# PANL-401

POYNTING
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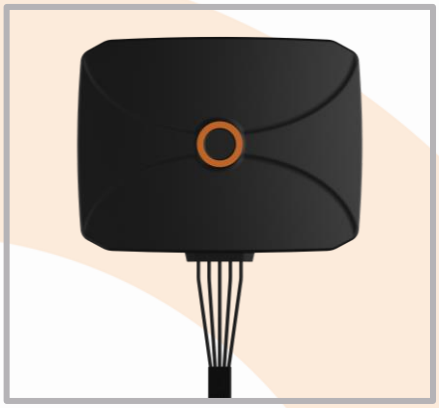
**ANTENNAS | PANL-401 SERIES**

## 5-IN-1 OMNI-DIRECTIONAL WIDEBAND PANEL 5G ANTENNA

410 – 6000 MHz, 7.8 dBi; 4 x Cellular & 1 x GNSS



410 – 470 MHz
617 – 960 MHz
1427 – 1517 MHz
1710 – 2700 MHz
3300 – 4200 MHz
4400 – 6000 MHz

7.8 dBi

Increase X Mb/s

Omni-Directional

5G

4G LTE

4x4 MIMO

IoT & M2M

-40°C to +80°C

IP 65

GPS Included

APPLICATION AREAS

Automotive

Urban

Rural/Farm

- **5-in-1 high-performance multi-functional 5G antenna**
- **4 x Cellular and 1 x Dual Band GNNS antennas**
- **Ultra-Wideband cellular antennas from 410 to 6000 MHz**
- **Cross Polarised with linear Vertical & Horizontal antennas for improved performance**
- **Omni-Directional panel antenna with a low-profile design**
- **Flexible, non-invasive mounting options**
- **Weather, dust, and vandal-resistant enclosure (IP65)**

### Product Overview

Introducing the PANL-401: a state-of-the-art, multi-functional panel antenna designed to revolutionize connectivity. This versatile antenna configuration offers a 5-in-1 solution, including 4 x Cellular and 1 x dual-band active GNSS antenna, which provides exceptional performance and versatility for improving cellular and GPS signal reception in vehicles or fixed installations.

The PANL-401 is an ultra-wideband antenna that covers a broad frequency range from 410 to 6000 MHz. This allows it to be used across different cellular operators and technologies, and it is ready for future cellular technologies up to 6GHz for 5G applications. The antenna provides an excellent balance between omnidirectionality, pattern diversity, and good radiation abilities at the desired elevation, which is an important criterion, especially for the transportation market. Additionally, the inclusion of a dual-band GNSS antenna ensures reliable navigation and precise location tracking, even in challenging environments.

Featuring a low-profile and compact design, the PANL-401 seamlessly blends into any environment, addressing both aesthetic and practical considerations. Its convenient window mount design simplifies installation, allowing for easy attachment to vehicle or building windows through either the included suction cups or adhesive mount.

With exceptional GNSS capabilities and wideband performance, the PANL-401 serves as your gateway to unparalleled connectivity across diverse wireless applications.

### Features

- 5-in-1 antenna solution; 4 x Cellular & 1 x Dual Band GNSS
- Ultra-wideband coverage from 410 to 6000 MHz
- 4x4 MIMO linear vertical & horizontal antennas for improved results
- Low-profile and rugged mechanical design with an IP65 rating
- Easy to install with adhesive mounting and suction cup options

### Application Areas

- Enhances connectivity for vehicles, trains, and ships, ensuring robust communication and precise GNSS tracking
- Ideal for enhancing cellular connectivity in urban and rural areas supporting 4G/LTE and 5G networks
- Enables seamless communication for smart city infrastructure
- Enhances connectivity for remote monitoring and control of energy infrastructure, such as oil and gas



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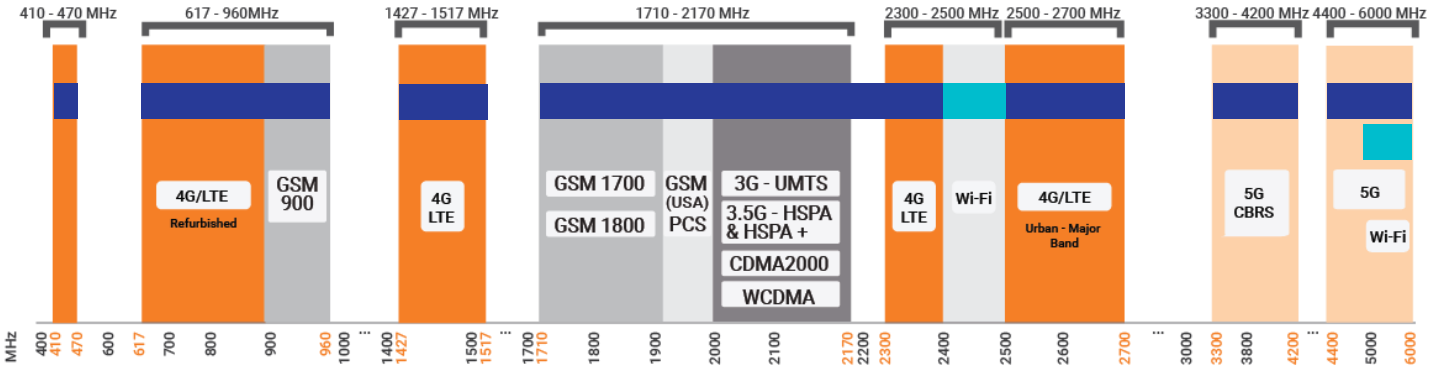
## Frequency Band

The PANL-401 is a wide-band 5G/4G antenna that works from | 410 – 470 MHz | 617 – 960 MHz | 1427 – 1517 MHz | 1710 – 2700 MHz | 3300 – 4200 MHz | and | 4400 – 6000 MHz |




**Indicates the 5G/LTE bands on which PANL-401 works**

**Indicates the Wi-Fi bands on which PANL-401 works**

## Antenna Overview

| | 5G LTE | GPS |
|---|---|---|
| **Number of Ports** | 4 | 1 |
| **SISO / MIMO** | 4x4 MIMO | SISO |
| **Frequency Bands** | 410 – 6000 MHz | L1: 1575.42 MHz ± 25 MHz<br>L5: 1176.45 MHz ± 25 MHz |
| **Polarisation** | Cross Polarised (Linear Vertical & Horizontal) | RHCP |
| **Peak Gain** | 7.8 dBi | 20±2 dB (LNA Gain) |
| **Coax Cable Type** | RTK-031 | RTK-031 |
| **Coax Cable Length** | 2m | 2m |
| **Connector Type** | SMA (M) | SMA (M) |

**The coax cables & connectors are factory mounted to the antenna*



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## Electrical Specifications – Cellular

| | |
|---|---|
| **Frequency Bands:** | 410 – 470 MHz<br>617 – 960 MHz<br>1427 -1517 MHz<br>1710 -2700 MHz<br>3300 – 4200 MHz<br>4400 – 6000 MHz |
| **Gain (Max):** | 0.5 dBi @ 410 – 470 MHz<br>4 dBi @ 617 – 960 MHz<br>4 dBi @ 1427 – 1517 MHz<br>5 dBi @ 1710 – 2700 MHz<br>7.8 dBi @ 3400 - 4200 MHz<br>7 dBi @ 5000 - 6000 MHz |
| **VSWR:** | ≤2:1 across 85% of the bands |
| **Feed Power Handling:** | 10 W |
| **Input Impedance:** | 50 Ohm (nominal) |
| **Polarisation:** | Cross Polarised (Linear Vertical & Horizontal) |
| **Coax Cable Loss:** | 0.39 dB/m @ 400 MHz<br>0.54 dB/m @ 900 MHz<br>0.68 dB/m @ 1500 MHz<br>0.79 dB/m @ 1800 MHz<br>1.09 dB/m @ 3000 MHz<br>1.65 dB/m @ 5800 MHz |
| **DC Short:** | Yes |

## Electrical Specifications – GNSS

| | |
|---|---|
| **Frequency Range:** | 1575.42 MHz<br>1176.45MHz |
| **LNA Gain:** | 20±2 dB |
| **VSWR:** | <2:1 |
| **DC Voltage:** | 2.7-5 V |
| **Operating Current:** | <15mA |
| **Nominal Impedance:** | 50 Ω |
| **Polarisation:** | RHCP |
| **Out of Band Rejection:** | 1575 MHz ± 25 MHz: 40dBc min<br>1176 MHz ± 25 MHz: 40dBc min |
| **Coax Cable Loss:** | 0.68 db/m @ 1500 MHz |

## Product Box Contents

| | |
|---|---|
| **Antenna:** | A-PANL-0401-V1-01 |
| **Mounting Bracket:** | Adhesive Mount and Suction Cups |

## Ordering Information

| | |
|---|---|
| **Commercial Name:** | PANL-401 |
| **Order Product Code:** | A-PANL-0401-V1-01 |
| **EAN Number:** | 6009710928837 |

## Mechanical Specifications

| | |
|---|---|
| **Product Dimensions:** | 267 mm x 210 mm x 31 mm<br>(Excluding cables) |
| **Packaged Dimensions:** | 380 mm x 280 mm x 70 mm |
| **Weight:** | 0.88 kg |
| **Packaged Weight:** | 1.40 kg |
| **Radome Material:** | UV Stable ASA |
| **Radome Colour:** | Black |
| **Mounting Type:** | Adhesive Mount and Suction Mount |

## Environmental Specifications, Certification & Approvals

| | |
|---|---|
| **Wind Survival:** | ≤160km/h |
| **Temperature Range (Operating):** | -40°C to +80°C |
| **Environmental Conditions:** | Indoor |
| **Water Ingress Protection Ratio/Standard:** | IP 65 |
| **Salt Spray:** | MIL-STD 810G/ASTM B117 |
| **Operating Relative Humidity:** | Up to 98% |
| **Storage Humidity:** | 5% to 95% - non-condensing |
| **Storage Temperature:** | -40°C to +70°C |
| **Enclosure Flammability Rating:** | UL 94-HB |
| **Impact Resistance:** | IK 08 |
| **Product Safety & Environmental:** | Complies with CE and RoHS standards |



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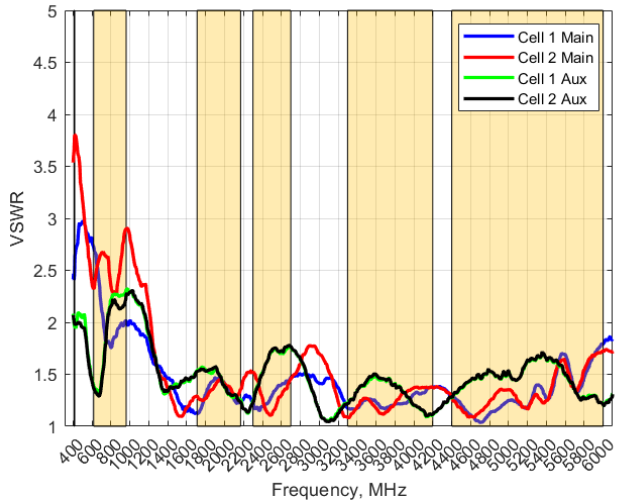
## Antenna Performance Plots

### VSWR



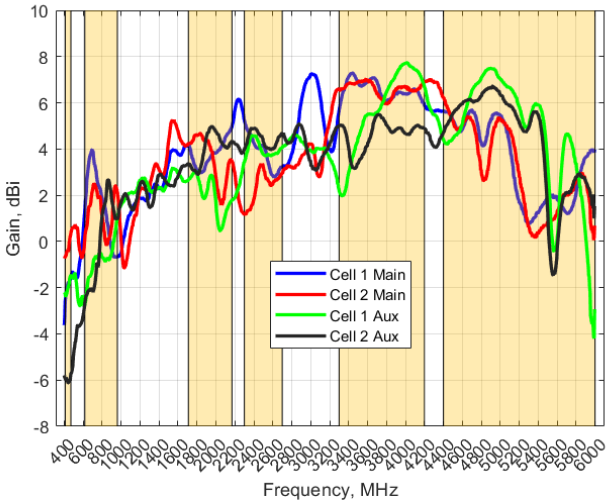

### Voltage Standing Wave Ratio (VSWR)*

VSWR is a measure of how efficiently radio-frequency power is transmitted from a power source, through a transmission line, into a load. In an ideal system, 100% of the energy is transmitted which corresponds to a VSWR of 1:1.

The PANL-401 delivers superior performance across all bands with a VSWR of ≤2:1, across 85% of the bands.

**VSWR measured with 2m low loss cable.*

### GAIN (EXCLUDING CABLE LOSS)



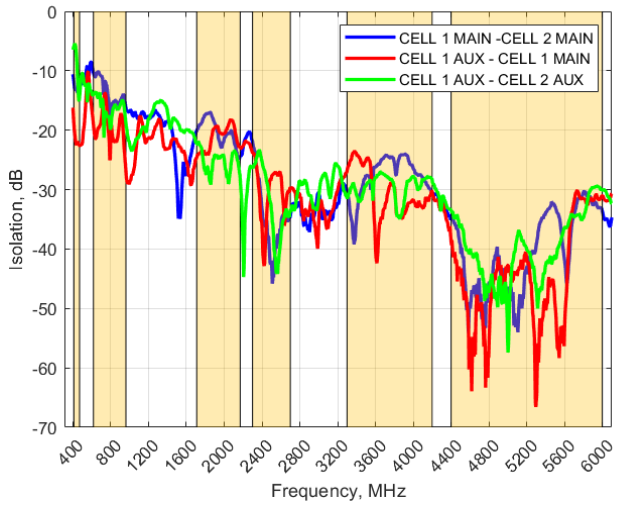

### Gain⁺ in dBi

7.8 dBi is the peak gain across all bands from 410 – 6000 MHz

| | |
|---|---|
| Gain @ 410 – 470 MHz: | 0.5 dBi |
| Gain @ 617 – 960 MHz: | 4 dBi |
| Gain @ 1427 – 1517 MHz: | 4 dBi |
| Gain @ 1710 – 2700 MHz: | 5 dBi |
| Gain @ 3300 – 4200 MHz: | 7.8 dBi |
| Gain @ 4400 – 6000 MHz: | 7 dBi |

*⁺Antenna gain measured with polarisation aligned standard antenna*

### ISOLATION




### Isolation

Isolation is a measure of how much energy from one port leaks into another port undesirably. Isolation of 0 dB between 2 ports means that there is no isolation and the energy from 1 port excitation is visible on another port. Isolation of -30 dB or more means that <0.1% of 1 port's energy is leaked into another. A good isolation is under -10 dB.



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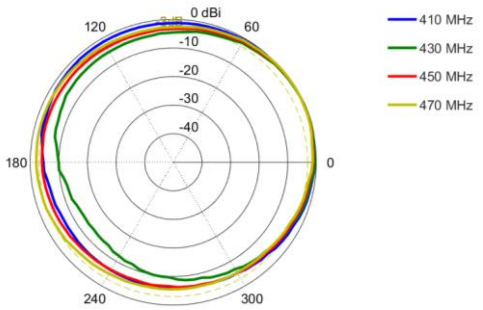
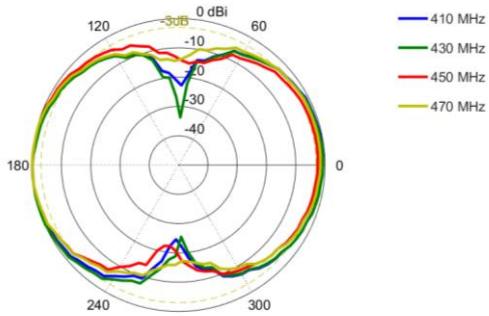
## Radiation Patterns – Cellular (Main)

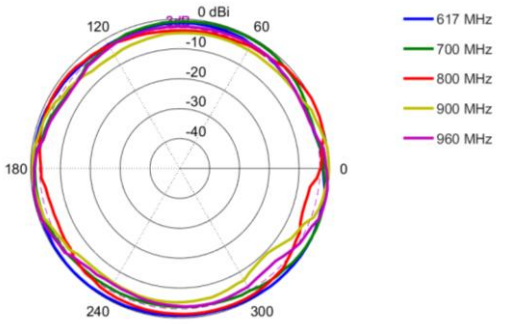
### Azimuth: 410 – 470 MHz



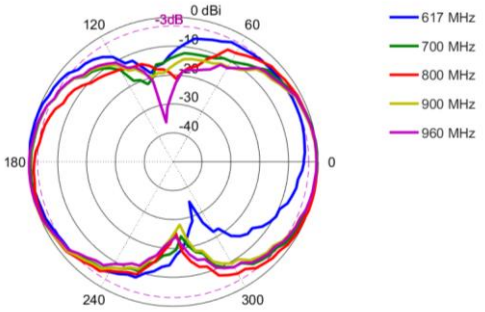

### Elevation: 410 – 470 MHz



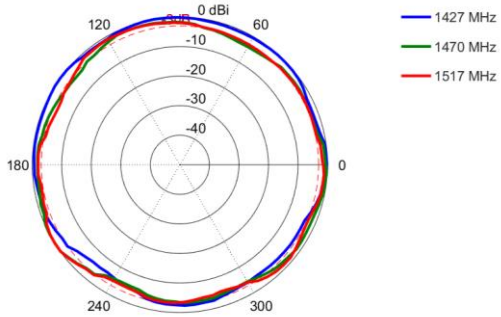

### Azimuth: 617 – 960 MHz



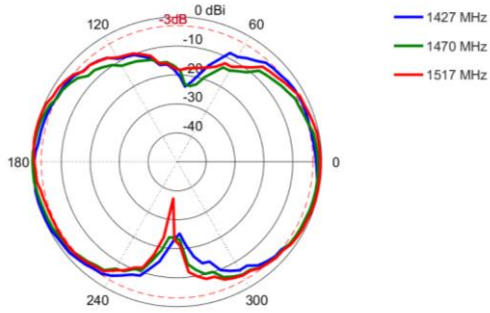

### Elevation: 617 – 960 MHz



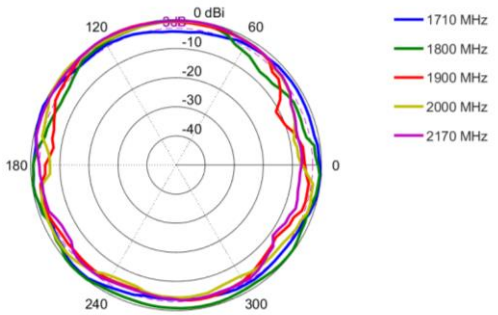

### Azimuth: 1427 – 1517 MHz



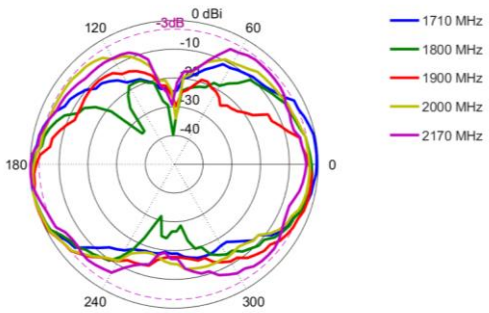

### Elevation: 1427 – 1517 MHz




### Azimuth: 1710 – 2170 MHz




### Elevation: 1710 – 2170 MHz



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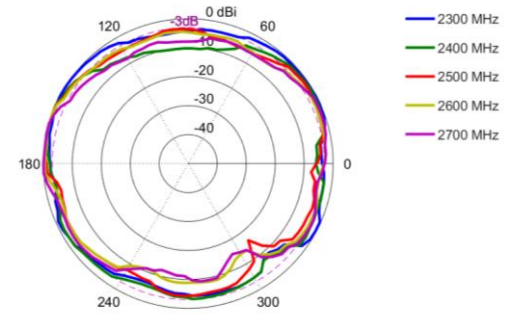
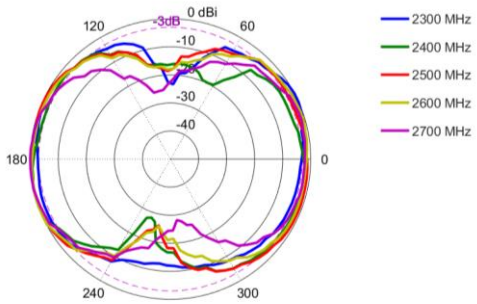
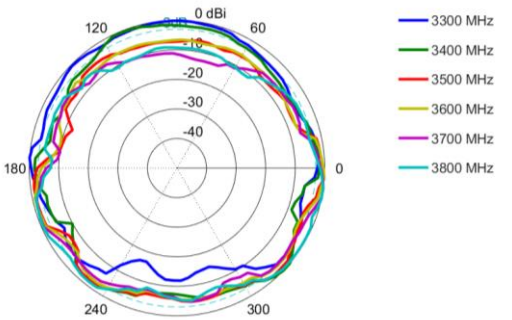
## Azimuth: 2300 – 2700 MHz



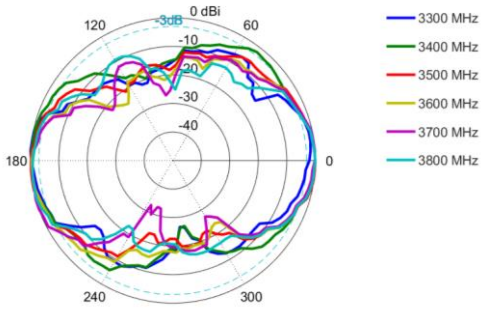

## Elevation: 2300 – 2700 MHz



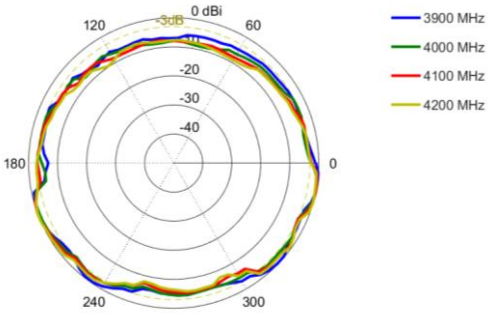

## Azimuth: 3300 – 3800 MHz



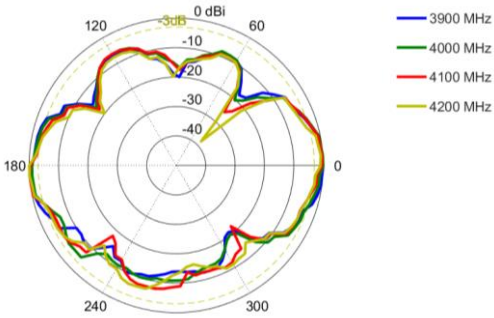

## Elevation: 3300 – 3800 MHz



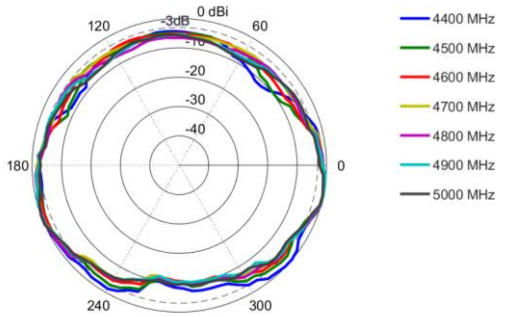

## Azimuth: 3900 – 4200 MHz



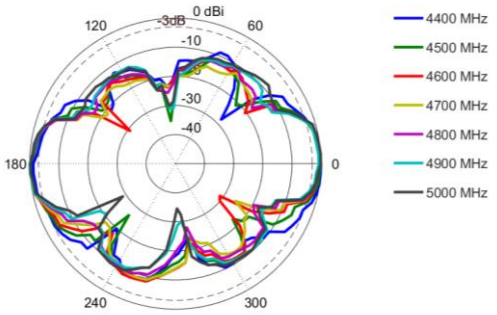

## Elevation: 3900 – 4200 MHz




## Azimuth: 4400 – 5000 MHz




## Elevation: 4400 – 5000 MHz



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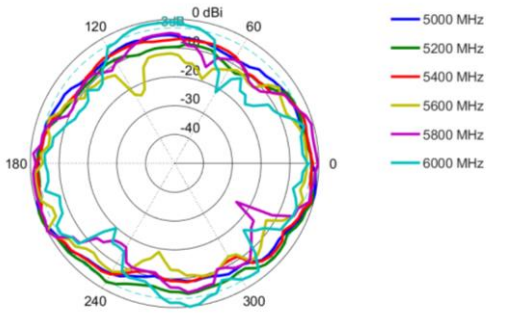
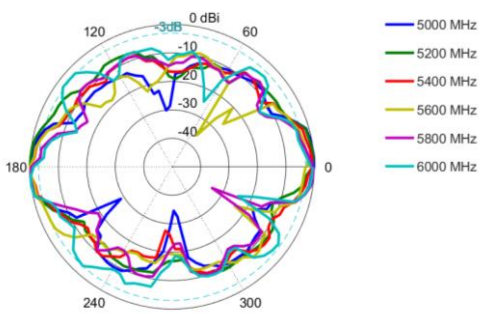
### Azimuth: 5000 – 6000 MHz

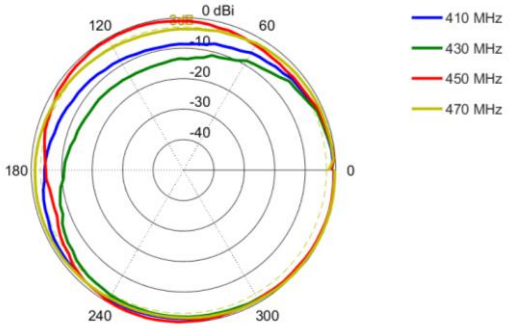



### Elevation: 5000 – 6000 MHz

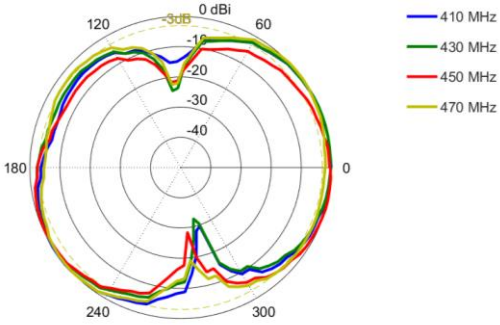



## Radiation Patterns – Cellular (Aux)

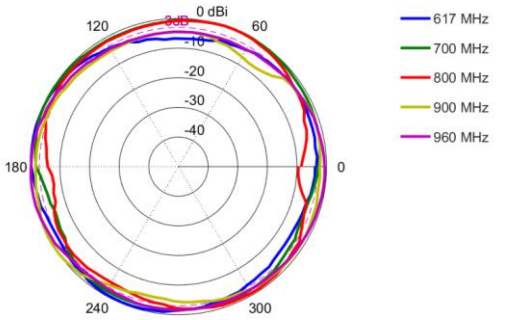
### Azimuth: 410 – 470 MHz



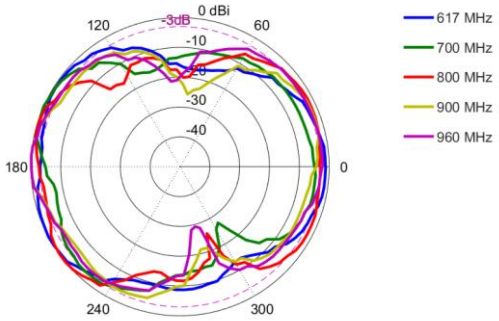

### Elevation: 410 – 470 MHz



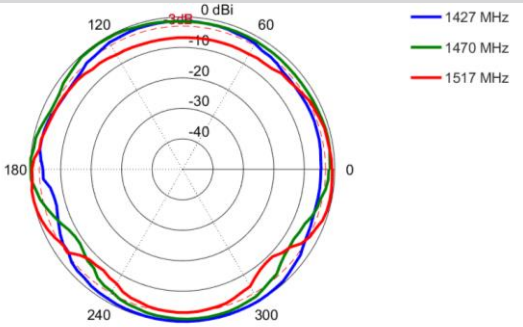

### Azimuth: 617 – 960 MHz



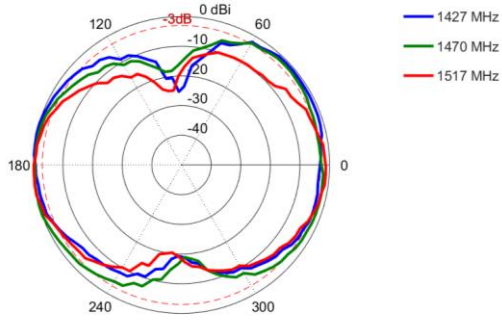

### Elevation: 617 – 960 MHz




### Azimuth: 1427 – 1517 MHz




### Elevation: 1427 – 1517 MHz



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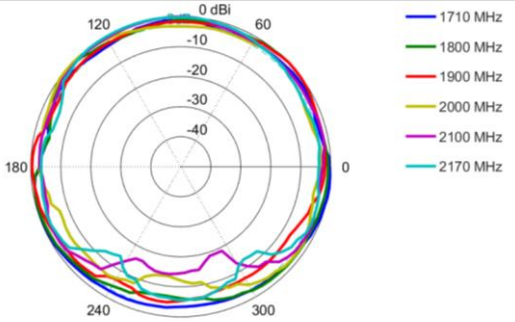
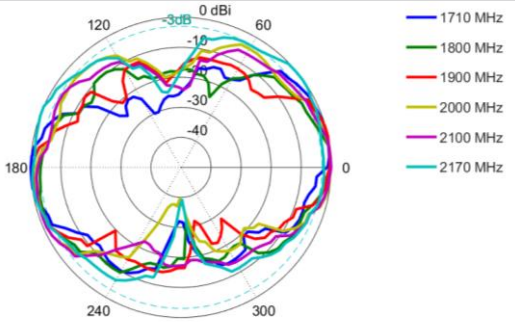
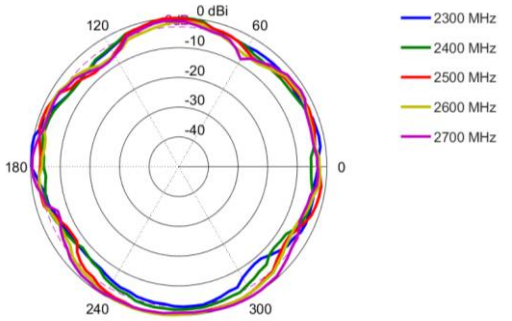
## Azimuth: 1710 – 2170 MHz



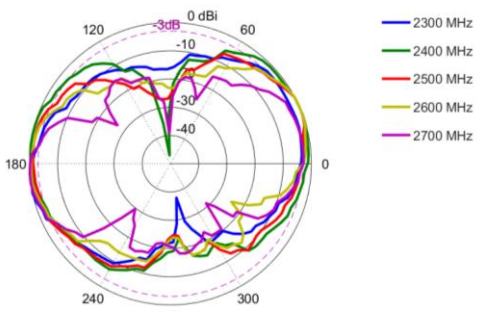

## Elevation: 1710 – 2170 MHz



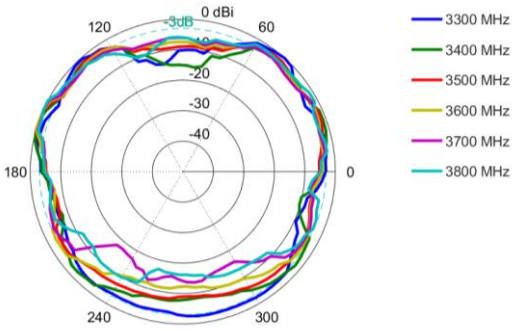

## Azimuth: 2300 – 2700 MHz



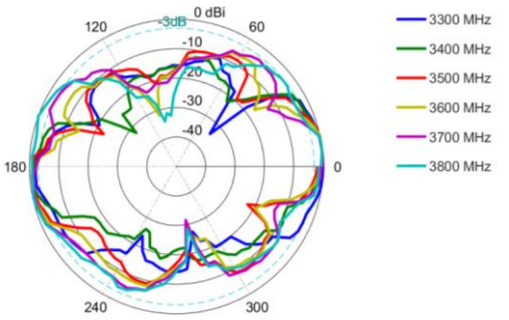

## Elevation: 2300 – 2700 MHz



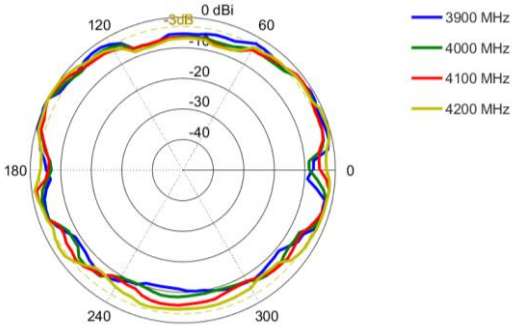

## Azimuth: 3300 – 3800 MHz



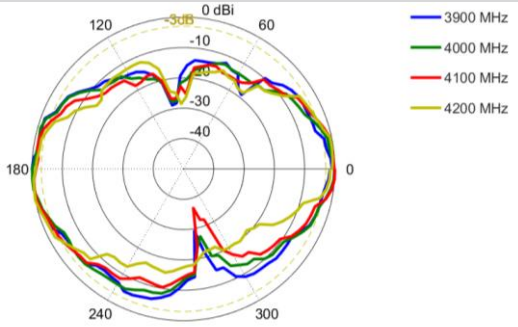

## Elevation: 3300 – 3800 MHz




## Azimuth: 3900 – 4200 MHz




## Elevation: 3900 – 4200 MHz



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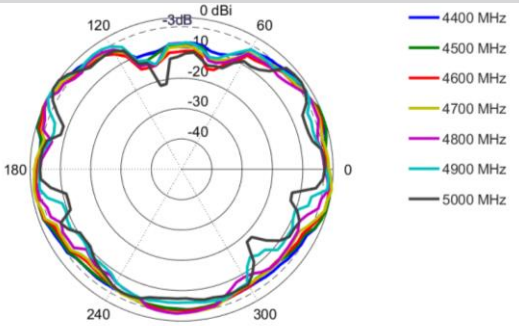
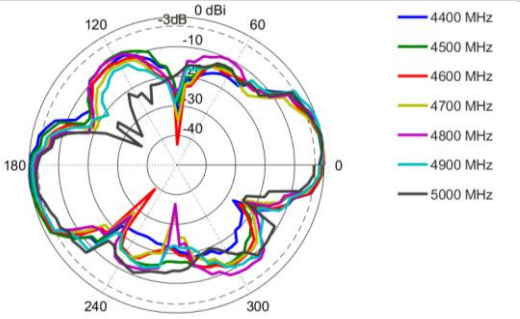
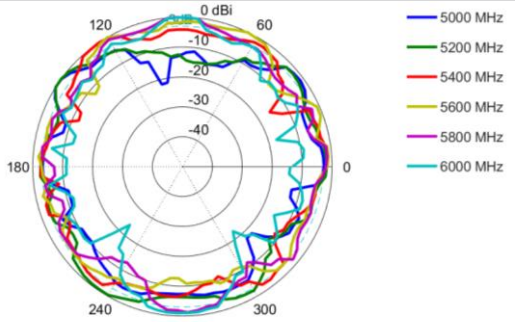
### Azimuth: 4400 – 5000 MHz



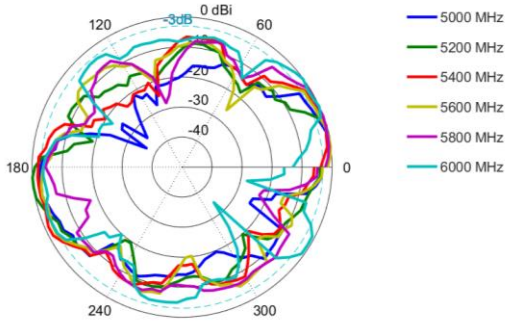

### Elevation: 4400 – 5000 MHz



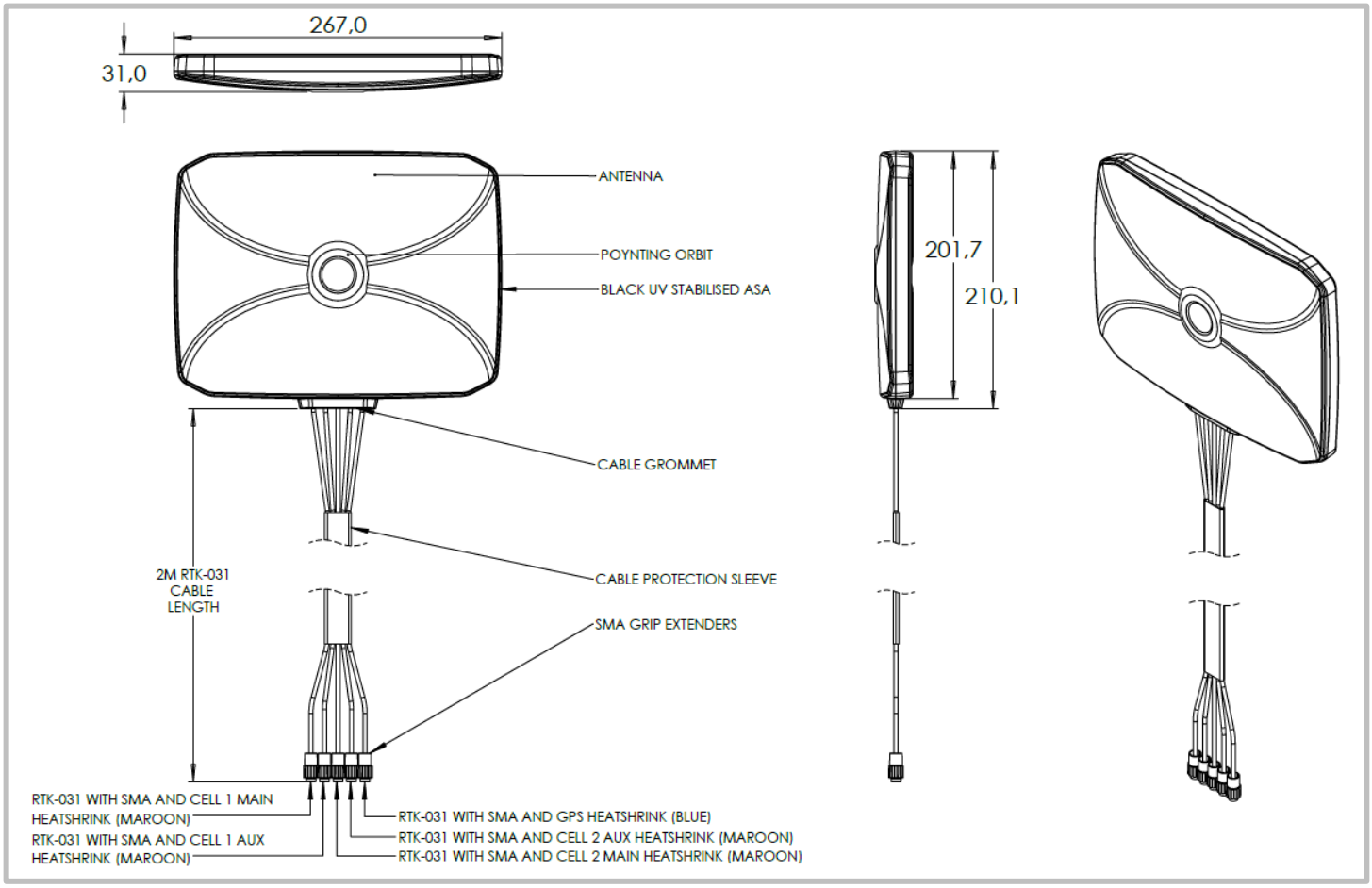

### Azimuth: 5000 – 6000 MHz




### Elevation: 5000 – 6000 MHz




## Technical Drawings






Revised: February 2025

Regulatory Compliance: RoHS 2011/65/EU Compliant | ISO 9001:2015
Document version: TS-A-PANL-0401-V1-01 REV 1.0
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## Mounting Options


**Window Mount**

Window mounting using the provided Velcro mount assembly


**Window Mount**

Window mounting using the provided Suction Cups



**Revised:** February 2025

**Regulatory Compliance:** RoHS 2011/65/EU Compliant | ISO 9001:2015
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## Additional Accessories

See accessories technical specifications on www.poynting.tech


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