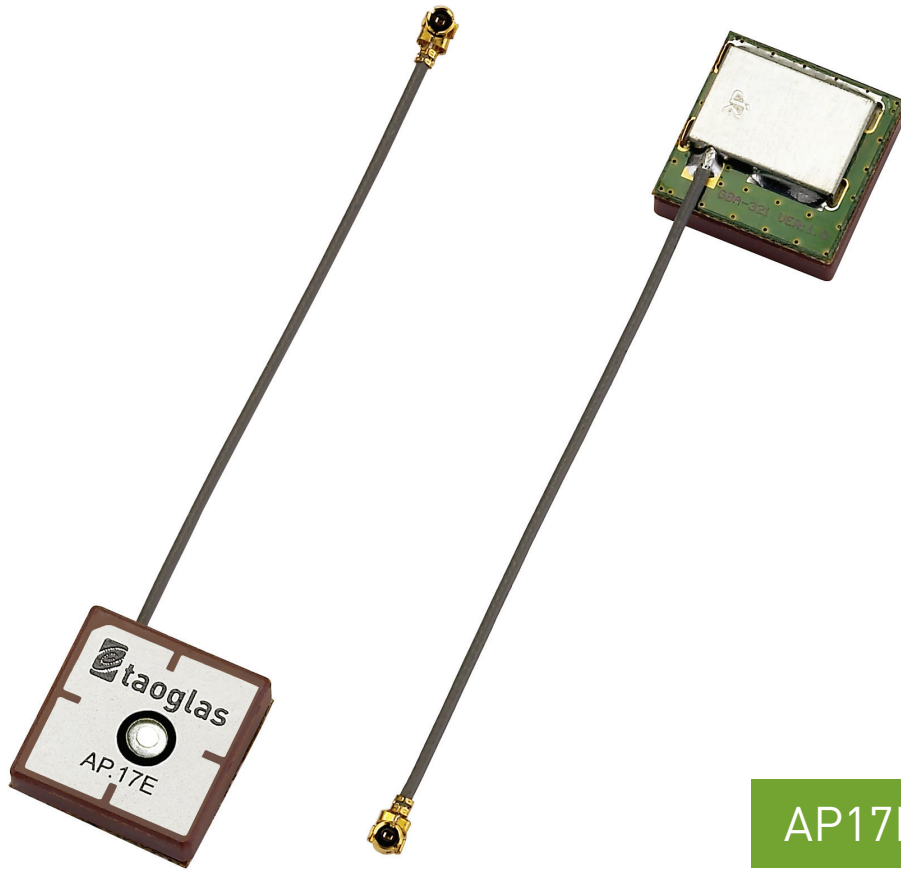




AP17E.07.0064A

## Specification

|                     |                                                                                                                        |
|---------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Part No.</b>     | AP17E.07.0064A                                                                                                         |
| <b>Product Name</b> | 17mm One Stage GPS Active Patch Antenna Module with Front End SAW Filter                                               |
| <b>Feature</b>      | 17mm*17mm*6.3mm<br>64mm 1.13 IPEX MHFI<br>Wide Voltage 1.8V~5.5V<br>15dB LNA<br>Tested in Free space<br>RoHS Compliant |

## 1. Introduction

The AP.17E is a one stage 17mm active patch antenna that has been designed specifically for embedded (inside device) integration with GPS receiver modules.

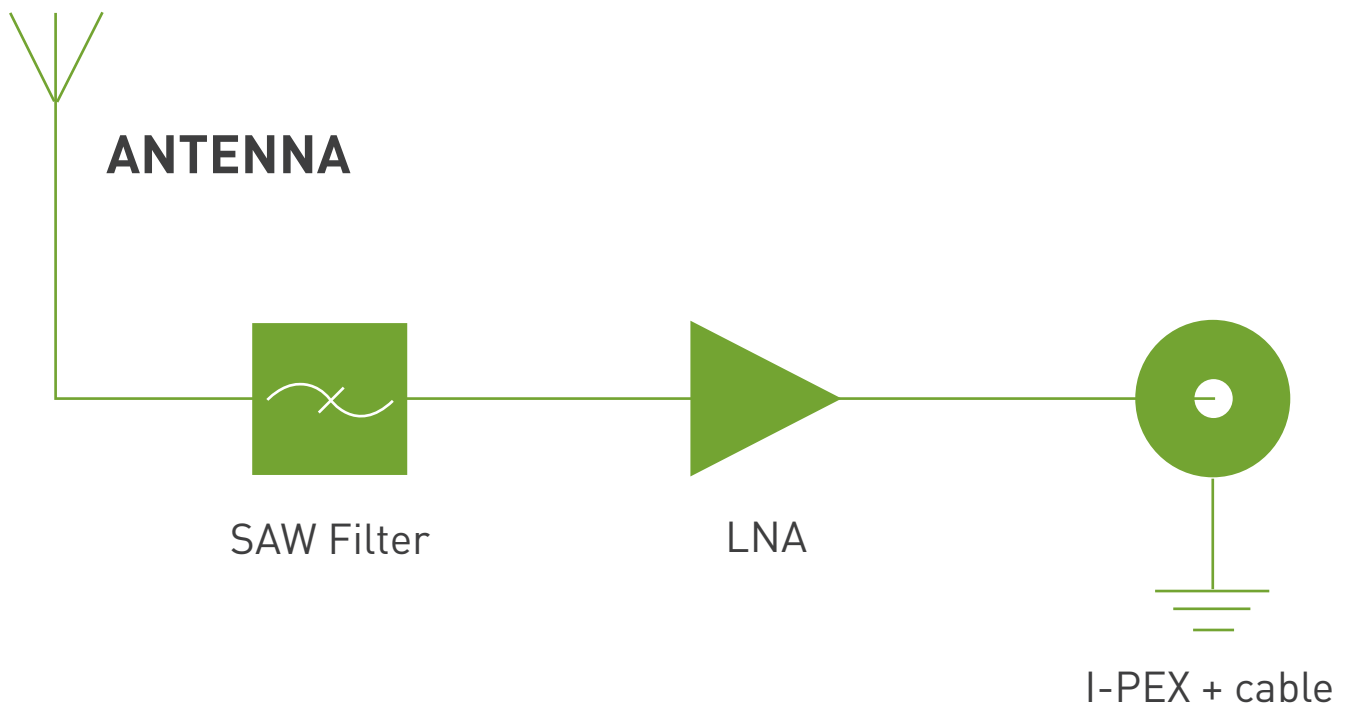
The AP.17E combines a 17\*17\*4mm advanced low profile ceramic patch antenna with a one stage LNA and a front-end SAW filter with ultra thin coaxial cable. It comes with it's own integrated ground-plane.

The front end SAW filter reduces the risks where there is a cellular transmitter nearby of interference from out of band frequencies which can cause LNA burn-out, saturation, or radiated spurious emissions.

The antenna can work on a wide input voltage from 1.8V to 5.5V with best in class power consumption figures.

If further tuning and optimization specific to a customer device is required Taoglas offers a custom tuned and optimized part service. Contact [sales@taoglas.com](mailto:sales@taoglas.com) for more information.

Cables and connectors can be customized according to request.



## 2. Specification

### 2.1 Patch Antenna

| Parameter       | Specification          |
|-----------------|------------------------|
| Frequency       | 1575.42 ± 1.023MHz     |
| Gain @ Zenith   | -1.0dBic Typ. @ Zenith |
| Polarization    | RHCP                   |
| Axial Ratio     | 3.0dB max @ Zenith     |
| Patch Dimension | 17*17*4mm              |

### 2.2 LNA

| Parameter              | Specification                                                                   |
|------------------------|---------------------------------------------------------------------------------|
| Frequency              | 1575.42 ± 1.023MHz                                                              |
| Outer Band Attenuation | F0=1575.42MHz<br>F0±30MHz 2dB min.<br>F0±50MHz 18dB 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

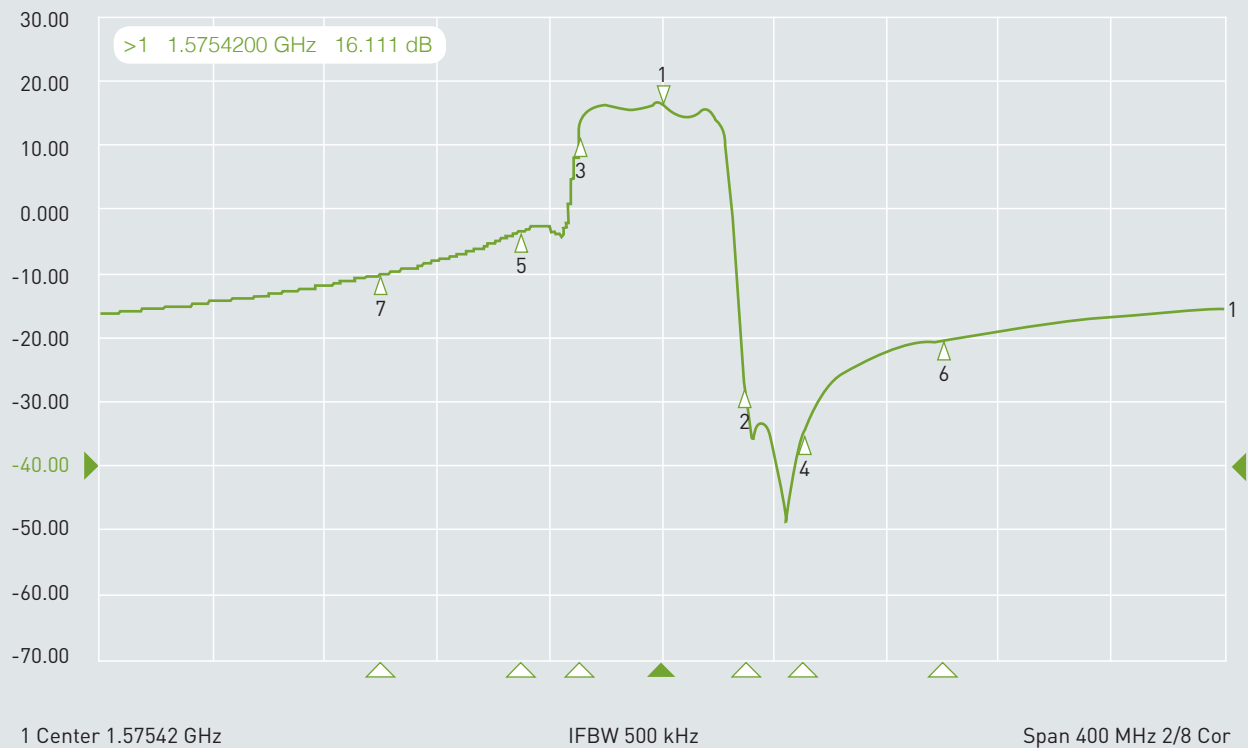
| Voltage   | LNA Gain (Typ) | Power Consumption(mA) Typ | Noise Figure Typ |
|-----------|----------------|---------------------------|------------------|
| Min. 1.8V | 13dB           | 1.6mA                     | 2.5dB            |
| Typ. 3.0V | 16dB           | 3.5mA                     | 2.5dB            |
| Max. 5.5V | 17dB           | 7.6mA                     | 2.6dB            |

### 2.3 Cable\* & Connector

| Parameter | Specification                                     |
|-----------|---------------------------------------------------|
| RF Cable  | Coaxial Cable Ø 1.13 ± 0.1mm, length 64mm ± 2.5mm |
| Connector | IPEX MHFI (U.FL)                                  |

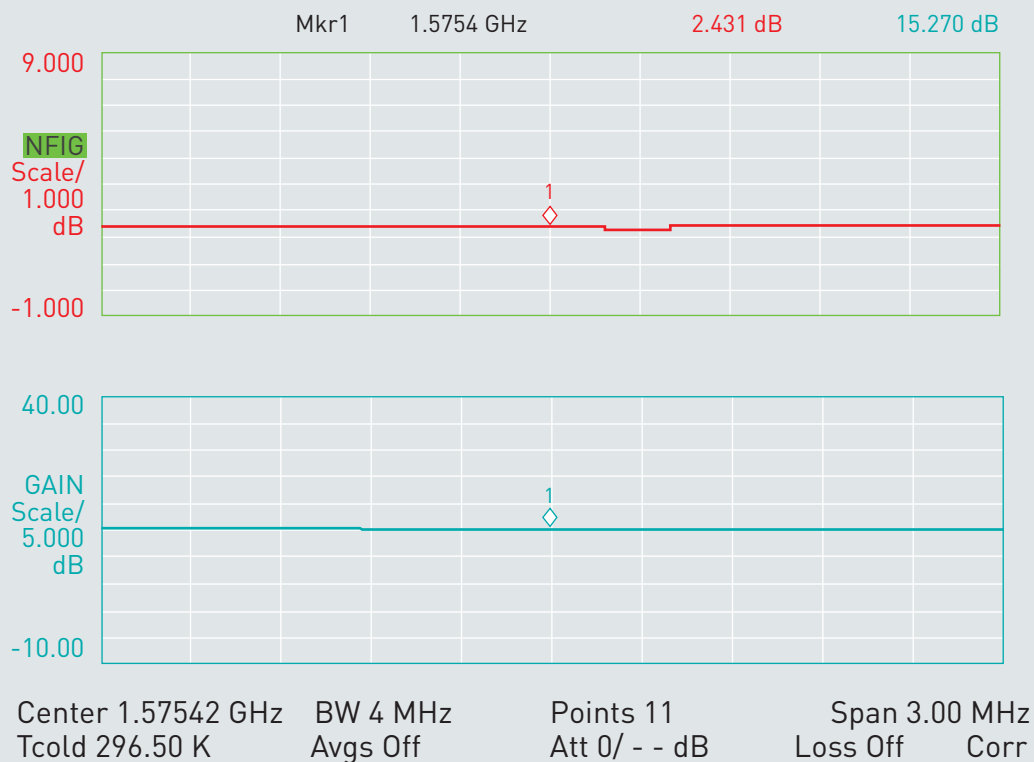
### 3. LNA Gain and Out Band Rejection @3.0V

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



|     |     |     |    |               |         |    |
|-----|-----|-----|----|---------------|---------|----|
| Cg1 | Tr1 | S21 | >1 | 1.5754200 GHz | 16.111  | dB |
| Cg1 | Tr1 | S21 | 2  | 1.6054200 GHz | -27.059 | dB |
| Cg1 | Tr1 | S21 | 3  | 1.5454200 GHz | 12.455  | dB |
| Cg1 | Tr1 | S21 | 4  | 1.6254200 GHz | -34.597 | dB |
| Cg1 | Tr1 | S21 | 5  | 1.5254200 GH  | -3.4458 | dB |
| Cg1 | Tr1 | S21 | 6  | 1.6754200 GHz | -20.195 | dB |
| Cg1 | Tr1 | S21 | 7  | 1.4754200 GHz | -10.158 | dB |

## 4. LNA Noise Figure @3.0V

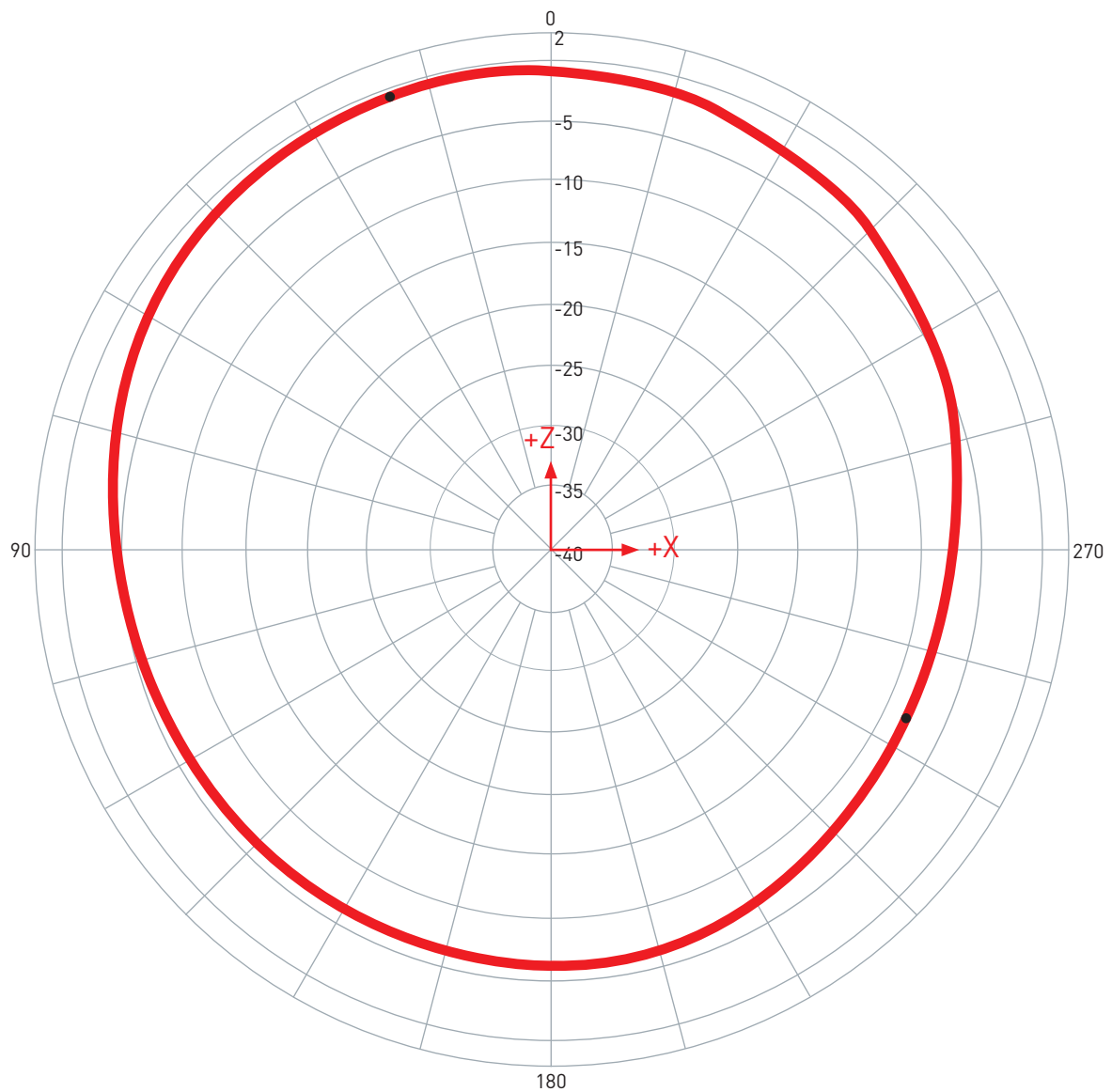


## 5. Total Specification (through Antenna, LNA, Cable and Connector)

| Parameter             | Specification                   |
|-----------------------|---------------------------------|
| Frequency             | 1575.42 ± 1.023MHz              |
| Gain                  | At 3V: 15 ± 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. 5.5V |
| Antenna               | 17*17*6.1mm                     |

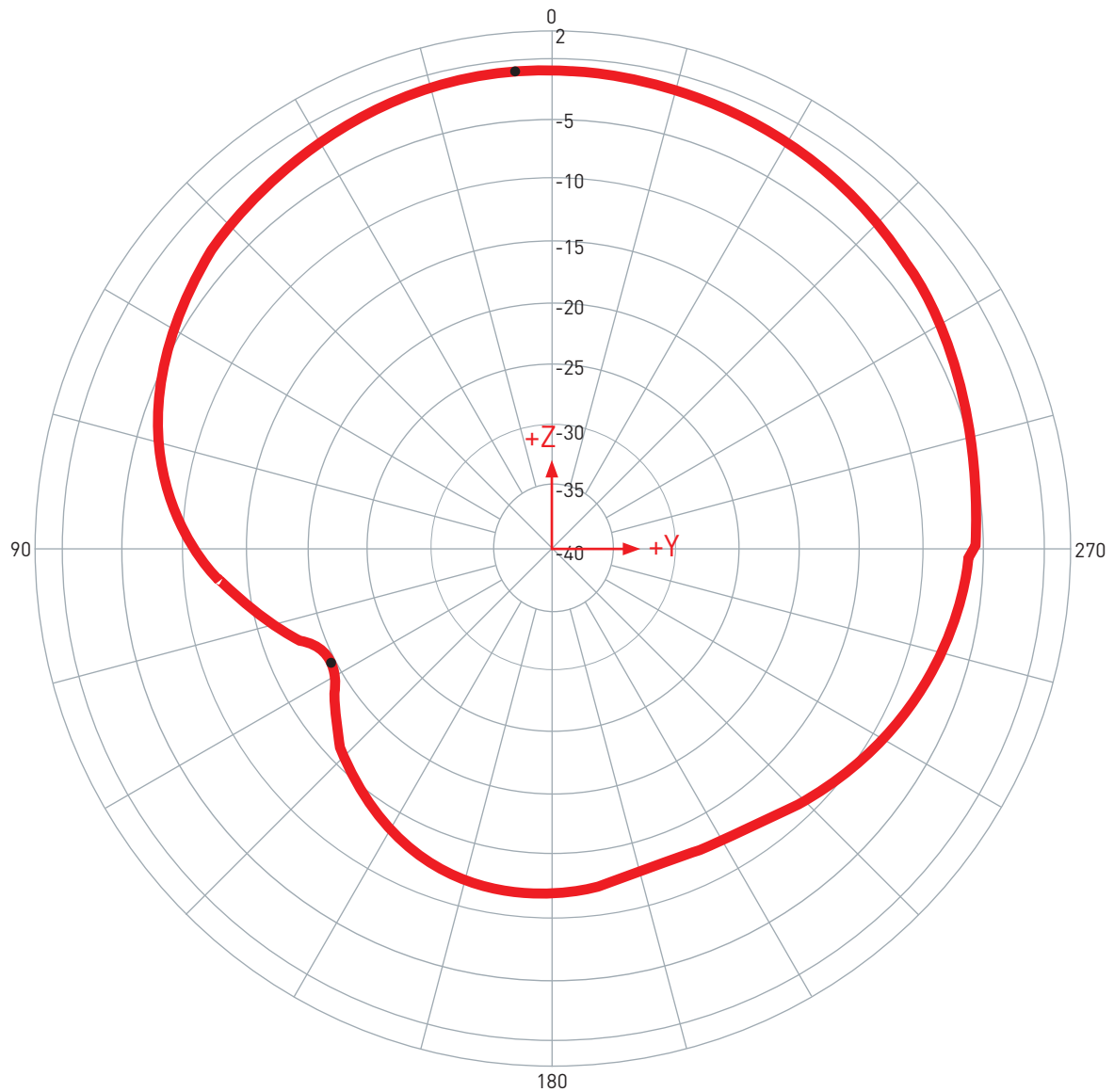
## 6. Radiation Patterns

### 6.1 XZ Plane Radiation



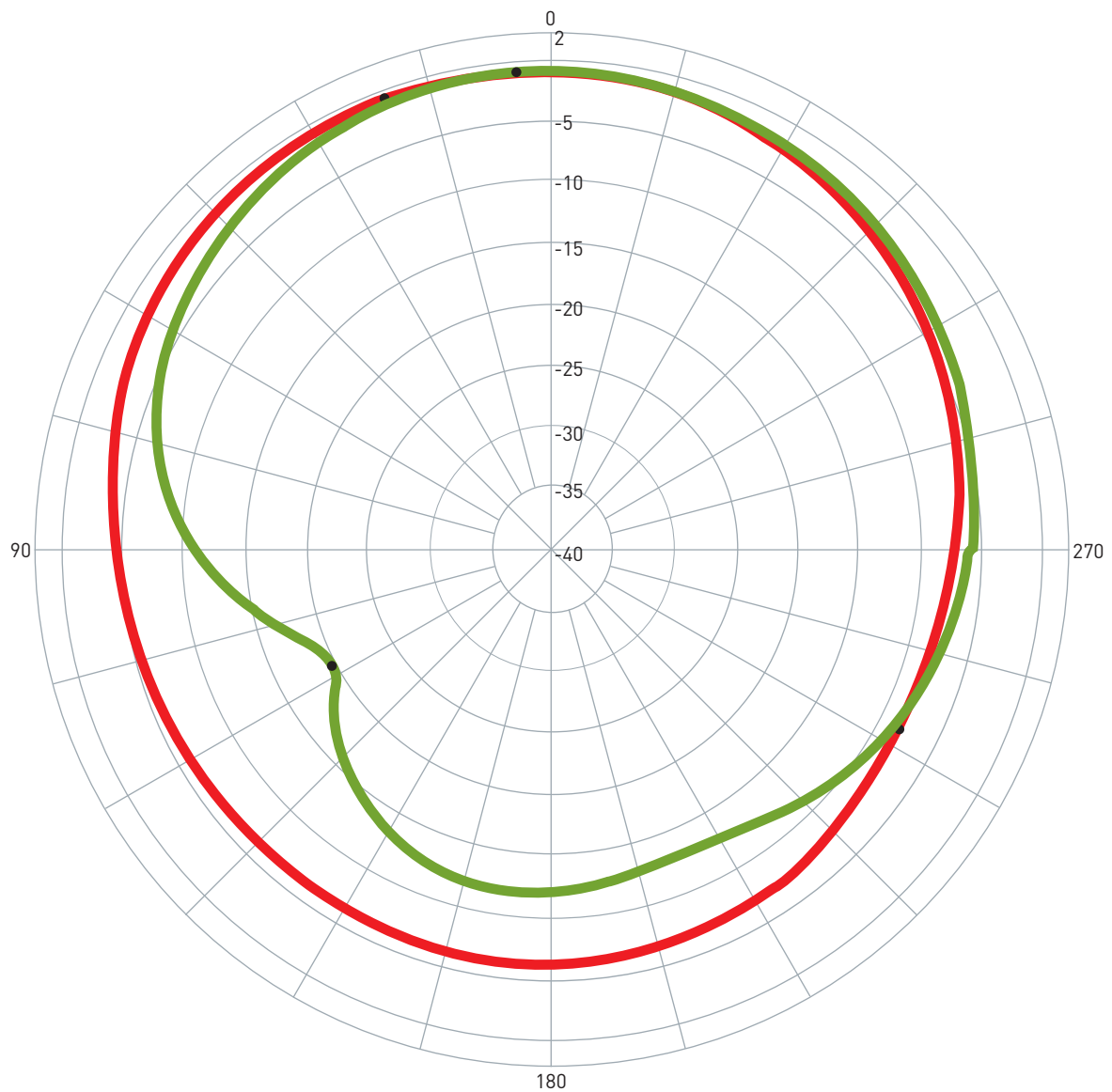
| Pattern                                                                               | Model No.      | Test Mode | Freq (MHz) | Max Gain(dBi) | Min Gain(dBi)  | Avg. Gain(dBi) | Source Polar. | Date     |
|---------------------------------------------------------------------------------------|----------------|-----------|------------|---------------|----------------|----------------|---------------|----------|
| 1  | AP17E.07.0064A | XZ        | 1575.42    | -0.88 / 20.00 | -8.25 / 244.00 | -4.01          | RHCP          | 2011/9/9 |

## 6.2 YZ Plane Radiation



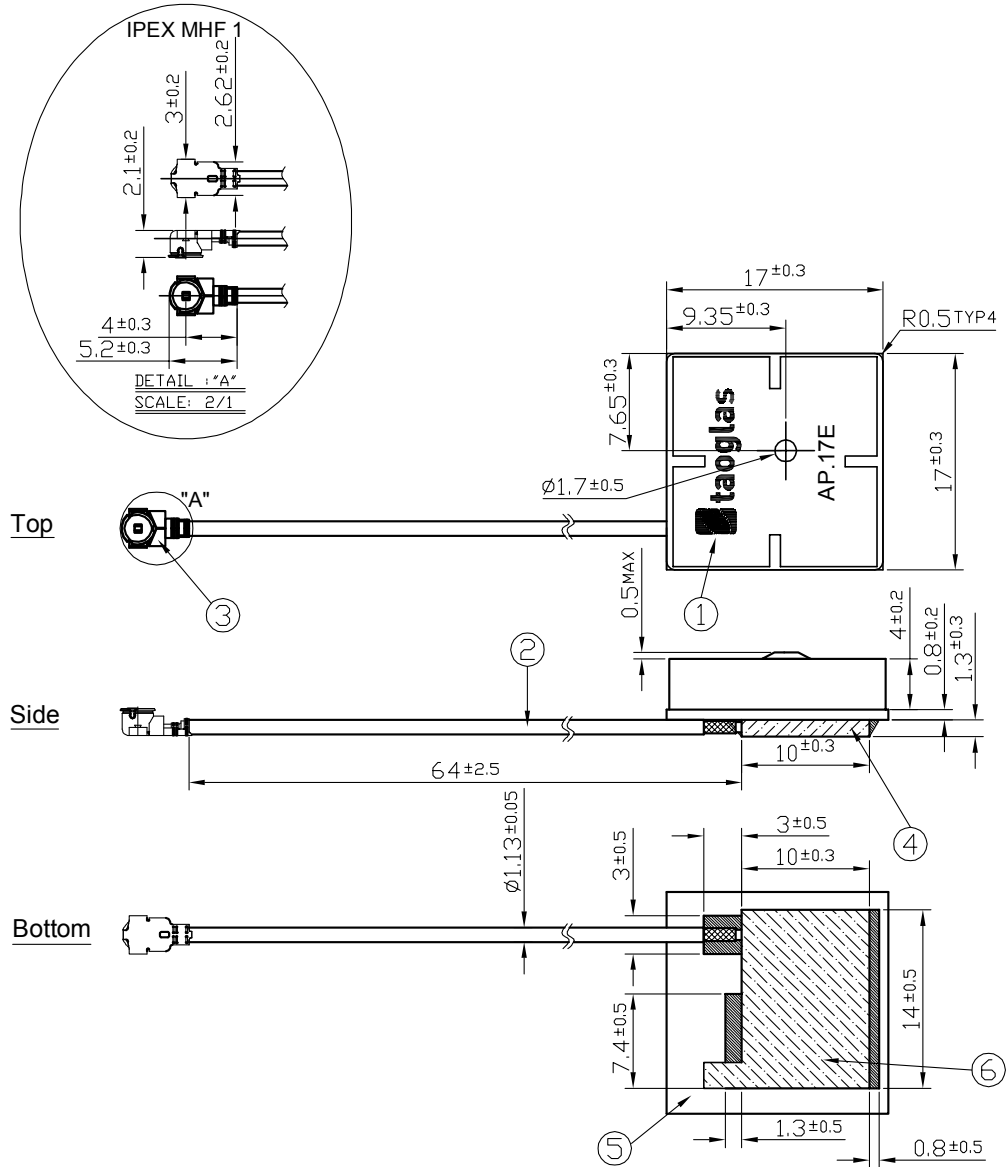
| Pattern                                                                               | Model No.      | Test Mode | Freq (MHz) | Max Gain(dBi) | Min Gain(dBi)   | Avg. Gain(dBi) | Source Polar. | Date     |
|---------------------------------------------------------------------------------------|----------------|-----------|------------|---------------|-----------------|----------------|---------------|----------|
| 1  | AP17E.07.0064A | YZ        | 1575.42    | -1.01 / 4.00  | -19.77 / 118.00 | -5.35          | RHCP          | 2011/9/9 |

## 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       | AP17E.07.0064A | XZ        | 1575.42    | -0.88 / 20.00 | -8.25 / 244.00  | -4.01          | RHCP          | 2011/9/9 |
| 2       | AP17E.07.0064A | YZ        | 1575.42    | -1.01 / 4.00  | -19.77 / 118.00 | -5.35          | RHCP          | 2011/9/9 |

## 7. Technical Drawing



### NOTE:

1. Soldered area
2. Shielding case
3. Double Sided Adhesive
4. The connector position has special orientation to the PCB as per drawing.
5. All material must be RoHS compliant.
6. Open/short QC, VSWR required.

|   | Name                     | P/N           | Material   | Finish      | QTY |
|---|--------------------------|---------------|------------|-------------|-----|
| 1 | AP.17E Patch (17*17*4mm) | AP.17E        | Ceramic    | Clear       | 1   |
| 2 | 1.13 Coaxial Cable       | OD.113.CM     | FEP        | Gray        | 1   |
| 3 | IPEX MHF1 Connector      | IPEX.MHF1.113 | Brass      | Gold Plated | 1   |
| 4 | Shielding Case           |               | Tin (SPTE) | Tin Plated  | 1   |
| 5 | PCB                      |               | FR4 0.8t   | Green       | 1   |

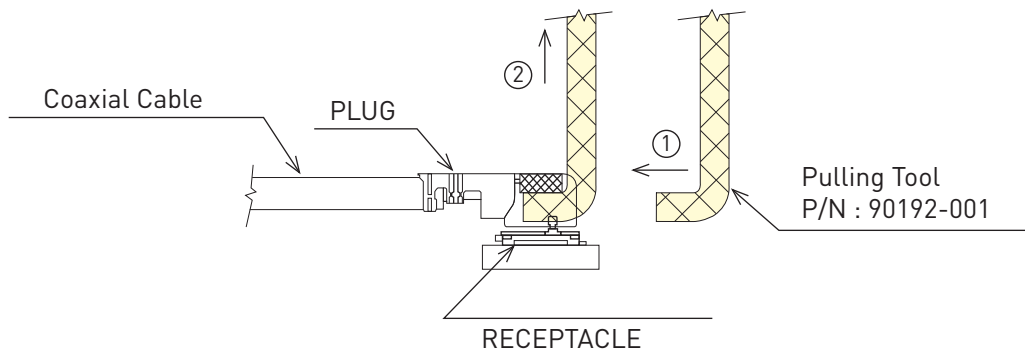
## 8. Plugs Usage Precautions

### 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.

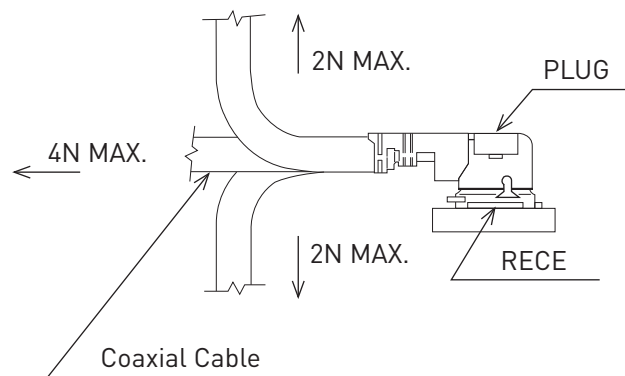
(2) To mate the connectors, the mating axes of both connectors must be aligned and the connectors can be mated. The "click" will confirm fully mated connection.

Do not attempt to insert on an extreme angle.

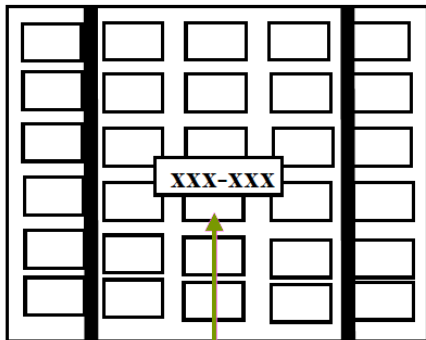


### 8.2 Pull forces on the cable after connectors are mated

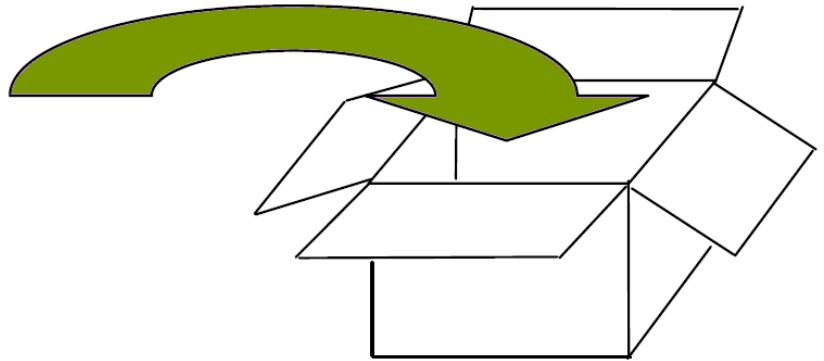
After the connectors are mated, do not apply a load to the cable in excess of the values indicated in the diagram below.



## 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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