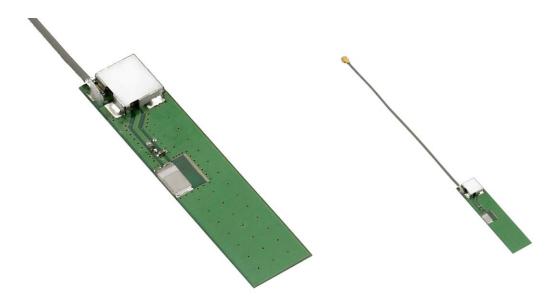


SPECIFICATION

Model No.	:	ALA.01
Part No.	:	ALA.01.07.0095A
Product Name	:	1575MHz Ceramic Active Loop Module
Features	:	16dB One Stage PCB Dims: 45*10*2.3mmmm RoHS compliant
Photo	:	





1.0 Introduction

The active loop antenna ALA.01 is best suited for applications where omni-directionality is important. The average gain is similar to an 18mm active patch antenna but in a much narrower profile, only 2.3mm at its highest point, allowing this antenna to be used perpendicular to the device main-board, or placed adjacent to the top or bottom of device main board. A one stage LNA combined with a SAW filter boosts the S/N (C/N) of the GPS system and helps to overcome some noise effects from today's crowded device boards that passive antennas cannot resolve.

The antenna can be placed in a plastic slot in the device housing. Alternatively adhesive foam, hot-melt, or non-conductive screws could be used to mount the antenna. The core antenna design principle of loop current flow tends to "lock-out" a lot of surface noise from close circuitry from entering the antenna.

2.0 Specification

Antenna

Parameter	Specification	
Frequency	1575.42 ± 1.023MHz	
Bandwidth (10dB	70MHz typical	
return loss)		
Peak Gain	Typ. 3.1dBi	
Avg. Gain	-2.2dBI	
Polarization	Linear	
VSWR	2 max (depends on the special environment)	
Dimension	5*3*0.5mm	



LNA

Parameter	Specification
Frequency	1575.42 ± 1.023MHz
Gain	Typ. 16dB @ 3V
	Typ. 17.8dB @ 5V
Noise Figure	Typ. 1.3dB @ 3V
	Saw Filter (fo=1575.42MHz)
Filter (out of band	40dB typ. fo±50MHz
attenuation)	45dB min. fo±100Mhz
Output VSWR	< 2.0
Input Voltage	DC = 3.0~5.0V
Current	DC = 13mA at 3.0V

Cable *& Connector

Parameter	Specification
RF Cable	95±5mm 1.13 Coaxial Cable
Connector	IPEX MHF(U.FL)

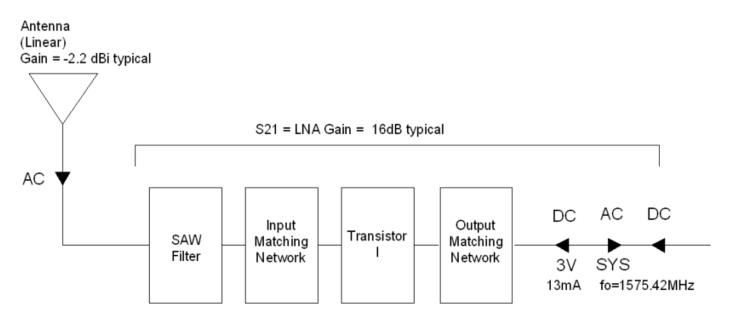
Total Specification

Parameter	Specification		
Frequency	1575.42 ± 1.023MHz		
Gain	16 ± 4dB @ 90°		
Output Impedance	50Ω		
Polarization	Linear		
Output VSWR	Max 2.0		
Operation			
Temperature	-40°C to + 85°C		
Storage Temperature	-40°C to + 90°C		
Humidity	10 to 95%		
Input Voltage	Min. 2.7V, Typ. 3.0V, Max. 3.3V		
Dimensions	45*10*2.3mm		
Weight	1.35±0.5g (typical)		



3.0 Performance Measurement

3.1 Block Diagram



The structure of GPS antenna module

4.0 Measurement Method

4.1 Chip

- a) Reflection Co-efficient Measurement
 - a. Equipment: Network Analyzer (Aglient E5071A)(Fig.1)
 - b. Item S₁₁ Log Chart(Return Loss) S₁₁ Smith Chart (impedance)



Figure 1. Network Analyzer



b) Pattern Measurement

- a. Equipment: Anechoic Chamber (Fig. 2), Network Analyzer (Aglient E8753ES)
- b. Item: Gain Pattern, Axial ratio

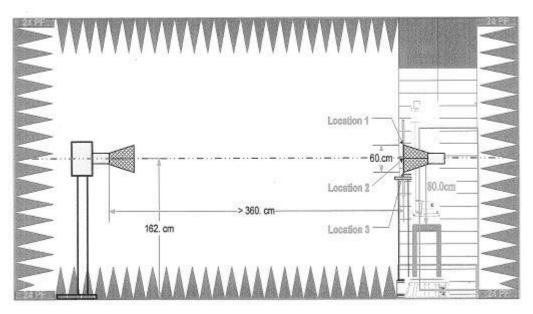


Figure 2. Quiet Room

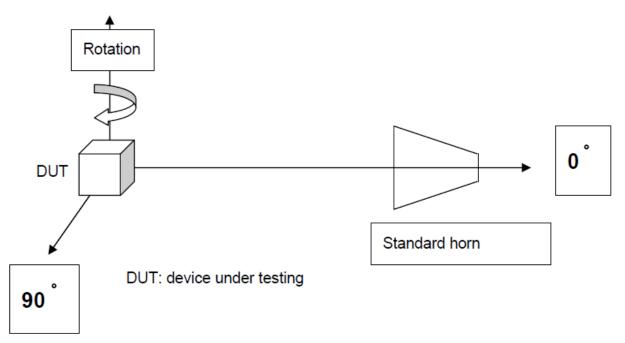
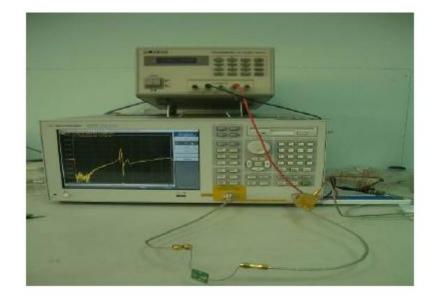


Figure 3. Schematic of measurement set-up



4.2 LNA

- a) Parameter Measurement
 - a. Equipment: Network Analyzer (Aglient E5071B)(Fig.4)
- $b. \ S_{11}, \, S_{12}, \, S_{21}, \, S_{22}$





- a) Noise Figure Measurement
 - a. Equipment: Noise Meter (Aglient E4407B)(Fig.5)
 - b. Environment: Shielding Room (Fig. 6)
 - c. Item: N.F (Noise Figure)

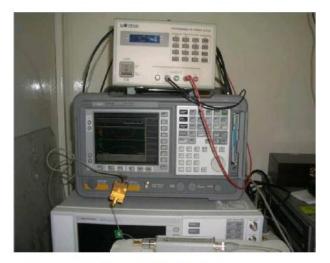


Fig. 5 Noise Meter



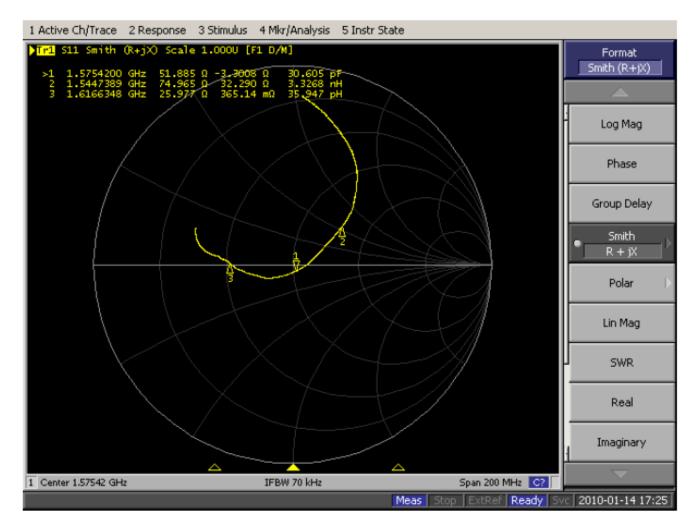
Fig.6 Shielding Room



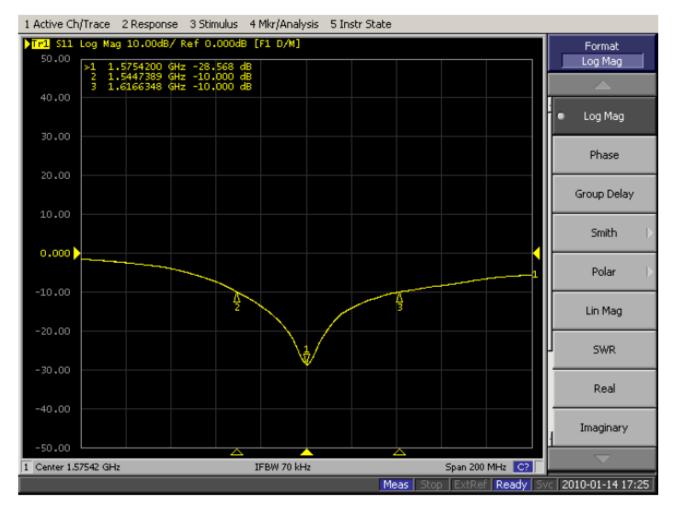
5.0 Measured Values

5.1 Chip

5.1.1 Smith Chart (Impedance)



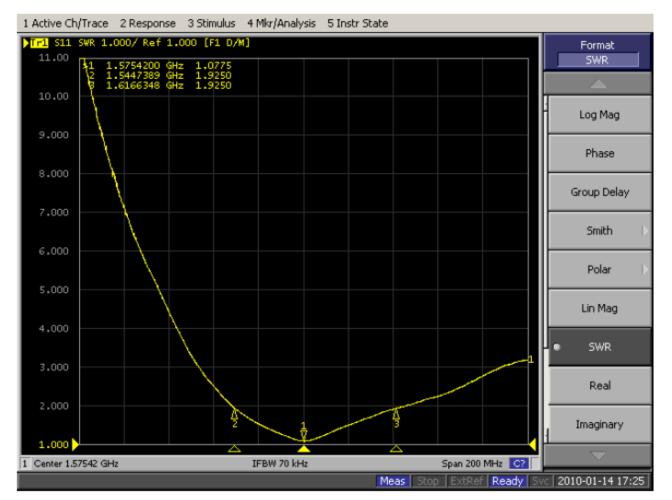




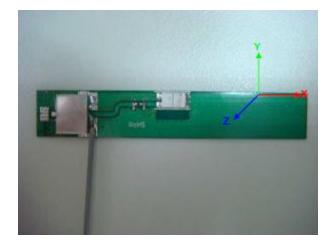
5.1.2 S₁₁ Log Chart (Return Loss): Bandwidth S₁₁ <-10dB



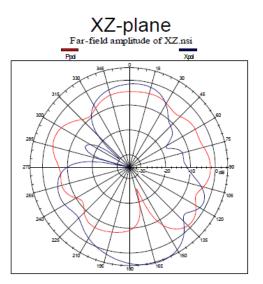
5.1.3 S₁₁ VSR



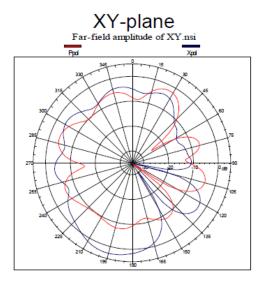
5.1.4 Radiation Patterns (Excluding LNA)







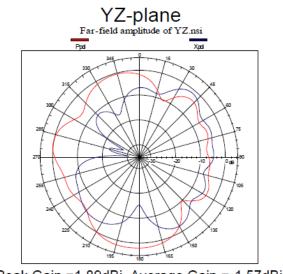
(Peak Gain =4.92 dBi, Average Gain =-1.62 dBi)



(Peak Gain =2.75dBi, Average Gain =-3.44 dBi)

Plane	XZ	YZ	ХҮ
Average Gain	-1.62	-1.57	-3.44
Peak Gain	4.92	1.89	2.75

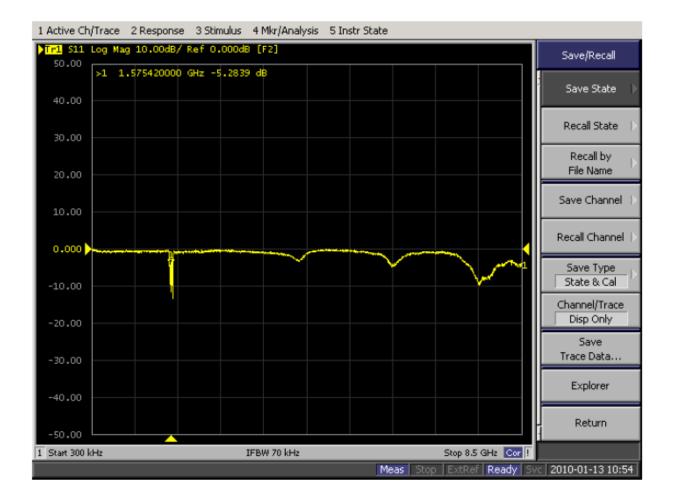
Note: Total Gain = The total power of radiation pattern (exclude LNA Gain from GP8) + LNA Gain - cable loss (1.1dB/m)



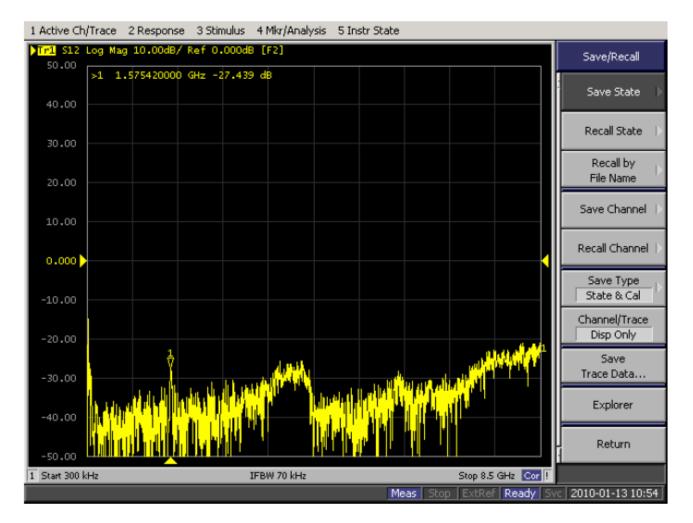
(Peak Gain =1.89dBi, Average Gain =-1.57dBi)



5.2 Low Noise Amplifier (LNA) 5.2.1 S₁₁ (network analyzer input power -40dB)







5.2.2 S₁₂ (network analyzer input power -40dB)





5.2.3 S₂₁ (Gain) (network analyzer input power -40dB)

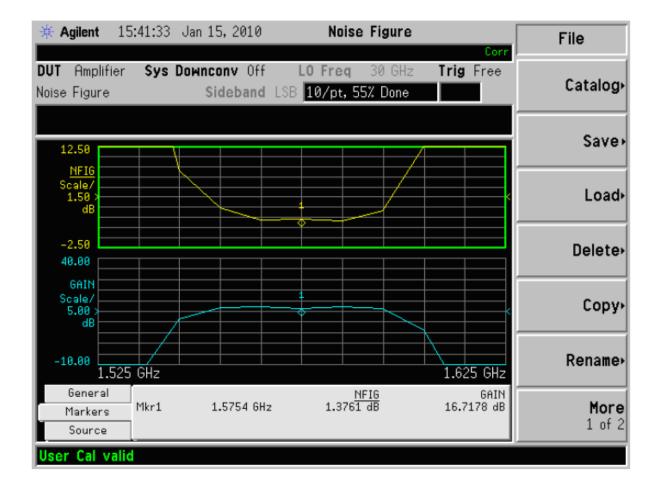




5.2.4 S₂₂ (Gain) (network analyzer input power -40dB)



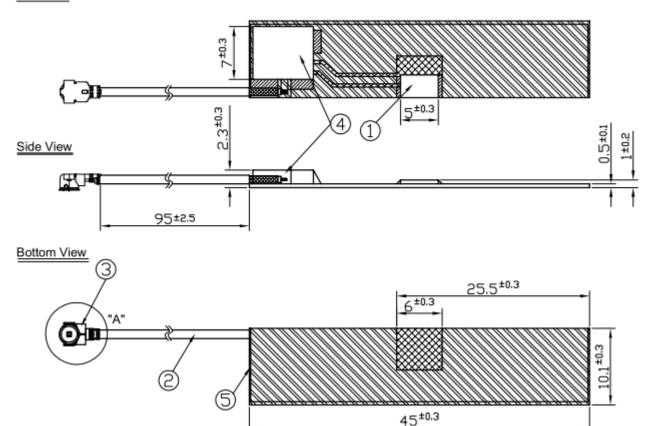
5.3 Noise Figure





6.0 Drawing

Top View



1	Chip Antenna: 5*3*0.5mm	Mada
2	Cable Ø1.13 L=95±5mm	Note: 1.Soldered Area
3	IPEX MHFI(U.FL)	2.Solder Mask Area(Green)
4	Shielding Case	
5	PCB	