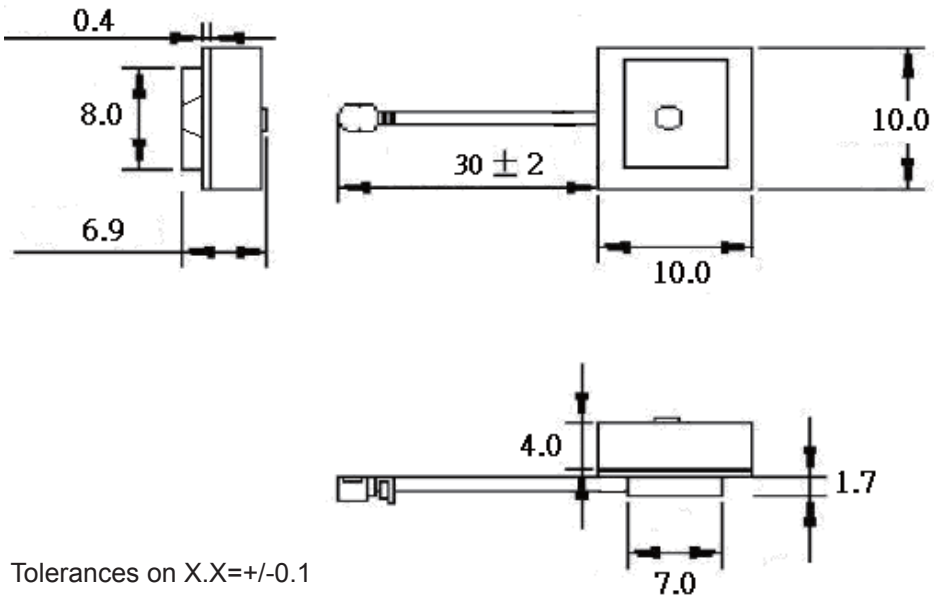
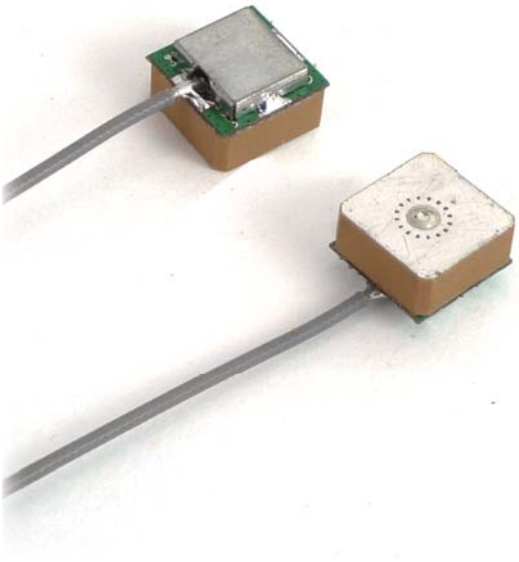
AE023 GPS Module Antenna

Active Patch Antenna with Embedded LNA Module

Product No. **AE02353GPS000**

Dimensions (unit: mm)





Tolerances on X.X=+/-0.1

Application

- Navigation systems or position tracking systems
- Hand-held devices when GPS function is needed, e.g., PDA, Smart phone, PND.

Features

- Stable and reliable in performances
- Low temperature coefficient of frequency
- Compact size
- RoHS compliance

Physical Specification

Dimensions	10 x 10 x 6.9 mm	
Weight	3.3 ± 0.3 g (typ)	
Operating Condition	Temperature	-40 °C ~ +85 °C
	Humidity	10 ~ 95% RH
Storage Condition	Temperature	-40 °C ~ +90 °C
	Humidity	10 ~ 95% RH

Electrical Specification

Patch antenna	
Center Frequency	1575.42 ± 1.023 MHz when covered with a radome and measured by LNA ground plane
Bandwidth (under 10dB return loss)	11 MHz typ.
Impendance	50 Ω
Gain at Zenith	-2 dBic typ.
Gain at 10° elevation	-5 dBic typ.
Polarization	R.H.C.P
Axial Ratio	3.0 dB typ.
Patch size	10 x 10 x 4 mm
LNA	
Center Frequency	1575.42 ± 1.023 MHz
Gain	16 dB at 3V
Noise Figure	1.2 dB at 3V
Filter (Out of band attenuation)	Saw filter
	40dB typ. fo±50MHz
	45dB Min. fo±100MHz
	(fo=1575.42MHz)
Output V.S.W.R	2.0 Max.
Input Voltage	DC = 3.0±0.5V
Current	DC =13mA at 3V

All value are defined at 25±15 °C ,65±20 % RH, power handling 1 μw, air pressure 960 ±100 HPA unless otherwise noted.

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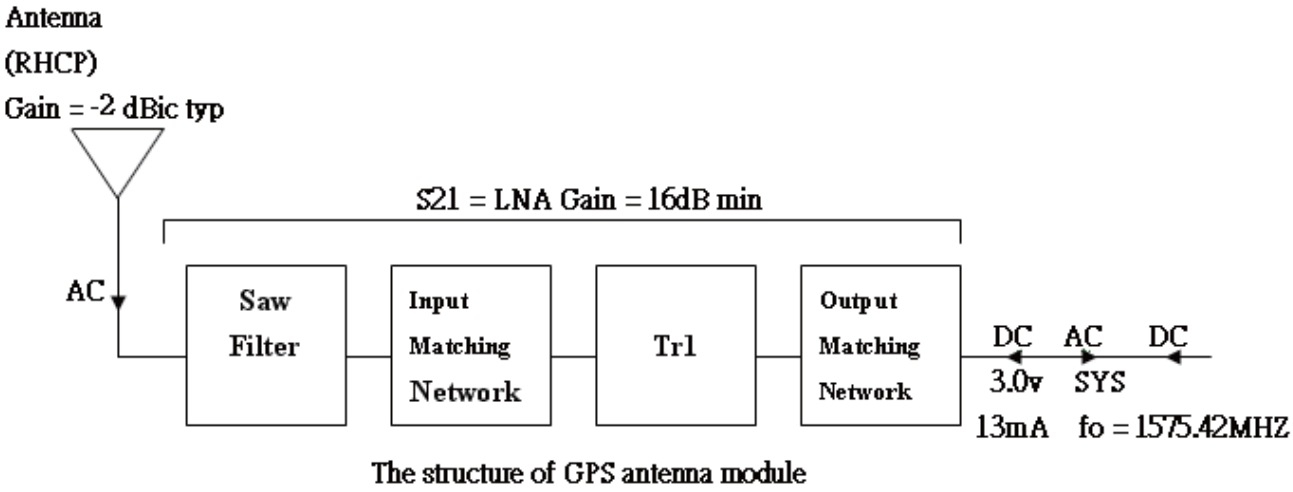
Block diagram



The structure of GPS antenna module

Measurement method Patch

1. Reflection Coefficient Measurement
   Equipment : Network Analyzer(Agilent E5071A)(Fig.1)
   Item : S_{11} Log Chart(Return loss), S_{11} Smith Chart(Impedance)

Fig.1 Network Analyzer

2. Pattern Measurement
   Equipment : Anechoic Chamber(Fig. 2), Network Analyzer(Agilent E8753ES), Standard Horn
   Item : Gain pattern, Axial ratio

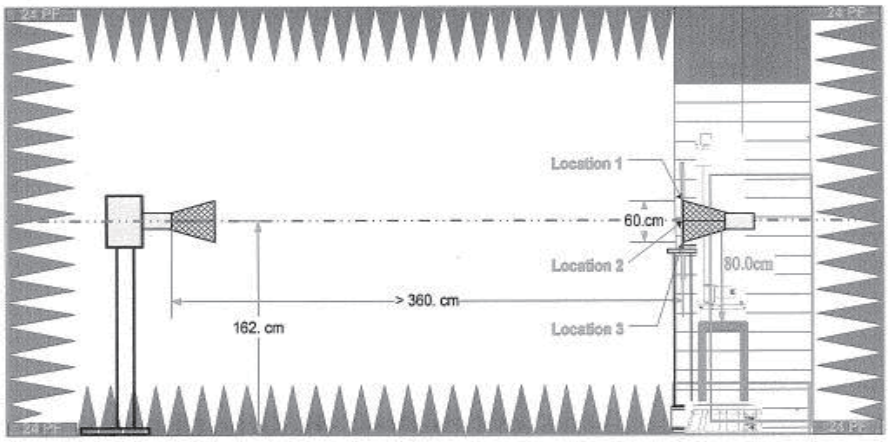


Fig.2 Quiet zoom

The plane defined in the fig3 which we measured the face of gain pattern.

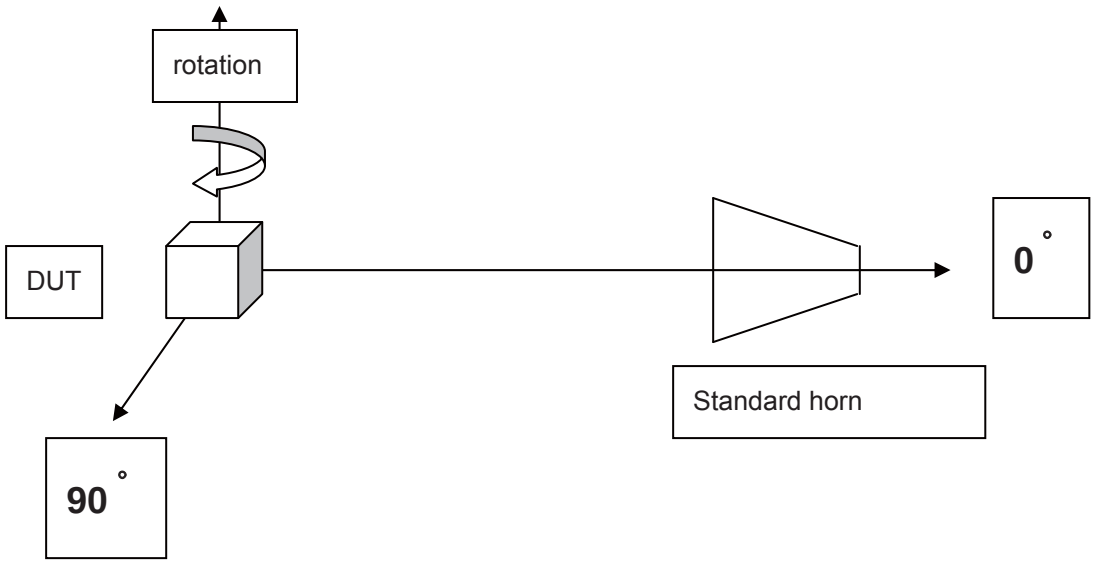


Fig.3 The definition of the measurement face

Measurement method LNA

1.Parameter Measurement

Equipment : Network Analyzer(Agilent E5071B)(fig4)

Item : S_{11}, S_{12}, S_{21}, S_{22}

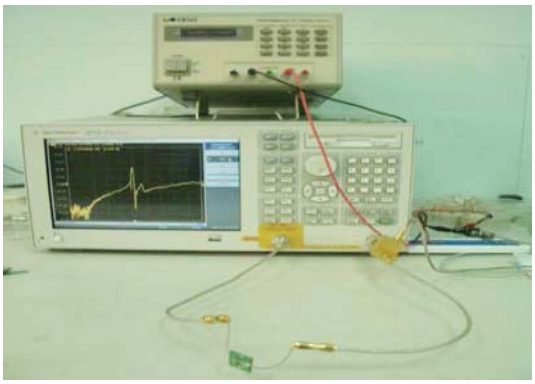


Fig.4 Network Analyzer

2.Noise Figure Measurement

Equipment : Noise meter(Agilent: E4407B-219)(fig5)

Environment : Shielding Room(fig6)

Item : N.F (Noise Figure)

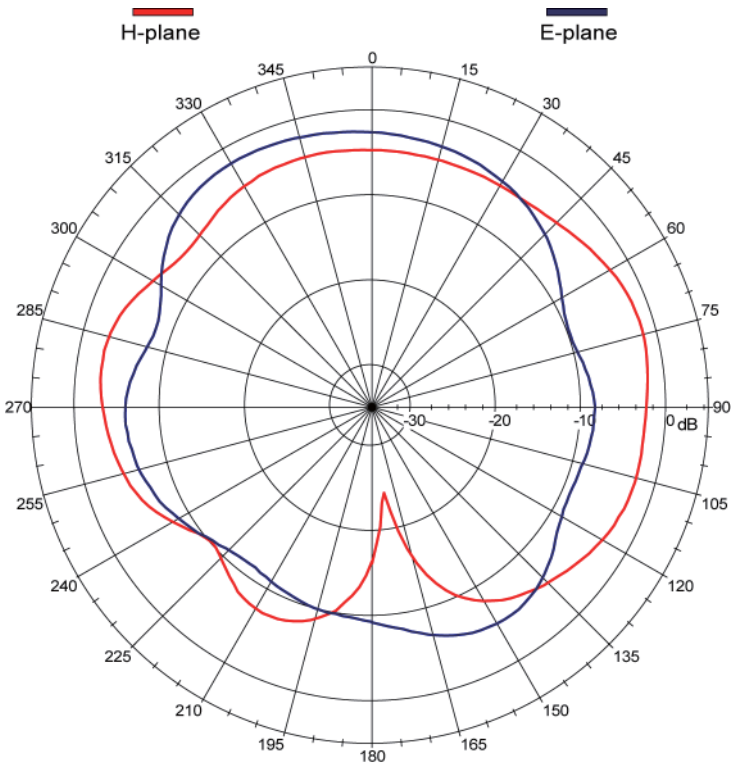
Fig.5 Noise Meter

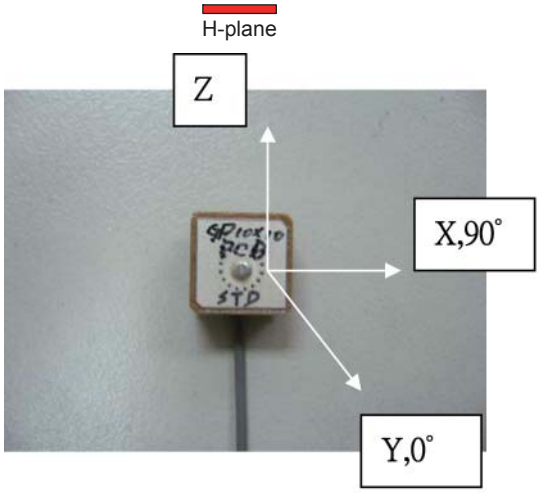
Fig.6 Shielding Room

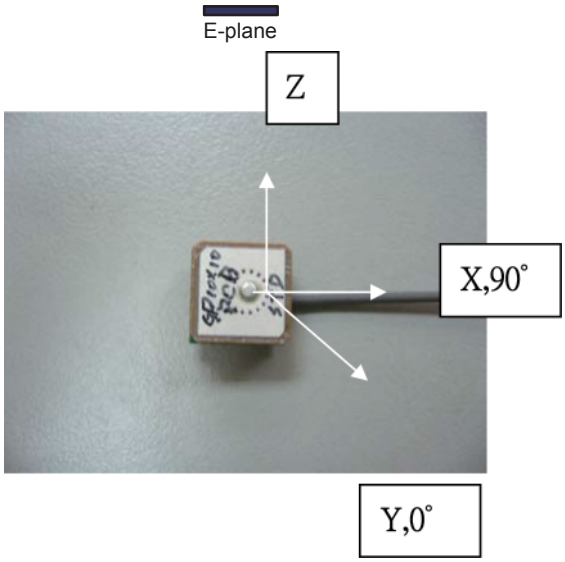
Measured value Patch

1. Radiation Gain Pattern (exclude LNA Gain)

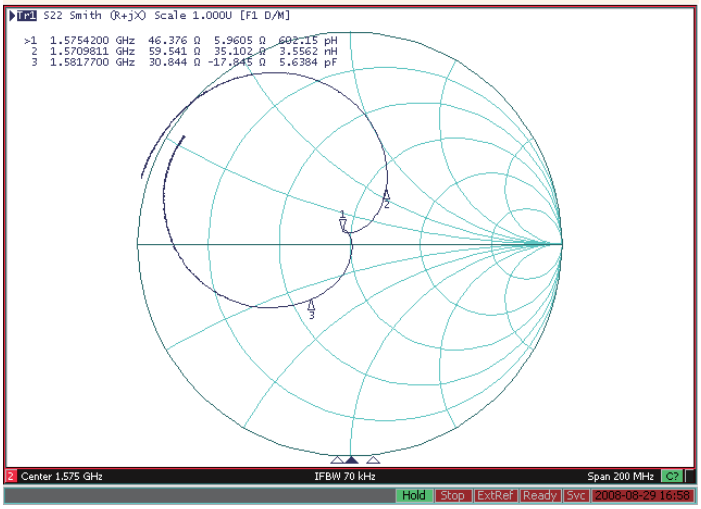
PS: Total Gain = Radiation Pattern (exclude LNA Gain)+ LNA Gain - cable loss(1.1dB/m)





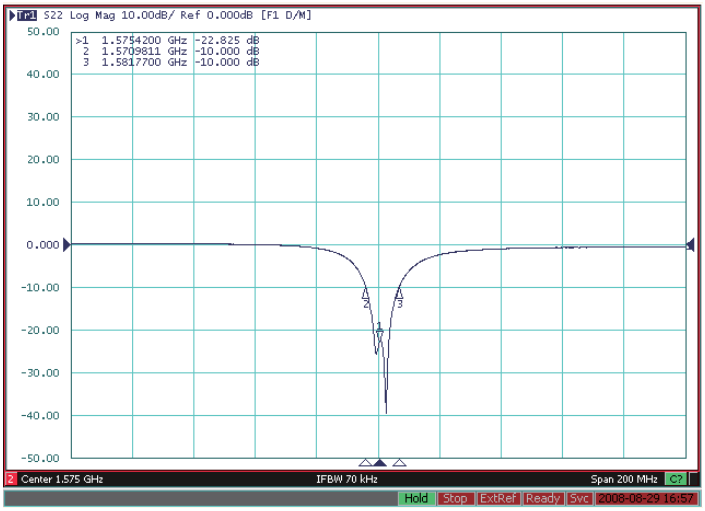


2. S_{11} Smith Chart (Impedance)



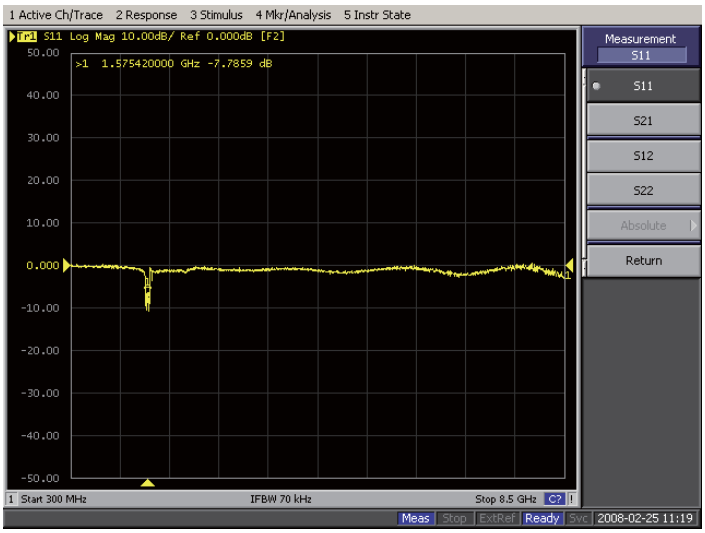
3. S_{11} Log Chart (Return loss)

Bandwidth(S_{11}<-10dB)

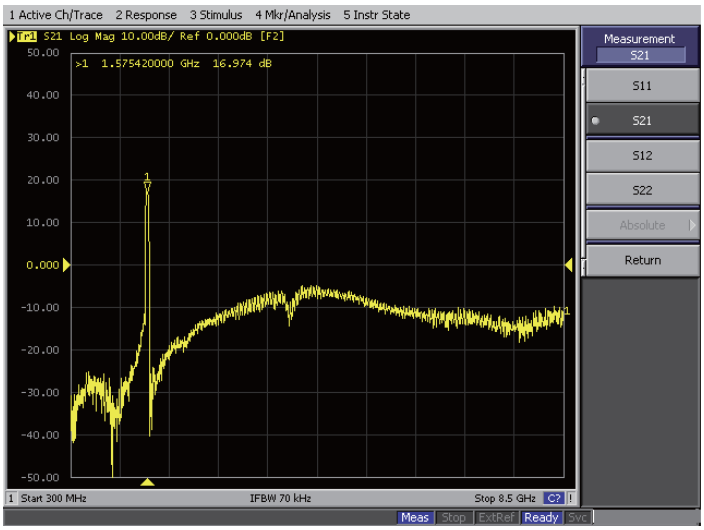


Measured value LNA

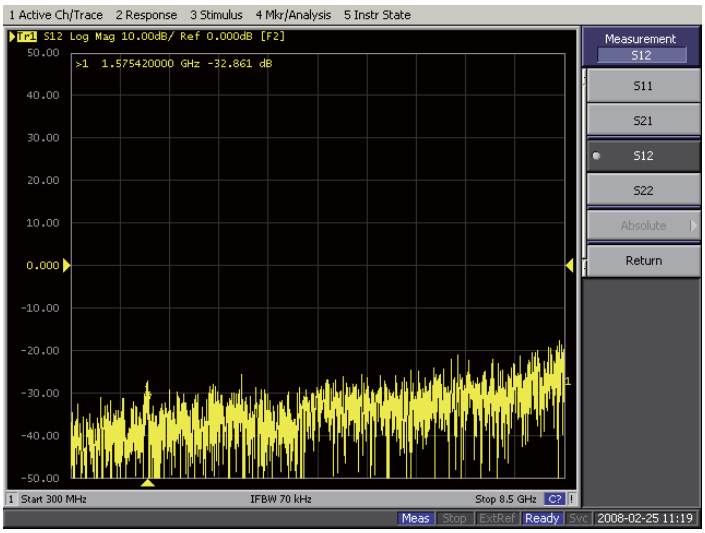
S_{11}: Network analyzer inpur power is -40dBm



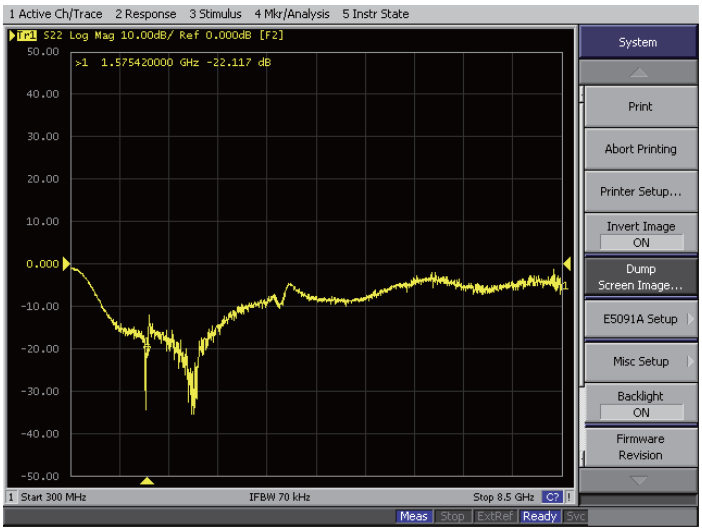
S_{21} (Gain): Network analyzer inpur power is -40dBm



S_{12}: Network analyzer inpur power is -40dBm



S_{22} (Gain) : Network analyzer inpur power is -40dBm



N.F (Noise Figure)