

AP.25E.07.0054A

## Specification

|                     |   |
|---------------------|---|
| <b>Part No.</b>     | AP.25E.07.0054A   |
| <b>Product Name</b> | 25mm One Stage GPS Active Patch Antenna Module with front-end Saw Filter  |
| <b>Feature</b>      | <ul style="list-style-type: none"> <li>Industry leading GPS antenna performance</li> <li>35mm*35mm*4.50mm (Ground Plane)</li> <li>54mm Ø1.13 I-PEX MHFI (U.FL)</li> <li>15dB LNA</li> <li>Wide Input Voltage 1.8V to 5.5V</li> <li>Low Power Consumption</li> <li>ROHS Compliant</li> </ul> |

## 1. Introduction

The AP.25E has been designed specifically for embedded (inside device) integration with GPS receiver modules where there is a GSM transmitter nearby and risk of interference and saturation.

The AP.25E combines a 25\*25\*2mm advanced low profile ceramic patch

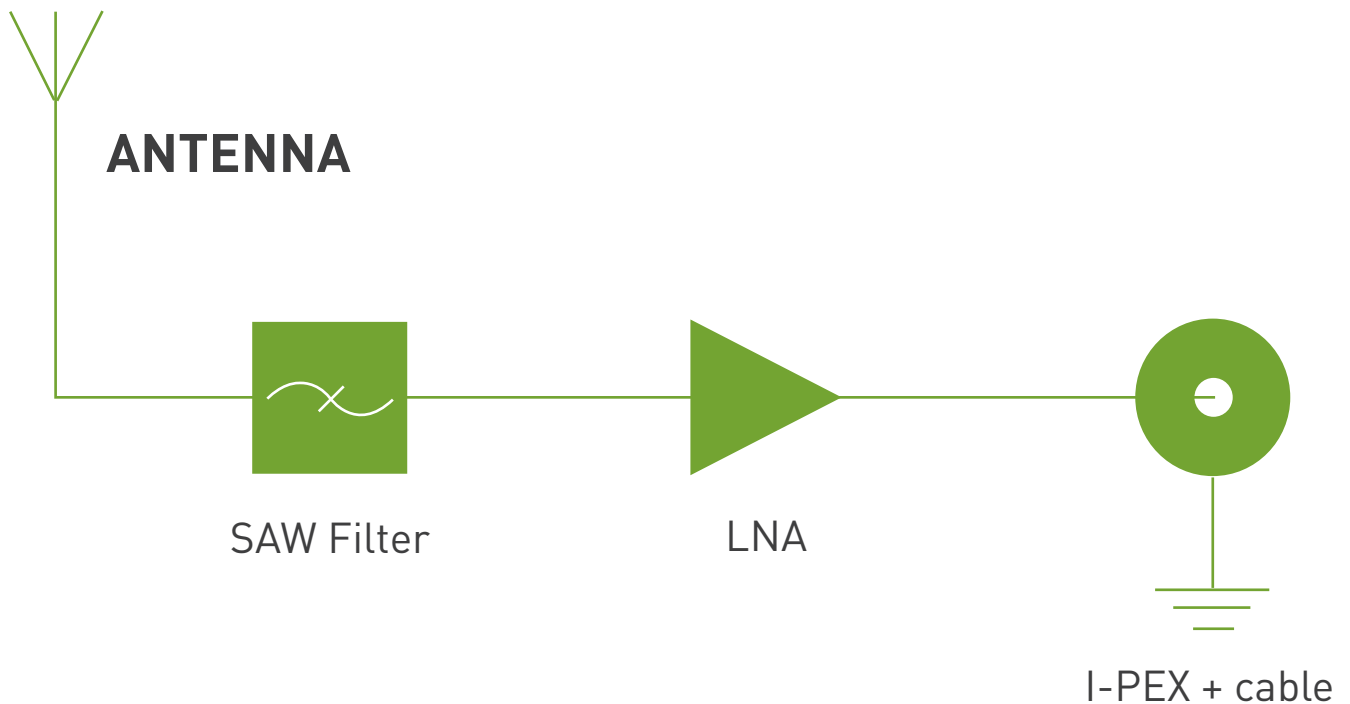
antenna with a one stage LNA and a front-end SAW filter with ultra thin coaxial cable.

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.

The AP.25E consists of 2 functional blocks – the LNA and also the patch antenna.



The AP.25E has a SAW filter on the front of it. The main use of the AP.25E would be for small devices where the GSM transmitter is close to the GPS antenna, it helps avoid

burn-out of the LNA or the module due to interference from the GSM transmitter at out band frequencies.

## 2. Specification

### 2.1 Patch Antenna

| Parameter       | Specification          |
|-----------------|------------------------|
| Frequency       | 1575.42 ± 1.023MHz     |
| Gain @ Zenith   | +1.5dBic Typ. @ Zenith |
| Polarization    | RHCP                   |
| Axial Ratio     | 3.0dB max @ Zenith     |
| Patch Dimension | 25*25*2mm              |

### 2.2 LNA

| Parameter              | Specification   |
|------------------------|---|
| Frequency              | 1575.42 ± 1.023MHz  |
| Outer Band Attenuation | F0=1575.42MHz<br>F0±30MHz 9dB min.<br>F0±50MHz 20dB min.<br>F0±100MHz 25dB min. |
| Output Impedance       | 50Ω   |
| Output VSWR            | 2.0 Max   |
| Pout at 1dB Gain       | Typ. -2dBm  |
| Compression point      | Min. -6dBm  |

#### LNA Gain, Power Consumption and Noise Figure

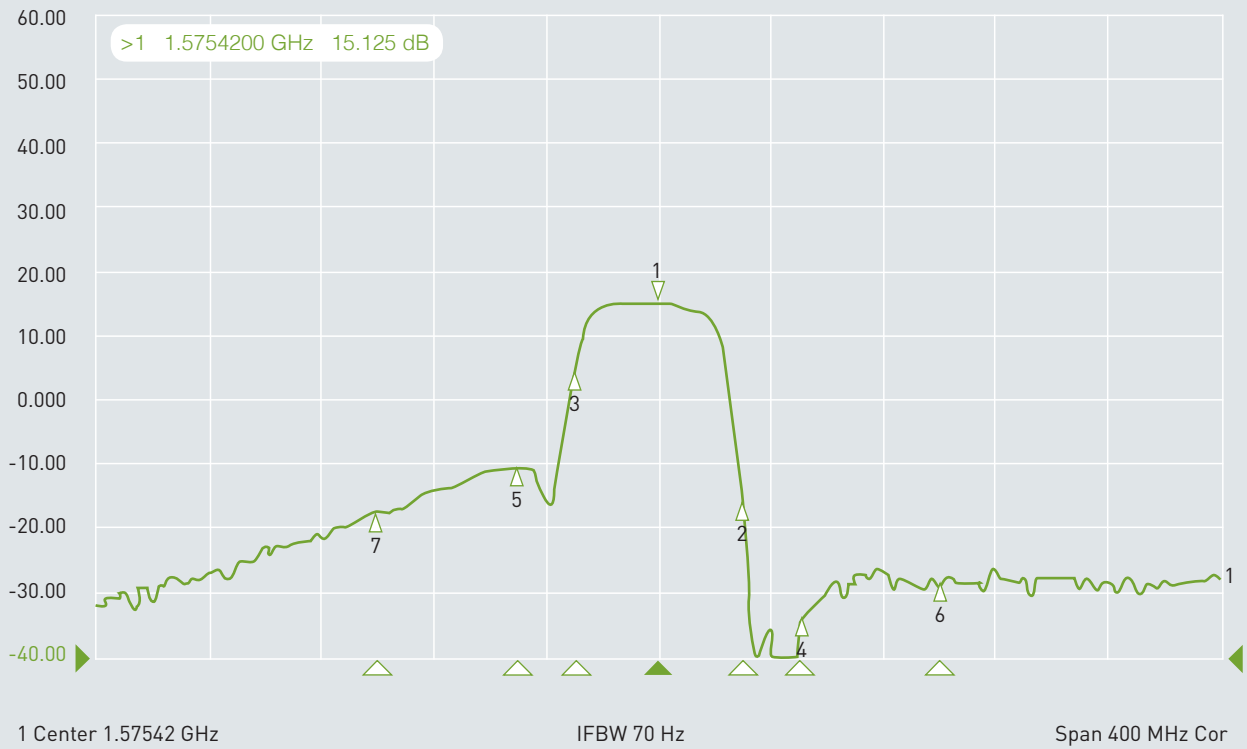
| Voltage   | LNA Gain (Typ) | Power Consumption(mA) Typ | Noise Figure Typ |
|-----------|----------------|---------------------------|------------------|
| Min. 1.8V | 14dB           | 3mA                       | 2.5dB            |
| Typ. 3.0V | 15dB           | 3mA                       | 2.5dB            |
| Max. 5.5V | 15dB           | 3mA                       | 2.5dB            |

### 2.3 Cable\* & Connector

| Parameter | Specification                                  |
|-----------|--|
| RF Cable  | Coaxial Cable Ø1.13 ± 0.1mm, length 54 ± 2.5mm |
| Connector | IPEX MHFI (U.FL)                               |

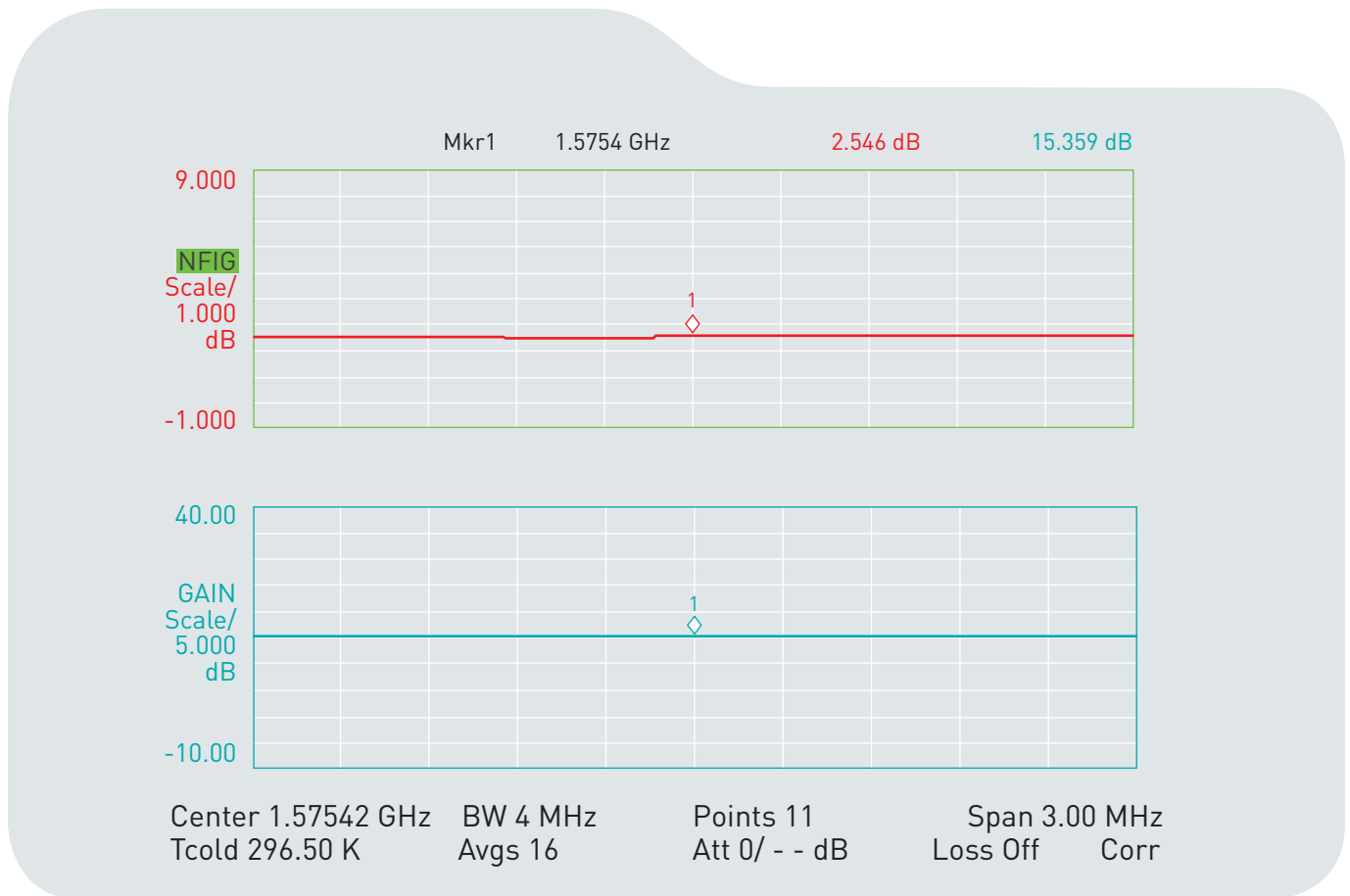
### 3. LNA Gain and Out Band Rejection @3.0V

Tr1 S21 Log Mag 10.00dB/ Ref -40.00dB (F2)



|     |     |     |    |               |            |
|-----|-----|-----|----|---------------|------------|
| Cg1 | Tr1 | S21 | >1 | 1.5754200 GHz | 15.125 dB  |
| Cg1 | Tr1 | S21 | 2  | 1.6054200 GHz | -15.348 dB |
| Cg1 | Tr1 | S21 | 3  | 1.5454200 GHz | 4.4144 dB  |
| Cg1 | Tr1 | S21 | 4  | 1.6254200 GHz | -34.991 dB |
| Cg1 | Tr1 | S21 | 5  | 1.5254200 GHz | -10.262 dB |
| Cg1 | Tr1 | S21 | 6  | 1.6754200 GHz | -28.746 dB |
| Cg1 | Tr1 | S21 | 7  | 1.4754200 GHz | -17.596 dB |

## 4. LNA Noise Figure @3.0V

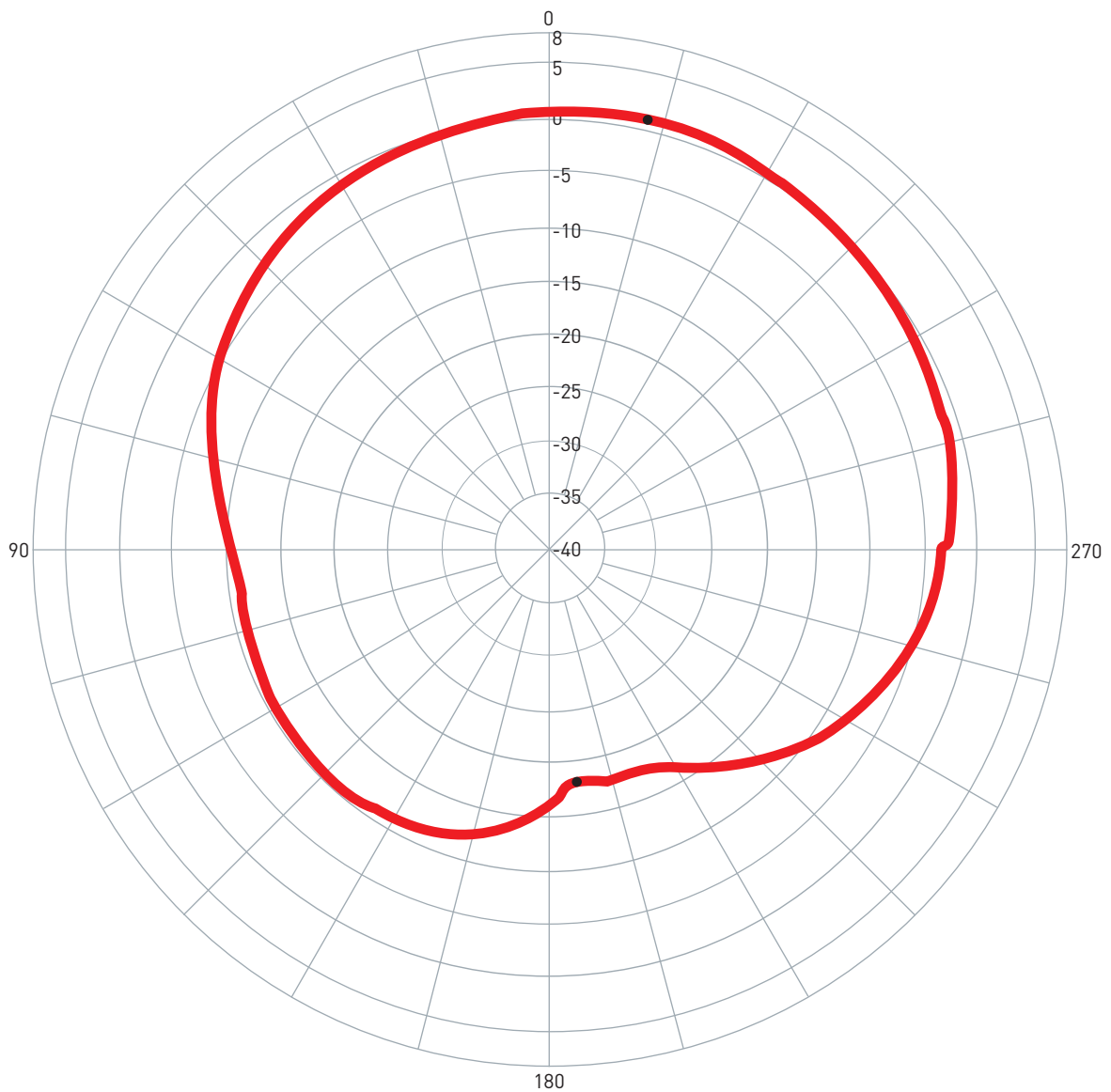


## 5. Total Specification (through Antenna, LNA, Cable and Connector)

| Parameter             | Specification                 |
|-----------------------|-------------------------------|
| Frequency             | 1575.42 ± 1.023MHz            |
| Gain                  | At 3V: 16.5 ± 3dBic @ 90°     |
| Output Impedance      | 50Ω                           |
| Polarization          | RHCP                          |
| Output VSWR           | Max 2.0                       |
| Operation Temperature | -40°C to + 85°C               |
| Storage Temperature   | -40°C to + 85°C               |
| Relative Humidity     | 40% to 95%                    |
| Input Voltage         | Min. 1.8V, Typ. 3.0V, Max. 5V |
| Antenna               | 35*35*4.5mm                   |

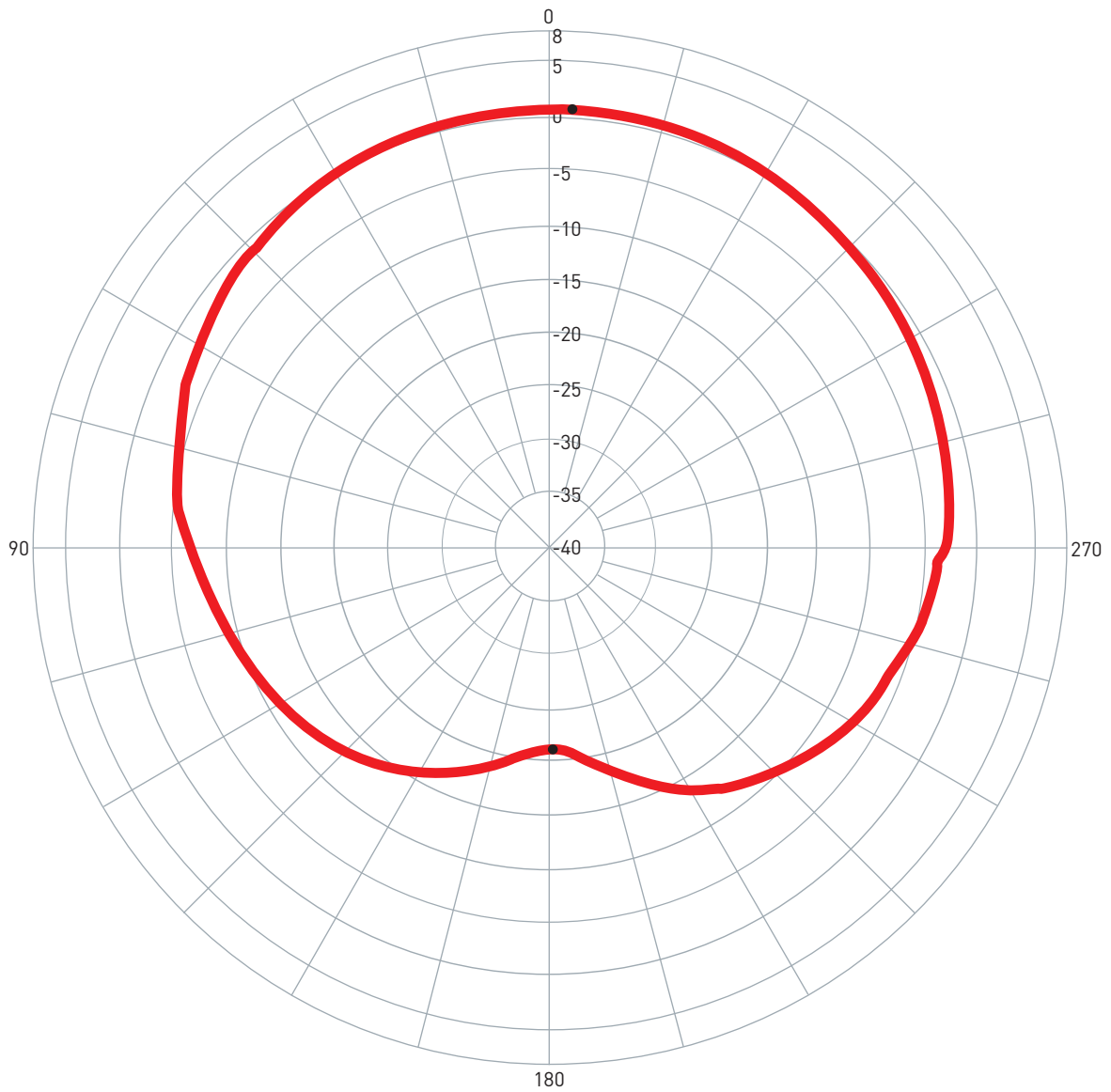
## 6. Radiation Patterns

### 6.1 XZ Plane Radiation



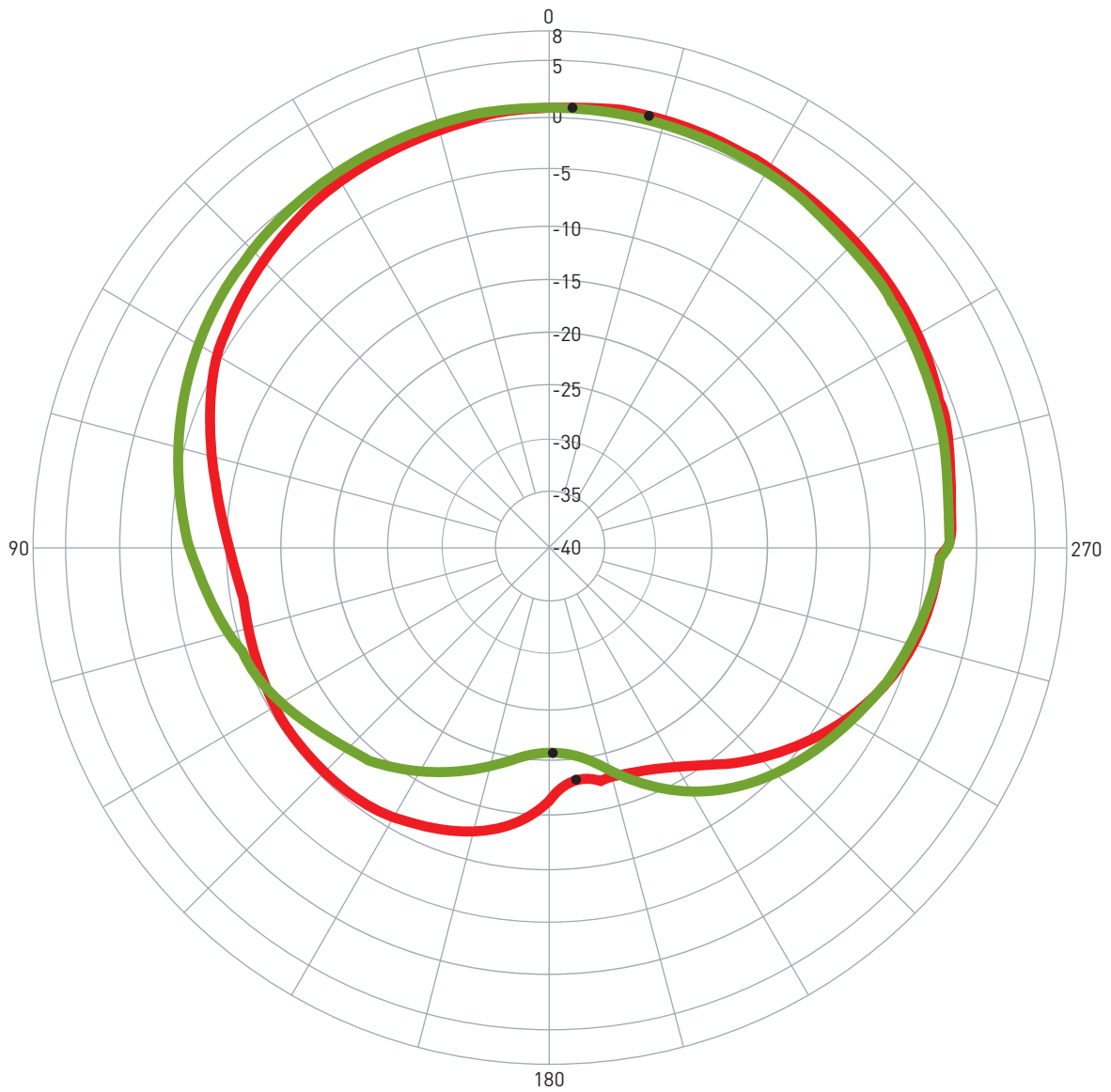
| Pattern | Model No.       | Test Mode | Freq (MHz) | Max Gain(dBi) | Min Gain(dBi)   | Avg. Gain(dBi) | Source Polar. | Date      |
|---------|-----------------|-----------|------------|---------------|-----------------|----------------|---------------|-----------|
| 1       | AP.25E.07.0054A | XZ        | 1579.00    | 0.86 / 347.00 | -18.16 / 187.00 | -3.65          | RHCP          | 2010/4/19 |

## 6.2 YZ Plane Radiation



| Pattern | Model No.       | Test Mode | Freq (MHz) | Max Gain(dBi) | Min Gain(dBi)   | Avg. Gain(dBi) | Source Polar. | Date      |
|---------|-----------------|-----------|------------|---------------|-----------------|----------------|---------------|-----------|
| 1       | AP.25E.07.0054A | YZ        | 1579.00    | 0.73 / 357.00 | -20.87 / 181.00 | -3.44          | RHCP          | 2010/4/19 |

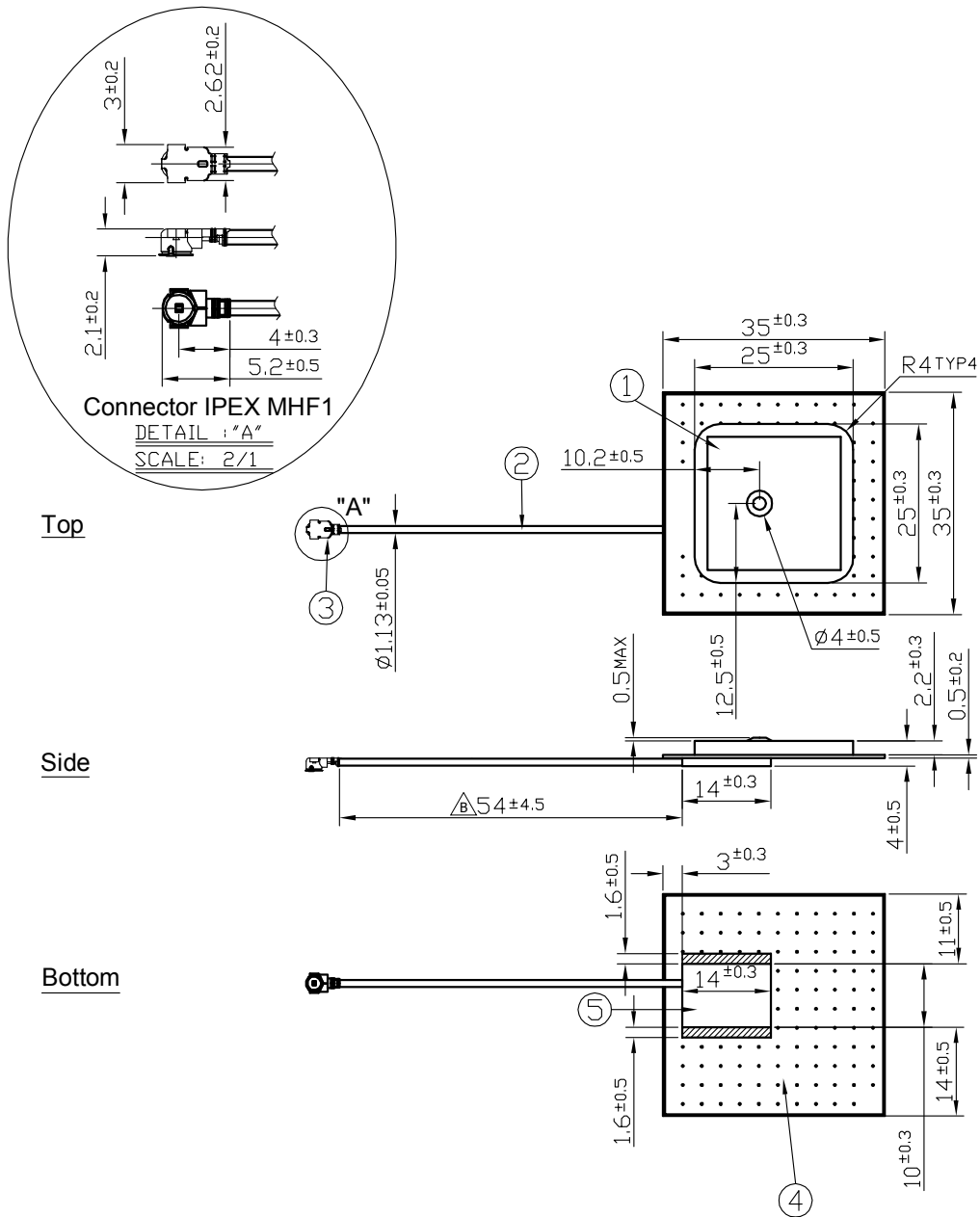
### 6.3 XY Plane Radiation



| Pattern | Model No.       | Test Mode | Freq (MHz) | Max Gain(dBi) | Min Gain(dBi)   | Avg. Gain(dBi) | Source Polar. | Date      |
|---------|-----------------|-----------|------------|---------------|-----------------|----------------|---------------|-----------|
| 1       | AP.25E.07.0054A | XZ        | 1579.42    | 0.86 / 347.00 | -18.16 / 187.00 | -3.65          | RHCP          | 2010/4/19 |
| 2       | AP.25E.07.0054A | YZ        | 1579.42    | 0.73 / 357.00 | -20.87 / 181.00 | -3.44          | RHCP          | 2010/4/19 |




## 7. Technical Drawing



|   | Name                    | Material   | Finish     | QTY |
|---|-------------------------|------------|------------|-----|
| 1 | AP.25E Patch(25*25*2mm) | Ceramic    | Clear      | 1   |
| 2 | 1.13 Coaxial Cable      | FEP        | Gray       | 1   |
| 3 | IPEX MHF1               | Brass      | Gold       | 1   |
| 4 | AP.25E PCB              | FR4 0.5t   | Green      | 1   |
| 5 | Shielding Case          | SPTE (Tin) | Tin Plated | 1   |

### NOTE:

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

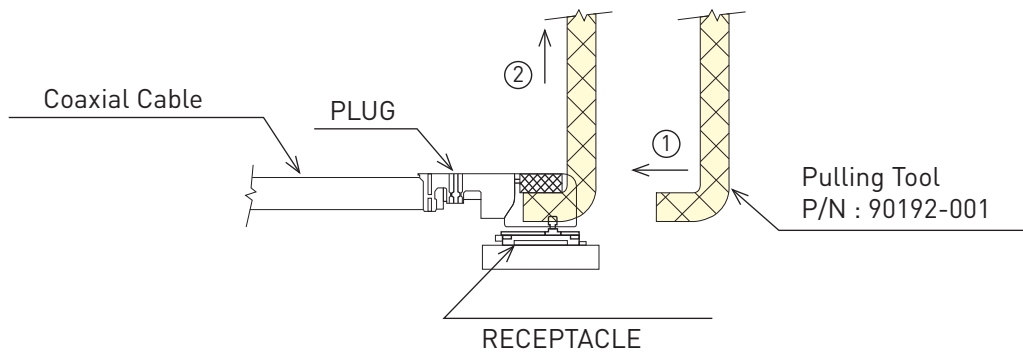
## 8. Plugs Usage Precautions

### 8.1 Mating / unmating

(1) To disconnect connectors, insert the end portion of I-PEX under the connector flanges and pull off vertically, in the direction of the connector mating axis.

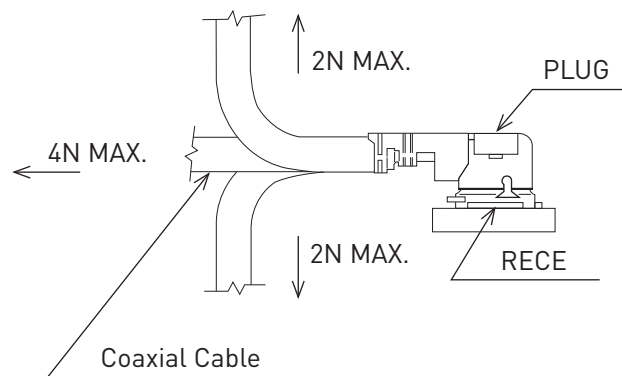
(2) To mate the connectors, the mating axes of both connectors must be aligned and the connectors can be mated. The "click" will confirm fully mated connection.

Do not attempt to insert on an extreme angle.



### 8.2 Pull forces on the cable after connectors are mated

After the connectors are mated, do not apply a load to the cable in excess of the values indicated in the diagram below.





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