# Model name: λ/4 coax cable antenna BMW 9.289.029.3

## Scope

The λ/4 coax cable antenna (BMW SNR.: 9.289.029.3) is used for the following applications:

- WLAN (WIFI)
- Bluetooth

The tested specimen had a length of ~1m. The measured values vary with the cable length.

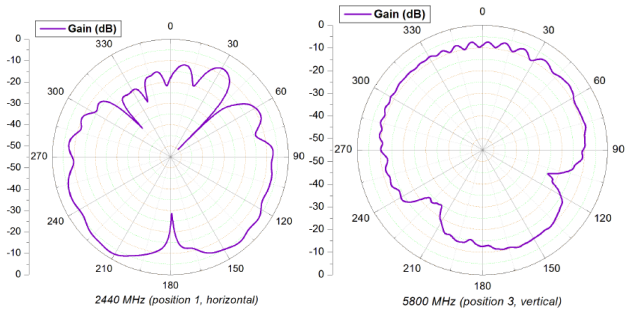
## Productinformations

| Specifications | |
|---|---|
| Frequency Range (MHz) | 2400–2495; 5150–5850 |
| Antenna Type | λ/4; 5/8 λ Monopole |
| Peak Gain 2.4GHz Band | -2.5 dBi |
| Peak Gain 5GHz Band | -2,8 dBi |
| VSWR | < 4.0:1 (> 2 GHz) |
| Polarization | Linear |
| Azimuth Beamwidth | Omni-directional |
| Power Handling | 3 Watt CW |
| Feed Point Impedance | 50 Ω unbalanced |
| Size | L: 45.0 mm; D: 5mm |
| Weight | 1.6 g |
| Mounting | Moulding |
| Cable / Connector | Fakra SF or MiniCoax |

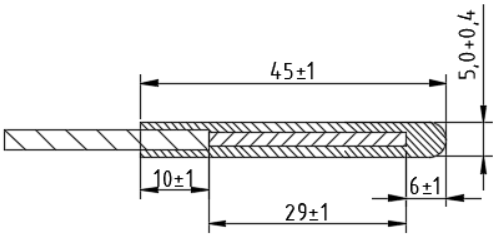


- The open inner conductor at the end of the coax cable set a λ/4 or a 5/8 λ antenna for WLAN or Bluetooth
- Molding is only for the coax cable 6.923.610.9 (Low Loss/RTK 031) possible
- On the coax cable 6.923.610.9* (Low Loss/RTK 031) can be assembled two contact types:
  - Fakra SF (with diagnostic function)
  - MiniCoax (connection monitoring in combination with ADTCon-MC Diagnosepin)

## Radiation pattern




## Dimensions




*Please note that the article must be comply with the MD-Specifications and handling instructions, you can request them from your contact person or you can find them on our internet page.

MD ELEKTRONIK GmbH
Neutraublinger Straße 4
84478 Waldkraiburg (Germany)

**Email:** product-info@md-elektronik.de
**Homepage:** www.md-elektronik.de

# Specification λ/4 coax cable antenna

## Picture


## Versions

| Document | Version | Date | Type of modification |
|---|---|---|---|
| Specification | 00 | 10.06.2020 | Walzik Werner (BMW)<br>Grasser Thomas (MD)<br>Huber Markus (MD) |
| | | | |

# Datasheet Wave FAKRA – 8705915-03

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# Datasheet Wave FAKRA
# 8705915-03
# 19.02.2020

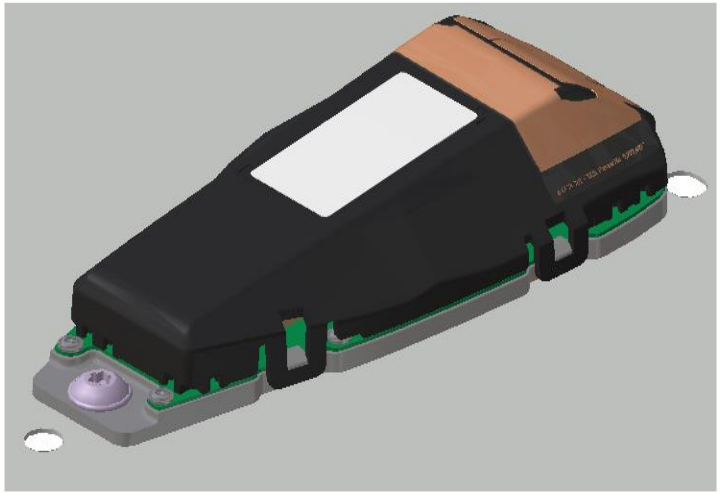
molex®

# Supplier data

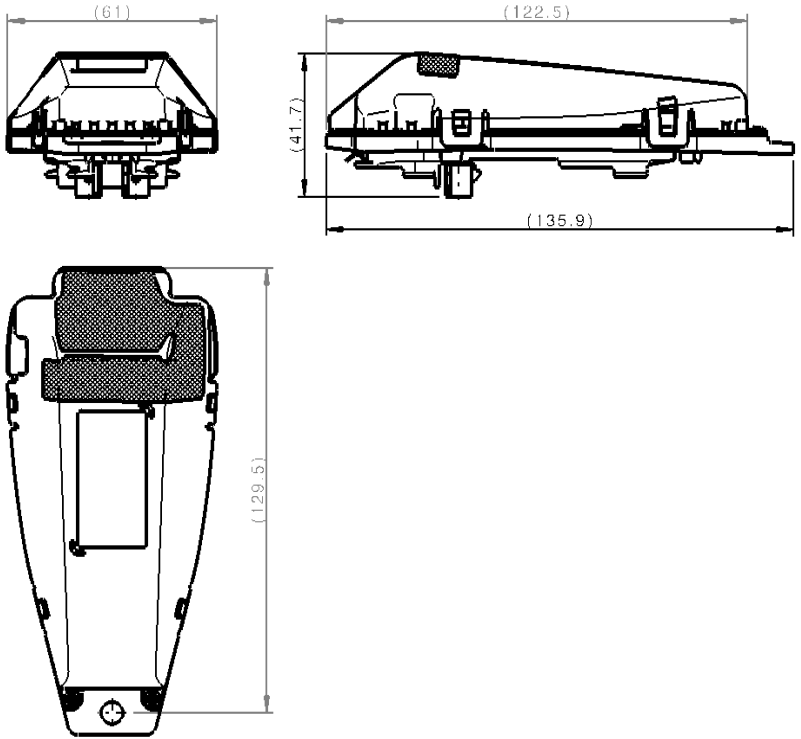
| | |
|---|---|
| Company | Molex CVS Hildesheim GmbH |
| Address | Daimlerring 31, D-31135 Hildesheim |
| Production site (address, country) | Molex CVS Shanghai, China |

Alle Messwerte wurden an B3-Mustern durchgeführt und werden sich bis zur Serienreife ggf. nochmalig ändern.

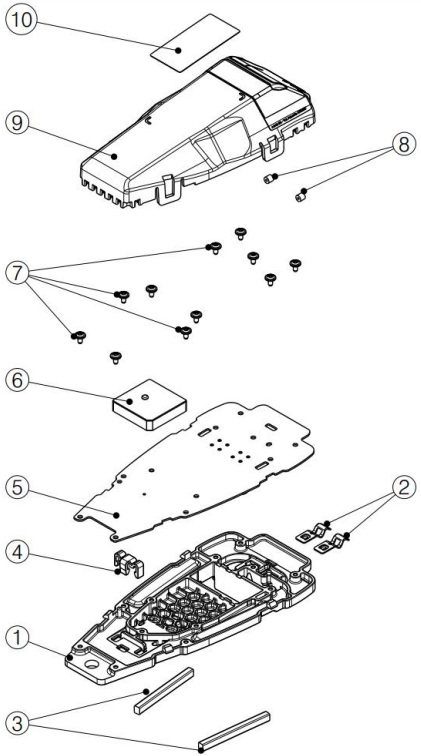
# Mechanical data



64174 – 8705915-03



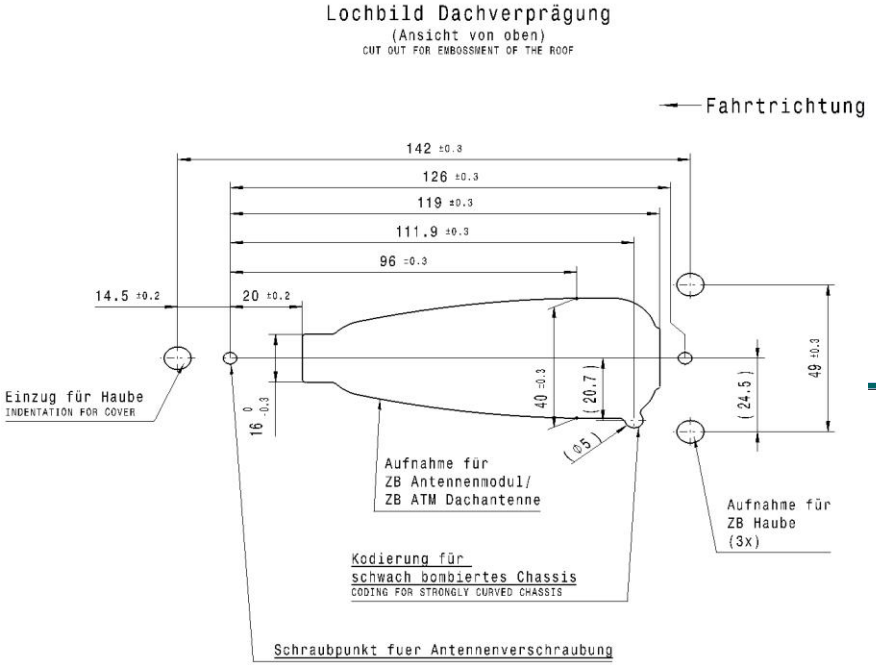
# Mechanical data

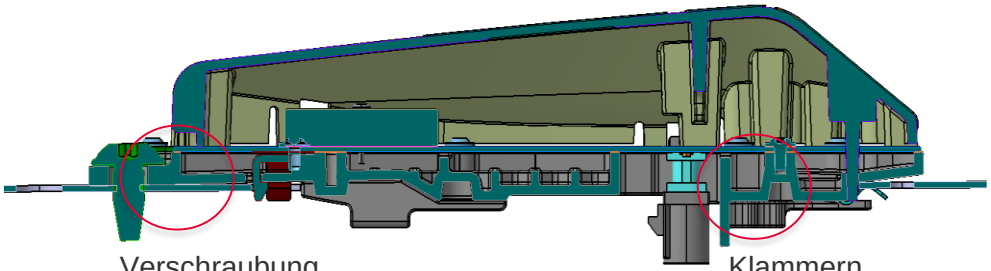



| MOLEX PN | BMW PN | AI | Status: 2020-02-20<br>BMW DESCRIPTION | weight in g |
|---|---|---|---|---|
| 6 41 74 | 8705915 | 03 | ANTENNE WAVE 5G GNSS ROW - FAKRA | 170 |

| | | | |
|---|---|---|---|
| **1** | 1 | 3 41 14 401 | Chassis |
| **2** | 2 | 3 41 03 301 | Spring |
| **3** | 2 | 3 41 10 801 | Gasket |
| **4** | 1 | 3 41 14 102 | Compensorclip |
| **5** | 1 | 6 41 74 911 | PCB populated |
| **6** | 1 | 6 41 74 801 | GNSS-L1-Patch |
| **7** | 11 | FC010030036 | Screw |
| **8** | 2 | 3 41 03 801 | Silicone Contact |
| **9** | 1 | 6 41 74 201 | Cover Assembly |
| **9.1** | 1 | 3 41 14 101 | Cover |
| **9.2** | 1 | 6 41 74 701 | MIMO1-Foil |
| **9.3** | 1 | 6 41 74 602 | Cover-Label printed |
| **10** | 1 | 6 41 74 601 | Label printed |

# Mounting situation in vehicle

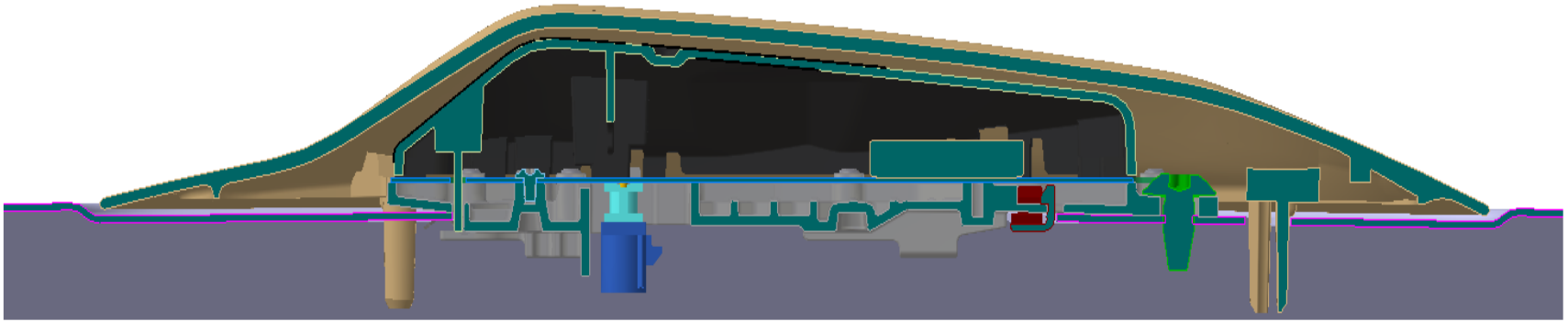


Verschraubung
im vorderen
Bereich

Klammern
im hinteren
Bereich

# Mounting situation in vehicle



# Electrical parameter GNSS

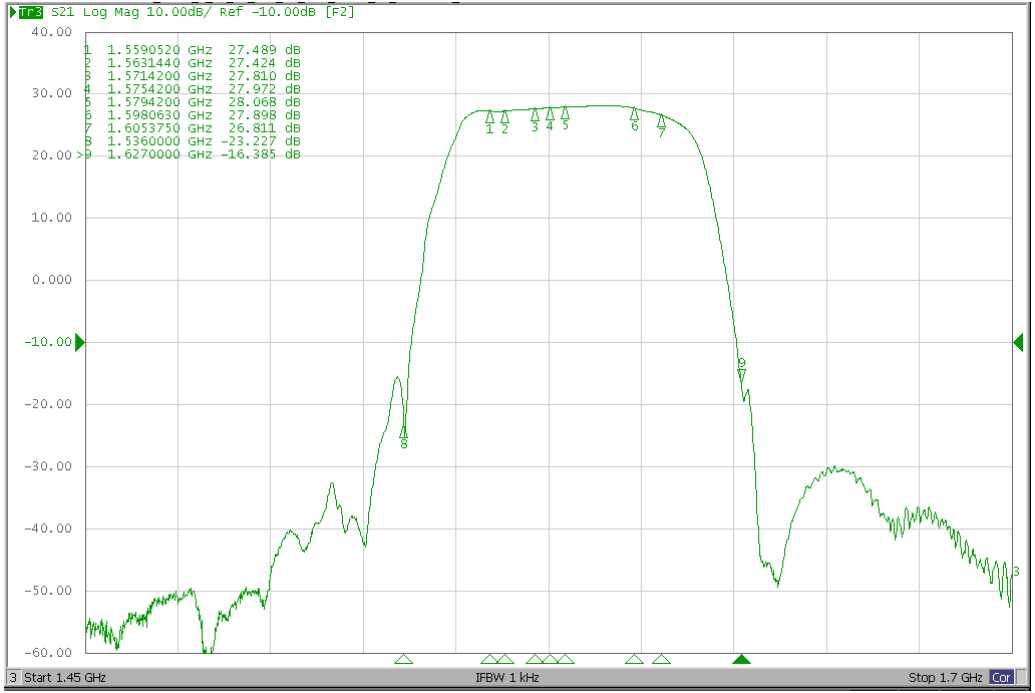
Main electrical data

| Parameter | Unit | Min | Typ | Max |
|---|---|---|---|---|
| Supply Voltage | V | 4.5 | 5.0 | 5.5 |
| Supply Current | mA | | 24 | |
| LNA Gain | dB | 25 | | 29 |
| Noise Figure | dB | | | 2.5 |
| Output Return Loss | dB | 10 | | |
| Antenna Passive Average Gain (at Zenith) in Band 1 | dBiC | 4.1 | 4.7 | 4.9 |

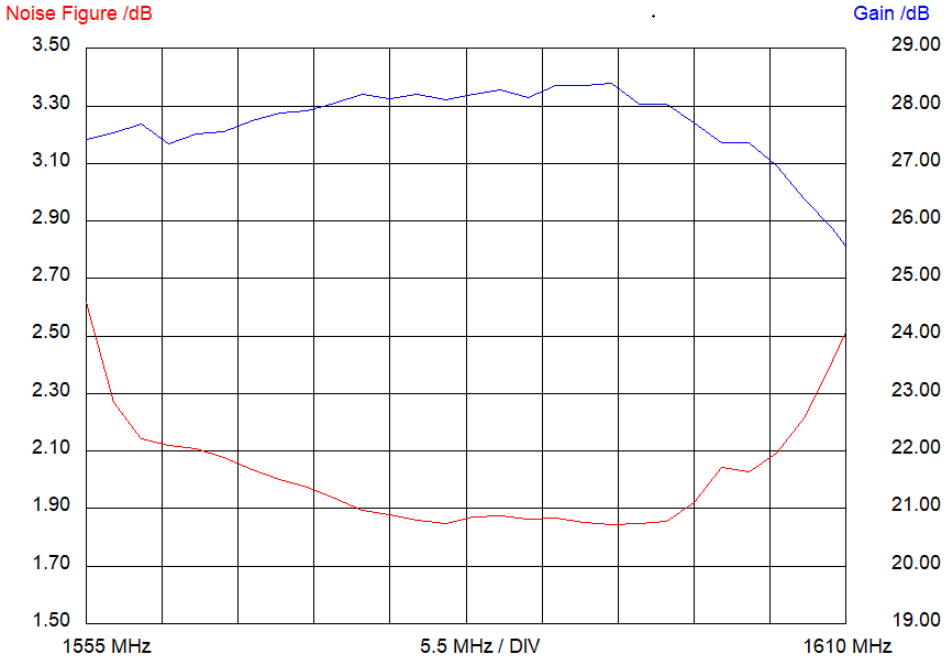
GNSS frequency bands

| Band 1 | Frequency-Range |
|---|---|
| L1 Beidou | 1559 – 1563 MHz |
| L1 GPS, Galileo E1, QZSS, SBAS | 1565 – 1585 MHz |
| L1 Glonass | 1598 – 1606 MHz |

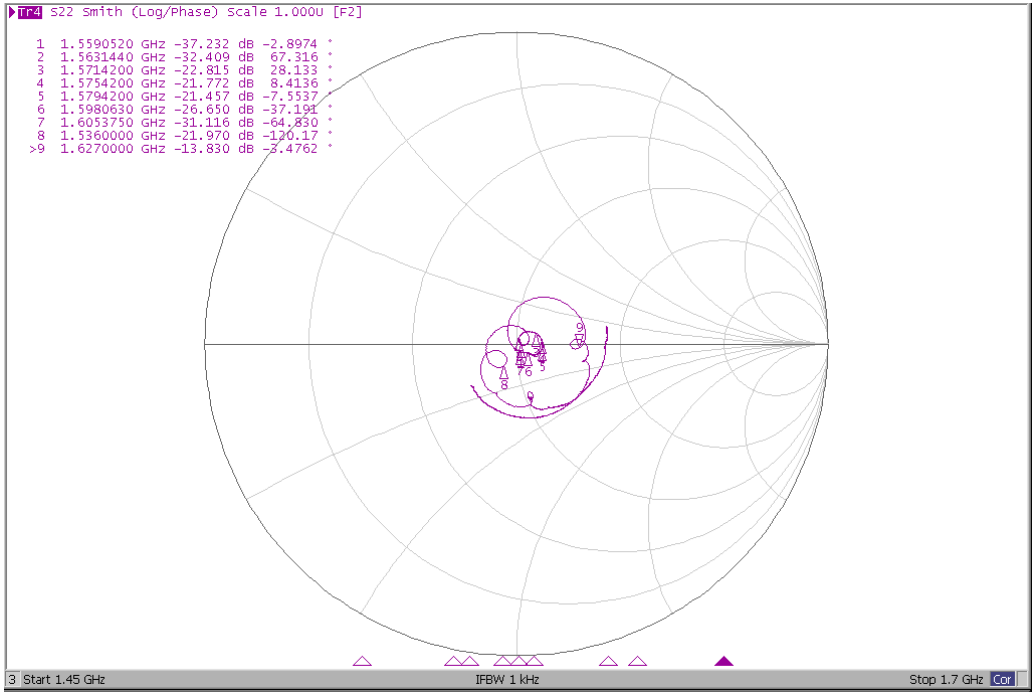
# LNA Gain



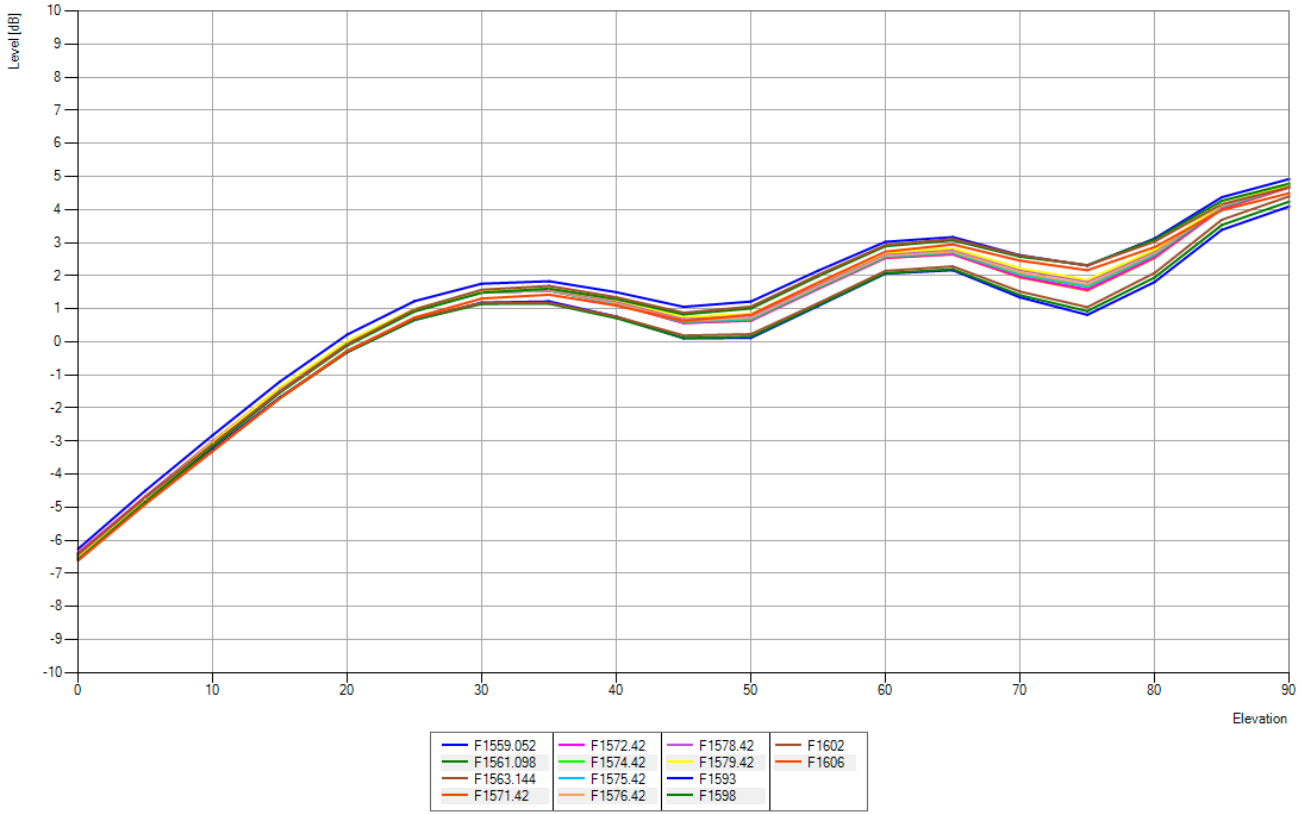
# LNA Noise figure



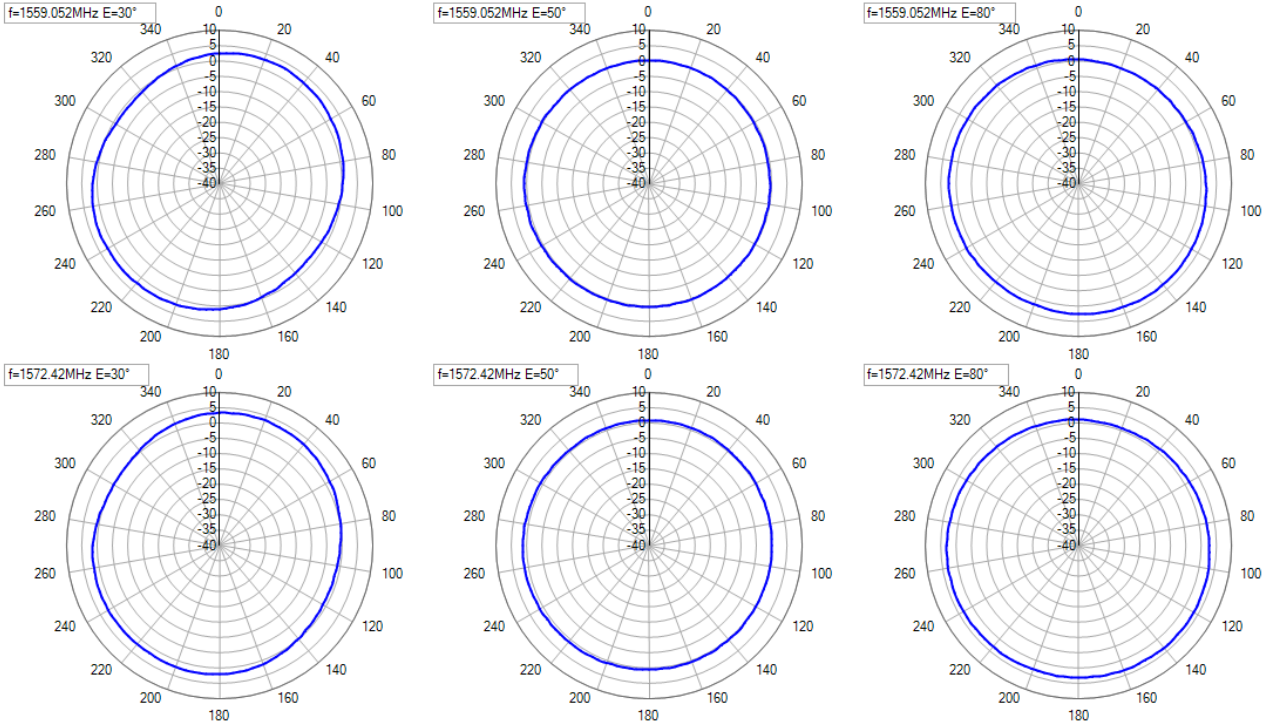
# LNA Output return loss



# Average Gain over Elevation ( RC-Polarization)



# Radiation Pattern GNSS

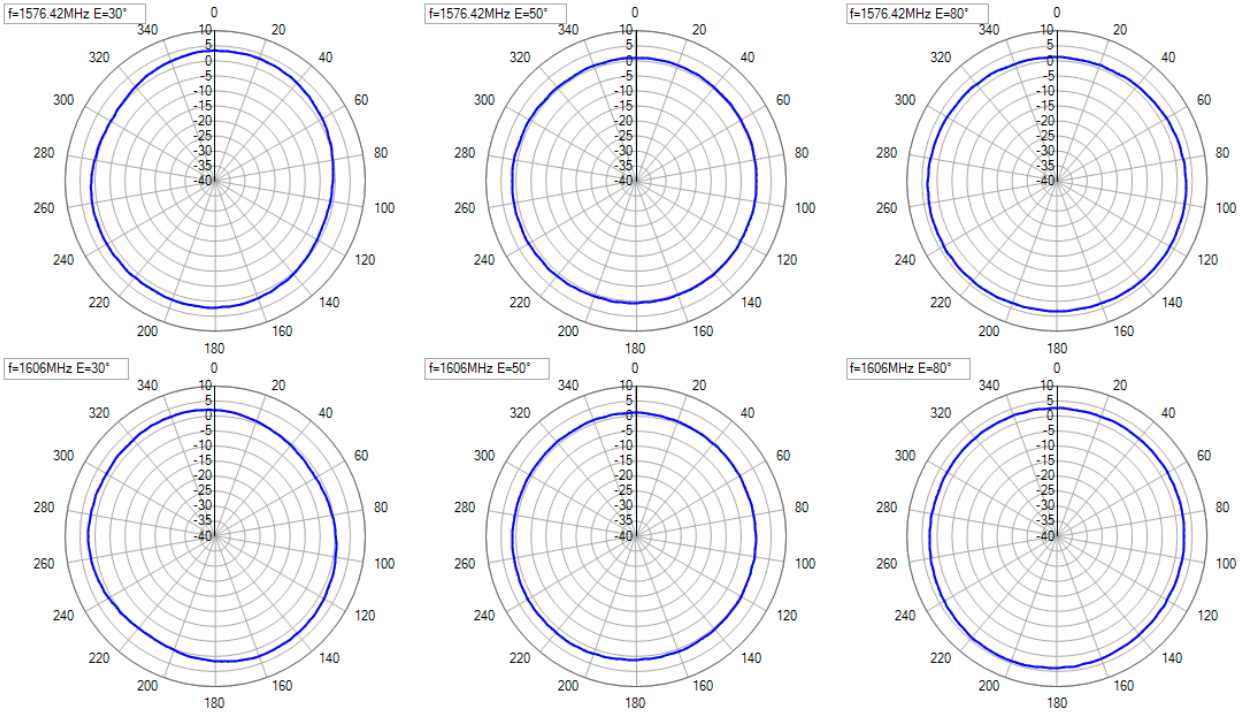



| | min | max |
|---|---|---|
| F1559.052 E30 RC | -1.86 | 3.08 |
| F1559.052 E50 RC | -0.54 | 0.71 |

| | min | max |
|---|---|---|
| F1559.052 E80 RC | 0.03 | 3.03 |
| F1572.42 E30 RC | -1.25 | 3.44 |

| | min | max |
|---|---|---|
| F1572.42 E50 RC | 0.09 | 1.26 |
| F1572.42 E80 RC | 0.88 | 3.49 |

# Radiation Pattern GNSS

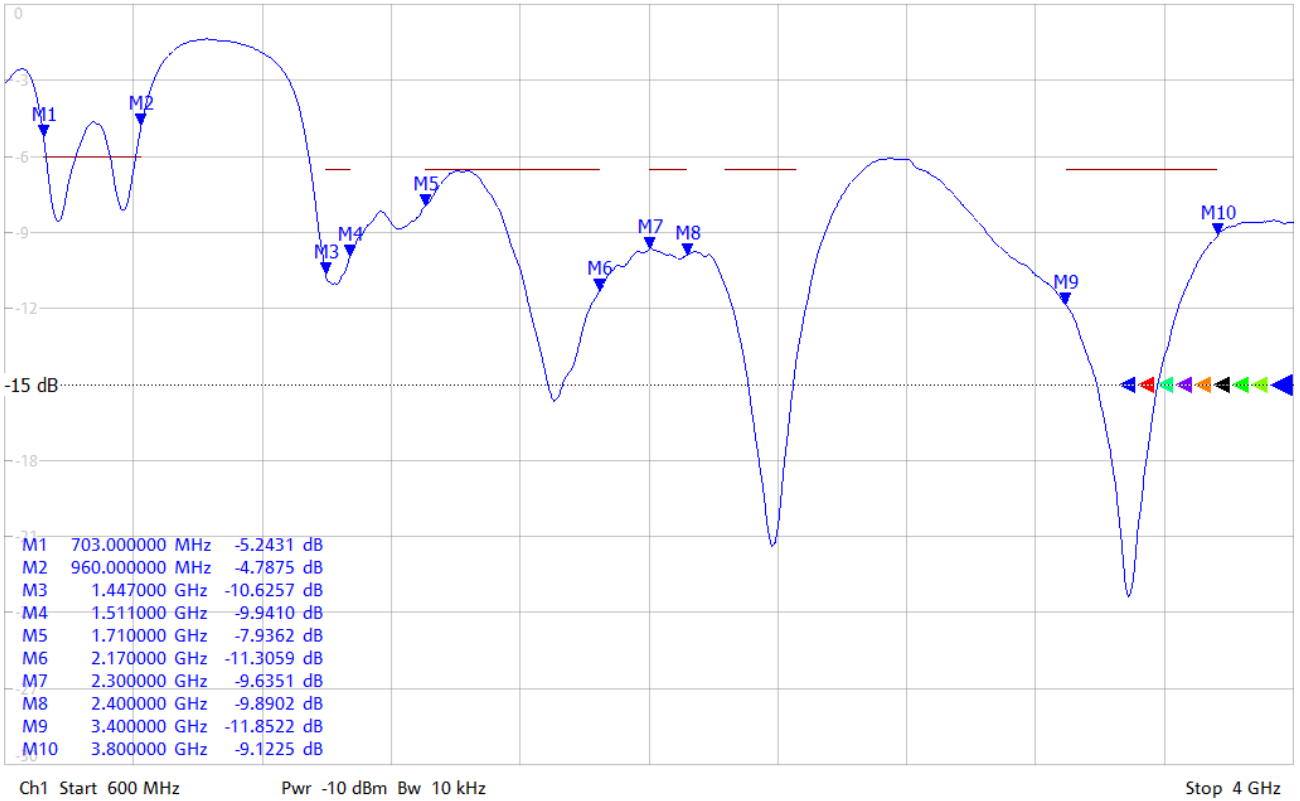



| | min | max |
|---|---|---|
| F1576.42 E30 RC | -1.18 | 3.41 |
| F1576.42 E50 RC | 0.18 | 1.35 |

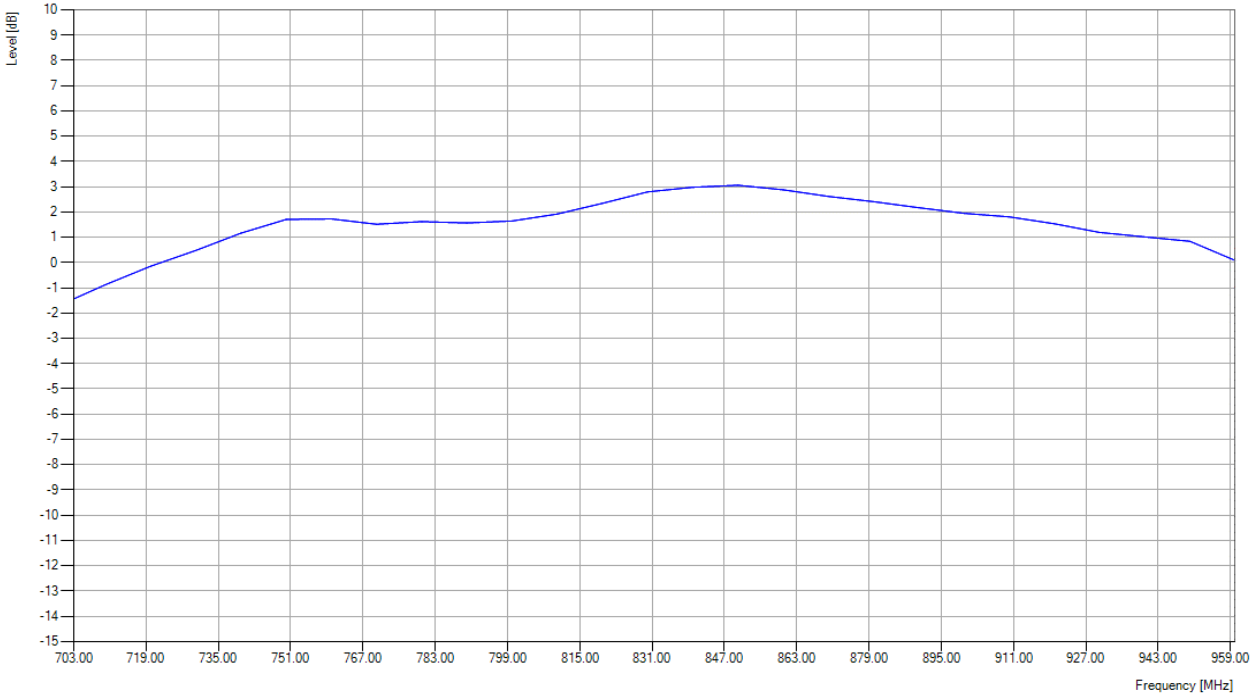
| | min | max |
|---|---|---|
| F1576.42 E80 RC | 1.07 | 3.52 |
| F1606 E30 RC | -1.21 | 2.54 |

| | min | max |
|---|---|---|
| F1606 E50 RC | -0.23 | 1.73 |
| F1606 E80 RC | 2.30 | 4.14 |

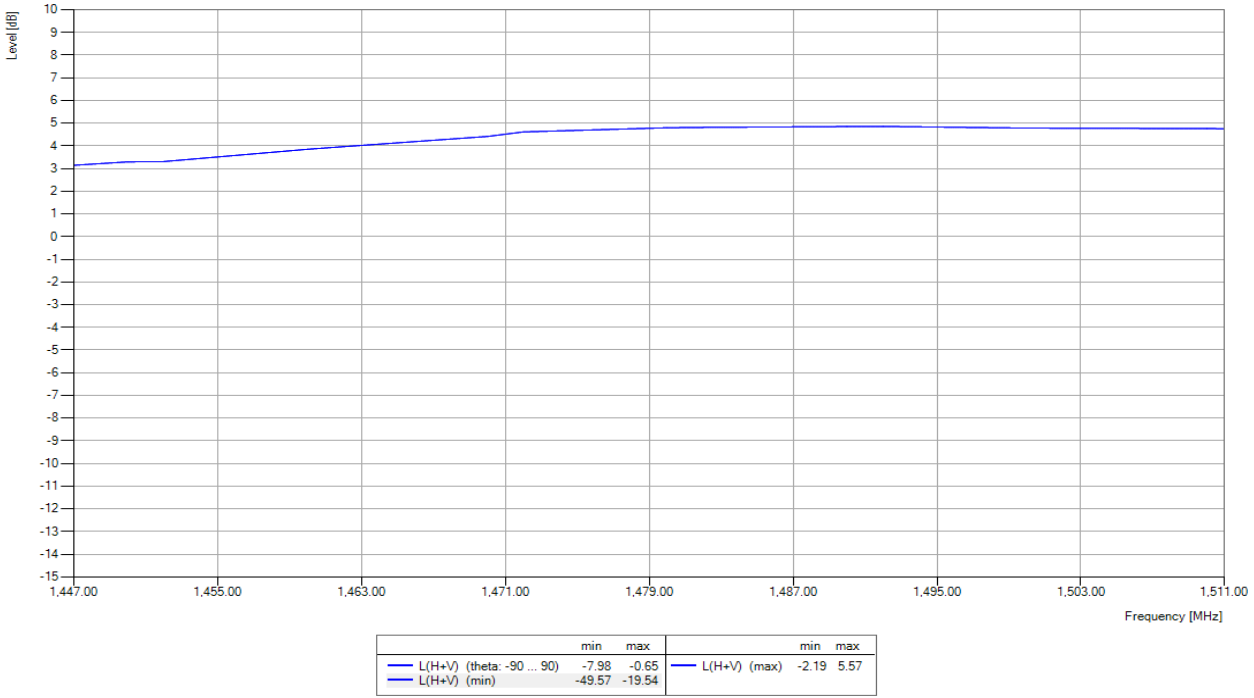
# Matching MIMO1



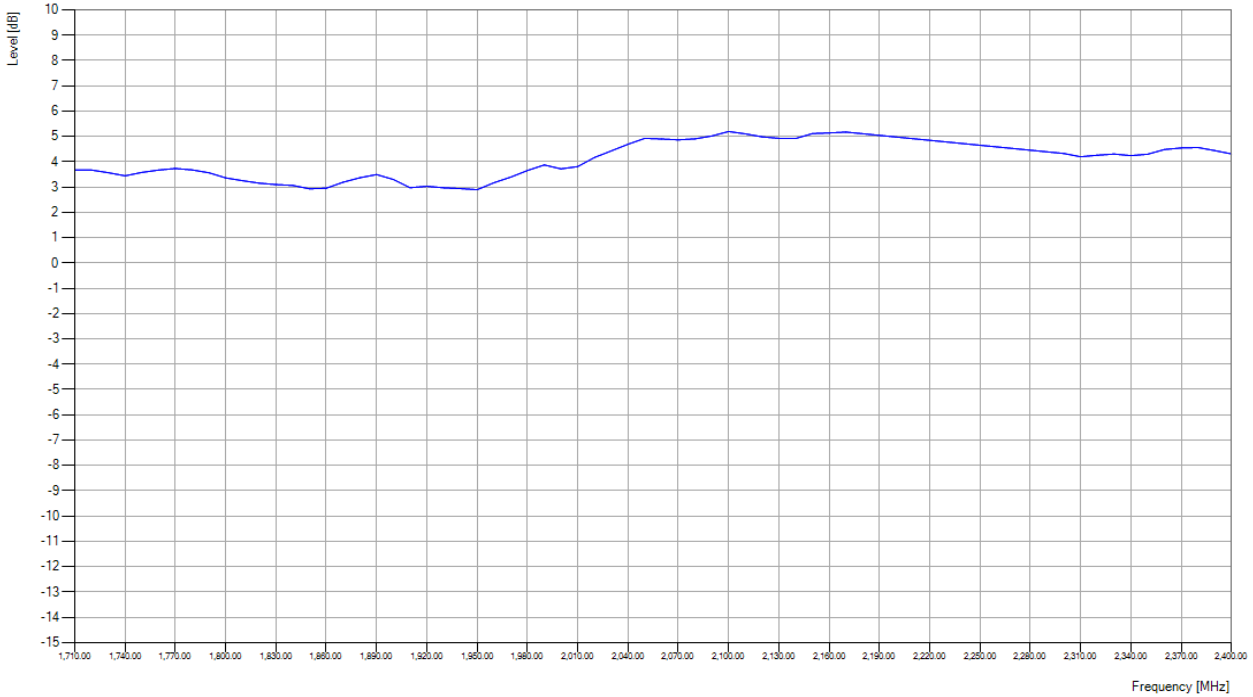
# Max. Gain vs. Frequency (703 MHz-960 MHz)



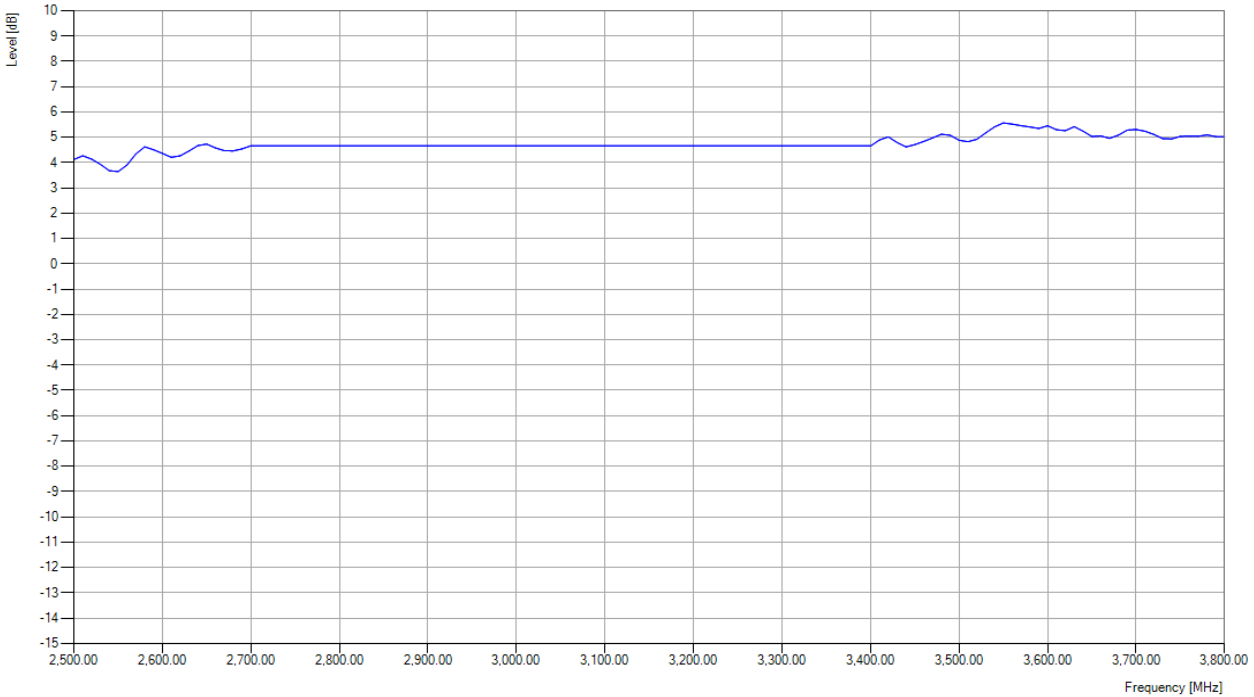
# Max. Gain vs. Frequency (1447 MHz-1511 MHz)



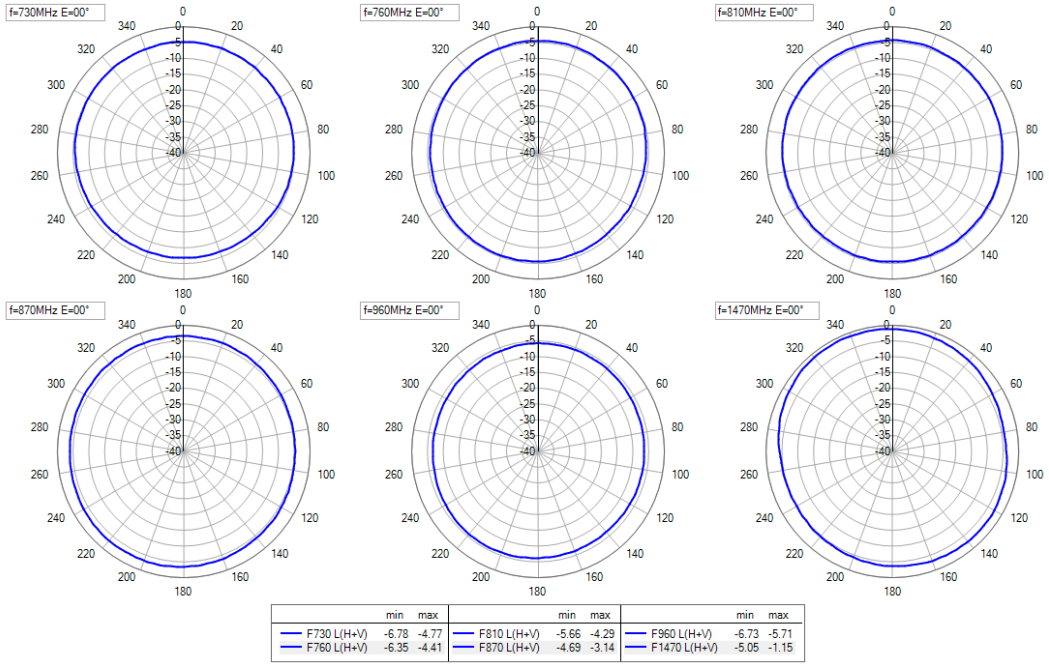
# Max. Gain vs. Frequency (1710 MHz-2400 MHz)



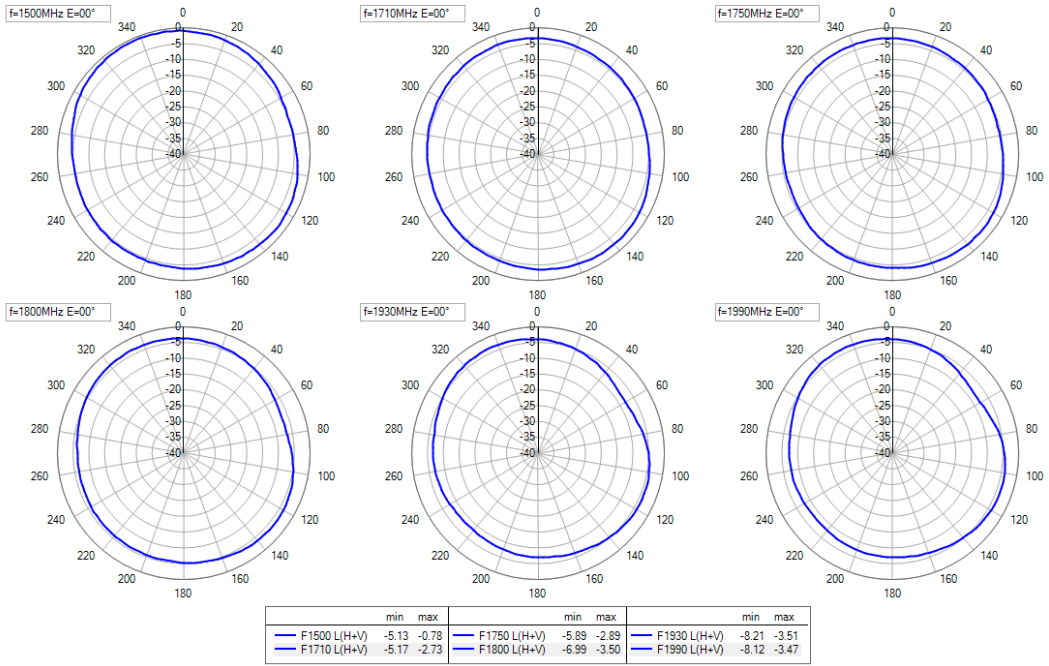
# Max. Gain vs. Frequency (2500 MHz-3800 MHz)



# Radiation Pattern MIMO

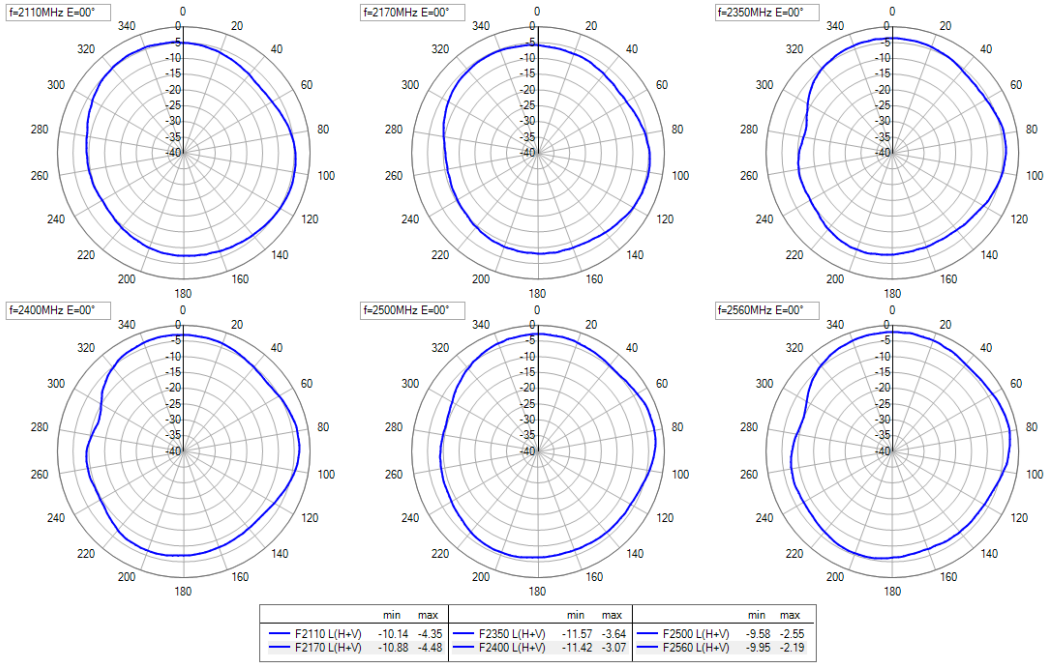


# Radiation Pattern MIMO

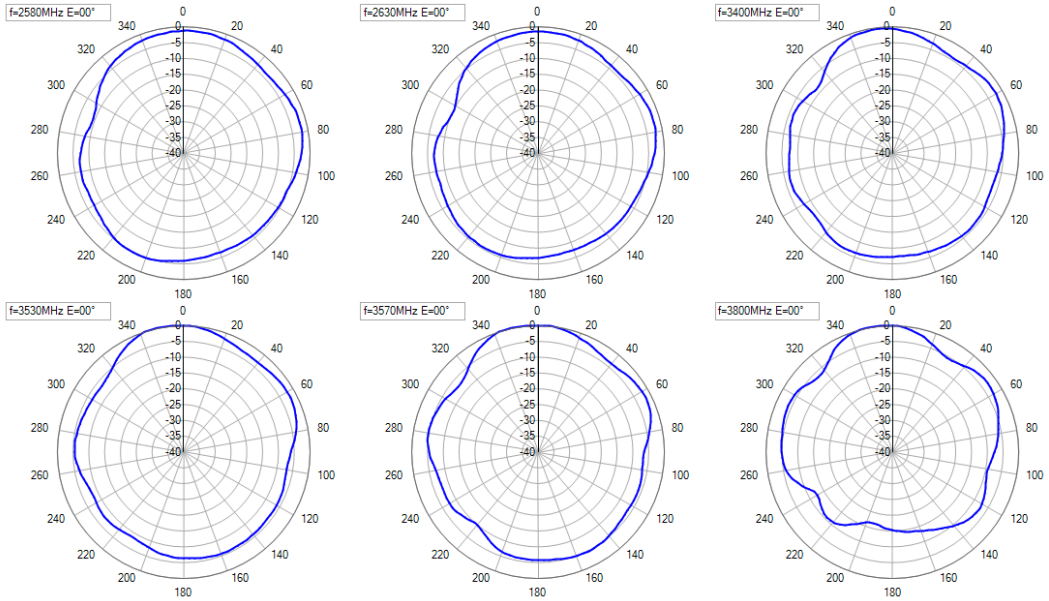



| | min | max | | min | max | | min | max |
|---|---|---|---|---|---|---|---|---|
| F1500 L(H+V) | -5.13 | -0.78 | F1750 L(H+V) | -5.89 | -2.89 | F1930 L(H+V) | -8.21 | -3.51 |
| F1710 L(H+V) | -5.17 | -2.73 | F1800 L(H+V) | -6.99 | -3.50 | F1990 L(H+V) | -8.12 | -3.47 |

# Radiation Pattern MIMO



# Radiation Pattern MIMO




| | min | max |
|---|---|---|
| F2580 L(H+V) | -9.36 | -1.30 |
| F2630 L(H+V) | -10.15 | -1.52 |

| | min | max |
|---|---|---|
| F3400 L(H+V) | -8.44 | -0.45 |
| F3530 L(H+V) | -8.54 | 0.00 |

| | min | max |
|---|---|---|
| F3570 L(H+V) | -9.85 | 0.00 |
| F3800 L(H+V) | -16.67 | 0.00 |

# Max. Gain Summary

| E-UTRA Bands | Frequency-Range UL | Max Gain (MIMO1) |
|---|---|---|
| GSM 850 | 824 – 849 | 3 dBi |
| GSM 900 | 890 – 915 | 2.2 dBi |
| GSM 1800 | 1710 –1785 | 3.7 dBi |
| GSM 1900 | 1850 –1910 | 3.5 dBi |
| UMTS B. 1 | 1920 –1980 | 3.7 dBi |
| UMTS B. 2 | 1850 –1910 | 3.5 dBi |
| UMTS B. 3 | 1710 –1785 | 3.7 dBi |
| UMTS B. 5 | 824 – 849 | 3 dBi |
| UMTS B. 6 | 830 – 840 | 3 dBi |
| UMTS B. 8 | 880 – 915 | 2.2 dBi |
| UMTS B. 19 | 830 – 845 | 3 dBi |

# Max. Gain Summary

| Band | Frequency-Range UL | Max Gain (MIMO1) |
|---|---|---|
| LTE 1 | 1920 - 1980 | 3.7 dBi |
| LTE 3 | 1710 - 1785 | 3.7 dBi |
| LTE 5 | 824 - 849 | 3 dBi |
| LTE 7 | 2500 - 2570 | 4.3 dBi |
| LTE 8 | 880 - 915 | 2.2 dBi |
| LTE 9 | 1749 - 1785 | 3.7 dBi |
| LTE 13 | 777 - 787 | 1.6 dBi |
| LTE 17 | 704 - 716 | -0.9 dBi |
| LTE 19 | 830 - 845 | 3 dBi |
| LTE 20 | 832 - 862 | 3.1 dBi |
| LTE 21 | 1447 - 1463 | 4 dBi |

# Max. Gain Summary

| Band | Frequency-Range UL | Max Gain (MIMO1) |
|---|---|---|
| LTE 28 | 703 - 748 | 1.9 dBi |
| LTE 32 | 1452-1496 | 4.9 dBi |
| LTE 38 | 2570-2620 | 4.6 dBi |
| LTE 40 | 2300 -2400 | 4.6 dBi |
| LTE 41 | 2496 -2690 | 4.7 dBi |
| TD3500 | 3400-3600 | 5.6 dBi |
| TD3700 | 3600-3800 | 5.6 dBi |