TAOGLAS

Datasheet

HLA.01

Description:

HLA.01 5.8GHz 3.2*1.6*0.5mm Ceramic Loop Antenna

Features:

3.2mm *1.6mm * 0.5mm

Low profile

Peak gain 2.1dBi

65%+ Efficiency Typical

Compact Size

RoHS & REACH Compliant

1. Introduction

The HLA.01 5150-5900 MHz ceramic chip antenna is specifically designed for Wi-Fi/ WHDMI applications where high data throughput is needed. It is a high efficiency miniature SMD edge mounted ceramic antenna with minimum footprint requirement. This ceramic chip antenna uses the main PCB as its ground plane, thereby increasing antenna efficiency. It is tuned for different PCB sizes by simply changing the value of the matching circuit. The HLA.01 with dimension of 3.2mm *1.6mm * 0.5mm, is one of the smallest antennas available worldwide. This antenna is delivered on tape and reel. Typical Applications include but are not limited to USB Dongles, Smart Watches and WHDMI PCMCIA cards.

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 2dBi 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 2dBi peak gain, but you don't need to select an embedded antenna that has a peak gain of less than 2dBi 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 3dBi or more if available. Once that antenna gets integrated into your device, performance will degrade below this 2dBi 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 what is specified by the module manufacturer and enlisting our help will ensure you are getting the best performance possible without exceeding the peak gain limits.

2. Specifications

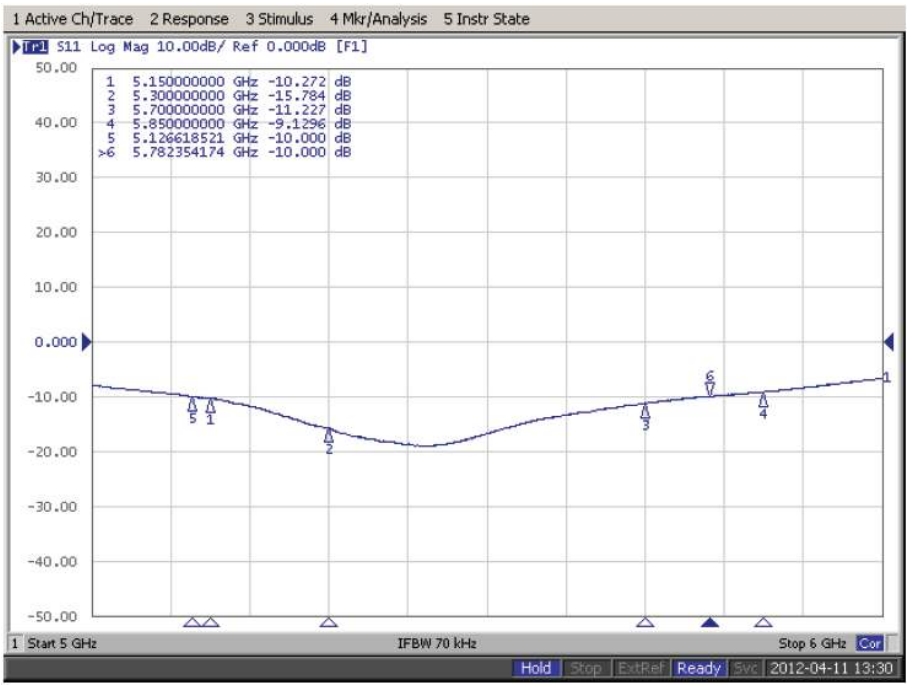
Wi-Fi Electrical							
Band	**Frequency (MHz)**	**Efficiency (%)**	**Peak Gain (dBi)**	**Max Power Input**	**Impedance**	**Polarization**	**Radiation Pattern**
5.8GHz Wi-Fi	5150~5850	65	2.1	50 W	50 Ω	Linear	Omni

Mechanical	
Dimensions	3.2 x 1.6 x 0.5mm
Ground Plane	80x40mm
Material	Ceramic

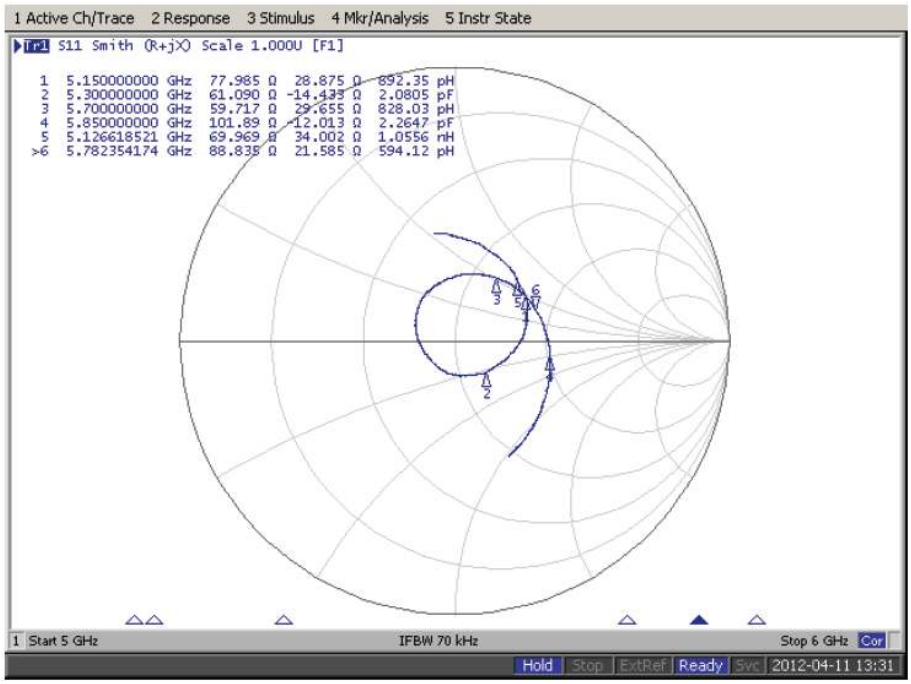
Environmental	
Temperature Range	-40°C to +85°C
Temperature Coefficient of Frequency (ppm/°C)	0±20 max. (@-40°C to 85°C)
Humidity	Non-condensing 65°C 95% RH
Moisture Sensitivity Level (MSL)	3 (168 Hours)

3. Antenna Characteristics

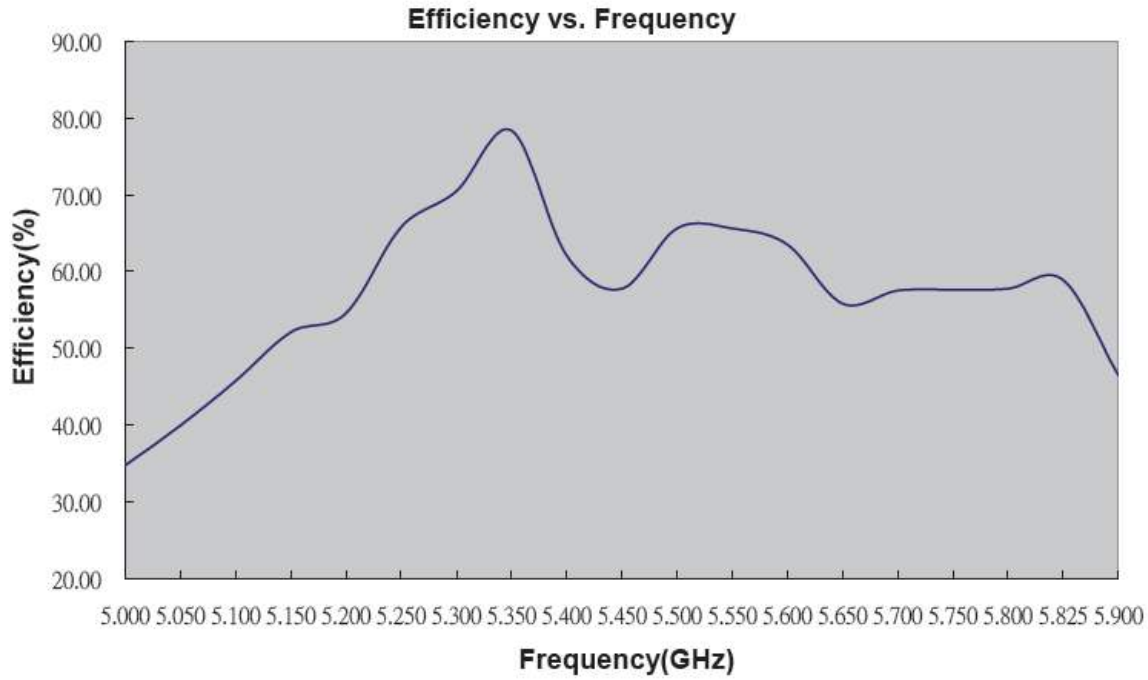
3.1 Return Loss



3.2 Return Loss (Smith Chart)



3.3 Efficiency



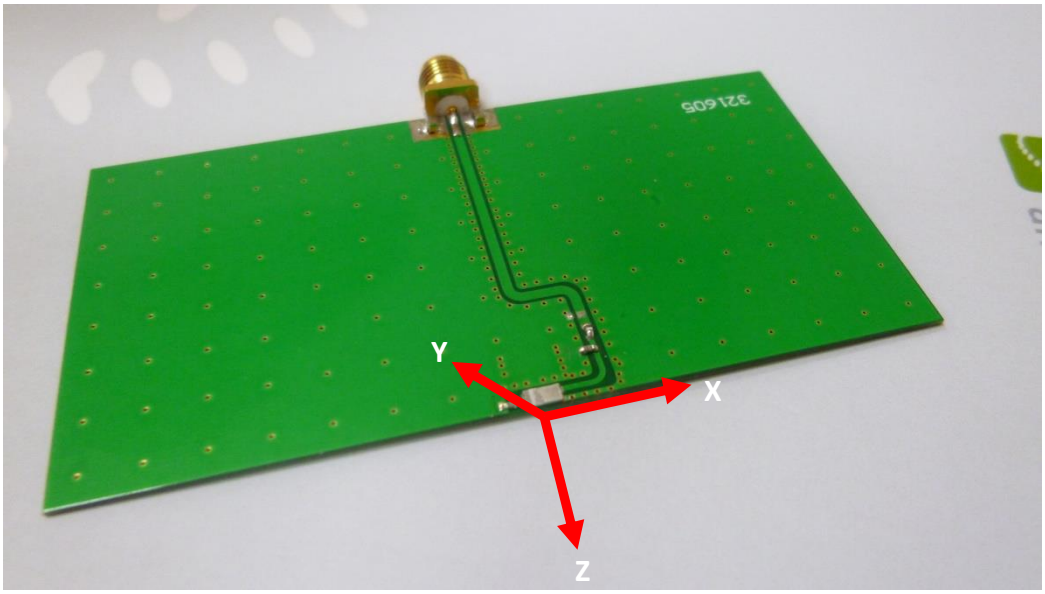
3.4 Efficiency (Table)

Frequency(GHz)	5.000	5.050	5.100	5.150	5.200	5.250	5.300	5.350	5.400	5.450
Efficiency(dB)	-4.58	-3.98	-3.39	-2.83	-2.63	-1.82	-1.52	-1.06	-2.07	-2.38
Efficiency(%)	34.83	39.99	45.81	52.12	54.58	65.77	70.47	78.34	62.09	57.81
Gain(dBi)	-0.23	0.00	0.54	0.83	1.23	2.06	1.95	2.46	1.82	1.14

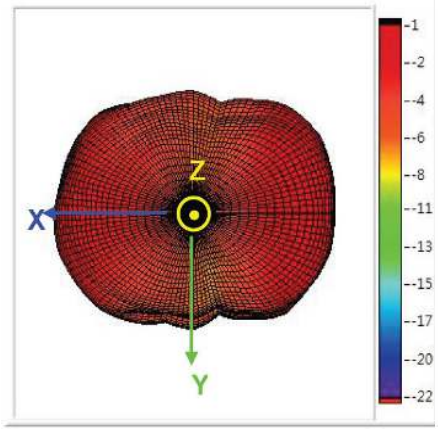
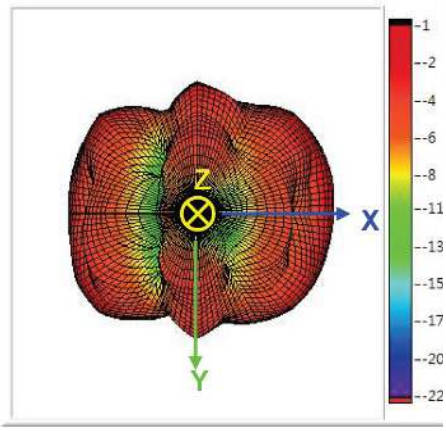
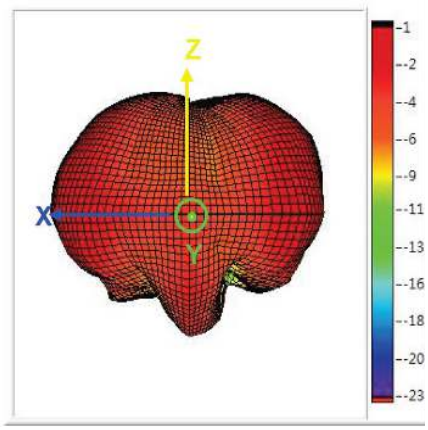
Frequency(GHz)	5.500	5.550	5.600	5.650	5.700	5.750	5.800	5.825	5.900
Efficiency(dB)	-1.83	-1.83	-1.97	-2.53	-2.40	-2.39	-2.38	-2.30	-3.32
Efficiency(%)	65.61	65.61	63.53	55.85	57.54	57.68	57.81	58.88	46.56
Gain(dBi)	2.12	1.73	1.70	1.28	1.75	1.85	1.87	1.63	0.60

4. Radiation Patterns

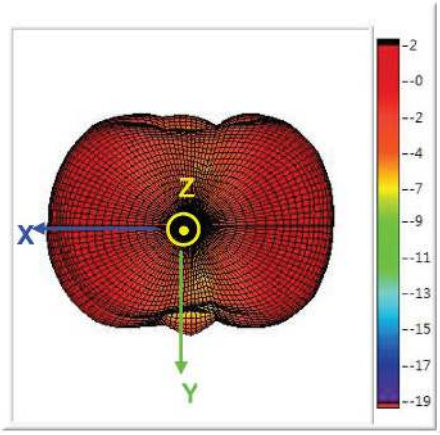
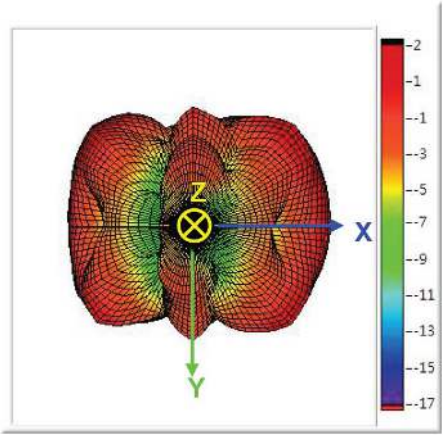
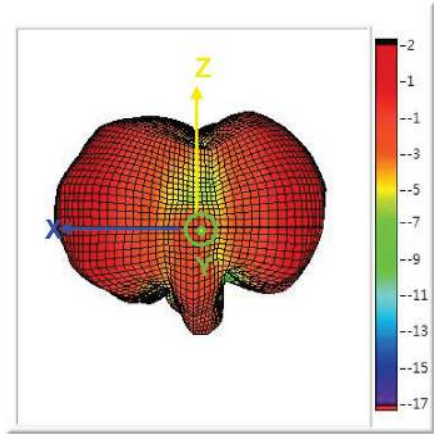
4.1 Test Setup



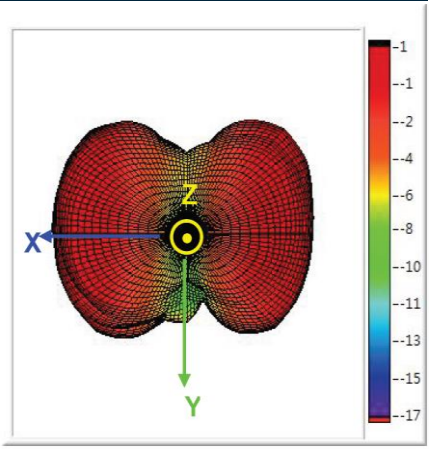
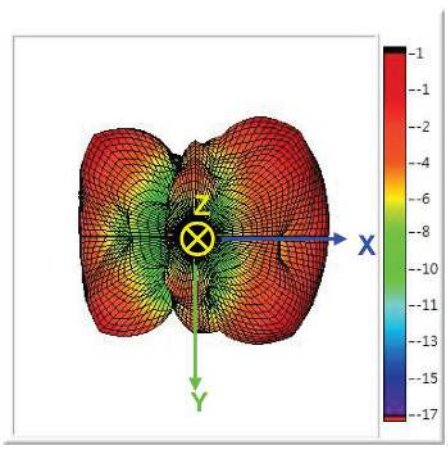
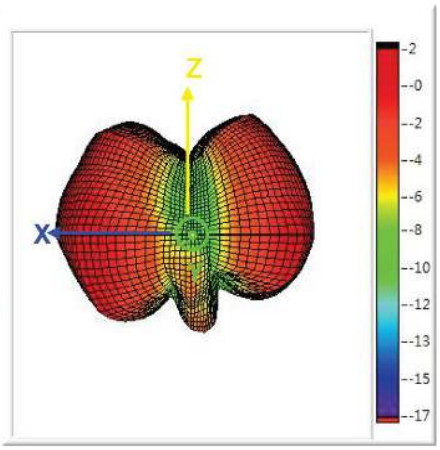
4.2 5150 MHz Radiation Patterns

XY Plane	XY Plane Flipped	XZ Plane
		

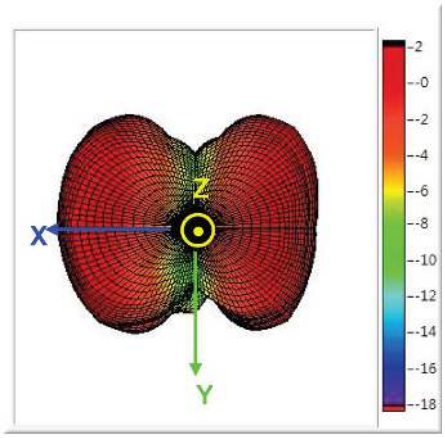
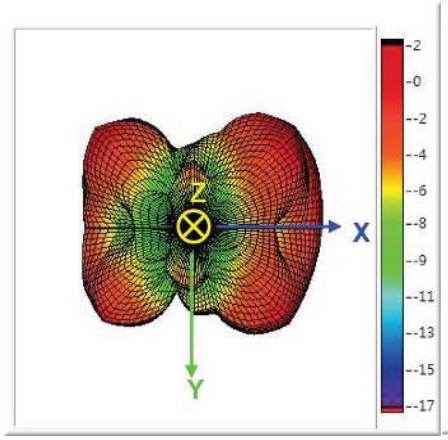
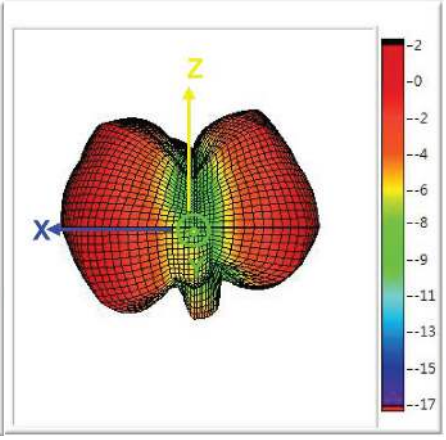
4.3 5350 MHz Radiation Patterns

XY Plane	XY Plane Flipped	XZ Plane
		

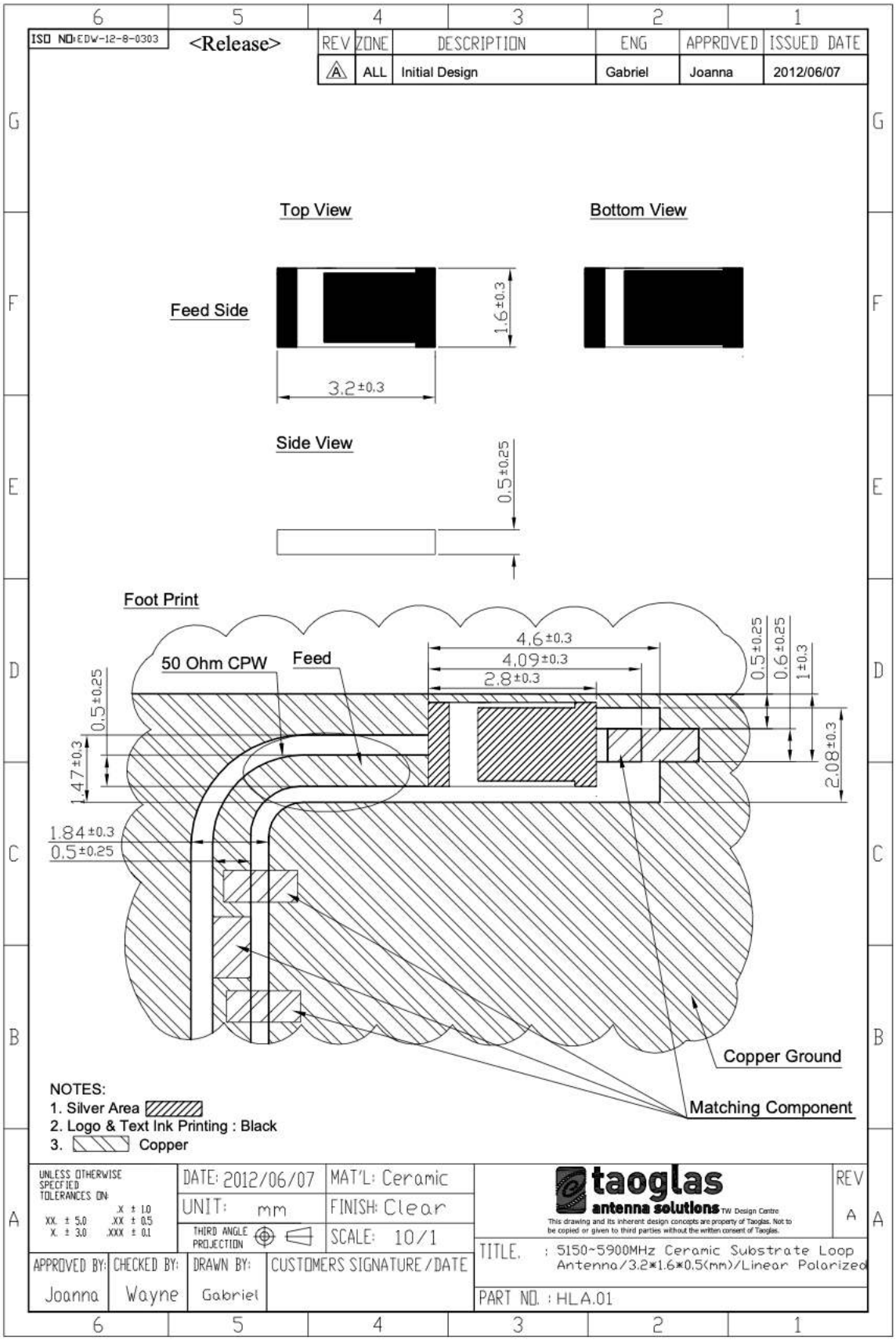
4.4 5700 MHz Radiation Patterns

XY Plane	XY Plane Flipped	XZ Plane
		

4.5 5850 MHz Radiation Patterns

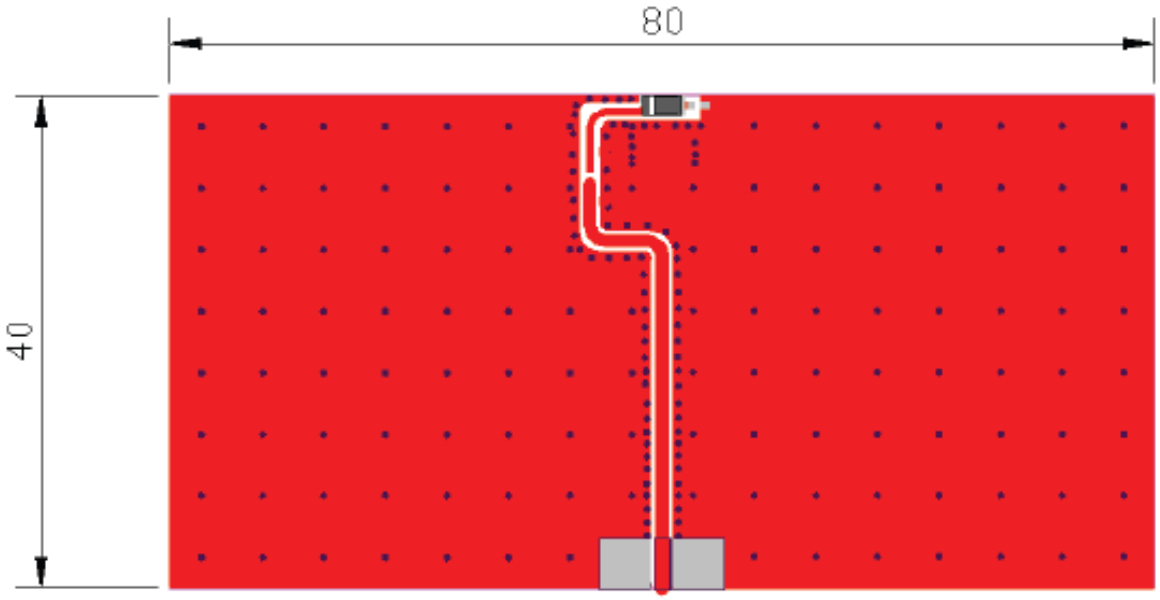
XY Plane	XY Plane Flipped	XZ Plane
		

5. Mechanical Drawing (Units: mm)



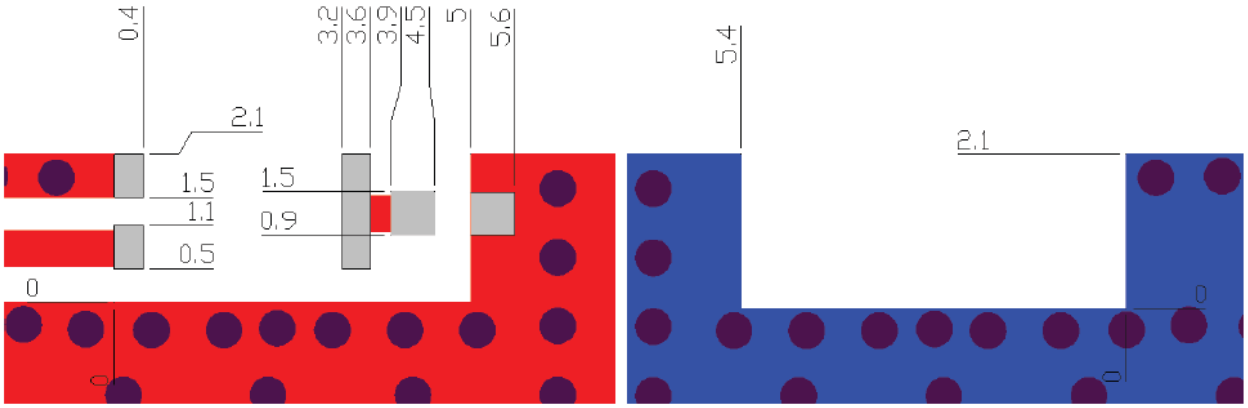
6. Footprint and Layout Guide

6.1 Evaluation Board Footprint



Unit : mm

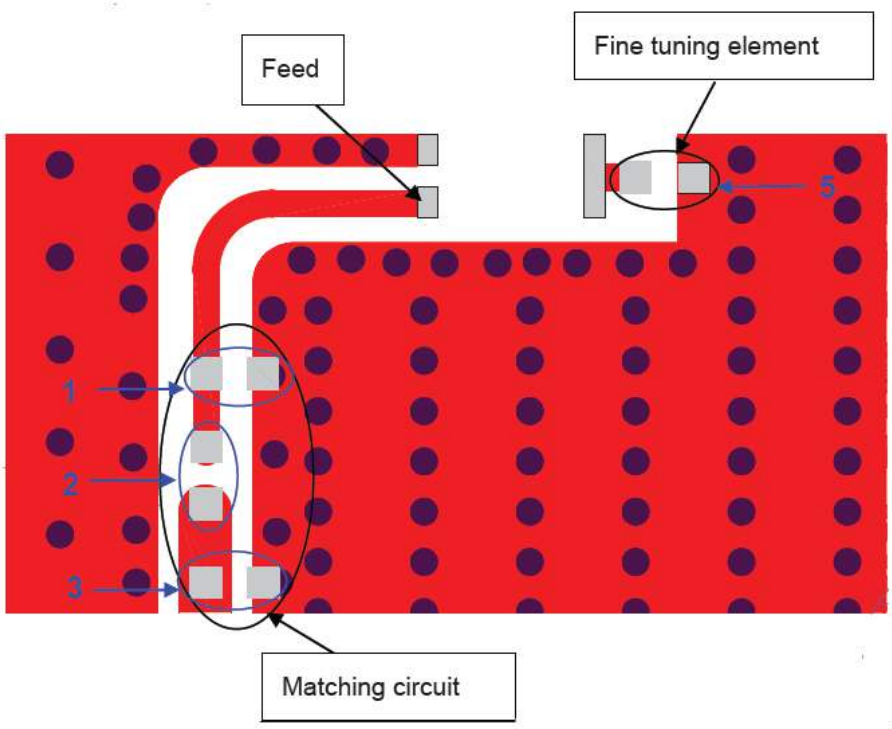
6.2 Layout Guide (Solder Land Pattern)



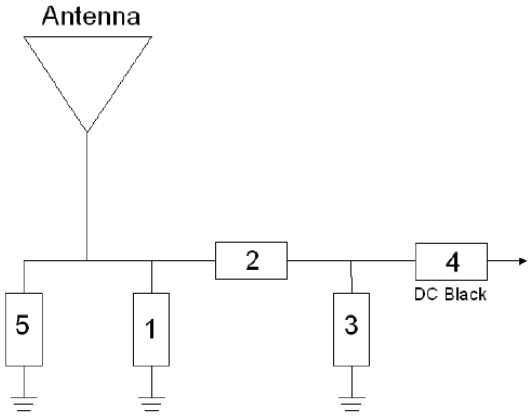
Unit : mm

7. Frequency Tuning

7.1 Antenna Tuning Scenario



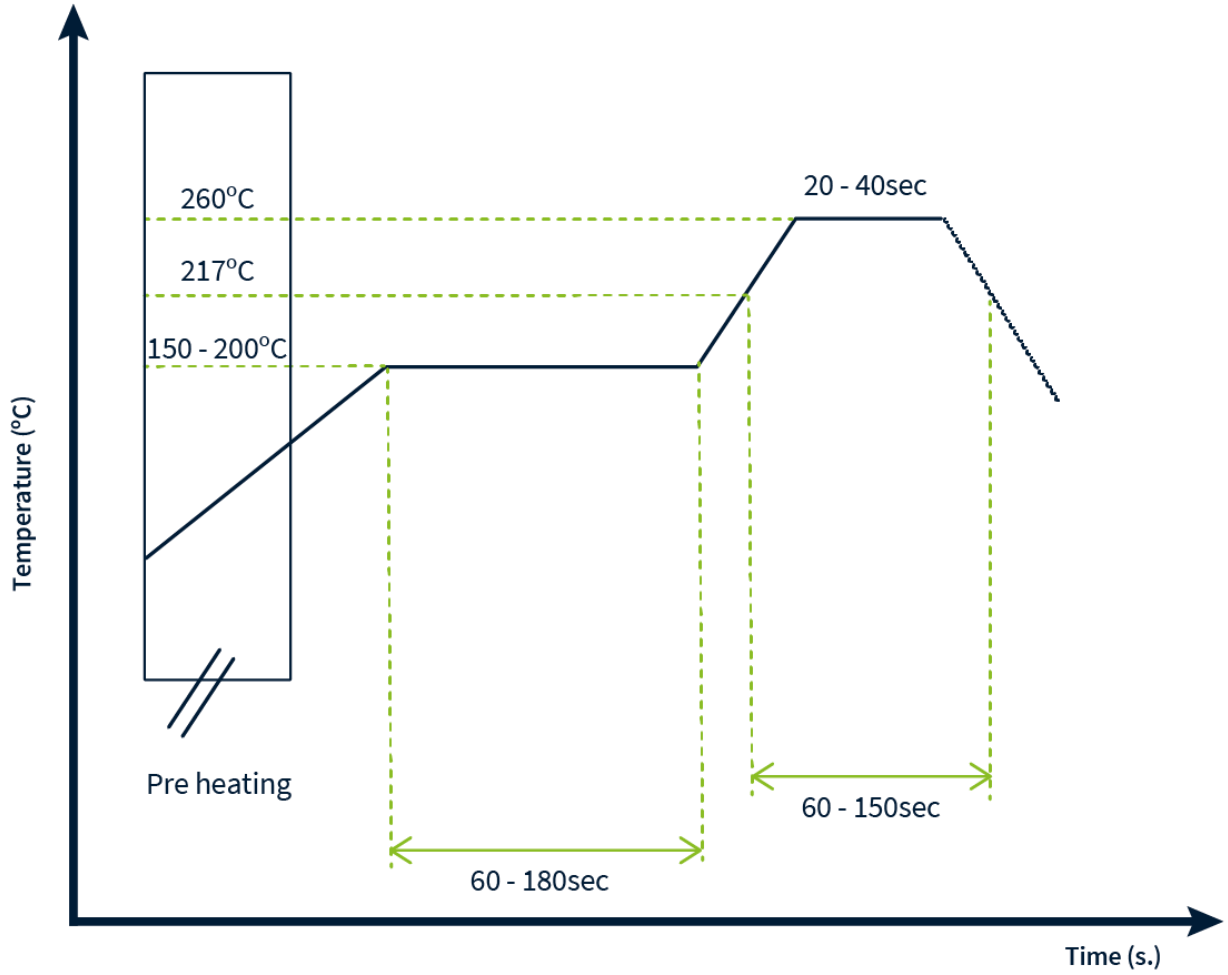
7.2 Matching Circuit (Center frequency is 5500MHz at 80x40mm ground plane)



System Matching Circuit Component		
Location	Description	Vendor
1	0.2pF	DARFON(0402)
2	0Ω	(0402)
3	1.5nH	DARFON(0402)
4	22pF	DARFON(0402)
5 (Fine tuning element)	0.2pF	DARFON(0402)

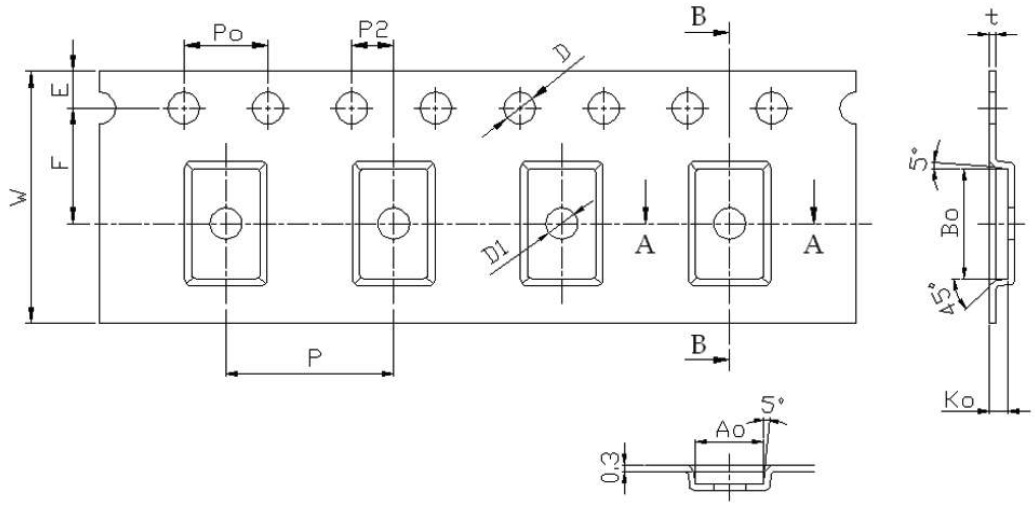
8. Soldering Conditions

8.1 Typical Soldering Profile (lead-free process)



9. Packaging

6000pcs HLA.01 per Tape & Reel



Tape Dimensions (unit: mm)		
Feature	Specification	Tolerance
W	12.00	±0.30
P	8.00	±0.10
E	1.75	±0.10
F	5.50	±0.10
P2	2.00	±0.10
D	1.50	+0.10 / -0.00
D1	-	±0.10
Po	4.00	±0.10
10Po	40.00	±0.20

Pocket Dimensions (unit: mm)		
Feature	Specification	Tolerance
Ao	1.90	+0.20 -0.10
Bo	3.50	
Ko	0.60	±0.05
t	0.30	±0.05

1. Cumulative tolerance of 10 pocket hole pitch: ±0.20mm
2. Carrier camber not to exceed 1mm in 250mm
3. Ao and Bo measured on a plane above the inside bottom of the pocket
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier
5. All dimensions meet EIA-481-B requirements
6. Material – Clear non Anti-Static Polystyrene, Black Conductive Polystyrene

Changelog for the datasheet

SPE-12-8-116-C HLA.01

Revision: C (Current Version)	
Date:	2021-08-25
Changes:	Updated Mech. Drawing Updated Template
Changes Made by:	Erik Landi

Previous Revisions

Revision: B	
Date:	2015-08-21
Changes:	added note on gain
Changes Made by:	Aine Doyle

Revision: A (Original First Release)	
Date:	2012-09-13
Notes:	Initial Release
Author:	Staff

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