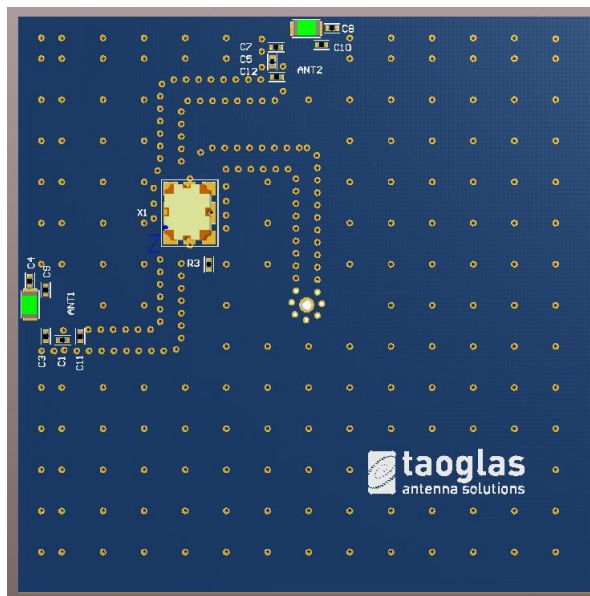


# Draft Specification

- Part No. : **MAT.12A**
- Product Name : **GPS/GLONASS/BEIDOU CP Loop Antennas**
- Features : Circularly Polarized GPS/GLONASS/BEIDOU  
Omnidirectional Antenna Pattern  
Low weight  
1575.42 MHz Center Frequency  
Surface-Mount  
70mm\*70mm\*2mm Evaluation Board  
Patent Pending  
**RoHS Compliant**



## 1. Introduction

The dueling loop antennas provide all the advantages of a circularly polarized patch with a smaller board footprint and at 20% the weight in comparison to a similar performing patch antenna.

With a typical patch antenna, circular polarization is achieved from the geometry of the antenna structure. This leaves the antenna sensitive to its environment and when placed on a board inside an enclosure, the axial ratio of the patch can be degraded. Typically, this is fixed by custom tuning the artwork of the patch itself for that specific enclosure which increases cost and lead time.

With the dueling loop antennas, two linearly polarized GPS chip antennas are placed orthogonally to one another and fed with a quadrature hybrid coupler. The hybrid coupler forces each antenna to be fed with an equal amplitude signal, with one signal being phased 90 degrees. This forces the antenna pattern to be circularly polarized, by definition. As a result, there is no degradation of axial ratio when the antennas are placed inside an enclosure and no need for custom tuning.

In this implementation, two Taoglas GGBLA.01.A antennas are used with a Yantel HC1400 P03S 3 dB hybrid coupler to produce a circularly polarized, high efficiency, omnidirectional antenna pattern.

For more information, please contact your regional Taoglas office and sales support team.

## 2. Specifications

ELECTRICAL	
Frequency	1575.42 MHz $\pm$ 30 MHz
Bandwidth	30MHz min
Return Loss <-10 dB	
Gain at Zenith	+ .16 dBic typ.
Gain at 10°elevation	-1.05 dBic typ.
Axial Ratio	2 dB max
Polarization	RHCP
Impedance	50 Ohms
MECHANICAL	
Ceramic Dimension	3.2 x 1.6 x .5 mm
Weight	.2 g
ENVIRONMENTAL	
Frequency Temperature Coefficient ( $\tau_f$ )	0 $\pm$ 20ppm / °C -40°C to +85°C
Operating Temperature	-40°C to +85°C

\*Measured on a 70x70mm ground plane

\*\*Changes in user groundplane and environment will offset center frequency

### 3. Test Setup

TBD

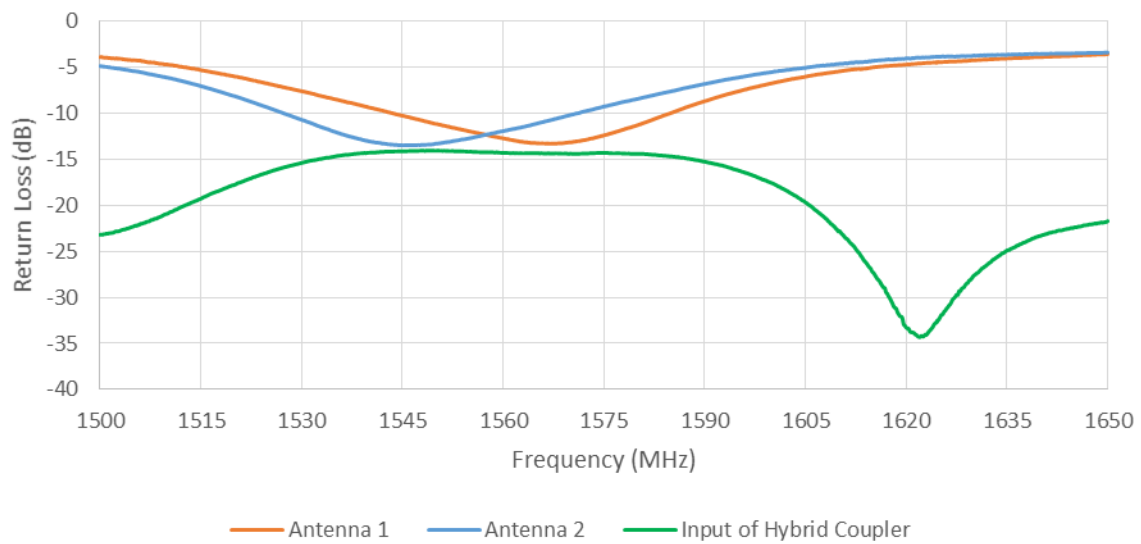
**Figure 1.** Return Loss measurement of the MAT.XXX

TBD

**Figure 2.** Peak gain, efficiency, and radiation pattern test setup

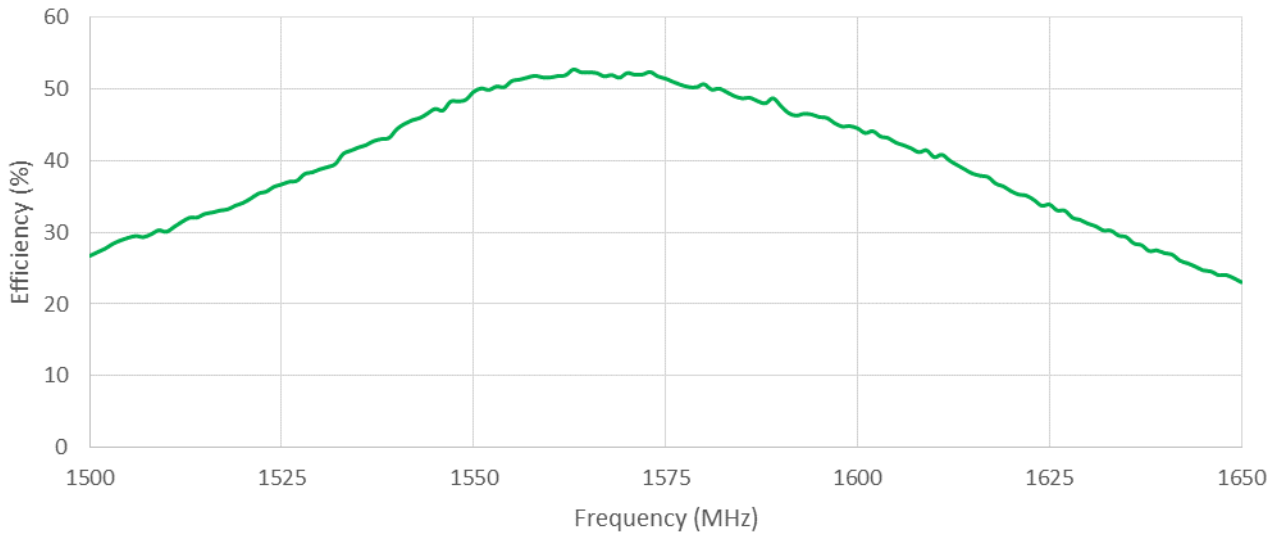
## 4. Antenna Properties

### 4.1 Return Loss



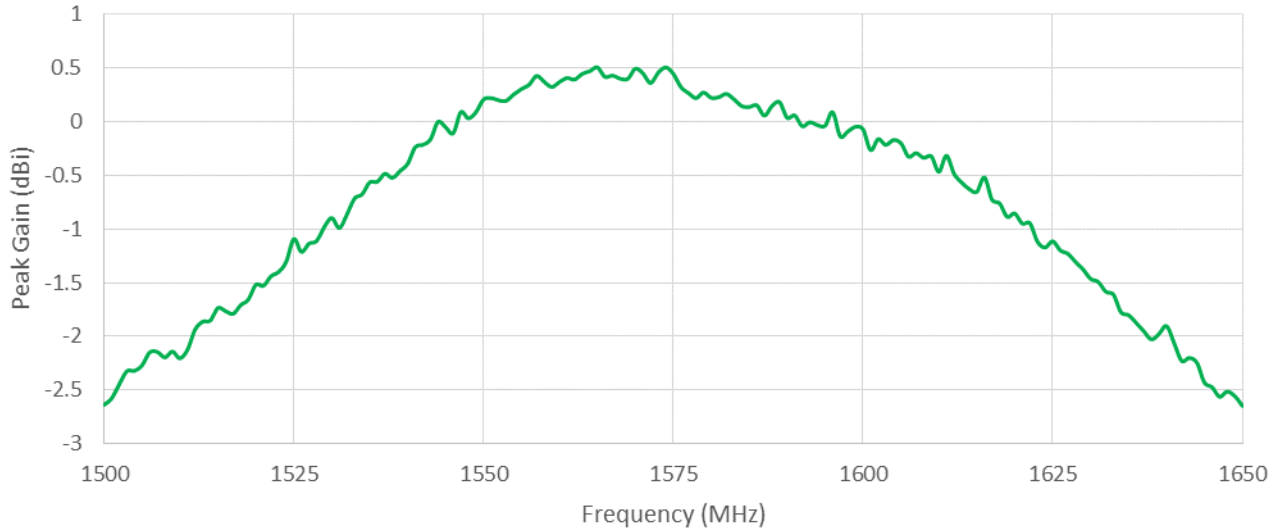
**Figure 3.** Return Loss of the two GGBLA.01.A antennas and the MAT.XXX Input

### 4.2 Efficiency



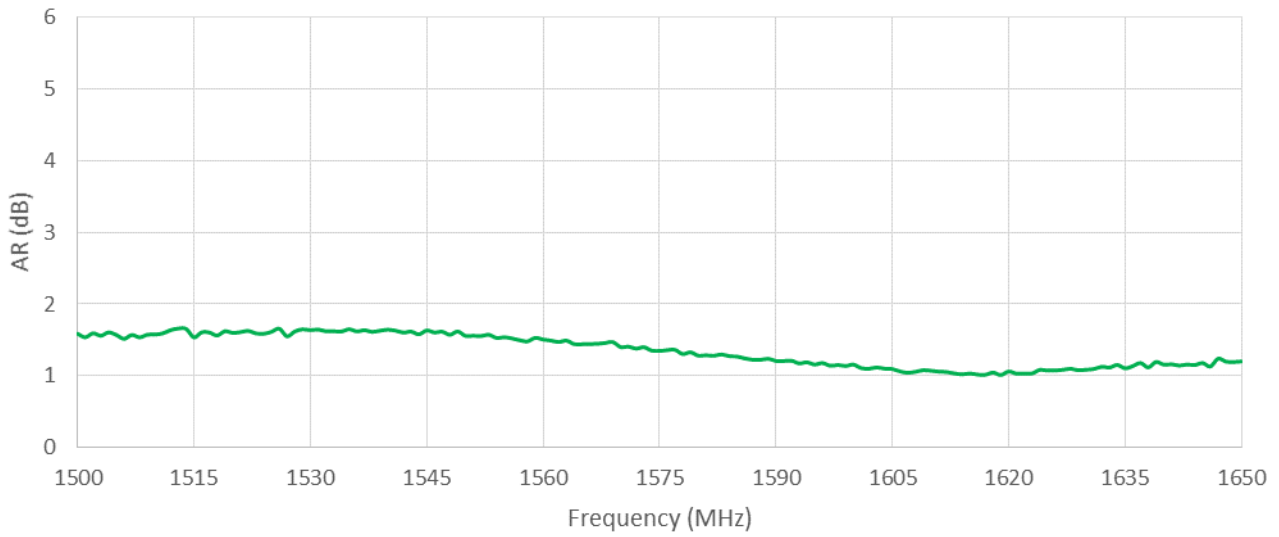
**Figure 4.** Efficiency of the MAT.XXX

### 4.3 Peak Gain



**Figure 5.** Peak Gain of the MAT.XXX

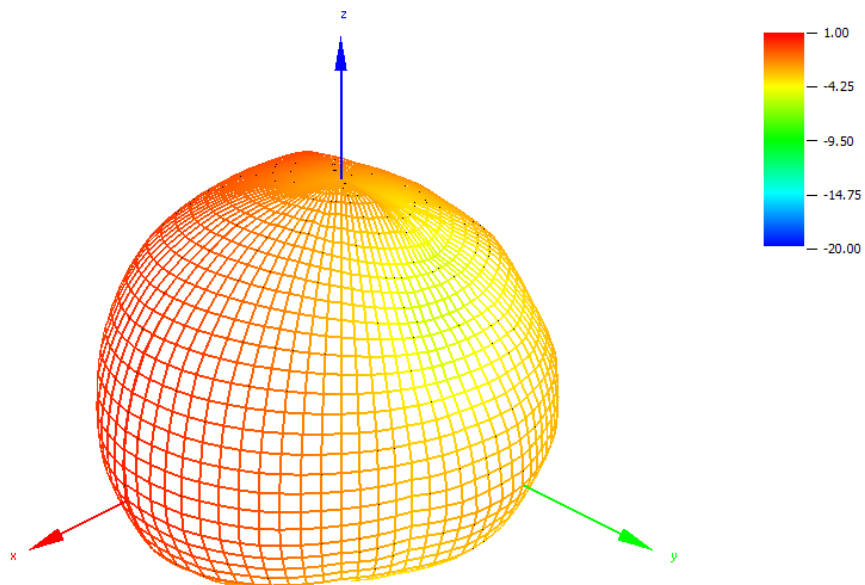
### 4.5 Axial Ratio



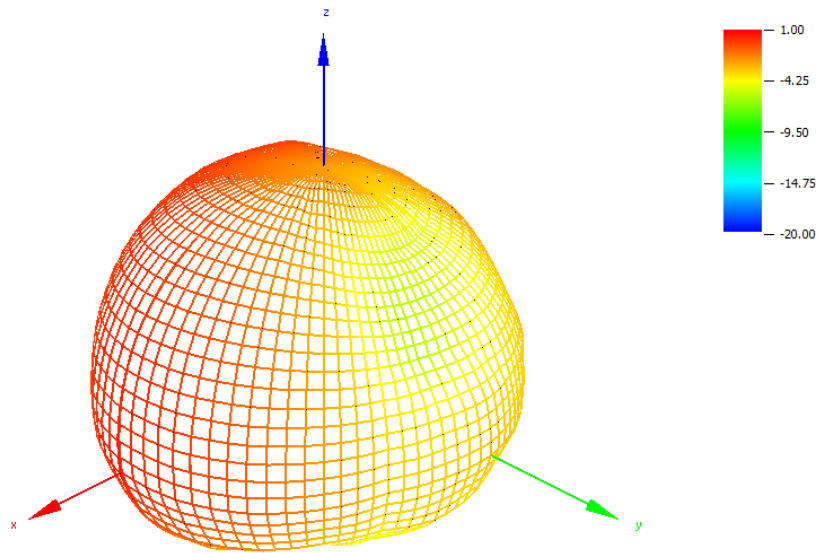
**Figure 6.** Axial Ratio of the MAT.XXX

## 5. Radiation Patterns

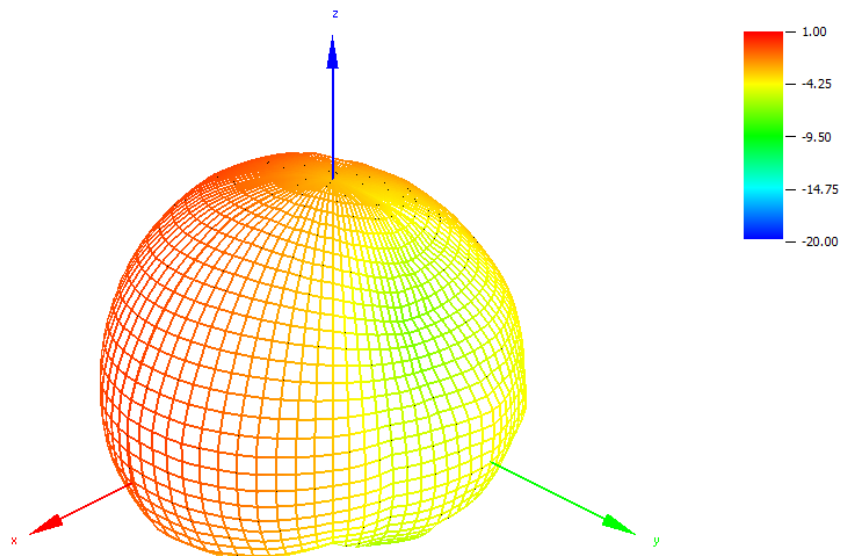
### 5.1 3D Radiation Patterns



**Figure 7.** Radiation Pattern of the MAT.XXX at 1561 MHz.



**Figure 8.** Radiation Pattern of the MAT.XXX at 1575 MHz.

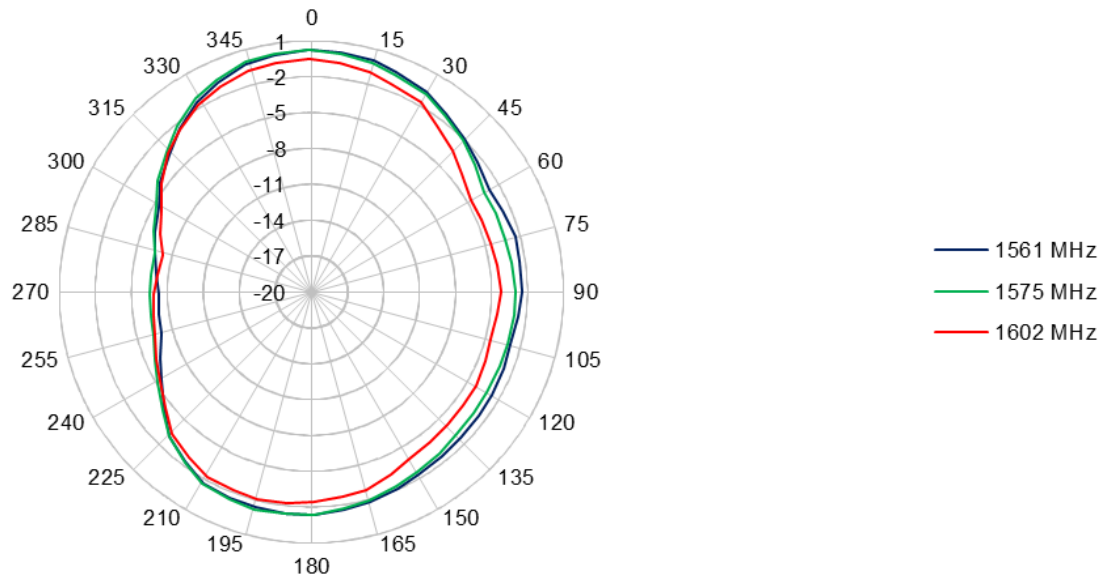


**Figure 9.** Radiation Pattern of the MAT.XXX at 1602 MHz.



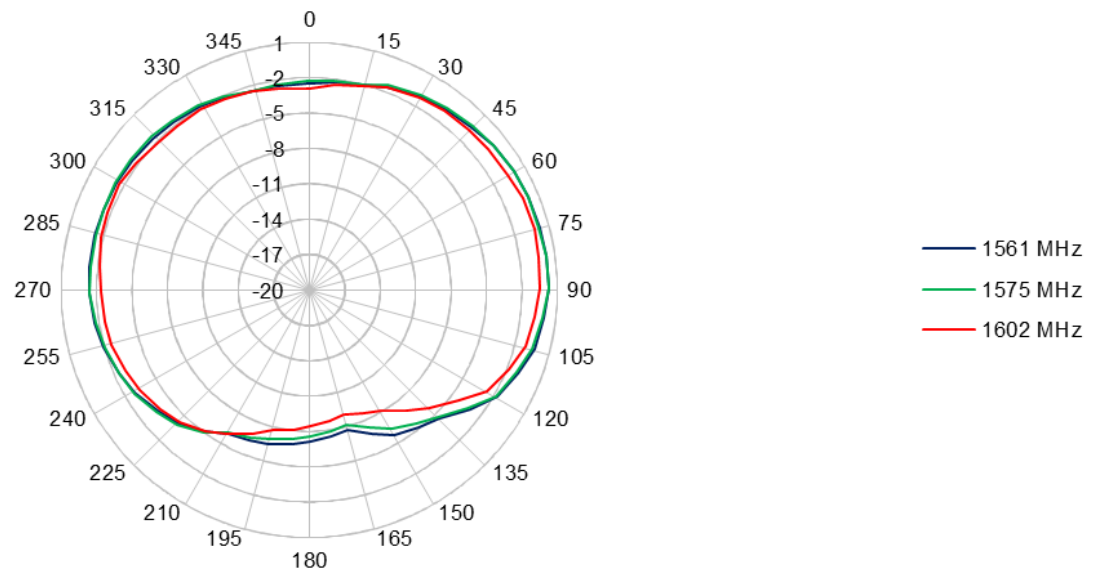
## **5.2 2D Radiation Patterns**

## XZ Plane Radiation



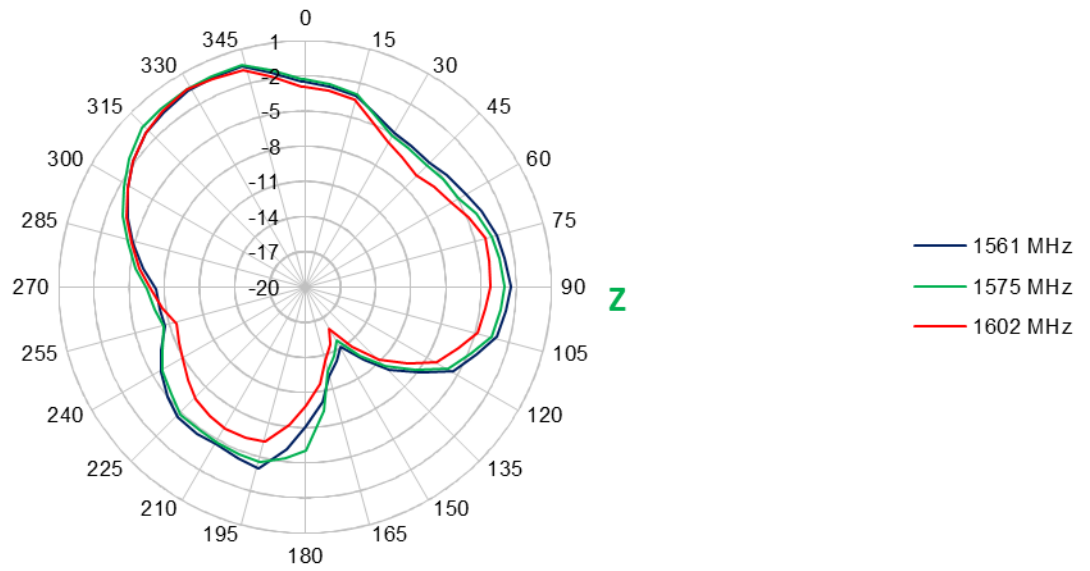
**Figure 10.**XZ Plane Radiation Pattern of the MAT.XXX at 1561, 1575, and 1602 MHz.

## YZ Plane Radiation



**Figure 11.** YZ Plane Radiation Pattern of the MAT.XXX at 1561, 1575, and 1602 MHz.

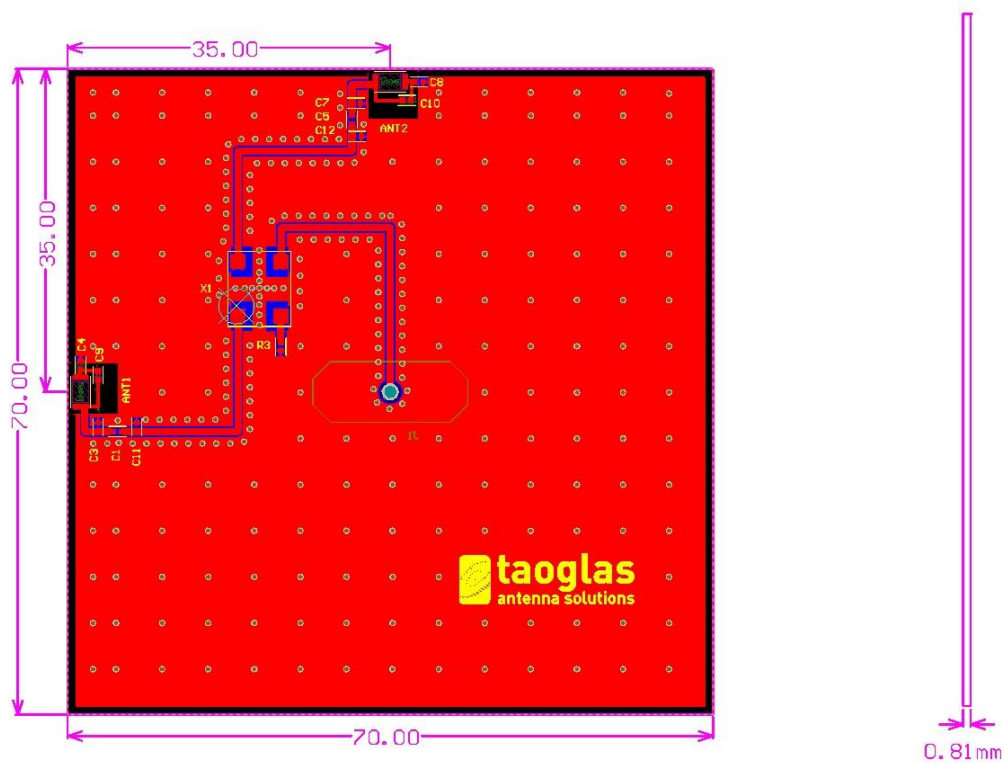
## XY Plane Radiation



**Figure 12.** XY Plane Radiation Pattern of the MAT.XXX at 1561, 1575, and 1602 MHz.

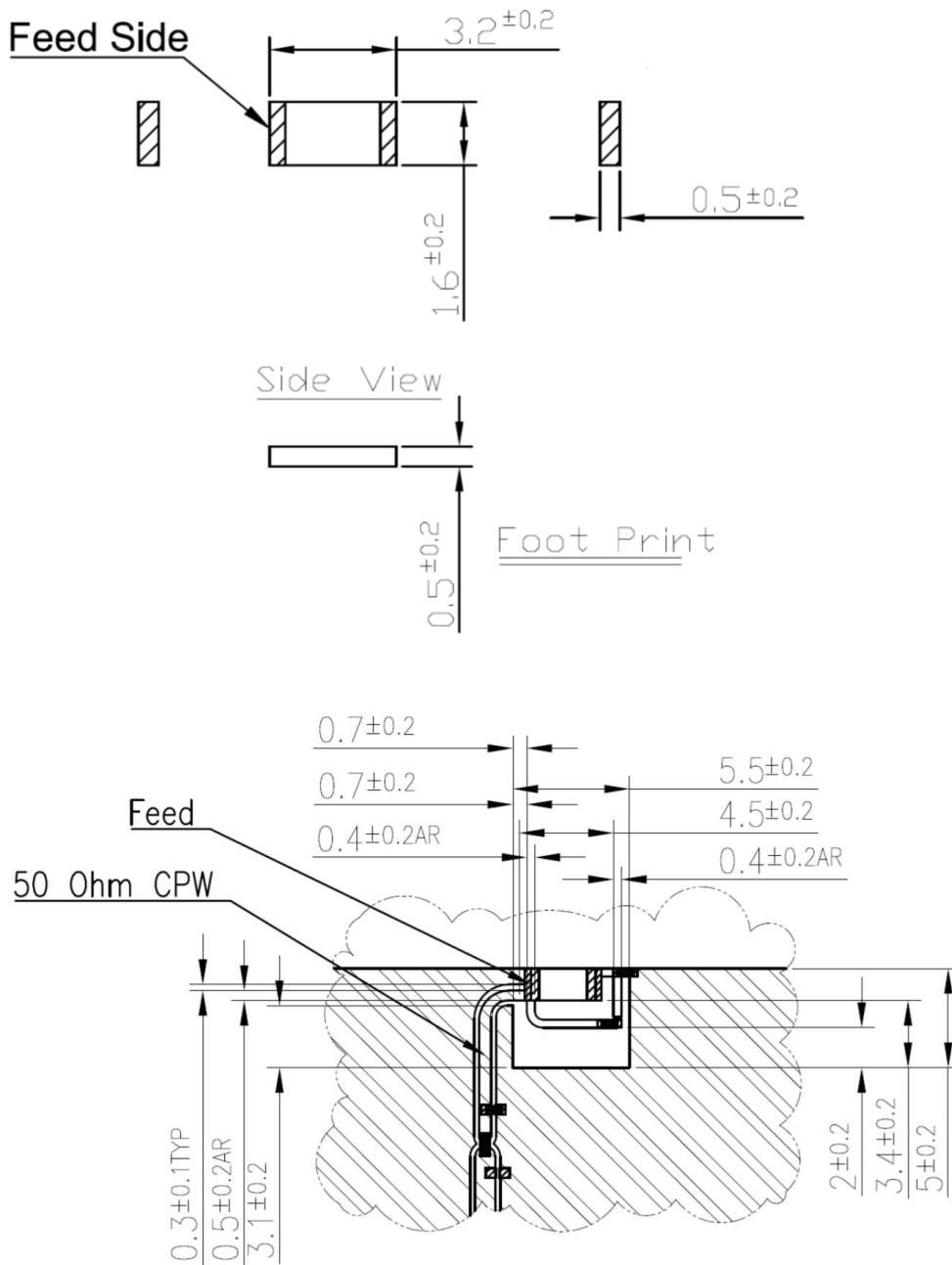
## 6. Mechanical Specifications

### 6.1 Dimensions and Drawing



**Please note that the transmission line length from hybrid coupler to each GGBLA.01 antenna must be equal to ensure proper phasing**

## 6.2 Antenna Footprint



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