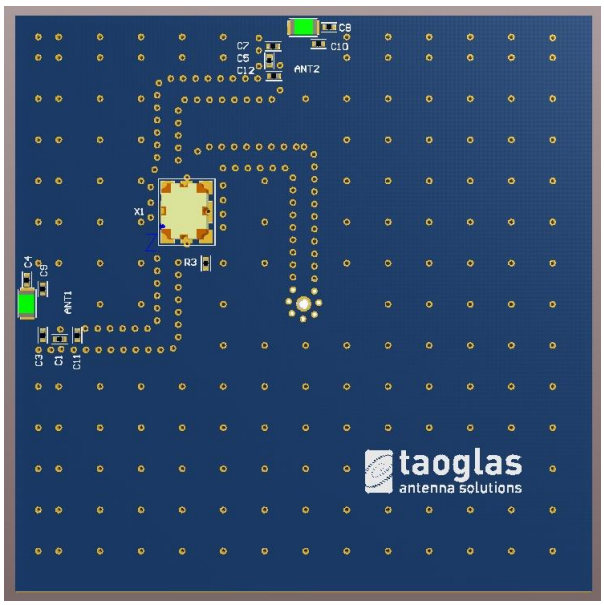
Draft Specification

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



1. Introduction

The dueling loop antennas provide all the advantages of a circuarly polarized patch with a smaller board footprint, ultra-low profile, 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 electrode of the patch itself for that specific enclosure which increases cost and lead time.

With the dueling loop antennas, two linearly polarizard 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 GPS/GLONASS/BEIDOU loop 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 support to integrate the Dueling Loop antenna design in your product, please contact you regional Taoglas office.

2. Specifications

ELECTRICAL	
Frequency	1575.42 MHz ± 30 MHz
Bandwidth Return Loss <-10 dB	30MHz min
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（T_f）	0 ± 20ppm / °C -40ºC to +85ºC
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

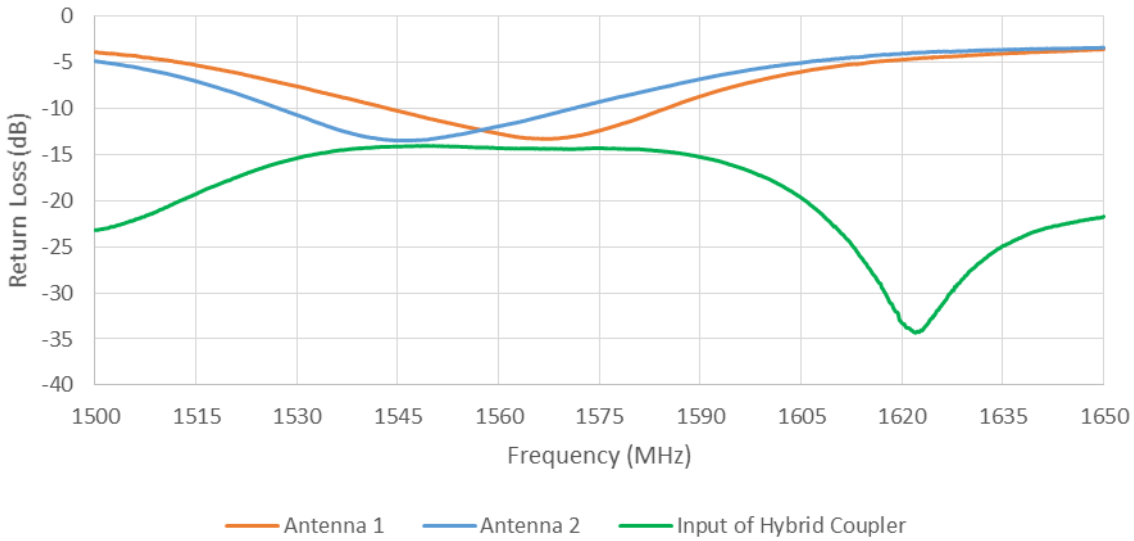


Figure 3. Return Loss of the two GGBLA.01.A antennas and the MAT.XXX Input

4.2 Efficiency

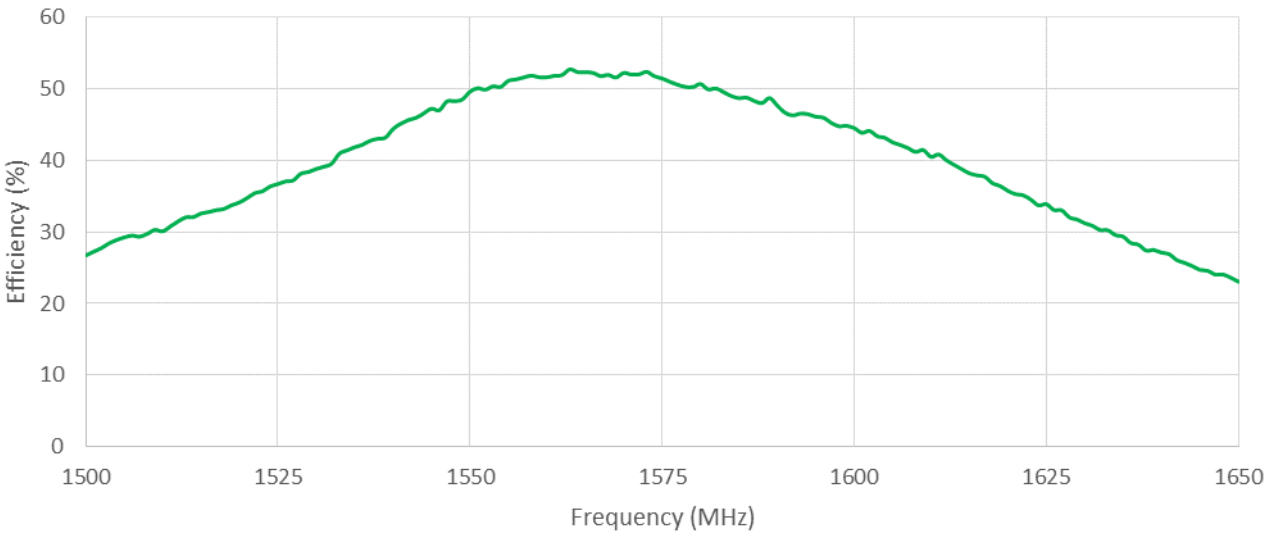


Figure 4. Efficiency of the MAT.XXX

4.3 Peak Gain

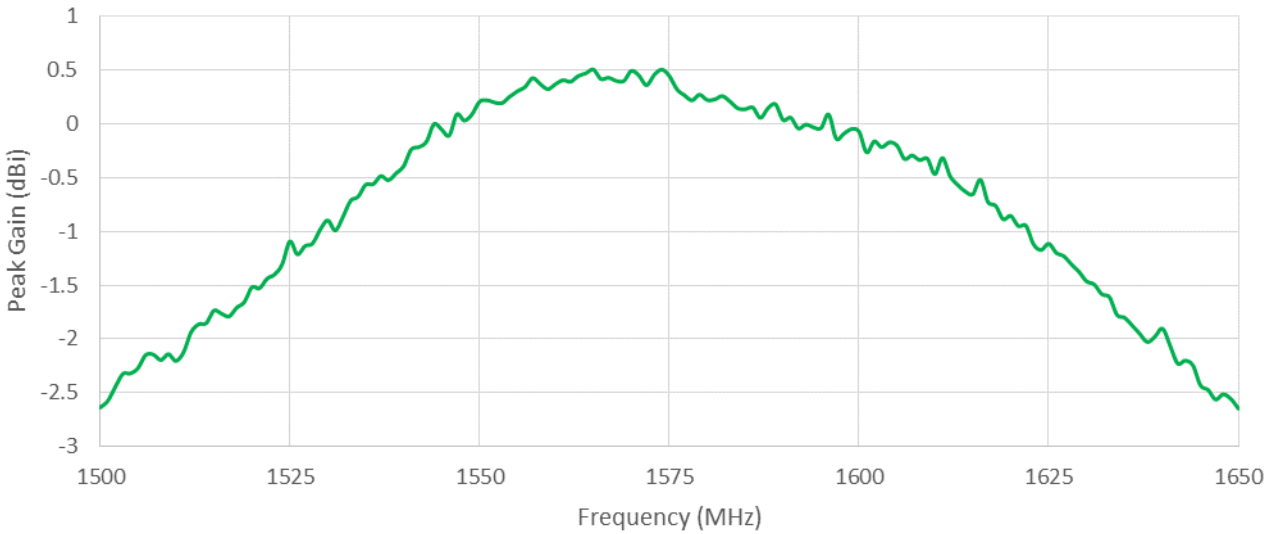


Figure 5. Peak Gain of the MAT.XXX

4.5 Axial Ratio

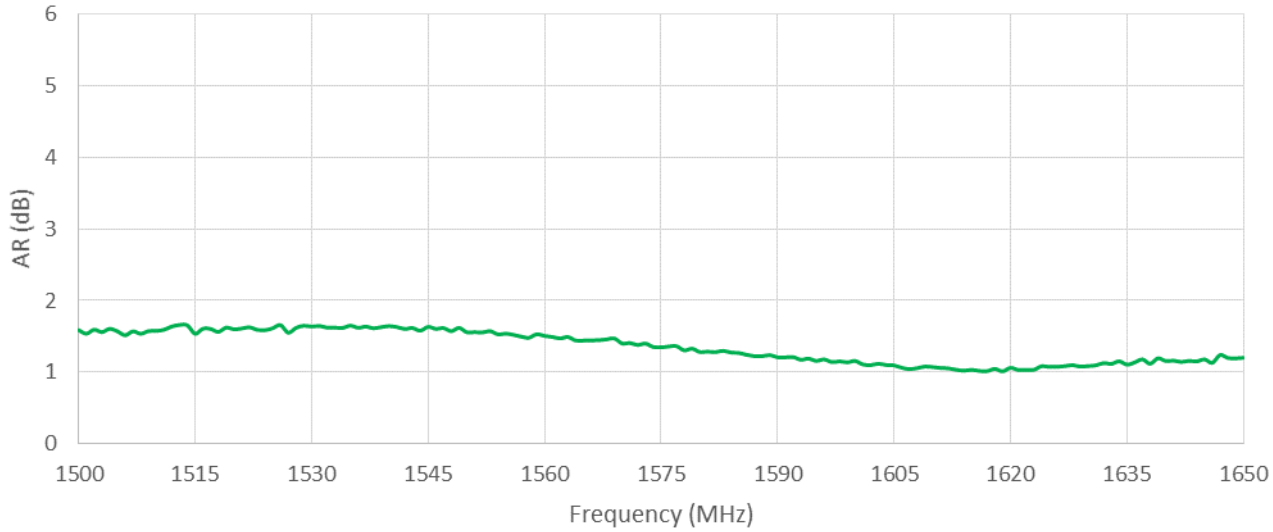


Figure 6. Axial Ratio of the MAT.XXX

5. Radiation Patterns

5.1 3D Radiation Patterns

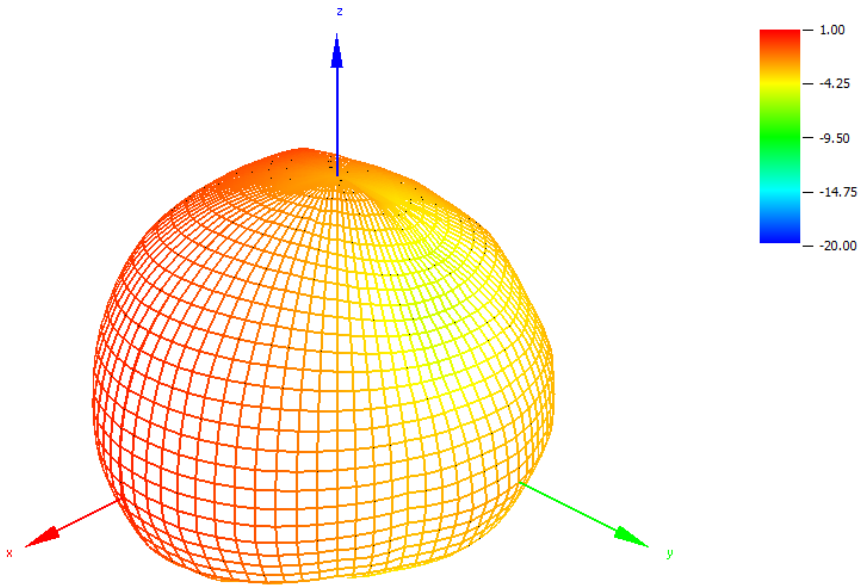


Figure 7. Radiation Pattern of the MAT.XXX at 1561 MHz.

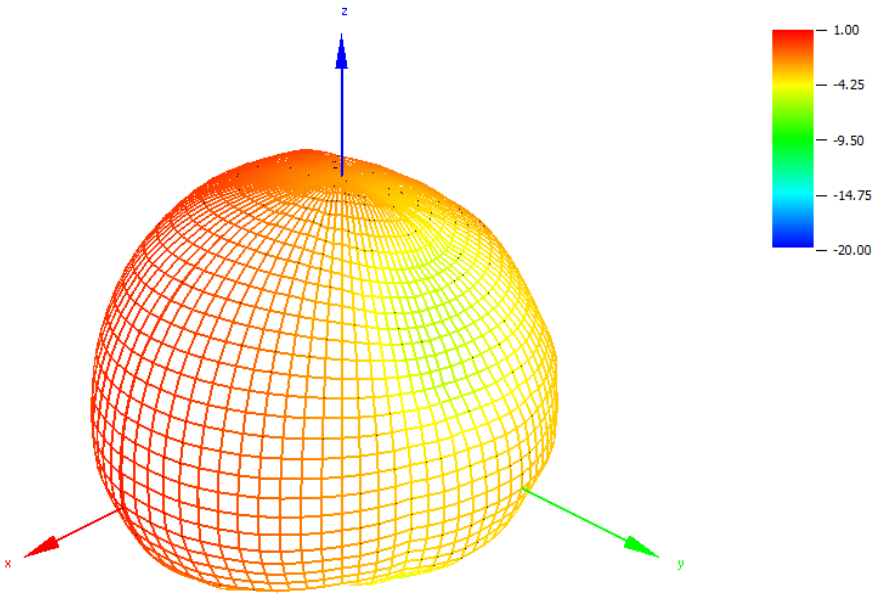


Figure 8. Radiation Pattern of the MAT.XXX at 1575 MHz.

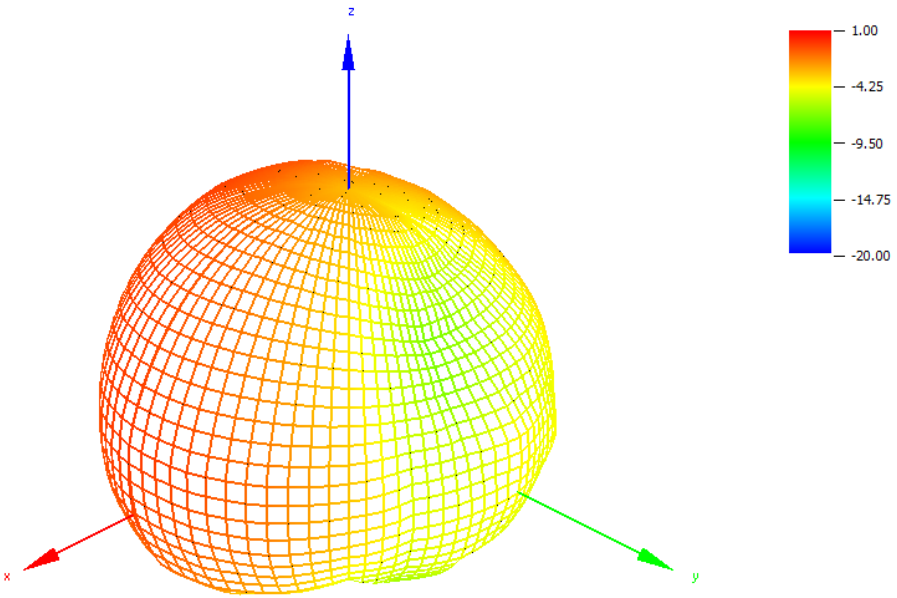


Figure 9. Radiation Pattern of the MAT.XXX at 1602 MHz.

5.2 2D Radiation Patterns

XZ Plane Radiation

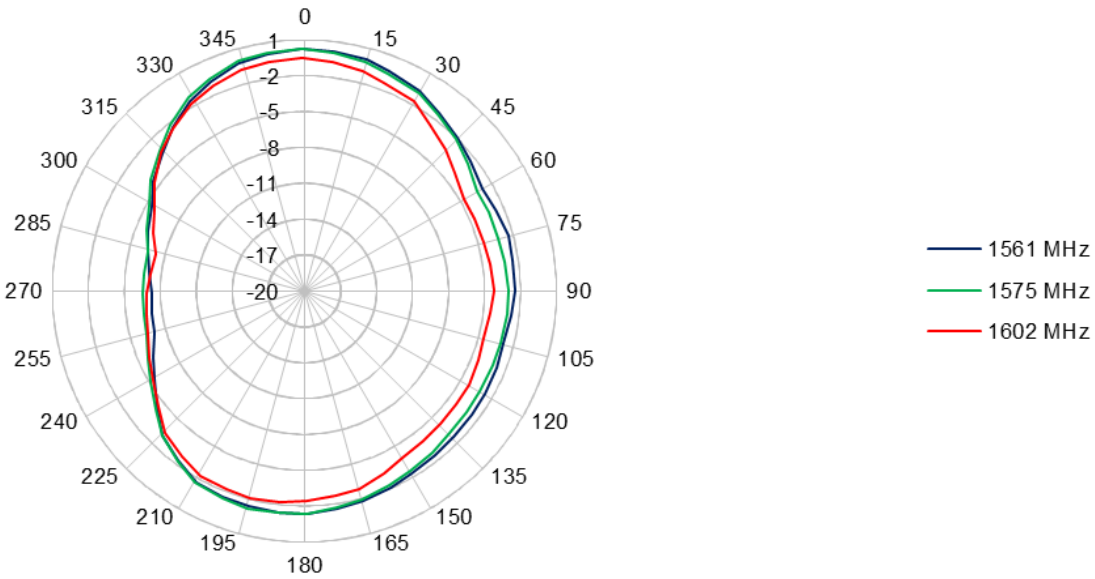


Figure 10. XZ Plane Radiation Pattern of the MAT.XXX at 1561, 1575, and 1602 MHz.

YZ Plane Radiation

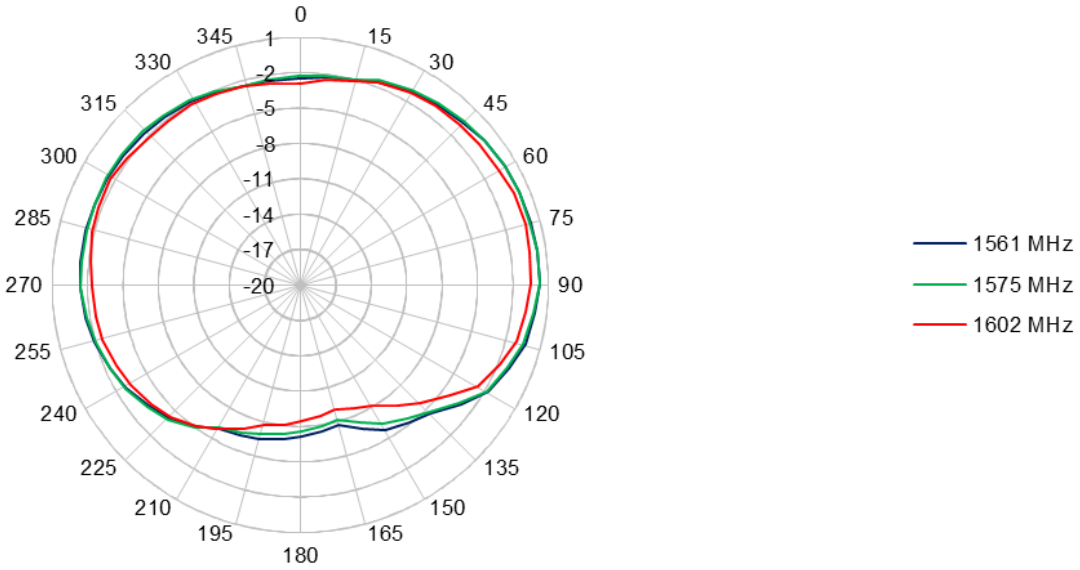


Figure 11. YZ Plane Radiation Pattern of the MAT.XXX at 1561, 1575, and 1602 MHz.

XY Plane Radiation

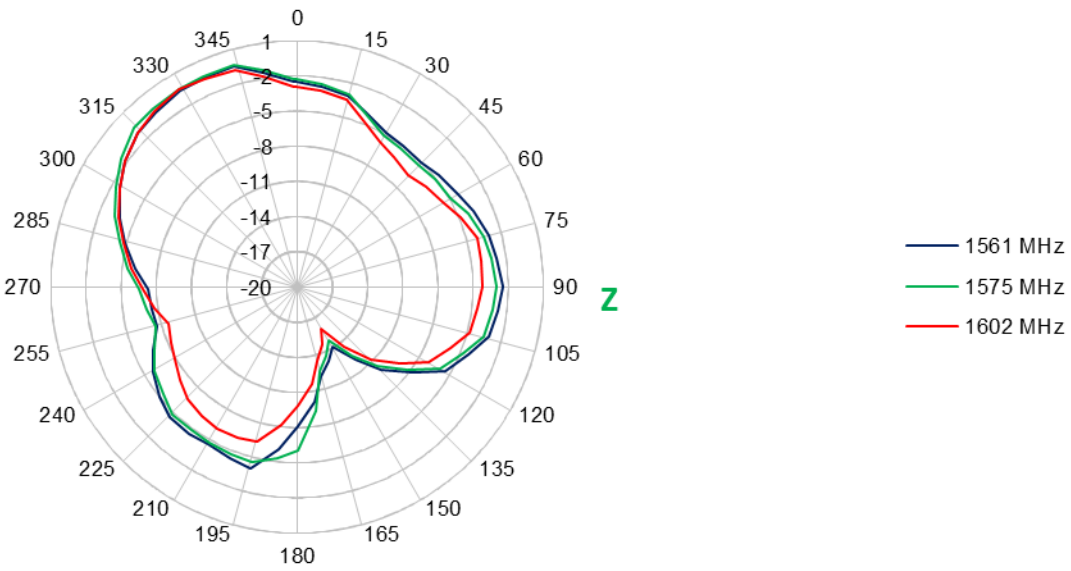
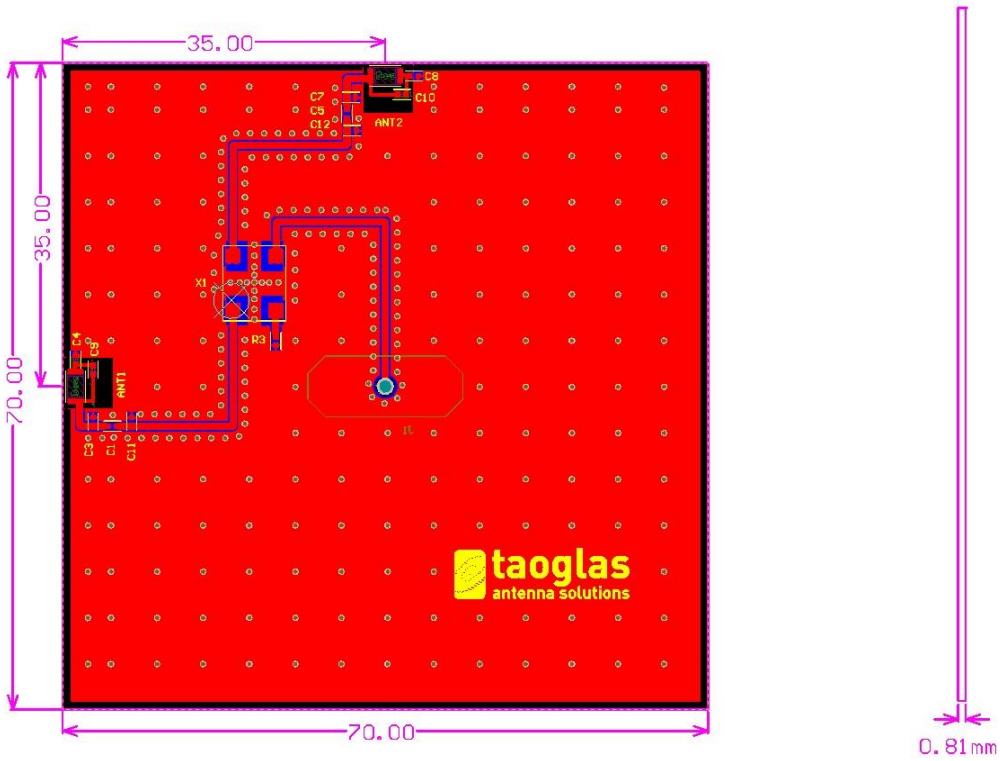


Figure 12. XY Plane Radiation Pattern of the MAT.XXX at 1561, 1575, and 1602 MHz.

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