



PAN62311DM Black



PAN62312DM White

All dimensions are in mm / inches

### Features:

- Supports 2xMIMO Cellular LTE 698-960/1695-2170/2300-2700/2900-3600MHz
- Supports 3xMIMO WiFi and DSRC 2400-2500MHz/4900-5925MHz
- Supports Beidou, GPS, Galileo, GLONASS, Active Satellite Antenna
- Direct Mount and optional Magnetic Mount features
- See GPSMBMM for magnetic mount details

### Applications:

- Telematics
- Location based services
- First Responders(Police, Ambulance, Fire)
- Government
- Energy(Utility Vehicles)
- Fleet Management
- Railroad

Issue: 1833

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For more information:

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Pulse/Larsen Antennas  
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Europe Headquarters  
Pulse GmbH & Co, KG  
Zeppelinstrasse 15  
Herrenberg, Germany  
Tel: 49 7032 7806 0

Pulse (Suzhou) Wireless Products Co, Inc.  
99 Huo Ju Road(#29 Bldg, 4<sup>th</sup> Phase  
Suzhou New District  
Jiangsu Province, Suzhou 215009 PR China  
Tel: 86 512 6807 9998



This document covers all product variants of the following product family

| Model NO.           | PAN62311DM                                                        | PAN62312DM                                    | PAN62311DMR                                                         | PAN62312DMR                                                         |
|---------------------|-------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
| Color               | Black                                                             | White                                         | Black                                                               | White                                                               |
| Cable NO.           | 6                                                                 | 6                                             | 6                                                                   | 6                                                                   |
| Operating Bands     | 2-LTE+<br>3WiFi+<br>1-GPS/GNSS                                    | 2-LTE+<br>3WiFi+<br>1-GPS/GNSS                | 2-LTE+<br>3WiFi+<br>1-GPS/GNSS                                      | 2-LTE+<br>3WiFi+<br>1-GPS/GNSS                                      |
| LET/WiFi Cable Type | RG58(Black)                                                       | RG58(White)                                   | RG58HT(Black)                                                       | RG58HT(White)                                                       |
| GPS Cable Type      | RG174(Black)                                                      | RG174(White)                                  | RG174HT(Black)                                                      | RG174HT(White)                                                      |
| Cable length        | 17FT                                                              | 17FT                                          | 17FT                                                                | 17FT                                                                |
| Connector           | LTE: SMA(M)<br>WiFi: RP-SMA(M)<br>GPS: SMA(M)                     | LTE: SMA(M)<br>WiFi: RP-SMA(M)<br>GPS: SMA(M) | LTE: SMA(M)<br>WiFi: RP-SMA(M)<br>GPS: SMA(M)                       | LTE: SMA(M)<br>WiFi: RP-SMA(M)<br>GPS: SMA(M)                       |
| Assembly option     | 1.Assembly directly with nut<br>2.Magnetic mount base P/N:GPSMBMM |                                               |                                                                     |                                                                     |
| Remark              |                                                                   |                                               | Compliant with EN 50155, EN 61373, EN45545-2, Railroad application. | Compliant with EN 50155, EN 61373, EN45545-2, Railroad application. |

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|                                  |                                                        |                 |
|----------------------------------|--------------------------------------------------------|-----------------|
| Frequency (2XLTE)                | 698 - 960 / 1695 – 2170 /<br>2300 - 2700 / 2900 – 3600 | MHz             |
| Frequency (3XWiFi&DSRC)          | 2400 – 2500/<br>4900 – 5925                            | MHz             |
| Frequency (1XGNSS)               | 1561.098±2.046/<br>1575.42±1.023/<br>1602.5625±4       | MHz             |
| Nominal Impedance                | 50                                                     | $\Omega$        |
| VSWR** (LTE)                     | < 1.5                                                  |                 |
| VSWR** (WiFi&DSRC)               | < 1.4                                                  |                 |
| Gain* (LTE antenna, < 2170 MHz)  | 4                                                      | dBi ± 2.5 dB    |
| Gain* (LTE antenna, > 2170 MHz)  | 5                                                      | dBi ± 2 dB      |
| Gain* (WiFi antenna, < 2500 MHz) | 4.5                                                    | dBi ± 1.5 dB    |
| Gain* (WiFi antenna, > 4900 MHz) | 5                                                      | dBi ± 2 dB      |
| Isolation LTE to LTE **          | 15 or better                                           | dB              |
| Isolation WiFi to WiFi **        | 25 or better                                           | dB              |
| GNSS antenna RHCP gain           | 1                                                      | dBic ± 2 dB     |
| LNA gain                         | 30                                                     | dB ± 2 dB       |
| Noise Figure                     | 2.5 (cascade)                                          | dB              |
| Current                          | 9                                                      | mA ± 2 mA       |
| V <sub>dc</sub>                  | 3-5                                                    | V <sub>dc</sub> |
| LNA and filter attenuation       |                                                        |                 |
|                                  | @ 824 MHz                                              | 70 dB           |
|                                  | @ 960 MHz                                              | 65 dB           |
|                                  | @ 1710 MHz                                             | 60 dB           |
|                                  | @ 2170 MHz                                             | 65 dB           |

\*Measured on 2ft GND plane and with 4 inch cables

\*\*In free space with 17ft cables

**Series: Panther**

**TECHNICAL DATA SHEET**  
**Description: 2xMiMo LTE, 3xMiMo WiFi,  
GNSS Vehicle Mount Antenna**  
**PART NUMBER: PAN62311DM, PAN62312DM,  
PAN62311DMR, PAN62312DMR**

### MECHANICAL SPECIFICATIONS

|                                          |                                                                                                                        |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Plastic radome for PAN62311DM/PAN62312DM | ABS/PC Material UV Stabilized, UL-94HB                                                                                 |
| for PAN62311DMR/PAN62312DMR              | PC material, EN45545 R6 HL3 compliant                                                                                  |
| Color                                    | Black, White                                                                                                           |
| Ingress Protection                       | IP67                                                                                                                   |
| Weight                                   | ~1540 g                                                                                                                |
| Fixing system                            | Roof mounting (Also Magnet mounting accessory available, GPSMBMM)<br>Recommended fastening torque 1518ft-lb (20-25Nm). |

### ENVIRONMENTAL SPECIFICATIONS

|                       |                                                     |
|-----------------------|-----------------------------------------------------|
| Operating temperature | MIL-STD 810G -40/+85° C                             |
| Humidity              | 95%RH @ +25°C for 12h and 55°C for 12h              |
| Vibration             | MIL-STD 810G, section 514.6 , 5-500 Hz, 60min/axis  |
| Thermal Shocks        | MIL-STD 810G, section 503.5, -40 to +85°C, 3 cycles |
| Drop Test             | Minimum of one drop per axis – 4, 1 meter drops     |

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Description: 2xMiMo LTE, 3xMiMo WiFi,  
GNSS Vehicle Mount Antenna

PART NUMBER: PAN62311DM, PAN62312DM,  
PAN62311DMR,PAN62312DMR

### Tests for railroad certification per EN50155, EN61373, EN45545-2

| NO | T SN IN STAND | TEST DESCRIPTION                                                         | REFER STANDARD     | TEST REPORT NO  | RESULT(PASS/FAIL) |
|----|---------------|--------------------------------------------------------------------------|--------------------|-----------------|-------------------|
| 1  | 12.2.3        | Cooling test                                                             | EN 50155           | DD20170919002   | PASS              |
| 2  | 12.2.4        | Dry heat test                                                            |                    |                 |                   |
| 3  | 12.2.5        | Damp heat test, cyclic                                                   |                    |                 |                   |
| 4  | 12.2.6        | Supply overvoltages                                                      | EN 50155           | W01714200900E   | PASS              |
| 5  | 12.2.7        | Surges, electrostatic discharge and transient burst susceptibility tests | EN 50155           | E1710056-01E    | PASS              |
| 6  | 12.2.8        | Radio interference                                                       |                    |                 |                   |
| 7  | 12.2.9        | Insulation test                                                          | EN 50155           | E17110014-01E   | PASS              |
| 8  | 12.2.10       | Salt mist test                                                           | EN 50155           | DD20170919002   | PASS              |
| 9  | 12.2.11       | Vibration                                                                | EN 61373           |                 |                   |
|    |               | Shock, and bump test                                                     | EN 61373           |                 |                   |
| 10 | 12.2.12       | Watertightness test                                                      | EN 50155           |                 |                   |
| 11 | 12.2.14       | Low temperature storage test                                             | EN 50155           | TC 18 02 000528 | HL1&HL2           |
| 12 | /             | fire & smoke                                                             | EN 45545-2 R15&R16 |                 |                   |
|    |               |                                                                          | EN 45545-2 R15&R16 | TC.18.04.001633 | HL1&HL2&HL3       |

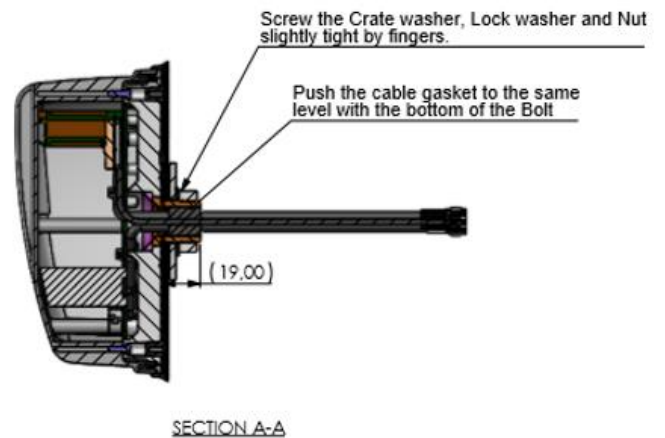
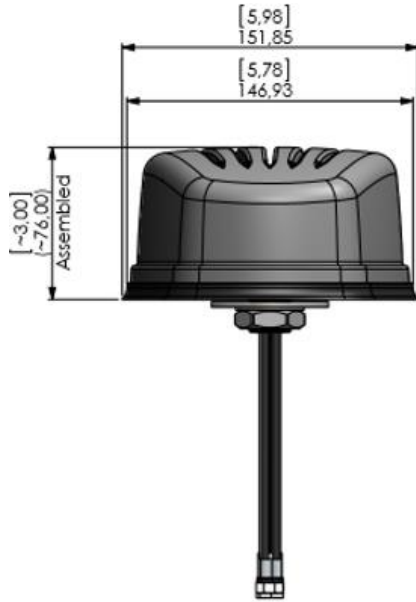
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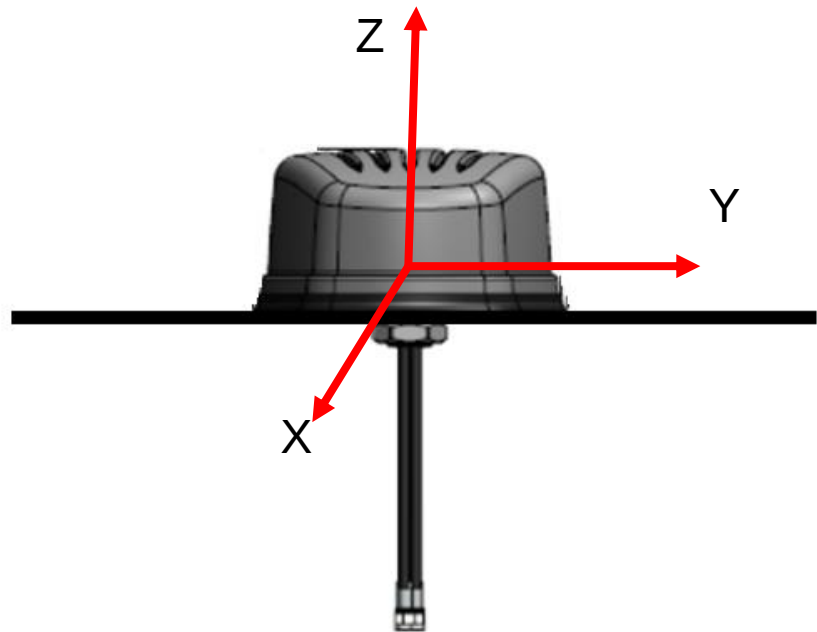
## MECHANICAL DRAWING



TEST SETUP



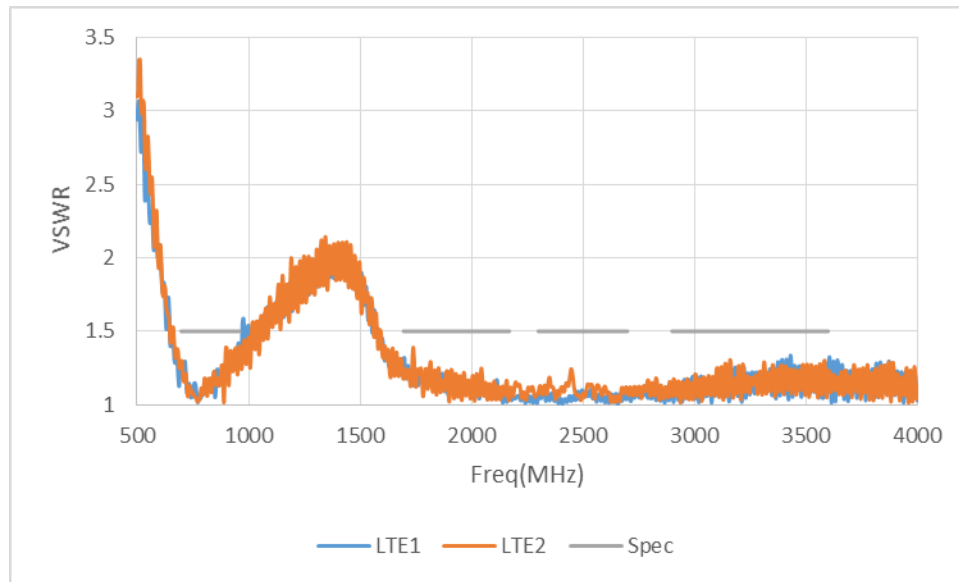
For VSWR, test in free space with 17ft cables



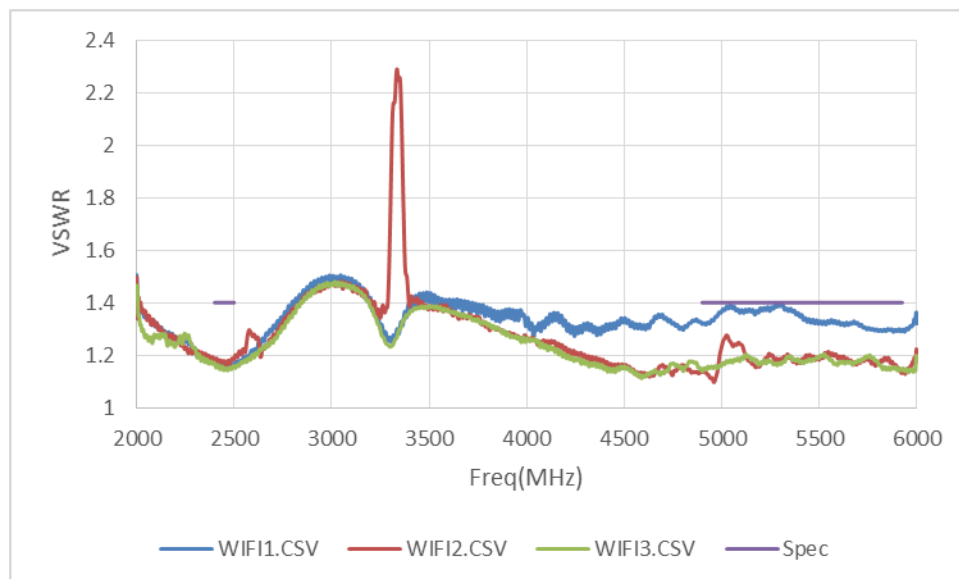
For radiation performance, test on 2ft GND plane with 4inch cables

## CHARTS

### VSWR of LTE antenna

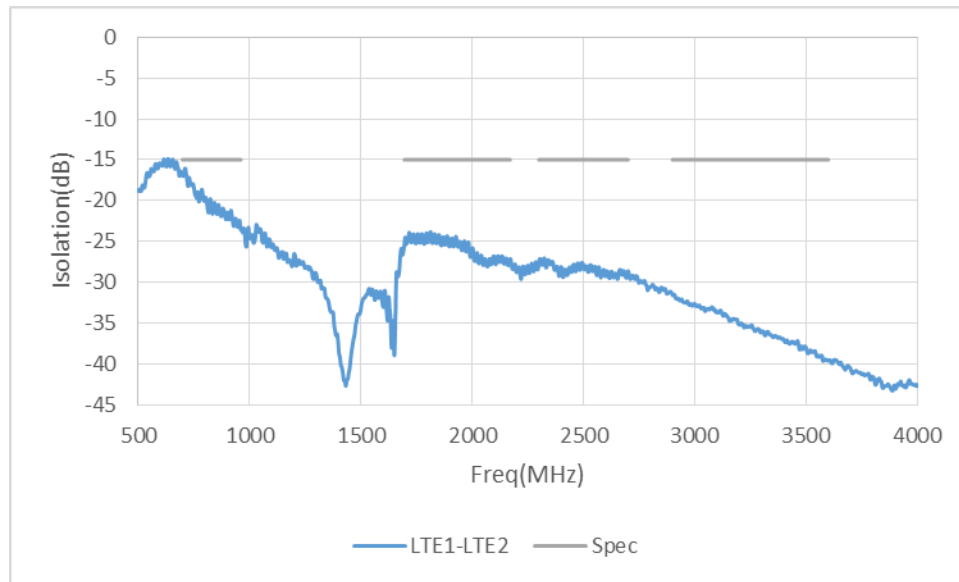


### VSWR of WiFi antenna

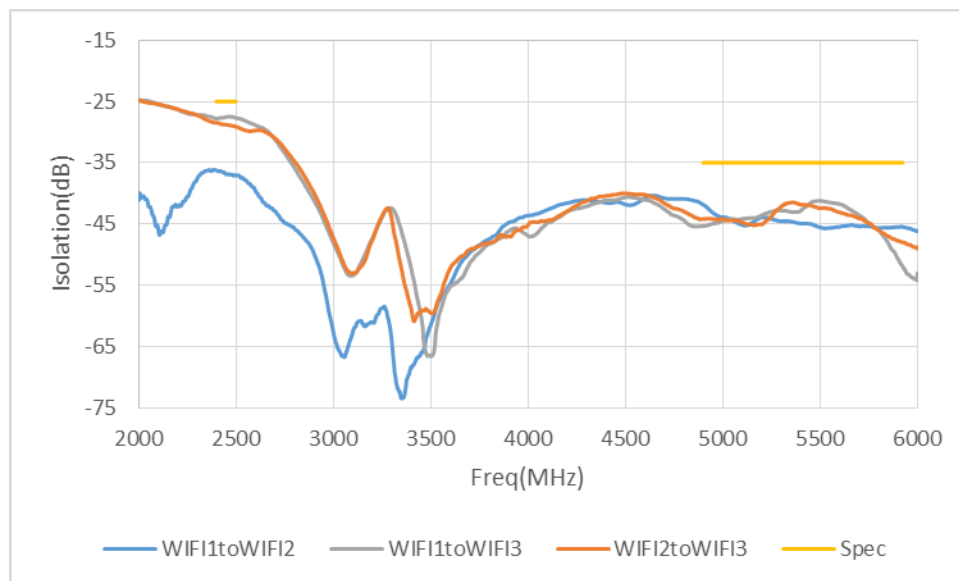


## CHARTS

### Isolation of LTE antenna

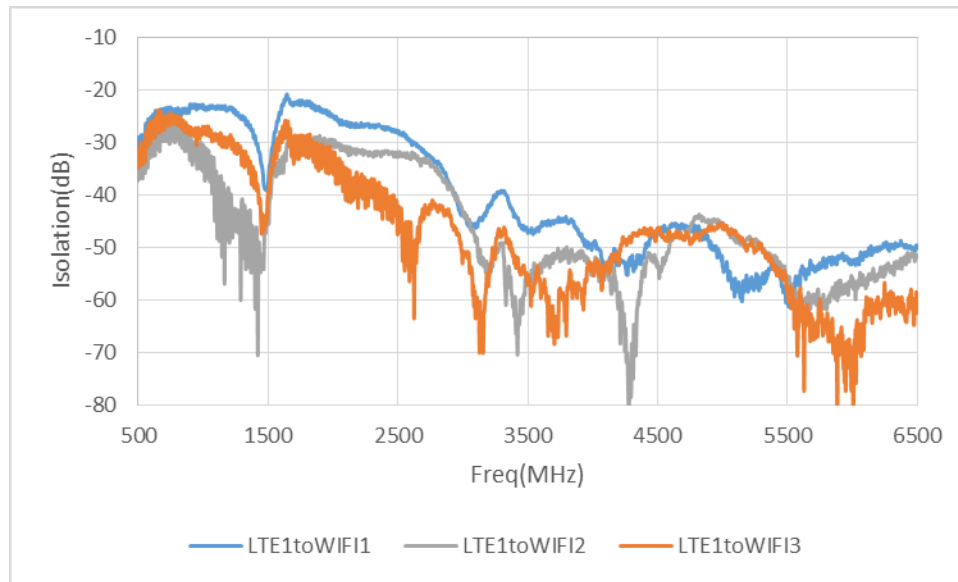


### Isolation of WiFi antenna

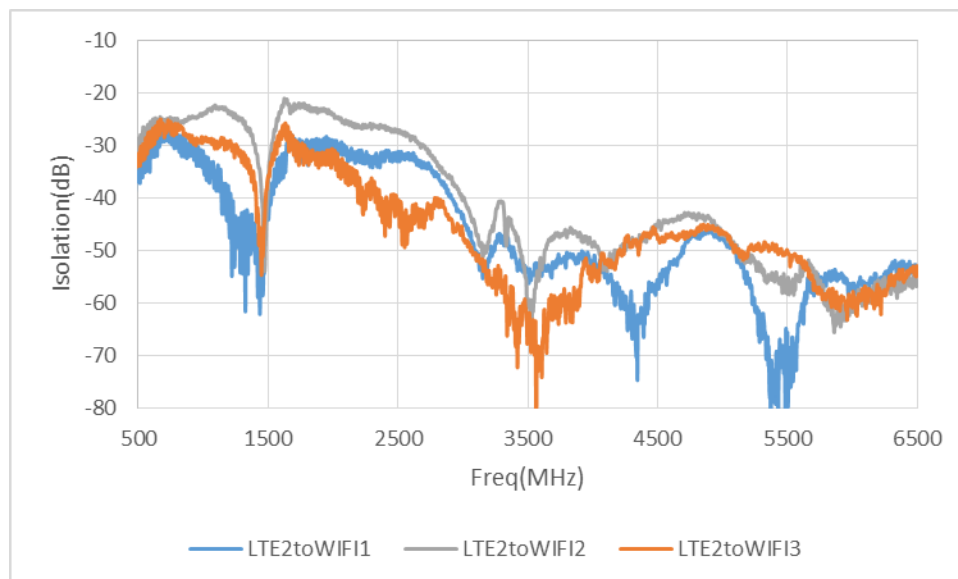


## CHARTS

### Isolation of LTE1 antenna to WiFi antenna



### Isolation of LTE2 antenna to WiFi antenna

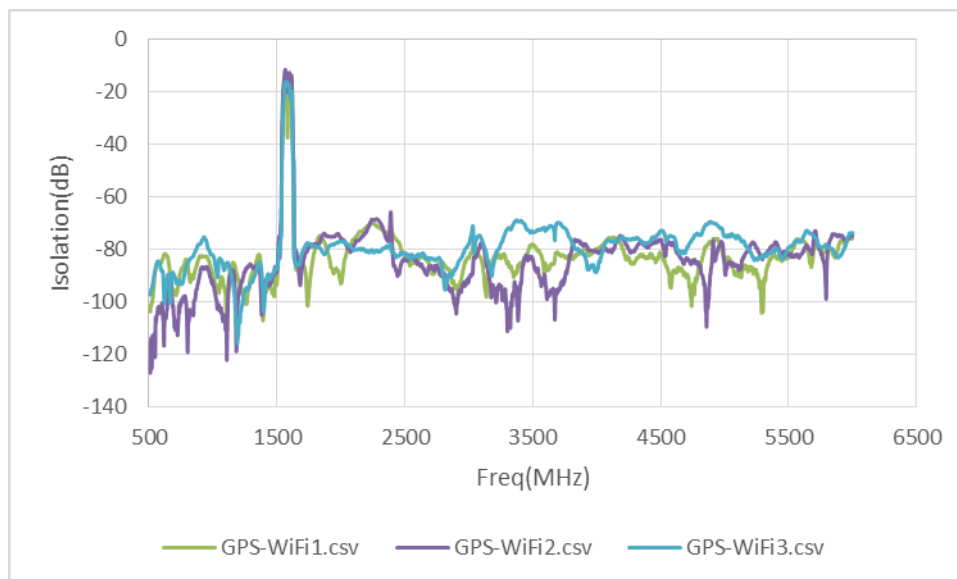


## CHARTS

### Isolation of GNSS antenna to LTE antenna

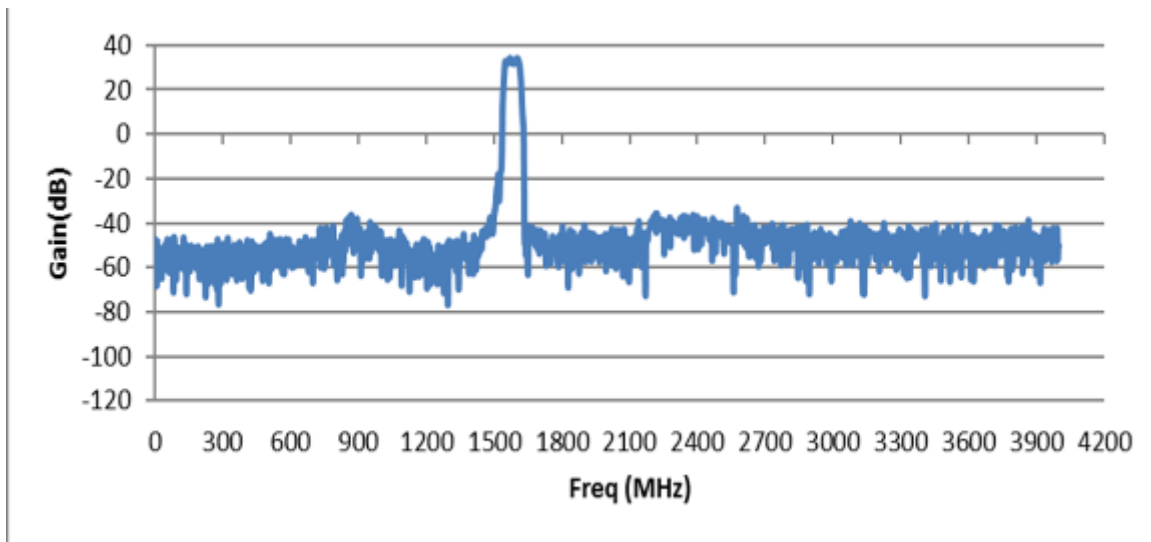


### Isolation of GNSS antenna to WiFi antenna



## CHARTS

### GNSS LNA performance

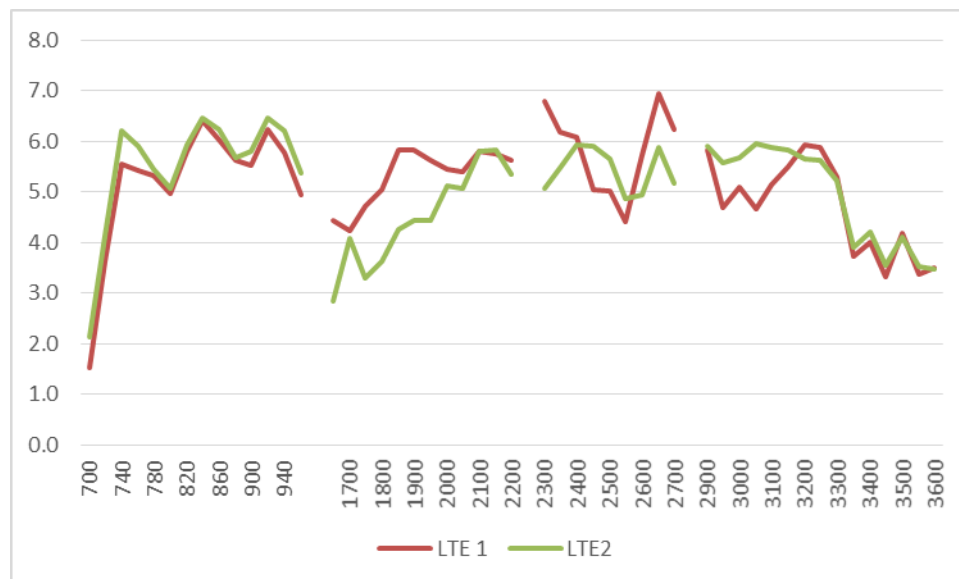


## CHARTS

### LTE antenna total efficiency on ground plane\*\*

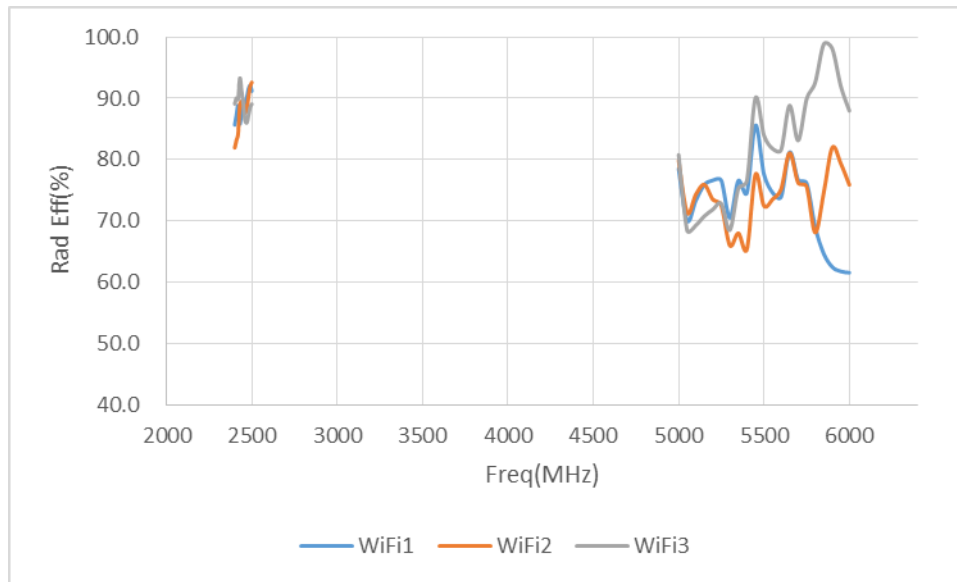


### Maximum 3D gain, LTE antenna on ground plane\*\*

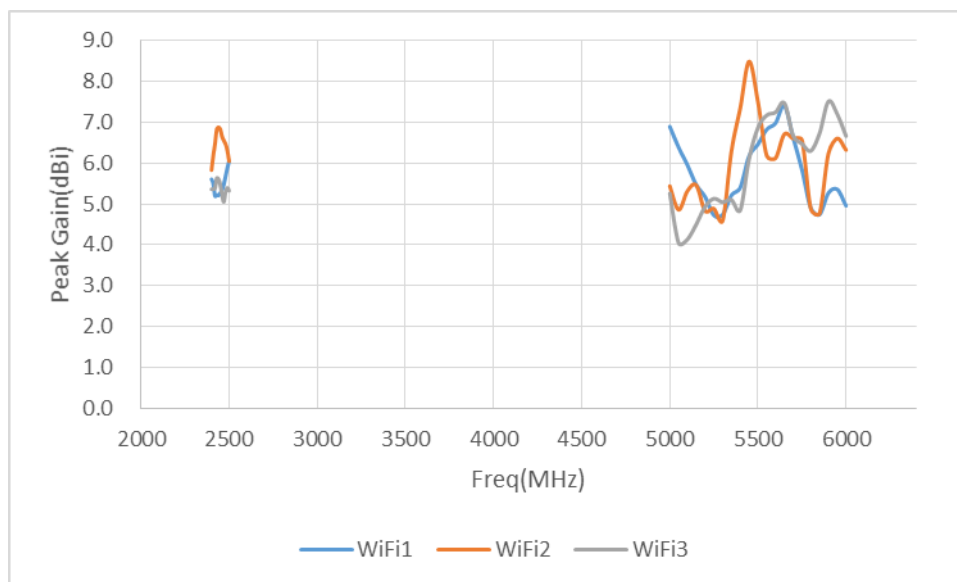


## CHARTS

### WiFi antenna total efficiency on ground plane\*\*

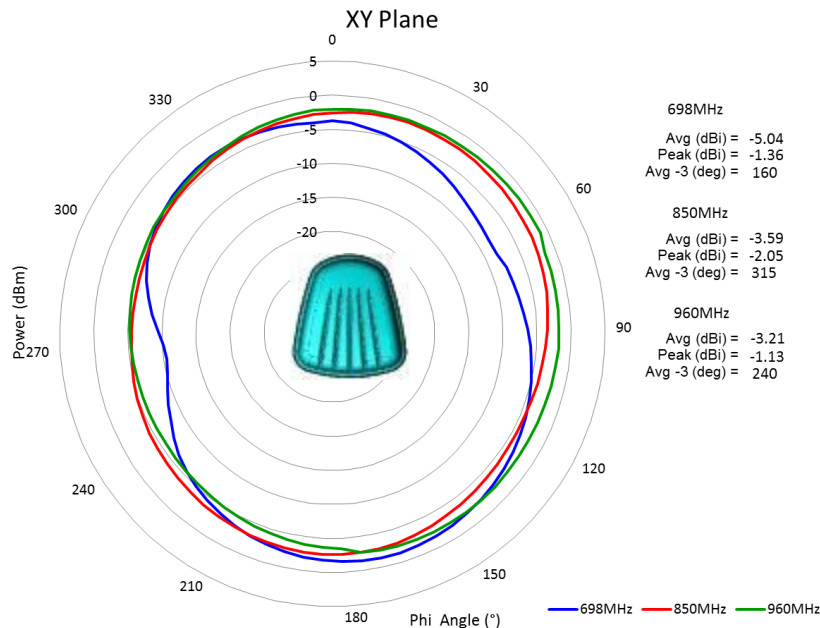


### Maximum 3D gain, WiFi antenna on ground plane\*\*

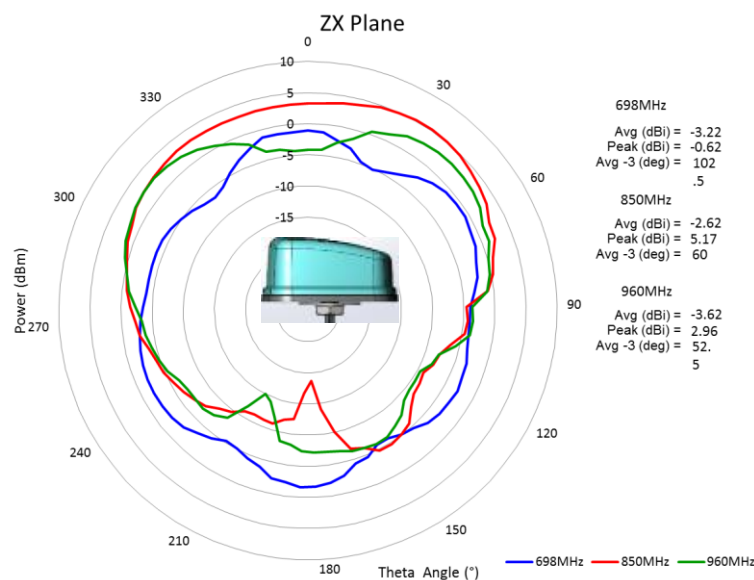


## CHARTS

### LTE1 antenna X-Y plane radiation pattern at LTE low band\*\*

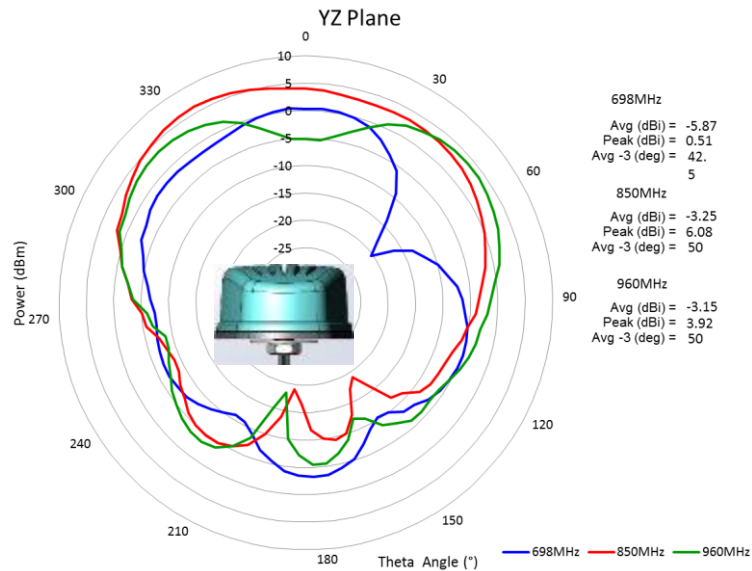


### LTE1 antenna Z-X plane radiation pattern at LTE low band\*\*



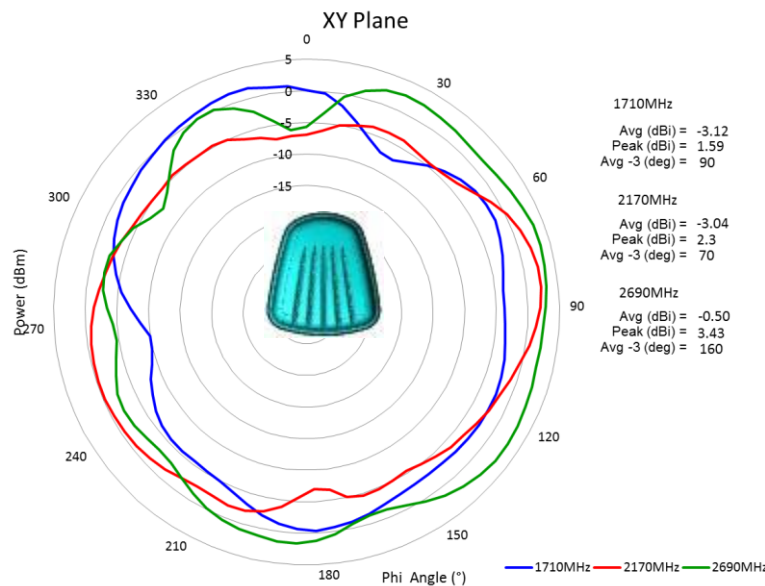
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### LTE1 antenna Y-Z plane radiation pattern at LTE low band\*\*

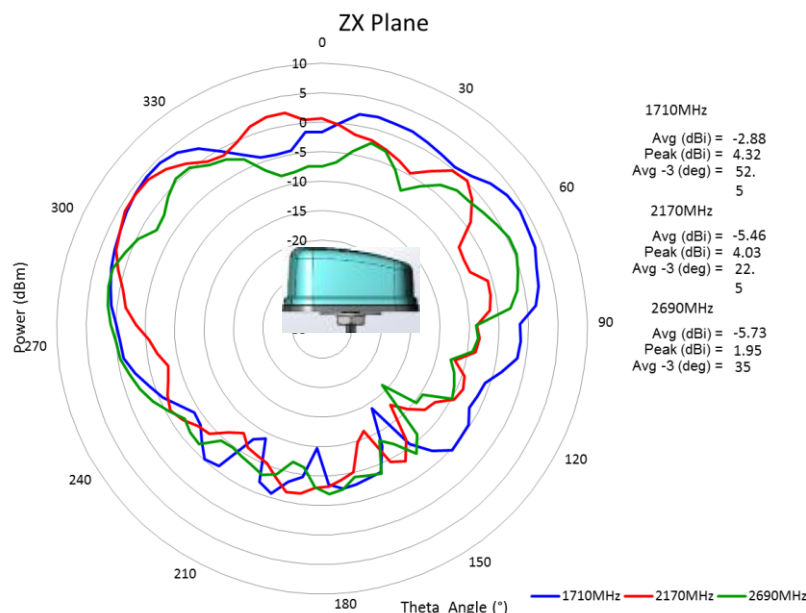


## CHARTS

### LTE1 antenna X-Y plane radiation pattern at LTE high band\*\*

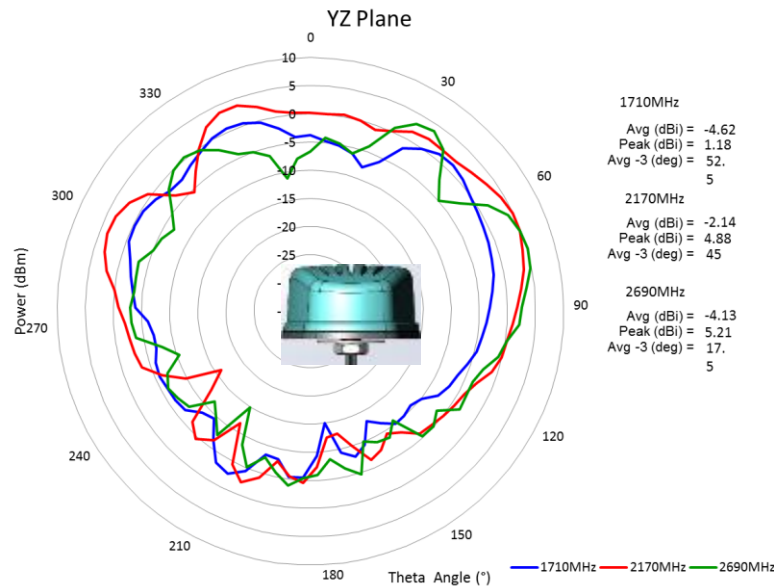


### LTE1 antenna Z-X plane radiation pattern at LTE high band\*\*



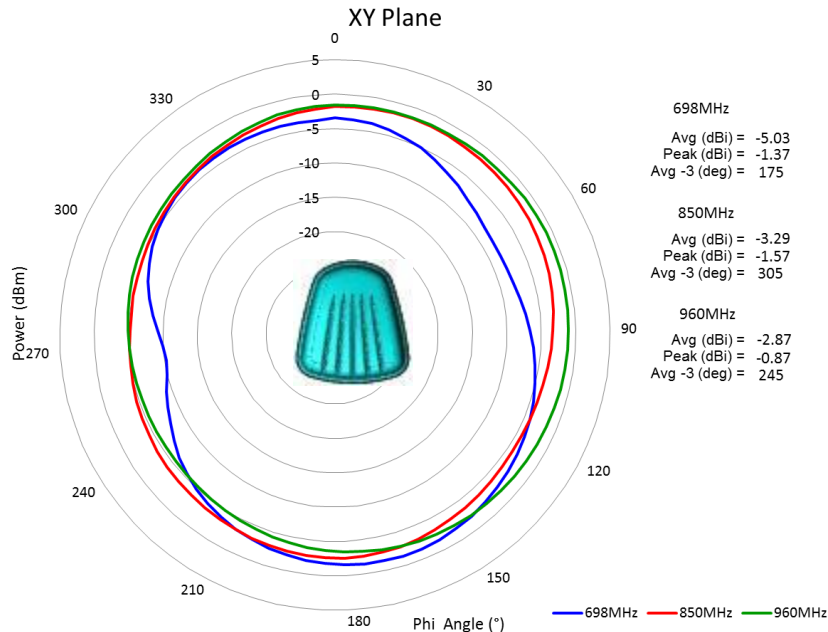
## CHARTS

### LTE1 antenna Y-Z plane radiation pattern at LTE high band\*\*

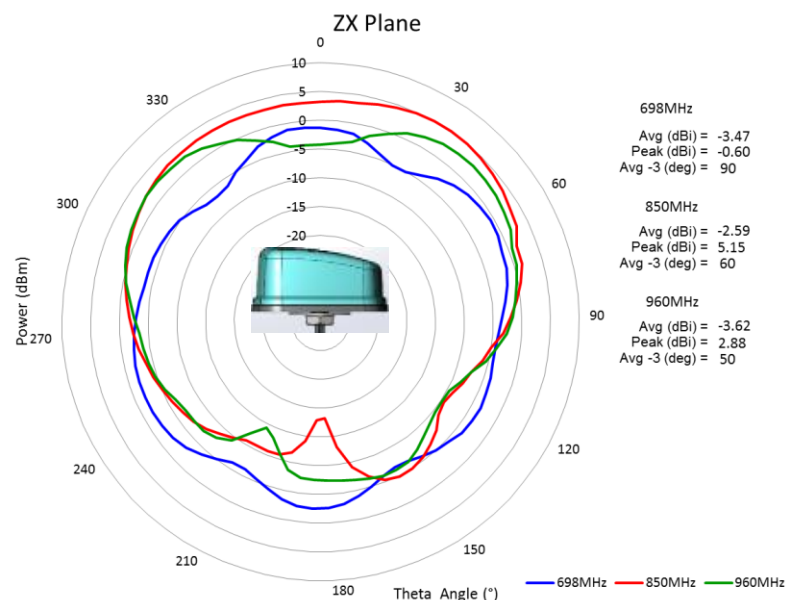


## CHARTS

### LTE2 antenna X-Y plane radiation pattern at LTE low band\*\*



### LTE2 antenna Z-X plane radiation pattern at LTE low band\*\*



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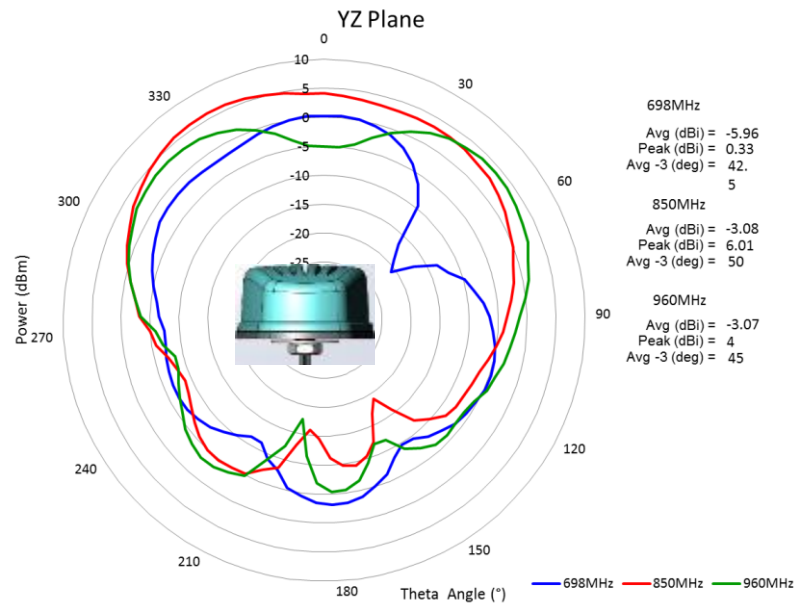
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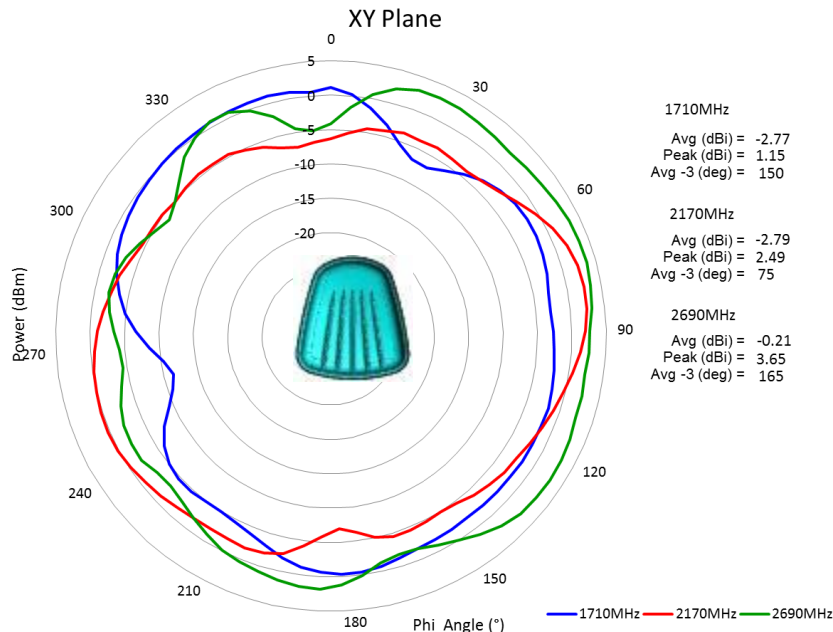
## CHARTS

### LTE2 antenna Y-Z plane radiation pattern at LTE low band\*\*

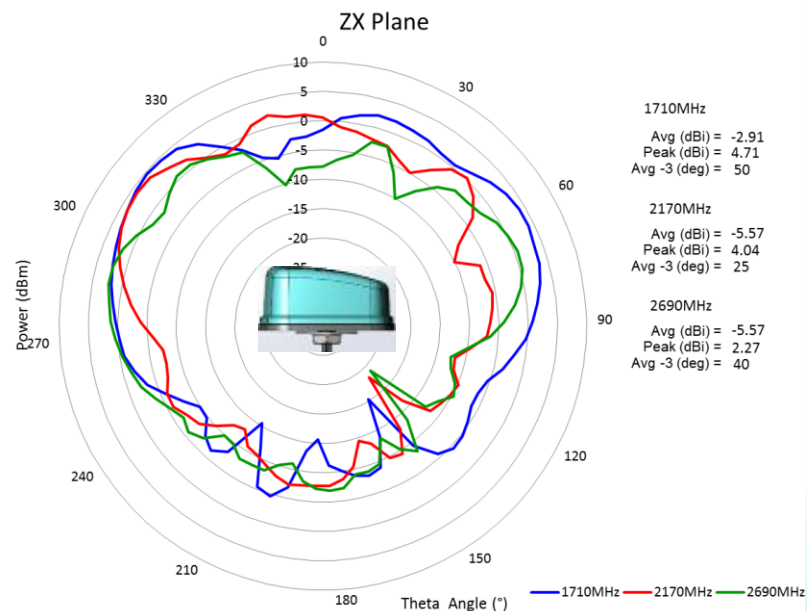


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### LTE2 antenna X-Y plane radiation pattern at LTE high band\*\*

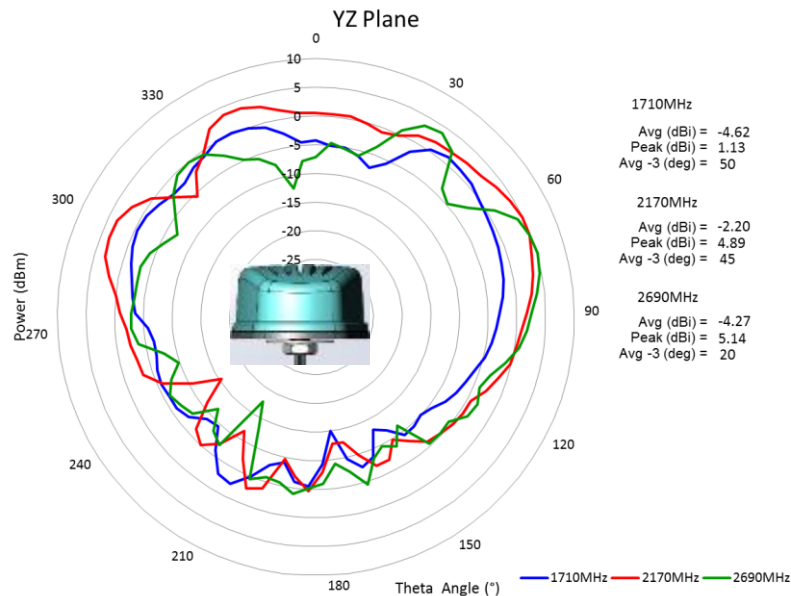


### LTE2 antenna Z-X plane radiation pattern at LTE high band\*\*



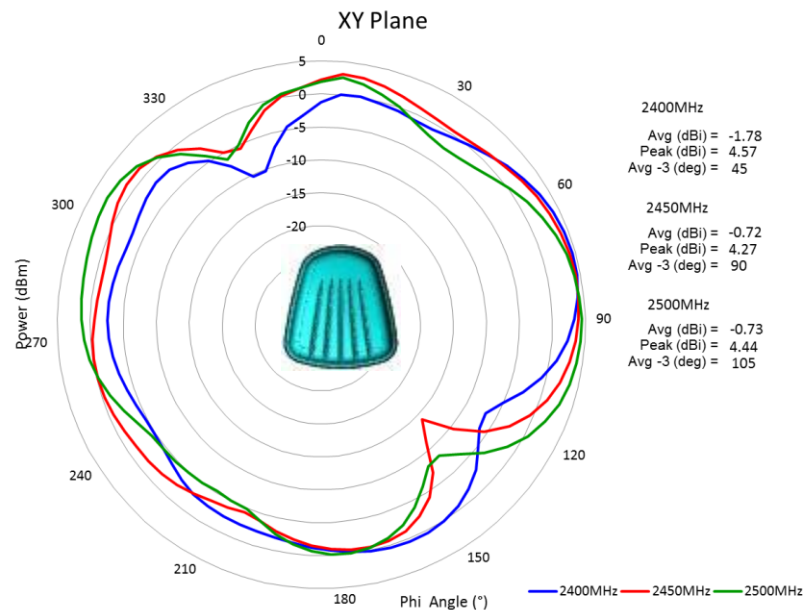
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### LTE2 antenna Y-Z plane radiation pattern at LTE high band\*\*

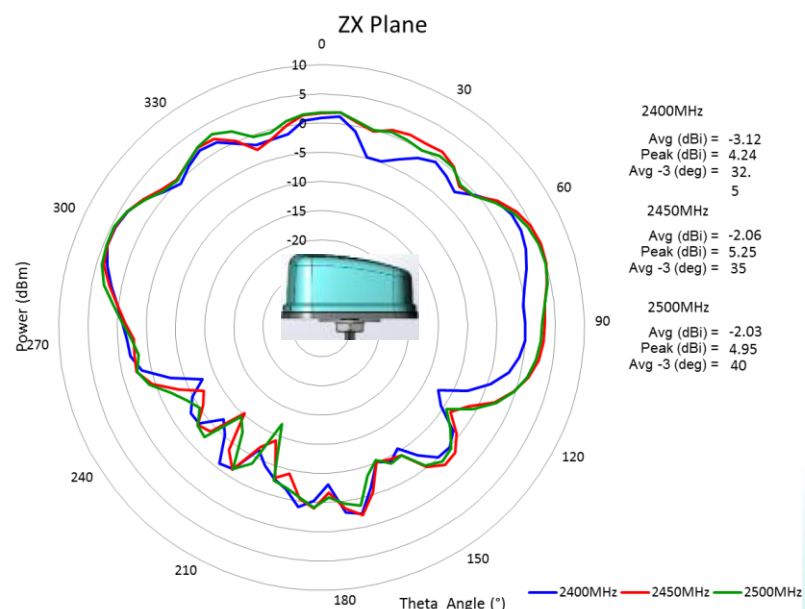


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### WiFi1 antenna X-Y plane radiation pattern at WiFi low band\*\*

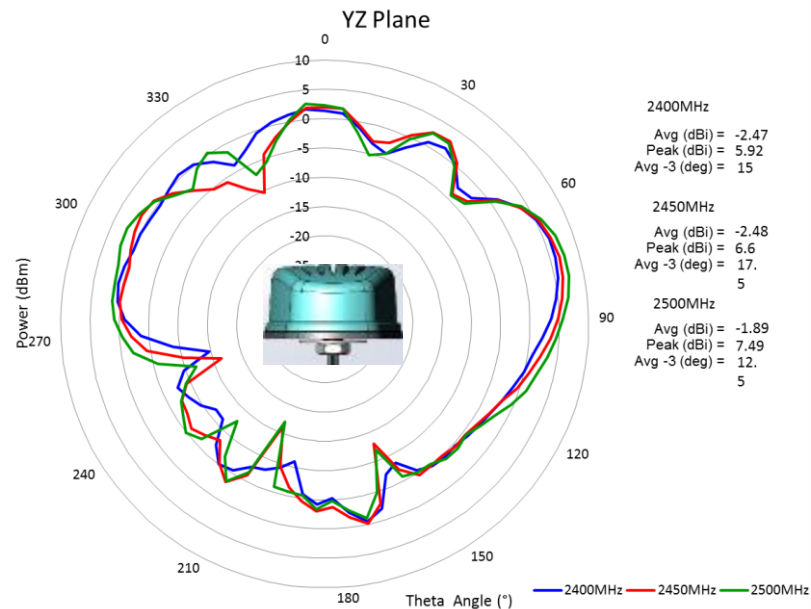


### WiFi1 antenna Z-X plane radiation pattern at WiFi low band\*\*



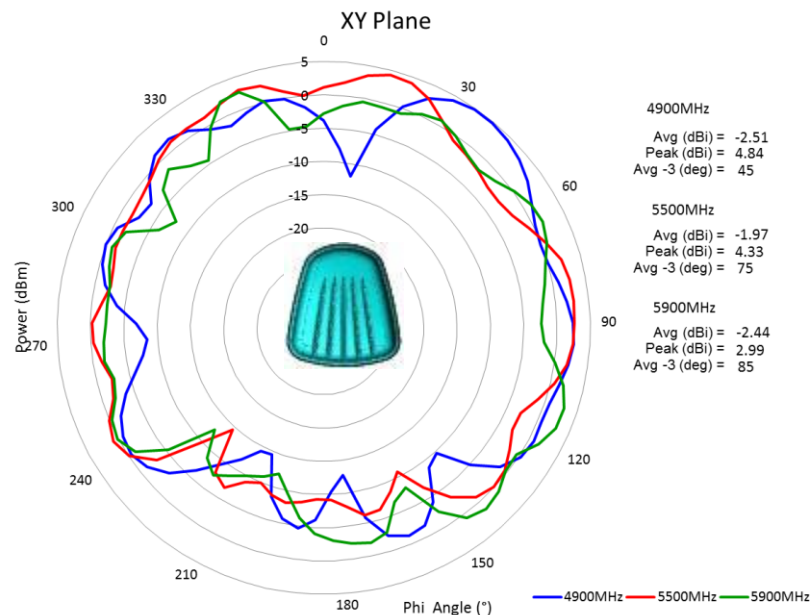
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### WiFi1 antenna Y-Z plane radiation pattern at WiFi low band\*\*

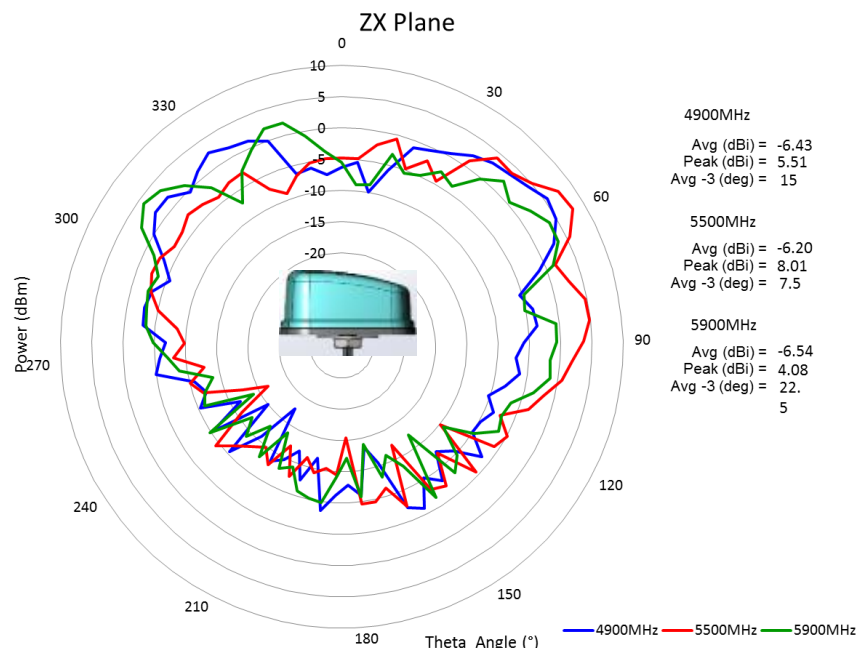


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### WiFi1 antenna X-Y plane radiation pattern at WiFi high band\*\*



### WiFi1 antenna Z-X plane radiation pattern at WiFi high band\*\*



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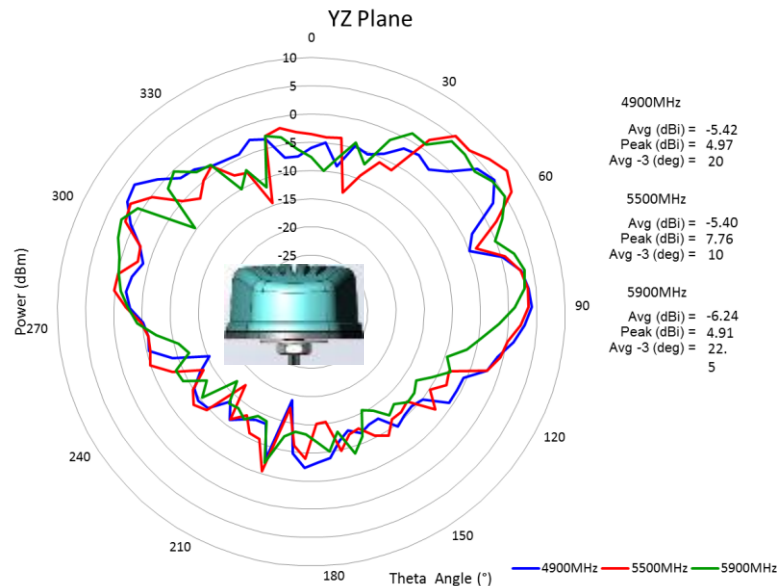
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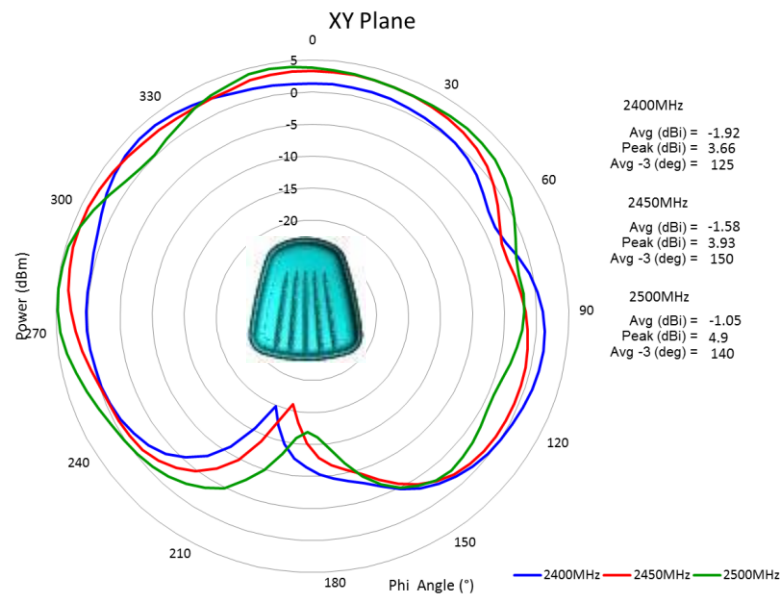
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### WiFi1 antenna Y-Z plane radiation pattern at WiFi high band\*\*

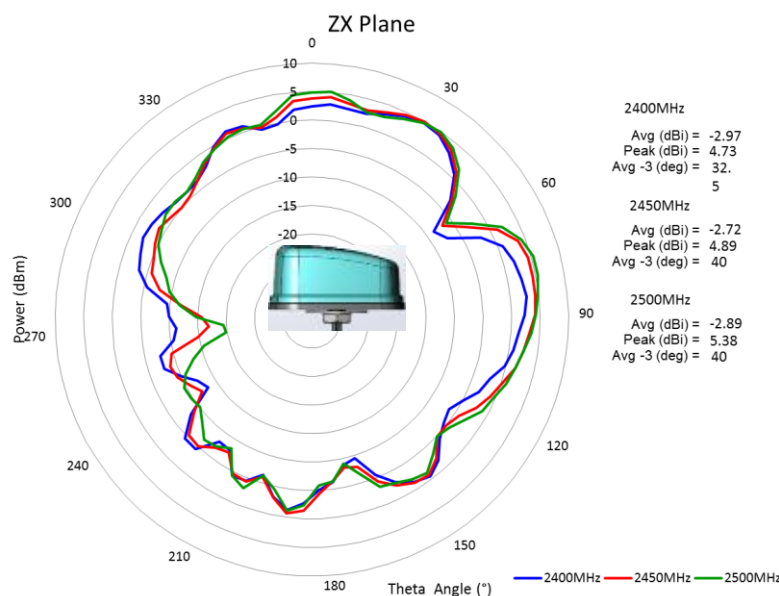


## CHARTS

### WiFi2 antenna X-Y plane radiation pattern at WiFi low band\*\*

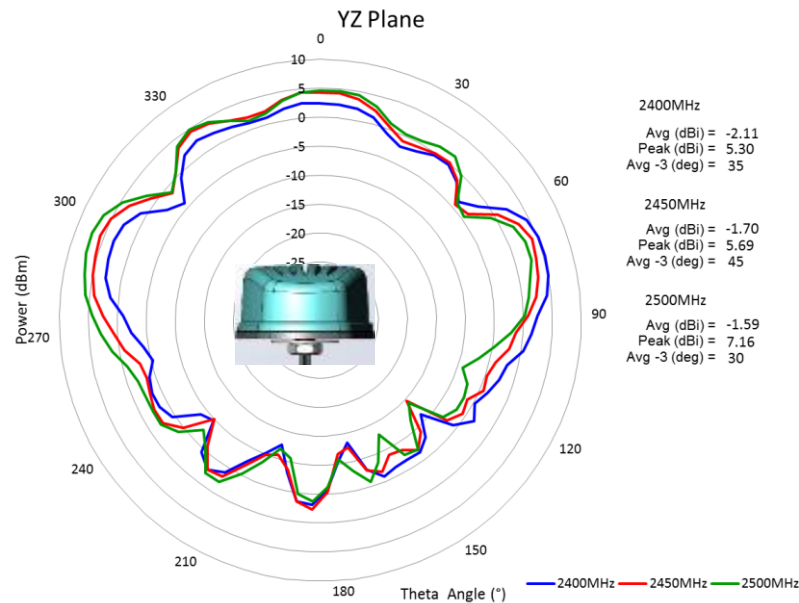


### WiFi2 antenna Z-X plane radiation pattern at WiFi low band\*\*



## CHARTS

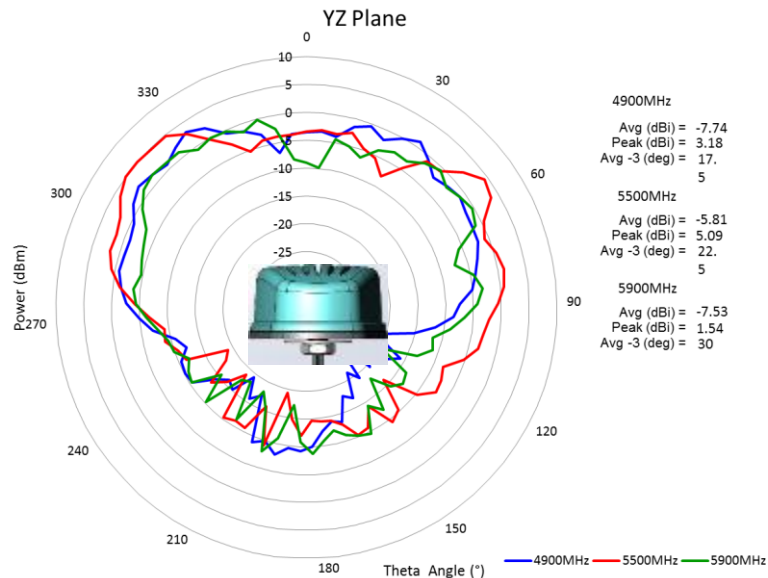
### WiFi2 antenna Y-Z plane radiation pattern at WiFi low band\*\*





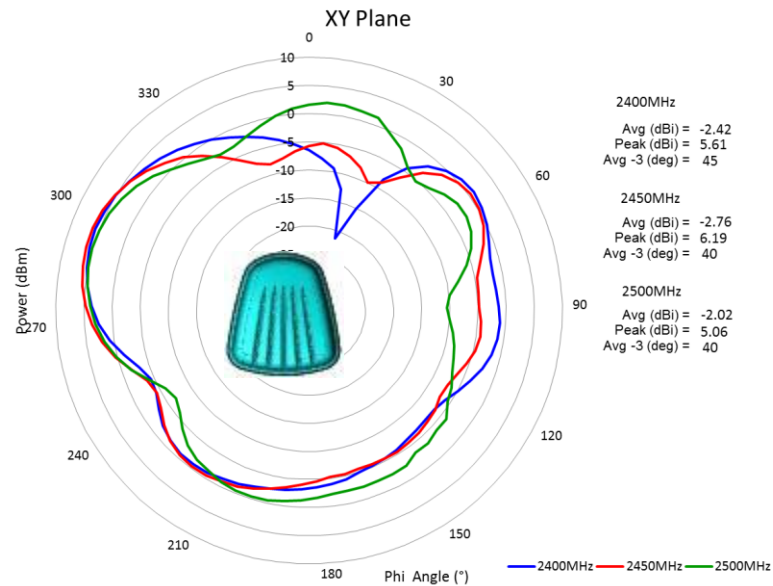
## CHARTS

### WiFi2 antenna Y-Z plane radiation pattern at WiFi high band\*\*

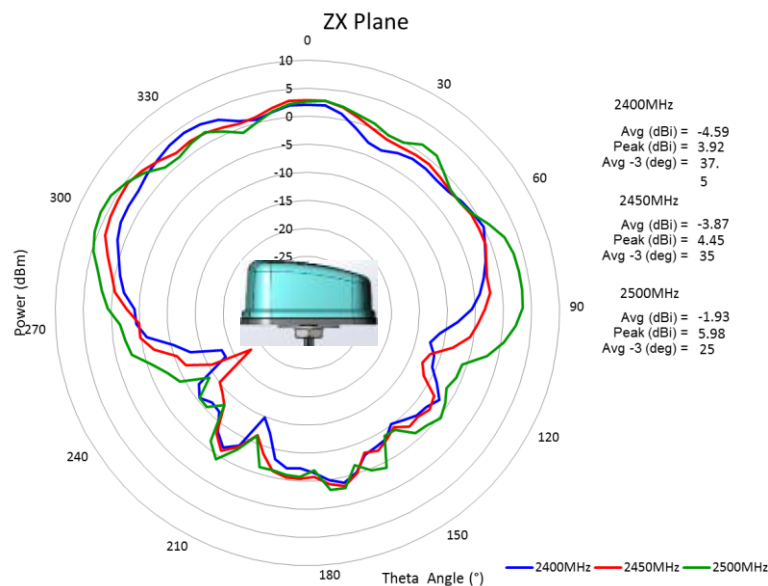


## CHARTS

### WiFi3 antenna X-Y plane radiation pattern at WiFi low band\*\*

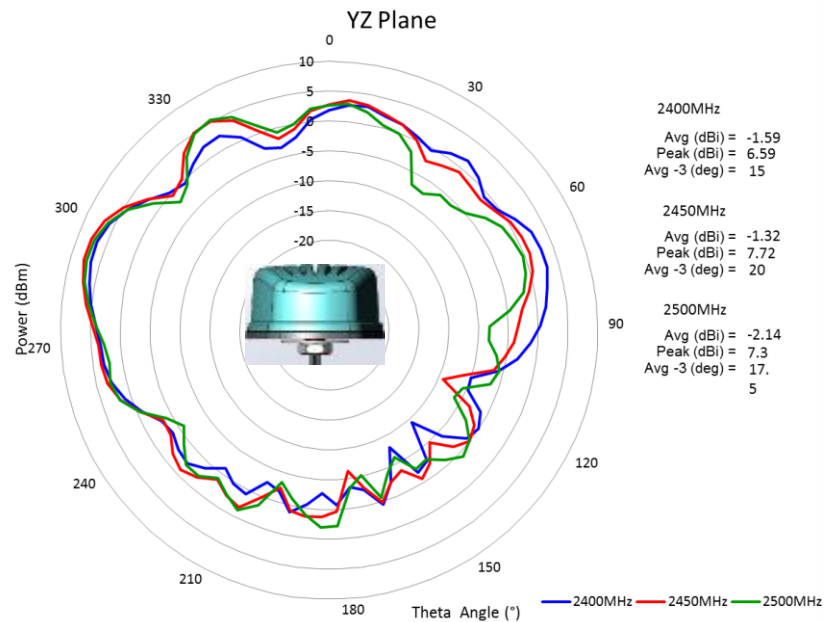


### WiFi3 antenna Z-X plane radiation pattern at WiFi low band\*\*



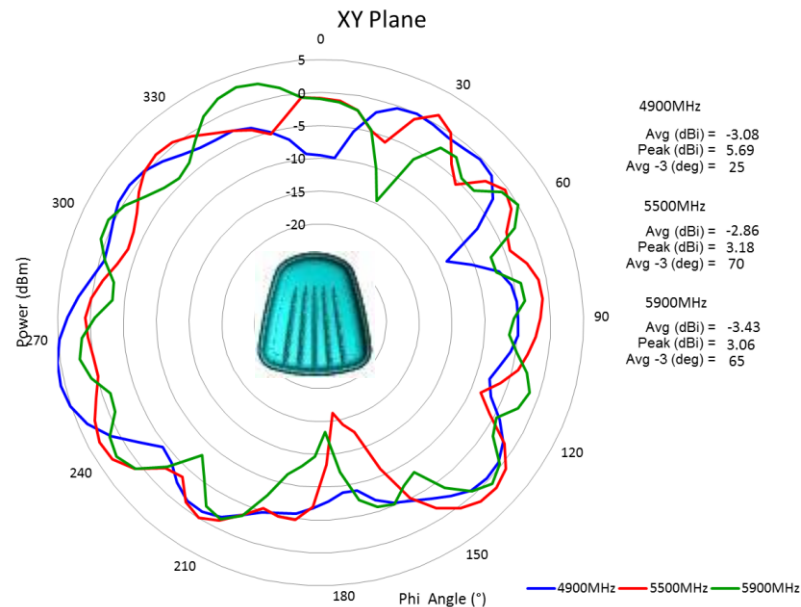
## CHARTS

### WiFi3 antenna Y-Z plane radiation pattern at WiFi low band\*\*

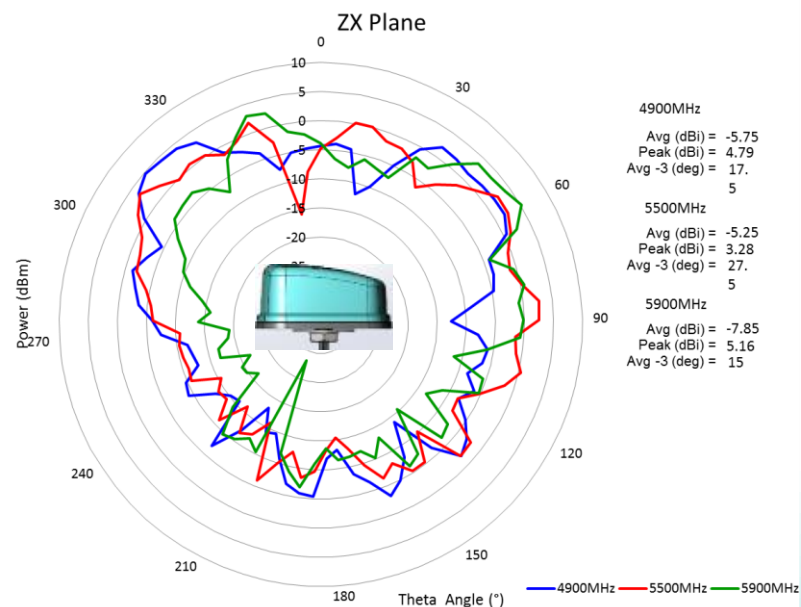


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### WiFi3 antenna X-Y plane radiation pattern at WiFi high band\*\*

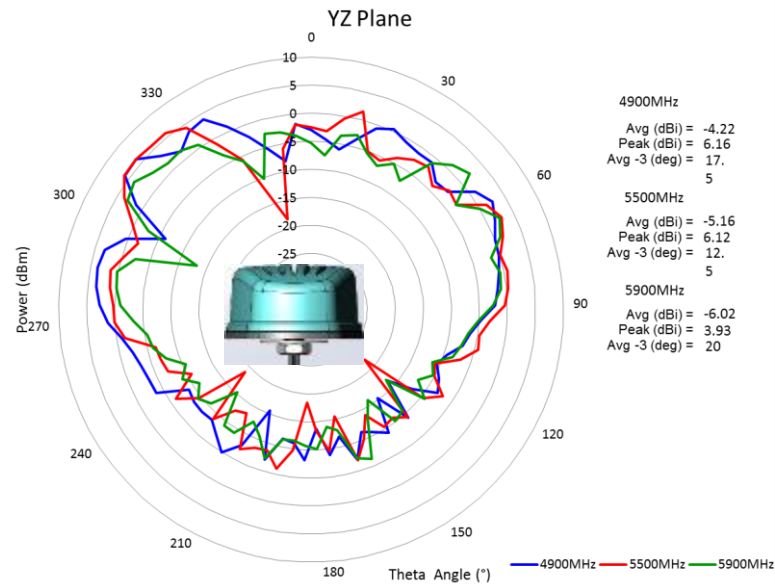


### WiFi3 antenna Z-X plane radiation pattern at WiFi high band\*\*



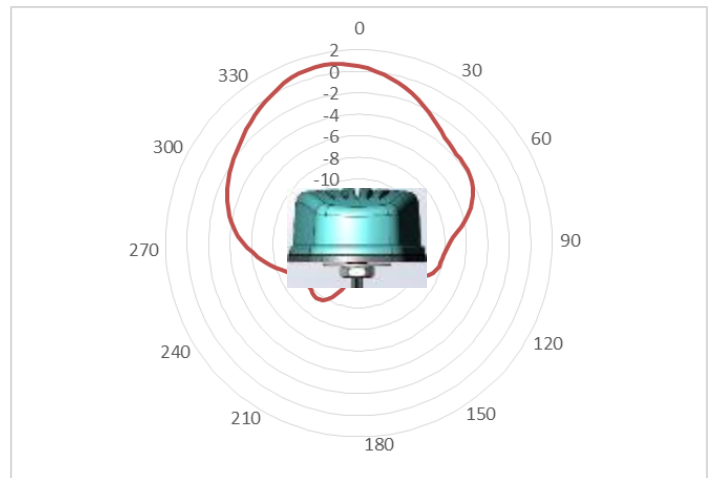
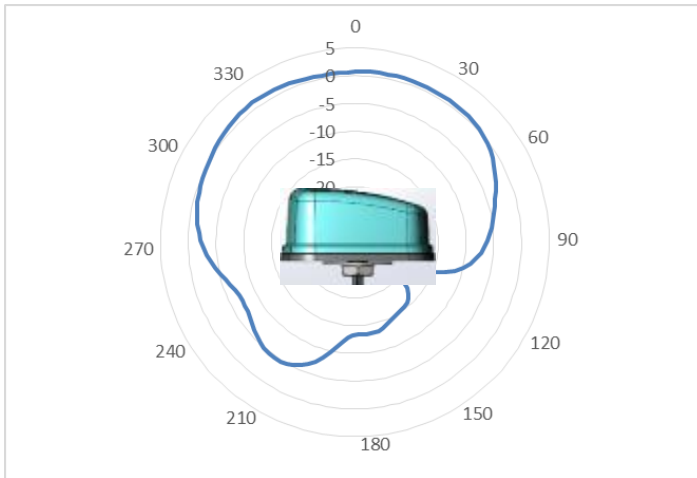
## CHARTS

### WiFi3 antenna Y-Z plane radiation pattern at WiFi high band\*\*

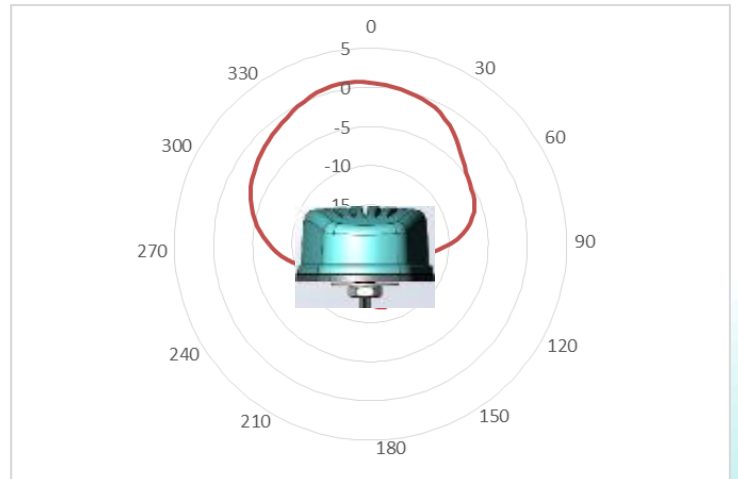
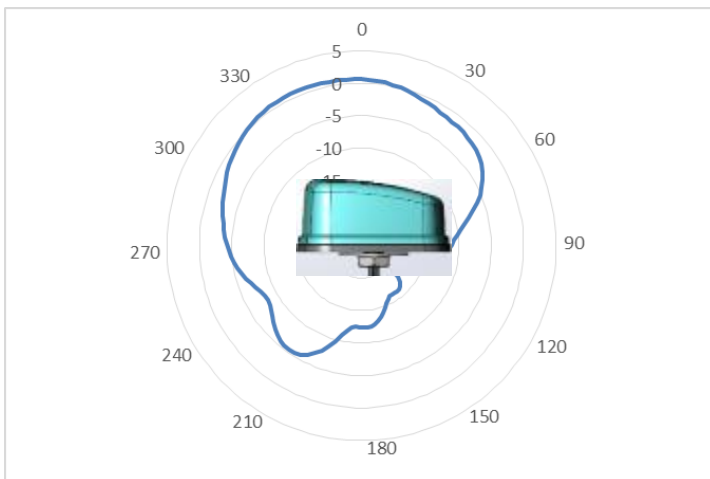


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### GNSS antenna, BD2 RHCP patterns, in free space\*

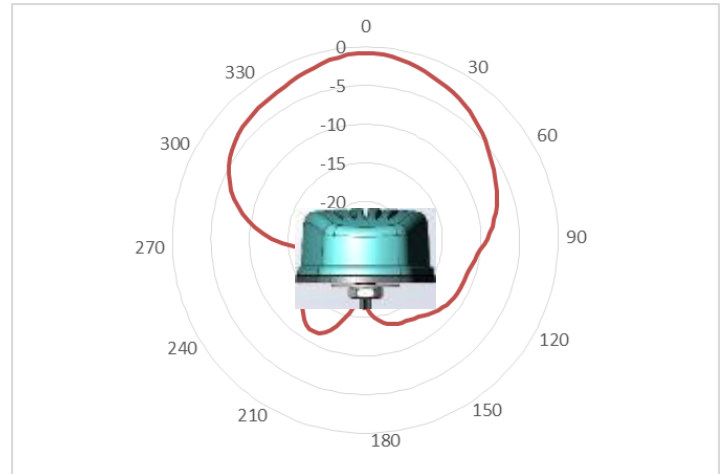
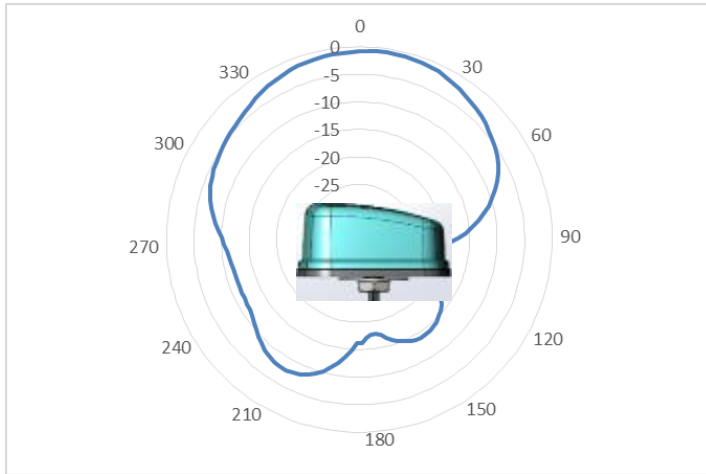


### GNSS antenna, GPS & Galileo RHCP patterns, in free space\*



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GNSS antenna, GLONASS RHCP patterns, in free space\*



**Series: Panther**

**TECHNICAL DATA SHEET**

**Description: 2xMiMo LTE, 3xMiMo WiFi,  
GNSS Vehicle Mount Antenna**

**PART NUMBER: PAN62311DM, PAN62312DM,  
PAN62311DMR, PAN62312DMR**

**PACKAGING**

One antenna pack in one PE bag, 6 antennas in one box

Issue: 1833

In the effort to improve our products, we reserve the right to make changes judged to be necessary.

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