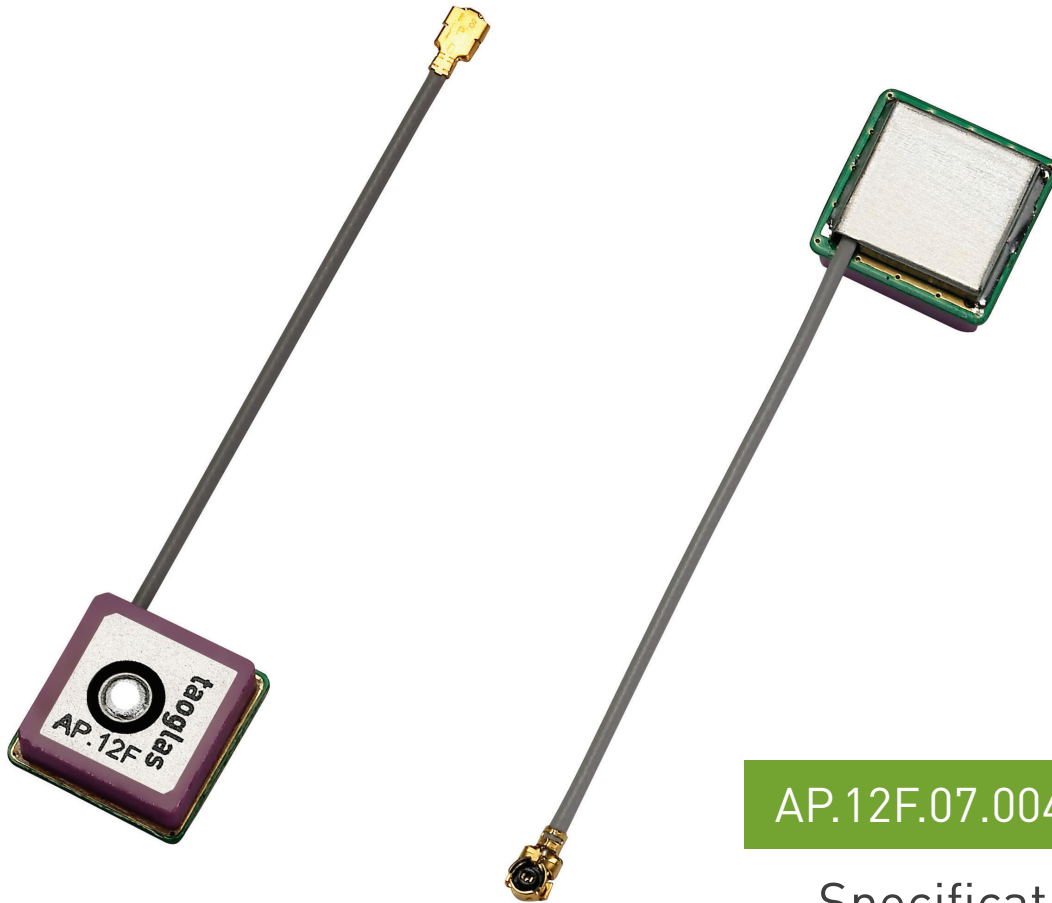




AP.12F.07.0045A

## Specification

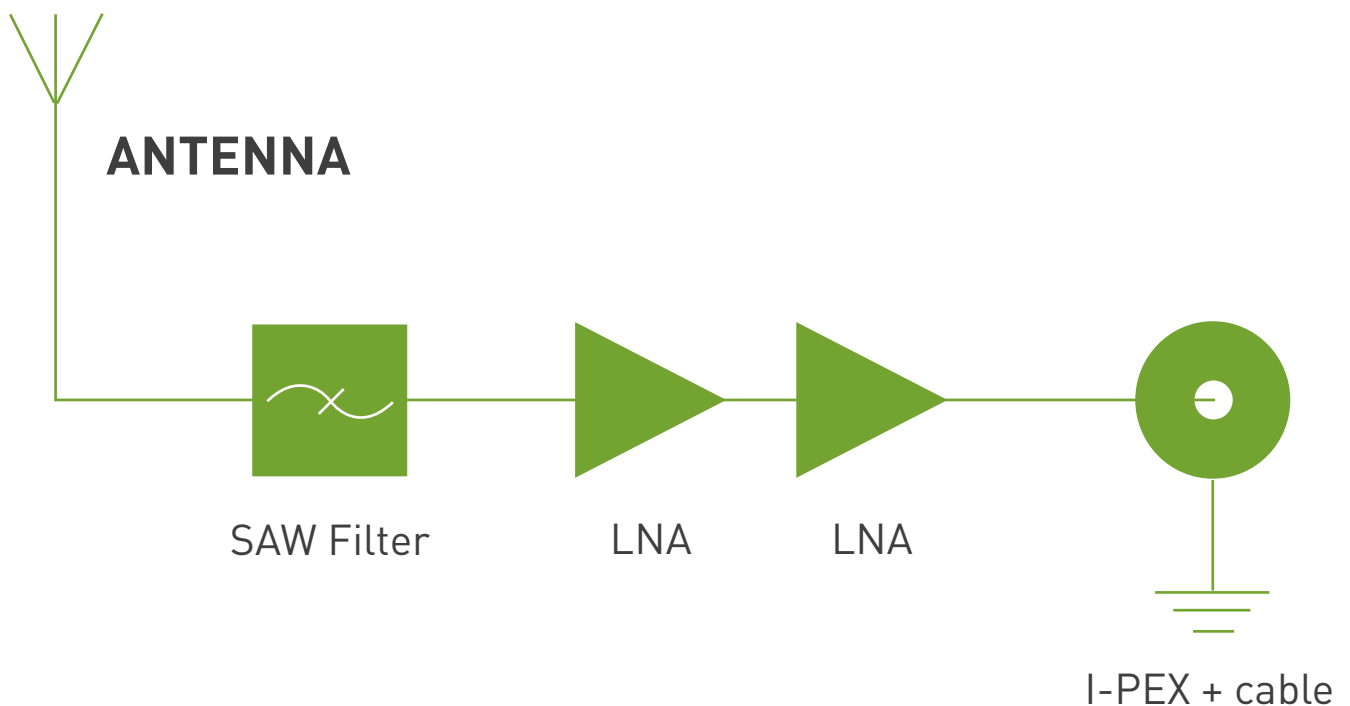
|                     |                                                                                                                                                               |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Part No.</b>     | AP.12F.07.0045A                                                                                                                                               |
| <b>Product Name</b> | 12mm Two Stage 25dB GPS Active Patch Antenna Module with front-end Saw Filter                                                                                 |
| <b>Feature</b>      | 13.4*13.4*5.7mm (Ground Plane)<br>45mm Ø1.13 cable IPEX MHFI (U.FL)<br>28dB LNA<br>Wide Input Voltage 1.8V to 5.5V<br>Low Power Consumption<br>RoHS Compliant |

## 1. Introduction

The AP.12F 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.12F combines a 12\*12\*3.5mm advanced low profile ceramic patch antenna with a two stage LNA and a front-end SAW filter with ultra thin coaxial cable.

Only 5.6mm in height, this Taoglas active antenna module utilises XtremeGain™ technology for the highest industry sensitivity. The AP.12F consists of 2 functional blocks – the LNA and also the patch antenna.



The AP.12F has a SAW filter on the front of it.

The main use of the AP.12F 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   | -5dBic Typ. @ Zenith |
| Polarization    | RHCP                 |
| Axial Ratio     | 4.0dB max @ Zenith   |
| Patch Dimension | 12*12*3.5mm          |

### 2.2 LNA

| Parameter              | Specification                                                                   |
|------------------------|---------------------------------------------------------------------------------|
| Frequency              | 1575.42 ± 1.023MHz                                                              |
| Outer Band Attenuation | F0=1575.42MHz<br>F0±30MHz 8dB min.<br>F0±50MHz 20dB min.<br>F0±100MHz 25dB min. |
| Output Impedance       | 50Ω                                                                             |
| Output VSWR            | 2.0 Max                                                                         |
| Pout at 1dB Gain       | Typ. 11dBm                                                                      |
| Compression point      | Min. 5dBm                                                                       |

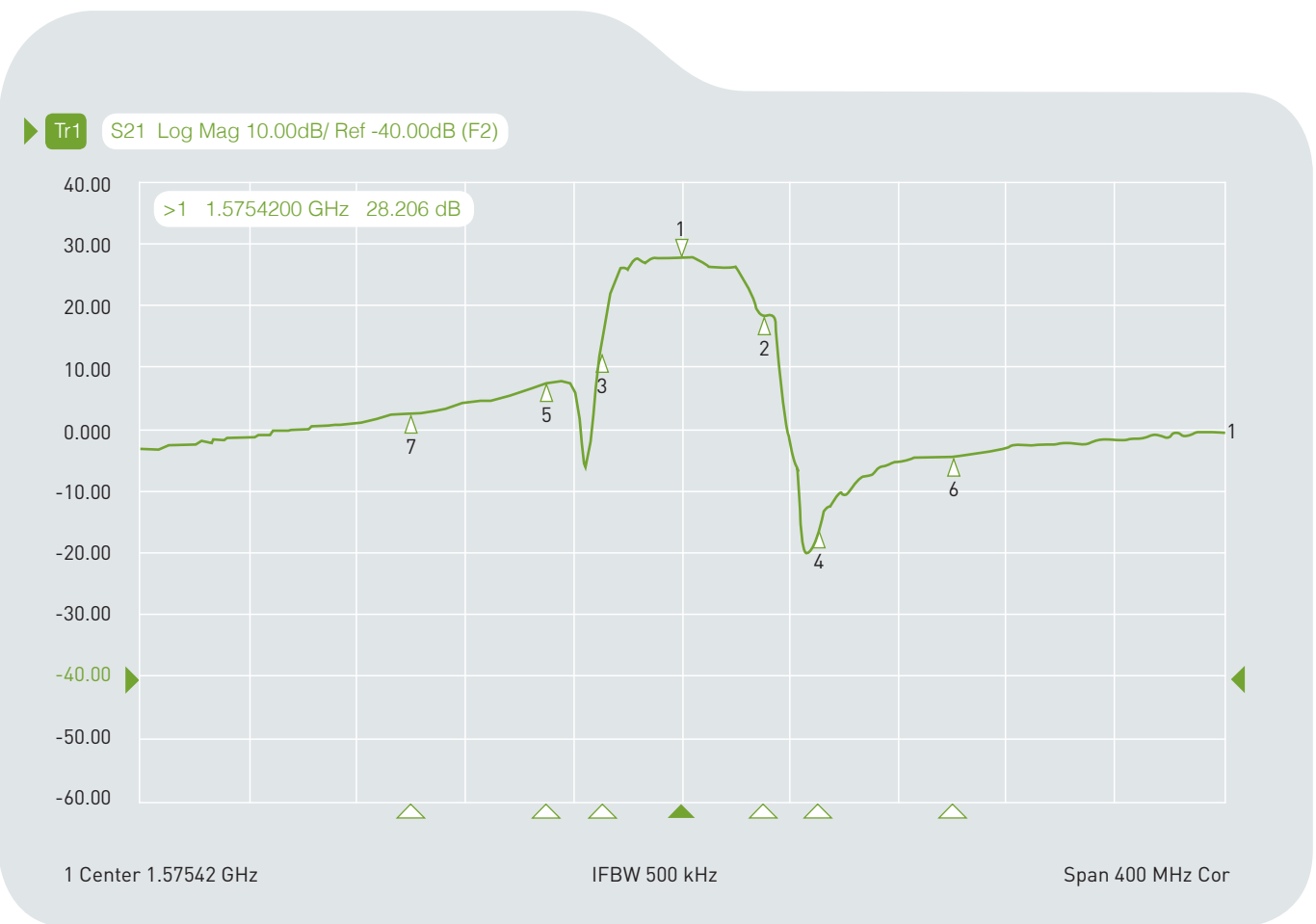
#### LNA Gain, Power Consumption and Noise Figure

| Voltage   | LNA Gain (Typ) | Power Consumption(mA) Typ | Noise Figure Typ |
|-----------|----------------|---------------------------|------------------|
| Min. 1.8V | 20dB           | 4mA                       | 2.0dB            |
| Typ. 3.0V | 28dB           | 9mA                       | 2.0dB            |
| Max. 5.5V | 29dB           | 20mA                      | 2.0dB            |

### 2.3 Cable\* & Connector

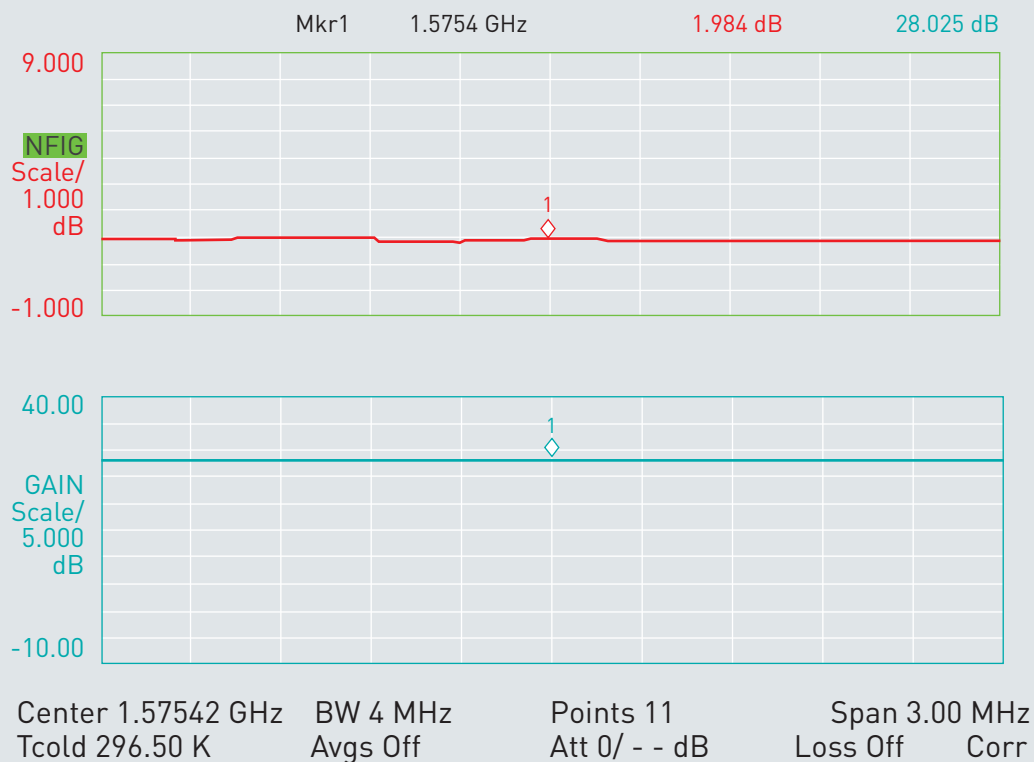
| Parameter | Specification                                   |
|-----------|-------------------------------------------------|
| RF Cable  | Coaxial Cable Ø 1.13 ± 0.1mm, length 45 ± 2.5mm |
| Connector | IPEX MHFI (U.FL)                                |

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



|     |     |     |    |               |         |    |
|-----|-----|-----|----|---------------|---------|----|
| Cg1 | Tr1 | S21 | >1 | 1.5754200 GHz | 28.206  | dB |
| Cg1 | Tr1 | S21 | 2  | 1.6054200 GHz | 18.456  | dB |
| Cg1 | Tr1 | S21 | 3  | 1.5454200 GHz | 13.008  | dB |
| Cg1 | Tr1 | S21 | 4  | 1.6254200 GHz | -15.497 | dB |
| Cg1 | Tr1 | S21 | 5  | 1.5254200 GH  | 7.6131  | dB |
| Cg1 | Tr1 | S21 | 6  | 1.6754200 GHz | -4.3556 | dB |
| Cg1 | Tr1 | S21 | 7  | 1.4754200 GHz | 2.6855  | dB |

## 4. LNA Noise Figure @3.0V

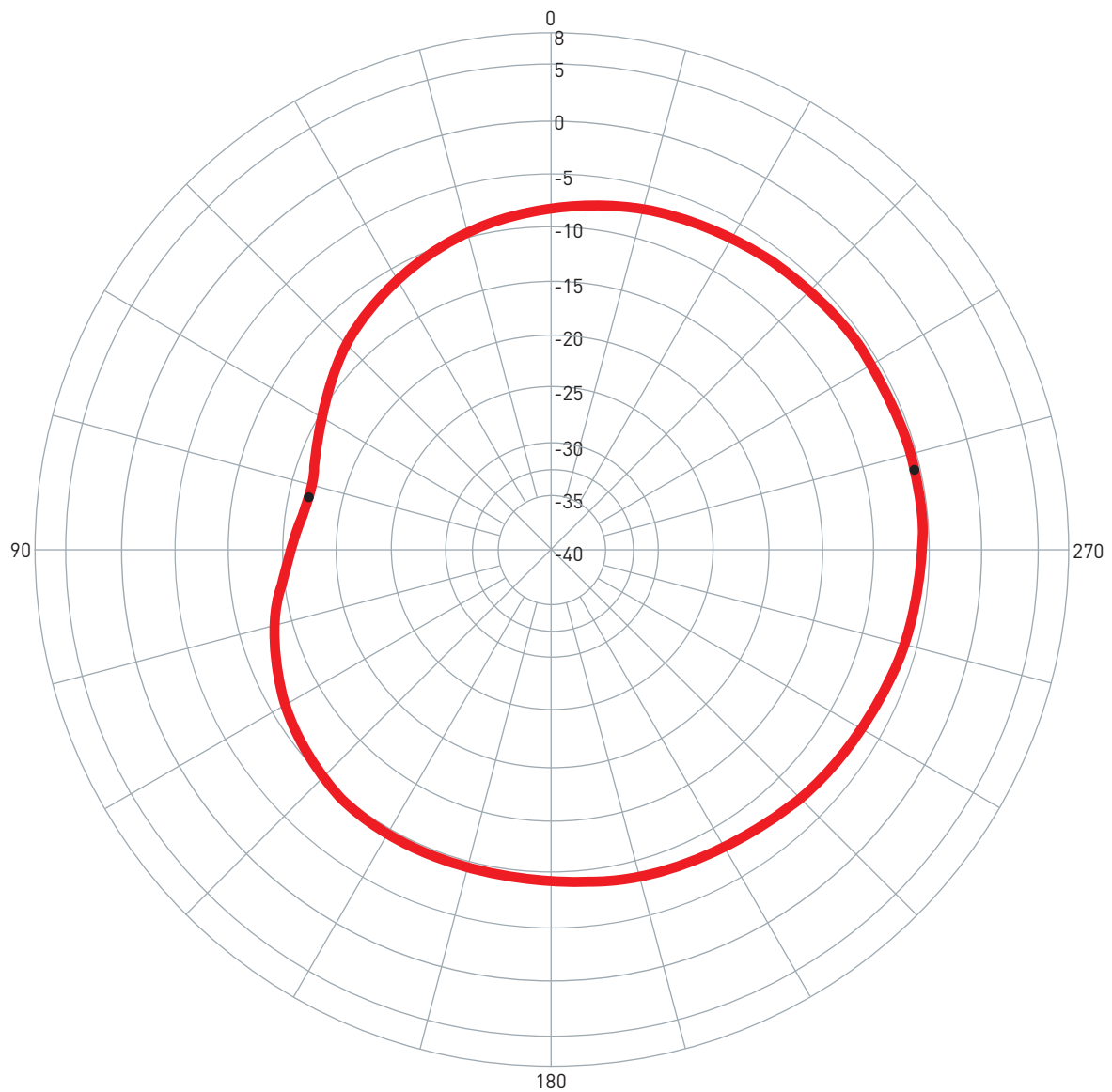


## 5. Total Specification (through Antenna, LNA, Cable and Connector)

| Parameter             | Specification                 |
|-----------------------|-------------------------------|
| Frequency             | 1575.42 ± 1.023MHz            |
| Gain                  | At 3V: 23 ± 4dBic @ 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               | 13.4*13.4*5.7mm               |

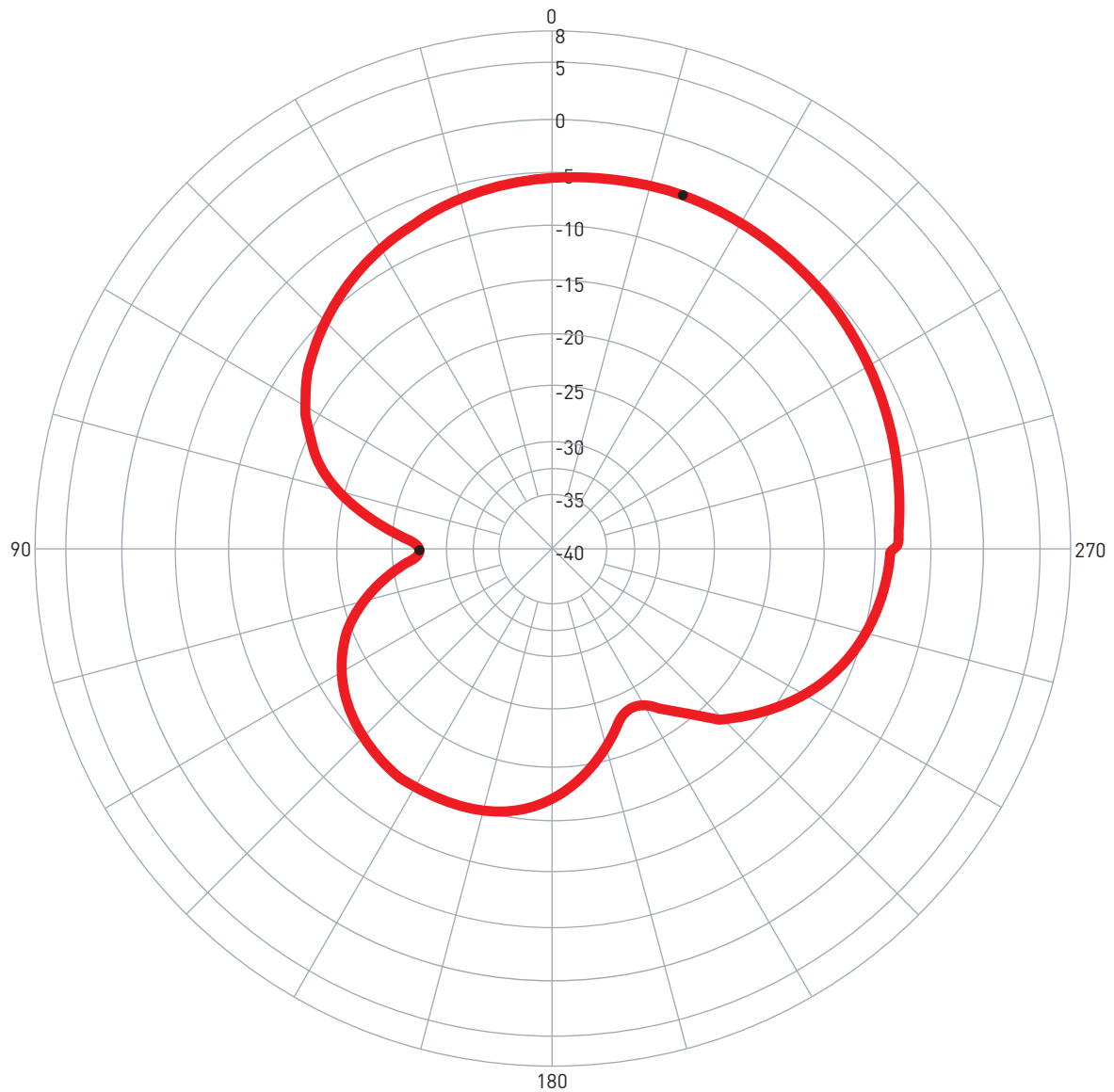
## 6. Radiation Patterns

### 6.1 XZ Plane Radiation



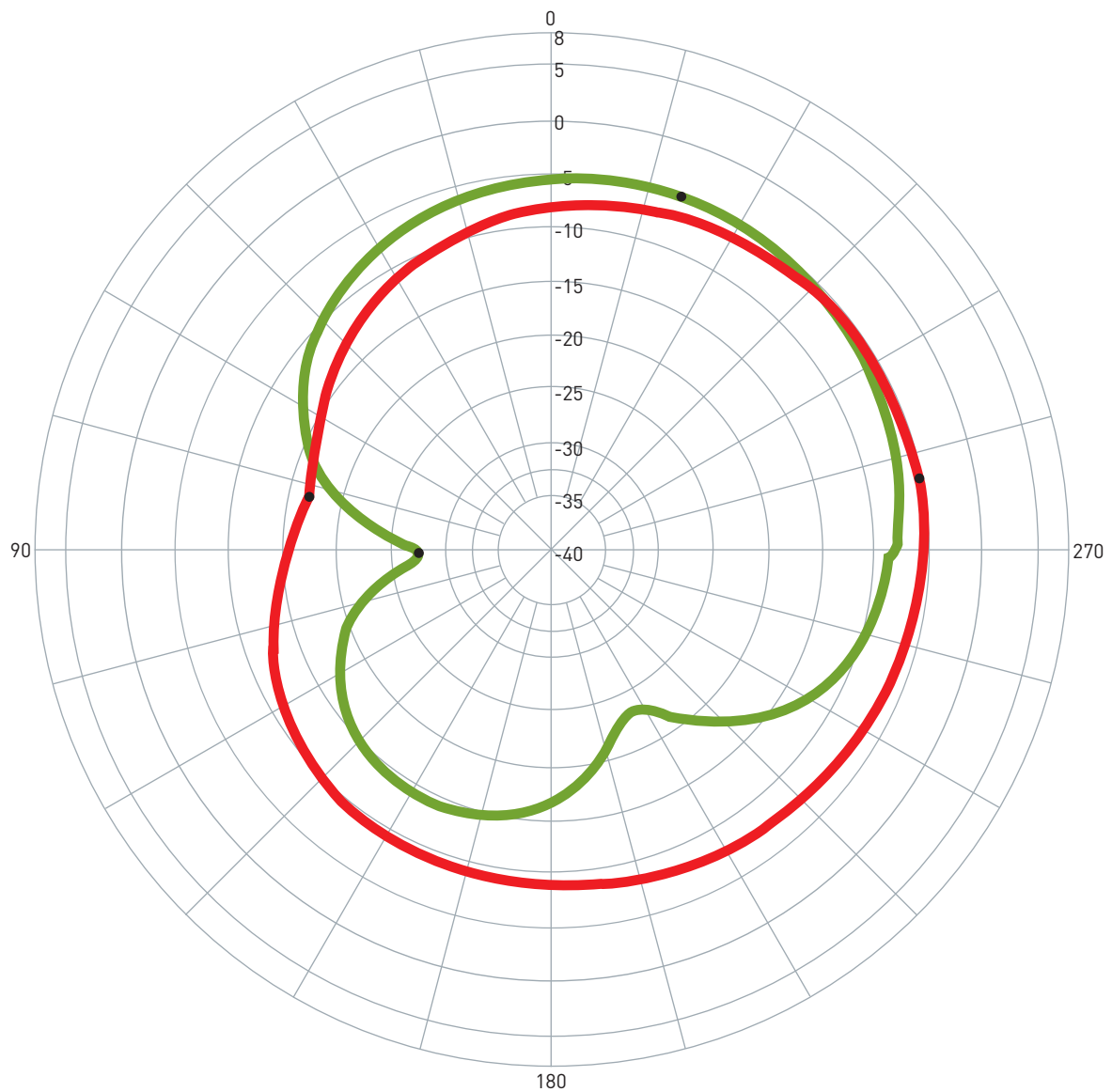
| Pattern                                                                               | Model No.       | Test Mode | Freq (MHz) | Max Gain(dBi)  | Min Gain(dBi)  | Avg. Gain(dBi) | Source Polar. | Date      |
|---------------------------------------------------------------------------------------|-----------------|-----------|------------|----------------|----------------|----------------|---------------|-----------|
| 1  | AP.12F.07.0045A | XZ        | 1612.00    | -5.64 / 282.00 | -16.83 / 77.00 | -8.49          | 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.12F.07.0045A | YZ        | 1612.00    | -5.08 / 340.00 | -27.50 / 91.00 | -9.64          | 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.12F.07.0045A | XZ        | 1612.00    | -5.64 / 282.00 | -16.83 / 77.00 | -8.49          | RHCP          | 2010/4/19 |
| 2       | AP.12F.07.0045A | YZ        | 1612.00    | -5.08 / 340.00 | -27.50 / 91.00 | -9.64          | RHCP          | 2010/4/19 |



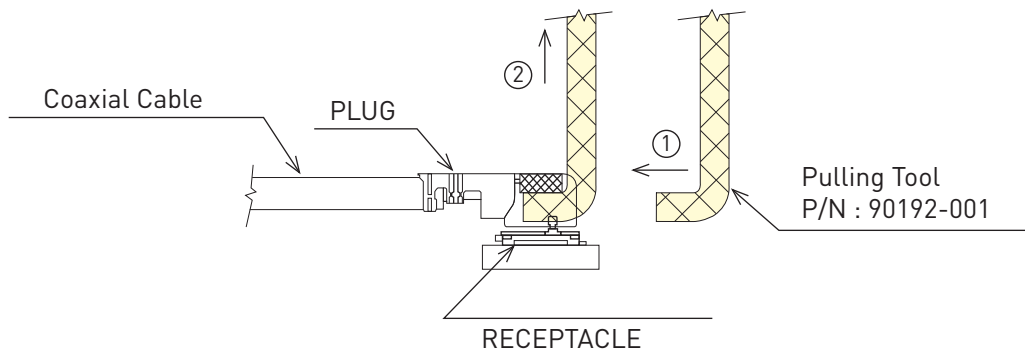
## 8. Plugs Usage Precautions

### 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.

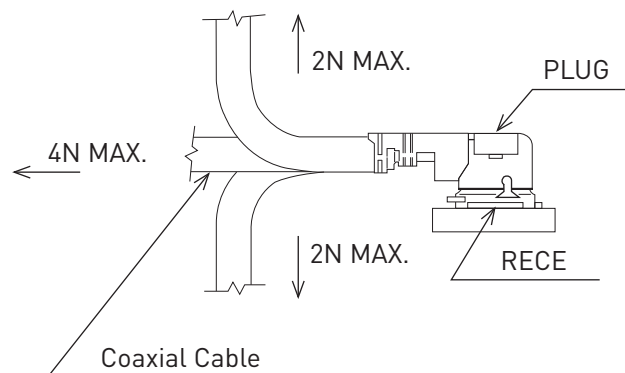
(2) To mate the connectors, the mating axes of both connectors must be aligned and the connectors can be mated. The "click" will confirm fully mated connection.

Do not attempt to insert on an extreme angle.

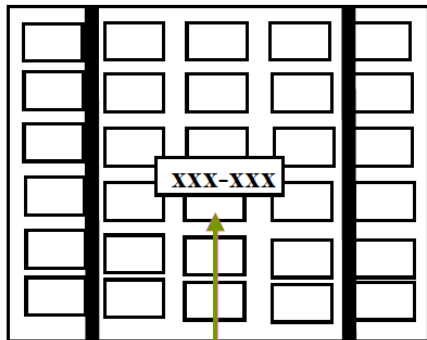


### 8.2 Pull forces on the cable after connectors are mated

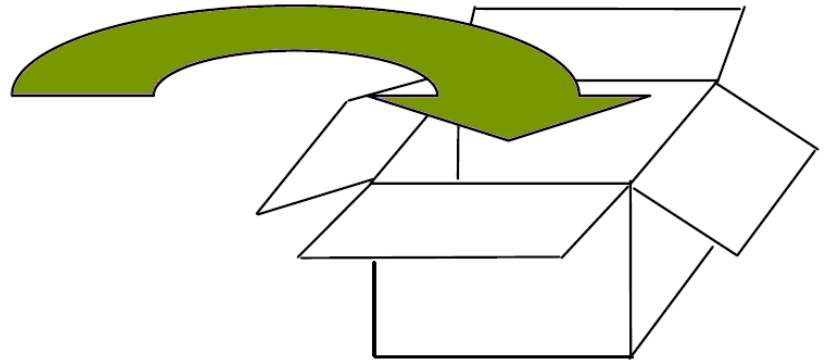
After the connectors are mated, do not apply a load to the cable in excess of the values indicated in the diagram below.



## 9. Packaging



- \*Packaged in Tray with Foam
- \*One Tray = 60 pieces
- \*6 Trays per Section = 360 pcs



- \*Each Carton contains 3 Sections
- \*1080 pieces per Carton

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