



Datasheet

GWLA.10

Description:

GWLA.10 – GPS/GALILEO & Dual-Band Wi-Fi Ceramic Loop Antenna
Embedded 2in1 Structure

Features:

Small Footprint Embedded Loop Antenna
Omnidirectional
High Efficiency
Multi-Band Application - 1575.42MHz GPS/GALILEO and 2.4/5.8GHz Wi-Fi
Two Separate Feeds on one Antenna
Low profile
Surface-Mount)
Dimensions: 3.2*1.6*0.5mm
RoHS & Reach Compliant

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1. Introduction



The GWLA.10 GPS/GALILEO and 2.4/5.8GHz 2in1 Embedded Ceramic Loop antenna is a high efficiency, miniature SMD, edge mounted ceramic antenna for GPS/GALILEO and Wi-Fi, WLAN, ZigBee, Bluetooth, and 802.11ac applications where PCB space is limited, such as hand-held devices. Rather than using two separate chip antennas for GPS/GALILEO and Wi-Fi, the GWLA.10 has two separate antenna feeds in a single antenna body, making it the ideal choice for applications where there is limited PCB space and where low cost is important.

The GWLA.10 uses the main PCB as its ground plane, thereby maintaining good efficiency despite its small size. This compact size antenna can be tuned for different PCB sizes/environments by changing the values of the matching circuit. This needs to be carefully calculated, contact a regional Taoglas facility for support. Also be aware that smaller ground-planes will reduce the efficiency of the antenna.

At 3.2*1.6*0.5mm, the GWLA.10 is one of the smallest antennas available worldwide. This antenna is delivered on tape and reel and manufactured in a TS16949 first tier automotive approved facility.

The GPS/GALILEO performance is excellent, with high efficiency and an omnidirectional pattern. The Wi-Fi performance is also great and delivers stable efficiency and radiation pattern too, allowing this antenna to be used in a huge variety of devices.

Typical Applications – Where GPS/GALILEO and Dual-Band Wi-Fi are required

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

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

Upon testing of any of our antennas with your device and a selection of appropriate layout, integration technique, or cable, Taoglas can make sure any of our antennas' peak gain will be below the peak gain limits. Taoglas can then issue a specification and/or report for the selected antenna in your device that will clearly show it complying with the peak gain limits, so you can be assured you are meeting regulatory requirements for that module.

For example, a module manufacturer may state that the antenna must have less than 2 dBi peak gain, but you do not need to select an embedded antenna that has a peak gain of less than 2 dBi in free-space. This will give you a less optimized solution. It is better to go for a slightly higher free-space peak gain of 3 dBi or more if available. Once that antenna gets integrated into your device, performance will degrade below this 2 dBi peak gain due to the effects of GND plane, surrounding components, and device housing. If you want to be absolutely sure, contact Taoglas and we will test. Choosing a Taoglas antenna with a higher peak gain than specified by the module manufacturer and enlisting our help will ensure you are getting the best performance possible without exceeding the peak gain limits.

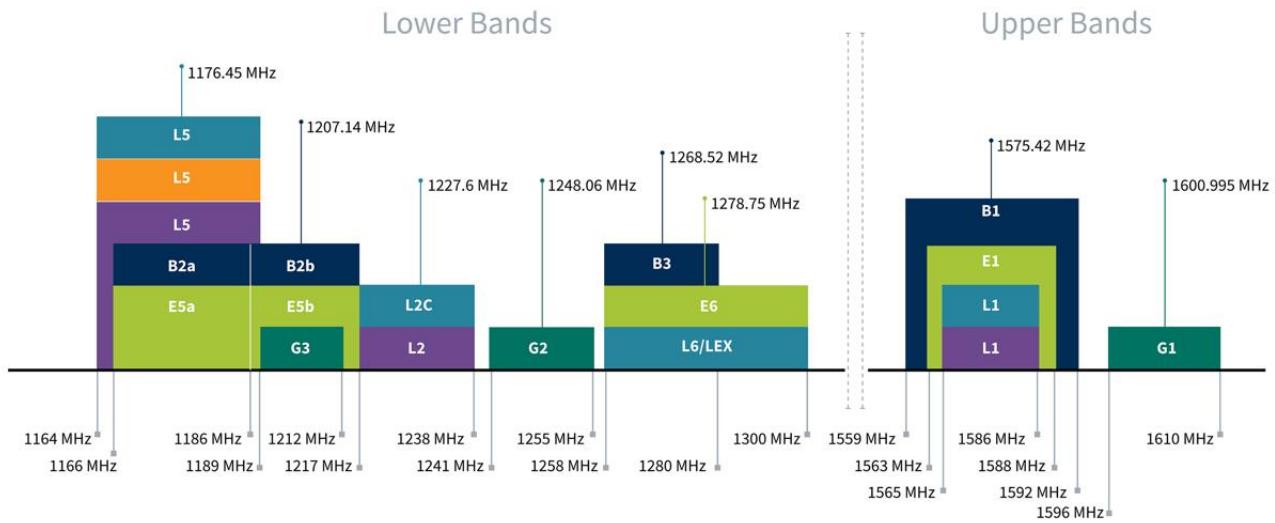
This antenna can be mounted with no performance degradation in either orientation as long as the antenna is soldered correctly via Surface mounting. Please see the integration instructions section for further detail regarding the optimum way to integrate this antenna into your device.

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. 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), EGNOS(E1/E5a), SDCM(G1/G2/G3), SNAS(B1/B2a), GAGAN(L1/L5), QZSS(L1/L5), KAZZ(L1/L5).



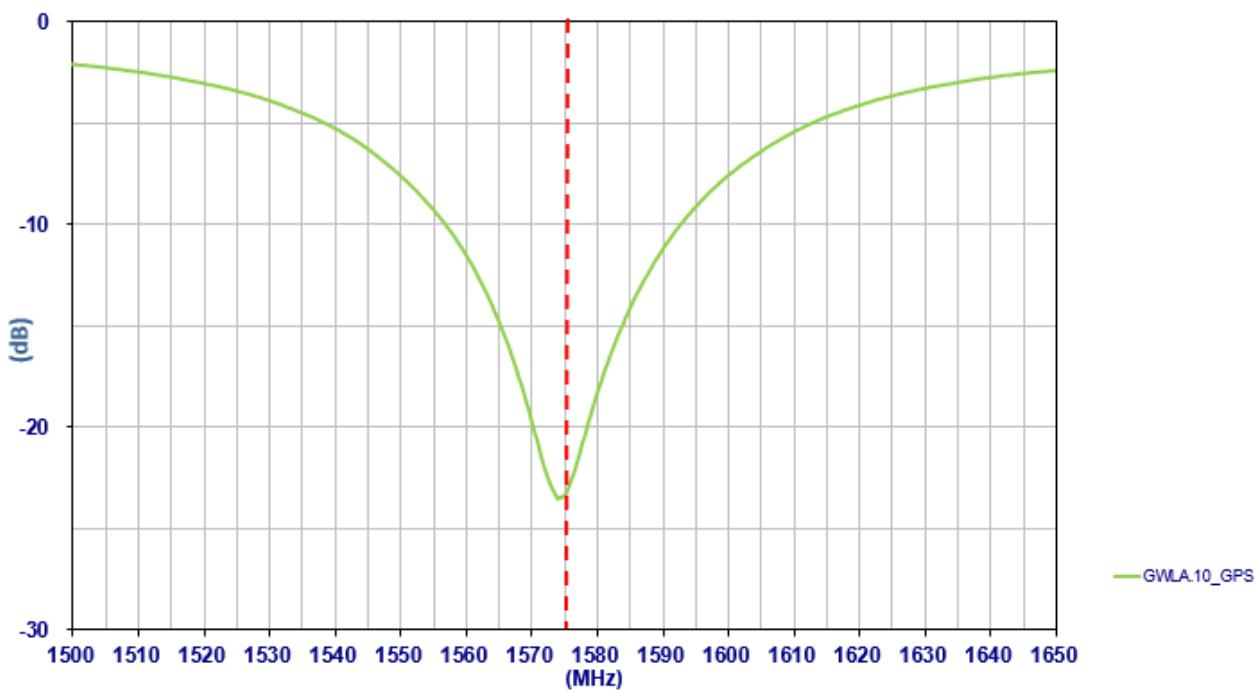
GNSS Bands and Constellations

Electrical*			
Application Bands	GPS/GALILEO Antenna	Wi-Fi Antenna	
Frequency (MHz)	1575.42	2400-2500	5150-5850
Bandwidth (MHz)	35 (RL<-10dB)	100 (RL<-10dB)	820 (RL<-6dB)
Peak Gain (dBi)	1.36	0.27	1.86
Efficiency (%)	57.06	51.25	53.56
Return Loss (dB)	< -10	< -10	< -6
Isolation (dB)	>15	>10	>25
Impedance		50Ω	
Polarization		Linear	
Input Power		2W	
Mechanical			
Dimensions	3.2*1.6*0.5mm		
Ground Plane	80*40mm (Standard Evaluation Board)		
Weight	0.02g		
Environmental			
Operating Temperature	-40°C to 85°C		
Storage Temperature	-40°C to 85°C		
Relative Humidity	20% to 70%		
Moisture Sensitivity Level (MSL)	3 (168 Hours)		

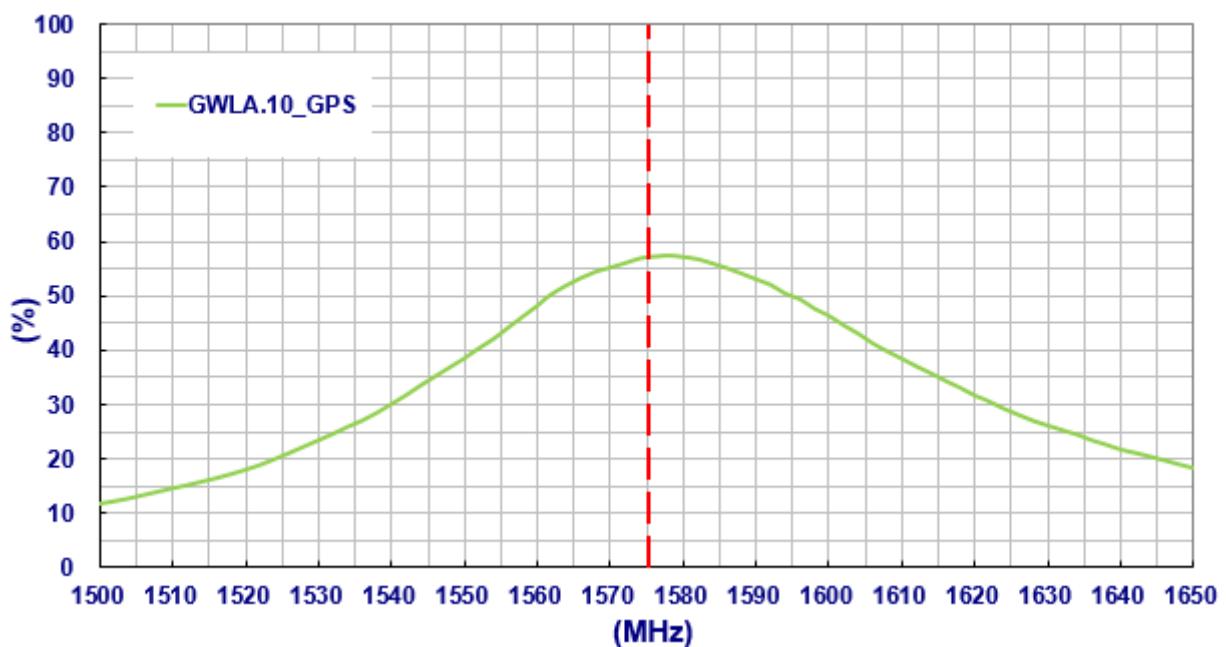
*Tested on 80*40mm evaluation board.

3. Antenna Characteristics

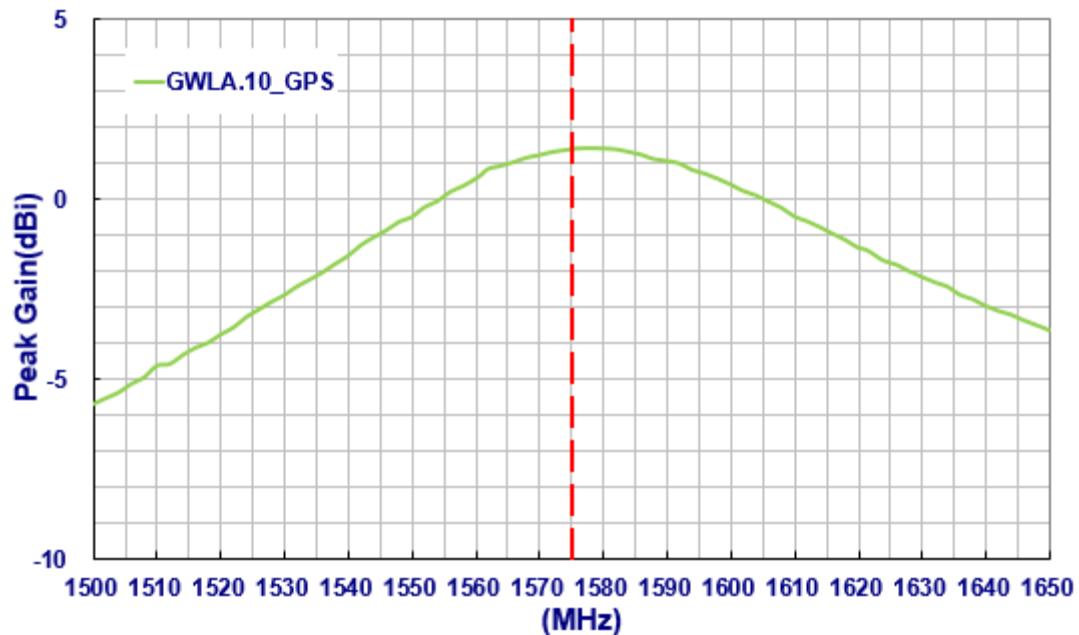
3.1 Return Loss - GPS/GALILEO Band



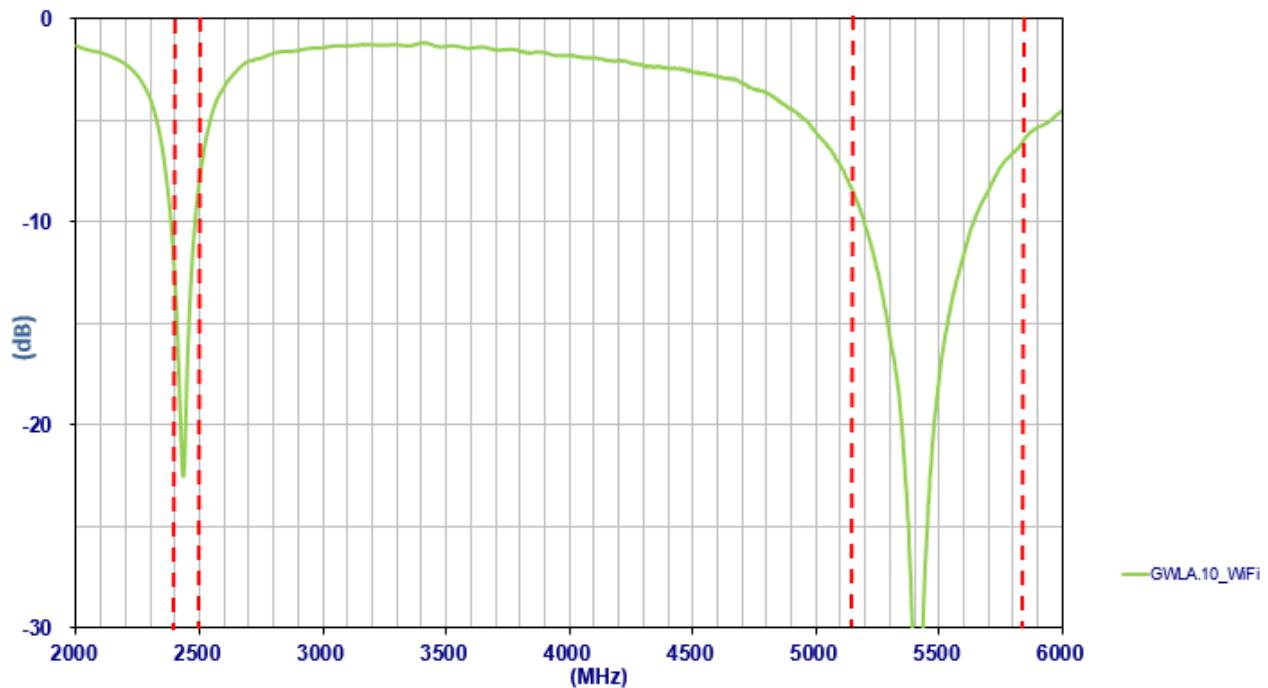
3.2 Efficiency - GPS/GALILEO Band



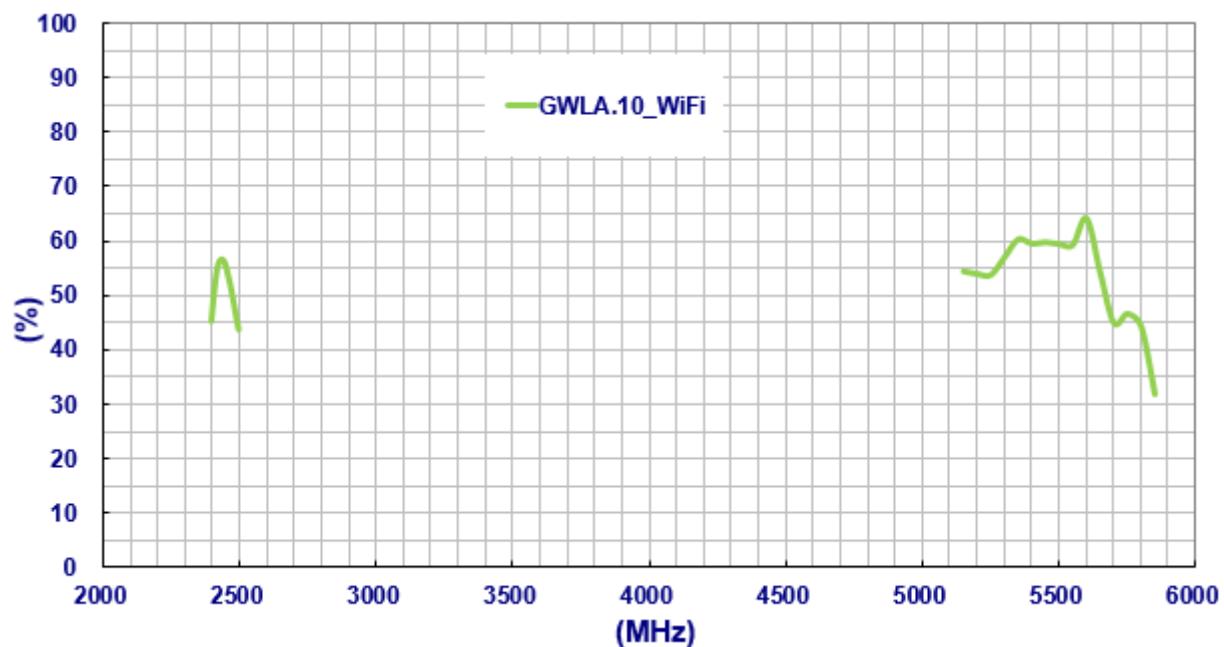
3.3 Peak Gain



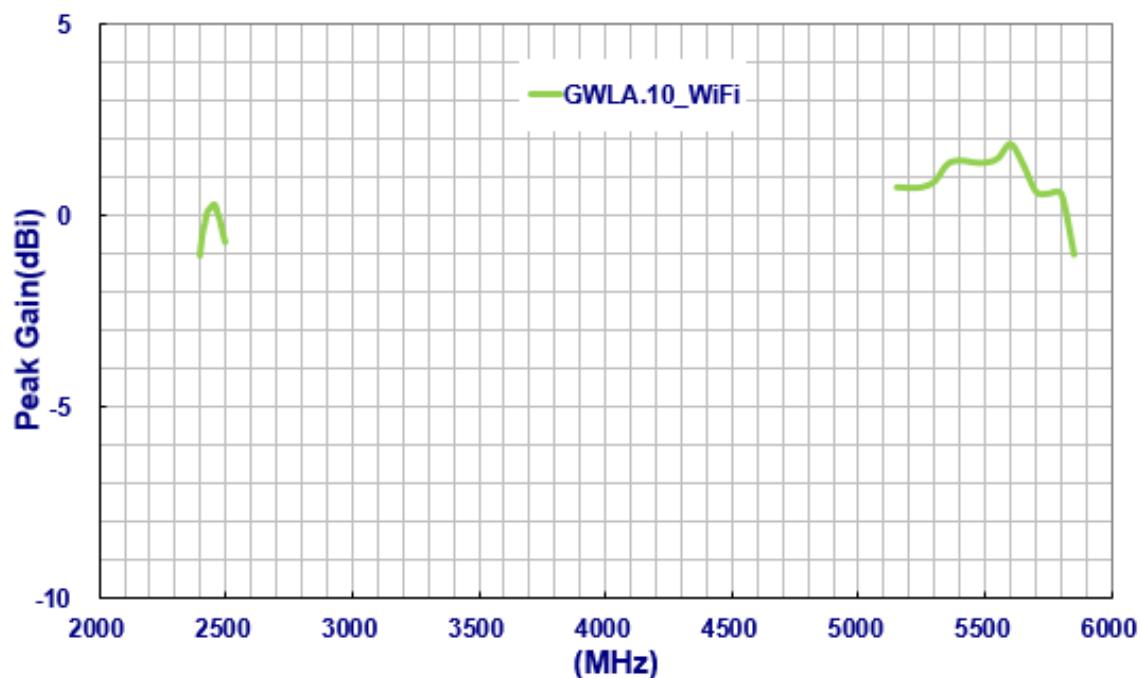
3.4 Return Loss - Wi-Fi Dual-Band



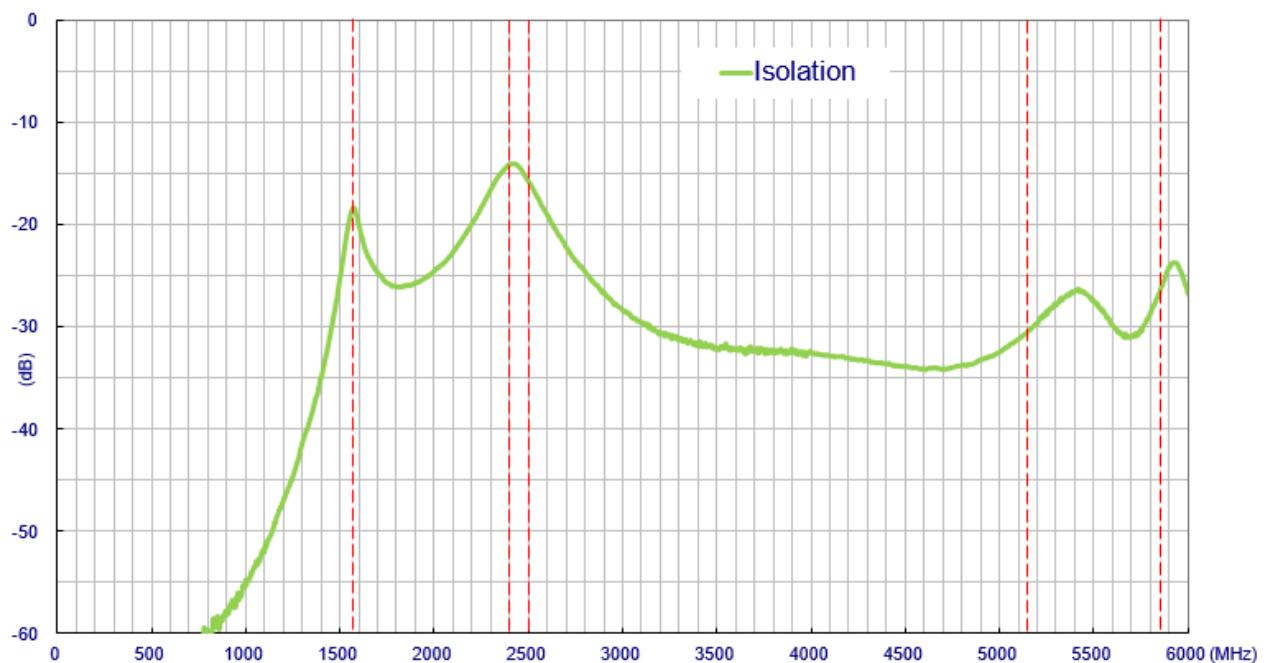
3.5 Efficiency- Wi-Fi Dual-Band



3.6 Peak Gain

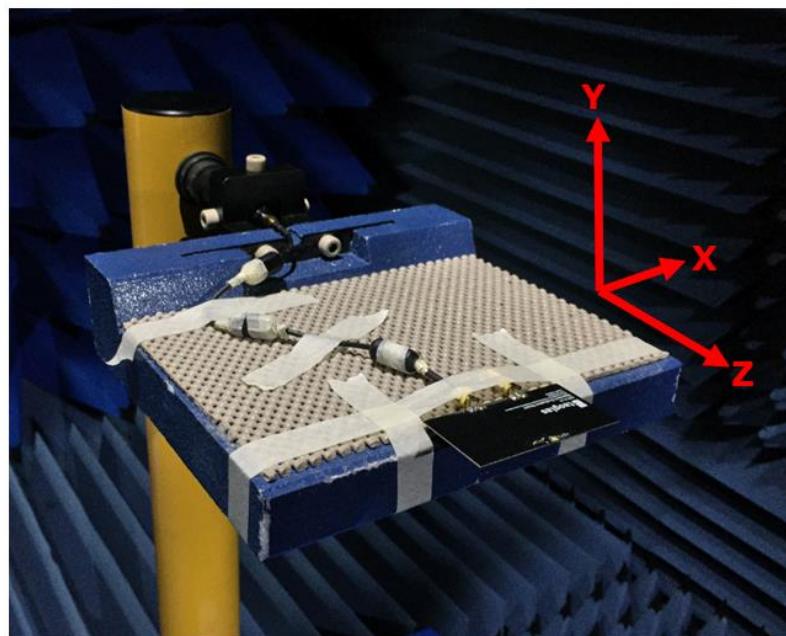


3.7 Isolation



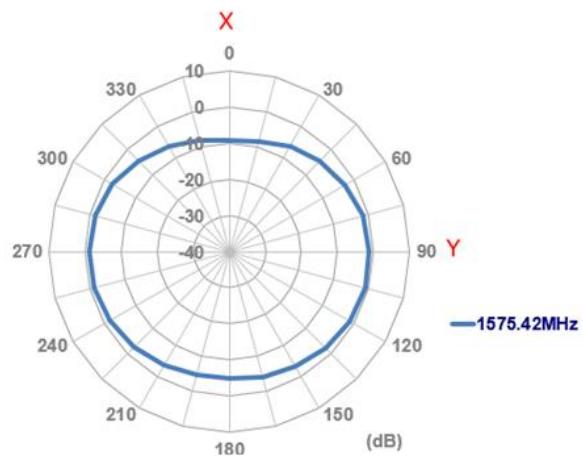
4. 2D Radiation Patterns

4.1 Test Setup

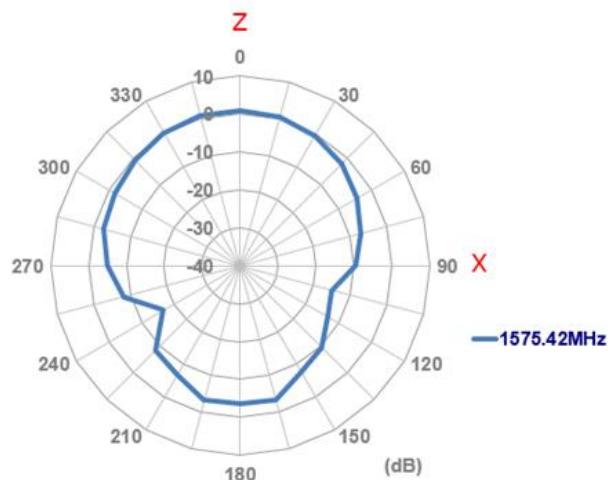


4.2 2D Gain Pattern@ GPS/GALILEO 1575.42MHz

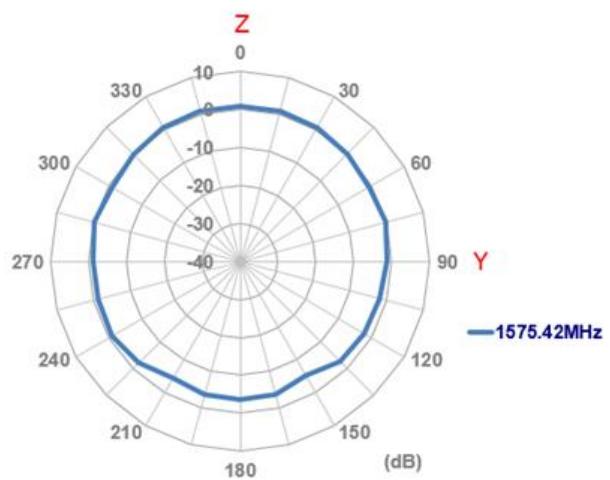
XY Plane



XZ Plane

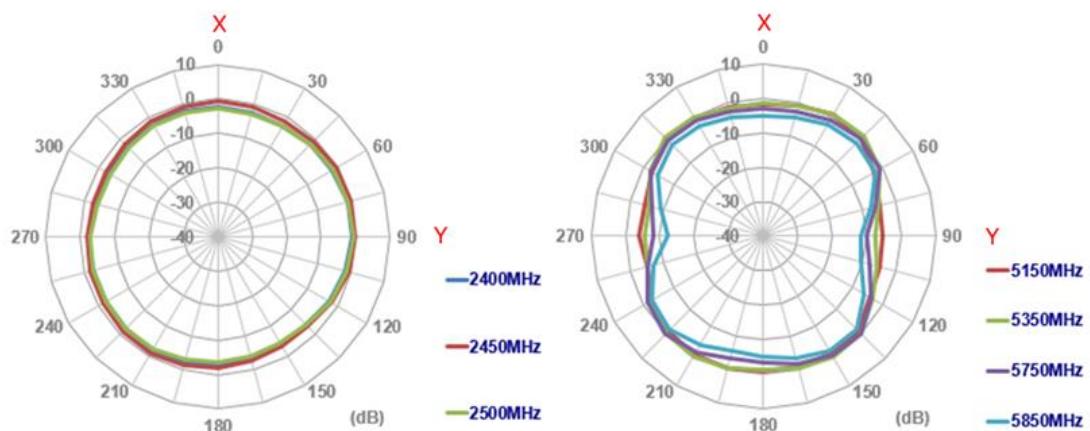


YZ Plane

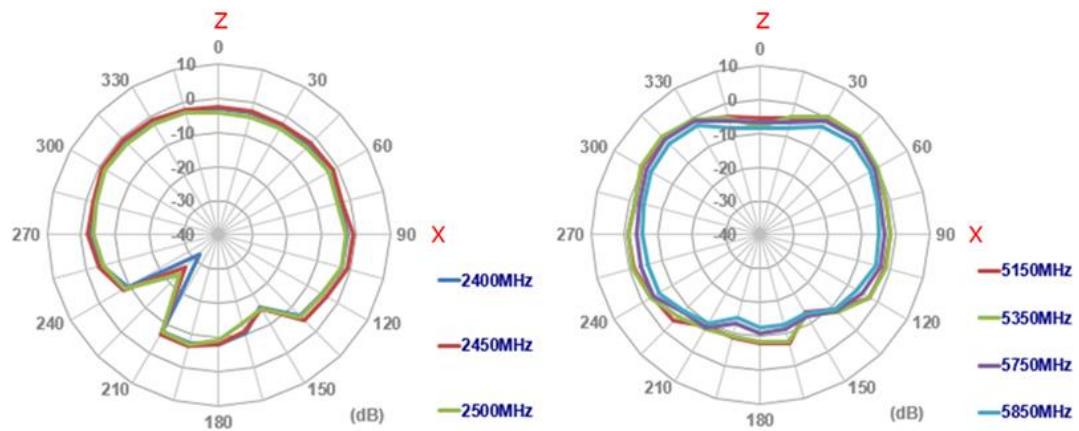


4.3 2D Gain Pattern@ GPS/GALILEO 1575.42MHz

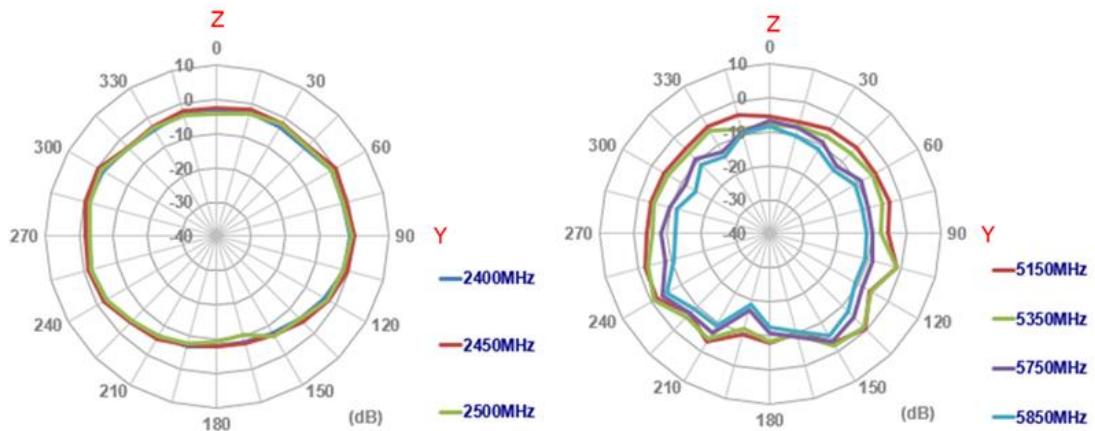
XY Plane



XZ Plane

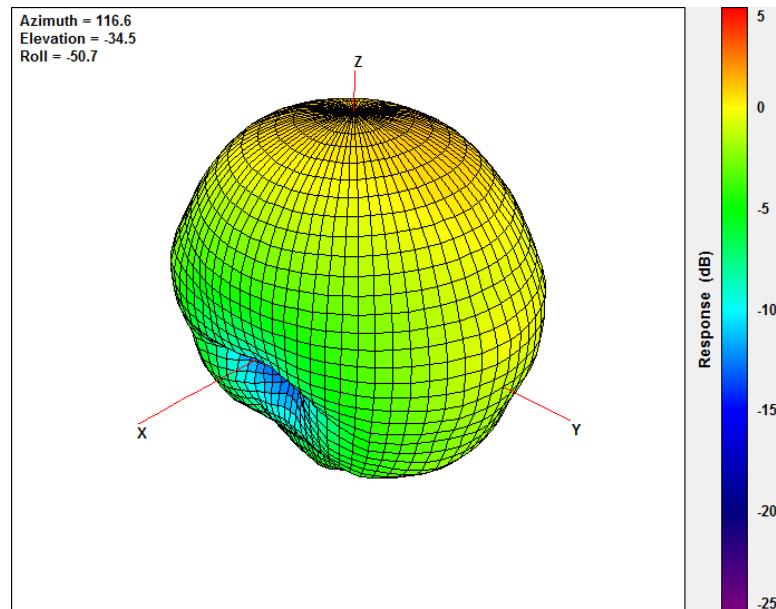


YZ Plane

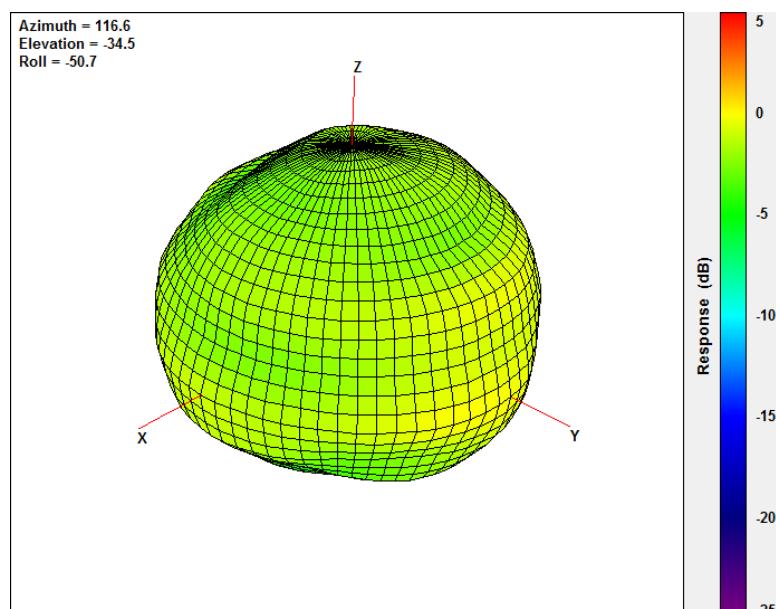


5. 3D Radiation Patterns

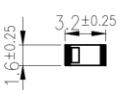
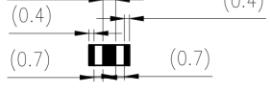
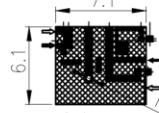
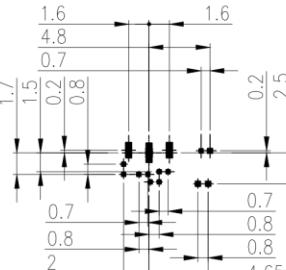
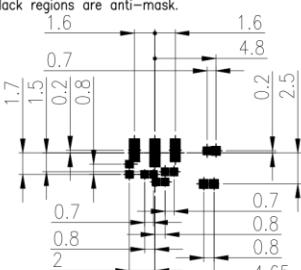
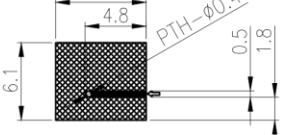
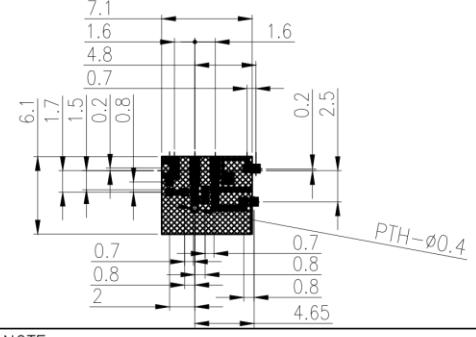
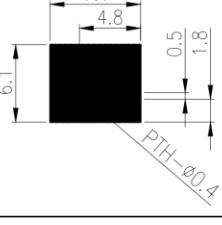
5.1 Gain Pattern@ GPS/GALILEO 1575.42MHz



5.2 Gain Pattern@ Wi-Fi Dual Bands

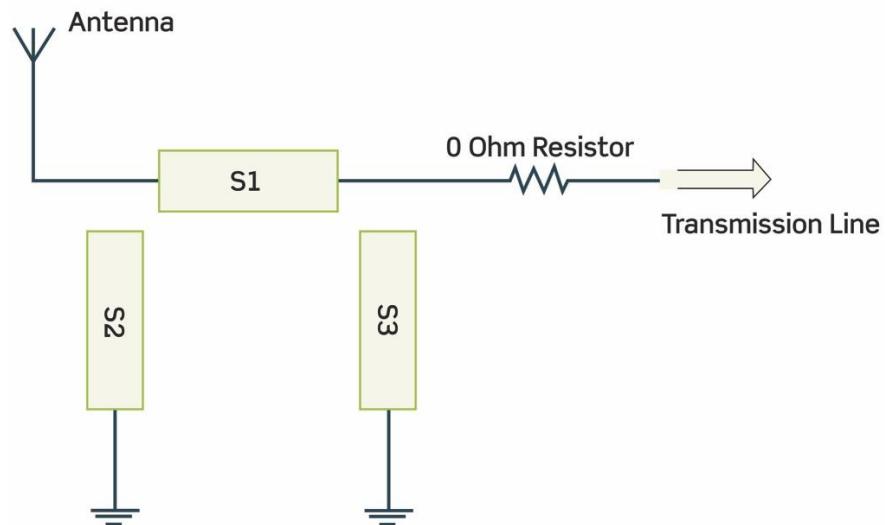


6. Mechanical Drawing (Units: mm)

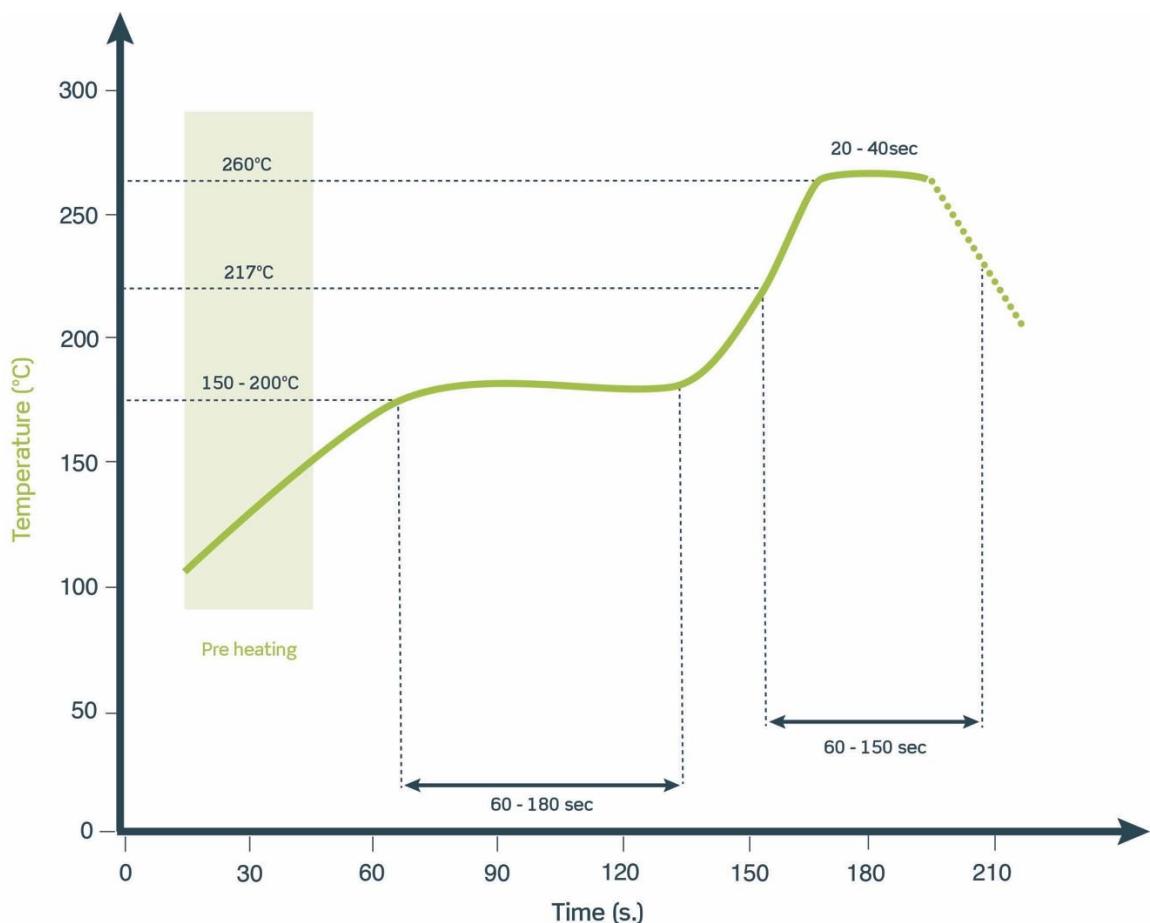
6		5		4		3		2		1										
ISO NO: EDW-18-8-1129		<Release>		REV	ZONE	DESCRIPTION			ENG	APPROVED	ISSUED DATE									
				Initial Design			Eva		Paul		2018/10/12									
G						Front View	Side View	(1) Back View			G									
		SCALE: 1/1																		
Foot Print																				
Top Copper			Top Solder Paste			Top Solder Mask														
Pad 1 and 11 should be connected to a 50 ohm transmission line. Pad 5 and 15 are connected to GND.			Pads 1 and 3 are the same size, Pads 5, 14, 15 are the same size. Pads 4, 6, 7, 8, 9, 10, 11, 12, 13 are the same size.			Pads 1 and 3 are the same size, Pads 5, 14, 15 are the same size. Pads 4, 6, 7, 8, 9, 10, 11, 12, 13 are the same size. This drawing is a negative of solder mask. Black regions are anti-mask.														
																				
GPS Feed Connected to 50 ohm transmission line.			WiFi Feed Connected to 50 ohm transmission line. Connected to GND																	
Bottom Copper(Top View)			Bottom Solder Paste			Bottom Solder Mask														
			N/A																	
Top Composite			Bottom Composite(Top View)																	
																				
NOTE:																				
1. Ag Plated area			6. Ground keepout should extend from top layer through all inner PCB layers to minimize coupling from RF feed to ground.																	
2. Solder Mask area			7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.																	
3. Copper area			8. The dimension tolerances should follow standard PCB manufacturing guidelines																	
4. Paste area																				
5. Copper Keepout Area																				
UNLESS OTHERWISE SPECIFIED			DATE: 2016/03/10			MAT'L:														
TOLERANCES ON:			UNIT: mm			FINISH:														
$.X \pm 0.2$			THIRD ANGLE PROJECTION			SCALE: 2/1														
$.XX \pm 0.5$																				
$.X \pm 0.3$																				
$.XXX \pm 0.05$																				
APPROVED BY:	CHECKED BY:	DRAWN BY:	CUSTOMERS SIGNATURE / DATE																	
Wayne	Paul	Haley																		
TITLE. : GPS & 2.4/5GHz Dual-Band Ceramic Substrate Loop Antenna/3.2*1.6*0.5(mm)/Linear Polarized																				
PART NO. : GWLA.10																				
6	5	4	3	2	1															

7. Matching Circuit

Like all antennas, surrounding components, enclosures, and changes to the GND plane dimensions can alter performance. A pi-matching network like the one shown below is required incase adjustments need to be made. The antenna EVB has a similar matching network. The components on the EVB are a good starting point for a new design, but will need to be adjusted upon integration for best performance. The zero ohm resistor is needed to solder down a coax pigtail to make measurements with a vector network analyzer.

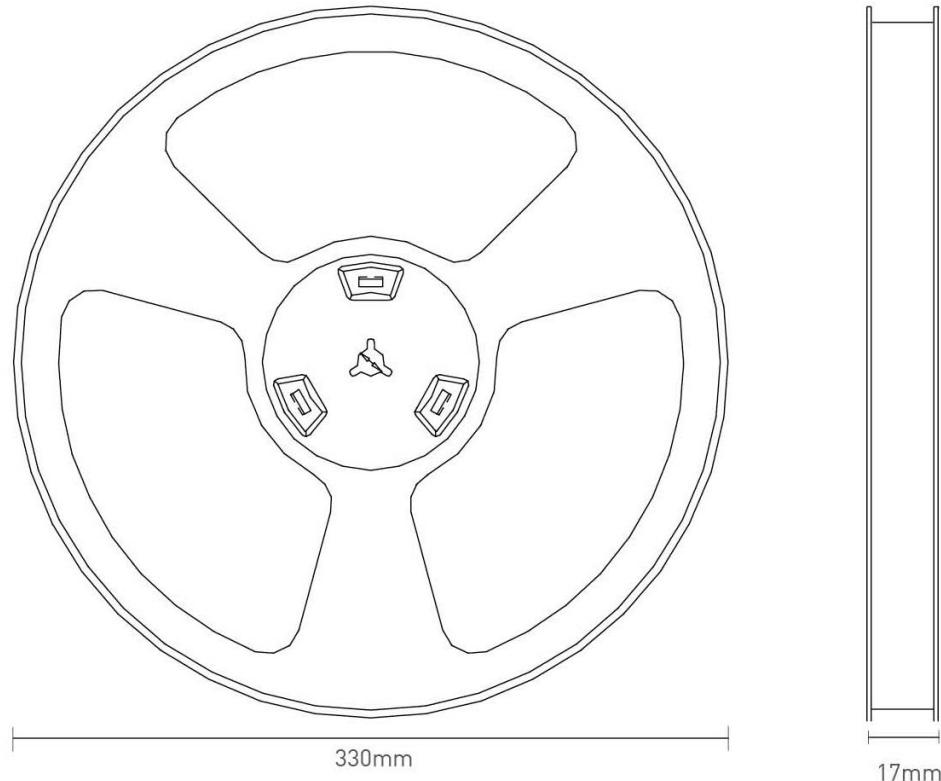


8. Soldering Conditions

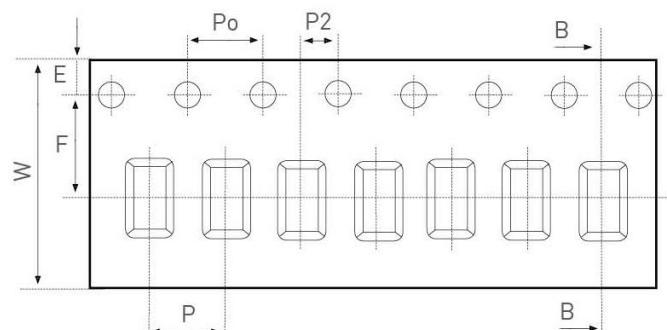


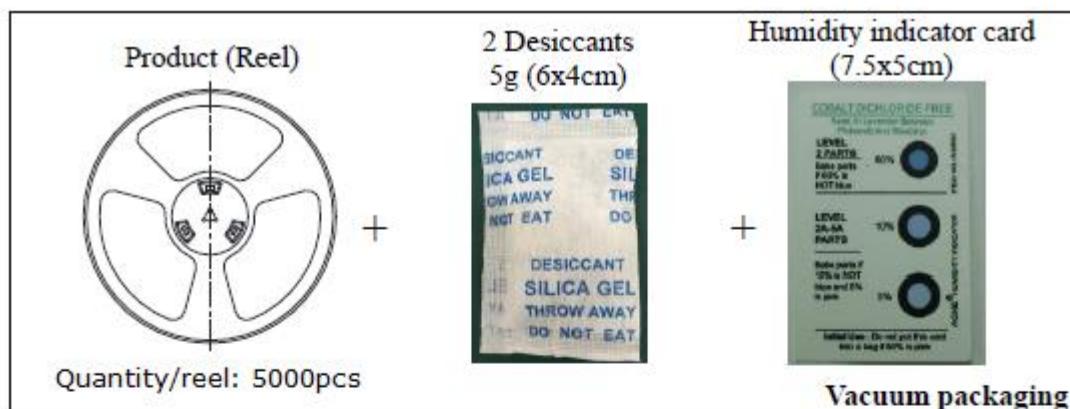
9. Packaging

5000 pcs GWLA.10 per tape & reel
 Dimensions - 330*330*17mm
 Weight - 484g

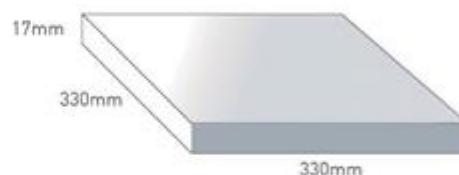


Tape Dimensions (unit: mm)		
Feature	Spec	Tolerances
W	12.00	± 0.30
P	4.00	± 0.10
E	1.75	± 0.10
F	5.50	± 0.10
P2	2.00	± 0.10
D	1.50	$^{+0.10}_{-0.00}$
P0	4.00	± 0.10
10P0	40.00	± 0.10

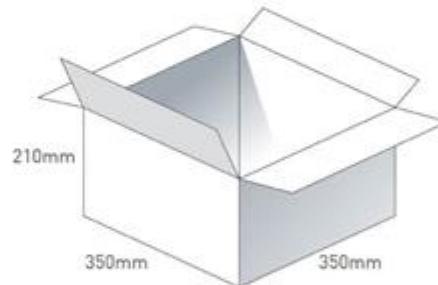




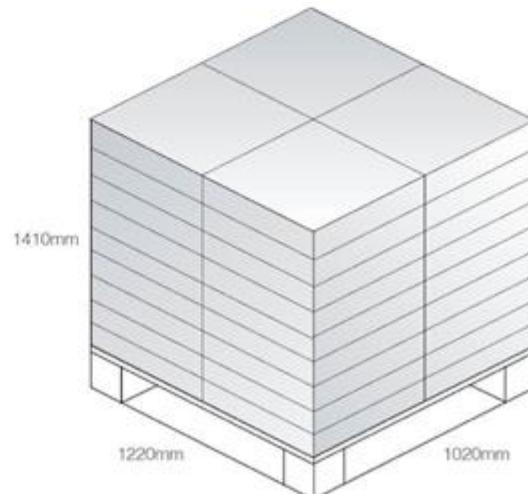
5000 pcs GWLA.01
1 reel in small inner box
Dimensions - 330*330*17
Weight - 484g



9 boxes / 45000 pcs in one carton
Carton Dimensions - 350*350*210mm
Weight - 4.89Kg



Pallet Dimensions 1220*1020*1410mm
36 Cartons per Pallet
4 Cartons per layer
9 Layers



Changelog for the datasheet

SPE-16-08-049– GWLA.10

Revision: D (Current Version)

Date:	2022-06-17
Changes:	Updated Specifications
Changes Made by:	Cesar Sousa

Previous Revisions

Revision: C

Date:	2021-10-21
Changes:	Updated Specifications
Changes Made by:	Erik Land

Revision: B

Date:	2018-06-17
Changes:	Updated Specifications
Changes Made by:	Jack Conroy

Revision: A (Original First Release)

Date:	2017-05-17
Notes:	Initial Specification Release
Author:	Author



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