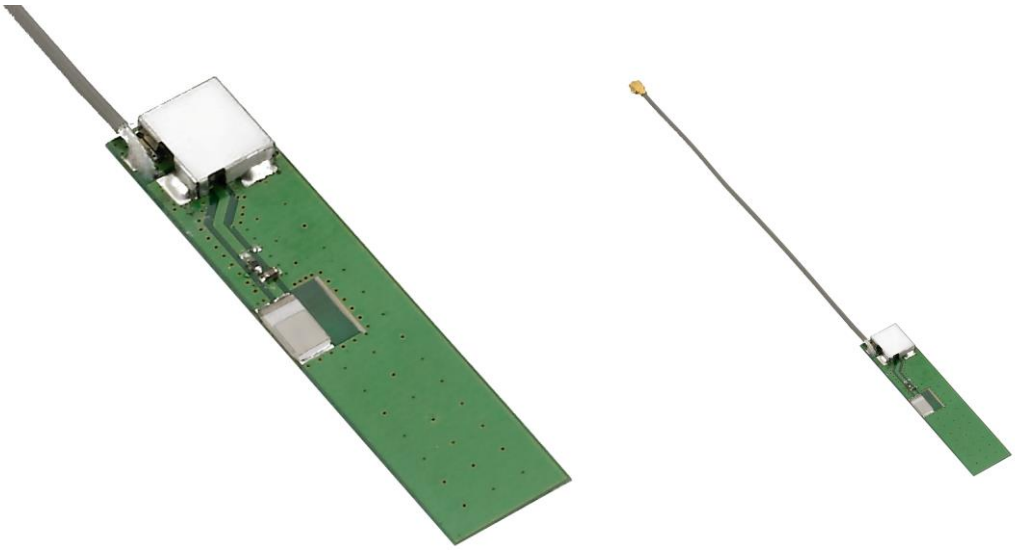
SPECIFICATION

Part No.	:	**ALA.01.07.0095A**
Product Name	:	1575MHz GPS-GALILEO Ceramic Active Loop Module
Features	:	16dB One Stage GPS/GALILEO PCB Dims: 45*10*2.3mmmm RoHS Compliant



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/GALILEO 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.

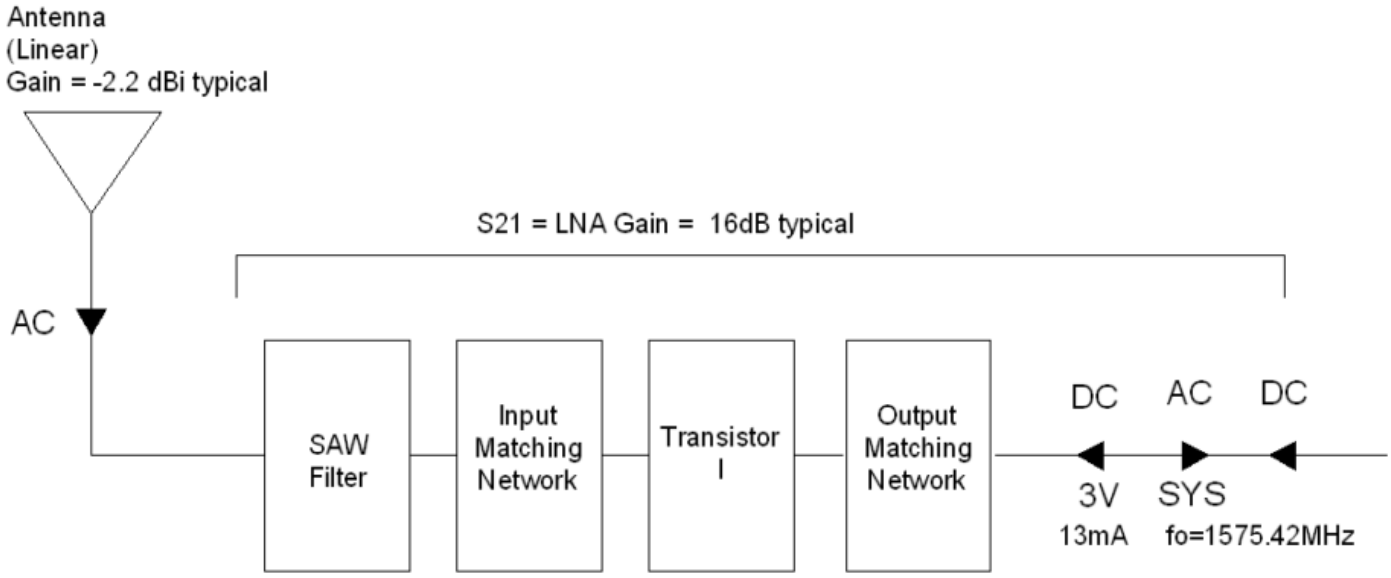
2. Specification

ELECTRICAL	
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
Gain (with LNA)	16 ± 4dB @ 90°
Output Impedance	50Ω
Polarization	Linear
Input Voltage	Min. 2.6V, Typ. 3.0V, Max. 5.0V
LNA	
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

MECHANICAL	
RF Cable	95±5mm 1.13 Coaxial Cable
Connector	IPEX MHF(U.FL)
Dimensions	45*10*2.3mm
Weight	1.35±0.5g (typical)
ENVIRONMENTAL	
Operation Temperature	-40°C to + 85°C
Storage Temperature	-40°C to + 90°C
Humidity	10 to 95%

3. Performance Measurement

3.1. Block Diagram



The structure of GPS antenna module

4. Measurement Method

4.1. Chip

a) Reflection Co-efficient Measurement

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

b. Item S_{11} Log Chart(Return Loss) S_{11} Smith Chart (impedance)

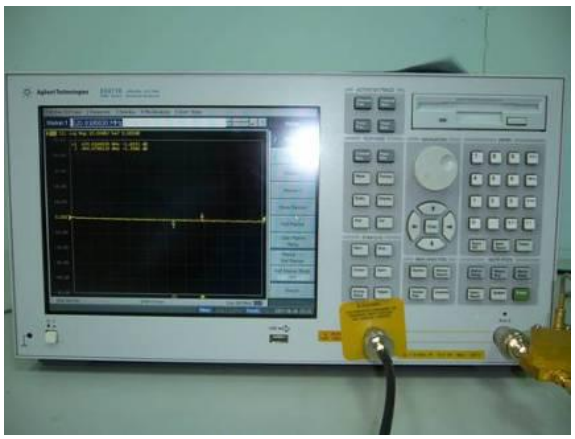


Figure 1. Network Analyzer

a) Pattern Measurement

a. Equipment: Anechoic Chamber (Fig. 2), Network Analyzer (Aglient E8753ES)

b.Item: Gain Pattern, Axial ratio

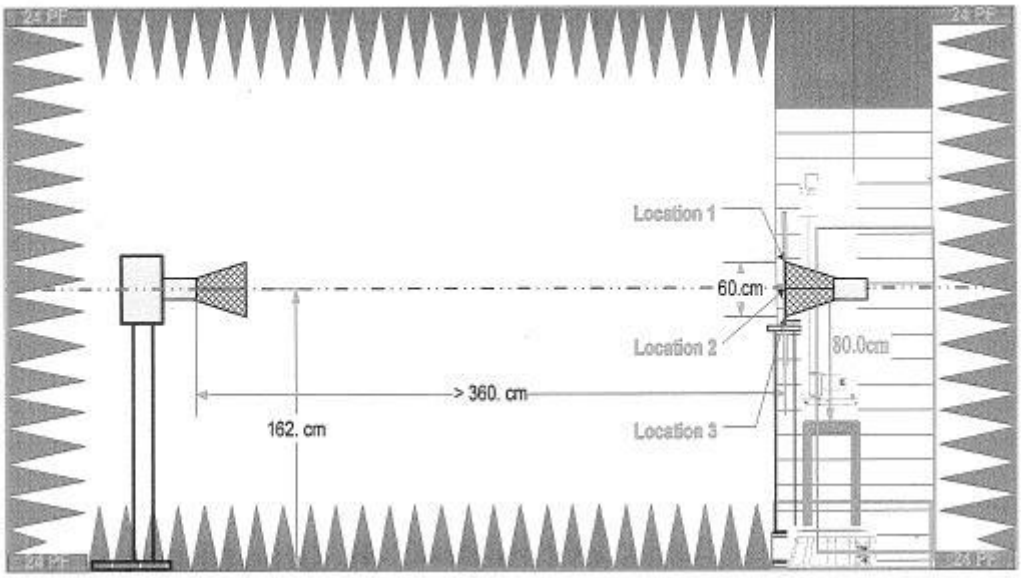


Figure 2. Quiet Room

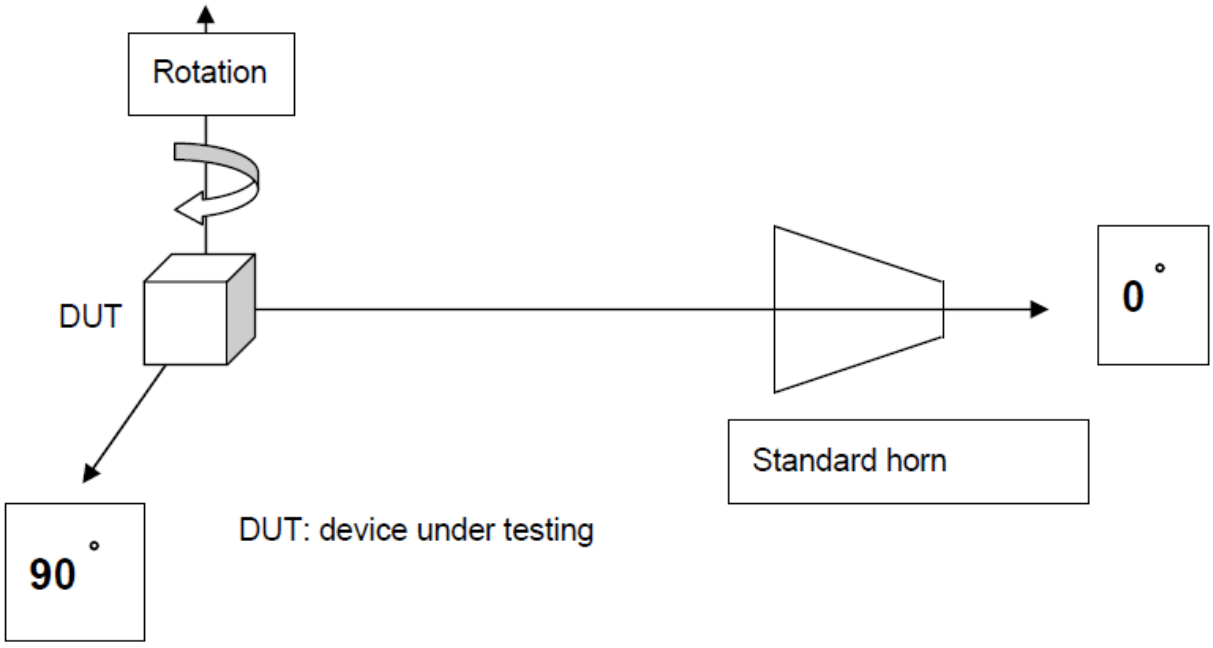


Figure 3. Schematic of measurement set-up

4.2. LNA

a) Parameter Measurement

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

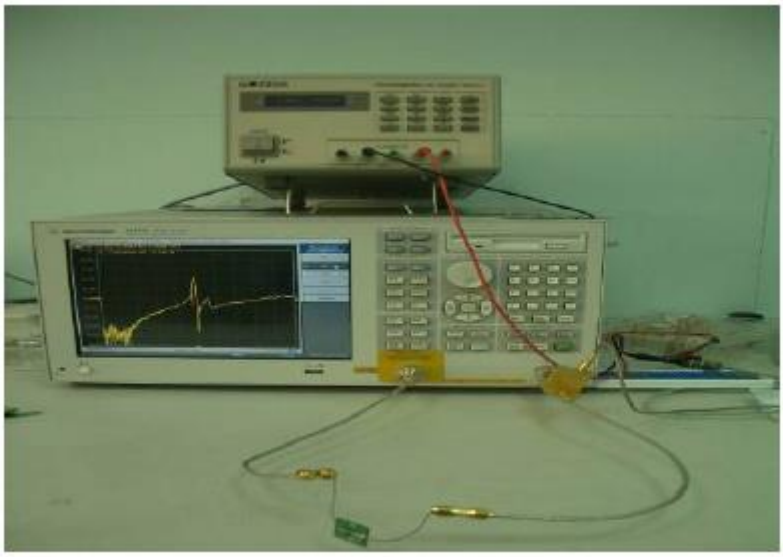


Figure 4. Network Analyzer

a) Noise Figure Measurement

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

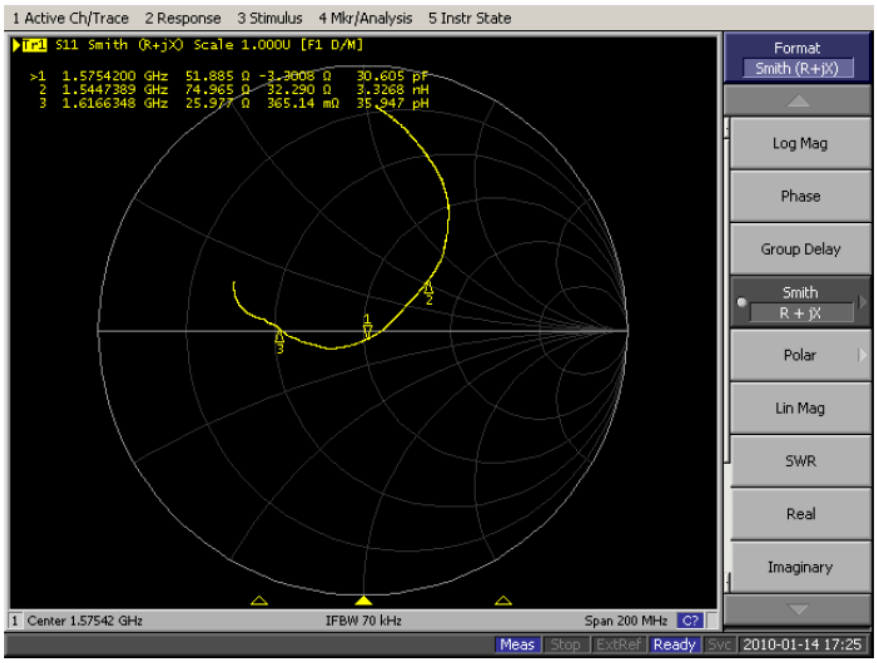
Fig. 5 Noise Meter

Fig.6 Shielding Room

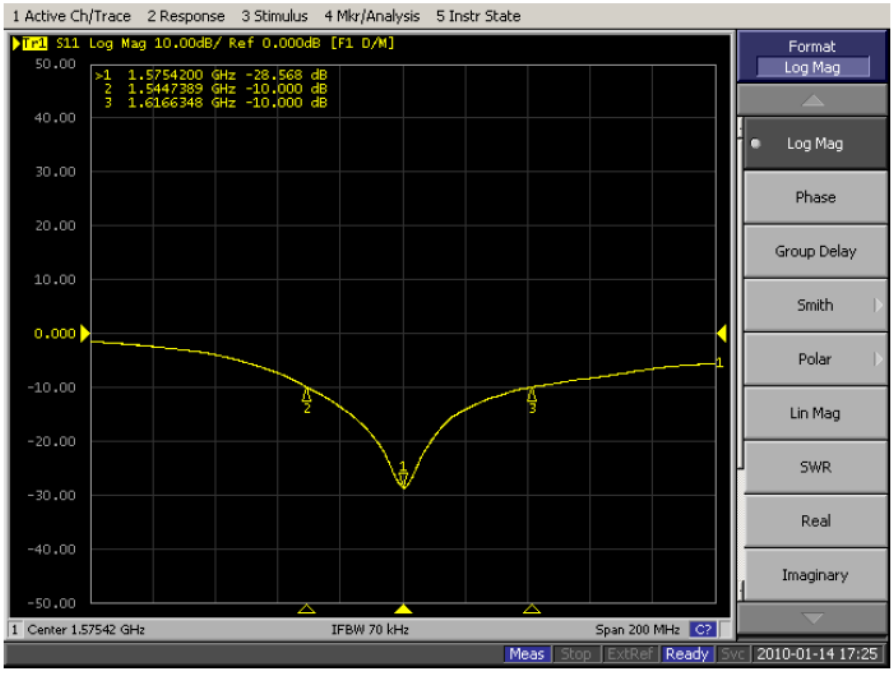
5. Measured Values

5.1. Chip

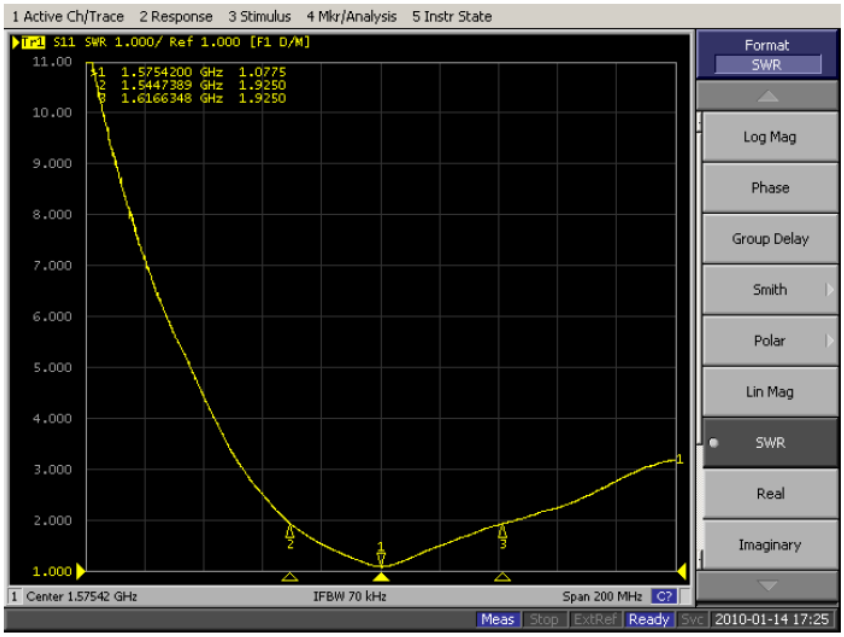
5.1.1. S_{11} Smith Chart (Impedance)



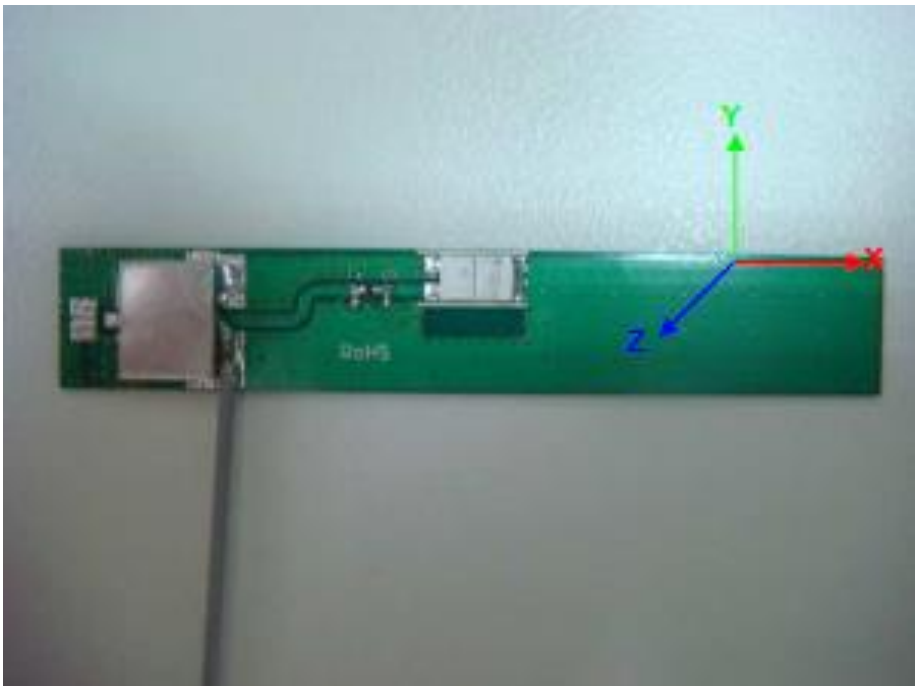
5.1.2. S_{11} Log Chart (Return Loss): Bandwidth S_{11} <-10dB



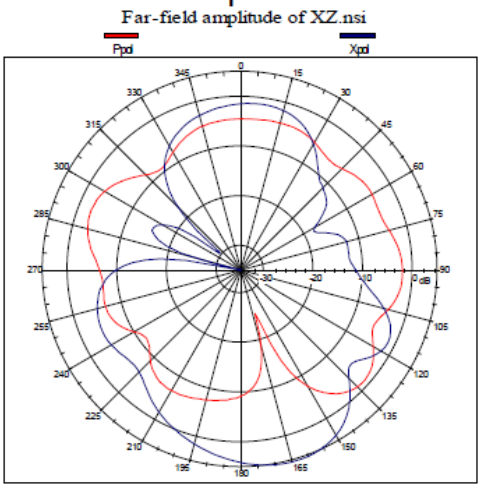
5.1.3. S_{11} VSR



5.1.4. Radiation Patterns (Excluding LNA)

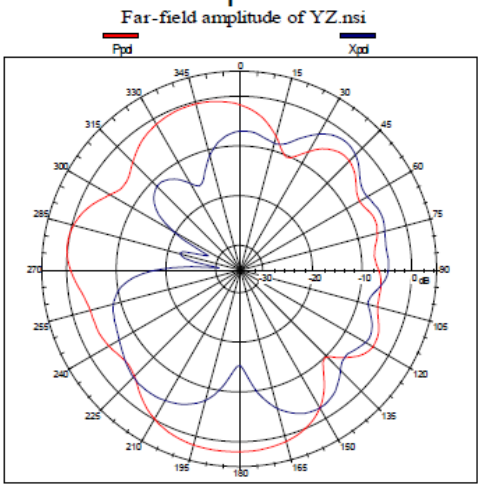


XZ-plane



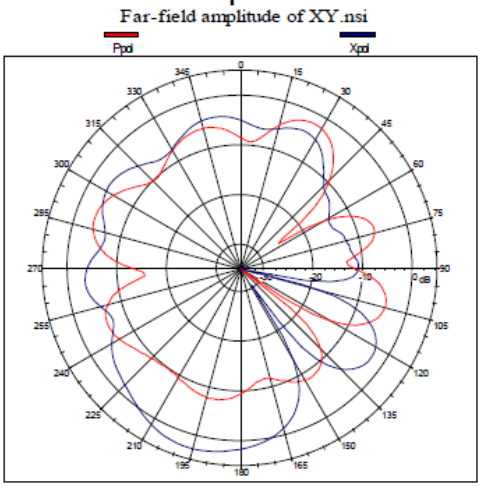
(Peak Gain =4.92 dBi, Average Gain =-1.62 dBi)

YZ-plane



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

XY-plane



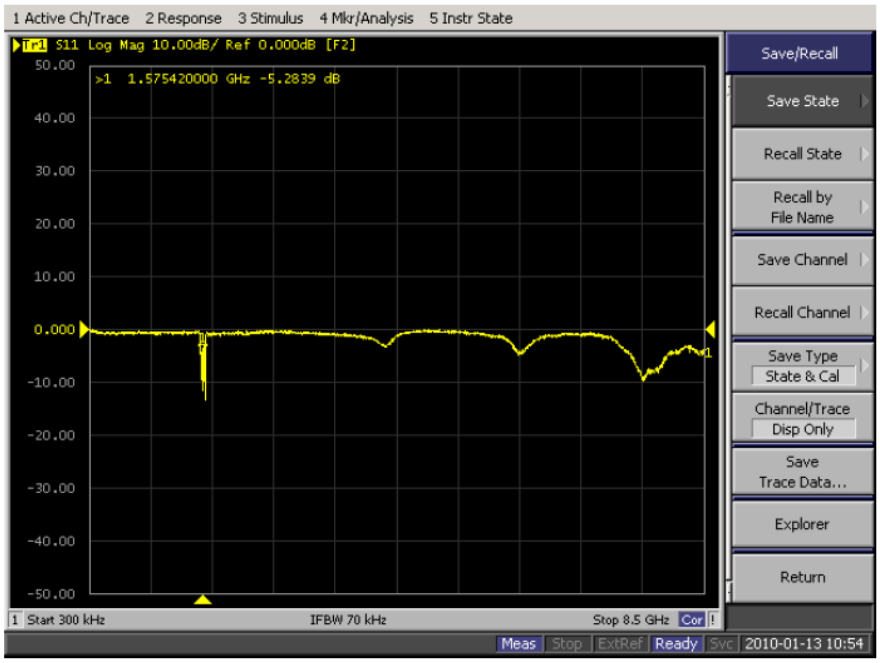
(Peak Gain =2.75dBi, Average Gain =-3.44 dBi)

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

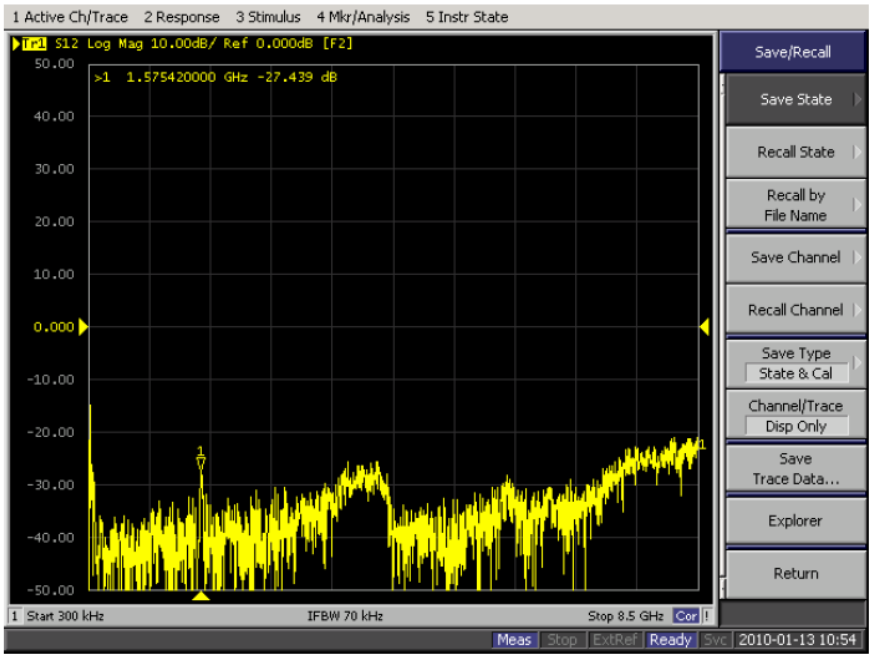
Note: Total Gain = The total power of radiation pattern (exclude LNA Gain from GP8) + LNA Gain - cable loss (1.1dB/m)

5.2. Low Noise Amplifier (LNA)

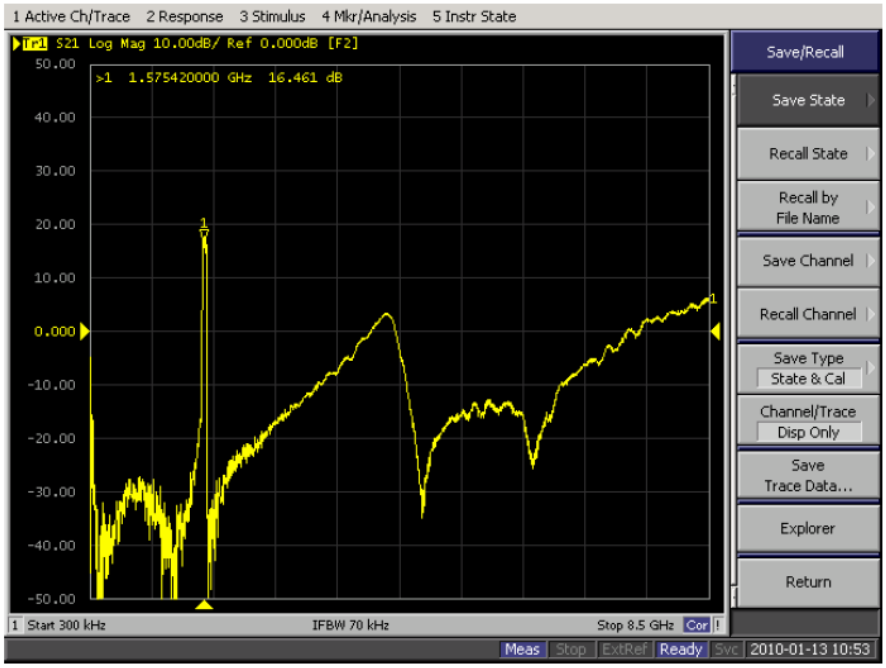
5.2.1. S_{11} (network analyzer input power -40dB)



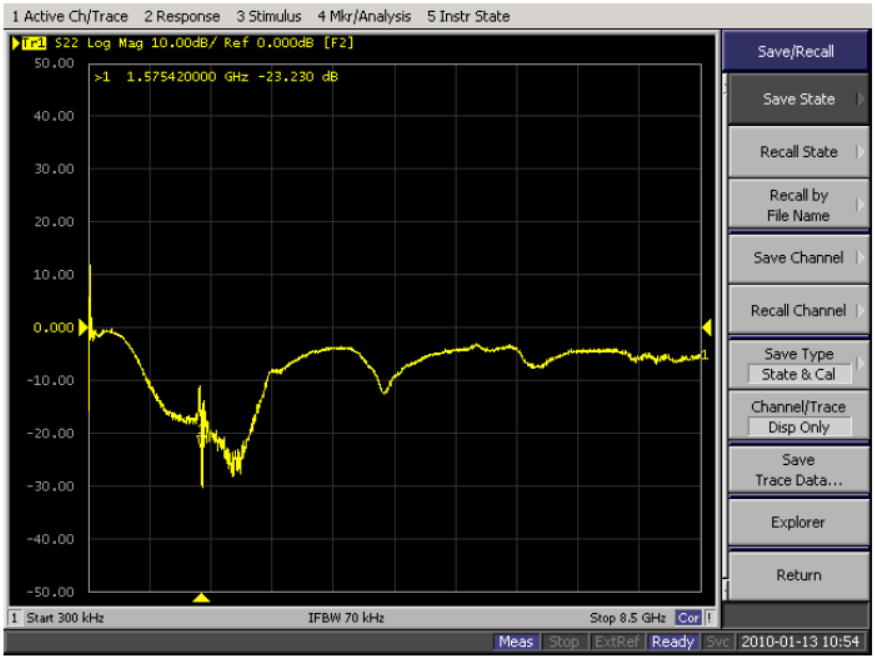
5.2.2. S_{12} (network analyzer input power -40dB)



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



5.2.4. $_{22}$ (Gain) (network analyzer input power -40dB)



5.3. Noise Figure