



**Product Name:** 3-in-1 5G NR/4G LTE/GNSS/WiFi Combination  
Antenna, Screw Mount

**Part Number:** MT-9B-AC-BLW01

**Features:**

- 5G NR/4G LTE 698-960MHz, 1710-2690MHz, 3300-3800 Supporting
- GPS & GLONASS & BeiDou L1 Bands Supporting
- WiFi Dual Bands 2.4G/5.8GHz Supporting
- Cable Length & Connector are customizable
- Robust Enclosure, IPX7 Waterproof Resistant

**Applications:**

- Machine to Machine Communication & IOT



**SANAV**

# 3-in-1 5G NR/4G LTE/GNSS/WiFi Combination Antenna, Screw Mount

**MODEL: MT-9B-AC-BLW01**

**WI-RD-D-244 V1.1**

## I. Specifications:

| Category                           | Specifications                                |                 |             |
|------------------------------------|-----------------------------------------------|-----------------|-------------|
| GNSS Electrical Characteristics    |                                               |                 |             |
| Polarization                       | R.H.C.P. (Right Handed Circular Polarization) |                 |             |
| Application Band                   | BeiDou                                        | GPS             | GLONASS     |
| Frequency (MHz)                    | 1561.00                                       | 1575.42         | 1602.00     |
| Efficiency (%)                     | 49.89                                         | 42.76           | 58.61       |
| Average Gain (dBi)                 | -3.02                                         | -3.69           | -2.32       |
| Peak Gain (dBi)                    | 1.21                                          | 1.21            | 1.44        |
| Active Antenna Performance         |                                               |                 |             |
| Application Band                   | BeiDou                                        | GPS             | GLONASS     |
| Frequency (MHz)                    | 1561 ± 2.046                                  | 1575.42 ± 1.023 | 1602 ± 5    |
| Gain (dB)                          | 27                                            | 27              | 27          |
| Noise Figure (dB)                  | 0.98                                          | 0.98            | 0.92        |
| Current Consumption (mA) (typical) | 0.9                                           |                 |             |
| Output Impedance (Ω)               | 50                                            |                 |             |
| GNSS _Out Of Band Rejection        |                                               |                 |             |
| Frequency (MHz)                    | 600 ~ 1300                                    | 1300 ~ 1530     | 1650 ~ 3000 |
| Gain (dB)                          | 55                                            | 30              | 30          |
| Passive Antenna Performance        |                                               |                 |             |
| V.S.W.R                            | < 2                                           |                 |             |
| Return loss (dB)                   | < -10                                         |                 |             |

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|                                |                                                    |                |                |                |                |                |               |
|--------------------------------|----------------------------------------------------|----------------|----------------|----------------|----------------|----------------|---------------|
| Impedance (Ω)                  | 50                                                 |                |                |                |                |                |               |
| ESD Protection                 | ±8 KV (direct discharge)<br>±15 KV (air discharge) |                |                |                |                |                |               |
| Cable / Length                 | H100_0.3 meter                                     |                |                |                |                |                |               |
| Connector                      | SMA (Male)                                         |                |                |                |                |                |               |
| LTE Electrical Characteristics |                                                    |                |                |                |                |                |               |
| Polarization                   | Linear                                             |                |                |                |                |                |               |
| Application Band               | LTE<br>700                                         | GSM<br>850/900 | DCS            | PCS            | UMTS1          | LTE2600        | 5G NR<br>Band |
| Frequency (MHz)                | 698 ~<br>824                                       | 824 ~<br>960   | 1710 ~<br>1880 | 1850 ~<br>1990 | 1920 ~<br>2170 | 2300 ~<br>2690 | 3300<br>~3800 |
| Efficiency (%)                 |                                                    |                |                |                |                |                |               |
| On 30*30cm Ground Plane        | 37.49                                              | 48.49          | 71.50          | 82.77          | 81.49          | 67.70          | 73.28         |
| Average Gain (dBi)             |                                                    |                |                |                |                |                |               |
| On 30*30cm Ground Plane        | -4.26                                              | -3.14          | -1.46          | -0.82          | -0.89          | -1.69          | -1.35         |
| Peak Gain (dBi)                |                                                    |                |                |                |                |                |               |
| On 30*30cm Ground Plane        | 1.06                                               | 2.80           | 8.21           | 8.72           | 8.72           | 8.14           | 7.27          |
| V.S.W.R                        | < 4.5                                              |                | < 3            |                |                |                | < 3.5         |
| Return Loss (dB)               | < -4                                               |                | < -6           |                |                |                | < -5.5        |
| Impedance (Ω)                  | 50                                                 |                |                |                |                |                |               |
| Cable / Length                 | LMR195_0.3 meter                                   |                |                |                |                |                |               |
| Connector                      | SMA (Male)                                         |                |                |                |                |                |               |

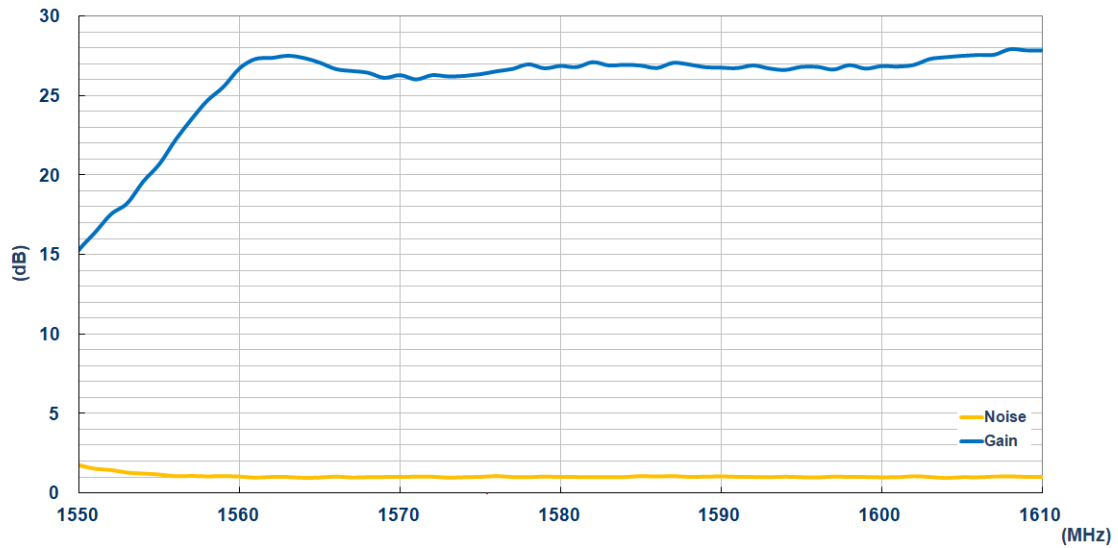


| WiFi Electrical Characteristics |                    |       |       |       |       |       |       |
|---------------------------------|--------------------|-------|-------|-------|-------|-------|-------|
| Polarization                    | Linear             |       |       |       |       |       |       |
| Frequency (MHz)                 | 2400               | 2450  | 2500  | 5150  | 5350  | 5725  | 5850  |
| Efficiency (%)                  |                    |       |       |       |       |       |       |
| On 30*30cm Ground Plane         | 70.63              | 72.44 | 68.87 | 74.99 | 69.98 | 67.30 | 55.72 |
| Average Gain (dBi)              |                    |       |       |       |       |       |       |
| On 30*30cm Ground Plane         | -1.51              | -1.40 | -1.62 | -1.25 | -1.55 | -1.72 | -2.54 |
| Peak Gain (dBi)                 |                    |       |       |       |       |       |       |
| On 30*30cm Ground Plane         | 5.80               | 6.03  | 5.71  | 6.14  | 6.17  | 6.37  | 5.58  |
| V.S.W.R                         | < 2.5              |       |       |       |       |       |       |
| Return Loss (dB)                | < -8               |       |       |       |       |       |       |
| Impedance (Ω)                   | 50                 |       |       |       |       |       |       |
| Cable / Length                  | LMR195_0.3 meter   |       |       |       |       |       |       |
| Connector                       | SMA (Male)         |       |       |       |       |       |       |
| Dimension (mm)                  | φ80(D) x 37.9(H)   |       |       |       |       |       |       |
| Environmental Conditions        |                    |       |       |       |       |       |       |
| Operation Temperature           | -40 ~ +85 °C       |       |       |       |       |       |       |
| Storage Temperature             | -40 ~ +85 °C       |       |       |       |       |       |       |
| Waterproof Resistant            | IPX7               |       |       |       |       |       |       |
| Relative Humidity               | 95% non-condensing |       |       |       |       |       |       |

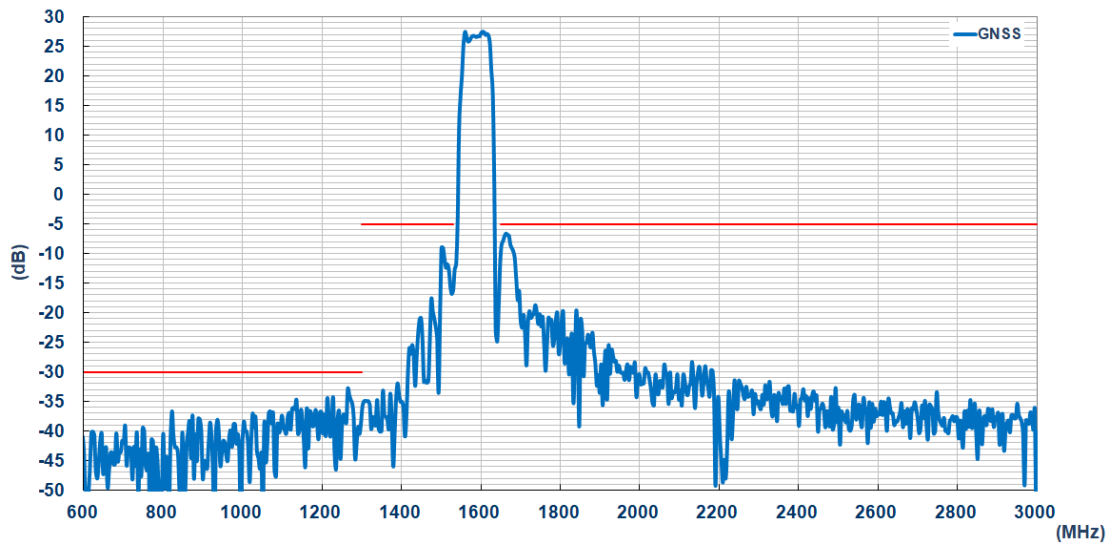


## II. Antenna Technical Parameters:

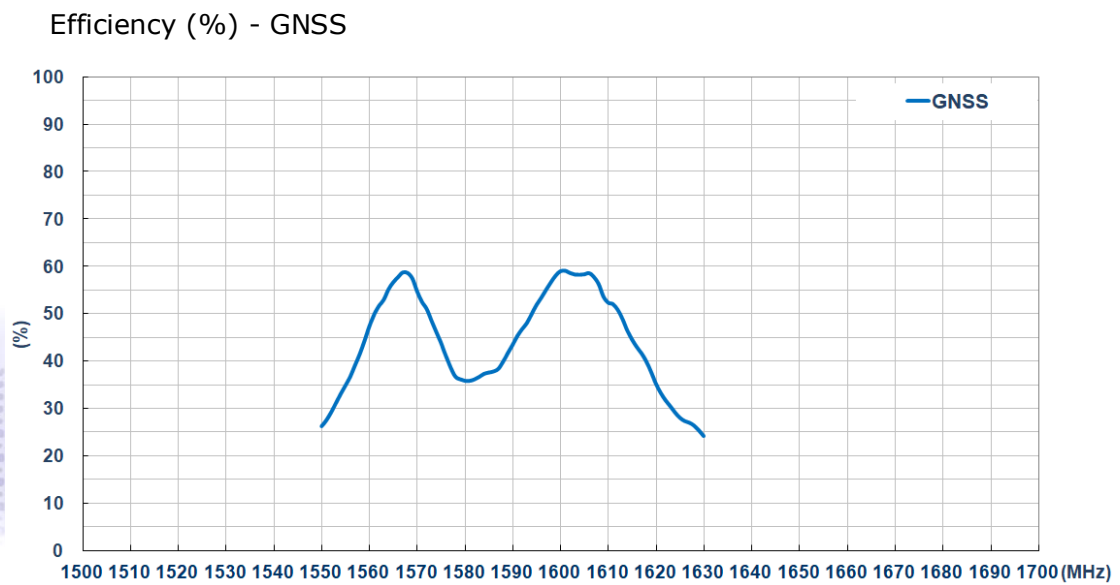
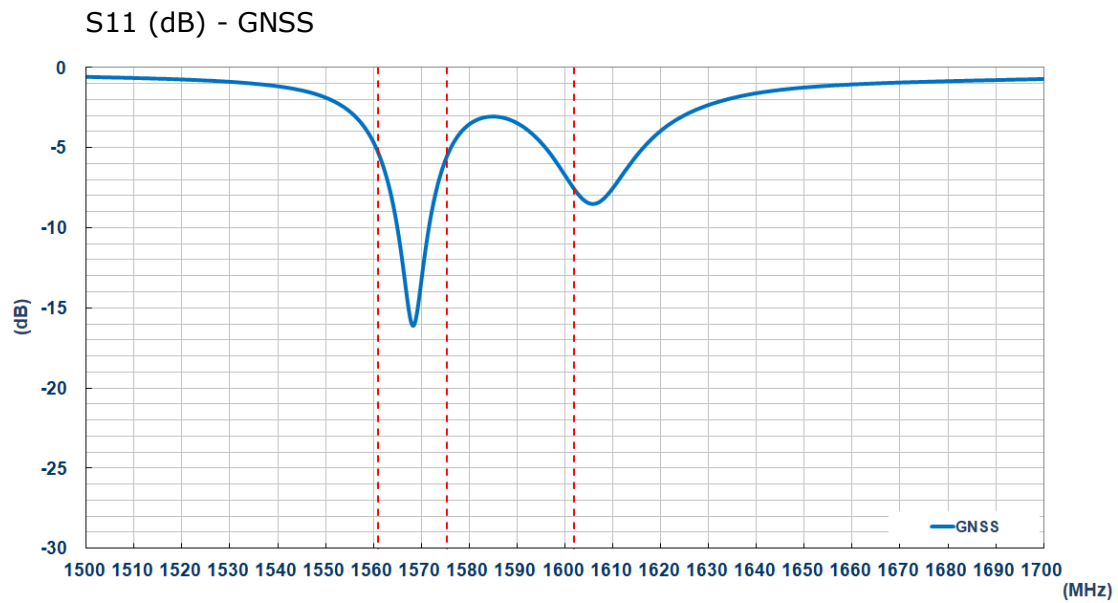
Noise Figure & Gain (dB) - GNSS



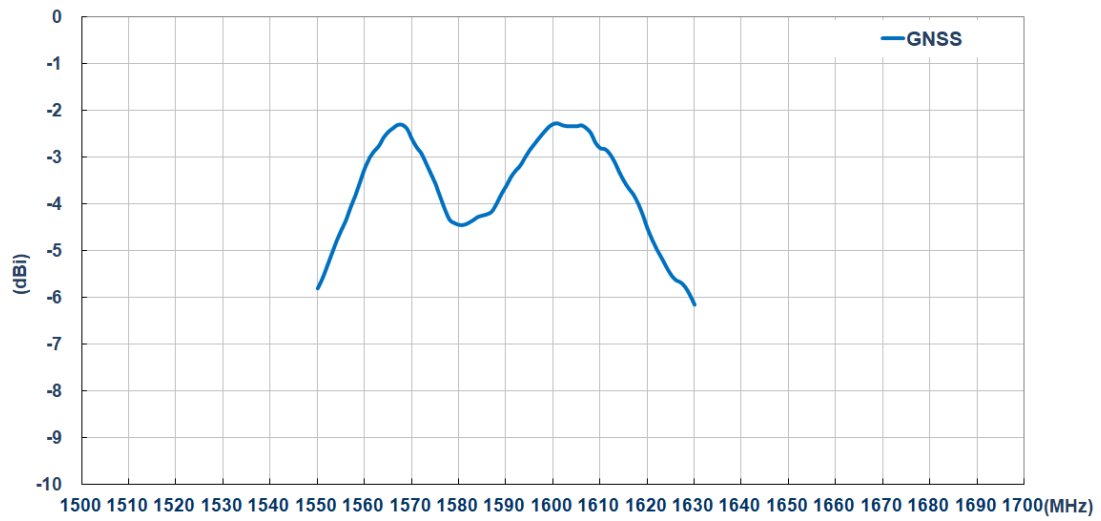
Out of Band Rejection (dB) - GNSS



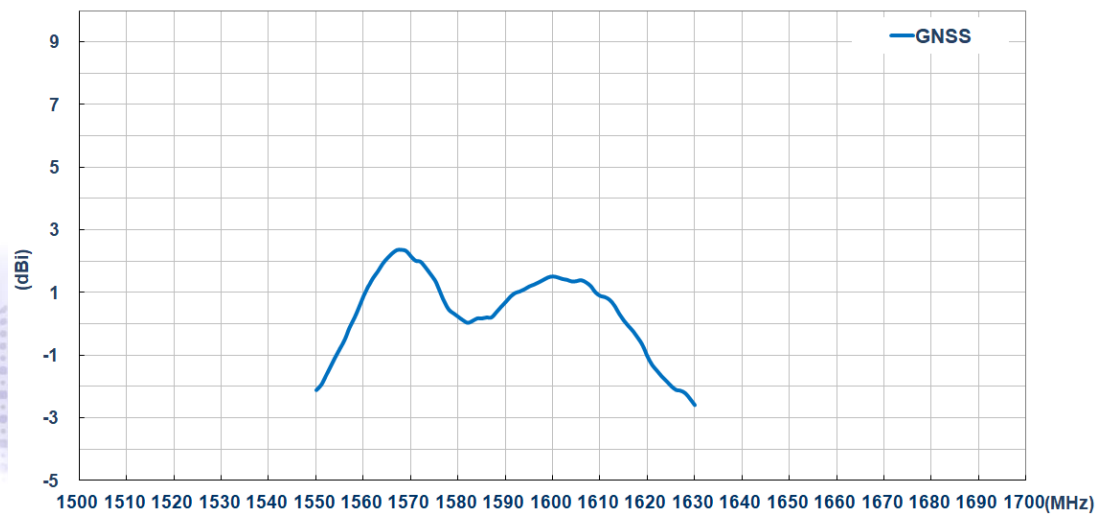
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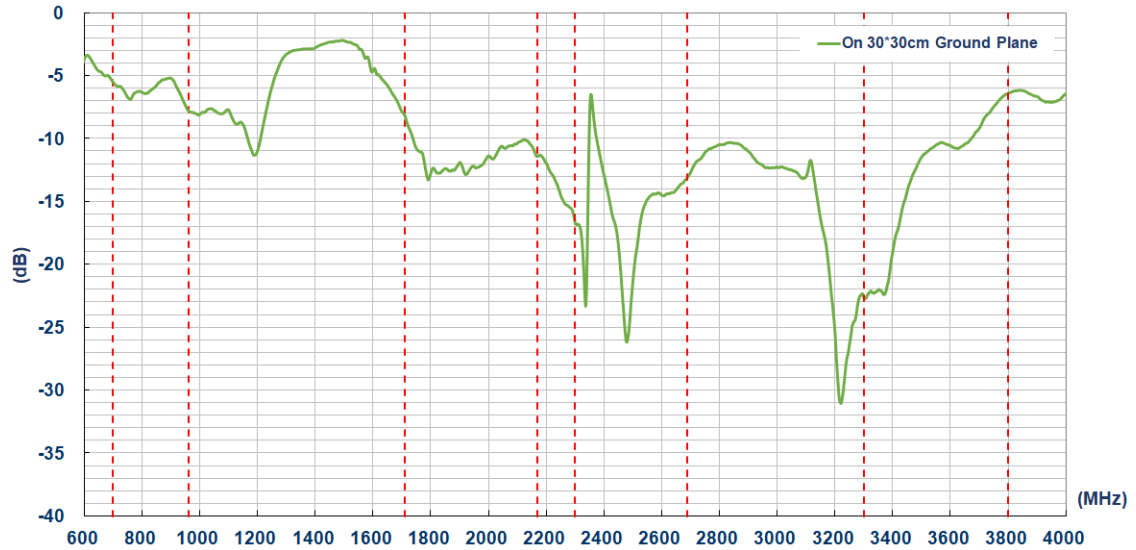
Average Gain (dBi) - GNSS



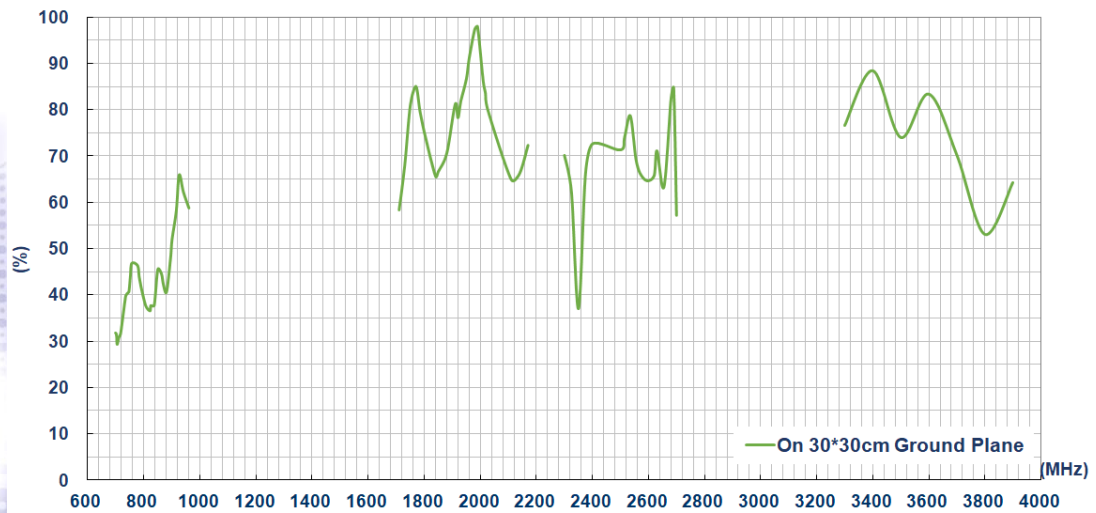
Peak Gain (dBi) - GNSS



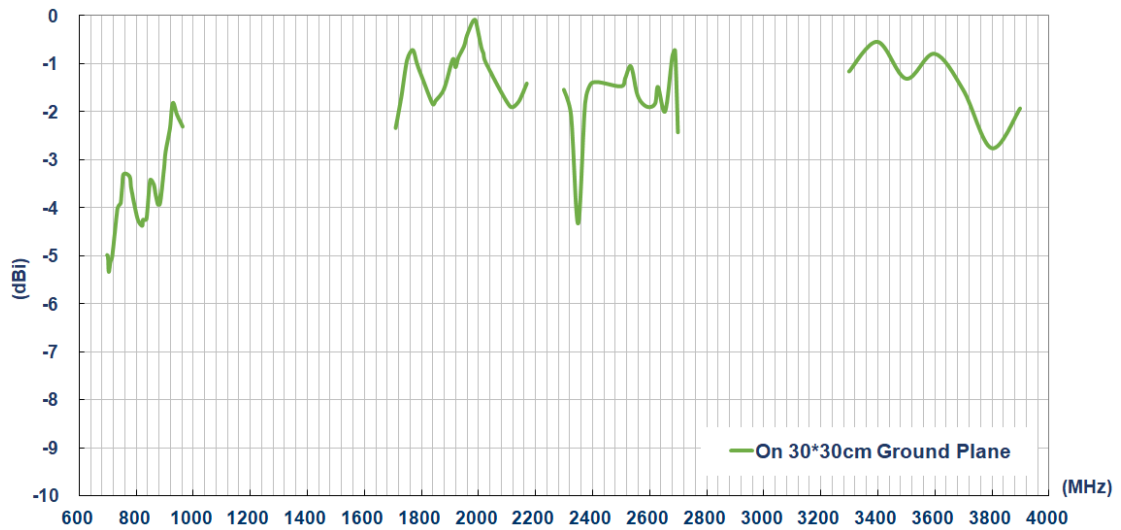
S11 (dB) - LTE



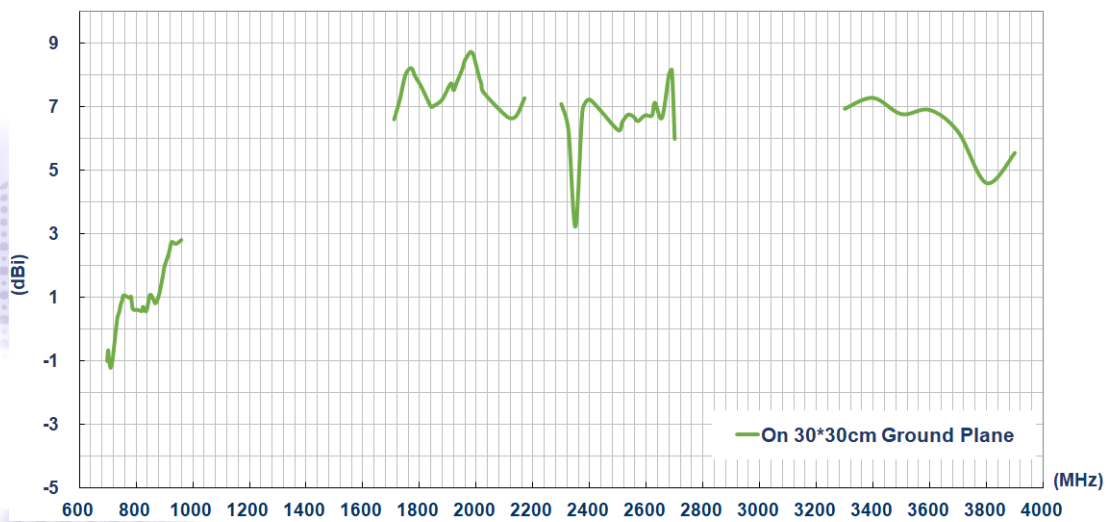
Efficiency (%) - LTE



Average Gain (dBi) - LTE

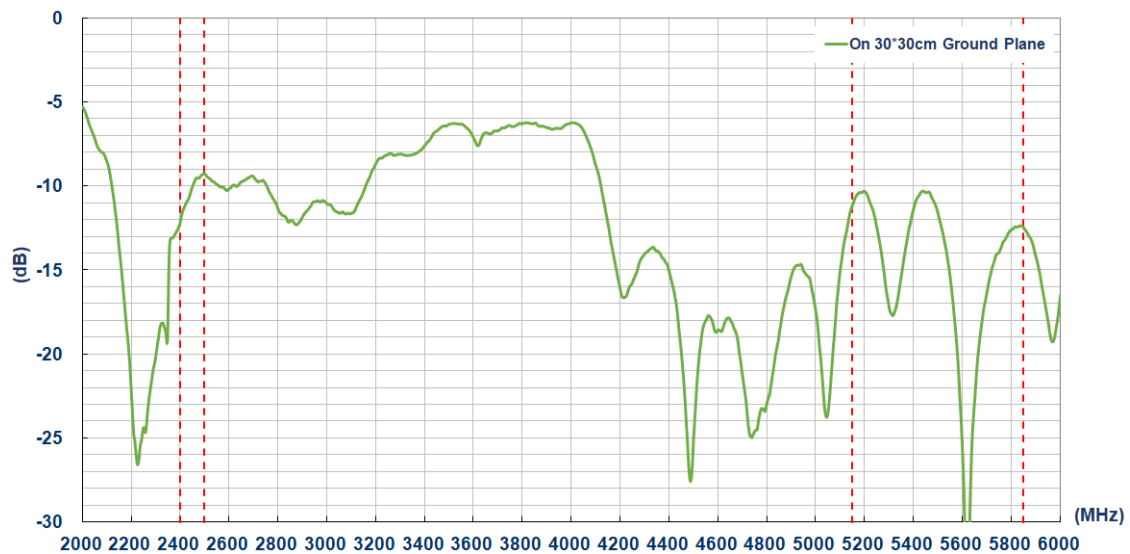


Peak Gain (dBi) - LTE



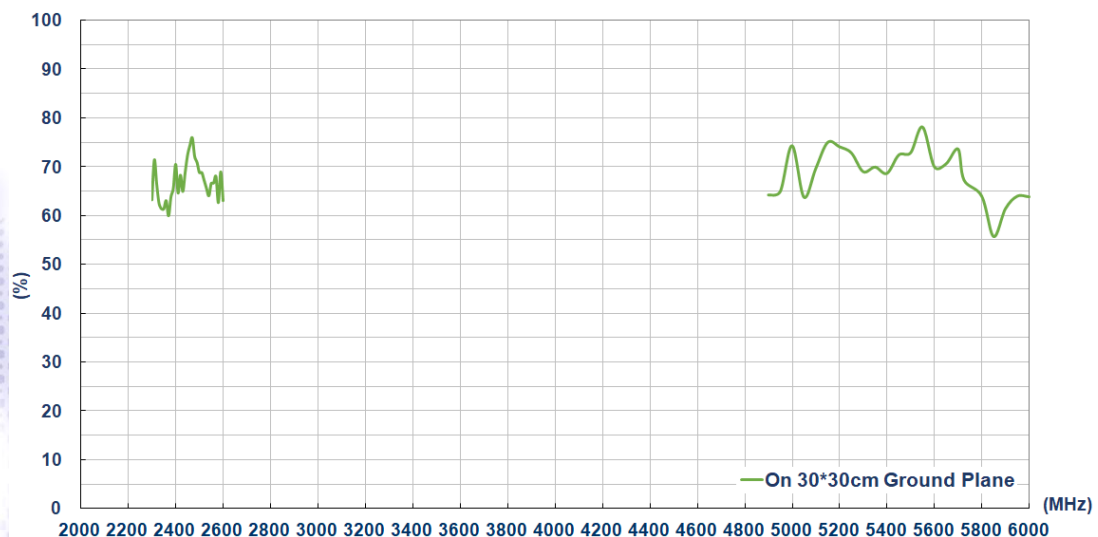
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S11 (dB) - WiFi

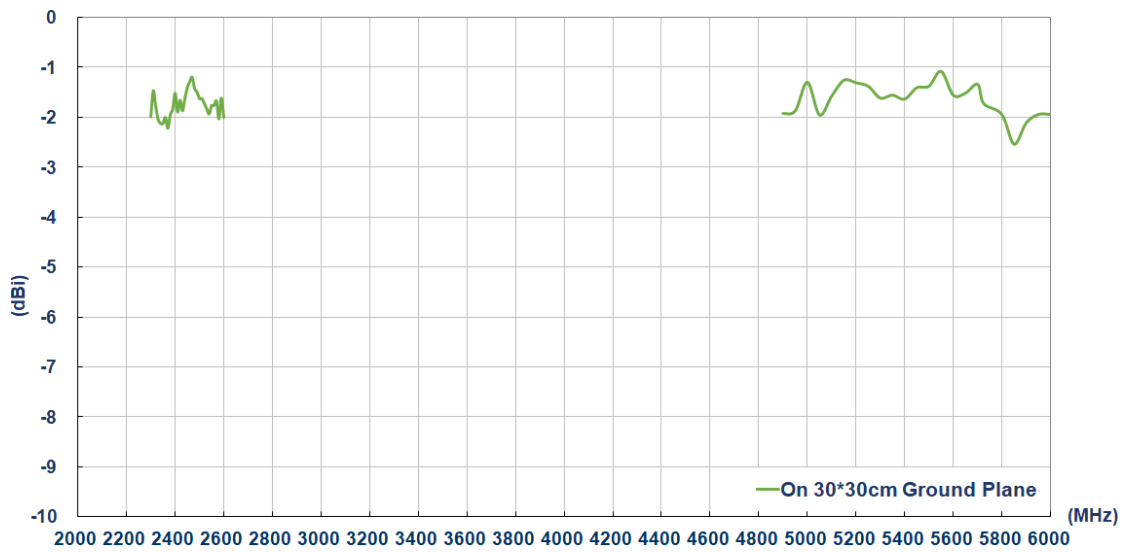


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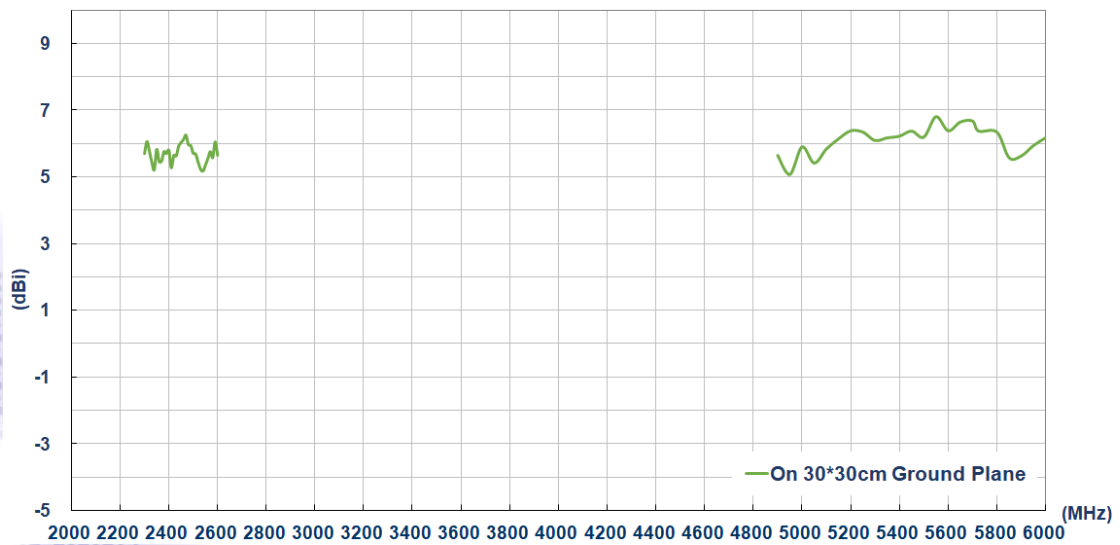
Efficiency (%) - WiFi



Average Gain (dBi) – WiFi

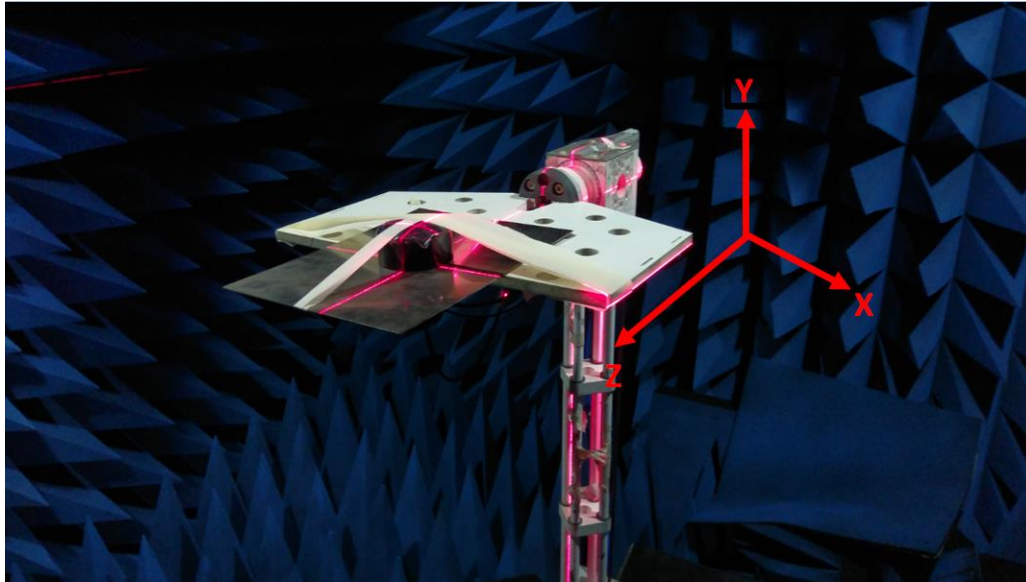


Peak Gain (dBi) – WiFi



### III. Antenna Radiation Pattern Measurement:

The antenna radiation patterns were measured in Anechoic Chamber.  
The measurement setup as below,

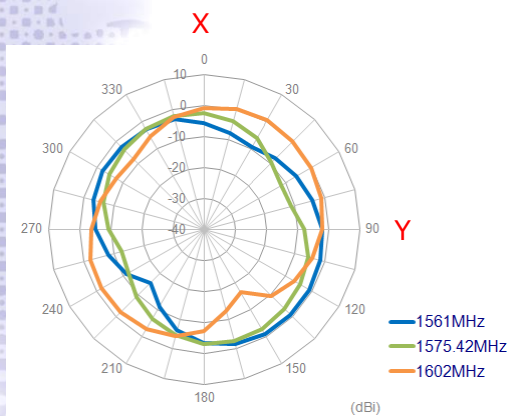


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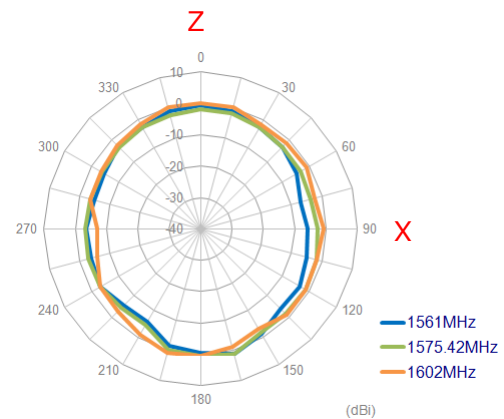
### IV. 2D Radiation Pattern:

GNSS

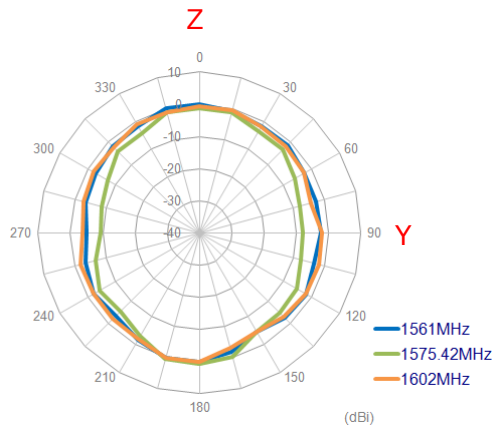
X-Y Plane



X-Z Plane

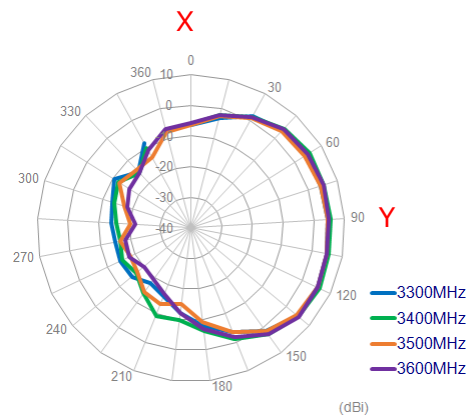
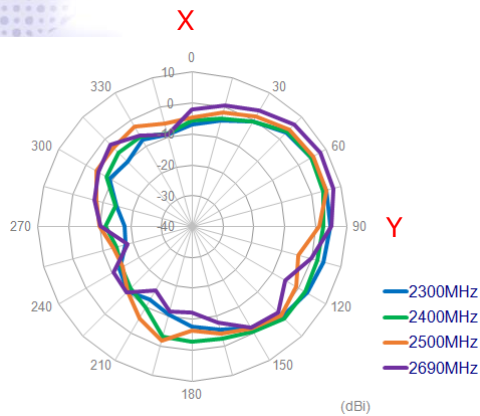
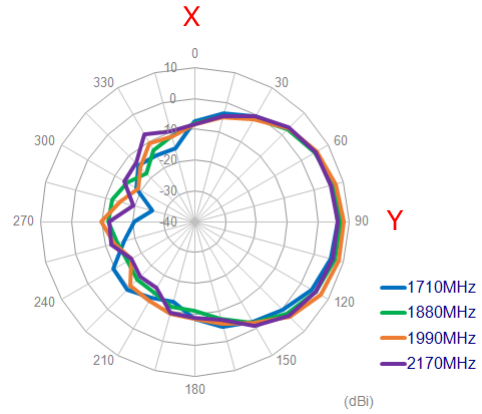
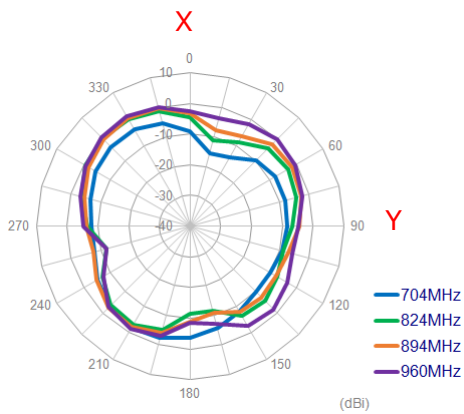


## Y-Z Plane

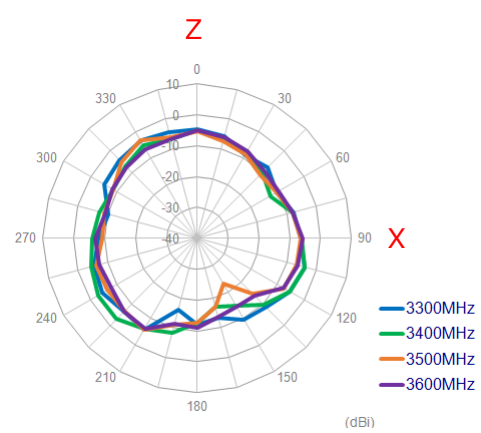
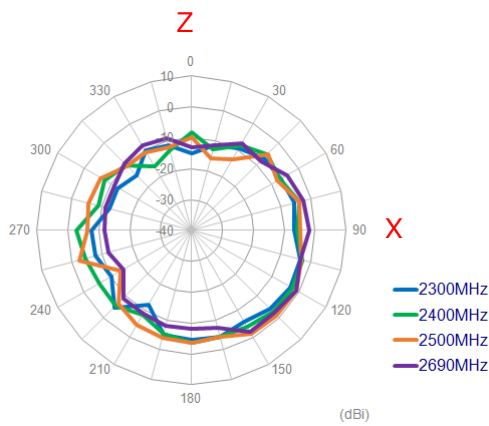
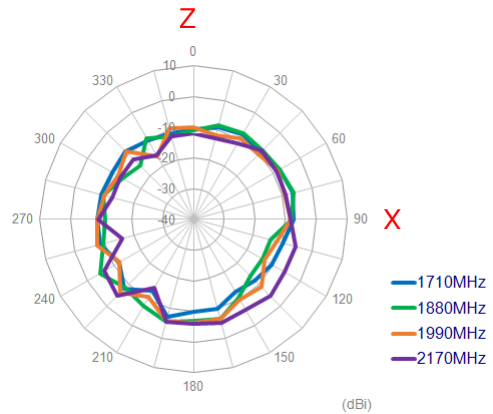
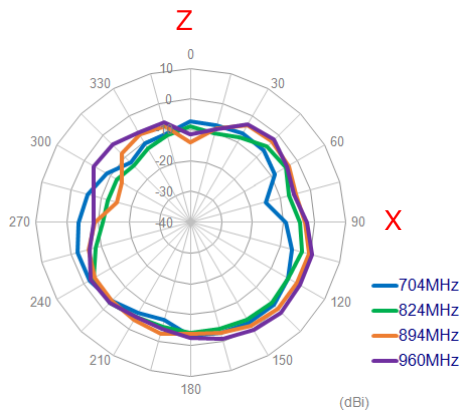


## LTE – On 30\*30cm Ground Plane

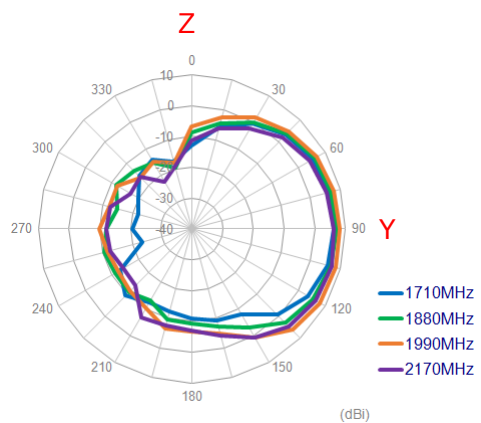
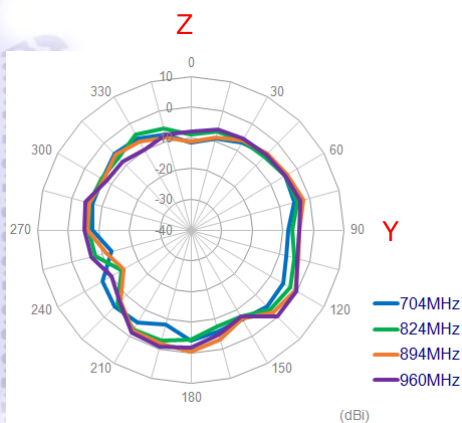
### X-Y Plane



## X-Z Plane

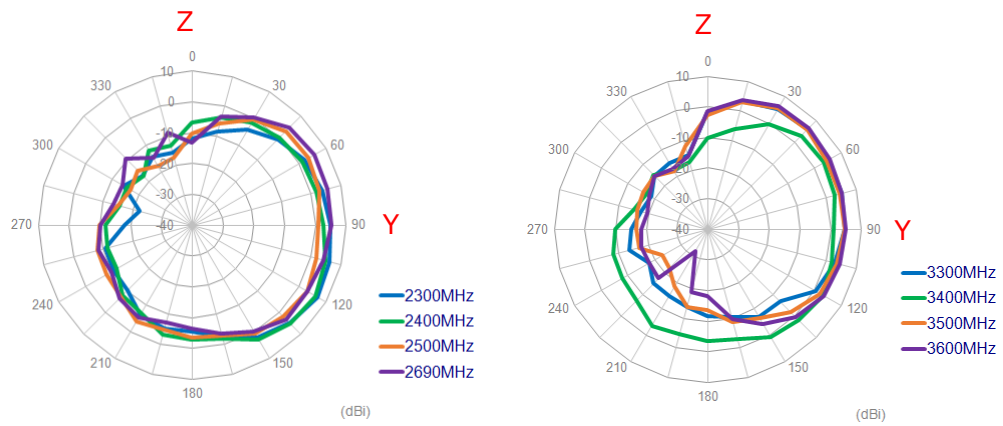


## Y-Z Plane



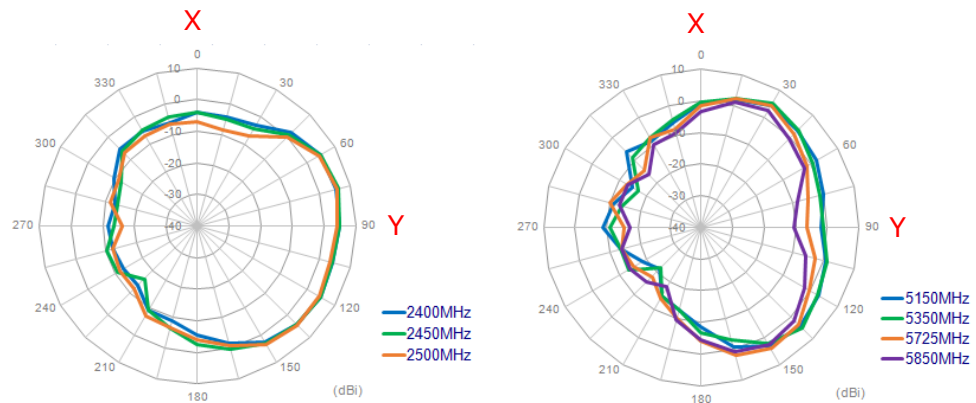
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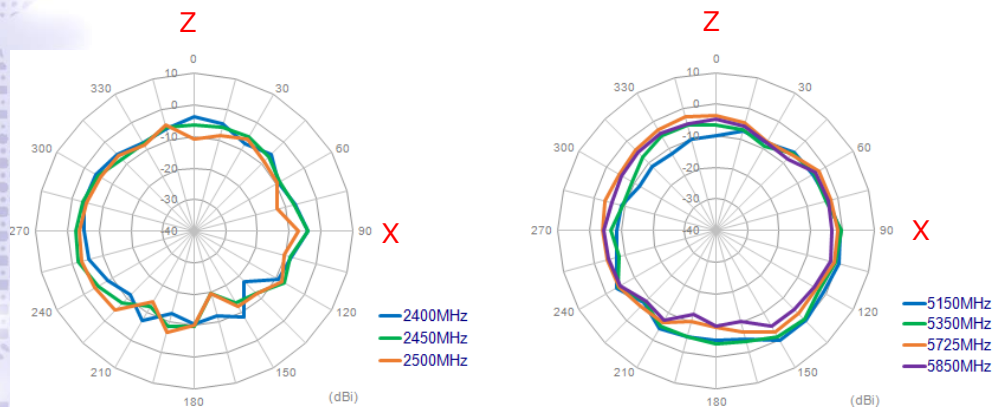


## WiFi - On 30\*30cm Ground Plane

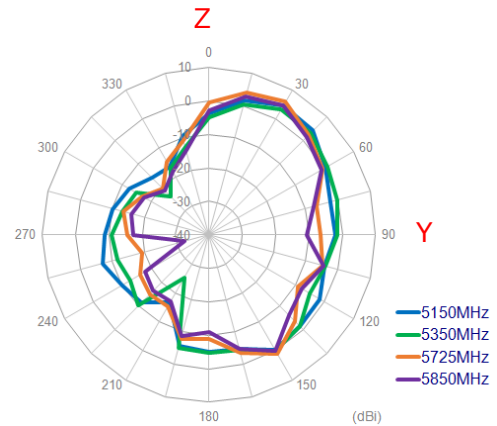
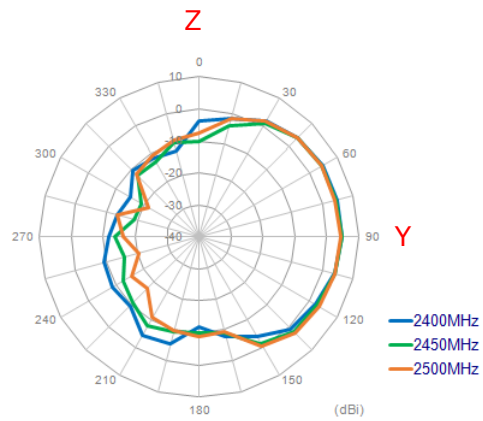
### X-Y Plane



### X-Z Plane



Y-Z Plane

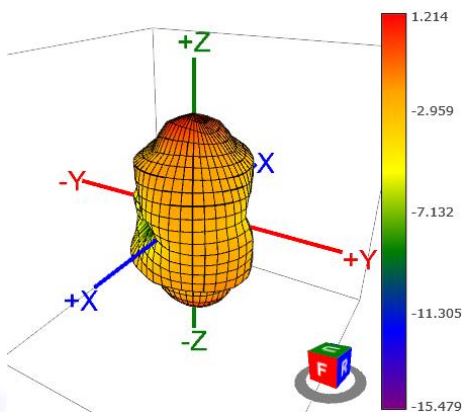


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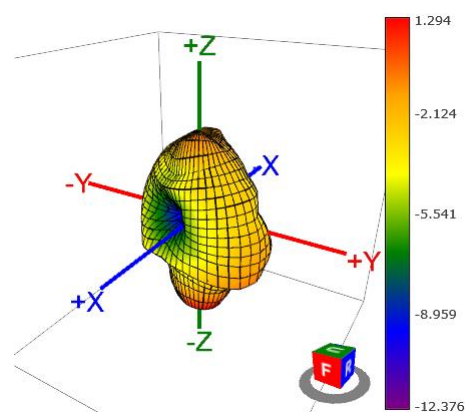
## V. 3D Radiation Pattern:

GNSS

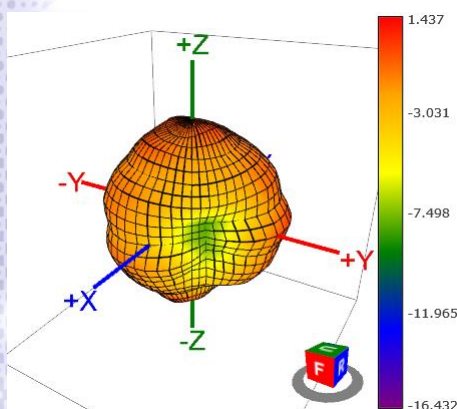
1561MHz (dBi)



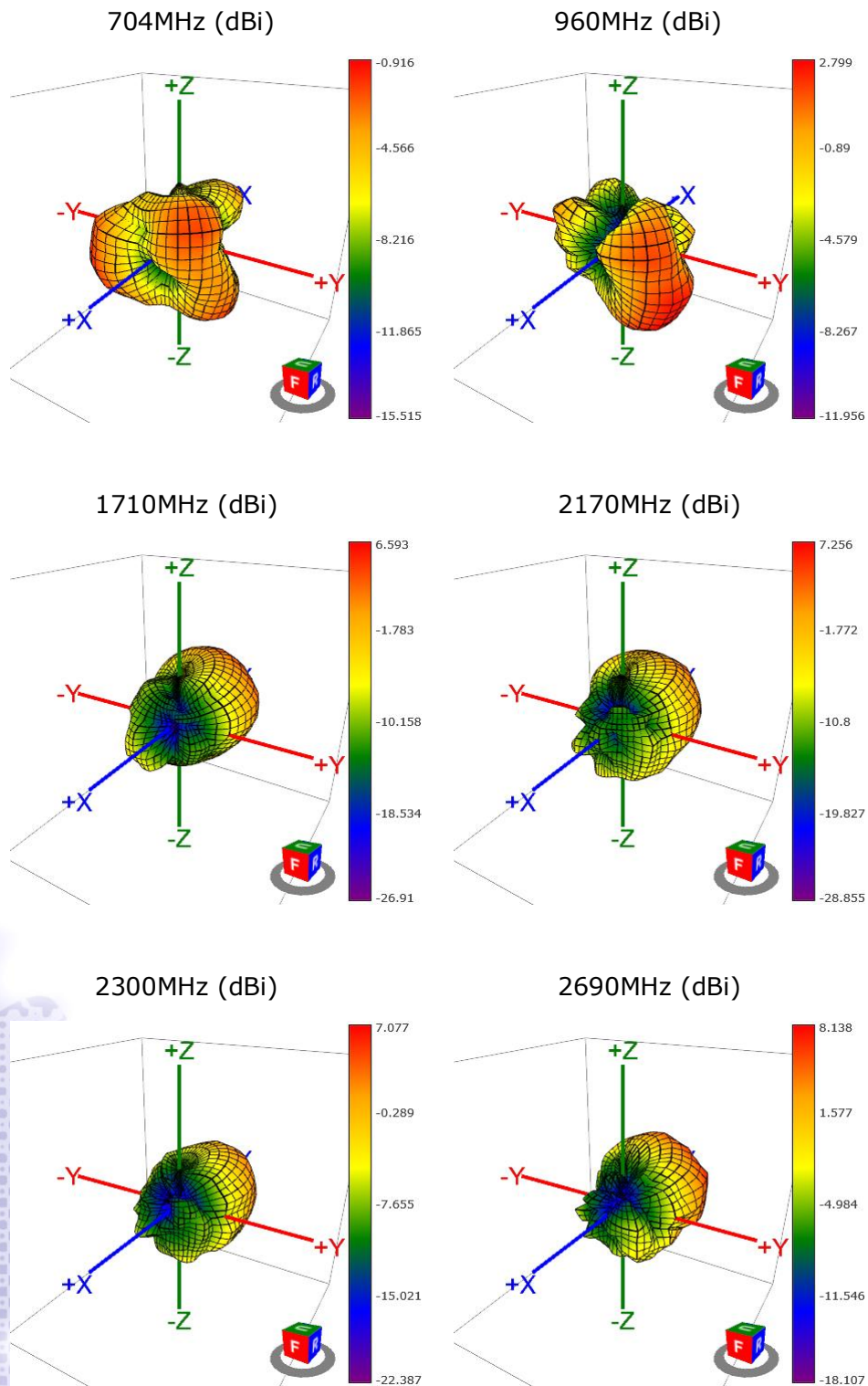
1575.42MHz (dBi)



1602MHz (dBi)



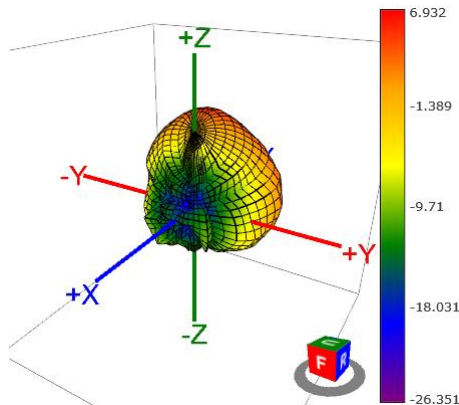
LTE – On 30\*30cm Ground Plane



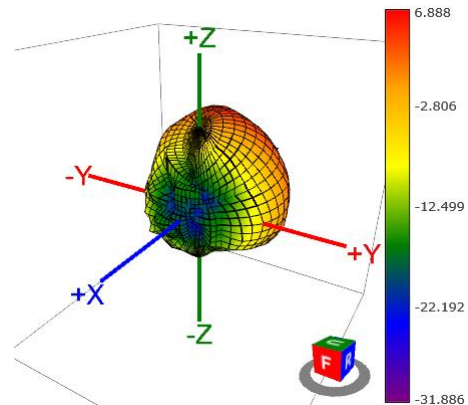
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3300MHz (dBi)

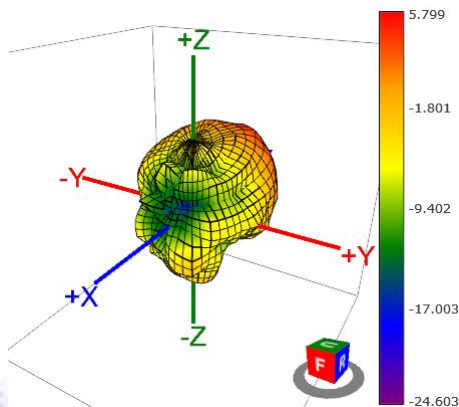


3600MHz (dBi)

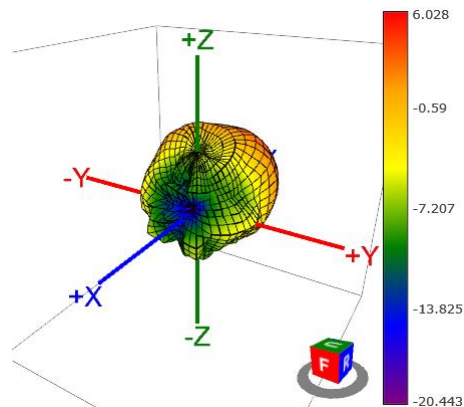


WiFi - On 30\*30cm Ground Plane

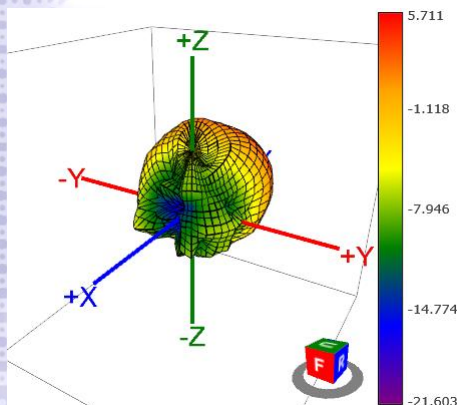
2400MHz (dBi)



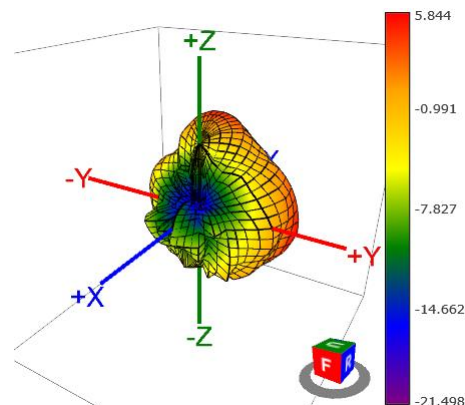
2450MHz (dBi)



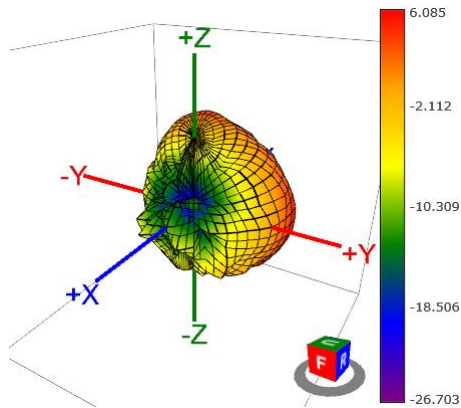
2500MHz (dBi)



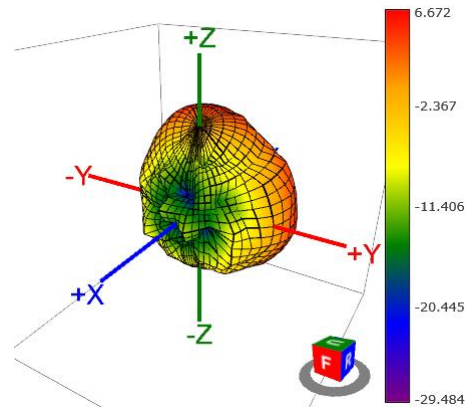
5150MHz (dBi)



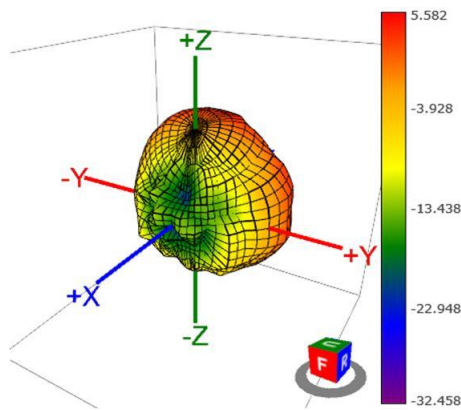
5350MHz (dBi)



5725MHz (dBi)



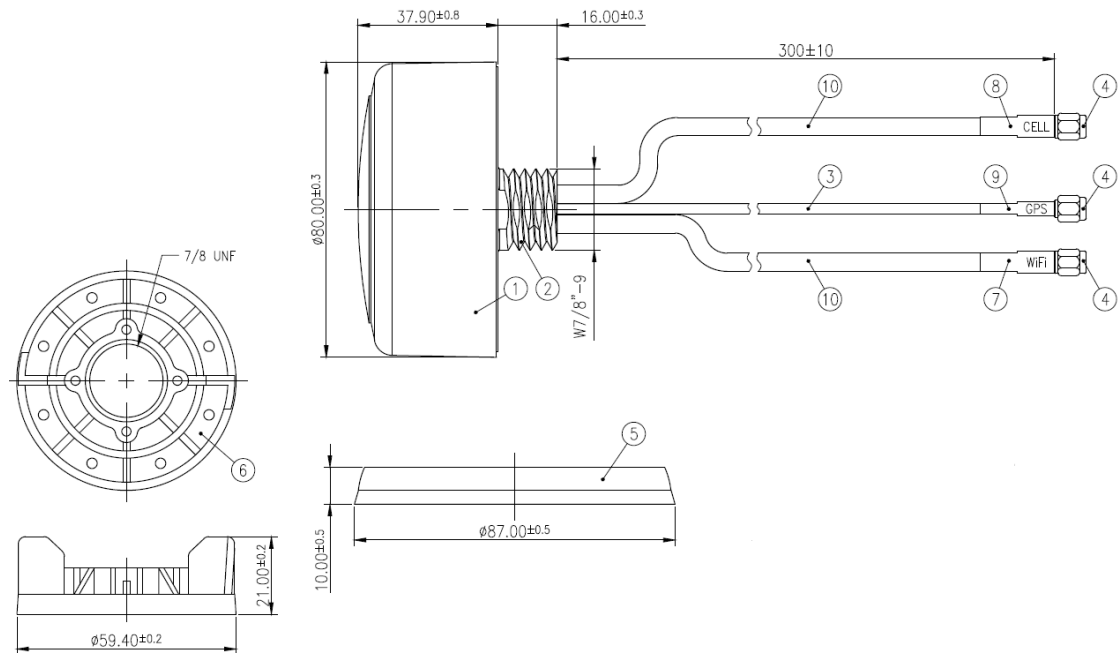
5850MHz (dBi)



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## VI. Mechanical Drawing (Unit:mm):



|    |                       |            |           |     |
|----|-----------------------|------------|-----------|-----|
| 10 | Cable LMR195          | PVC        | Black     | 2   |
| 9  | GPS Heat Shrink Tube  | CTMS       | Blue      | 1   |
| 8  | CELL Heat Shrink Tube | CTMS       | White     | 1   |
| 7  | WiFi Heat Shrink Tube | CTMS       | Yellow    | 1   |
| 6  | Nut                   | PC+PBT     | Black     | 1   |
| 5  | Gasket                | Silicone   | Black     | 1   |
| 4  | SMA(M) Connector      | Brass      | Au Plated | 3   |
| 3  | Cable H100            | PVC        | Black     | 1   |
| 2  | AU9 Bottom Base       | Zinc Alloy | Ni Plated | 1   |
| 1  | AU9 Top Housing       | PC+PBT     | Black     | 1   |
| No | NAME                  | MATERIAL   | FINISH    | QTY |

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