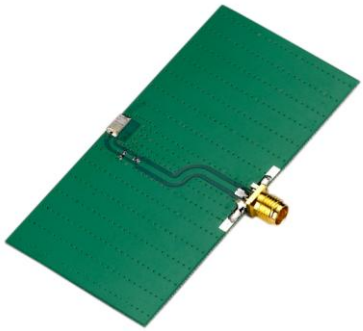
Specification

Part No.	:	**GLA.01**
Model	:	2.5dBi 1575Hz GPS Loop Antenna
Description	:	1575.42MHz
Features	:	5*3*0.6mm SMT Process Compatible **RoHS** ✔

GLA.01 Antenna



GLAD.01 EVB

REVISION STATUS

Version	Date	Page	Revision Description	Prepared	Approved
03	Sep. 25, 2009	All	Updated	TW PDC	Ronan Quinlan

1. Introduction

Taoglas have developed a unique ceramic miniature loop antenna series for GPS applications. At 5*3*0.6mm, the GLA.01 GPS 1575MHz Loop antenna is a miniature edge mounted antenna, designed for small space requirements. The radiation pattern is more omni-directional than traditional patch antennas. The GLA loop antenna series show at least three times the efficiency of traditional linear polarized 1575 MHz antennas. Efficiencies of 40% to 90% are achievable. Peak gain of 2.5dBi places this antenna gain performance within the range of a much larger 15mm to 18mm patch antenna.

Mechanically, the GLA.01 at only 0.6mm in height has a very low profile, and with a footprint of 6*5.5mm needs less space on the Board, it does require clearance of 6*5.5mm. Based on the loop effect this antenna works best when placed on the centre of the edge of the board, but can still work better than traditional linear polarized chip antennas even when placed at corners as substitute.

The GLA.01 is delivered on tape and reel and now allows M2M customers to use an omni-directional antenna in devices where orientation of the product is unknown.

1.1 Applications

*navigation or position tracking systems

*Hand-held devices when GPS function is needed, e.g., Smart phone. PDA, PND

2.0 Key Performance Indicators

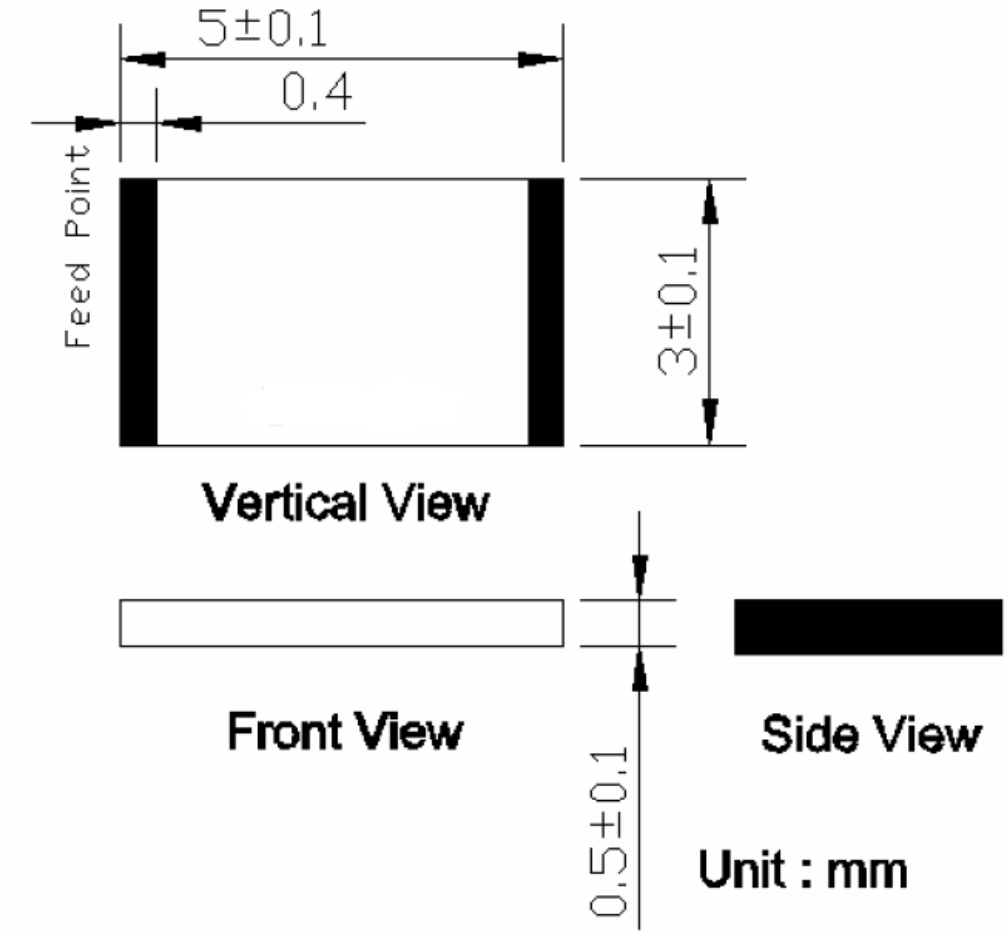
The antenna performance was measured with the GLA.01 mounted on an evaluation board (80*40mm ground plane) with SMA(F) connector.

No	Parameter	Specification
1	Center Frequency	1575.42±2MHz
2	Dimensions	5*3*0.6mm
3	VSWR	2 max (depends on the special environment)
4	Polarization	Linear
5	Bandwidth	50MHz(under -10dB return Loss)
6	Peak Gain	2.5dBi typ.
7	Efficiency	83% typ.
8	Impedance	50 Ω
9	Operating Temperature	-40°C~+105°C
10	Temperature Coefficient（τf）	0 ± 20 ppm @-20ºC to +80ºC

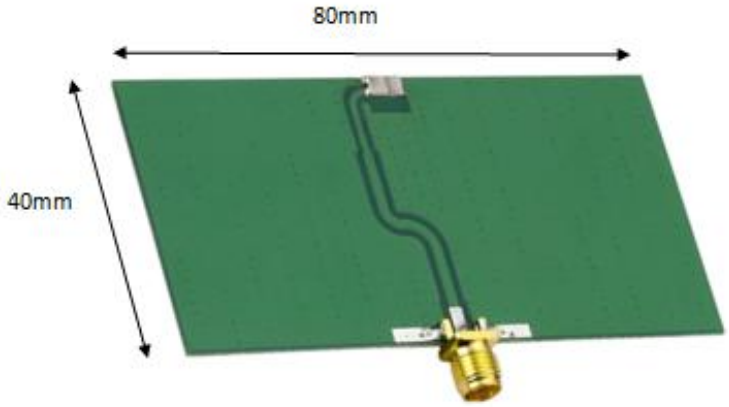
* Center frequency will be offset to working frequency according to the conditions of user's Ground plane and radome.

**The data was measured by A Test Lab Techno Corp. (CTIA Authorized Test Lab).

3.0 Antenna Dimensions & Test Board (unit:mm)

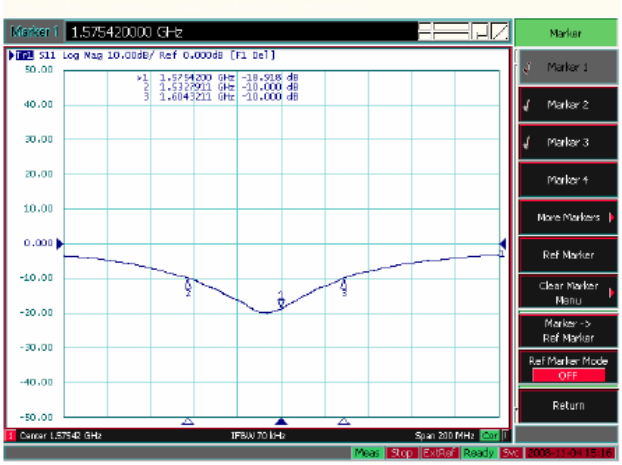


3.1Test board with Antenna (GLAD.01)

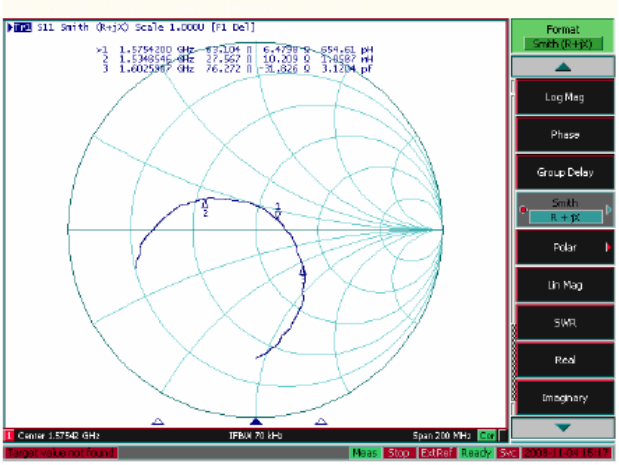


4.0 Electrical Characteristics (80*40mm ground plane)

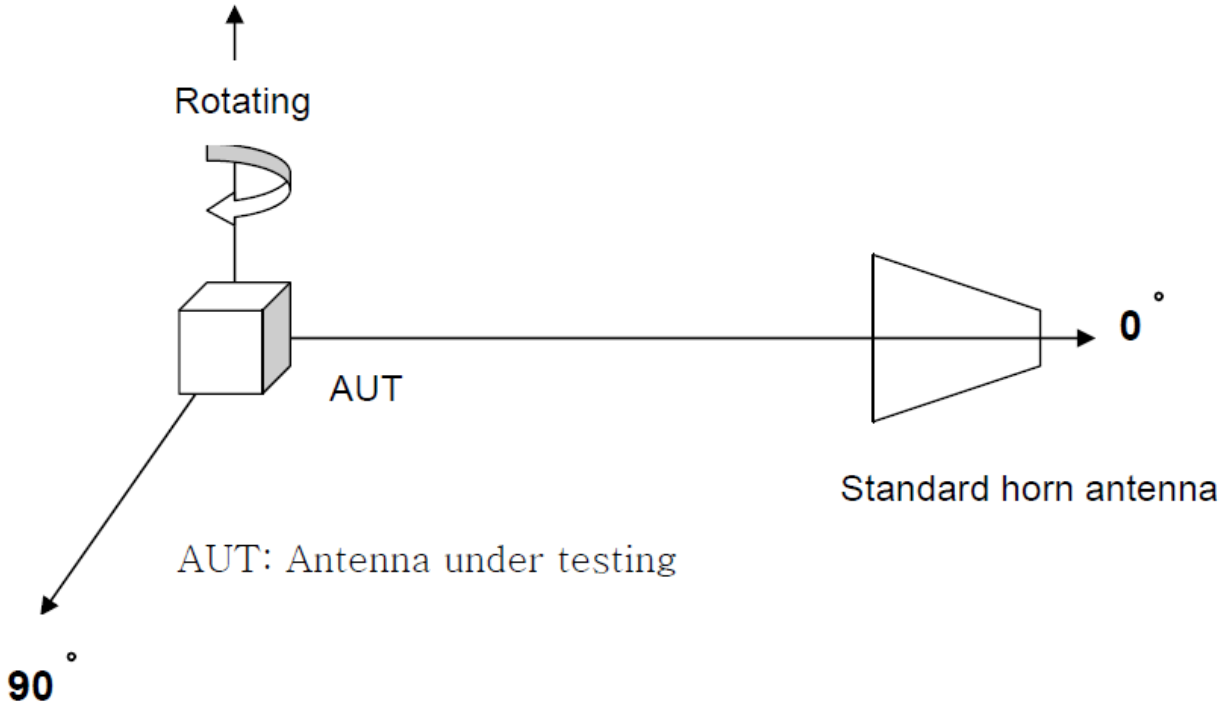
Return Loss(S_{11})



Smith Chart

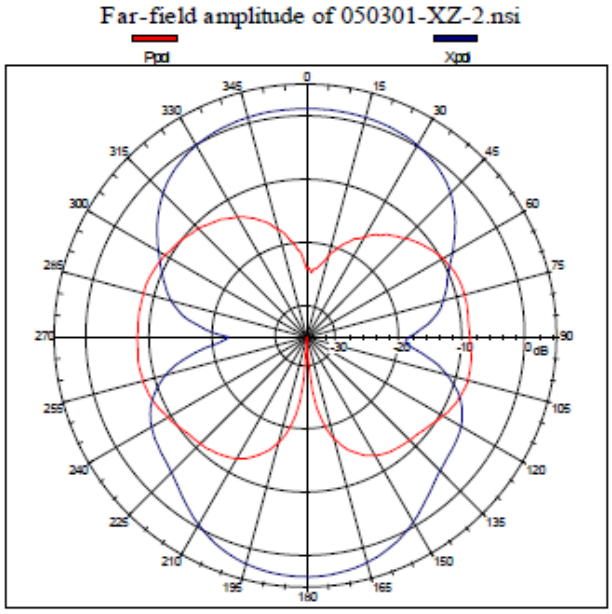


5.0 Radiation Pattern (Customize Design)

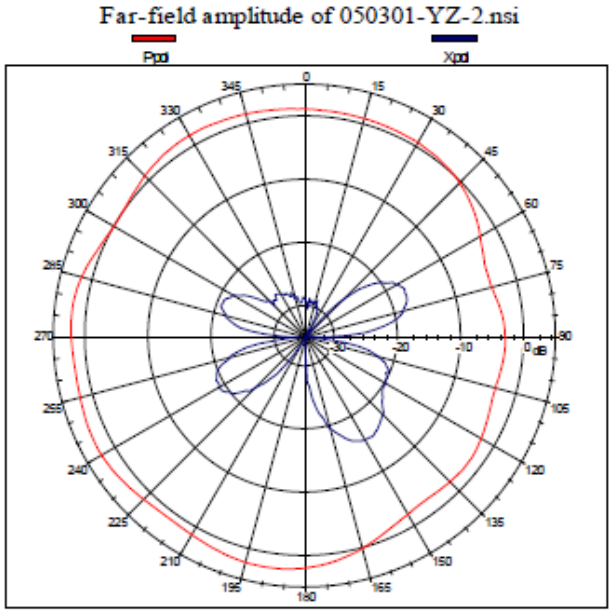


5.1 2D Gain Pattern – on 80*40mm Ground Plane

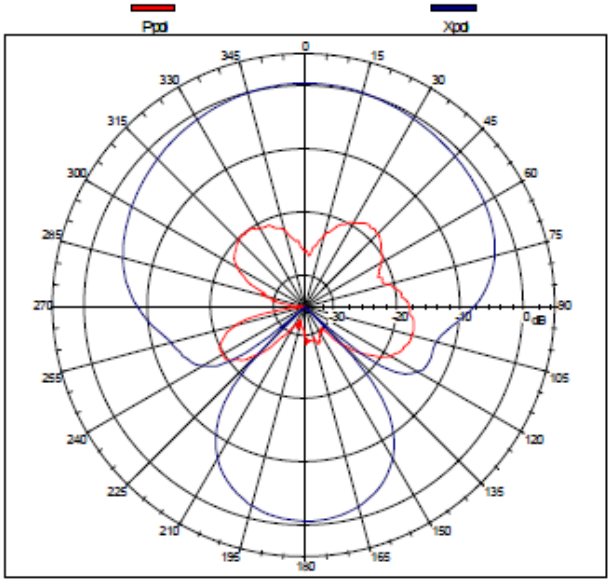
XZ



YZ

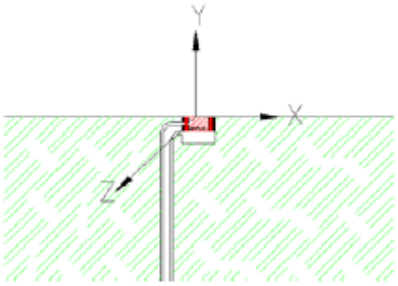


XY



Ppd – Vertical Polarization

Xpd – Horizontal Polarization

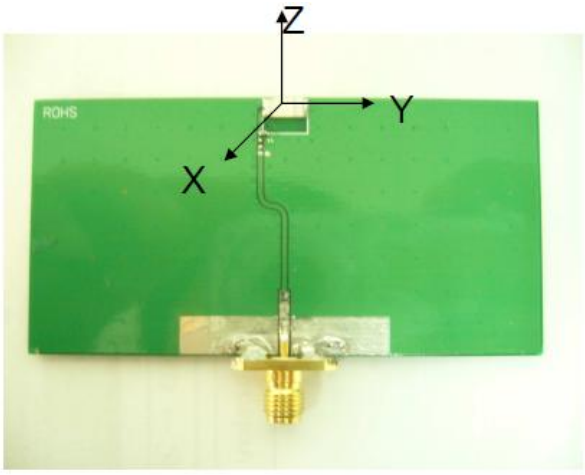


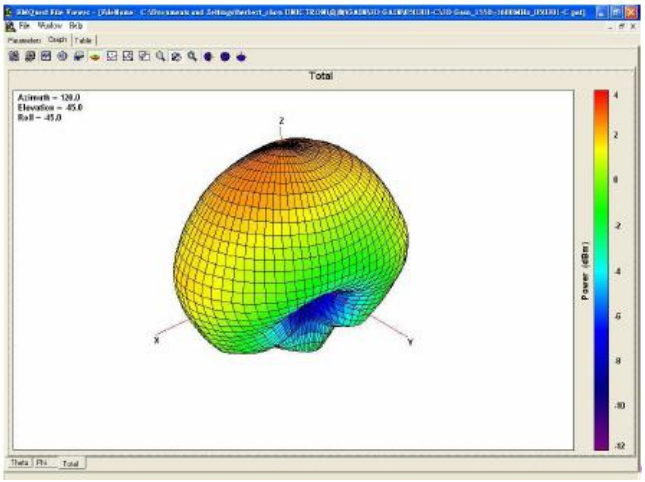
Source signal: Linearly polarized signal f_0=1575.42MHz

Gain Table

Plane	XZ	YZ	XY
Peak gain	2.91	2.35	0.32
Average Gain	-2.89	-0.1	-6.17

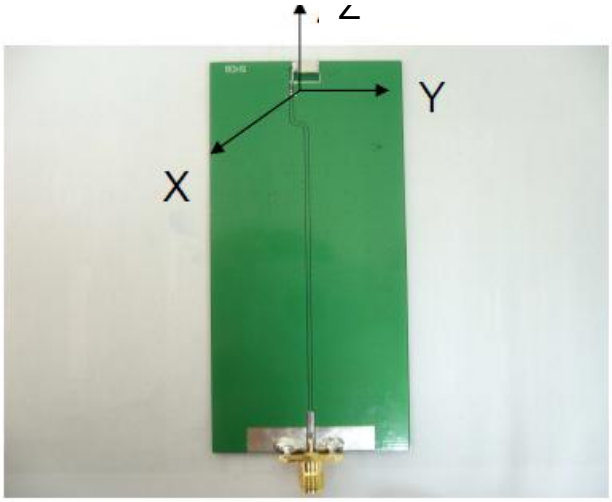
5.2 3D Gain Pattern – on 80*40mm Ground Plane

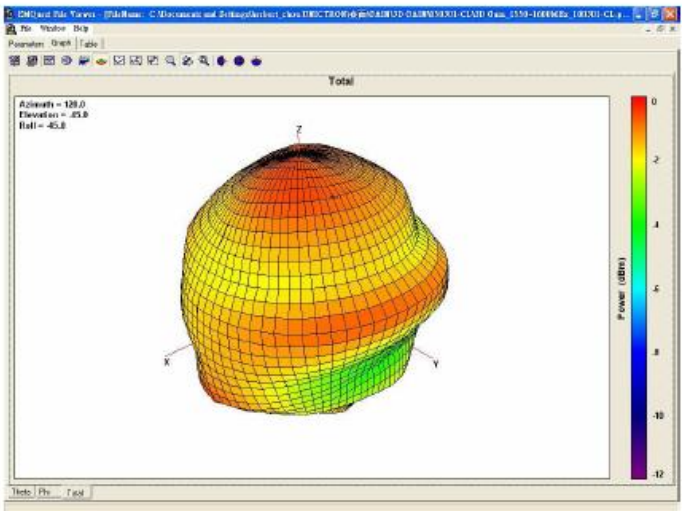




Frequency(MHz)	1560	1565	1570	1575	1580	1585	1590
Tot. Rad. Pwr. (dBm)	-0.82226	-0.7679	-0.80923	-0.80641	-0.7776	-0.80767	-0.85978
Peak EIRP (dBm)	2.71541	2.79732	2.76844	2.76525	2.76702	2.7234	2.66022
Directivity (dBi)	3.53767	3.56522	3.57768	3.57166	3.54462	3.53107	3.52
Efficiency (dB)	-0.82226	-0.7679	-0.80923	-0.80641	-0.7776	-0.80767	-0.85978
Efficiency (%)	82.7511	83.7934	82.9997	83.0537	83.6064	83.0296	82.0394
Gain (dBi)	2.71541	2.79732	2.76844	2.76525	2.76702	2.7234	2.66022
UHPRP / TRP Ratio (%)	68.2119	68.2975	68.4933	68.6078	68.6117	68.7251	68.7942
LHPRP / TRP Ratio (%)	31.7881	31.7025	31.5067	31.3922	31.3883	31.2749	31.2058
Average Gain (dB)	-0.82226	-0.7679	-0.80923	-0.80641	-0.7776	-0.80767	-0.85978

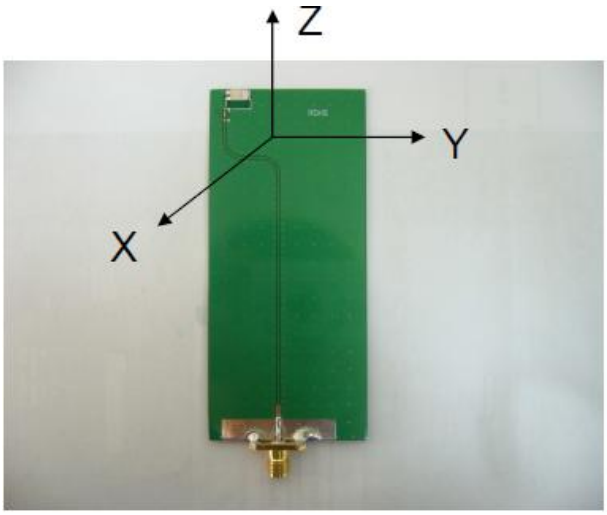
5.2 3D Gain Pattern – on 50*100mm Ground Plane – Centre Top

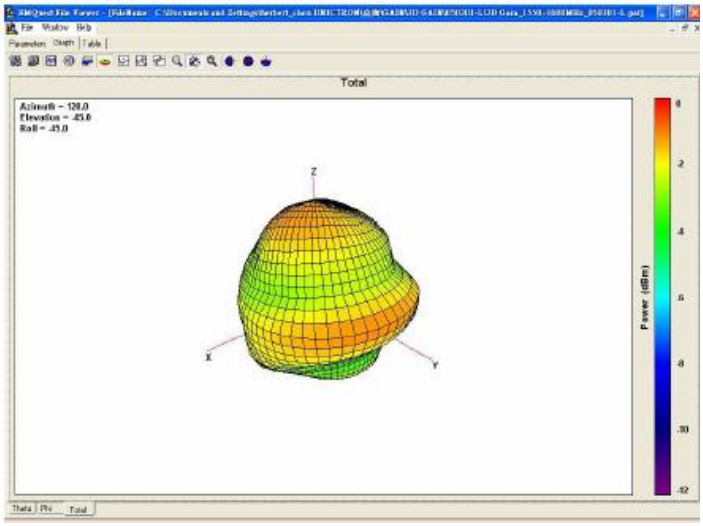




Frequency(MHz)	1560	1565	1570	1575	1580	1585	1590
Tot. Rad. Pwr. (dBm)	-3.96111	-3.20382	-2.68155	-2.36907	-2.35642	-2.69352	-3.28003
Peak EIRP (dBm)	-2.4723	-1.75869	-1.2382	-0.9125	-0.87807	-1.23312	-1.80293
Directivity (dBi)	1.48881	1.44513	1.44336	1.45657	1.47835	1.4604	1.47711
Efficiency (dB)	-3.96111	-3.20382	-2.68155	-2.36907	-2.35642	-2.69352	-3.28003
Efficiency (%)	40.1688	47.821	53.9318	57.9553	58.1243	53.7834	46.989
Gain (dBi)	-2.4723	-1.75869	-1.2382	-0.9125	-0.87807	-1.23312	-1.80293
UHPRP / TRP Ratio (%)	54.9149	54.8982	54.94	54.8889	54.8335	54.7676	54.7761
LHPRP / TRP Ratio (%)	45.0851	45.1018	45.06	45.1111	45.1665	45.2324	45.2239
Average Gain (dB)	-3.96111	-3.20382	-2.68155	-2.36907	-2.35642	-2.69352	-3.28003

5.3 3D Gain Pattern – on 50*100mm Ground Plane – Top Left of Board



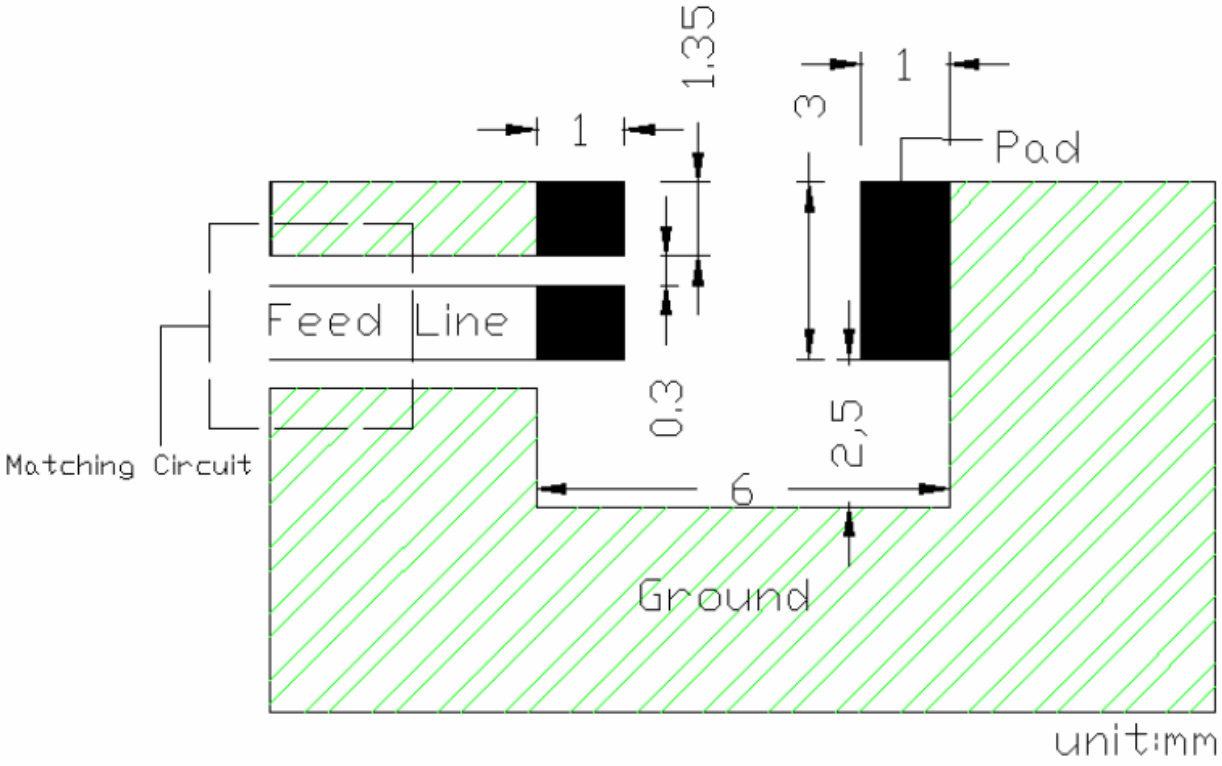


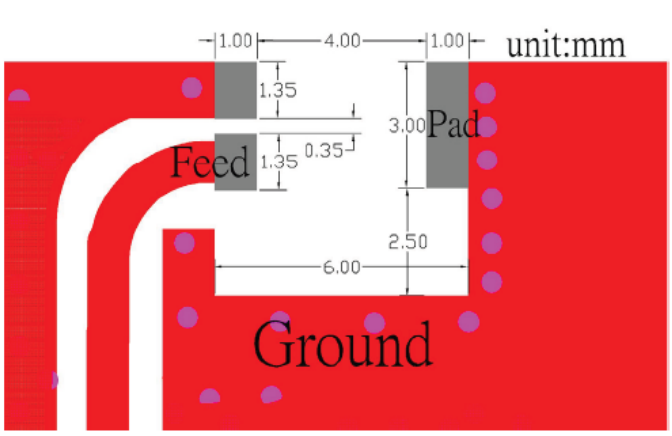
Frequency(MHz)	1560	1565	1570	1575	1580	1585	1590
Tot. Rad. Pwr. (dBm)	-2.94406	-2.32519	-1.94555	-1.73985	-1.75377	-2.03725	-2.52163
Peak EIRP (dBm)	-1.61421	-0.9904	-0.58359	-0.30568	-0.33041	-0.61122	-1.09395
Directivity (dBi)	1.32985	1.3348	1.36196	1.43417	1.42336	1.42602	1.42768
Efficiency (dB)	-2.94406	-2.32519	-1.94555	-1.73985	-1.75377	-2.03725	-2.52163
Efficiency (%)	50.7684	58.5438	63.8918	66.9908	66.7764	62.5569	55.9548
Gain (dBi)	-1.61421	-0.9904	-0.58359	-0.30568	-0.33041	-0.61122	-1.09395
UHPRP / TRP Ratio (%)	54.3363	54.3359	54.3598	54.3257	54.2355	54.232	54.231
LHPRP / TRP Ratio (%)	45.6637	45.6641	45.6402	45.6743	45.7645	45.768	45.769
Average Gain (dB)	-2.94406	-2.32519	-1.94555	-1.73985	-1.75377	-2.03725	-2.52163

6.0 Layout Guide

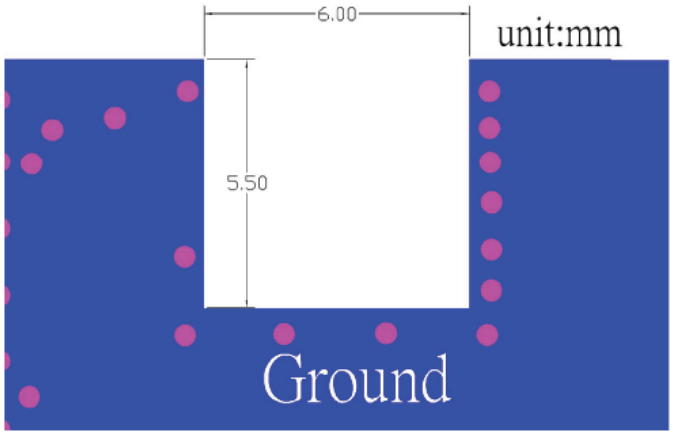
a. Solder Land Pattern:

Land pattern for soldering (black marking areas) is as shown below. Depending on Customer's requirement, matching circuit as shown below is also recommended. The footprint size is 6.0*5.5mm and the antenna requires clearance.



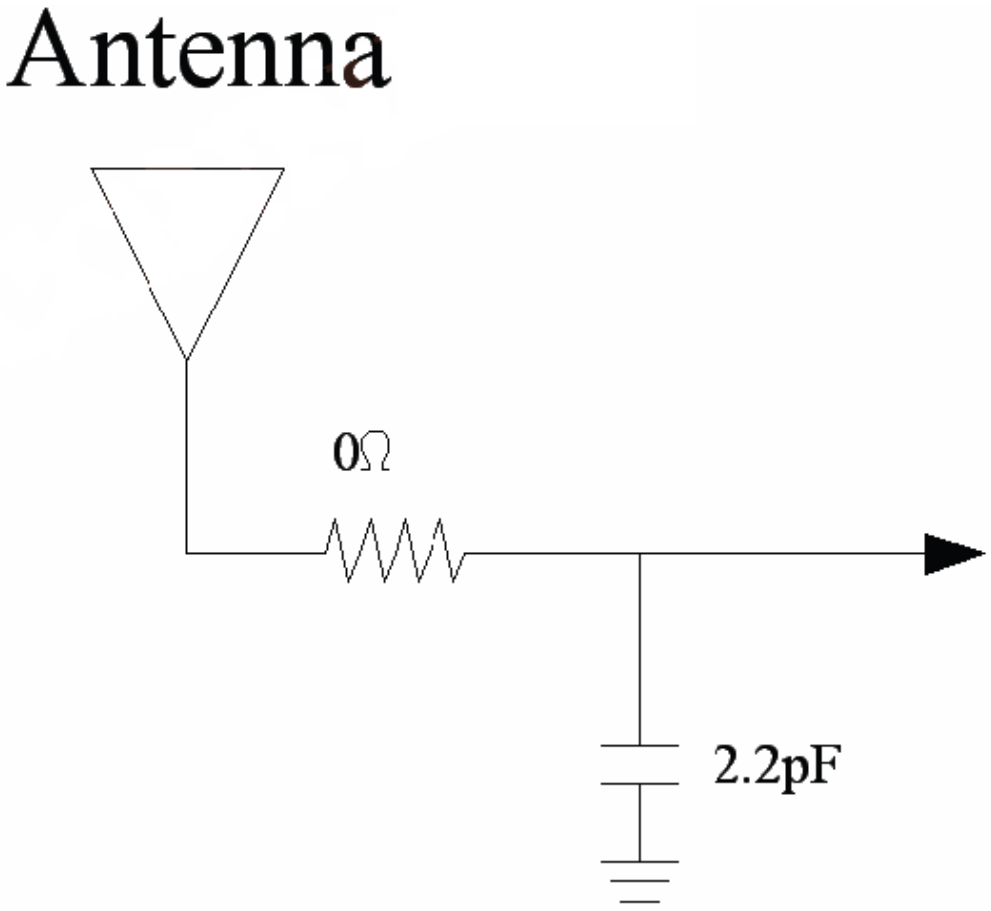


Top View



Back View

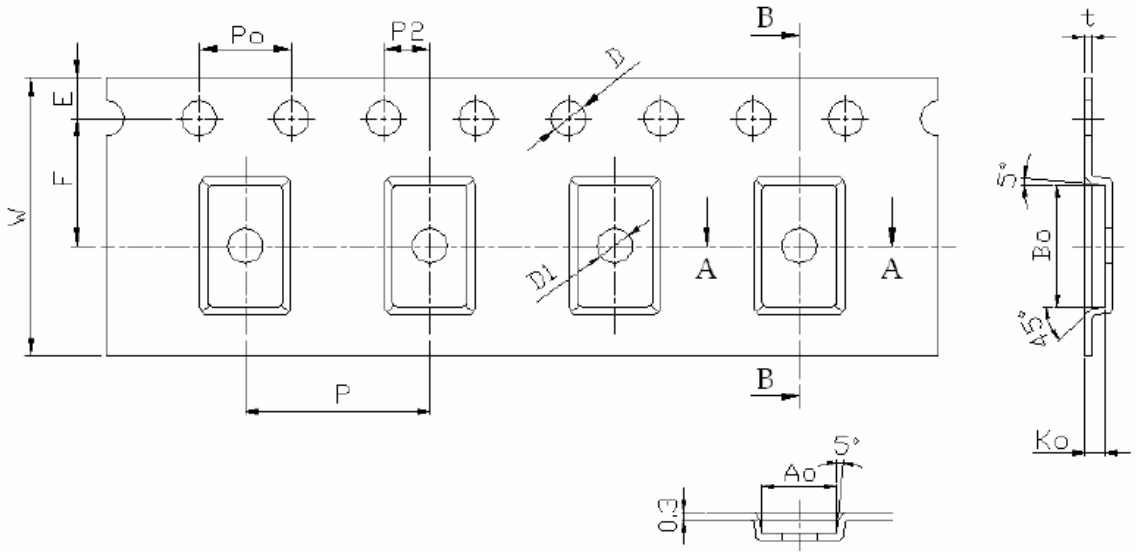
6.1 Matching Circuit



7.0 Packing

(1) Quantity/Reel: 5000pcs/Reel

(2) Plastic Tape



1. Cumulative tolerance of 10 sprocket hole pitch: ±0.20mm
2. Carrier camber not to exceed 1mm in 250mm
3. Ao and Bo measured on a plane 0.3mm above the 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.

7.1 Tape Dimensions (unit: mm)

Feature	Specifications	Tolerances
W	12	±0.30
P	8	±0.10
E	1.75	±0.10
F	5.5	±0.10
P2	2	±0.10
D	1.5	±0.10
Po	4	±0.10
10Po	40	±0.20

7.2 Pocket Dimensions (unit: mm)

Feature	Specifications	Tolerances
Ao	3.25	±0.10
Bo	5.25	±0.10
Ko	0.90	±0.10
t	0.30	±0.05