

SPECIFICATION

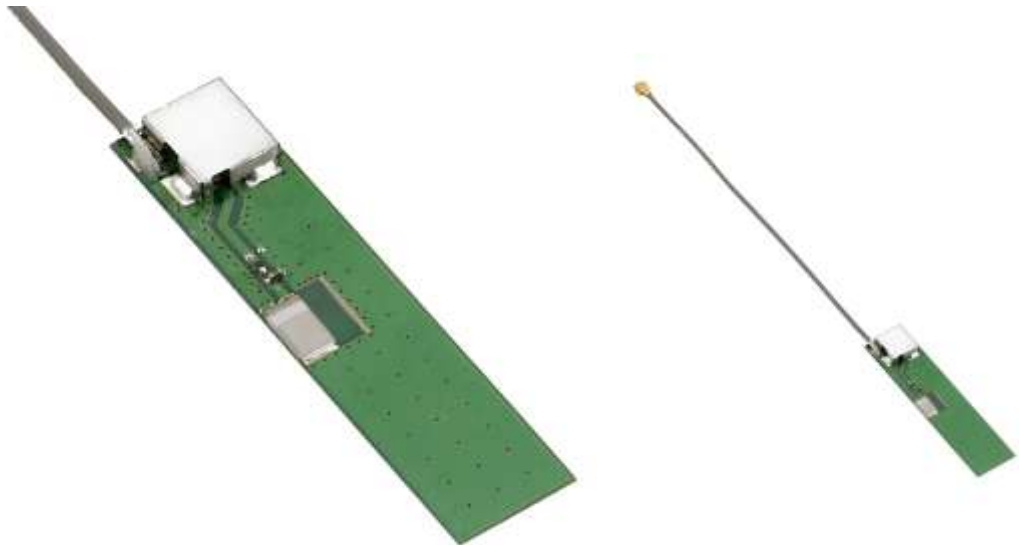
Model No. : **ALA.01**

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. 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. 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 = 2.6~5.0V |
| Current | DC = 13mA at 3.0V |

Cable *& Connector

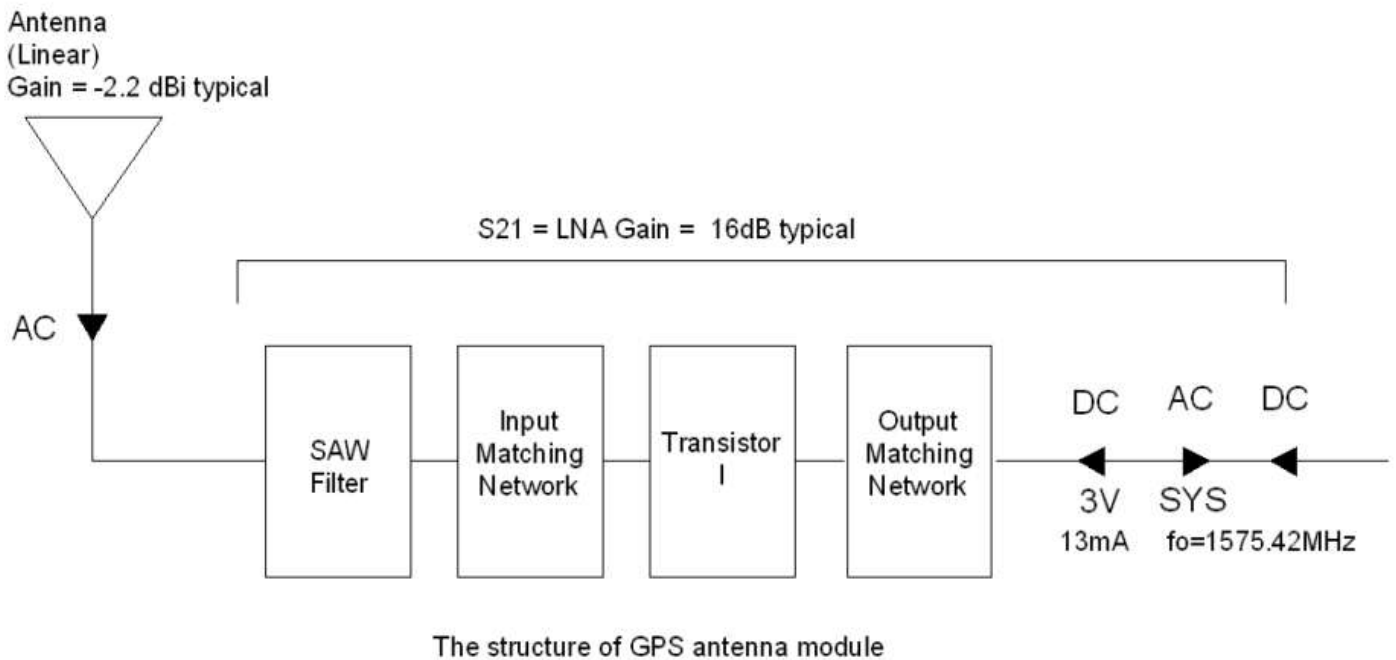
| Parameter | Specification |
|-----------|---------------------------|
| RF Cable | 95±5mm 1.13 Coaxial Cable |
| Connector | IPEX MHF(U.FL) |

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. 2.6V, Typ. 3.0V, Max. 5.0V |
| Dimensions | 45*10*2.3mm |
| Weight | 1.35±0.5g (typical) |

3. Performance Measurement

3.1 Block Diagram



4. Measurement Method

4.1 Chip

a) Reflection Co-efficient Measurement

a. Equipment: Network Analyzer (Agilent E5071A)(Fig.1)

b. Item S₁₁ Log Chart(Return Loss) S₁₁ Smith Chart (impedance)

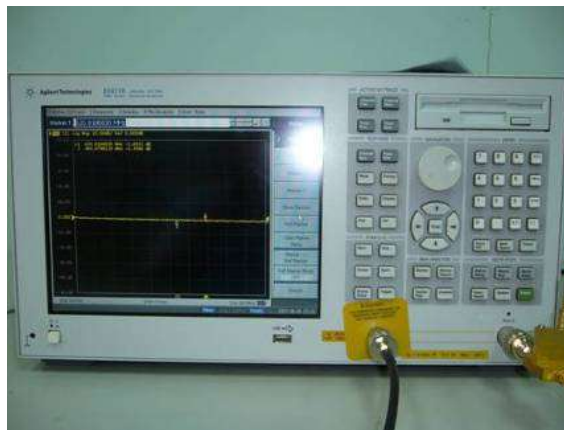


Figure 1. Network Analyzer

b) Pattern Measurement

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

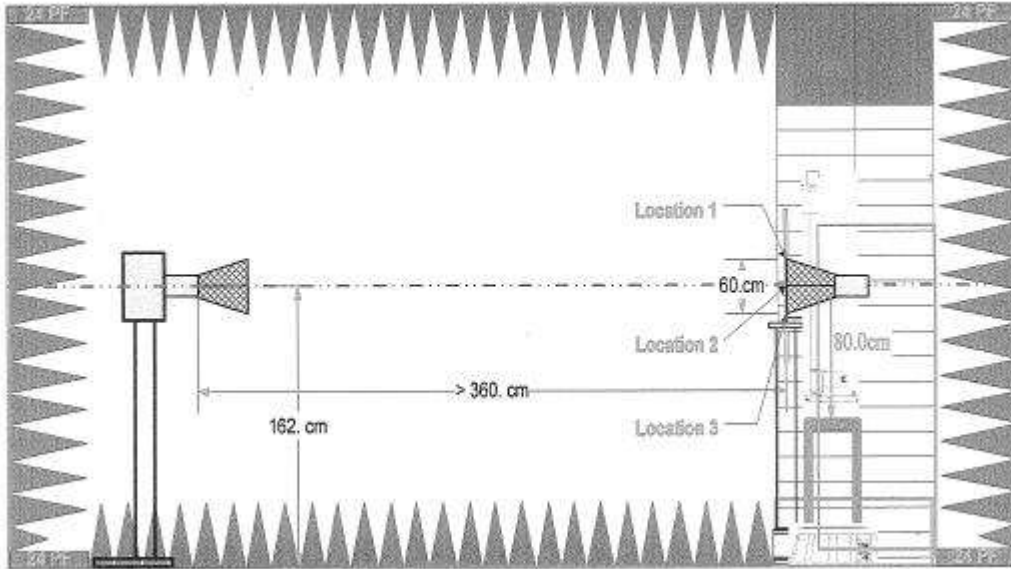


Figure 2. Quiet Room

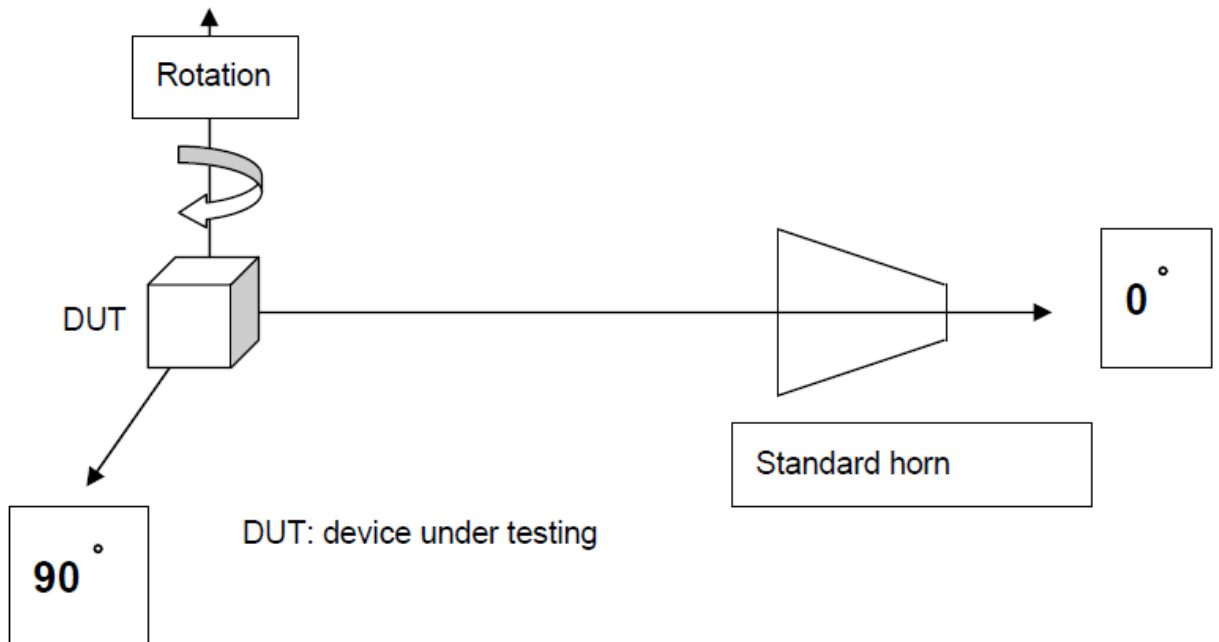


Figure 3. Schematic of measurement set-up

4.2 LNA

a) Parameter Measurement

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

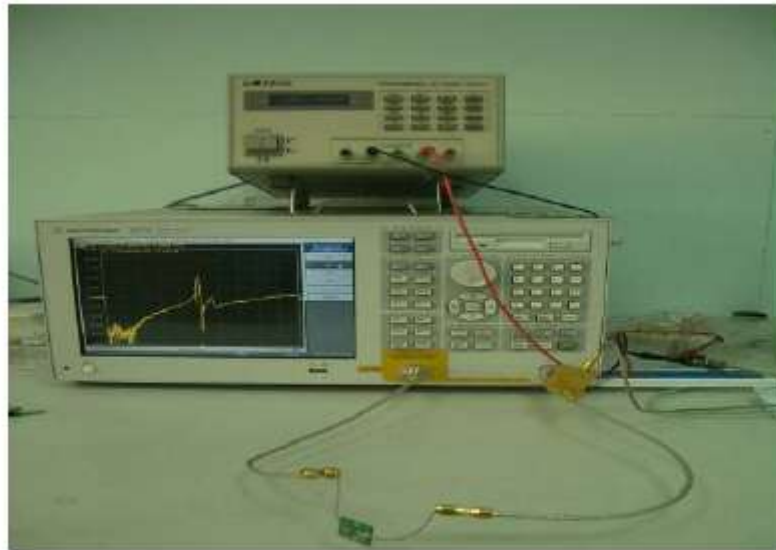


Figure 4. Network Analyzer

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

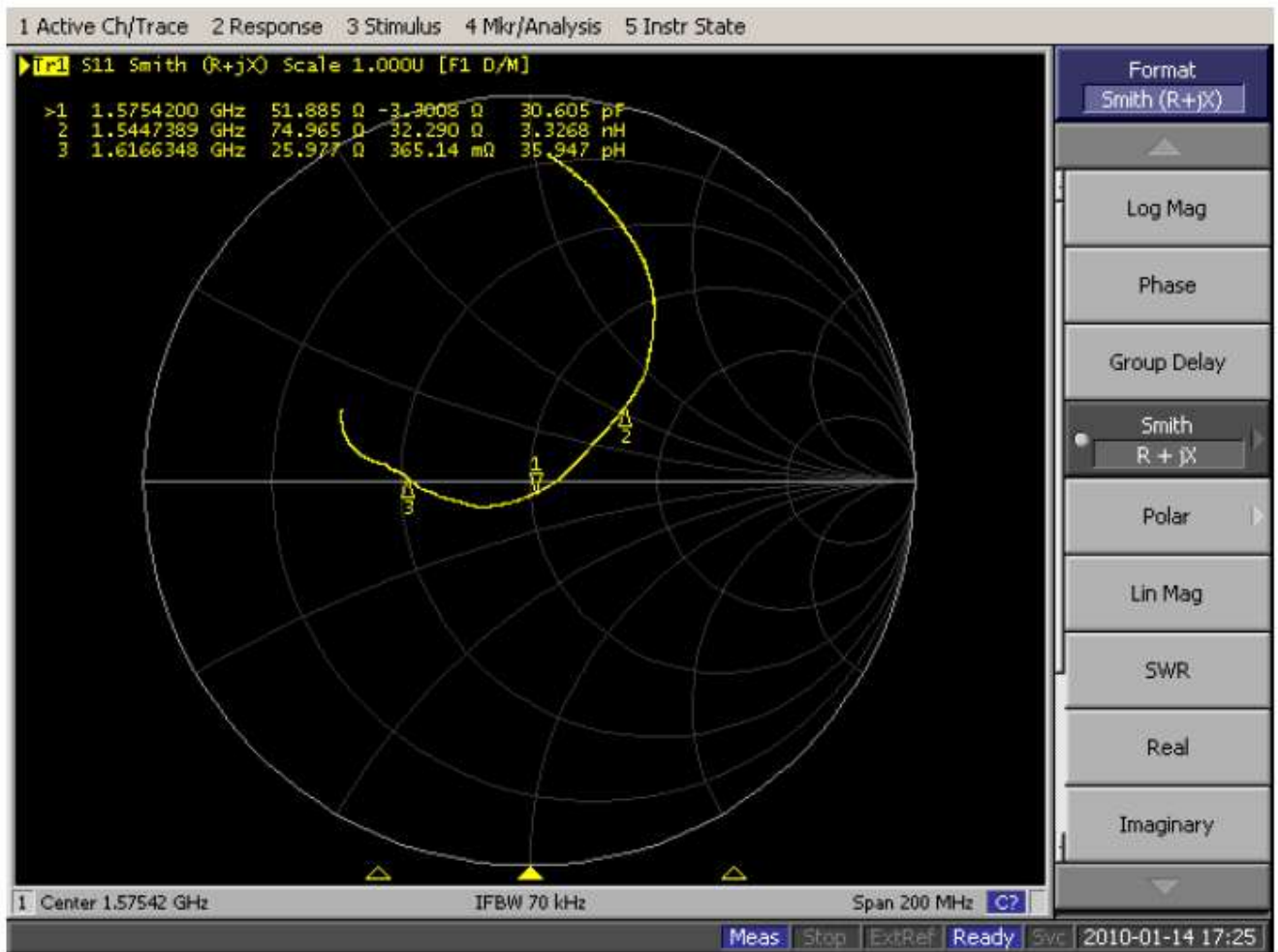


Fig.6 Shielding Room

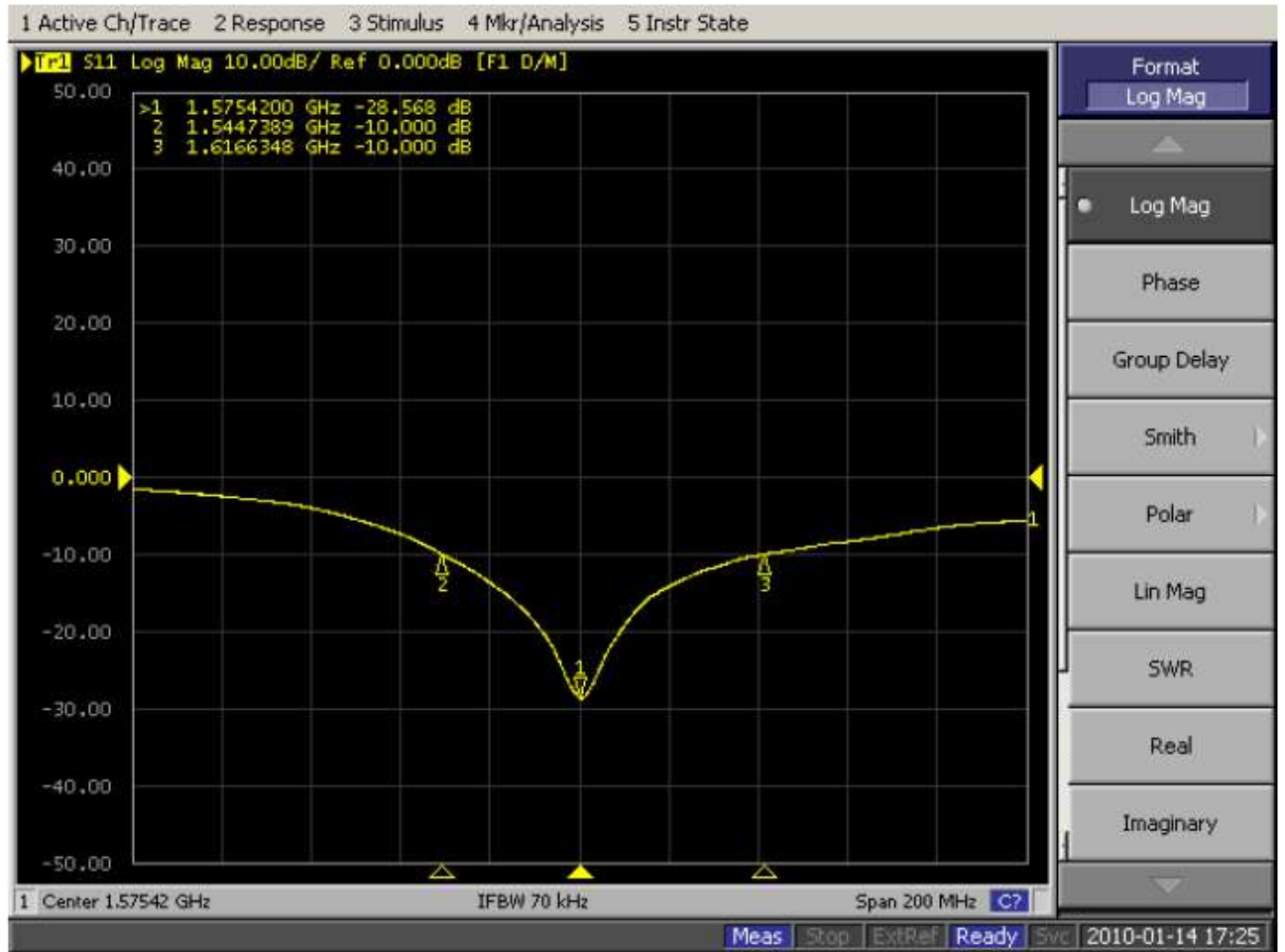
5. Measured Values

5.1 Chip

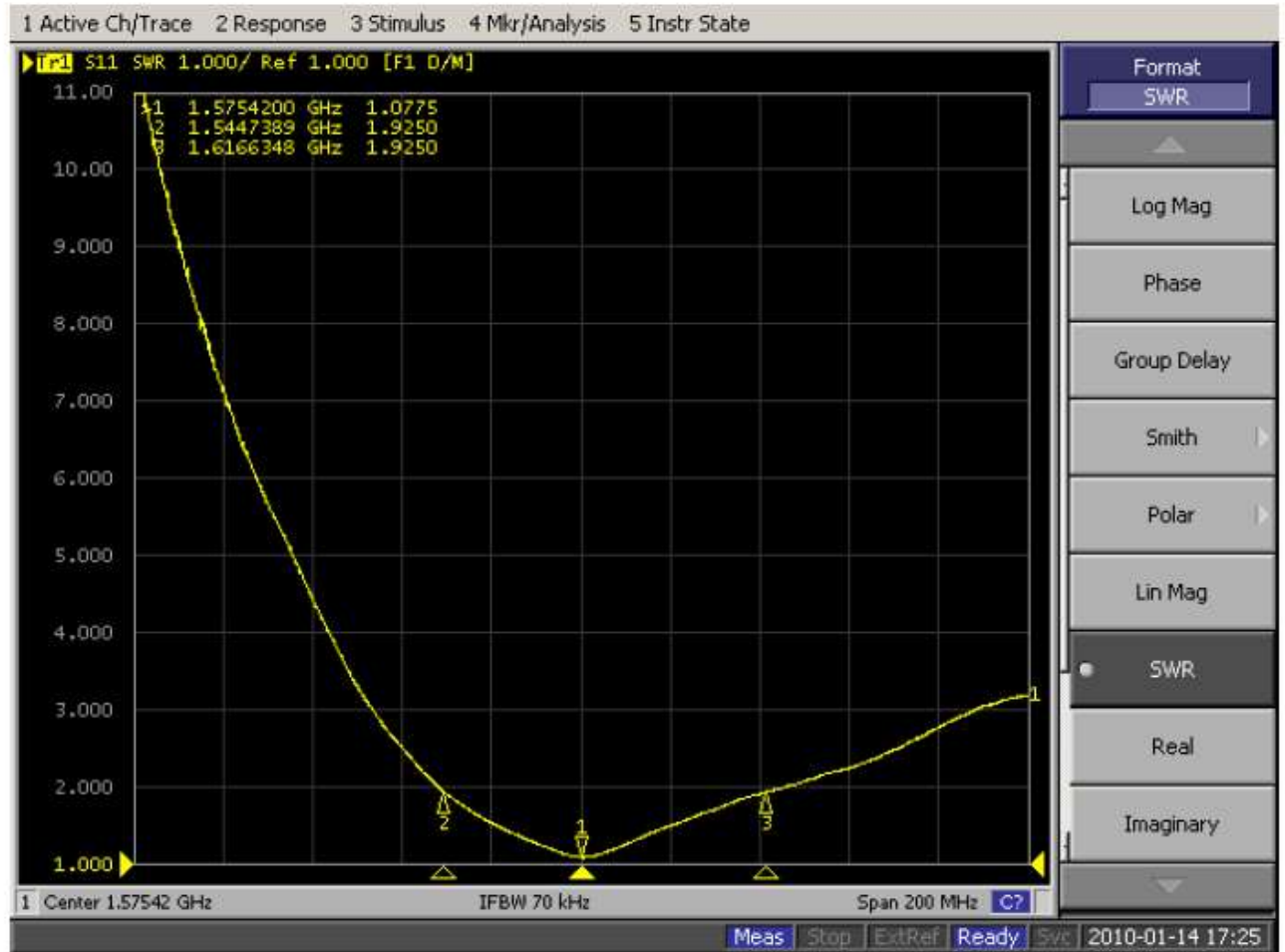
5.1.1 S_{11} Smith Chart (Impedance)



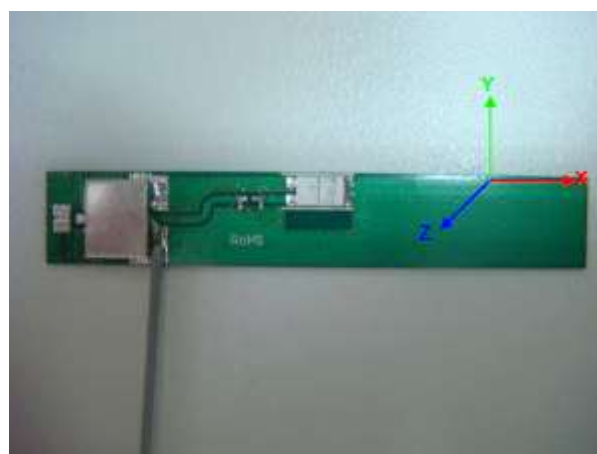
5.1.2 S_{11} Log Chart (Return Loss): Bandwidth $S_{11} < -10\text{dB}$



5.1.3 S₁₁ VSR

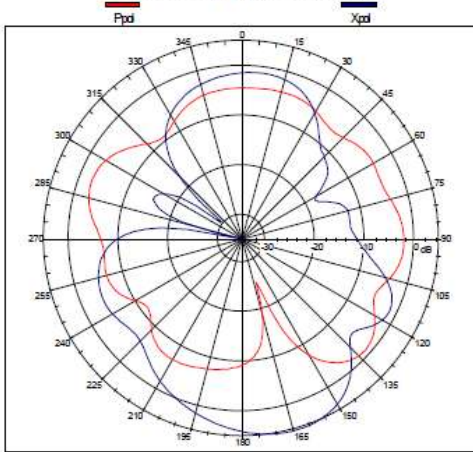


5.1.4 Radiation Patterns (Excluding LNA)



XZ-plane

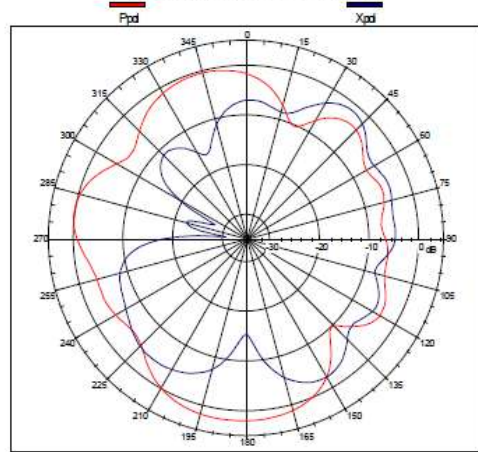
Far-field amplitude of XZ.nsi



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

YZ-plane

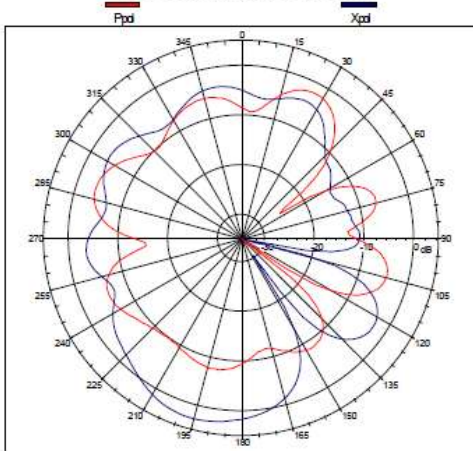
Far-field amplitude of YZ.nsi



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

XY-plane

Far-field amplitude of XY.nsi



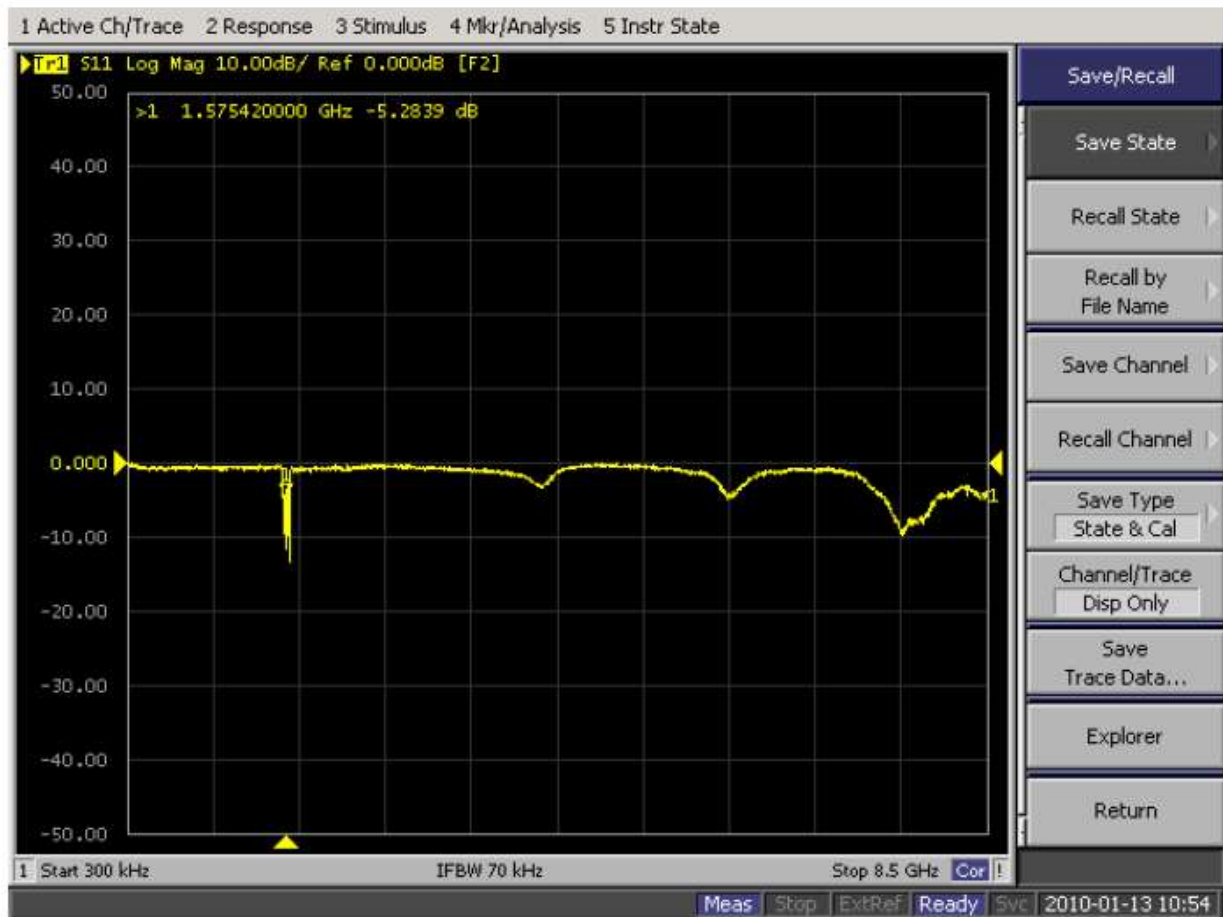
(Peak Gain = 2.75dBi, Average Gain = -3.44 dBi)

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

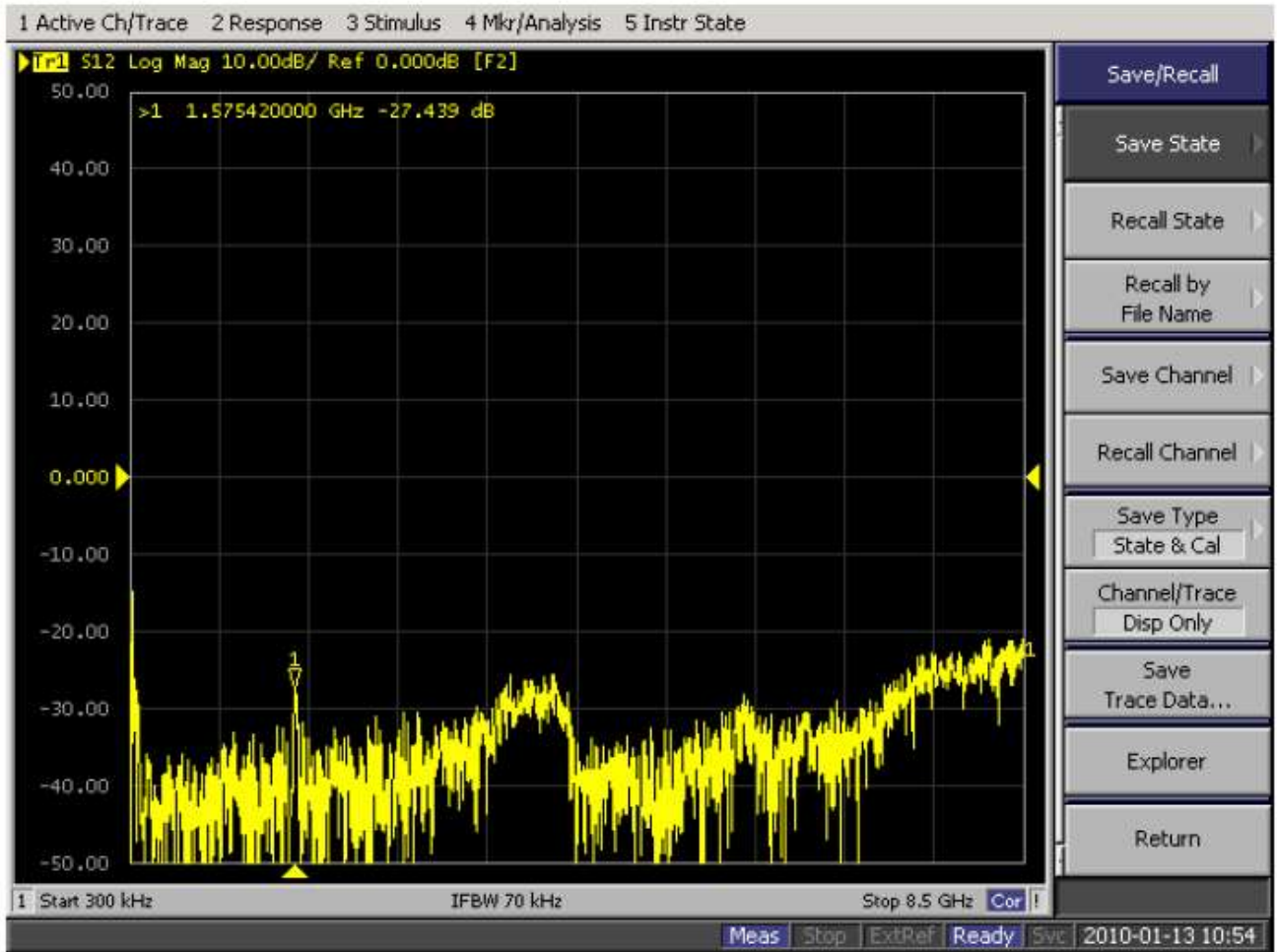
Note: Total Gain = The total power of radiation pattern (exclude LNA Gain from GP8) + LNA Gain - cable loss (1.1dB/m)

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)



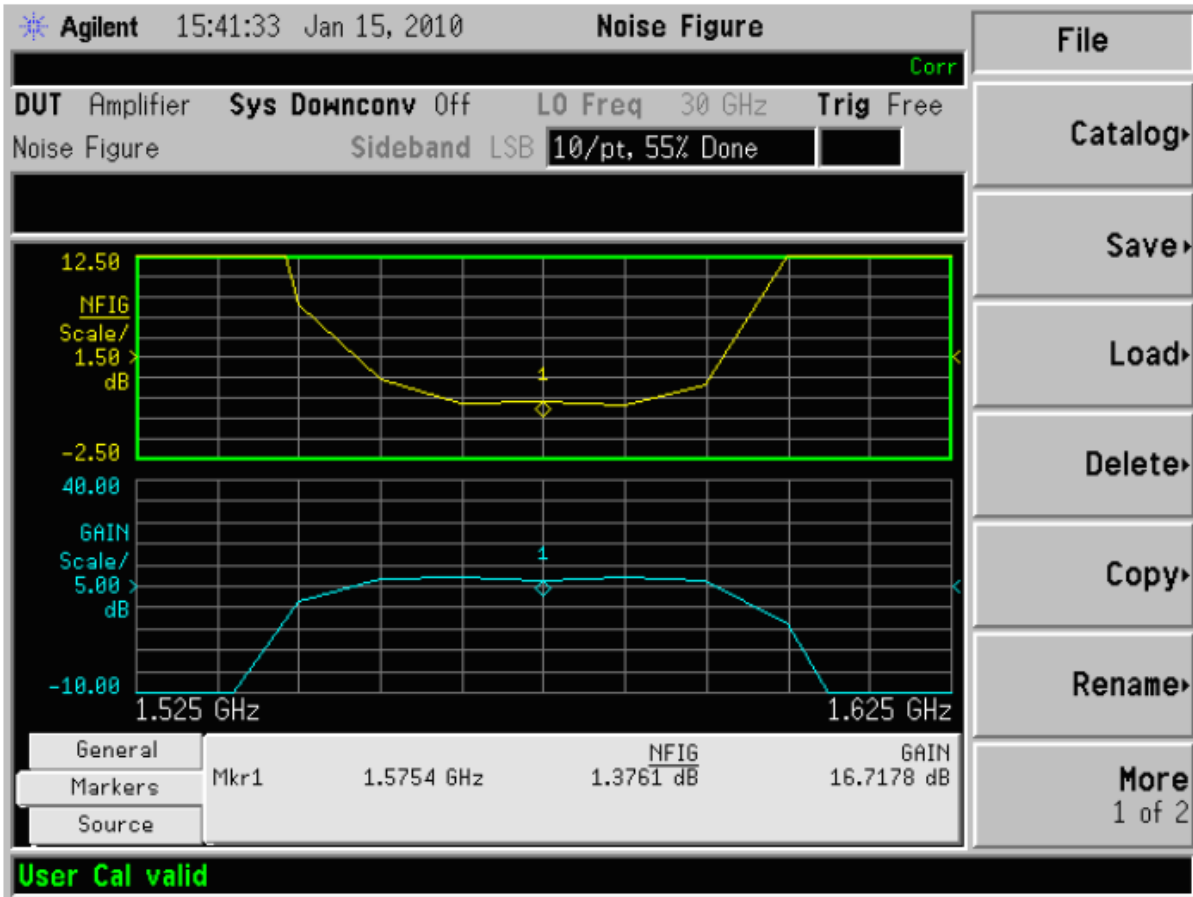
5.2.3 S_{21} (Gain) (network analyzer input power -40dB)



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

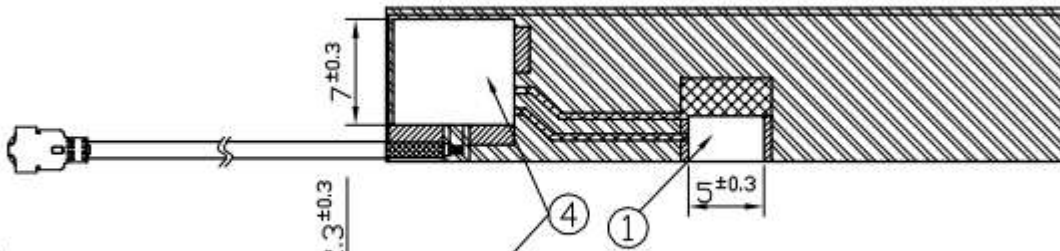


5.3 Noise Figure

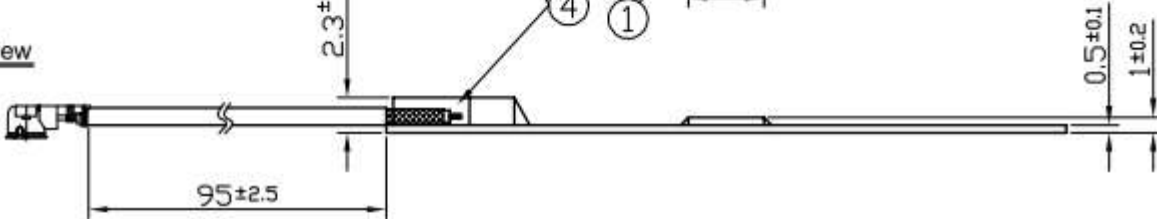


6. Drawing

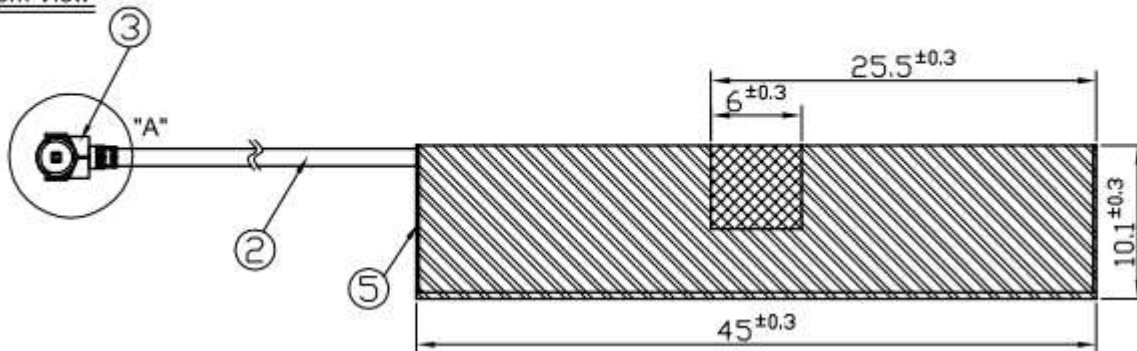
Top View



Side View



Bottom View



| | |
|---|-------------------------|
| 1 | Chip Antenna: 5*3*0.5mm |
| 2 | Cable Ø1.13 L=95±5mm |
| 3 | IPEX MHFI(U.FL) |
| 4 | Shielding Case |
| 5 | PCB |