



TAOGLAS®



Datasheet

Storm

Part No:
MA413.A.B.003

Description:

Low Profile 5G/4G Permanent Mount Antenna

Features:

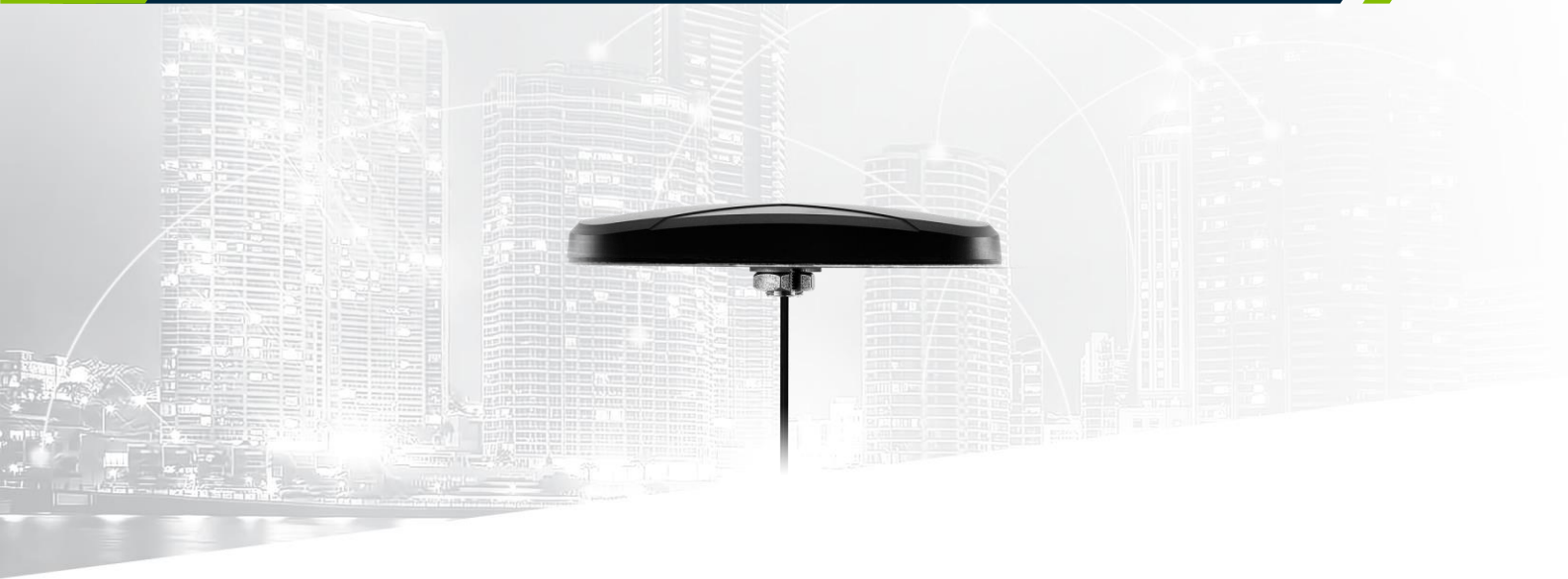
- 600-6000MHz 5G/4G Antenna
- Screw-Mount [Permanent Mount]
- Worldwide 5G/4G Bands including 3G and 2G
- Aerodynamic, Super Low-profile Vandal Resistant Housing
- IP67 Enclosure
- Dimensions: 216.24*93.25*30.95mm
- 1m CFD200 with SMA(M) connector
- Custom Cables and Connectors Available
- CE Certified
- RoHS and REACH Compliant

| | |
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1. Introduction



The Storm MA413 antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in worldwide telematics applications which combine Global Cellular communications. The MA413 delivers best in class 5G/4G antenna performance. You will never be out of touch with this extremely robust, reliable, high gain antenna.

At only 31mm high, the Storm is the world's lowest profile global telematics antenna solution. It delivers powerful worldwide 5G/4G antenna technology while also covering the 3G and 2G bands.

Typical applications:

- Transportation
- HD Video Streaming
- First Responder and Emergency Services
- Internet of Things (IoT market)
- Wireless M2M Devices
- Digital Signage

LTE 4G applications demand high speed data uplink and downlink. The MA413 does not require a ground plane. Low loss cables are used to keep efficiency high over long cable lengths. Cable length and connector types are fully customizable. Contact your regional Taoglas customer support team for further information.

2. Specifications

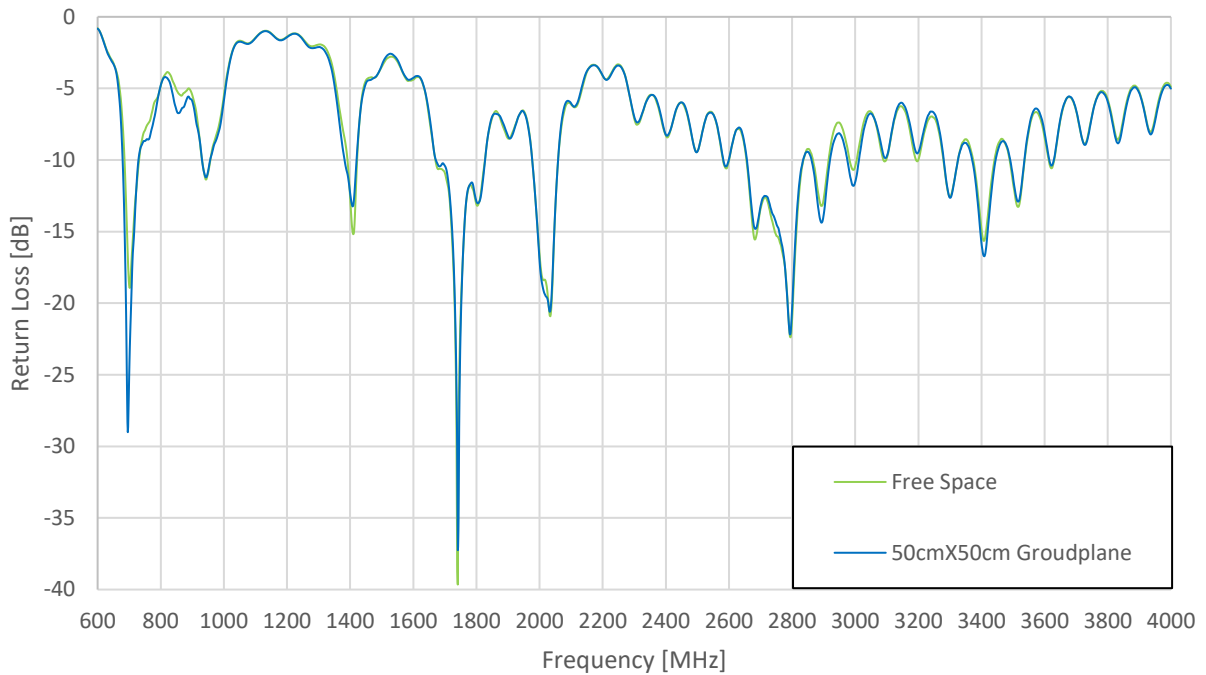
| Electrical | | | | | | | | |
|---|-----------------|-----------------------|----------------|-------------------|-----------------|-----------|------|--------------|
| Band | Frequency (MHz) | | Efficiency (%) | Average Gain (dB) | Peak Gain (dBi) | Impedance | VSWR | Polarization |
| 5G NR/4G Band 71 | 617~698 | Free space | 28 | -6.7 | 2.8 | 50Ω | < 3 | Linear |
| | | 50cmX50cm Groundplane | 35 | -5.7 | 5.1 | | | |
| 4G/3G Band 12,13,14,17,28,29 | 698~806 | Free space | 47 | -3.4 | 2.7 | | | |
| | | 50cmX50cm Groundplane | 58 | -2.4 | 5.7 | | | |
| 4G/3G/NB-IoT/Cat M Band 5,8,18,19,20,26,27 | 824~960 | Free space | 43 | -3.6 | 3.1 | | | |
| | | 50cmX50cm Groundplane | 48 | -3.2 | 4.9 | | | |
| 5G NR/4G Band 21,32,74,75,76 | 1427~1518 | Free space | 33 | -4.9 | 4.0 | | | |
| | | 50cmX50cm Groundplane | 33 | -5.0 | 4.6 | | | |
| 4G/3G Band 1,2,3,4,9,23,25,35,39,66 | 1710~2200 | Free space | 49 | -3.3 | 6.6 | | | |
| | | 50cmX50cm Groundplane | 50 | -3.3 | 7.0 | | | |
| 4G/3G Band 7,30,38,40,41 | 2300~2690 | Free space | 47 | -3.4 | 6.7 | | | |
| | | 50cmX50cm Groundplane | 48 | -3.2 | 7.1 | | | |
| 5G NR/4G Band 22,42,48,77,78,79 | 3300~4200 | Free space | 46 | -3.4 | 7.0 | | | |
| | | 50cmX50cm Groundplane | 55 | -2.7 | 7.6 | | | |
| LTE5200/ Wi-Fi 5800 | 5150~5925 | Free space | 33 | -4.9 | 3.7 | | | |
| | | 50cmX50cm Groundplane | 35 | -4.6 | 4.2 | | | |

| Mechanical | |
|----------------------------|---|
| Dimensions | 216.24*93.25*30.95mm |
| Casing | ABS+PC |
| Base and thread | Nickel Plated Aluminum |
| Weight (including cable) | 420g |
| IP Rating | IP67 |
| Recomended Assembly Torque | 5-7 N-m |
| Cable | 1 meter CFD200 standard, fully customizable |
| Connector | SMA Male connector, fully customizable |
| Environmental | |
| Operation Temperature | -40°C to 85°C |
| Storage Temperature | -40°C to 90°C |
| Humidity | Non-condensing 65°C 95% RH |

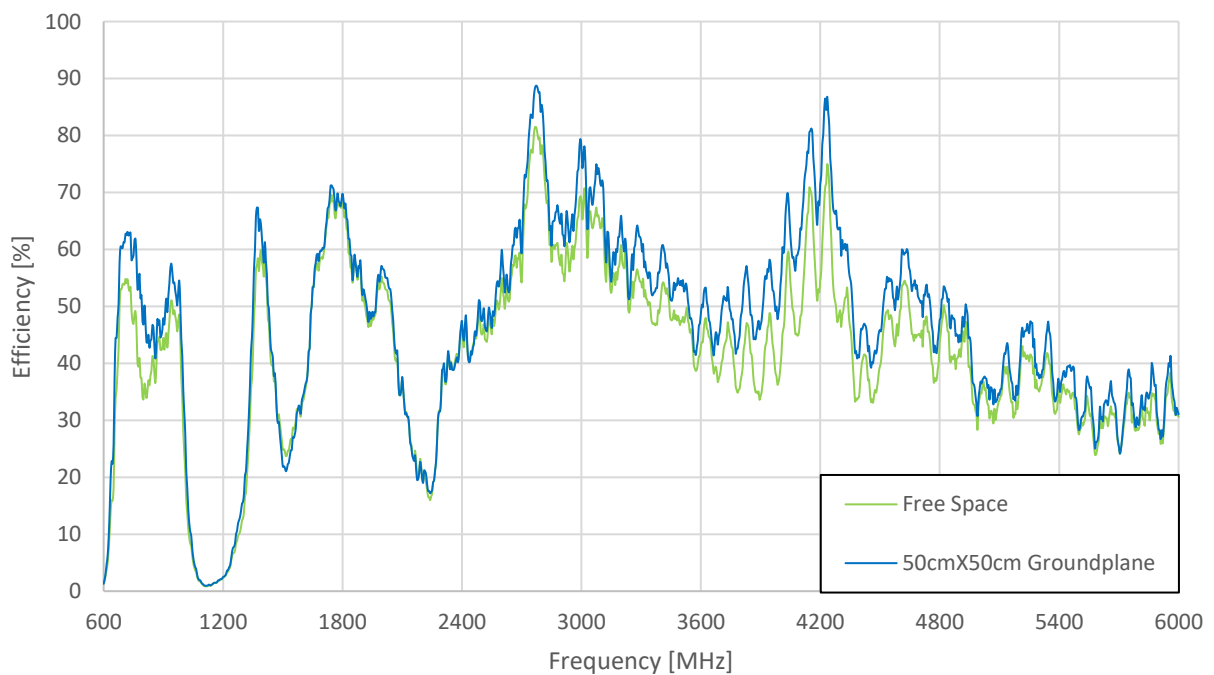
| 5G/4G Bands | | | |
|-------------|--|----------------------|---------|
| Band Number | 5G NR / FR1 / LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA | | |
| | Uplink | Downlink | Covered |
| 1 | UL: 1920 to 1980 | DL: 2110 to 2170 | ✓ |
| 2 | UL: 1850 to 1910 | DL: 1930 to 1990 | ✓ |
| 3 | UL: 1710 to 1785 | DL: 1805 to 1880 | ✓ |
| 4 | UL: 1710 to 1755 | DL: 2110 to 2155 | ✓ |
| 5 | UL: 824 to 849 | DL: 869 to 894 | ✓ |
| 7 | UL: 2500 to 2570 | DL: 2620 to 2690 | ✓ |
| 8 | UL: 880 to 915 | DL: 925 to 960 | ✓ |
| 9 | UL: 1749.9 to 1784.9 | DL: 1844.9 to 1879.9 | ✓ |
| 11 | UL: 1427.9 to 1447.9 | DL: 1475.9 to 1495.9 | ✓ |
| 12 | UL: 699 to 716 | DL: 729 to 746 | ✓ |
| 13 | UL: 777 to 787 | DL: 746 to 756 | ✓ |
| 14 | UL: 788 to 798 | DL: 758 to 768 | ✓ |
| 17 | UL: 704 to 716 | DL: 734 to 746 | ✓ |
| 18 | UL: 815 to 830 | DL: 860 to 875 | ✓ |
| 19 | UL: 830 to 845 | DL: 875 to 890 | ✓ |
| 20 | UL: 832 to 862 | DL: 791 to 821 | ✓ |
| 21 | UL: 1447.9 to 1462.9 | DL: 1495.9 to 1510.9 | ✓ |
| 22 | UL: 3410 to 3490 | DL: 3510 to 3590 | ✓ |
| 23 | UL: 2000 to 2020 | DL: 2180 to 2200 | ✓ |
| 24 | UL: 1625.5 to 1660.5 | DL: 1525 to 1559 | ✓ |
| 25 | UL: 1850 to 1915 | DL: 1930 to 1995 | ✓ |
| 26 | UL: 814 to 849 | DL: 859 to 894 | ✓ |
| 27 | UL: 807 to 824 | DL: 852 to 869 | ✓ |
| 28 | UL: 703 to 748 | DL: 758 to 803 | ✓ |
| 29 | UL: - | DL: 717 to 728 | ✓ |
| 30 | UL: 2305 to 2315 | DL: 2350 to 2360 | ✓ |
| 31 | UL: 452.5 to 457.5 | DL: 462.5 to 467.5 | ✗ |
| 32 | UL: - | DL: 1452 - 1496 | ✓ |
| 35 | | 1850 to 1910 | ✓ |
| 38 | | 2570 to 2620 | ✓ |
| 39 | | 1880 to 1920 | ✓ |
| 40 | | 2300 to 2400 | ✓ |
| 41 | | 2496 to 2690 | ✓ |
| 42 | | 3400 to 3600 | ✓ |
| 43 | | 3600 to 3800 | ✓ |
| 48 | | 3550 to 3700 | ✓ |
| 66 | UL: 1710-1780 | DL: 2110-2200 | ✓ |
| 71 | | 617 to 698 | ✓ |
| 74/75/76 | | 1427 to 1518 | ✓ |
| 78 | | 3300 to 3800 | ✓ |
| 79 | | 4400 to 5000 | ✓ |
| 85 | 698-716 | 728-746 | ✓ |

3. Antenna Characteristics

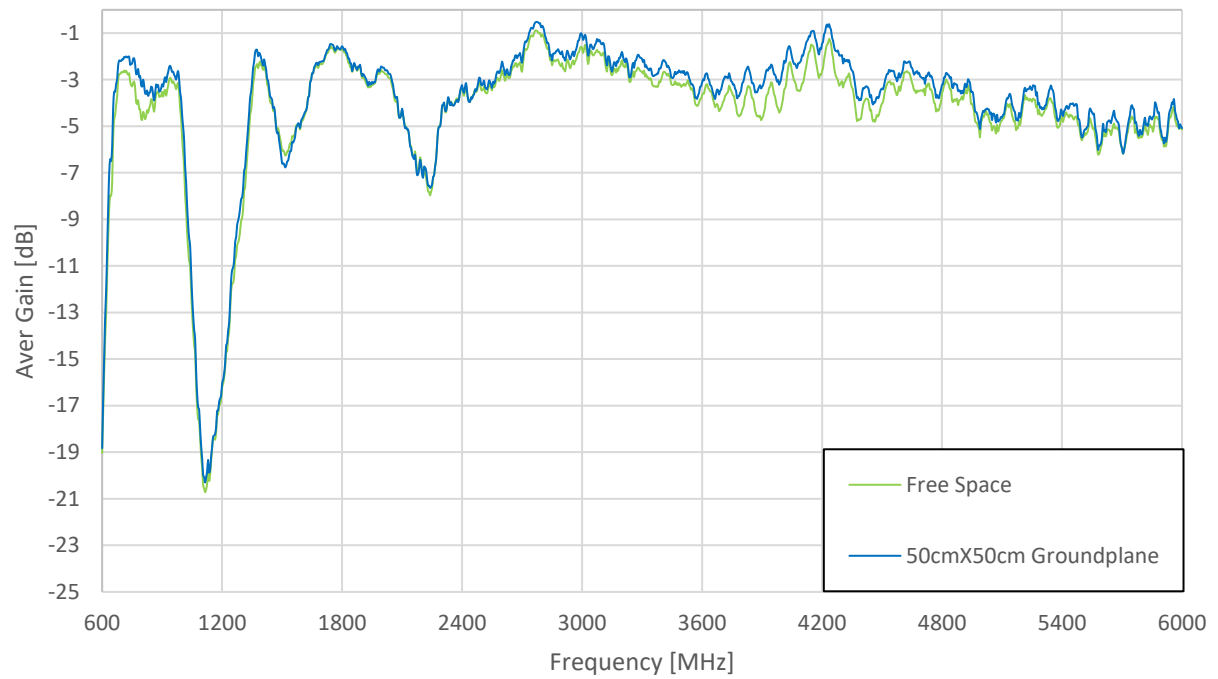
3.1 Return Loss



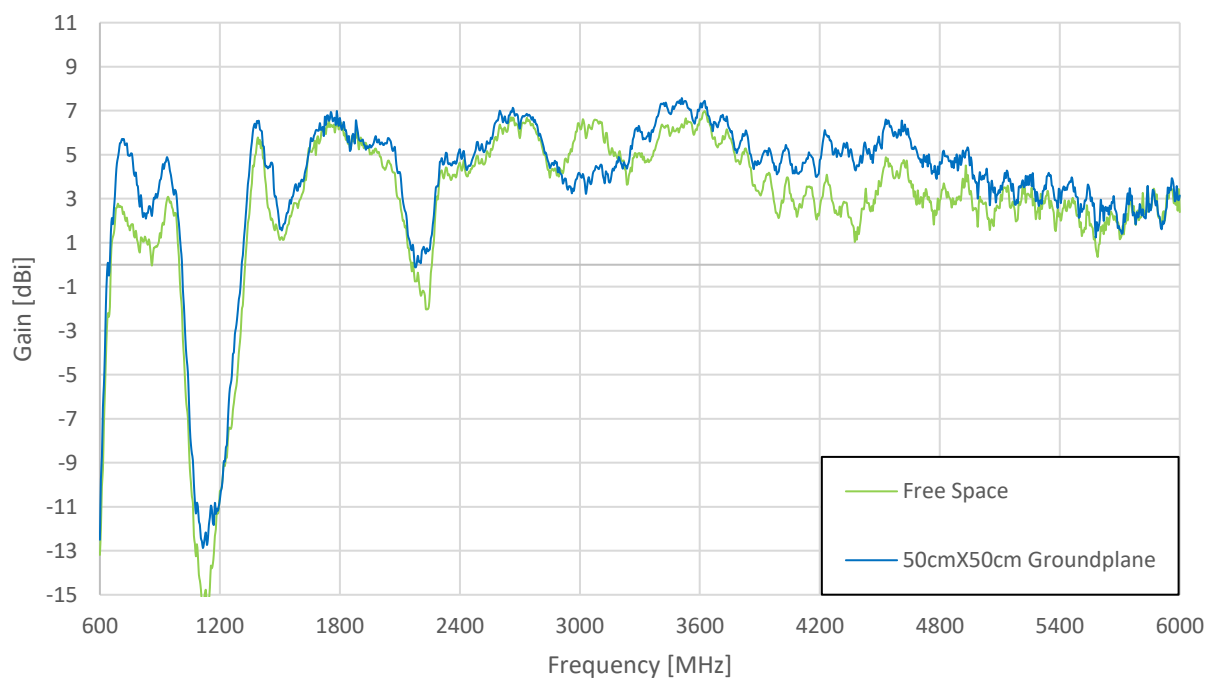
3.2 Efficiency



3.3 Average Gain



3.4 Peak Gain



4. Radiation Patterns

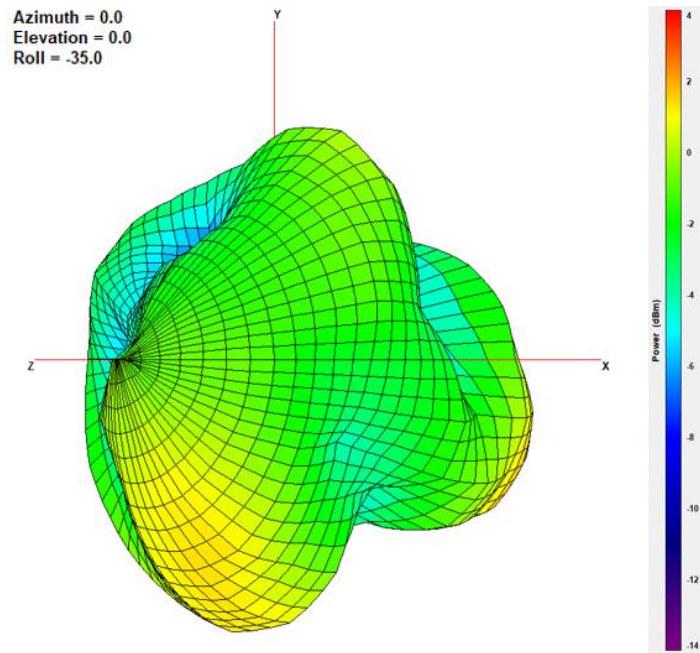
4.1 Test Setup



50cmx50cm Ground Plane

Freespace

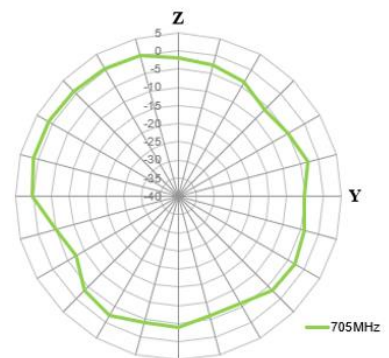
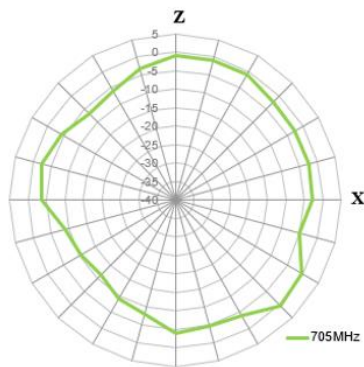
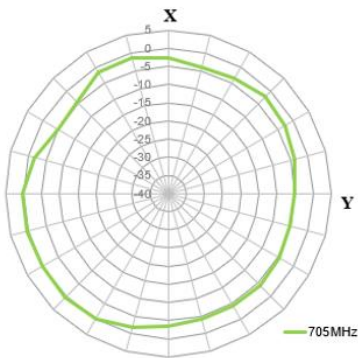
4.2 705MHz (Freespace) 3D and 2D Radiation Patterns



XY Plane

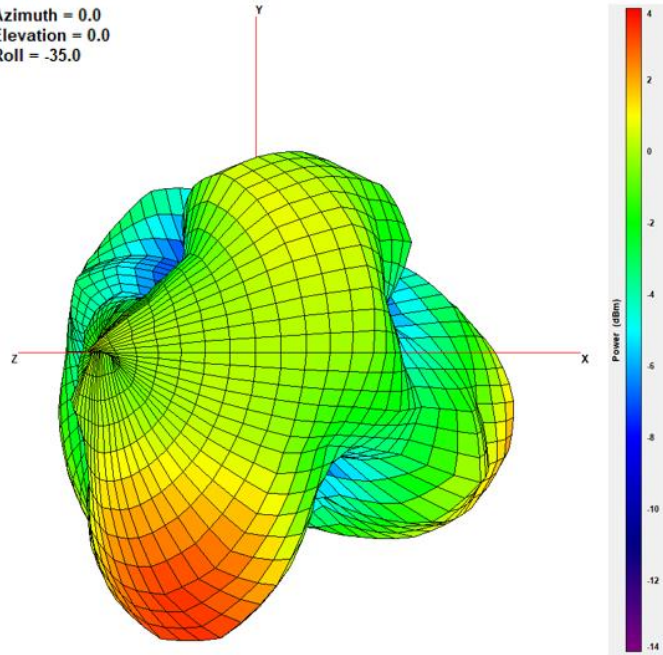
XZ Plane

YZ Plane



750MHz

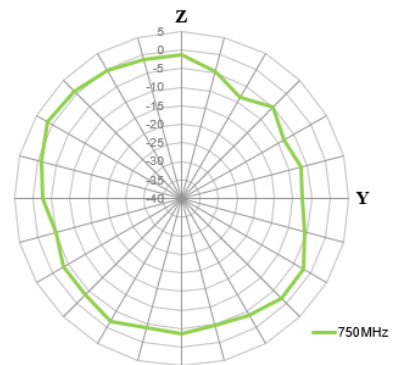
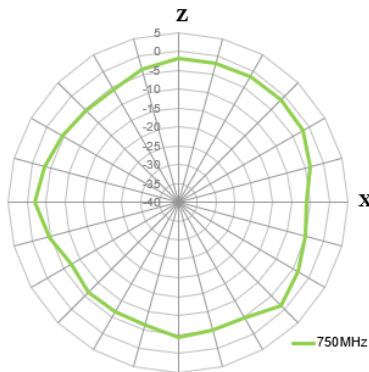
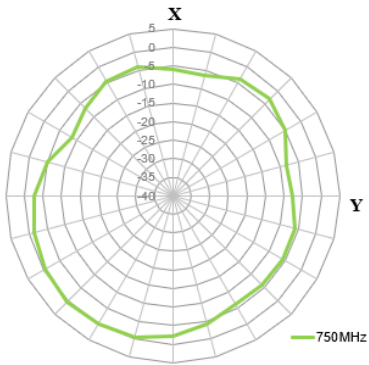
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XY Plane

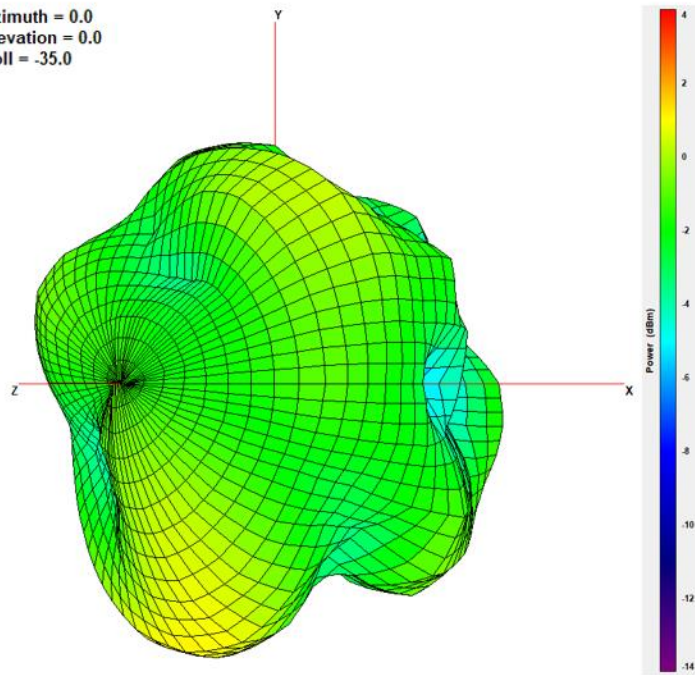
XZ Plane

YZ Plane



825MHz

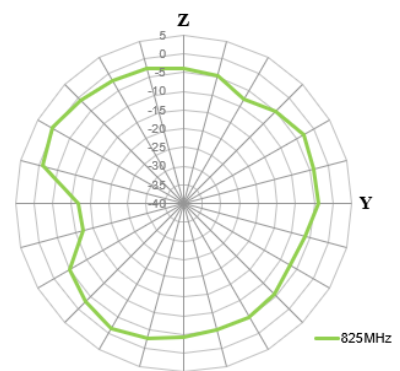
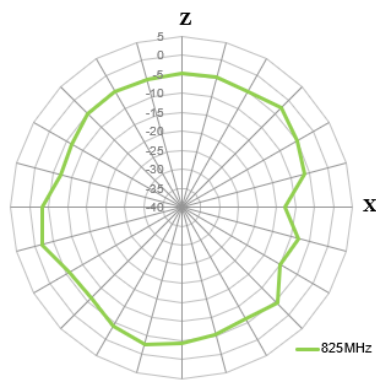
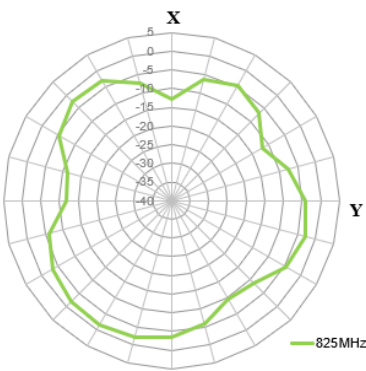
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XY Plane

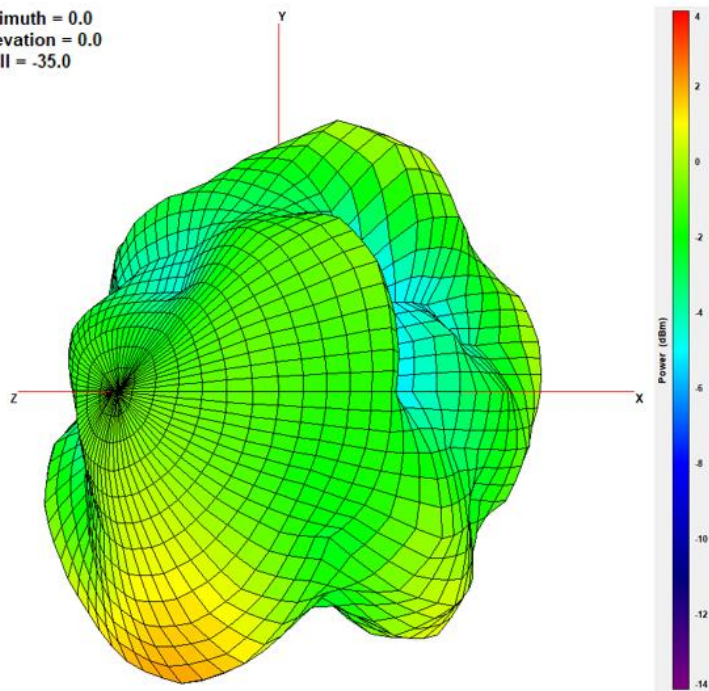
XZ Plane

YZ Plane



960MHz

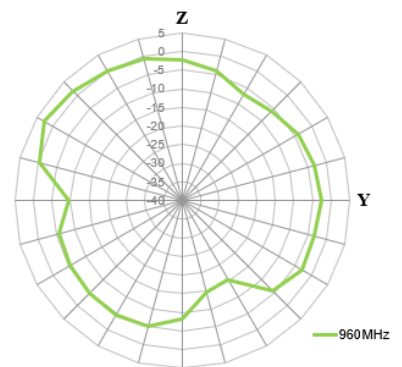
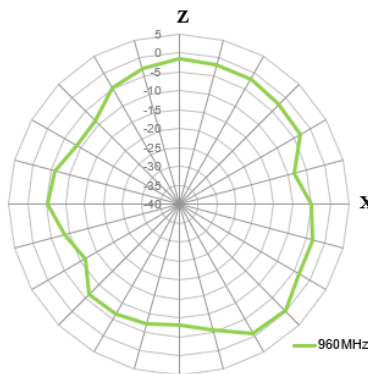
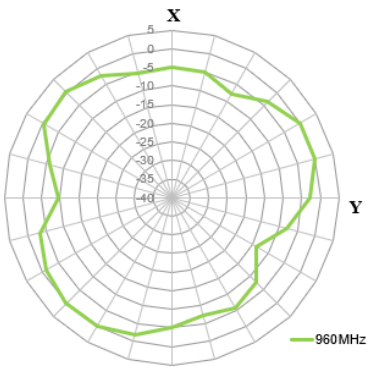
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XY Plane

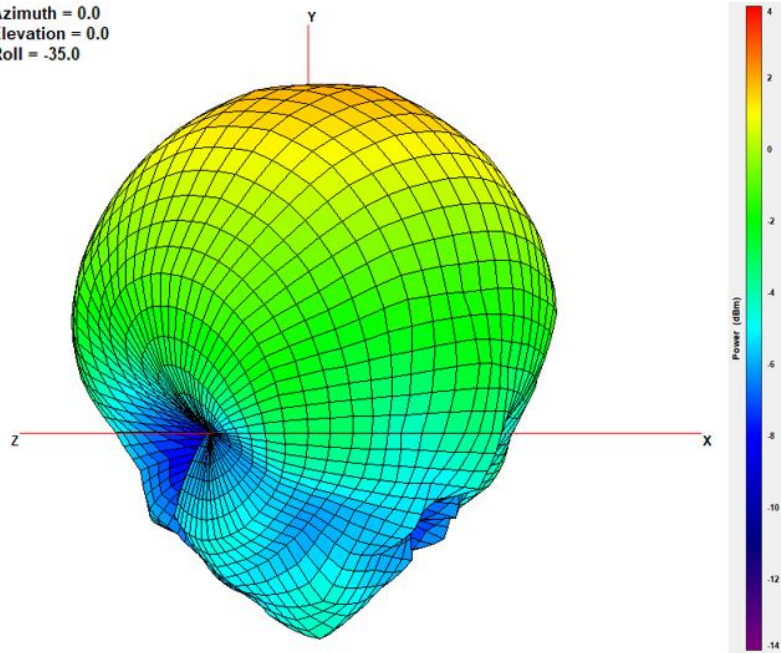
XZ Plane

YZ Plane



1710MHz

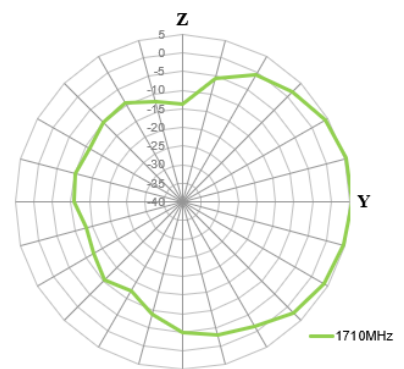
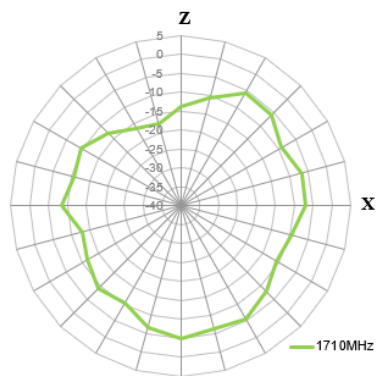
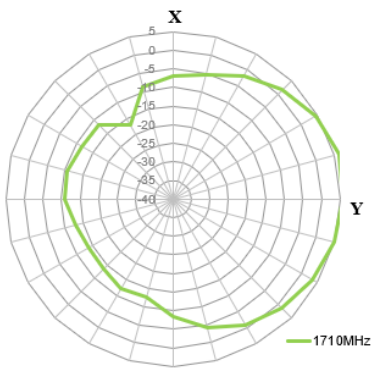
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XY Plane

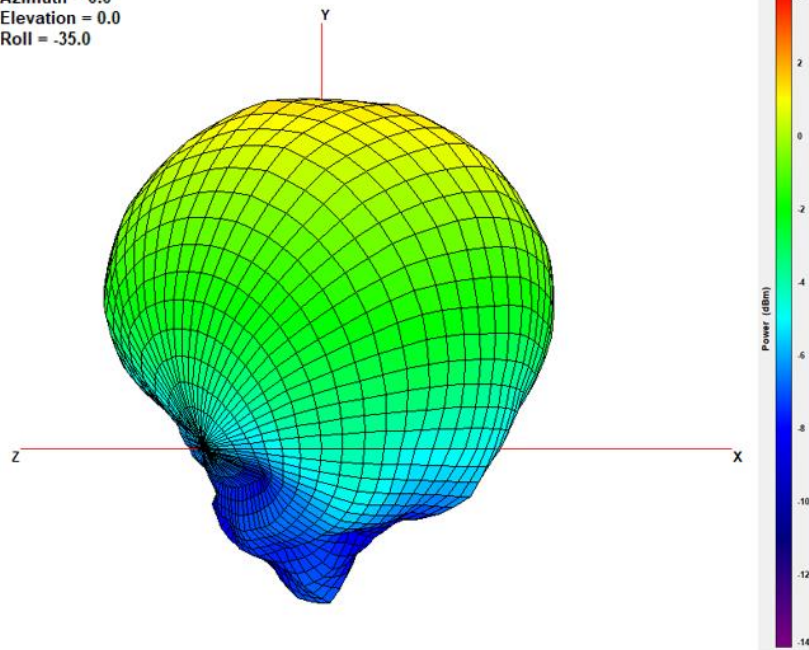
XZ Plane

YZ Plane



1850MHz

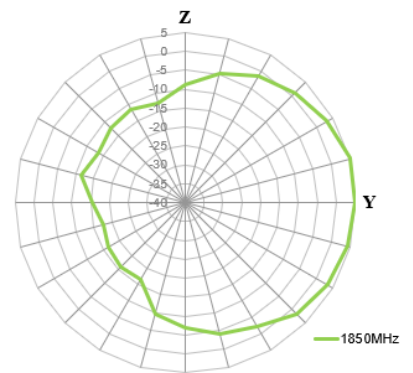
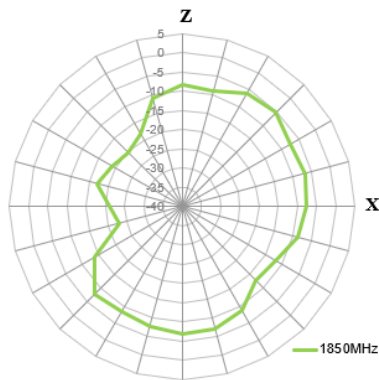
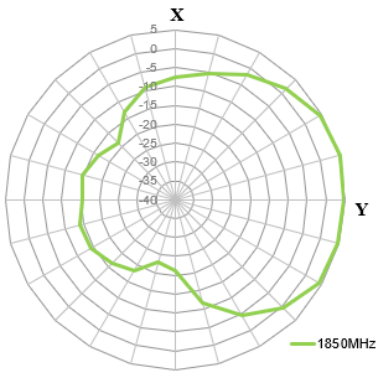
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XY Plane

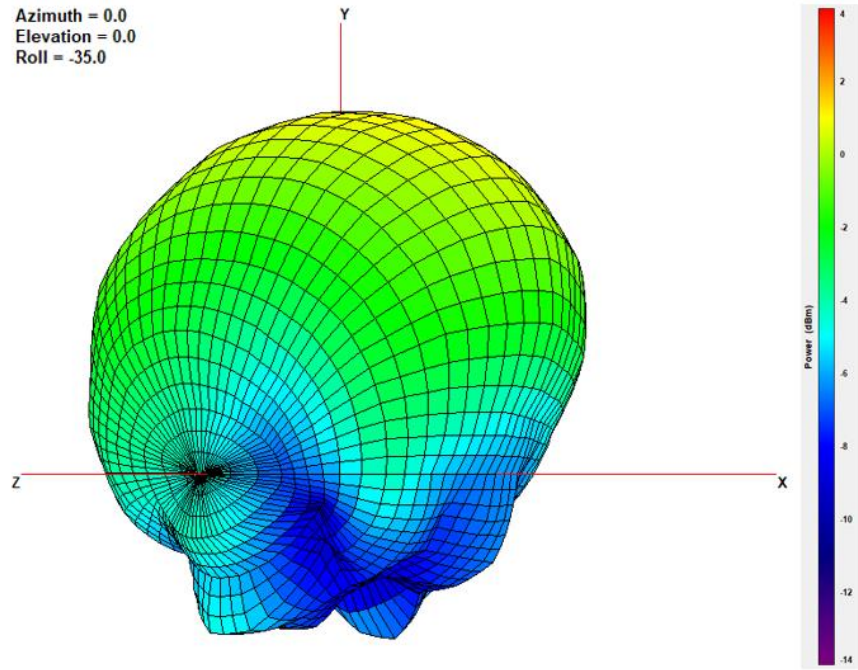
XZ Plane

YZ Plane



1990MHz

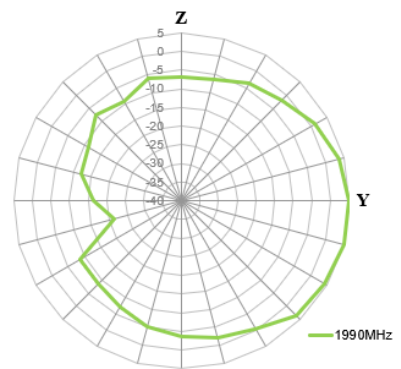
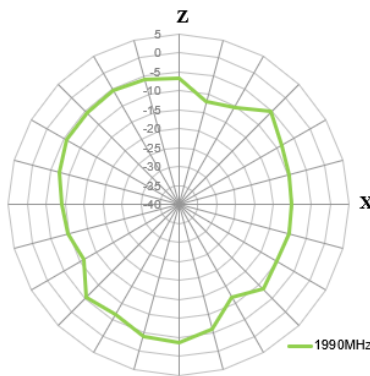
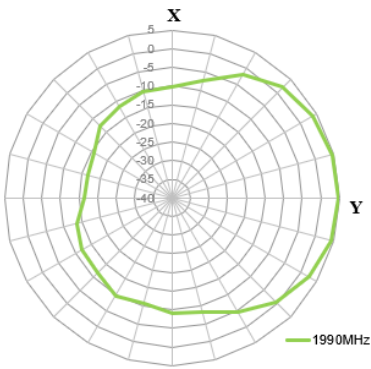
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XY Plane

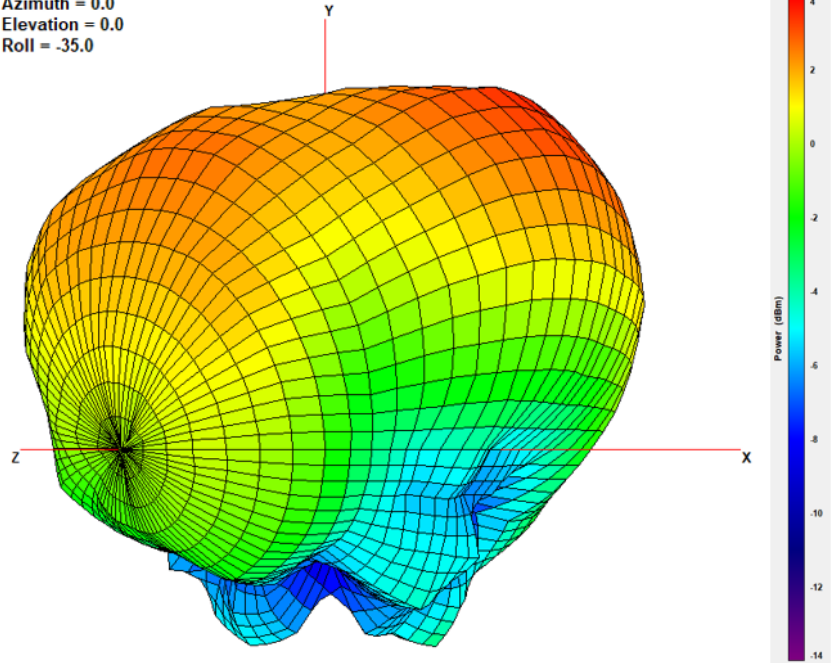
XZ Plane

YZ Plane



2170MHz

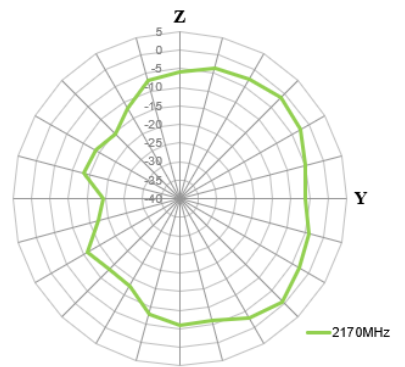
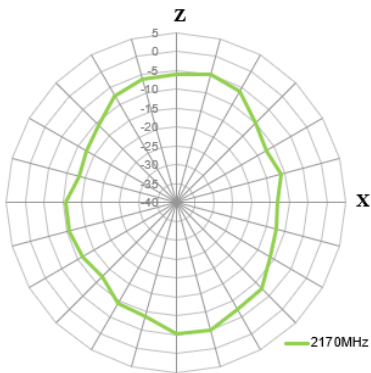
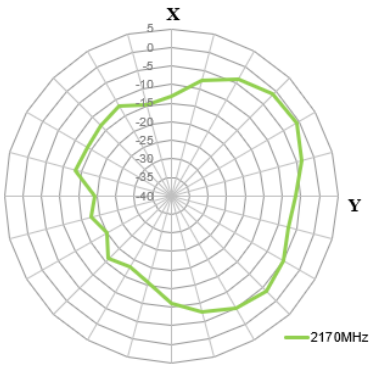
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XY Plane

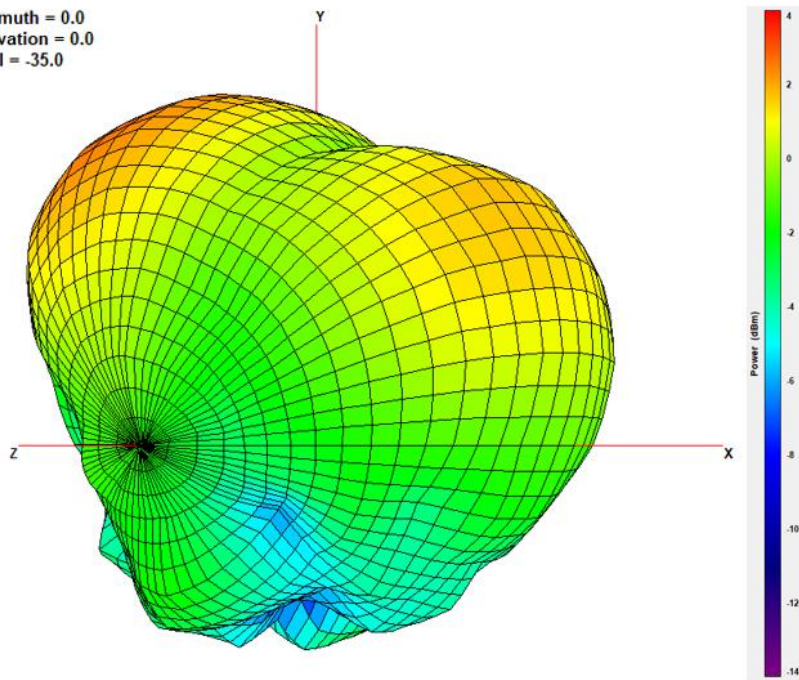
XZ Plane

YZ Plane



2500MHz

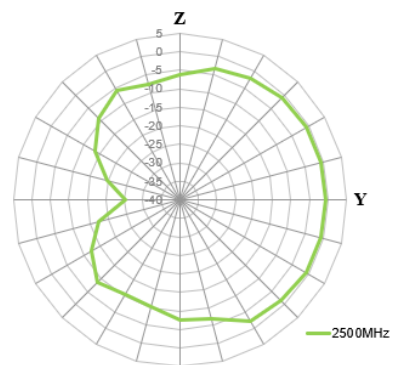
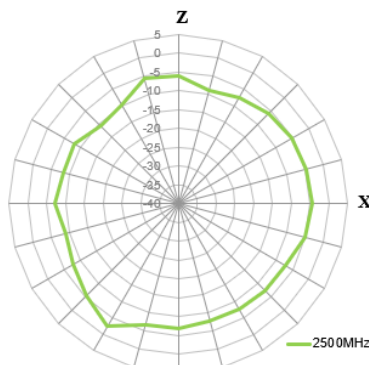
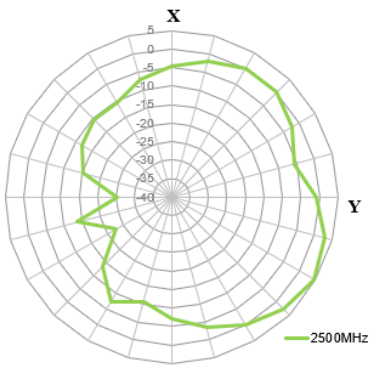
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XY Plane

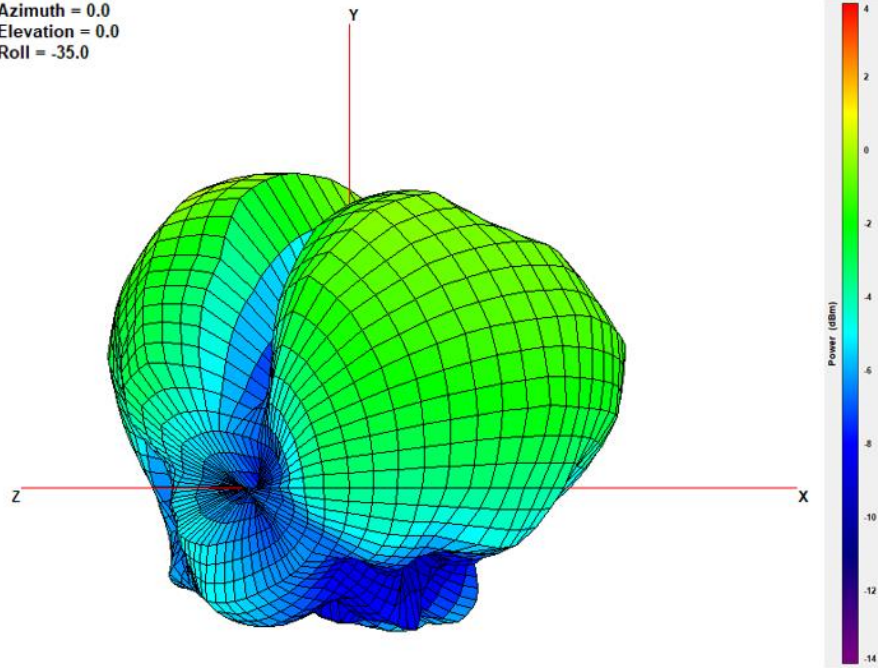
XZ Plane

YZ Plane



2690MHz

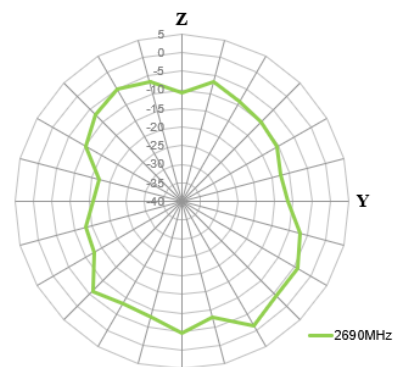
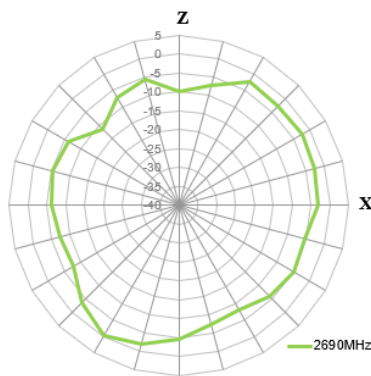
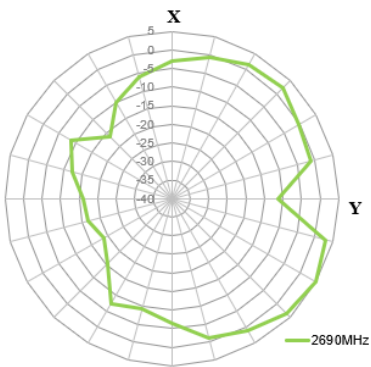
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XY Plane

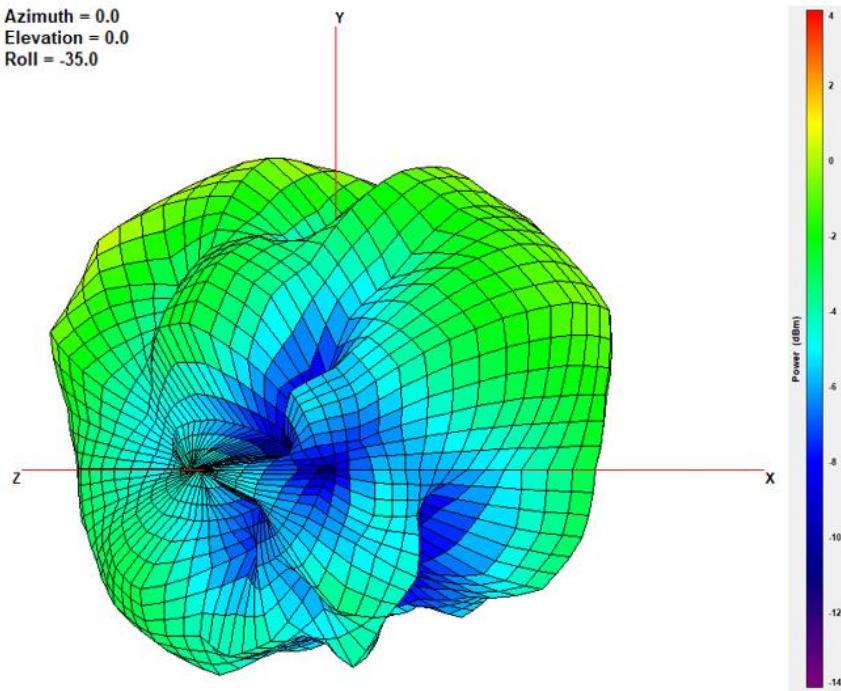
XZ Plane

YZ Plane



3300MHz

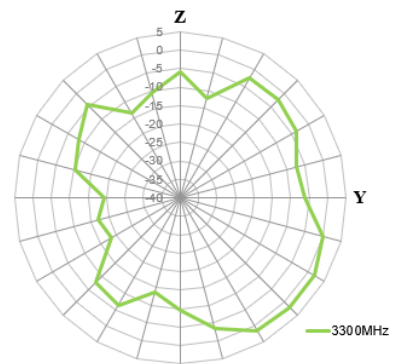
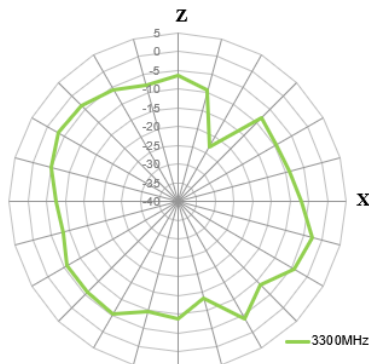
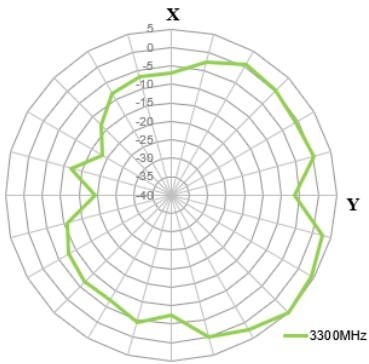
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XY Plane

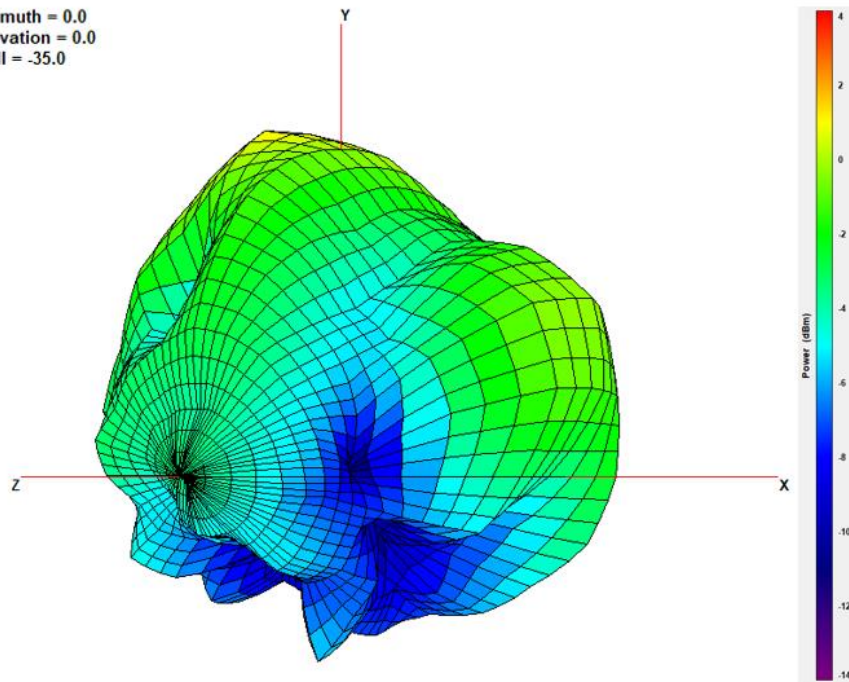
XZ Plane

YZ Plane



3500MHz

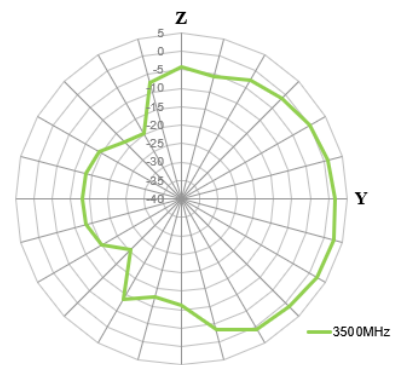
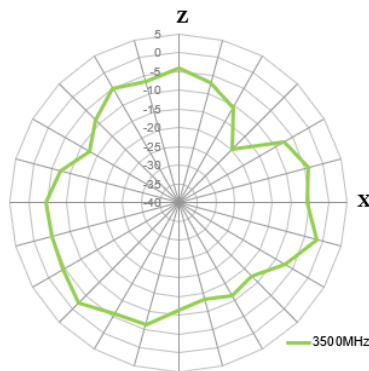
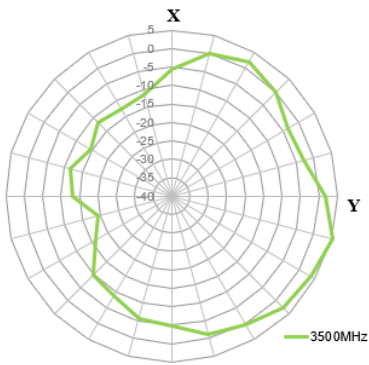
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XY Plane

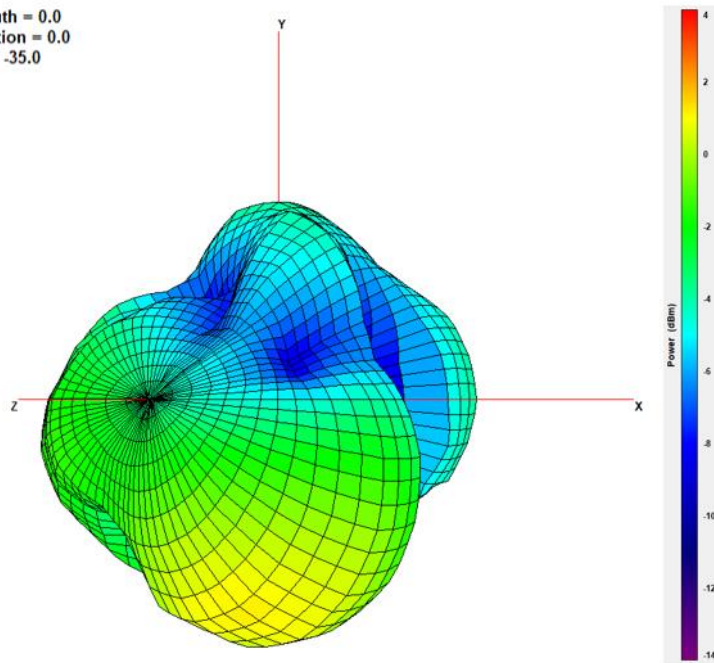
XZ Plane

YZ Plane



4.3 705MHz (50cm X 50cm Groundplane) 3D and 2D Radiation Patterns

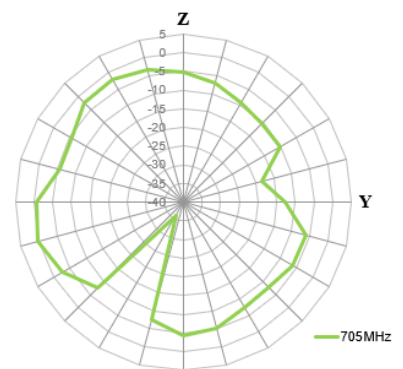
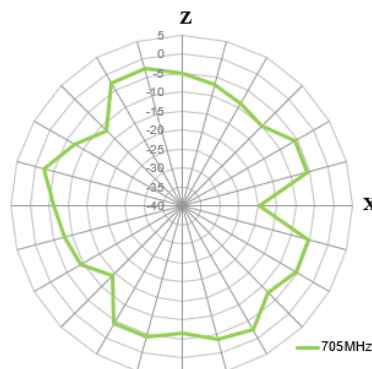
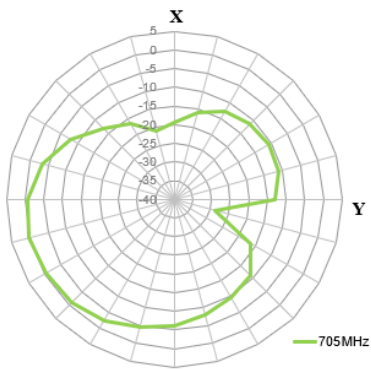
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XY Plane

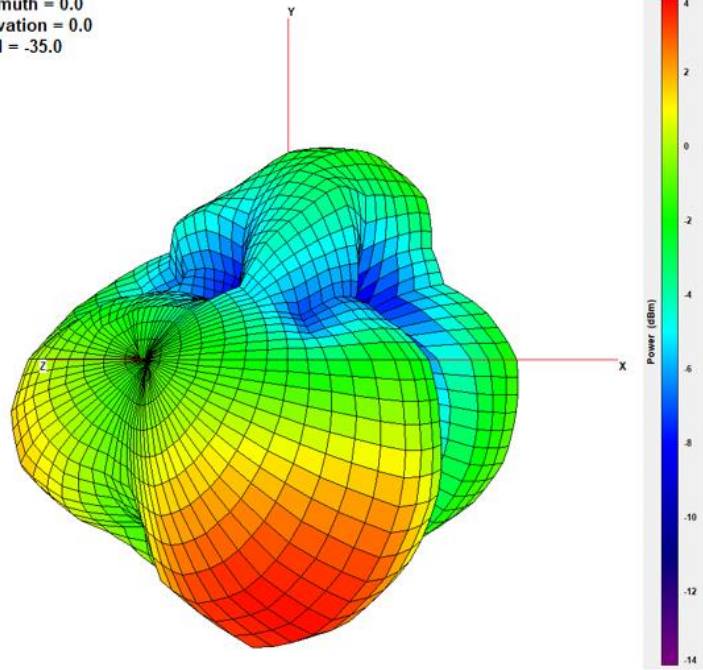
XZ Plane

YZ Plane



750MHZ

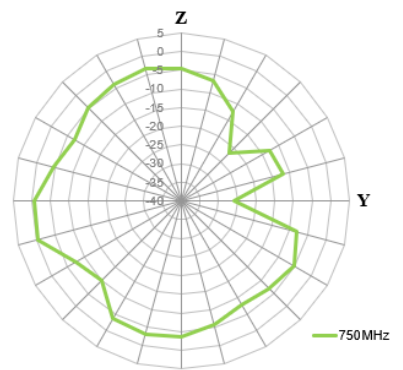
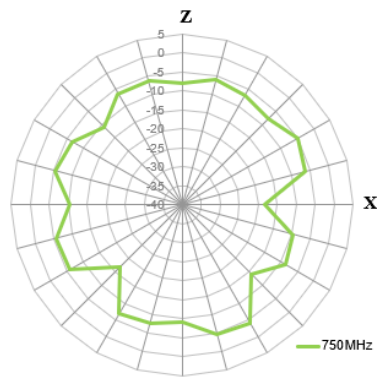
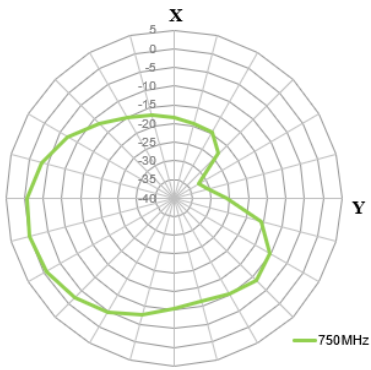
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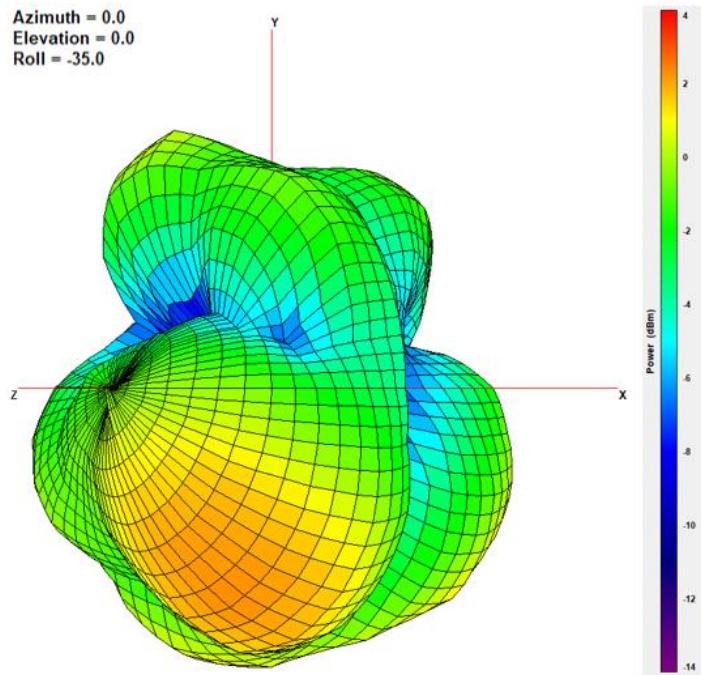
XY Plane

XZ Plane

YZ Plane



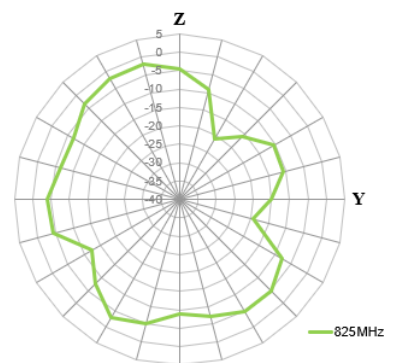
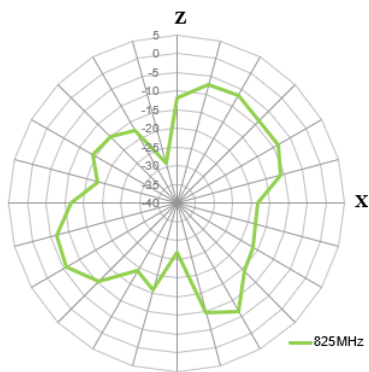
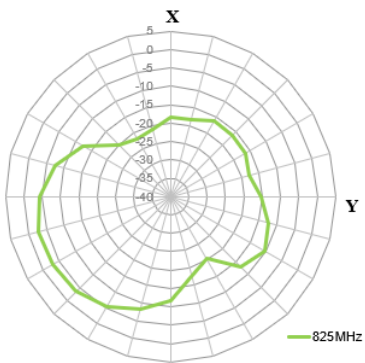
825MHz



XY Plane

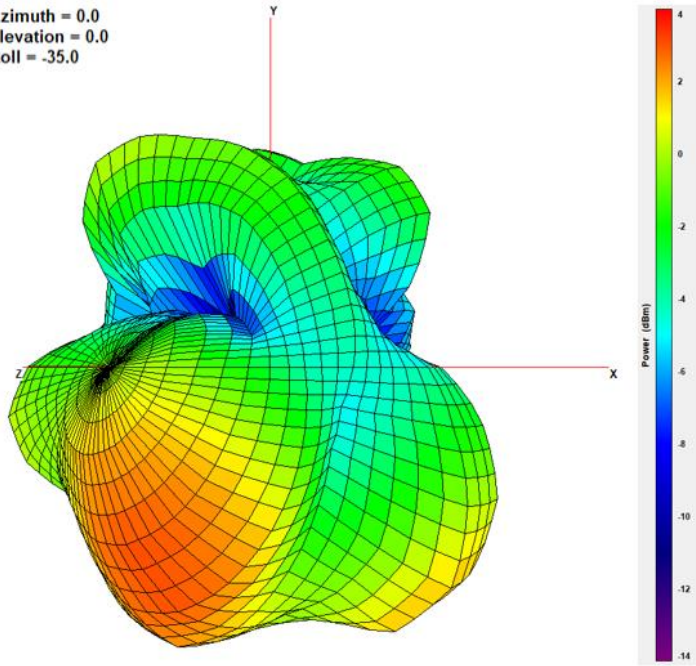
XZ Plane

YZ Plane



960MHz

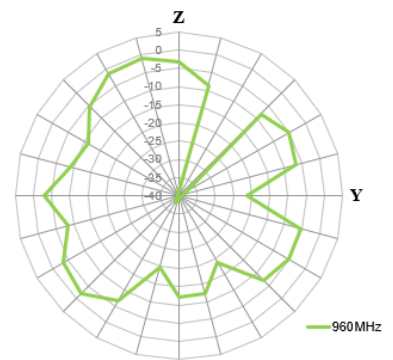
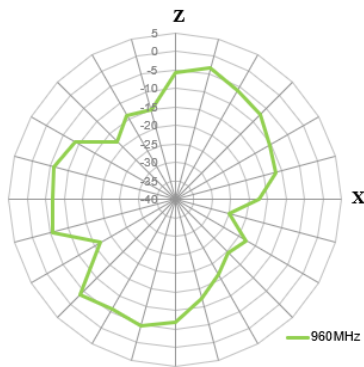
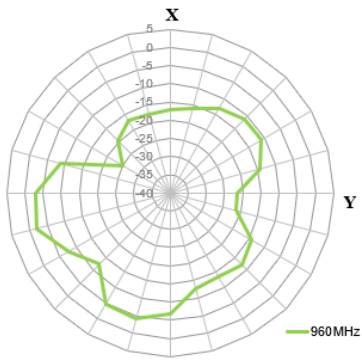
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XY Plane

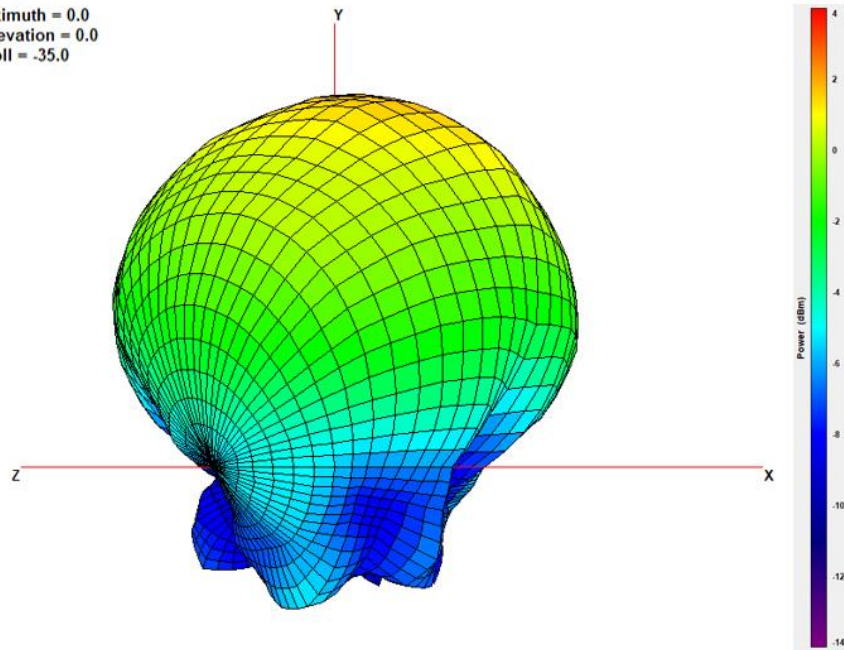
XZ Plane

YZ Plane



1710MHz

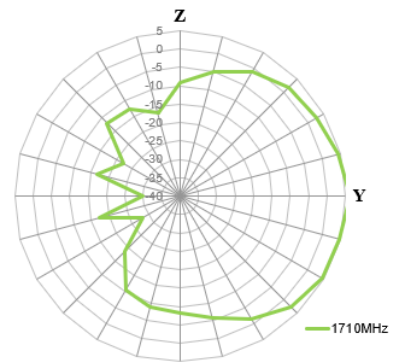
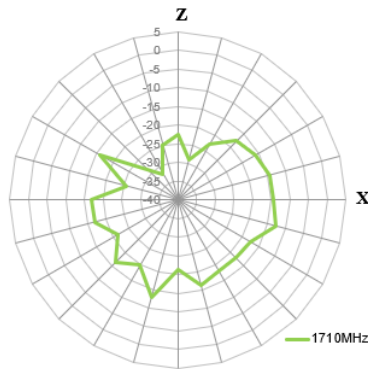
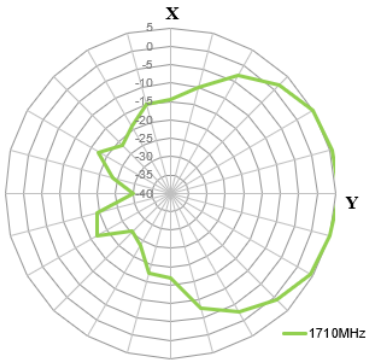
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XY Plane

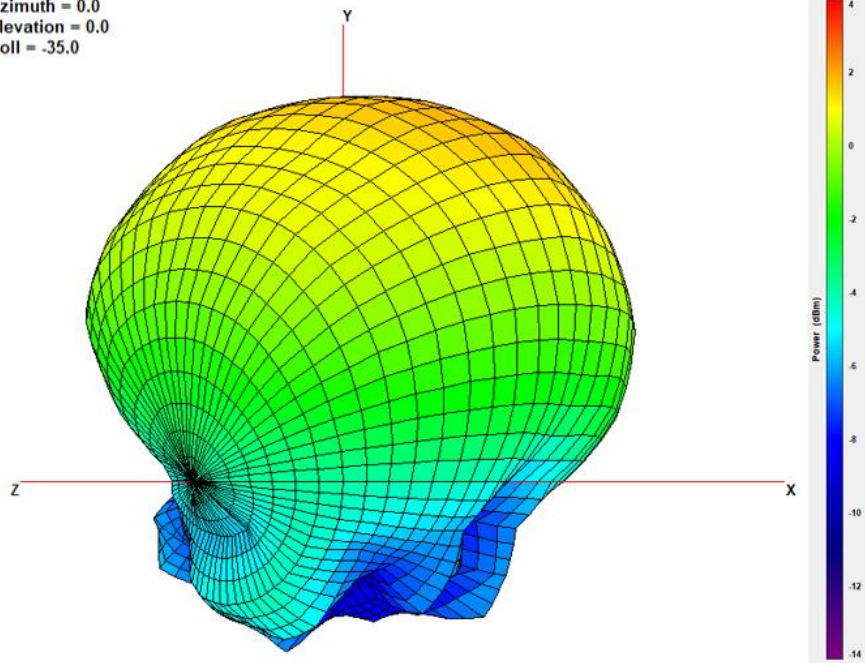
XZ Plane

YZ Plane



1850MHz

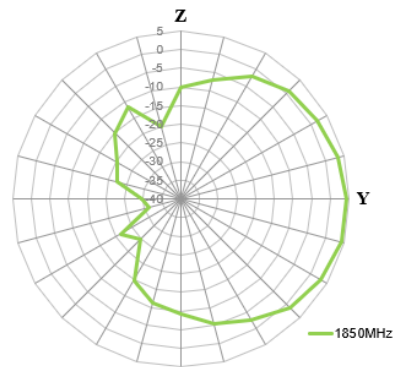
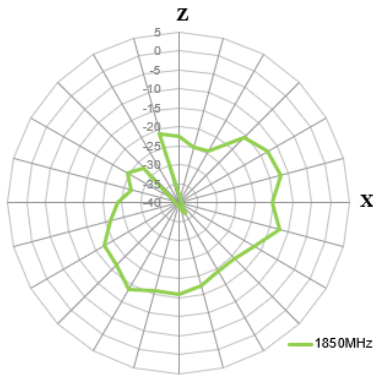
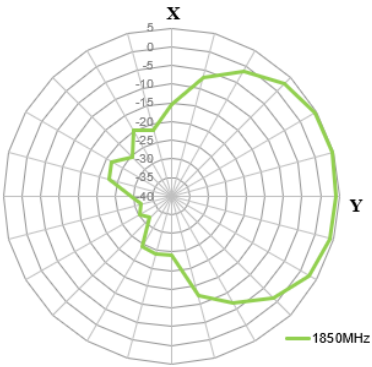
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XY Plane

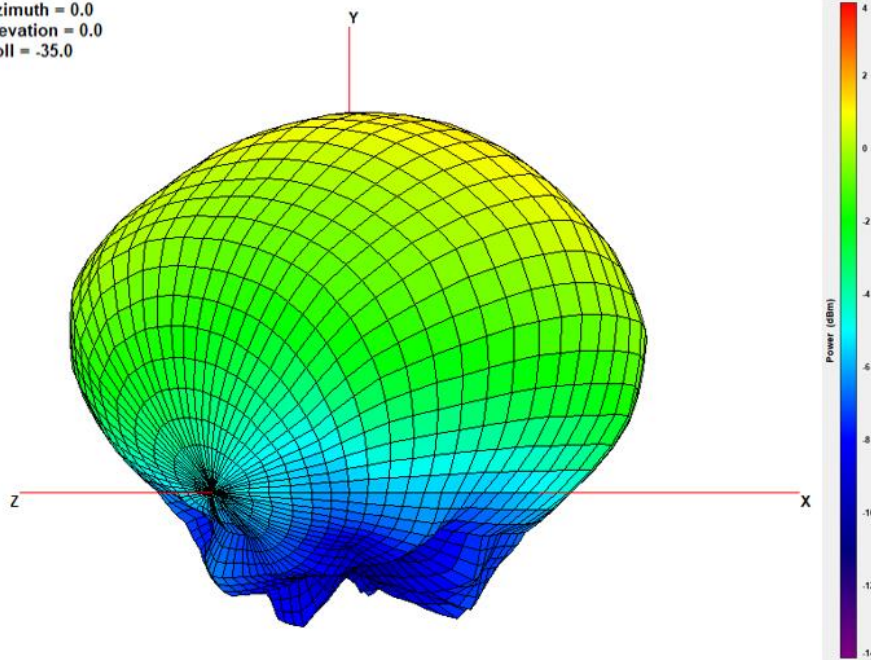
XZ Plane

YZ Plane



1990MHz

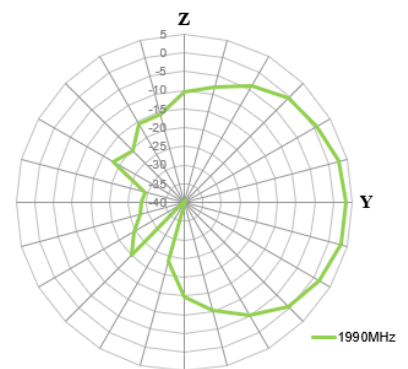
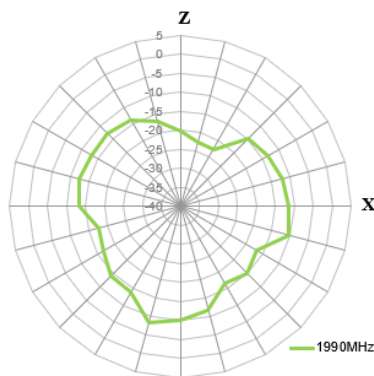
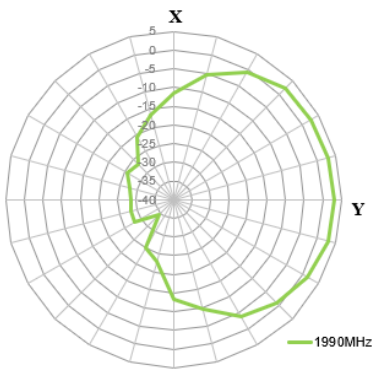
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XY Plane

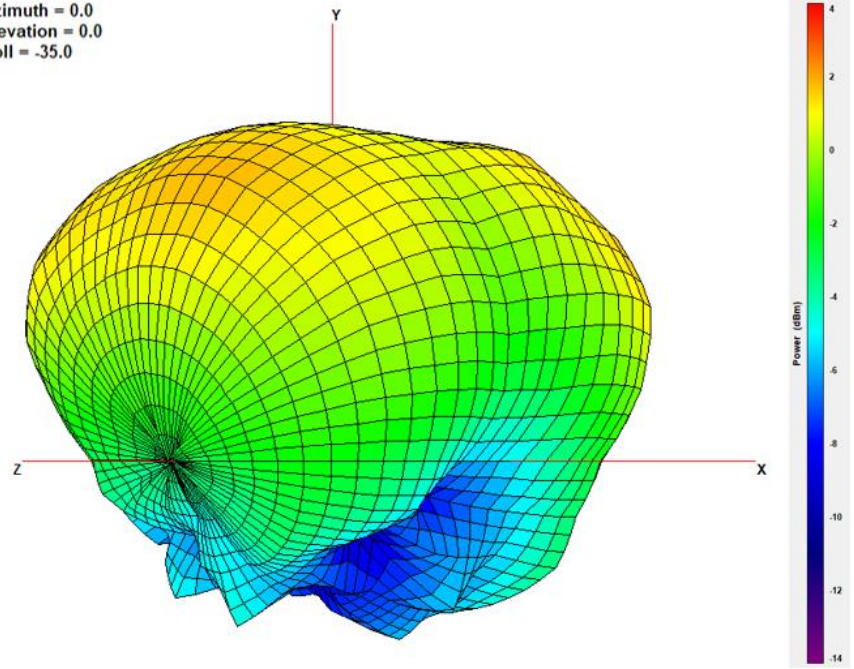
XZ Plane

YZ Plane



2170MHz

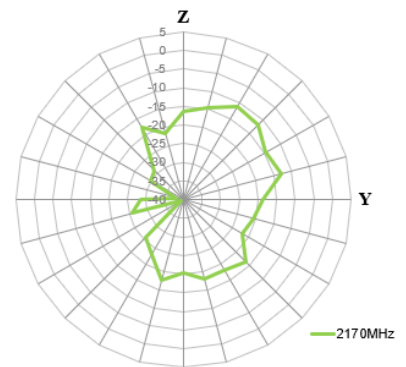
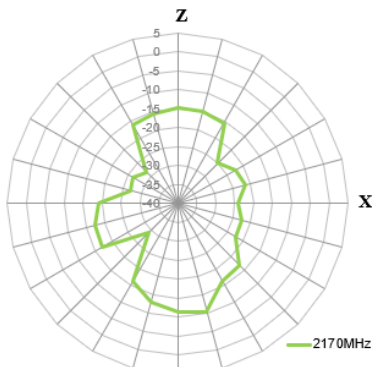
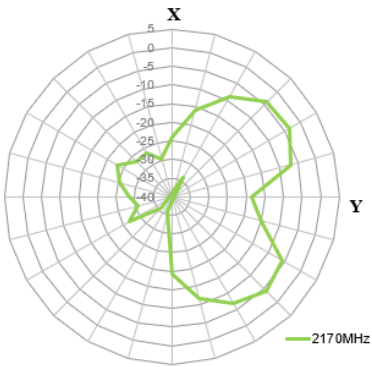
Azimuth = 0.0
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XY Plane

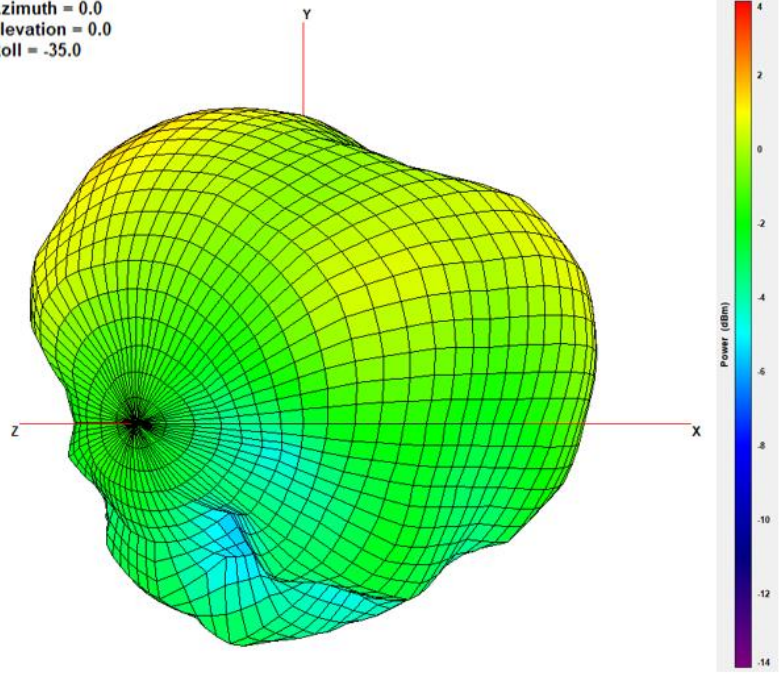
XZ Plane

YZ Plane



2500MHz

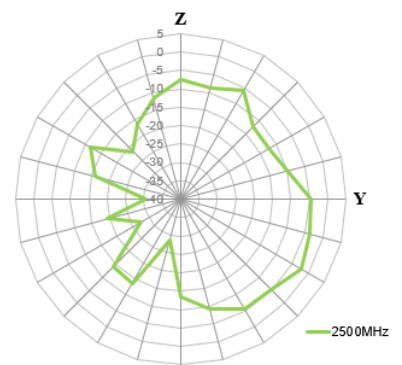
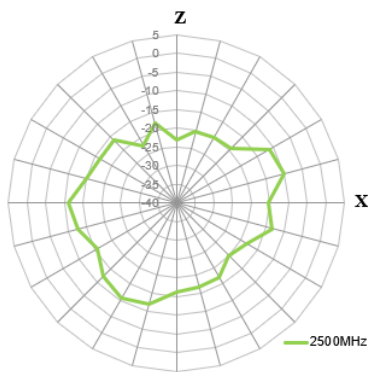
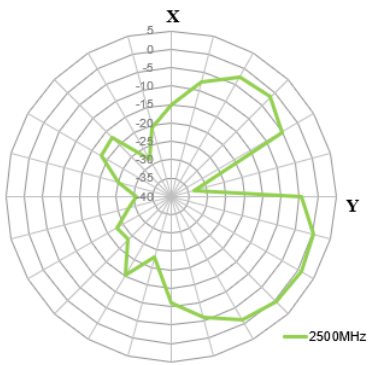
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XY Plane

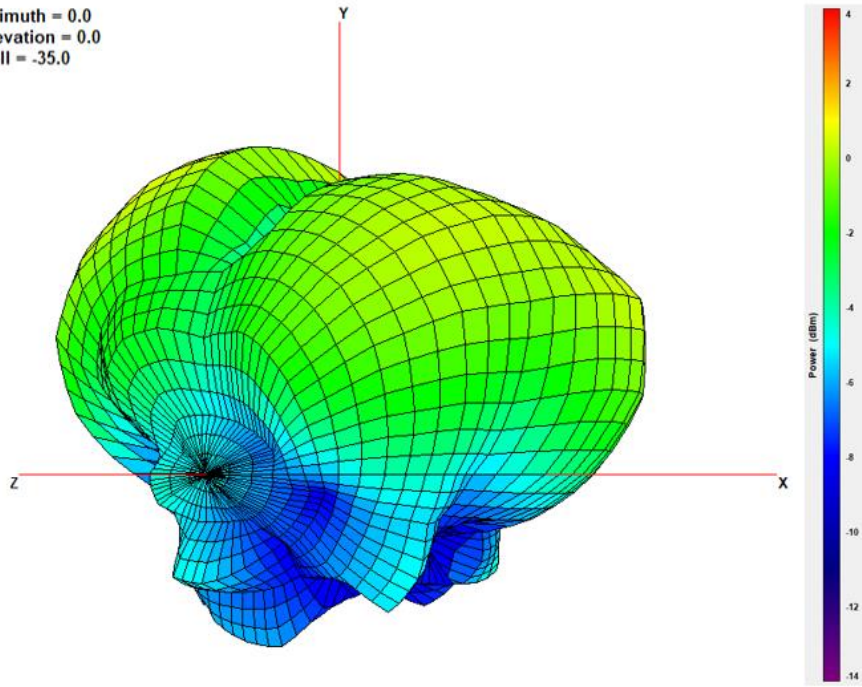
XZ Plane

YZ Plane



2690MHz

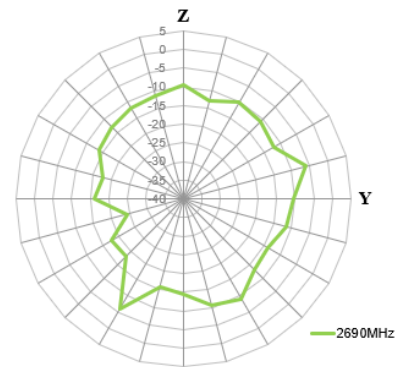
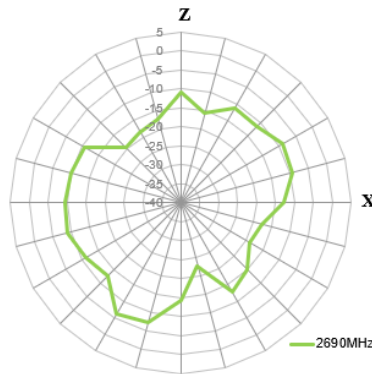
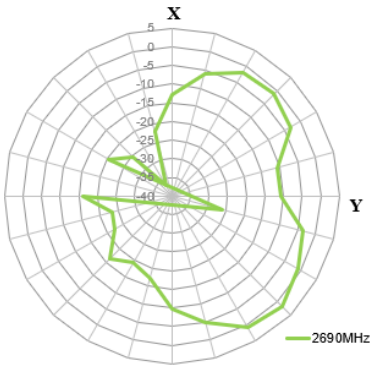
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XY Plane

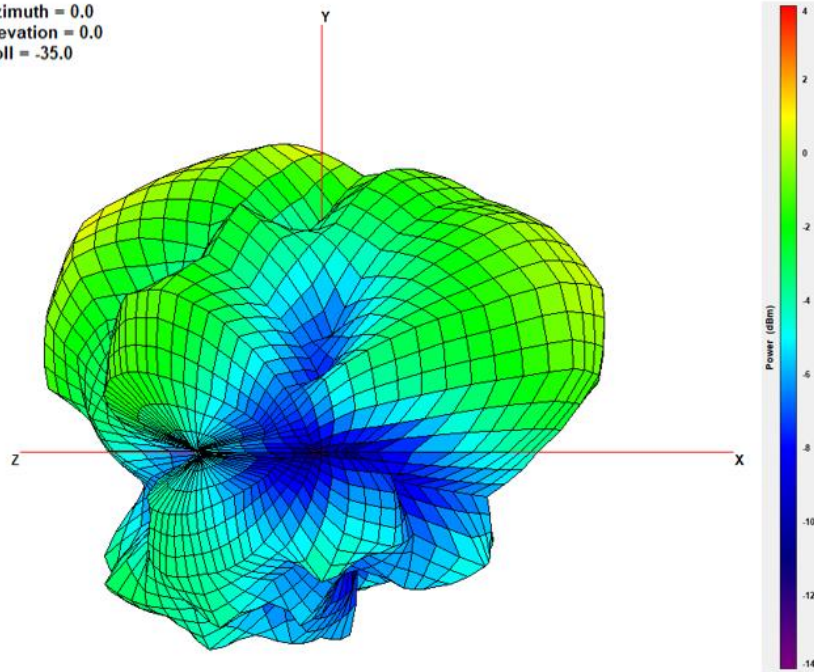
XZ Plane

YZ Plane



3300MHz

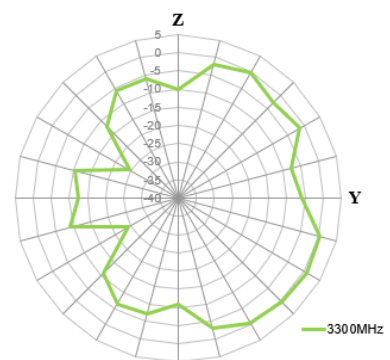
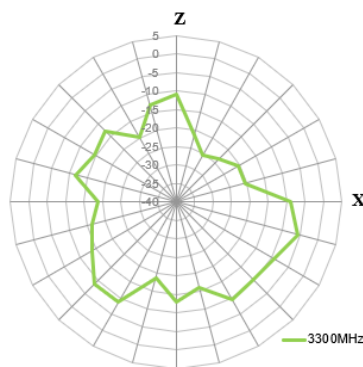
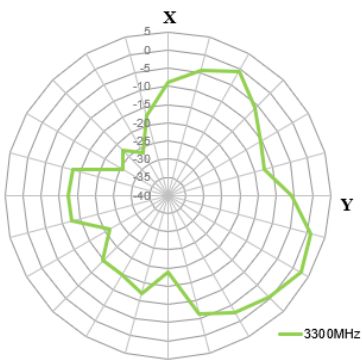
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XY Plane

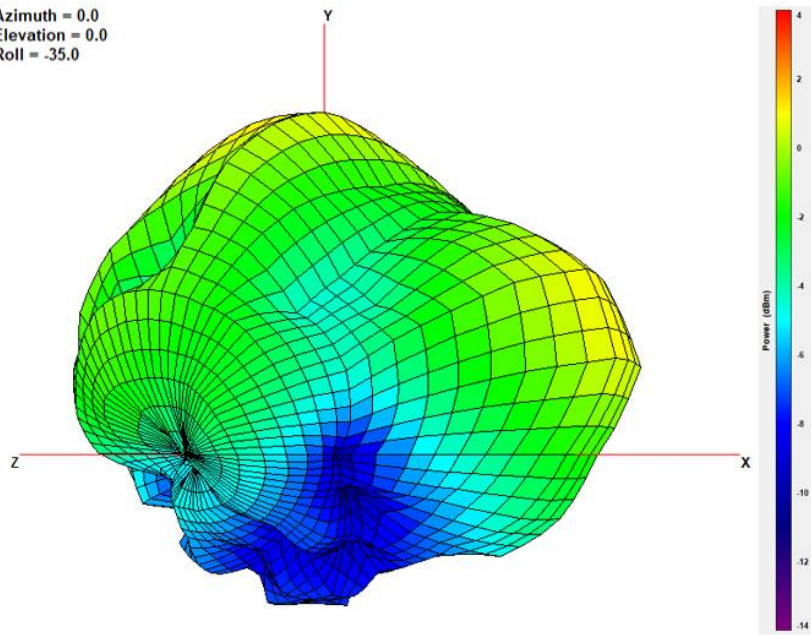
XZ Plane

YZ Plane



3500MHz

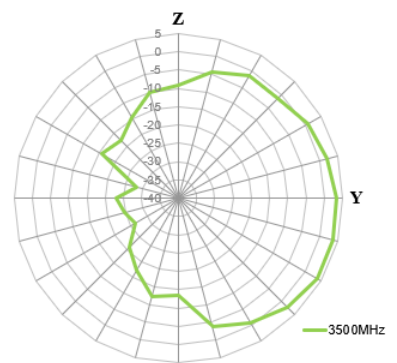
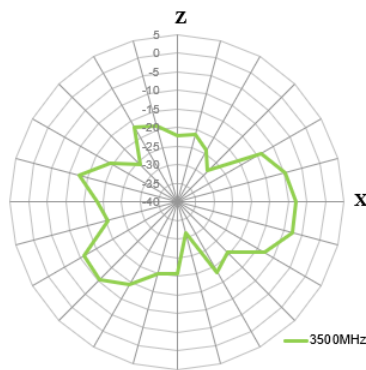
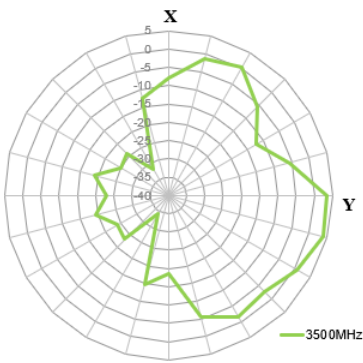
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XY Plane

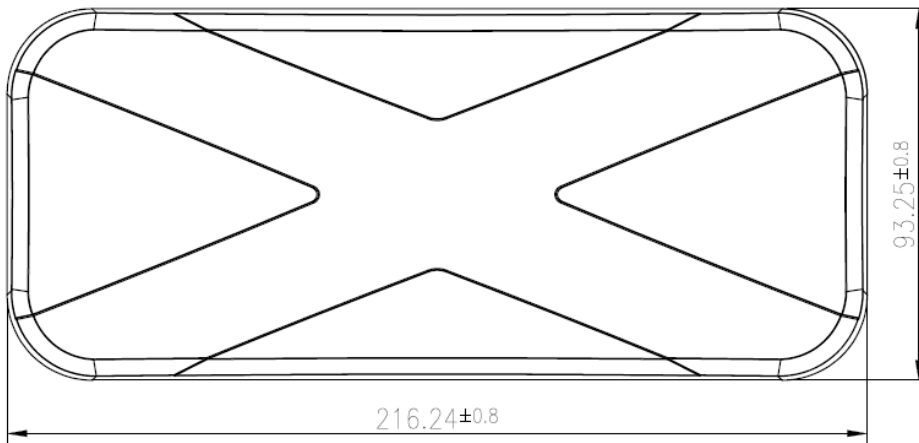
XZ Plane

YZ Plane

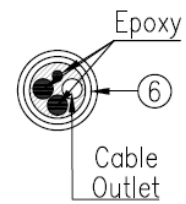


5. Mechanical Drawing (Units: mm)

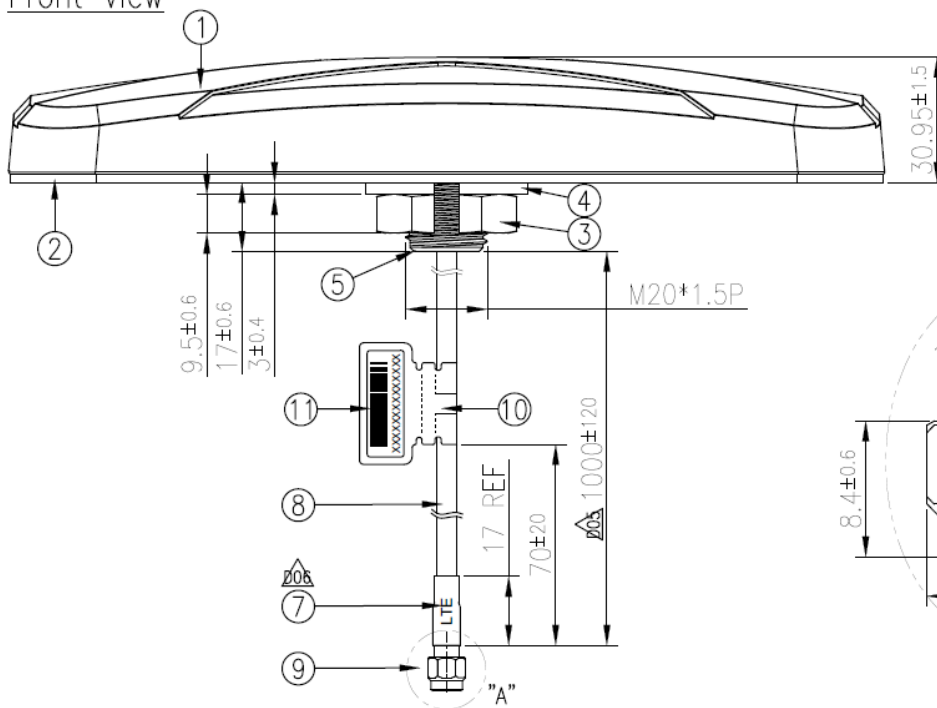
Top View



Bottom Thread View



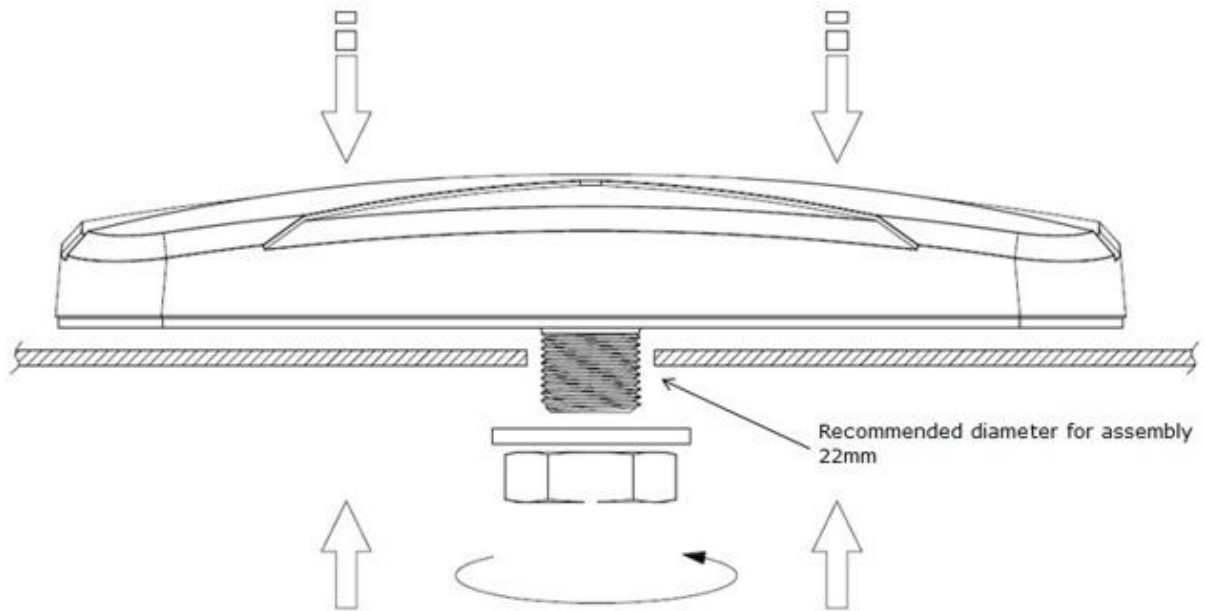
Front View



Detail A
Scale:4:1

| | Name | P/N | Material | Finish | QTY |
|----|------------------------|----------------|-----------------|---------------------|-----|
| 1 | Housing | 000113K000066A | ABS+PC | Black | 1 |
| 2 | Closed Cell Foam | 001013K000039A | 3M 9448+CR-4305 | White Liner | 1 |
| 3 | Nut_M20x1.5Px9.5H Cut | 000413E030061A | Steel Carbon | Ni-Zn plated | 1 |
| 4 | Washer_Cut | 000413E040061A | Steel Carbon | Ni-Zn plated | 1 |
| 5 | Metal Base | 000313K000060A | AL | Ni Plated | 1 |
| 6 | Cable Rubber | 000713E000063A | Silicone Rubber | Black | 1 |
| 7 | Heat Shrink Tube (LTE) | 001316L080000A | PE | Red Tube/White Text | 1 |
| 8 | CFD200 Coaxial Cable | 301415C010000A | PVC | Black | 1 |
| 9 | SMA(M)ST | 200211G010013A | Brass | Au Plated | 1 |
| 10 | Empty Label | 001015G000000A | Coated Paper | White | 1 |
| 11 | Barcode Label | 001015G010000A | PET | White | 1 |

6. Installation



Recommended torque for mounting: 5-7Nm

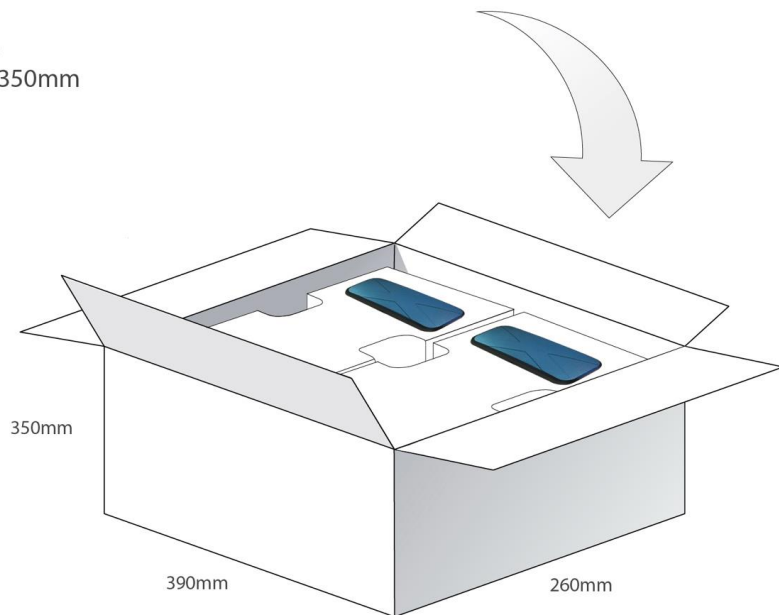
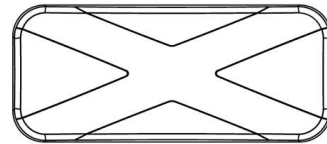
(Torque value obtained with antenna mounted on 1mm thick SUS-316 bracket)

7. Packaging

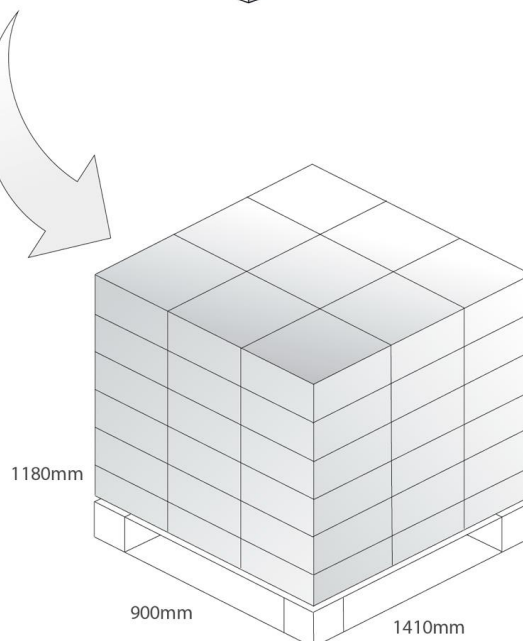
MA413.A.B.003

Packaging Specifications

2 pc MA413.A.B.003 per carton
 Carton Dimensions - 390*260*350mm
 Total Weight - 1.26Kg



Pallet Dimensions 1180*900*1410mm
 54 Cartons per pallet
 9 Cartons per layer
 6 Layers



Changelog for the datasheet

SPE-16-8-013 – MA413.A.B.003

Revision: F (Current Version)

| | |
|------------------|--|
| Date: | 2021-12-03 |
| Changes: | Updated RF Data And Datasheet Template |
| Changes Made by: | Gary West |

Previous Revisions

Revision: E

| | |
|------------------|---------------------|
| Date: | 2019-01-14 |
| Changes: | Updated the drawing |
| Changes Made by: | Jack Conroy |

Revision: D

| | |
|------------------|-----------------------------|
| Date: | 2017-03-30 |
| Changes: | Updated Spec with LTE table |
| Changes Made by: | Andy Mahoney |

Revision: C

| | |
|------------------|---|
| Date: | 2016-12-12 |
| Changes: | Amended dimensions mistake as per Mike's request. |
| Changes Made by: | Andy Mahoney |

Revision: B

| | |
|------------------|--------------------------------------|
| Date: | 2016-11-28 |
| Changes: | Updated CE mark as per request by DC |
| Changes Made by: | Andy Mahoney |

Revision: A (Original First Release)

| | |
|---------|------------------|
| Date: | 2016-03-02 |
| Notes: | |
| Author: | Technical Writer |



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