceramic GPS/GALILEO patch antenna is based on smart XtremeGain™ technology. It is mounted via pin and double-sided adhesive and has been selected as optimal solution for the customer device environment.

The GP.1575.12.4.A.02 provides gain and radiation pattern performance supporting solutions with high location accuracy, rapid satellite signal reception and lock, and quick time to first fix.

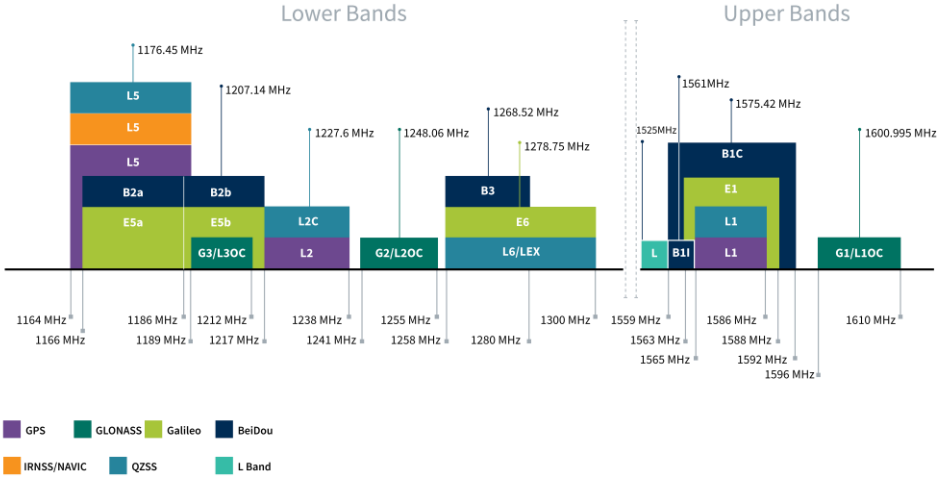
The compact size of the GP.1575.12.4.A.02 allows it to be used in areas where larger patch antennas won't fit.

Typical applications include:

- Asset Trackers
- Transportation and OBDs

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 1575.42 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
	■	□	□	□	□



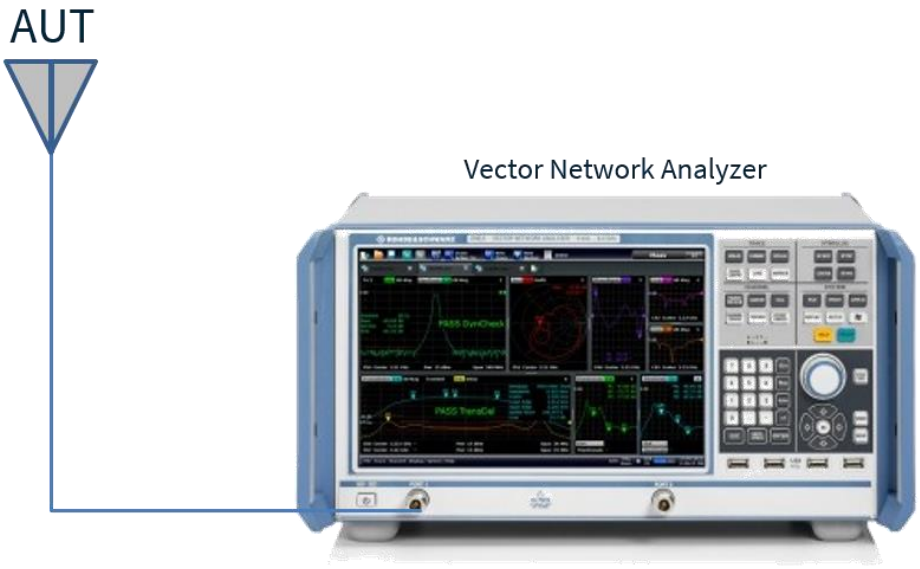
GNSS Bands and Constellations

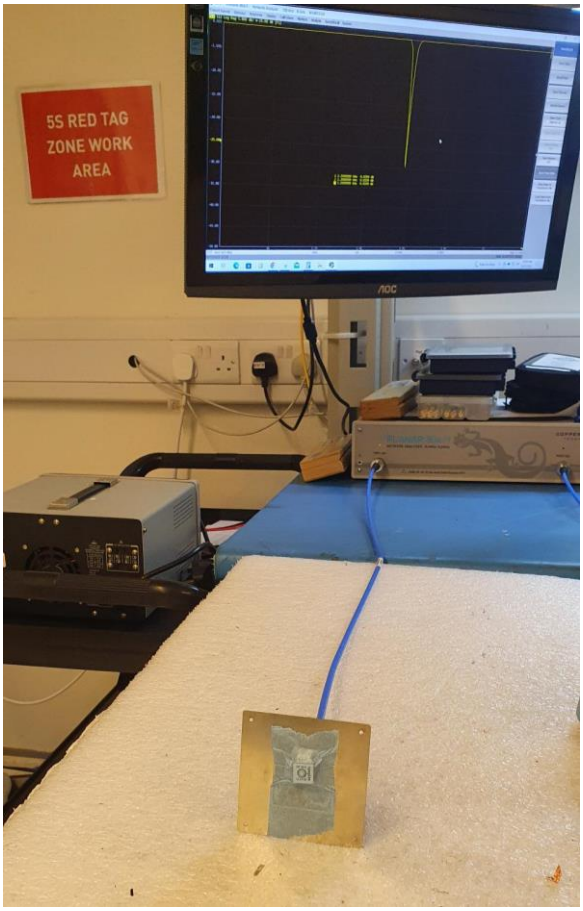
GNSS Electrical	
Frequency (MHz)	**1575.42**
Passive Antenna Efficiency (%) (Without cable loss)	65.72
Passive Antenna Gain at Zenith (dBic) (Without cable loss)	3.21
Polarization	RHCP
Impedance	50 Ω

Mechanical	
Dimensions	(12x12x4) mm
Operating Temperatures	-40ºC to +85ºC

3. Antenna Characteristics

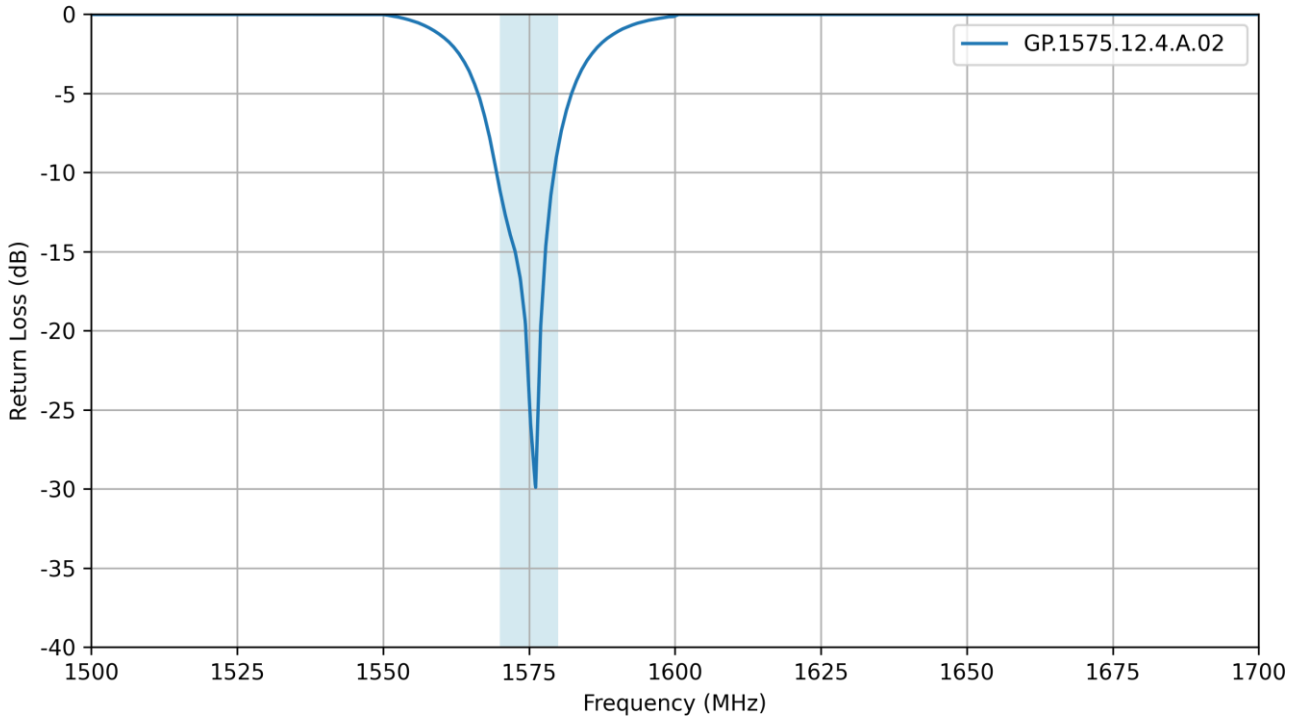
3.1 Test Setup



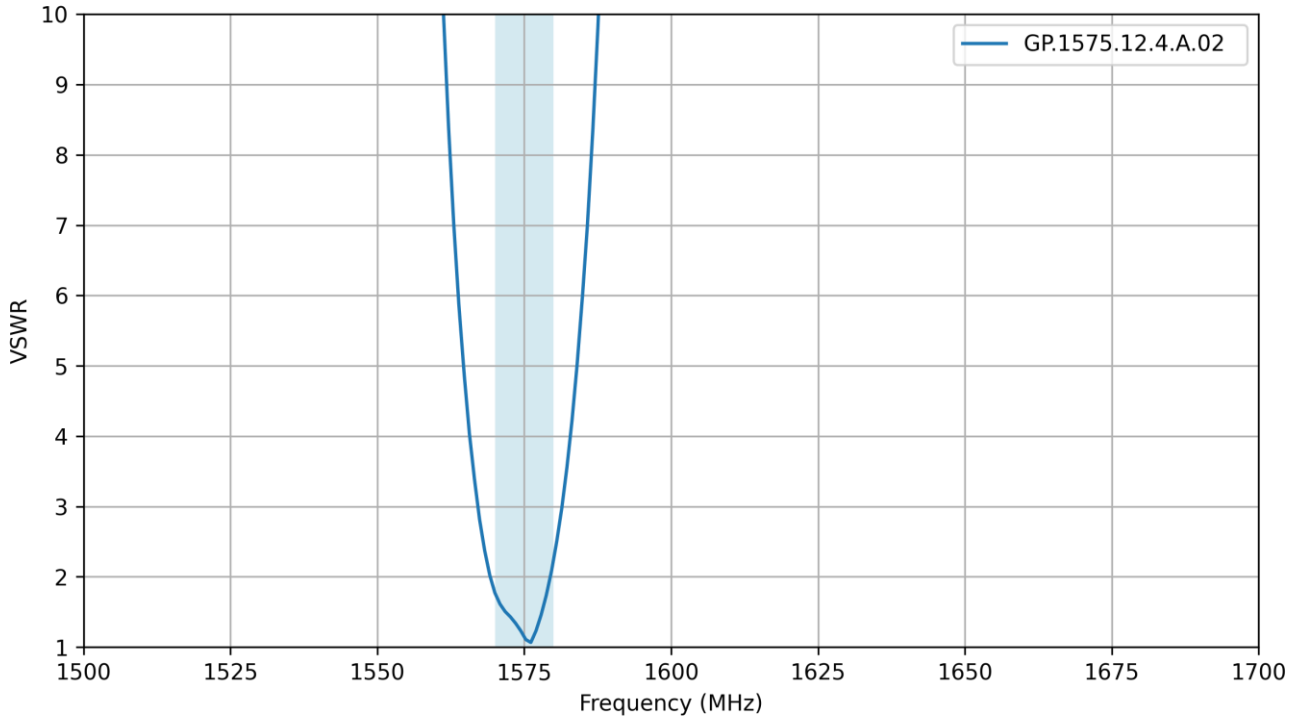


VNA Test Setup on a 50x50mm Ground Plane

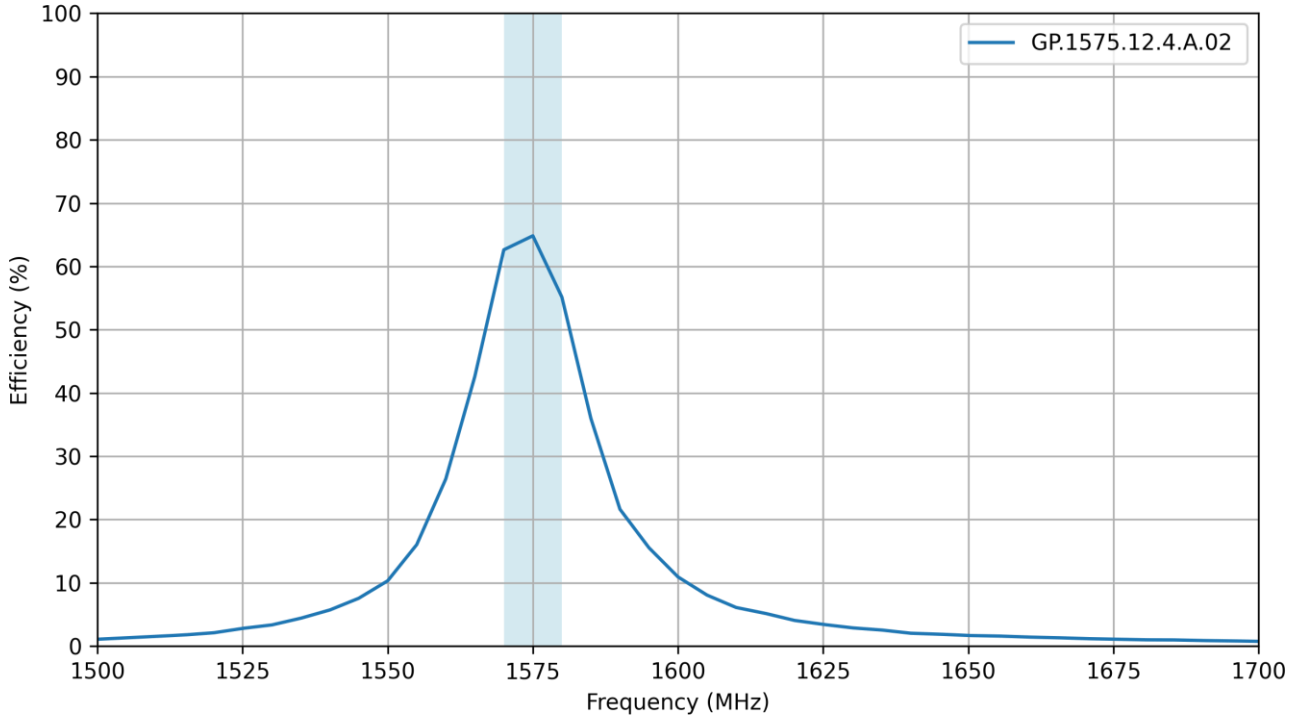
3.2 Return Loss



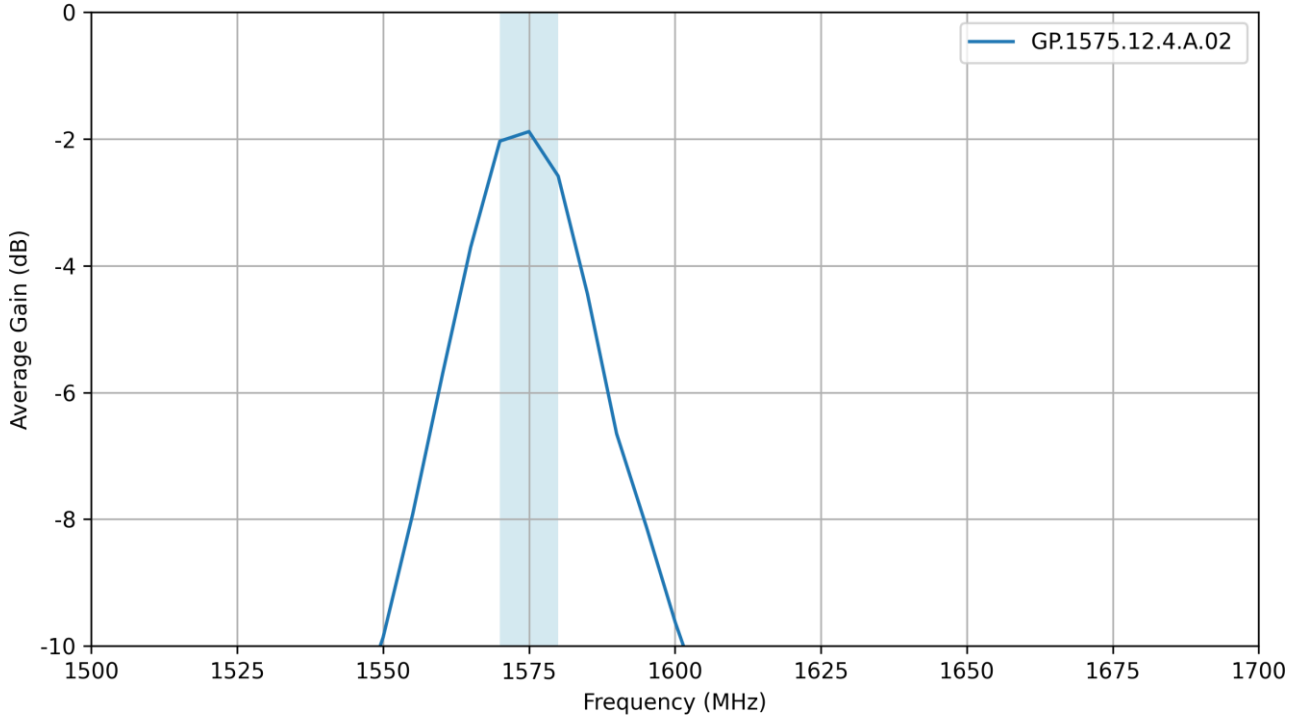
3.3 VSWR



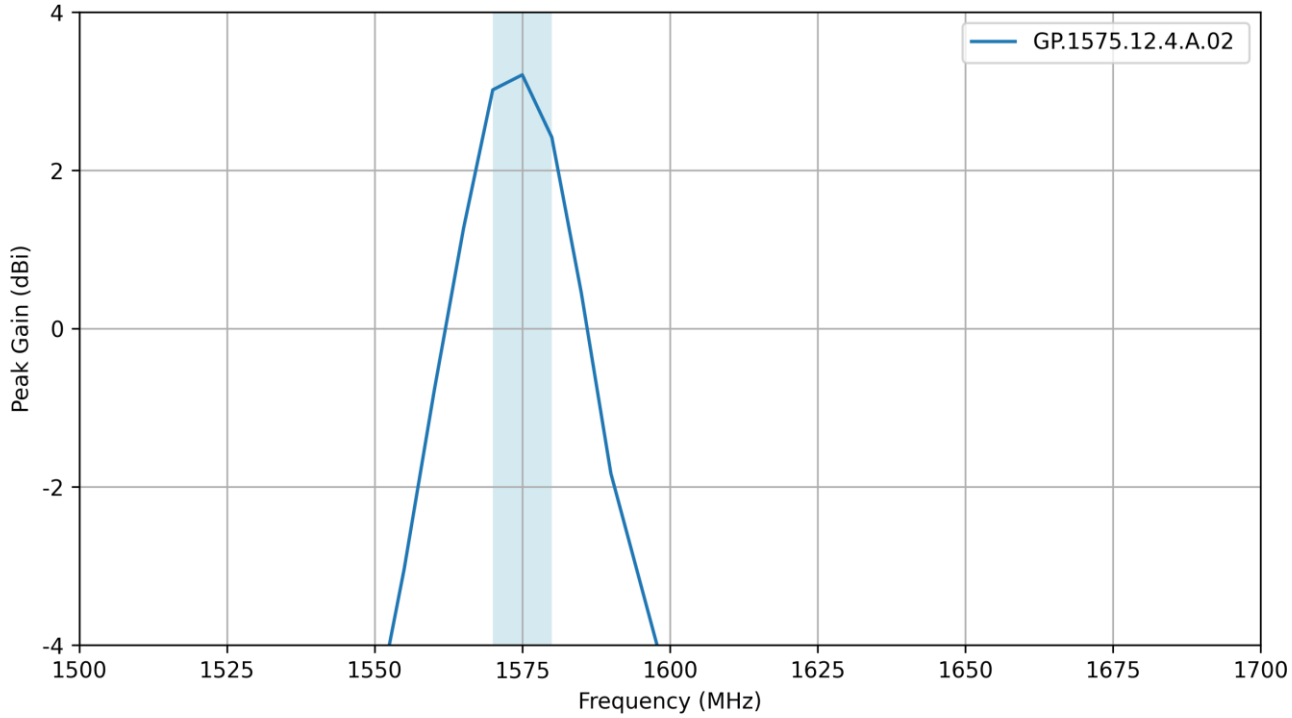
3.4 Efficiency



3.5 Average Gain

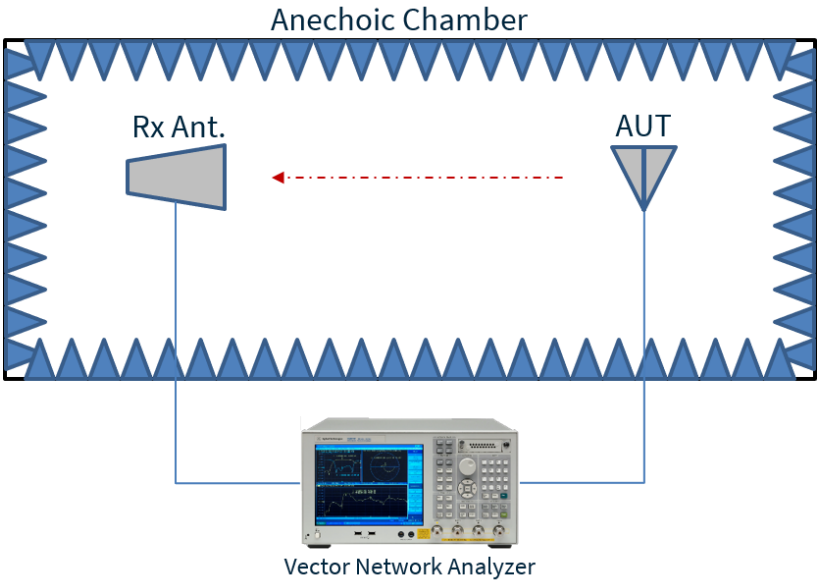


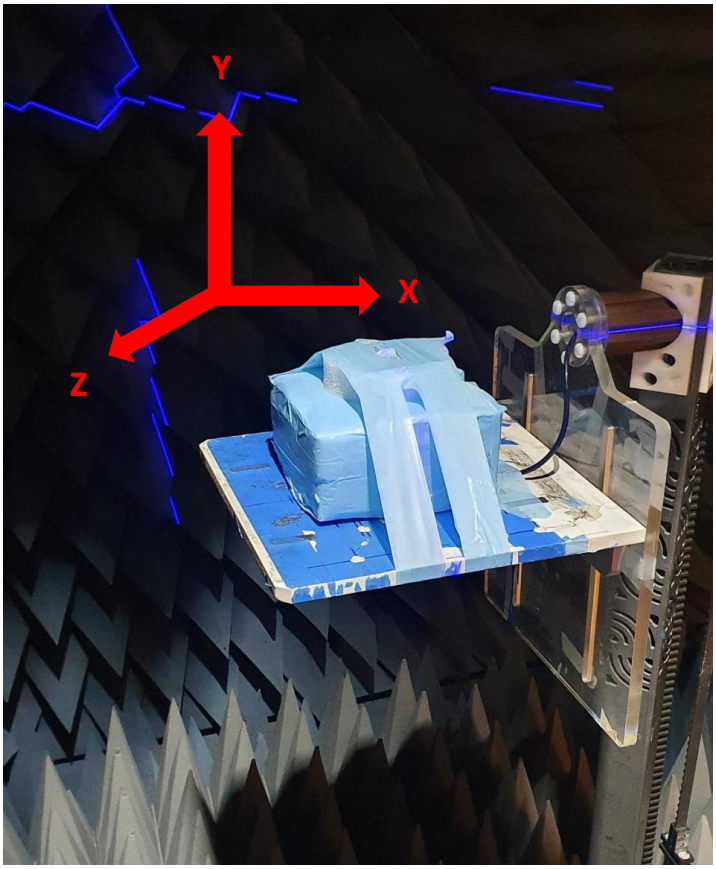
3.6 Peak Gain


GP.1575.12.4.A.02
Peak Gain (dBi)
4
2
0
-2
-4
1500
1525
1550
1575
1600
1625
1650
1675
1700
Frequency (MHz)

4. Radiation Patterns

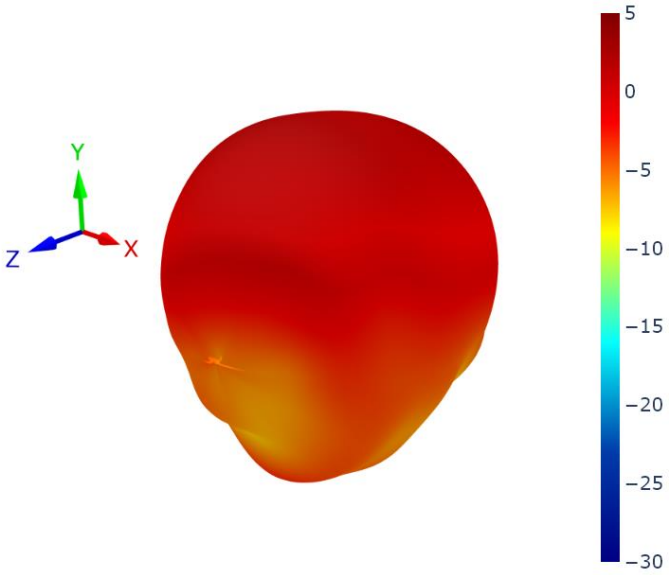
4.1 Test Setup

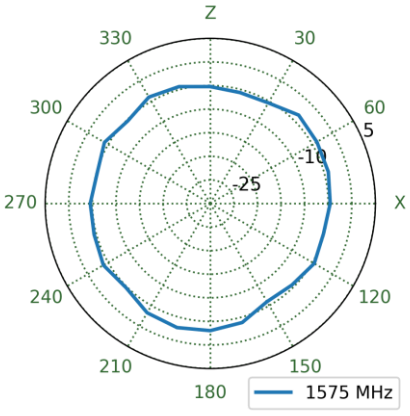
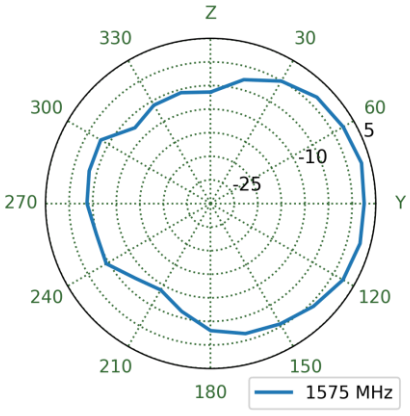
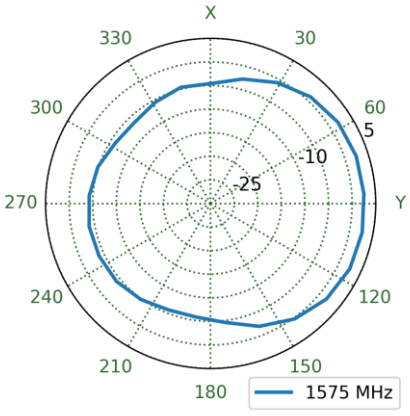




Chamber Test Setup on a 50x50mm Ground Plane

4.2 Patterns at 1575 MHz

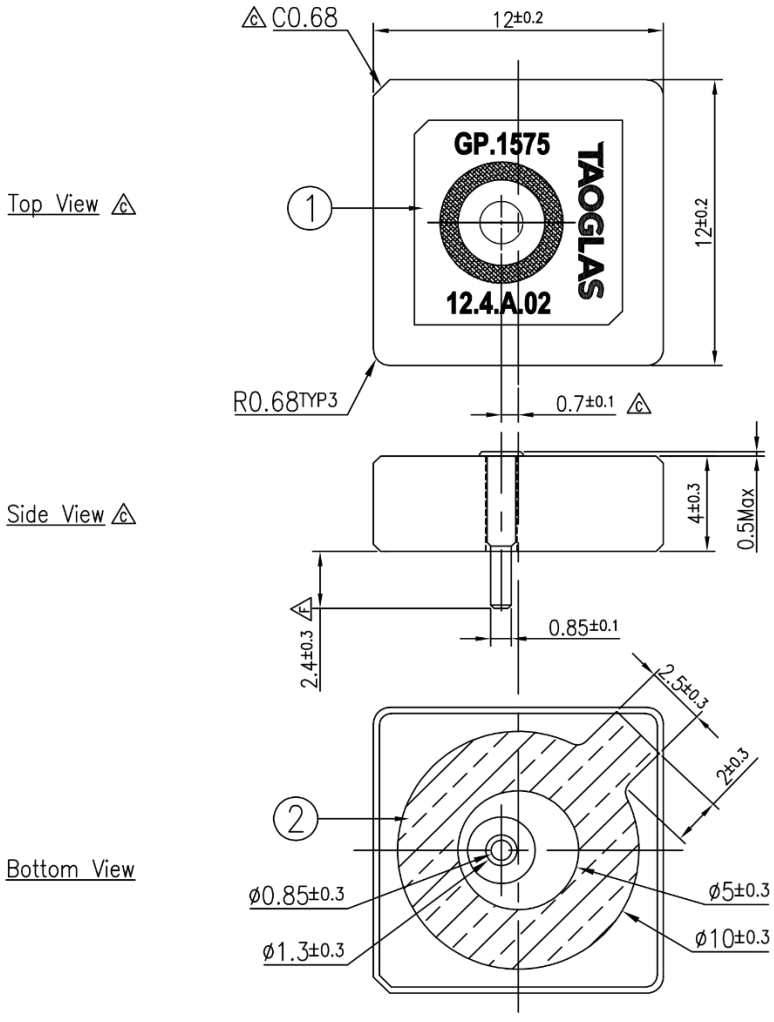


XZ Plane	YZ Plane	XY Plane
		

5. Mechanical Drawing

ISO NO.: EDW-12-8-0026
STATE: Release
NOTES: 1. Double sided adhesive area.

REV.	DESCRIPTION	ENG.	APPROVED	DATE
F	EC-21-08-010	Mickey	Buluto	2021/03/02



	Name	P/N	Material	Finish	QTY
1	GP.1575 Patch	001517F050000A	Ceramic	Brown	1
2	Double sided Adhesive	001517F050000A	Tesa 4972	White Linter	1

APPROVED BY:	Joanna
CHECK BY:	Joanna
DRAWN BY:	Sandy
DATE:	2012/01/31
UNLESS OTHERWISE SPECFIED TOLERANCES ON:	XX.±0.5 X.±0.3 .X±0.2 .XX±0.1 .XXX±0.05
THIRD ANGLE PROJECTION	

TAOGLAS. TW Design Centre

TITLE : GPS Patch Antenna
1575MHz Ceramic Patch

PART NO. : GP.1575.12.4.A.02

UNIT:	SCALE:	PAGES:	REV.
mm	4:1	1/1	F

6. Antenna Integration Guide

The following is an example on how to integrate the GP.1575.12.4.A.02 into a design. This antenna has one which is used for the RF Feed. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.

Top view of PCB.

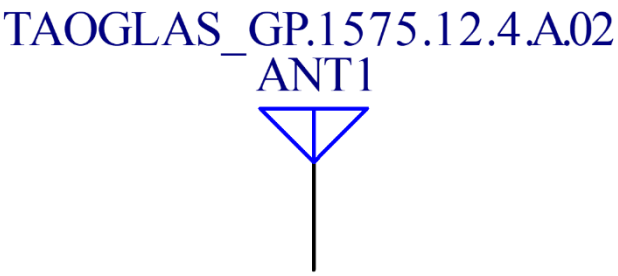
Please find the Integration files in Altium, 2D formats and the 3D model for the GP.1575.12.4.A.02 here: https://www.taoglas.com/product/gp-1575-12-4-a-02-2/

6.1 Schematic and Symbol Definition

Above is the 3D model of the GP.1575.12.4.A.02 on the PCB.

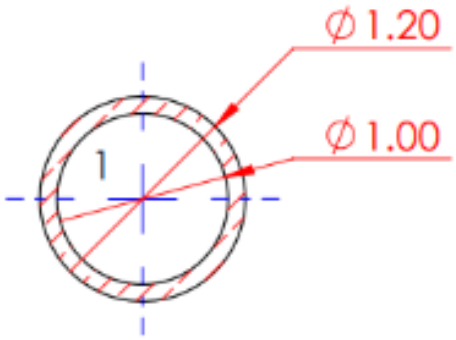
The circuit symbol for the GP.1575.12.4.A.02 is shown below. The antenna has 1 pin as indicated below.

Pin	Description
1	RF Feed

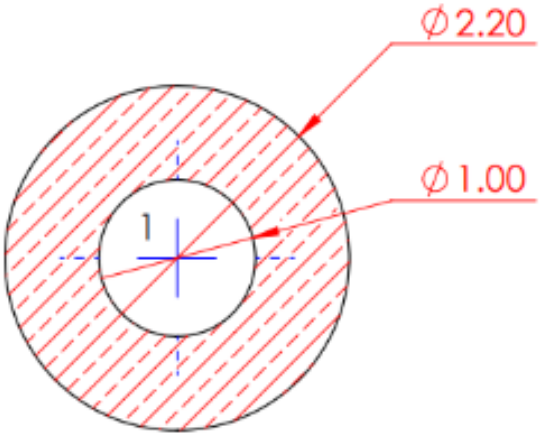


Above is a schematic symbol of GP.1575.12.4.A.02 and a table of the pin definitions.

6.2 Antenna Footprint



Top Side

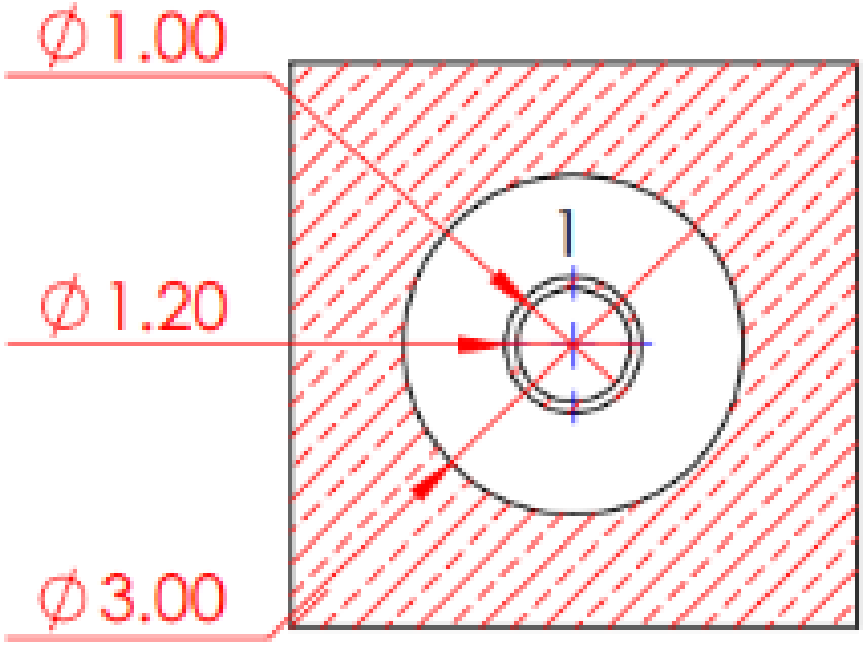


Bottom Side

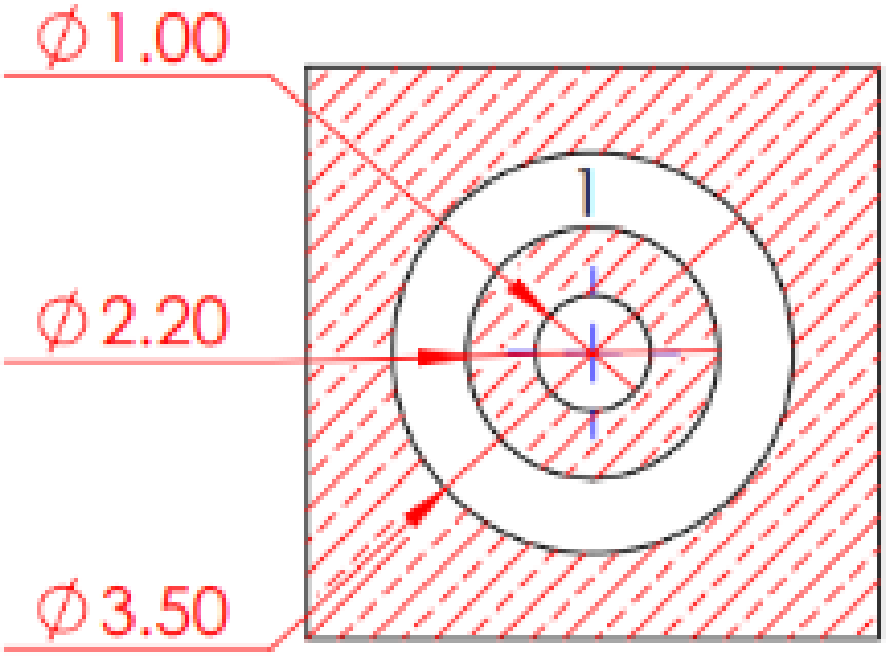
Pin	Description
1	RF Feed

6.3 Copper Clearance for GP.1575.12.4.A.02

The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the GP.1575.12.4.A.02 clearance area for Pin 1 (RF Feed Pad). The bottom copper keep out area only applies to the bottom layer and the top copper keep out area applies to all other layers.
There should be a Ø3mm copper clearance around the antenna pins on the top side of the PCB with a Ø3.5mm copper clearance around the antenna pins on the bottom side.



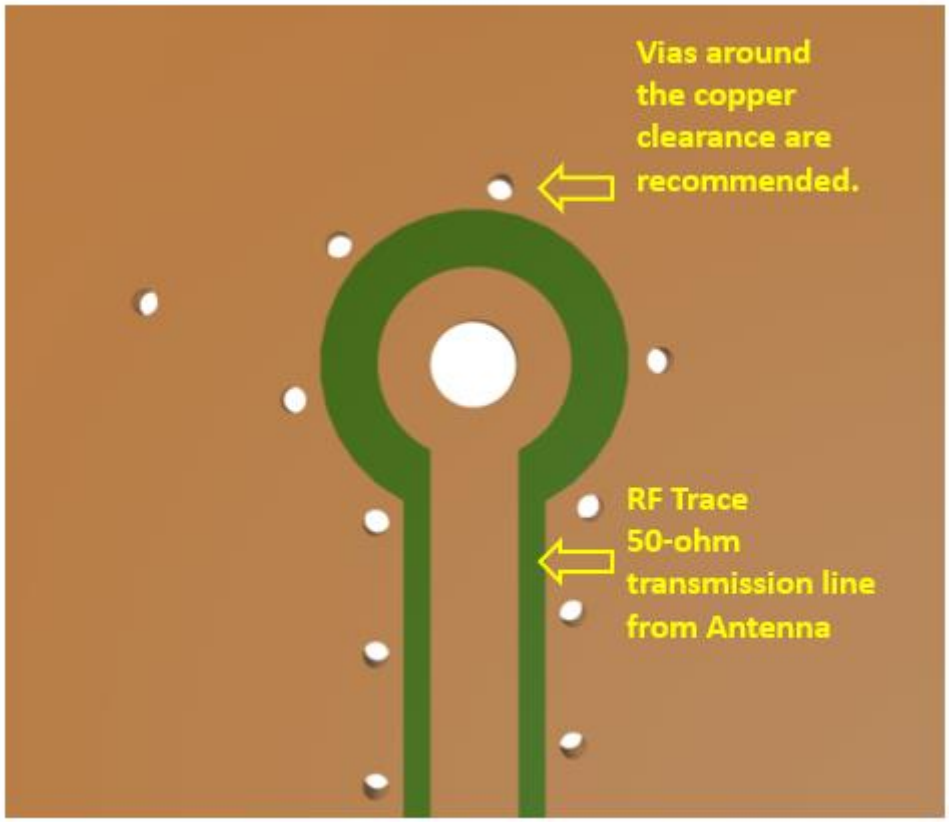
Top Side



Bottom Side

6.4 Antenna Integration

The GP.1575.12.4.A.02 should be placed in the centre of the PCB to take advantage of the ground plane. The RF trace must maintain a 50 Ohm transmission line. Ground vias should be placed around the copper clearance area.

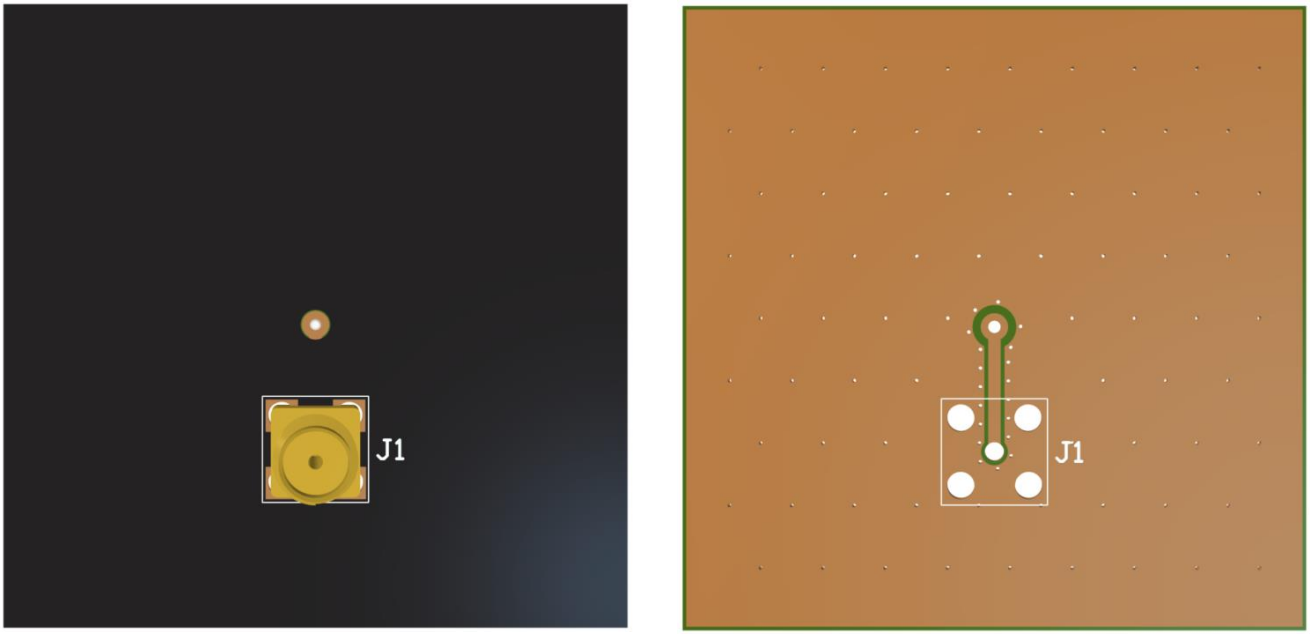


Bottom view of the PCB, showing transmission lines and integration notes.

6.5 Final Integration

The bottom side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.

Top Side (GP.1575.12.4.A.02 placement on 50x50mm PCB)

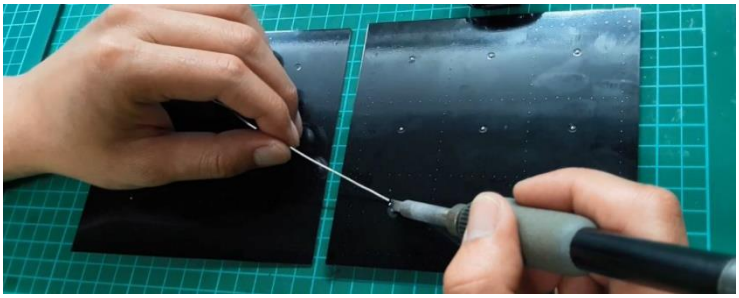


Bottom Side

7. Solder Reflow Profile

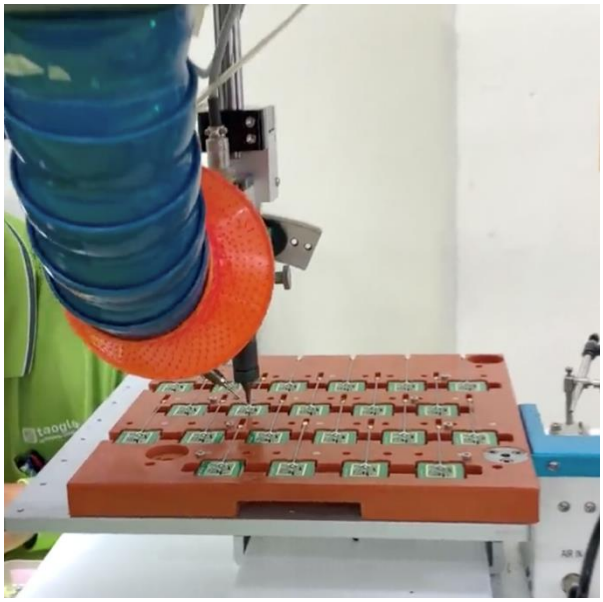
7.1 Manual Soldering Method

Soldering Temperature: 360-380°C
Soldering Duration: 3~4 seconds



7.2 Automated Soldering Machine

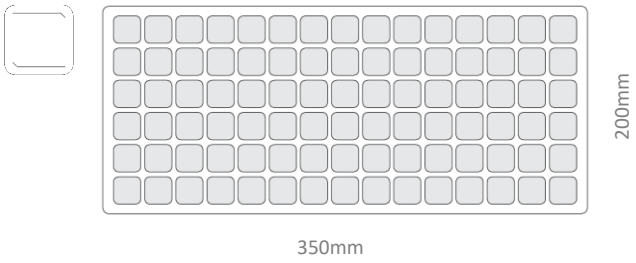
Soldering Temperature: 360-380°C
Soldering Duration: 3~4 seconds



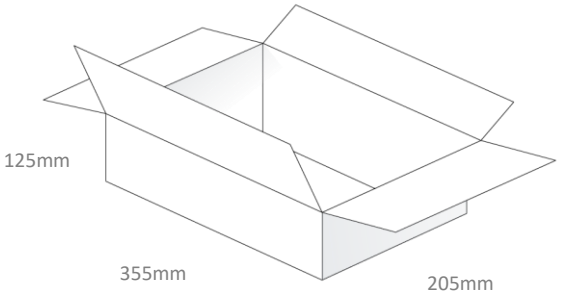
Please note that this process will require a one-time fixture to be made for each PCB design.

8. Packaging

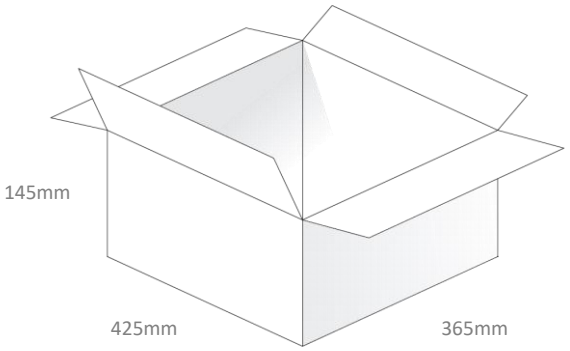
90pcs GP.1575.12.4.A.02 per Tray
Dimensions: 350*200*15mm
Weight: 720g



900pcs GP.1575.12.4.A.02 per Inner Carton
Dimensions: 355*205*125mm
Weight: 7.2Kg



1800pcs GP.1575.12.4.A.02 per Carton
Dimensions: 425*365*145mm
Weight: 14.4Kg



Changelog for the datasheet

SPE-12-8-093 – GP.1575.12.4.A.02

Revision: E (Current Version)	
Date:	2023-12-19
Changes:	Antenna integration guide update
Changes Made by:	Gary West

Previous Revisions

Revision: D	
Date:	2022-09-27
Changes:	Full Data Sheet Update
Changes Made by:	Evan Murphy

Revision: C	
Date:	2017-05-15
Changes:	
Changes Made by:	Technical Writer

Revision: B	
Date:	2012-07-19
Changes:	
Changes Made by:	Technical Writer

Revision: A (Original First Release)	
Date:	2009-08-10
Notes:	
Author:	Technical Writer

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