

# SPECIFICATION

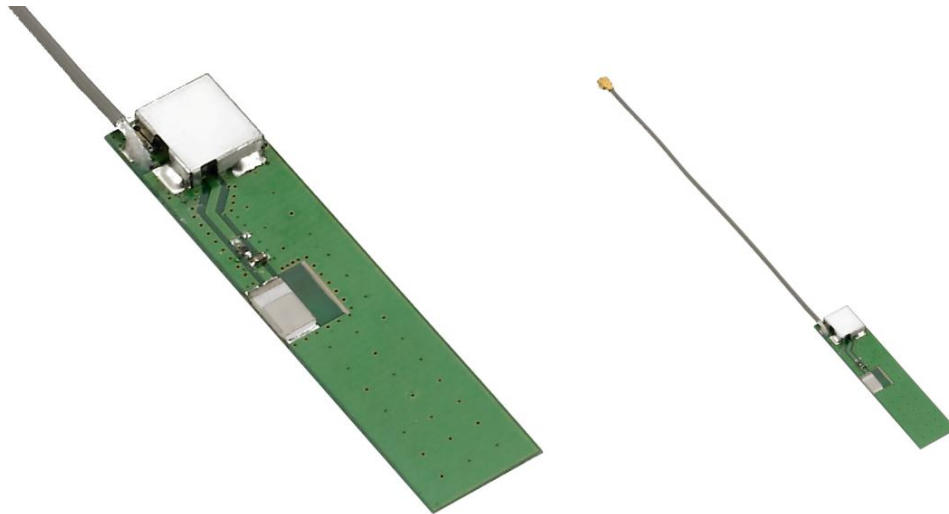
Model No. : **ALA.01**

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 :



## REVISION STATUS

Version	Date	Page	Revision Description	Prepared	Approved
01	Apr 9 <sup>th</sup> 2008	All	New product	TW Product Centre	Zita Lin

## 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 return loss)	70MHz typical
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
Filter (out of band attenuation)	Saw Filter (fo=1575.42MHz) 40dB typ. fo±50MHz 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)

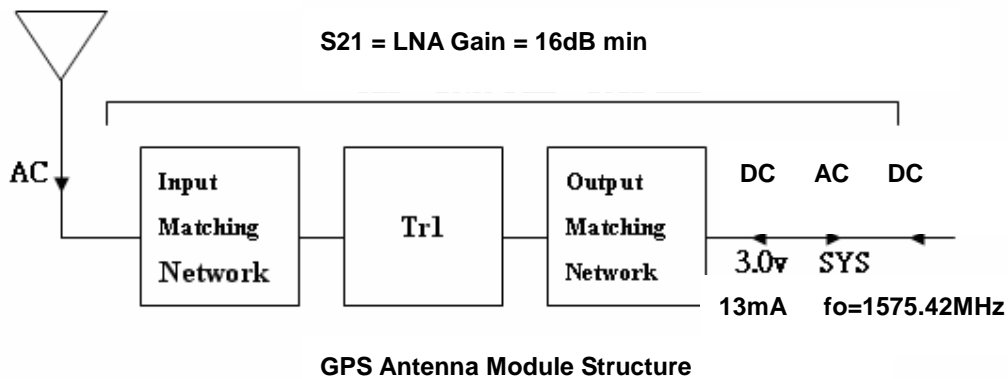
### 3.0 Performance Measurement

#### 3.1 Block Diagram

Antenna

(Linear)

Gain= -2.2dBi typ.



### 4.0 Measurement Method

#### 4.1 Chip

##### a) Reflection Co-efficient Measurement

- a. Equipment: Network Analyzer (Agilent E5071A)(Fig.1)
- b. Item  $S_{11}$  Log Chart(Return Loss)  $S_{11}$  Smith Chart (impedance)



Figure 1. Network Analyzer

##### b) Pattern Measurement

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

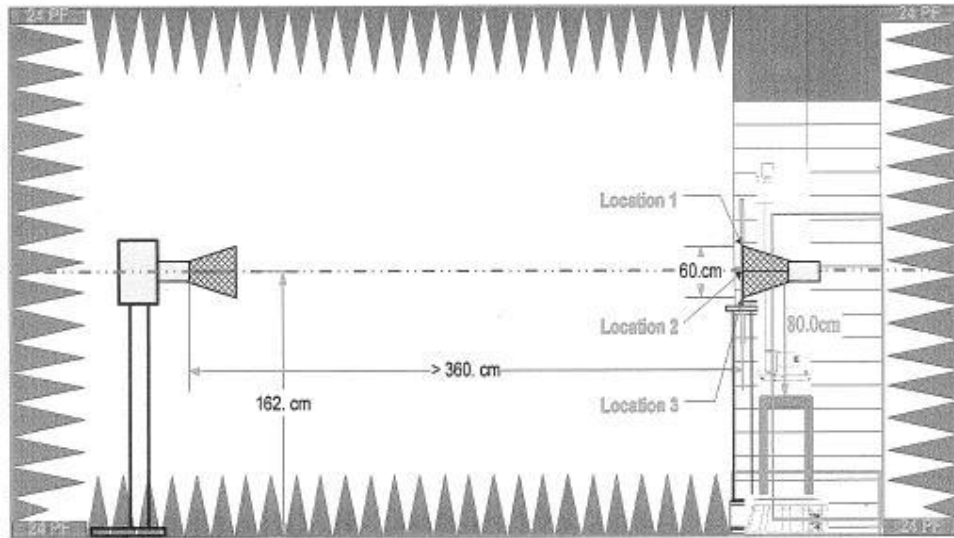


Figure 2. Quiet Room

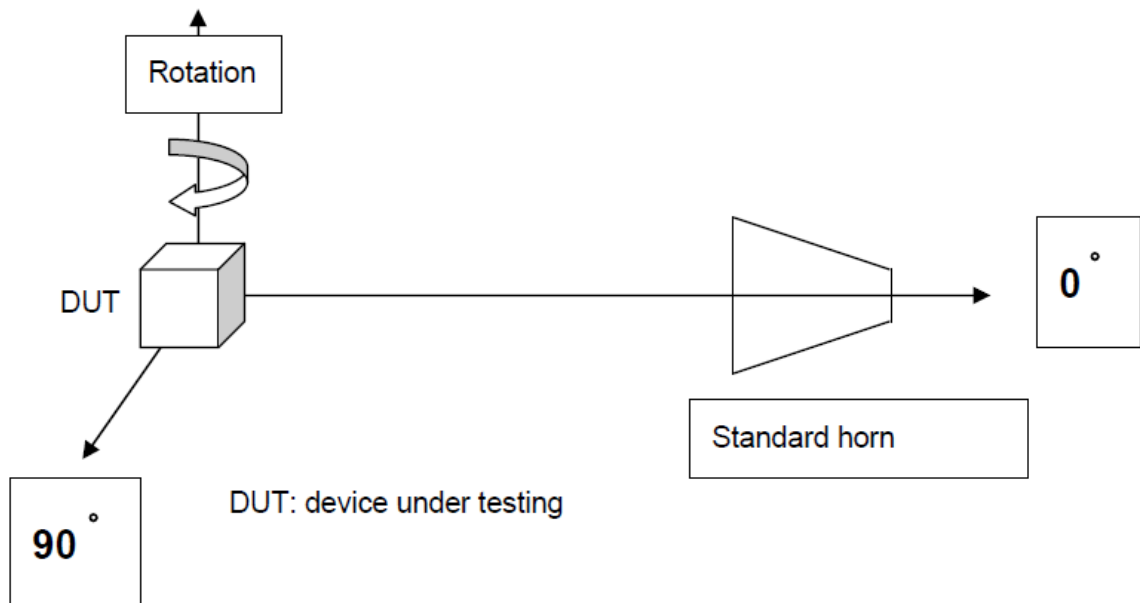


Figure 3. Schematic of measurement set-up

## 4.2 LNA

### a) Parameter Measurement

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

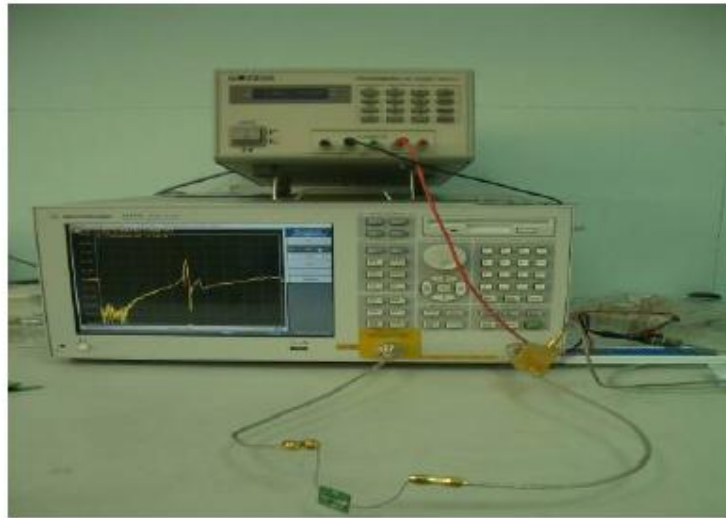


Figure 4. Network Analyzer

### a) Noise Figure Measurement

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



Fig. 5 Noise Meter

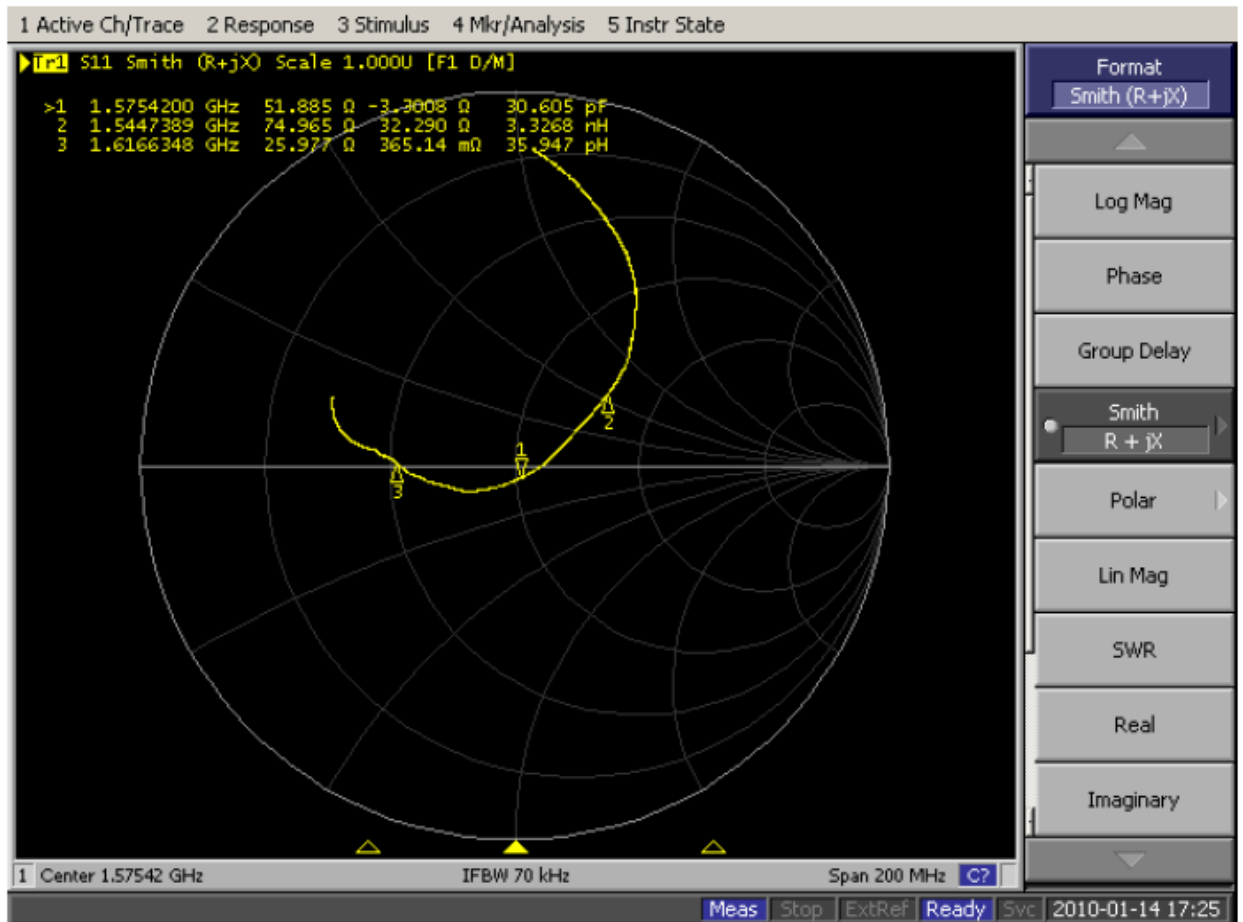


Fig.6 Shielding Room

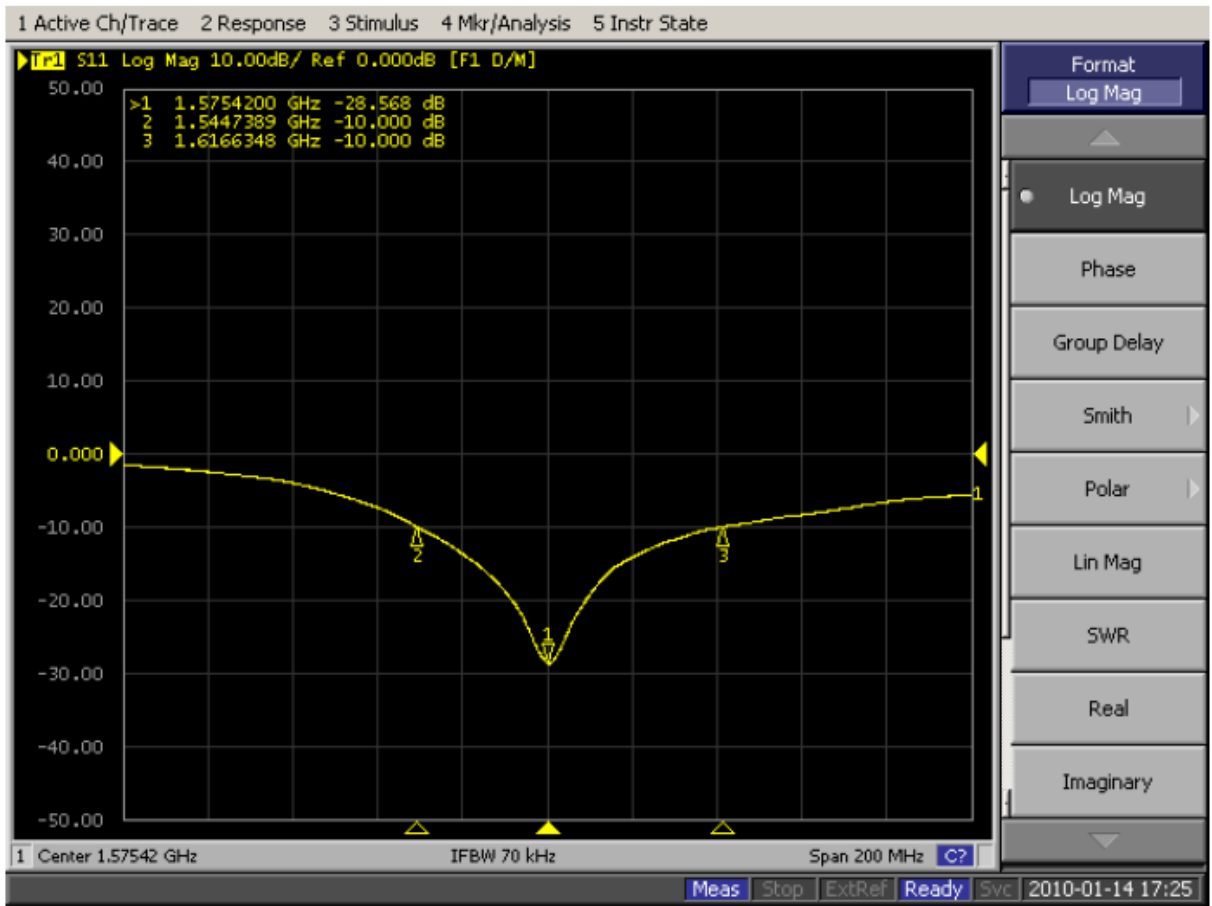
## 5.0 Measured Values

### 5.1 Chip

#### 5.1.1 $S_{11}$ Smith Chart (Impedance)

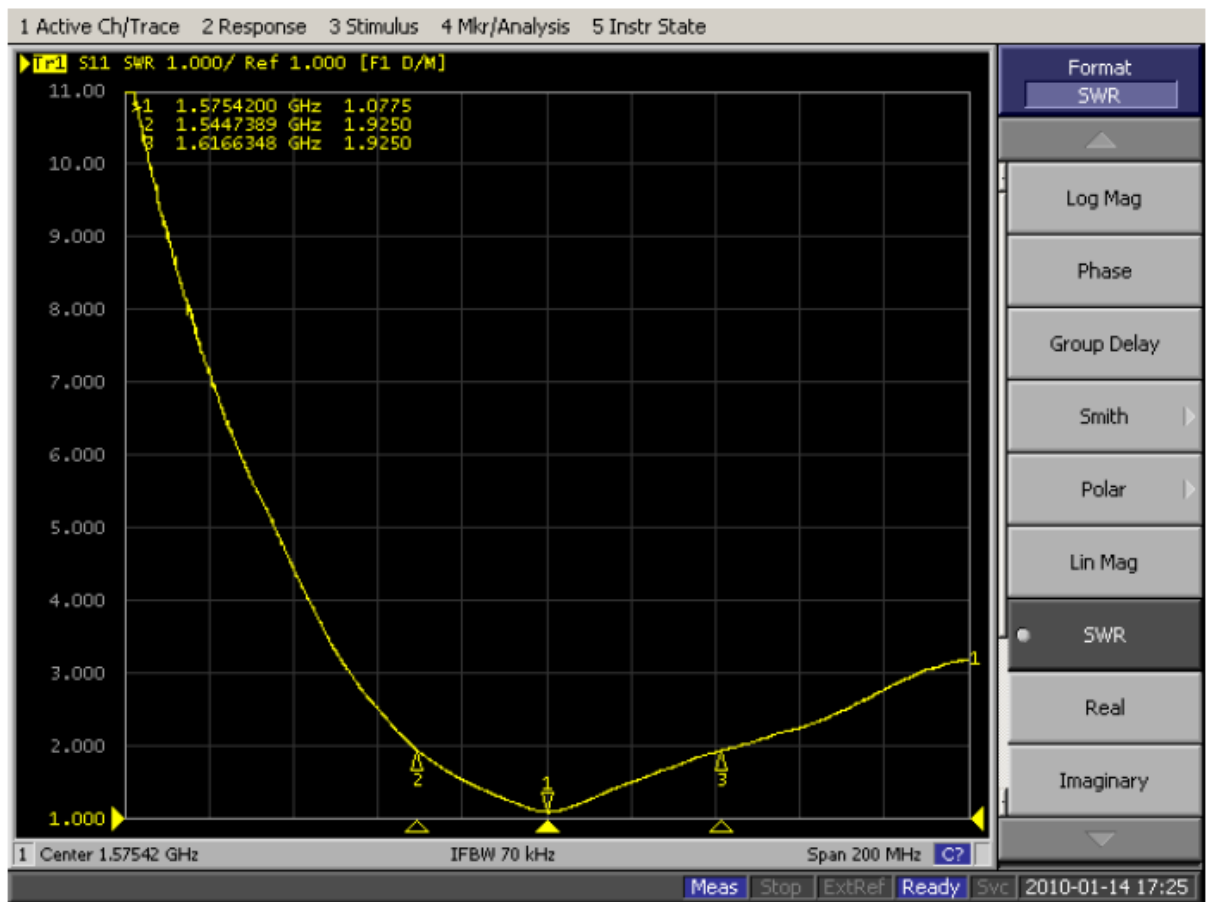


### 5.1.2 $S_{11}$ Log Chart (Return Loss): Bandwidth $S_{11} < -10\text{dB}$

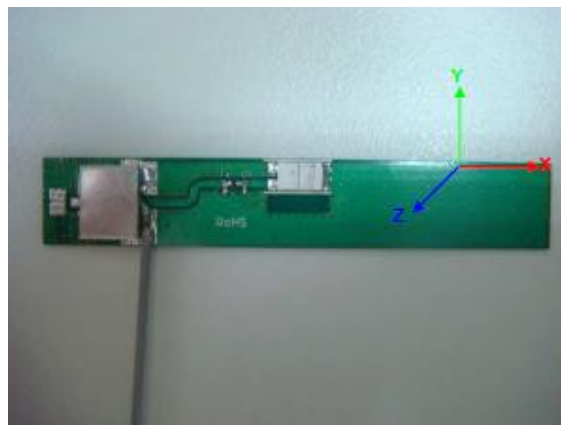




### 5.1.3 S<sub>11</sub> VSR



### 5.1.4 Radiation Patterns (Excluding LNA)

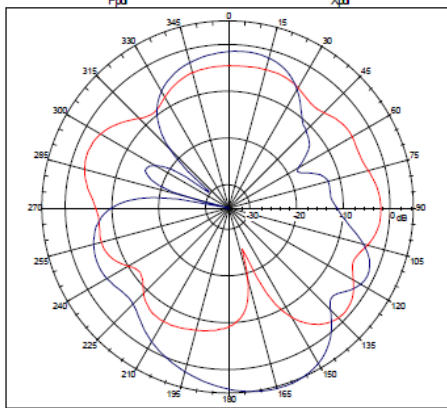


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Enniscorthy, Co. Wexford, Ireland

### XZ-plane

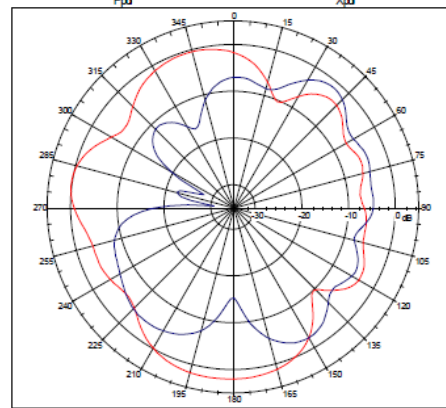
Far-field amplitude of XZ.nsi



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

### YZ-plane

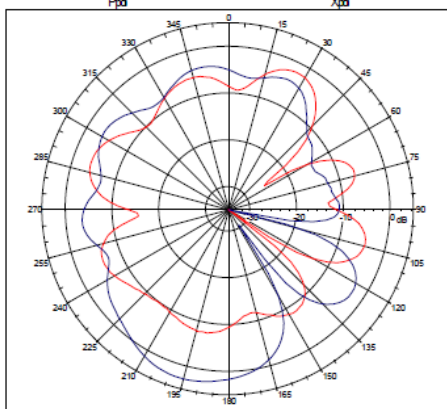
Far-field amplitude of YZ.nsi



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

### XY-plane

Far-field amplitude of XY.nsi



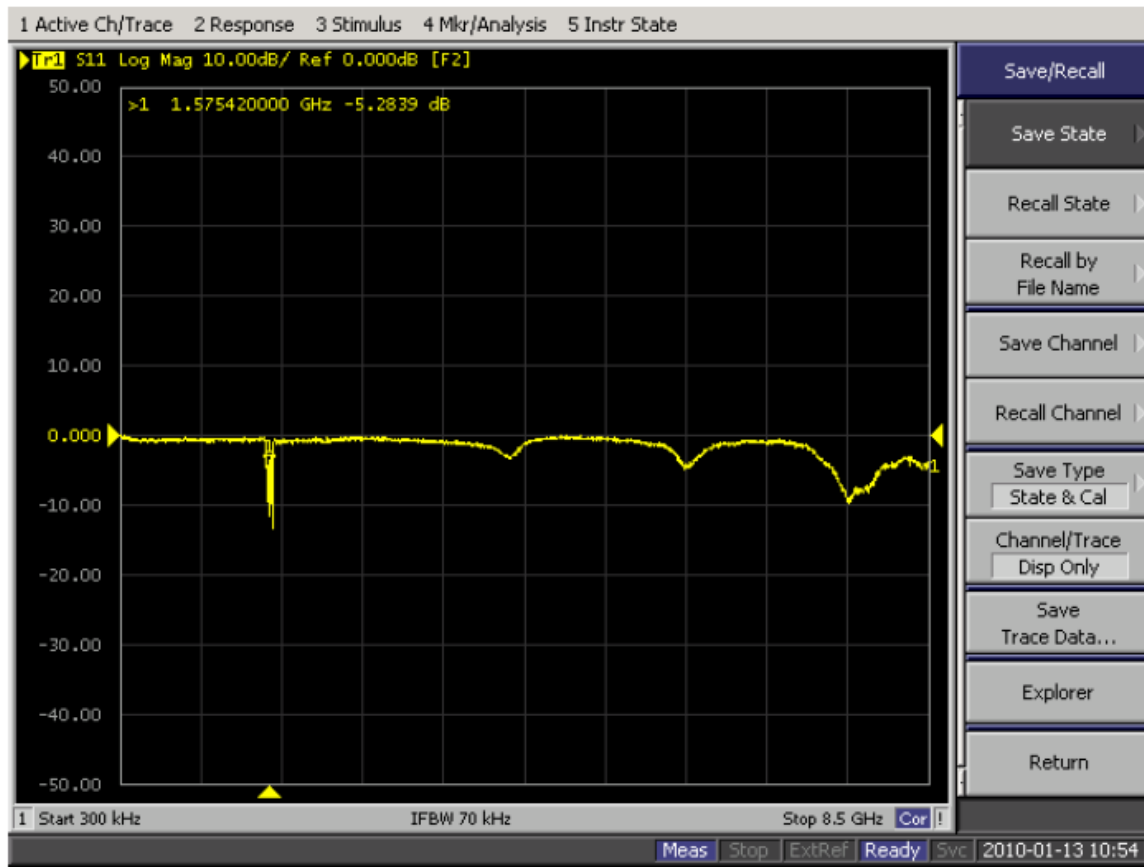
(Peak Gain =2.75dBi, Average Gain =-3.44 dBi )

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

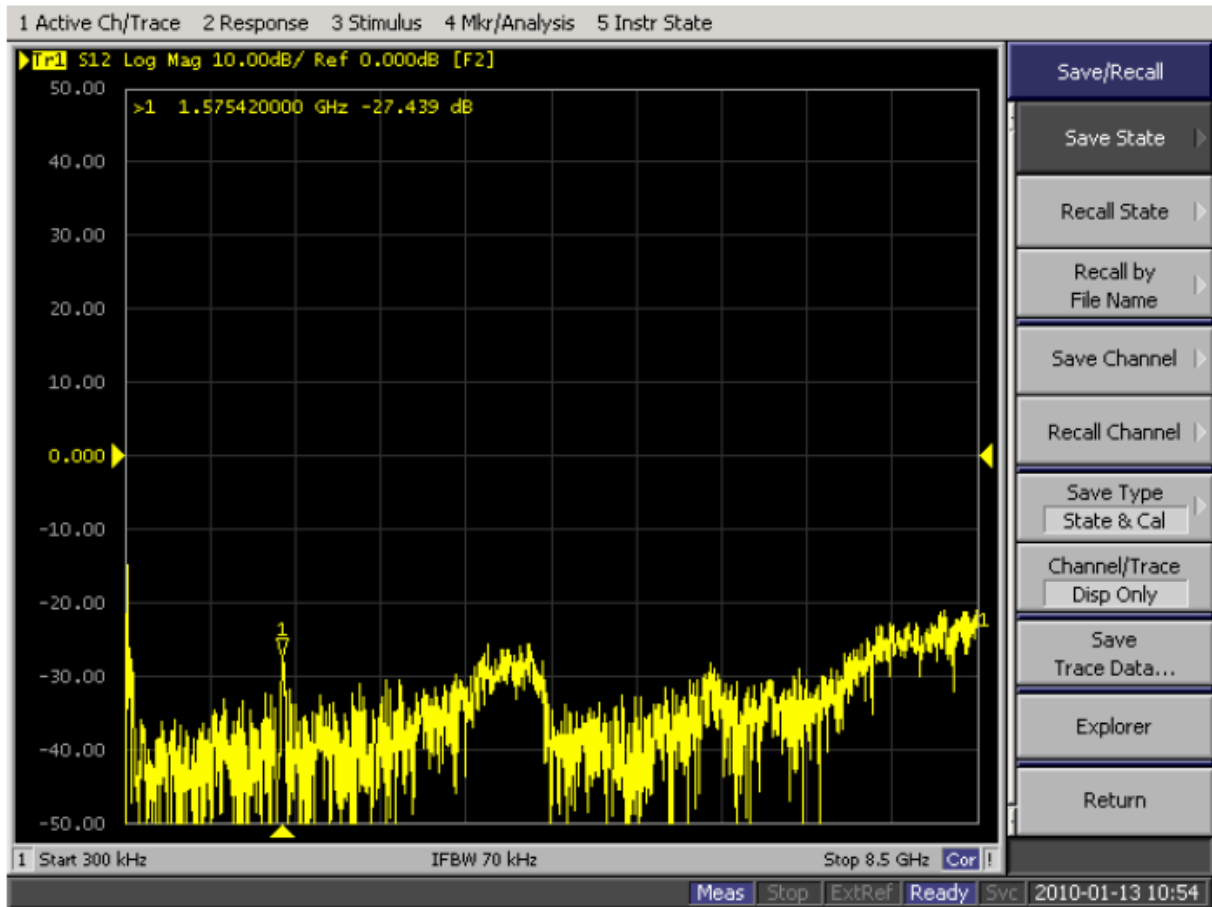
Note: Total Gain = The total power of radiation pattern (exclude LNA Gain from GP8) + LNA Gain - cable loss (1.1dB/m)

## 5.2 Low Noise Amplifier (LNA)

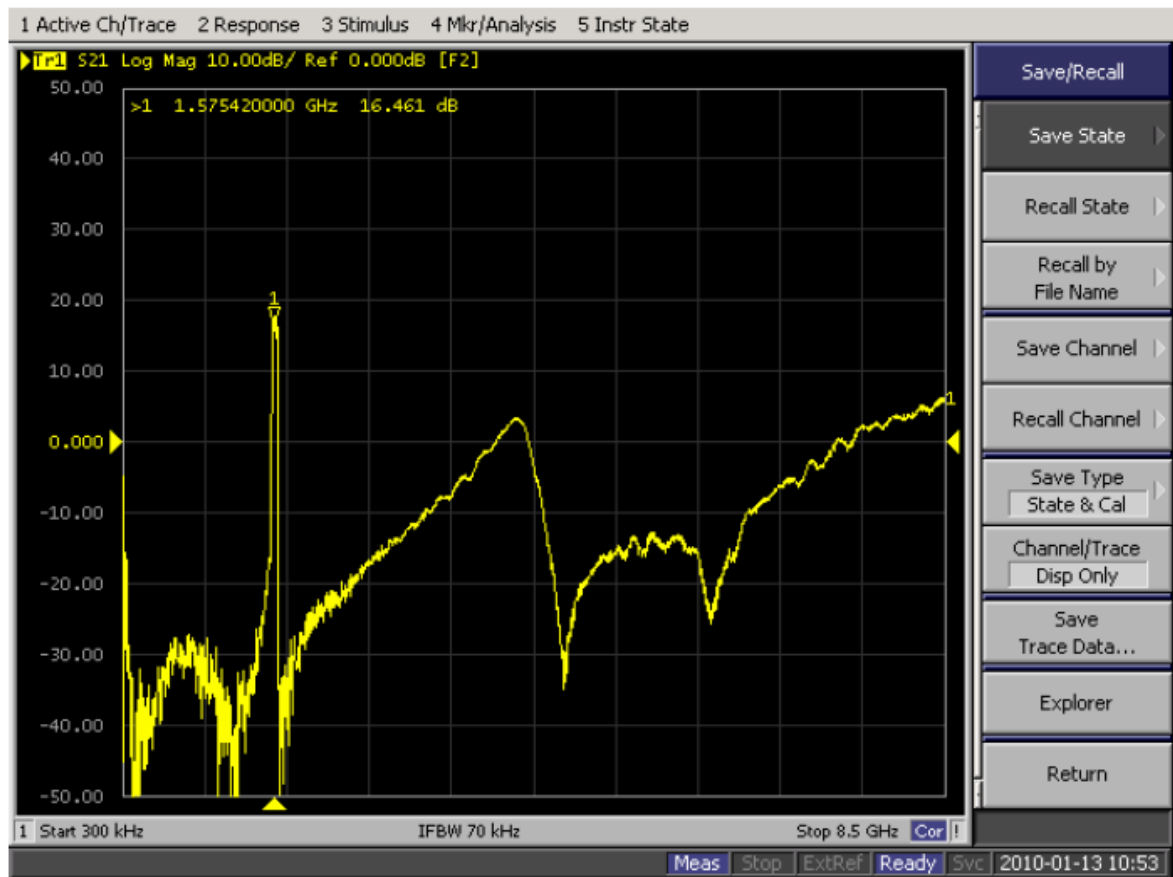
### 5.2.1 $S_{11}$ (network analyzer input power -40dB)



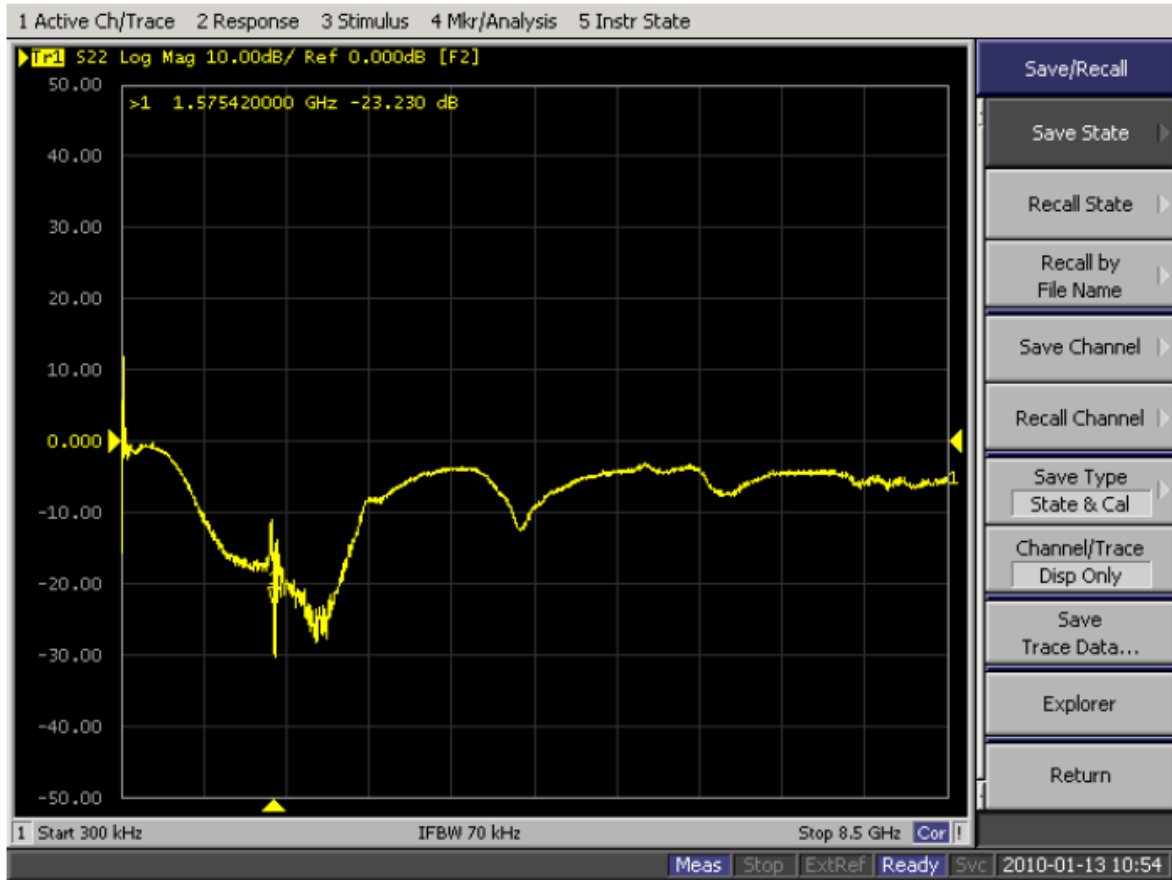
## 5.2.2 $S_{12}$ (network analyzer input power -40dB)



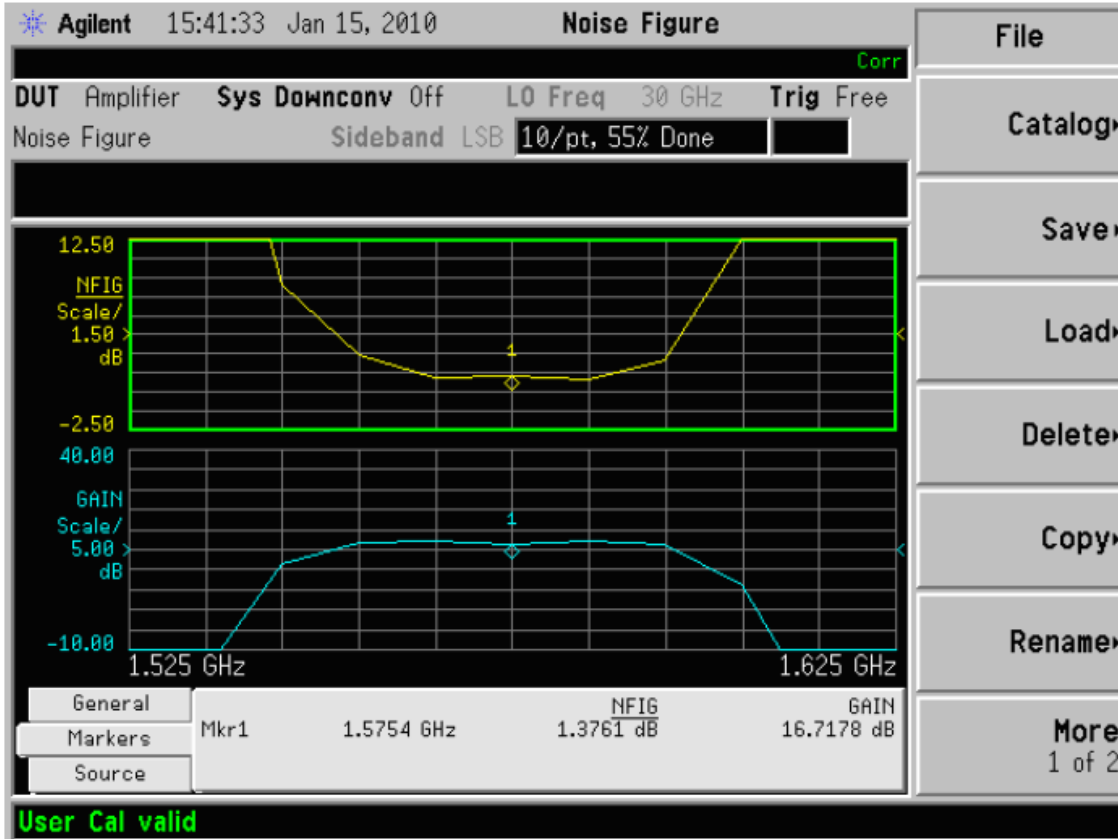
### 5.2.3 $S_{21}$ (Gain) (network analyzer input power -40dB)



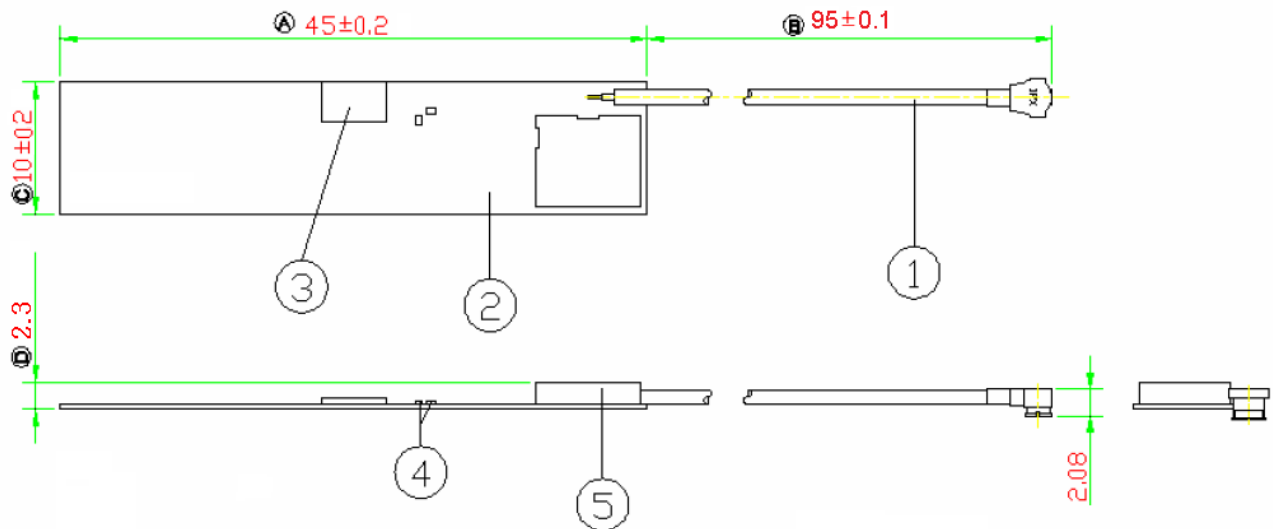
### 5.2.4 $S_{22}$ (Gain) (network analyzer input power -40dB)



### 5.3 Noise Figure



## 6.0 Drawing



1	Cable $\varnothing 1.13$ L= $95 \pm 5$ mm; IPEX MHFI(U.FL)
2	LNA PCB: $45 * 10 * 2.3$ mm
3	Chip Antenna: $5 * 3 * 0.5$ mm
4	R\C
5	Shielding: $8 * 7 * 1.7$ mm