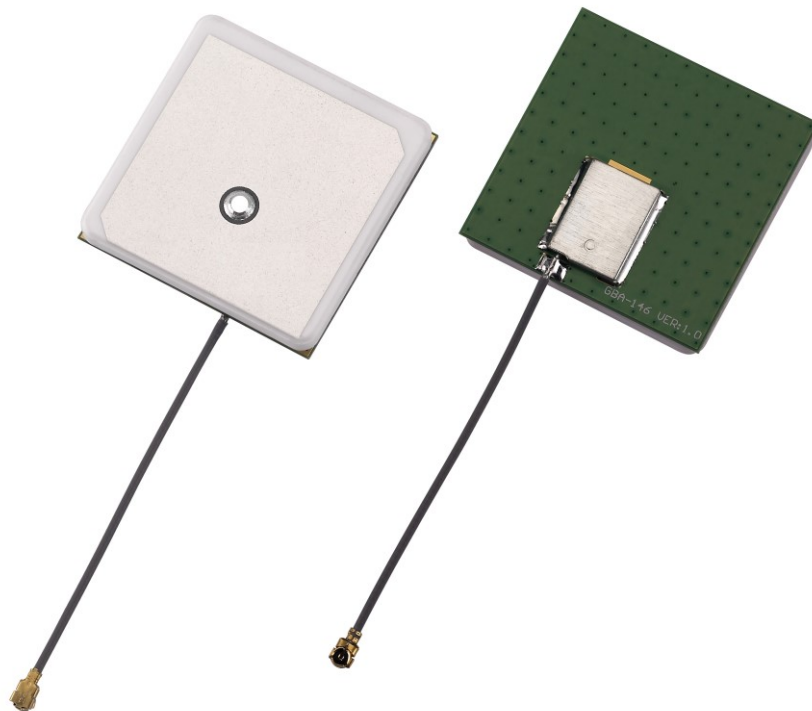


## SPECIFICATION

Part No. : **AP.35A.07.0054A**

Product Name : 35mm One Stage GPS/GALILEO Active Patch  
Antenna Module with back-end Saw Filter

Features : 35\*35\*3.5mm (Ground Plane)  
54mm Ø1.13 I-PEX MHFI (U.FL)  
15dB LNA  
RoHS Compliant

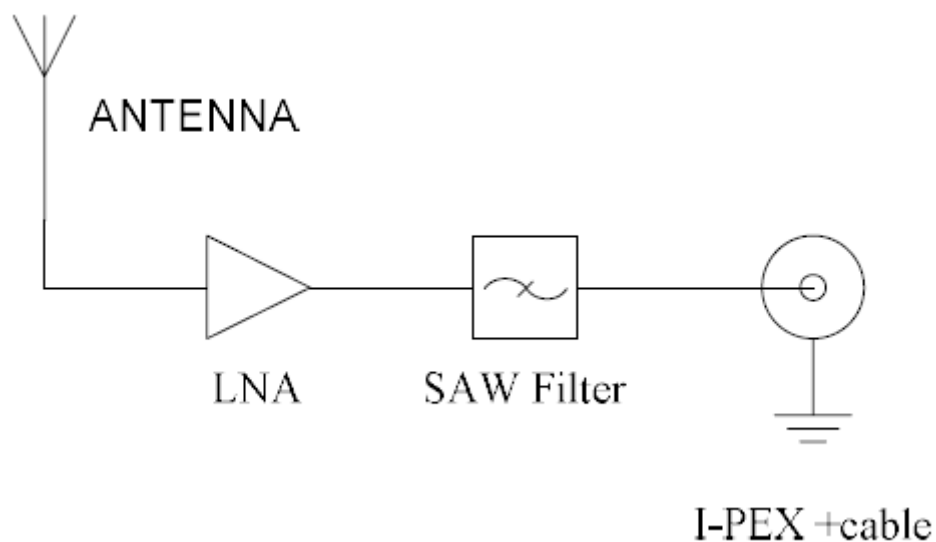


## 1. Introduction

The AP.35A has been designed for embedded (inside device) integration with GPS receiver modules, the AP.35A combines a 35\*35\*3.5mm advanced low profile ceramic patch antenna with a one stage LNA and ultra thin coaxial cable.

The Ground Plane size of 35\*35mm combined with the larger size GPS Patch, gives this solution a performance increase in gain of 1~2dB. It also helps shields the patch antenna from noise and increases performance at low elevations.. Taoglas active antenna modules utilise XtremeGain™ technology for the highest sensitivity in the industry.

This antenna system consists of two functional blocks, the LNA portion and the patch antenna. The AP.35A has a back-end SAW filter.



## 2. Specification

### 2.1. Patch Antenna

| Parameter       | Specification                     |
|-----------------|-----------------------------------|
| Frequency       | 1575.42 ± 1.023MHz                |
| Gain @ Zenith   | +2.5 dBic Typ. @ Zenith (35mm GP) |
| Polarization    | RHCP                              |
| Axial Ratio     | 3.0dB max. @Zenith                |
| Patch Dimension | 35*35*3.5mm                       |

### 2.2 LNA

| Parameter                                    | Specification      |                           |                  |
|----------------------------------------------|--------------------|---------------------------|------------------|
| Frequency                                    | 1575.42 ± 1.023MHz |                           |                  |
| Outer Band Attenuation                       | F0=1575.42MHz      |                           |                  |
|                                              | F0±30MHz           | 5dB min.                  |                  |
|                                              | F0±50MHz           | 23dB min.                 |                  |
|                                              | F0±100MHz          | 28dB min.                 |                  |
| Output Impedance                             | 50Ω                |                           |                  |
| Output VSWR                                  | 2.0 Max            |                           |                  |
| Pout at 1dB Gain Compression point           | Typ. -2dBm         |                           |                  |
|                                              | Min. -6dBm         |                           |                  |
| LNA Gain, Power Consumption and Noise Figure |                    |                           |                  |
| Voltage                                      | LNA Gain (Typ)     | Power Consumption(mA) Typ | Noise Figure Typ |
| Min. 1.8V                                    | 14dB               | 3mA                       | 1.5dB            |
| Typ. 3.0V                                    | 15dB               | 3mA                       | 1.5dB            |
| Max. 5.5V                                    | 15dB               | 3mA                       | 1.5dB            |

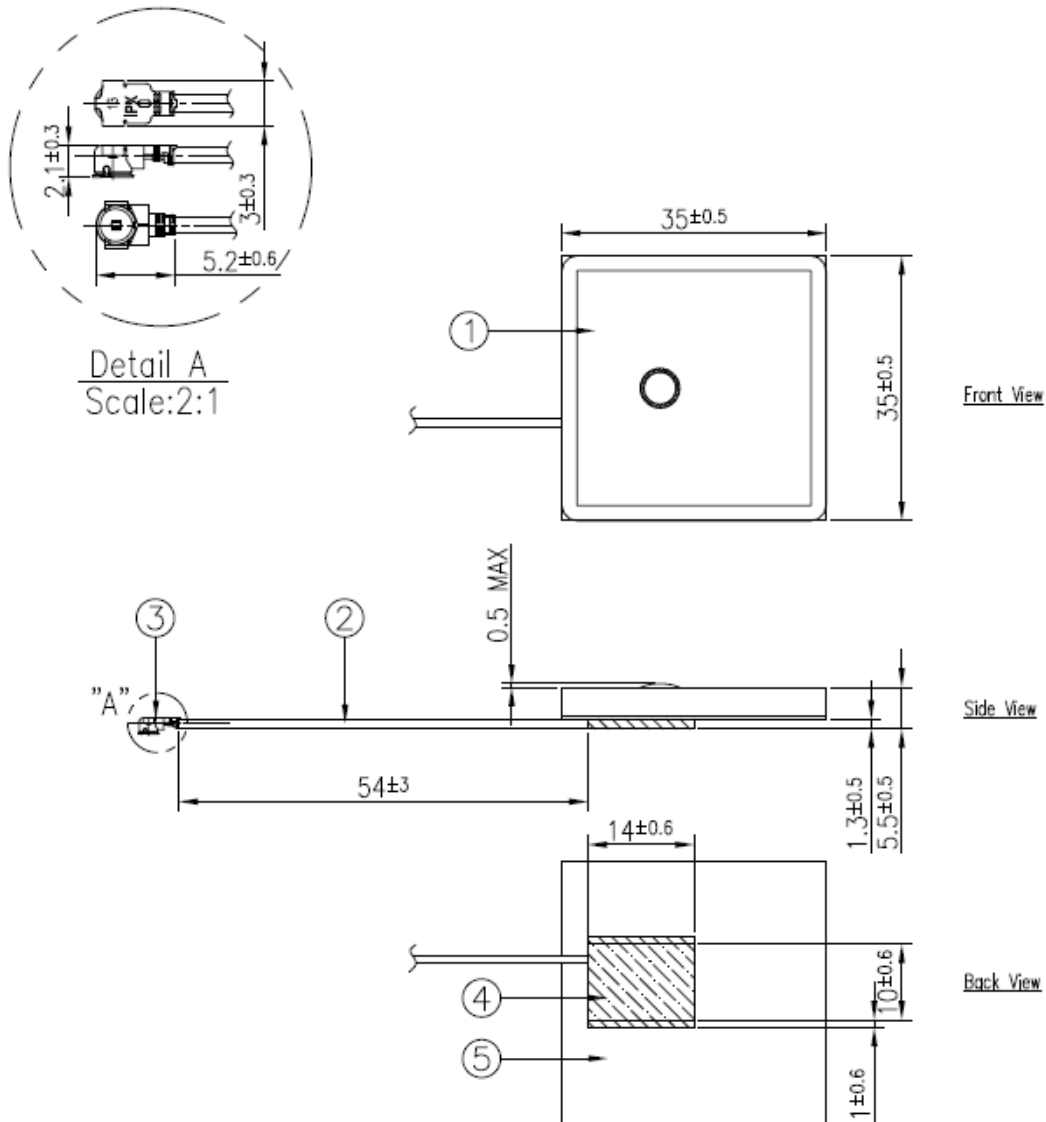
## 2.2. Cable & Connector

| Parameter | Specification                                                                    |
|-----------|----------------------------------------------------------------------------------|
| RF Cable  | Coaxial Cable $\varnothing 1.13 \pm 0.1\text{mm}$ , length $54 \pm 2.5\text{mm}$ |
| Connector | IPEX MHFI (U.FL)                                                                 |

## 2.3. Total Specification (through Antenna, LNA, Cable and Connector)

| Parameter             | Specification                                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------------------------|
| Frequency             | $1575.42 \pm 1.023\text{MHz}$                                                                             |
| Gain                  | At 90° At 5V: $18 \pm 3\text{dBic}$<br>At 3V: $17.5 \pm 3\text{dBic}$<br>At 1.8V: $15.5 \pm 3\text{dBic}$ |
| Output Impedance      | $50\Omega$                                                                                                |
| Polarization          | RHCP                                                                                                      |
| Output VSWR           | Max 2.0                                                                                                   |
| Operation Temperature | $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$                                                            |
| Storage Temperature   | $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$                                                            |
| Relative Humidity     | 40% to 95%                                                                                                |
| Input Voltage         | Min:1.8V Typ. 3.0V Max:5V                                                                                 |
| Antenna               | $35*35*5.5\text{mm}$                                                                                      |

### 3. Technical Drawing



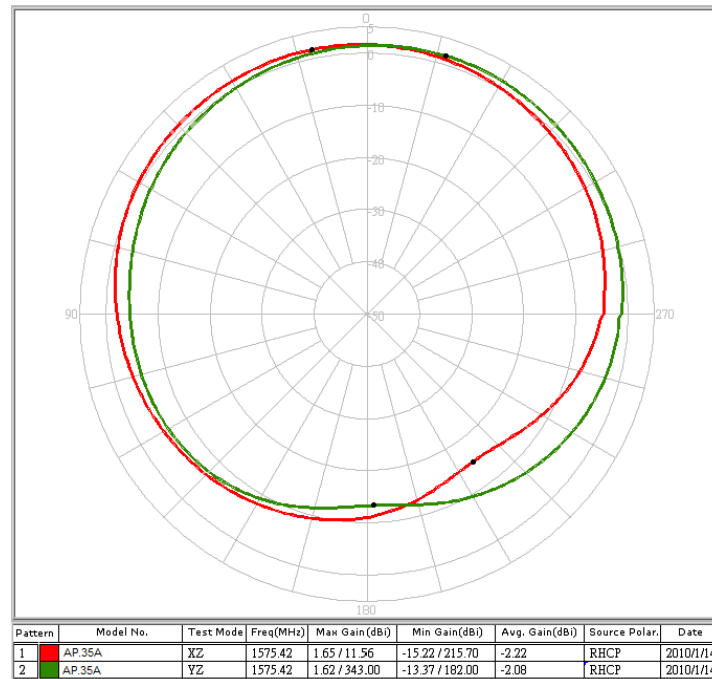
**NOTES:**

1. Soldered area 
2. Shielding case area 
3. All material must be RoHS compliant.
4. The connector orientation has a fixed position to the antenna as per drawing.

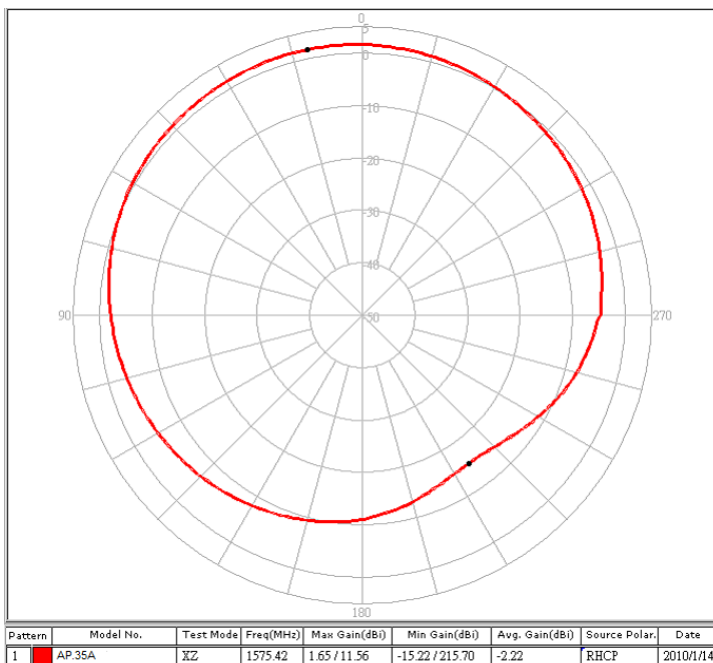
|   | Name                      | P/N            | Material       | Finish    | QTY |
|---|---------------------------|----------------|----------------|-----------|-----|
| 1 | AP.35A Patch(35*35*3.5mm) | 001517C120000A | Ceramic        | Clear     | 1   |
| 2 | 1.13 Coaxial Cable        | 300115C010000A | FEP            | Gray      | 1   |
| 3 | IPEX MHF1                 | 204111G000000A | Brass          | Au Plated | 1   |
| 4 | Shielding Case            | 000517C010000A | SPT            | Sn Plated | 1   |
| 5 | AP.35A PCB                | 100217C060000A | Composite 0.5t | Green     | 1   |

## 4. Radiation Patterns

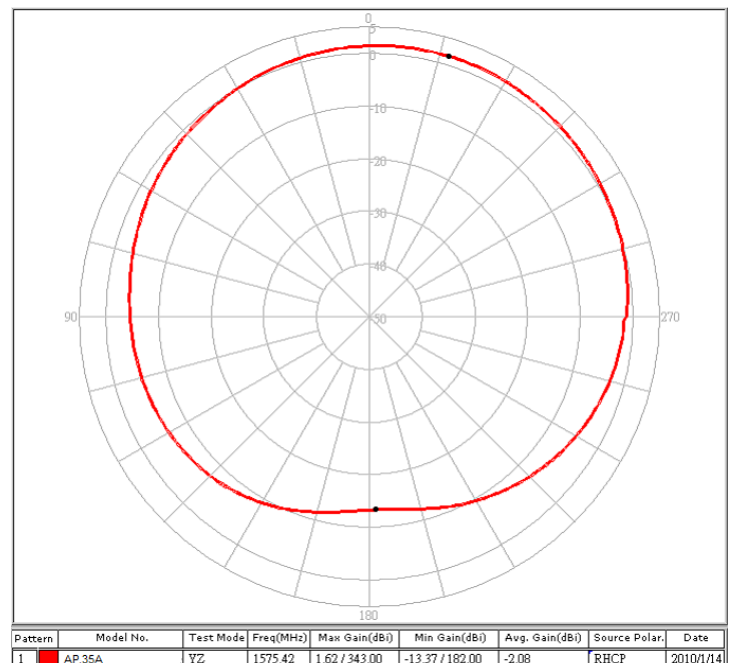
XY Plane



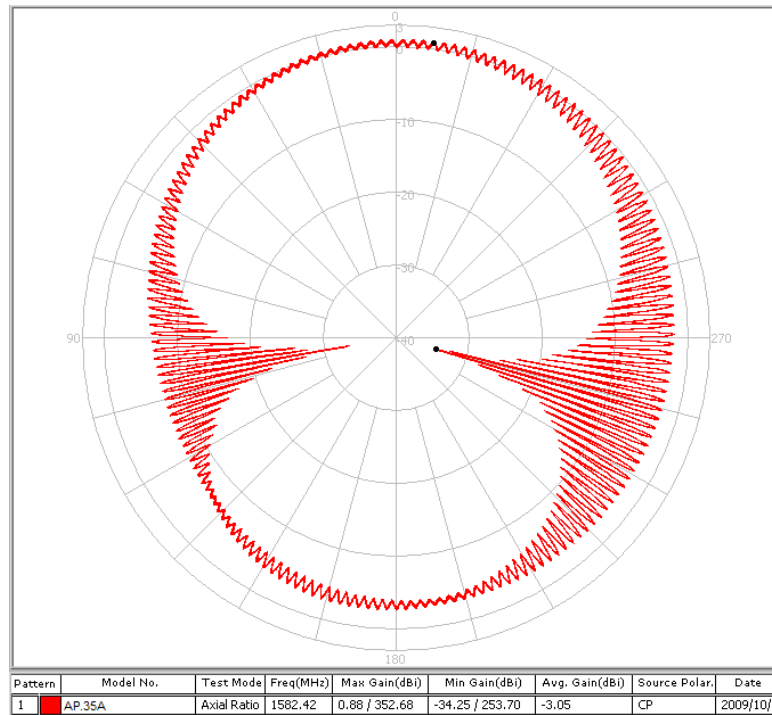
XZ Plane



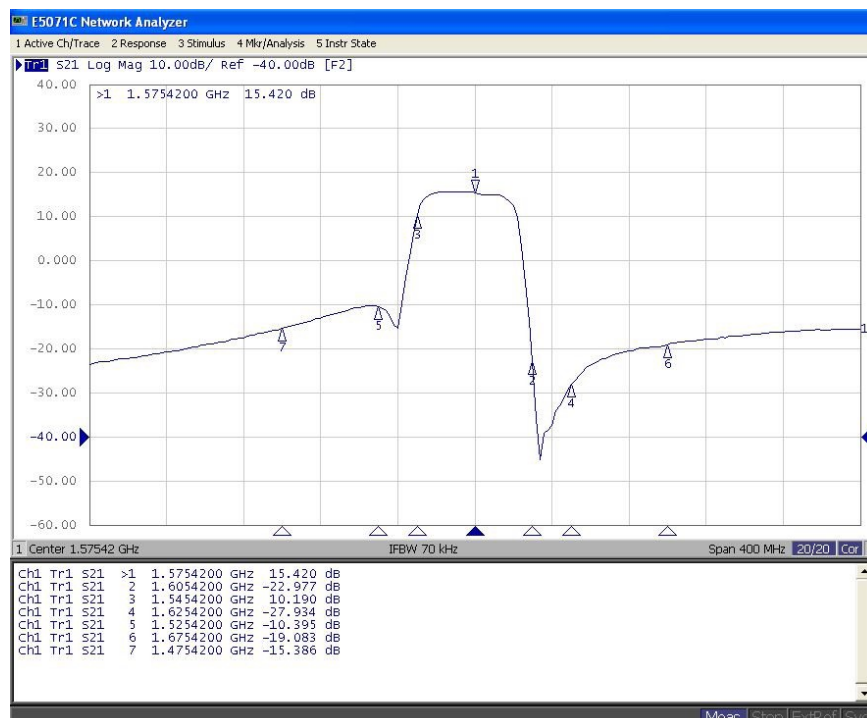
YZ Plane



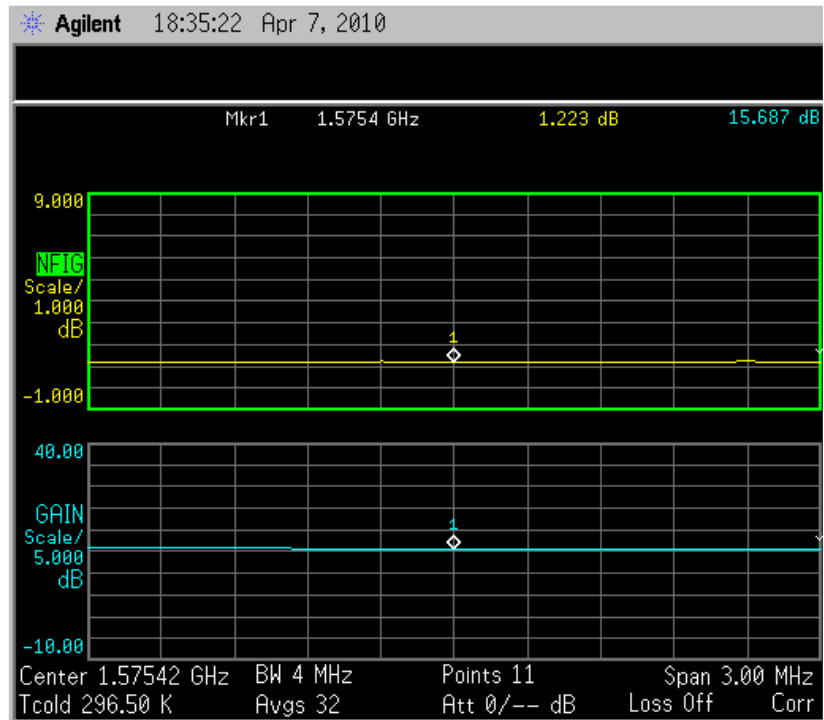
## 5. Axial Ratio



## 6. LNA Gain and Out of Band Rejection at 3.0V



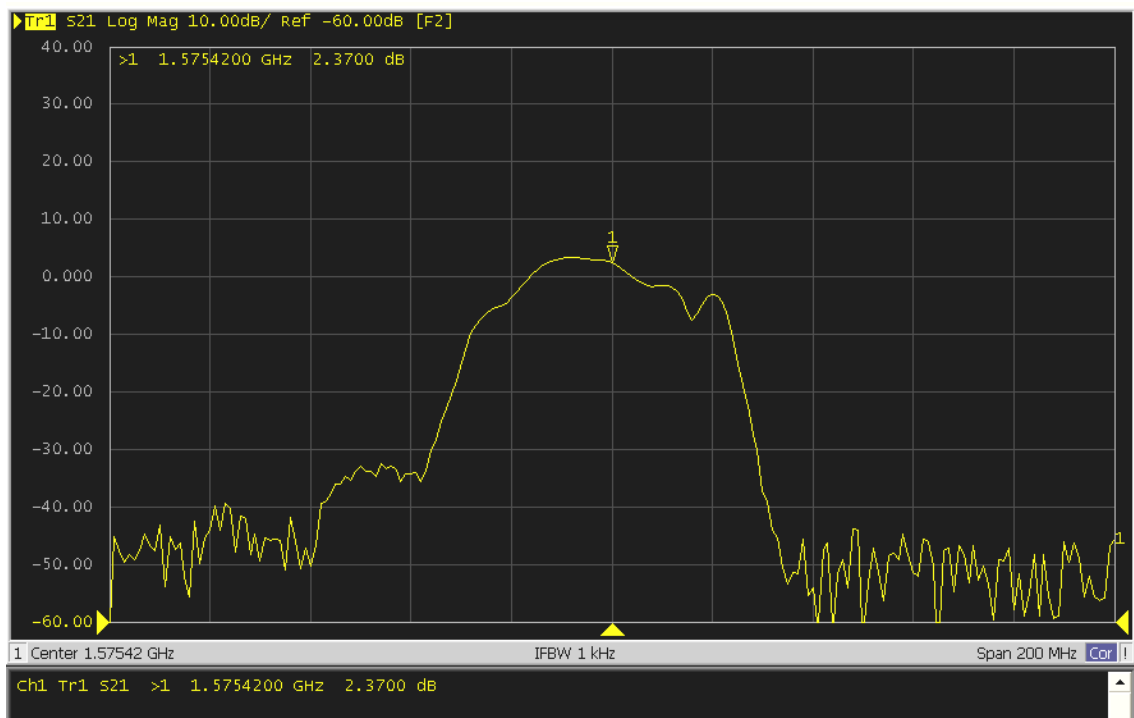
## 6. LNA Noise Figure at 3.0V



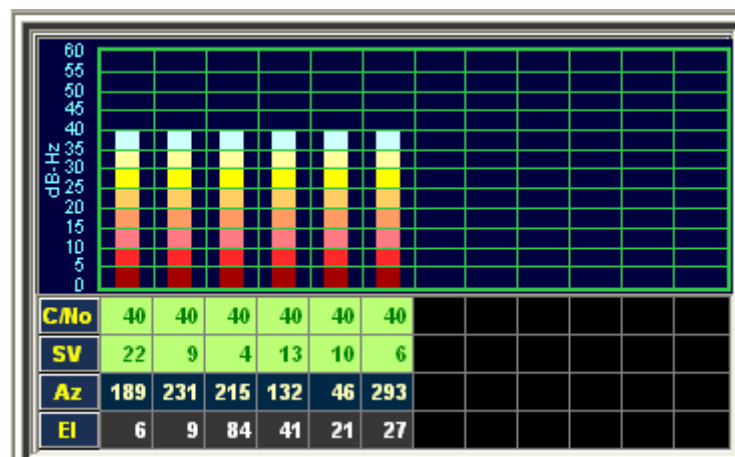
## 7. Reliability Tests

### 7.1. Reliability Test (Room temperature +25°C)

#### 7.1.1. S21 Radiation Gain at +25°C

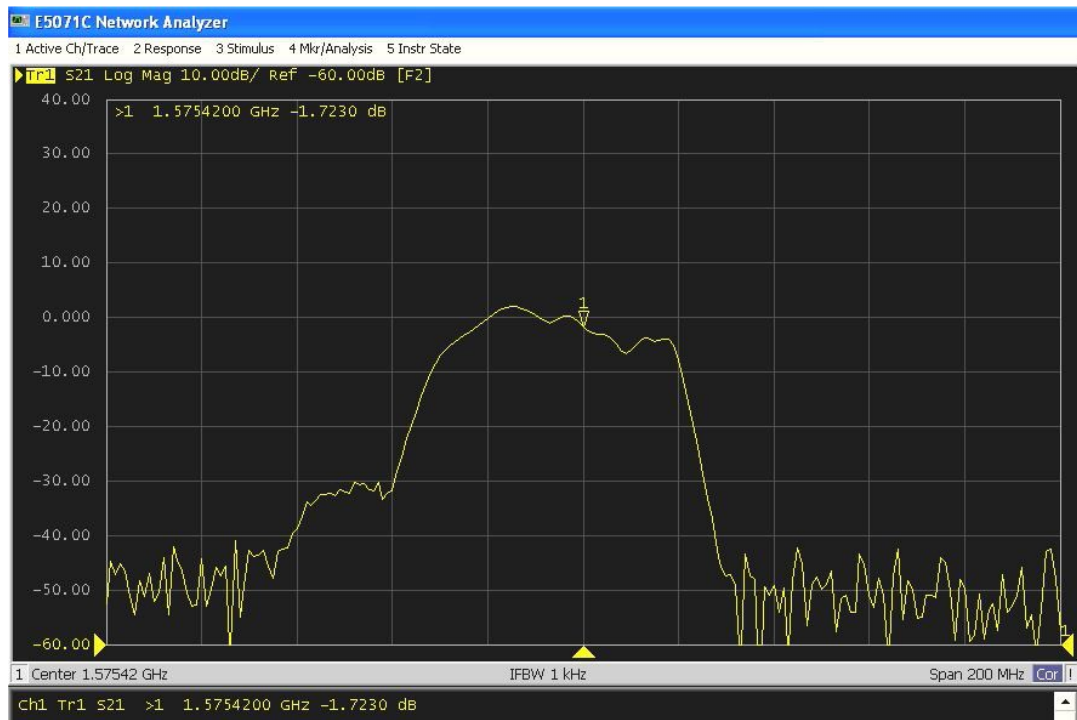


#### 7.1.2. C/N at +25°C

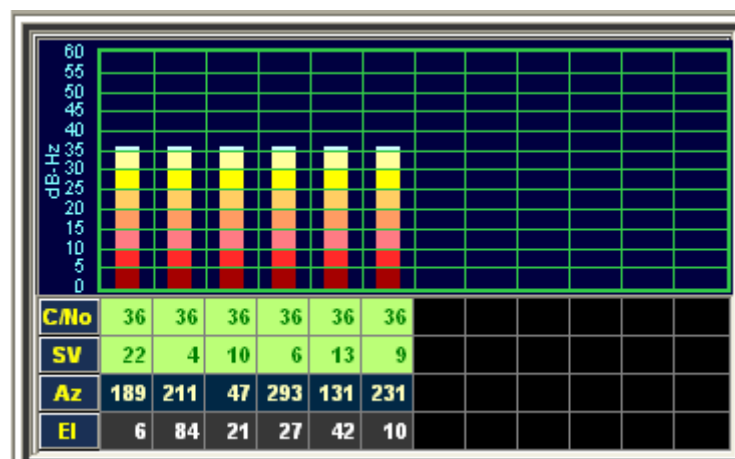


## 7.2. Reliability Test (High temperature +85°C)

### 7.2.1. S21 Radiation Gain at +85°C

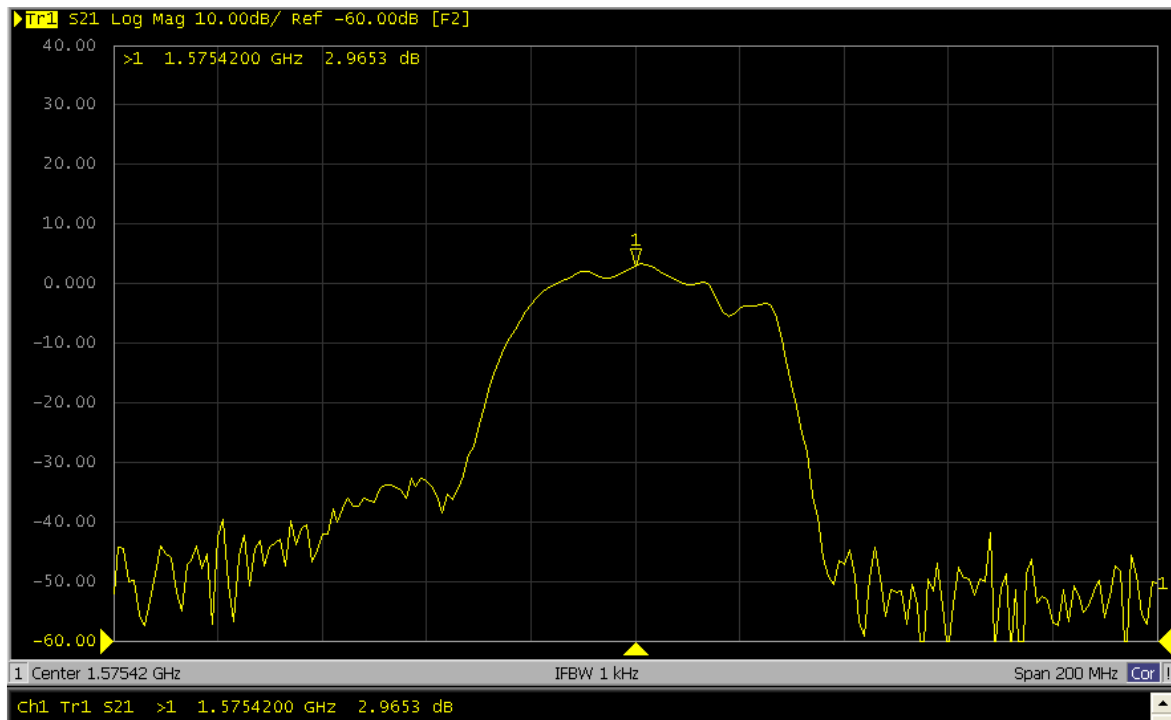


### 7.2.2. C/N at +85°C

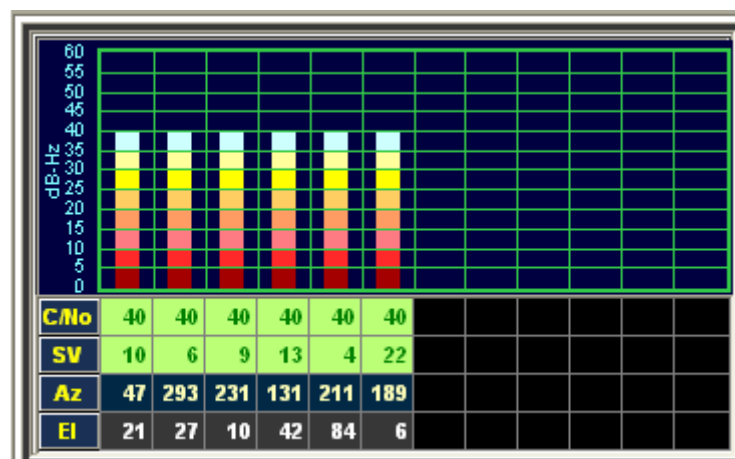


## 7.3. Reliability Test (Low temperature -40°C)

### 7.3.1. S21 Radiation Gain at -40°C



### 7.3.2. C/N at -40°C



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