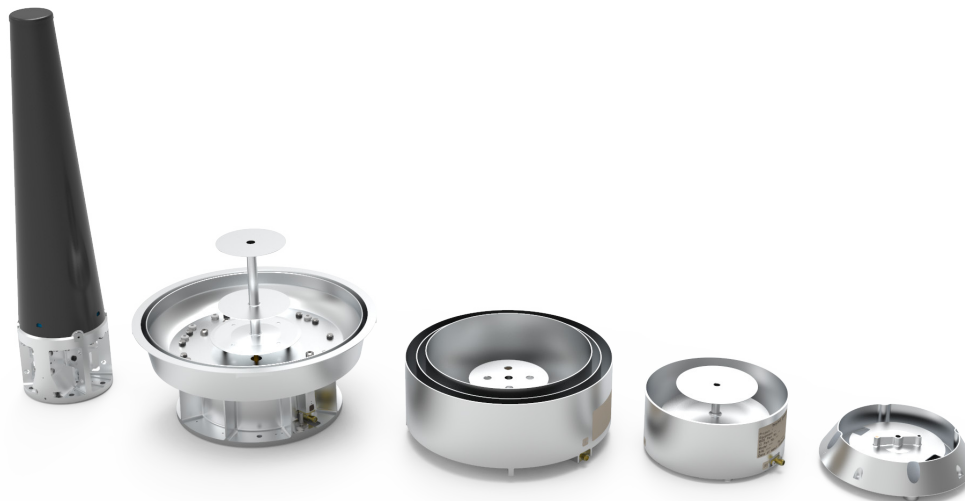




# Antennas for GNSS Receivers

Beyond Gravity Sweden's antennas for satellite-born GNSS receivers are all designed to minimize satellite body interaction. We offer helix and Patch Excited Cup (PEC) antennas. The L-band helix has very low back radiation and can be used where the height is not a limiting factor. The PEC antenna can be delivered without corrugations (for lowest mass and size) or with corrugations (for further improved back radiation).



Our products are originally developed for GPS and Galileo use, but are also compatible with other navigation systems like Glonass, COMPASS and QZSS. The products are based on many years of experience from antenna and microwave products for telecom payloads and also from microwave instrumentation for scientific purposes.

## Extended GNSS PEC Antenna

If you need improved performance with reduced spacecraft illumination, lowered cross-polarization and also reduced omni variation, the extended PEC antenna is your choice. The antenna is well suited for precise orbit determination (POD) applications, where antenna phase center stability is essential.

### Technical data

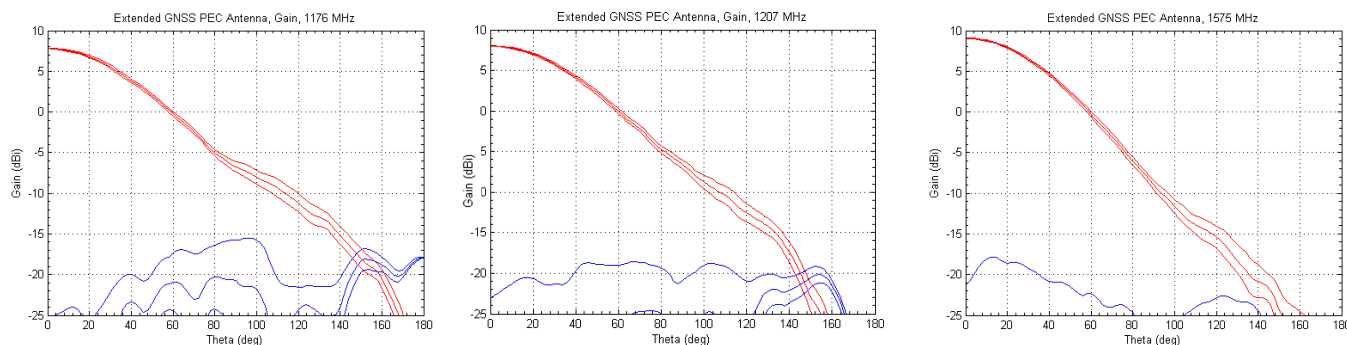
- Frequency band L5/E5a, E5b/G3, L2, G2, E6, L1/E1, G1
- Diameter 200 mm,
- Height 87 mm
- Mass < 735 g
- SMA RF interface

The SMA interface can face either sideways or directly into the spacecraft, i.e. possibility to use a straight or a 90 degree bend SMA.



Extended GNSS PEC Antenna

Typical measured radiation pattern performance for the antenna is shown below; min/average/max gain envelope over the hemisphere for co- and cross-polar radiation.



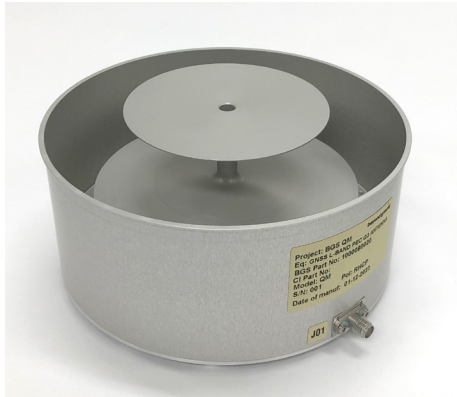
Radiation patterns for Extended GNSS PEC antenna, L5/E5a, G3/E5b and L1/E1 frequencies

## GNSS PEC Antenna G3

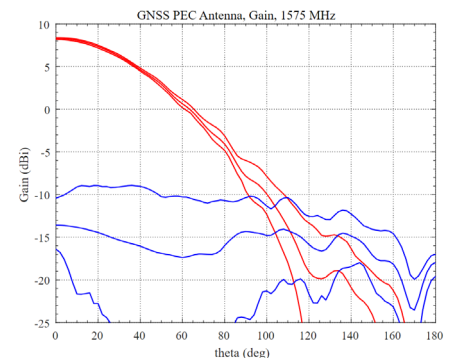
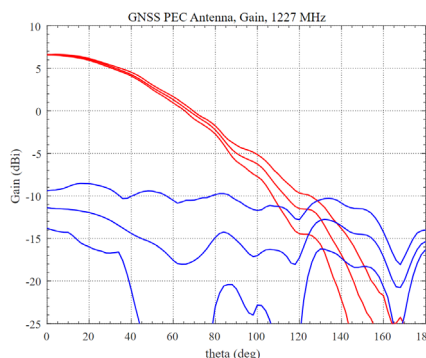
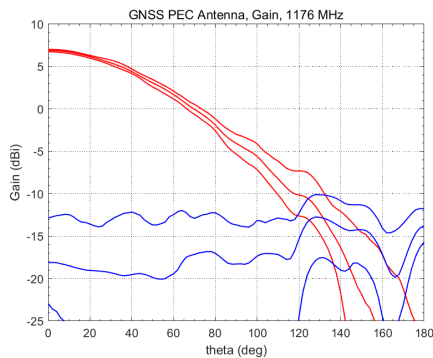
For smaller spacecraft where the quadrifilar helix antenna and the extended PEC antenna can be too high, a lower profile antenna is available. The antenna is designed to cope with very demanding vibration loads.

### Technical data

- Frequency band L5/E5a, E5b/G3, L2, G2, E6, L1/E1, G1
- Diameter 138 mm (excluding connector)
- Height 67 mm
- Mass 191 g
- SMA RF Interface



Typical measured radiation pattern performance of the antenna is shown below; min/average/max gain envelope over the hemisphere for co- and cross-polar radiation.



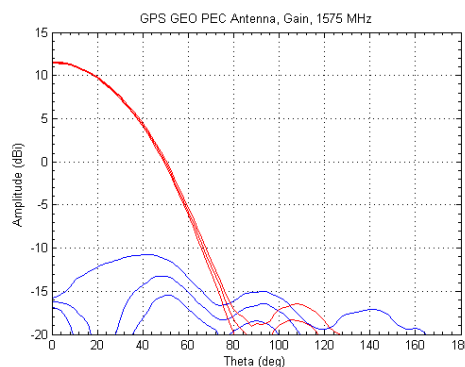
Radiation patterns for GNSS PEC antenna, L5/E5a, L2 and L1/E1 frequencies.

## GEO GNSS PEC Antenna

This antenna is aimed towards use on geostationary orbit (GEO) satellites. It is also a PEC antenna, but with increased boresight gain.

### Technical data

- Frequency band, L1/E1, G1
- Diameter 239 mm
- Height 179 mm
- Mass < 715 g
- SMA RF Interface



Radiation pattern for GEO GNSS PEC antenna, L1/E1 frequency



GEO GNSS PEC antenna

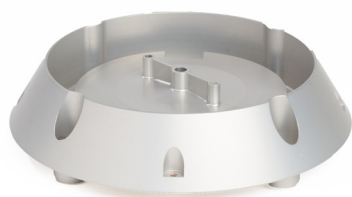
Typical measured radiation pattern performance of the antenna is shown above: min/average/max gain envelope over the hemisphere for co- and cross-polar radiation.

## L1 PEC Antenna

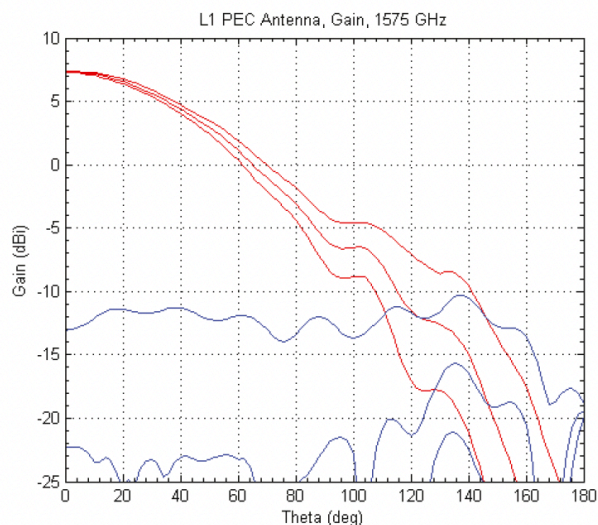
For missions and applications requiring single frequency antenna with low mass and volume this antenna is a very good choice. It is also a PEC antenna.

### Technical data

- Frequency band, L1/E1, G1
- Diameter 144 mm
- Height 35 mm
- Mass 220 g
- SMA RF Interface facing spacecraft



L1 PEC antenna



Radiation pattern for GNSS L1 PEC antenna, L1/E1 frequency

Typical measured radiation pattern performance of the antenna is shown above: min/average/max gain envelope over the hemisphere for co- and cross-polar radiation.

## GNSS Helix Antenna

This quadrifilar helix design exhibits extremely low back radiation in order to minimize satellite disturbances. To achieve this, a special feeding technique reducing the back radiation by 5 - 10 dB is used. The antenna design is patent protected.

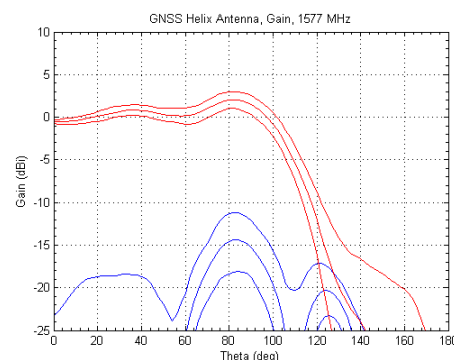
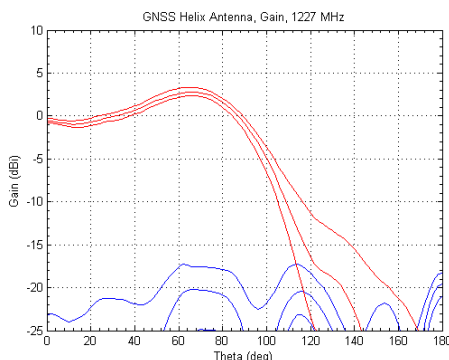
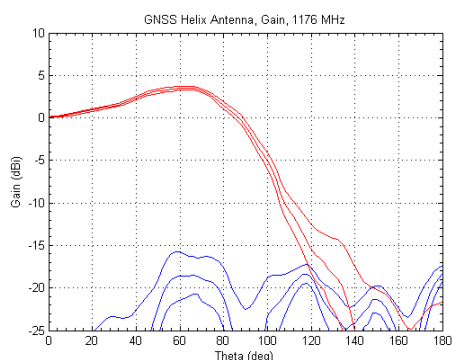


GNSS helix antennas

### Technical data

- Frequency band L5/E5a, E5b/G3, L2, G2, E6, L1/E1, G1
- Diameter 90mm
- Height 410 mm
- Mass < 815 g
- TNC RF Interface

Typical measured radiation pattern performance of the antenna is shown below; min/ average/max gain envelope over the hemisphere for co- and cross-polar radiation.



Radiation patterns for GNSS Helix Antenna, L5/E5a, L2 and L1/E1 frequencies.

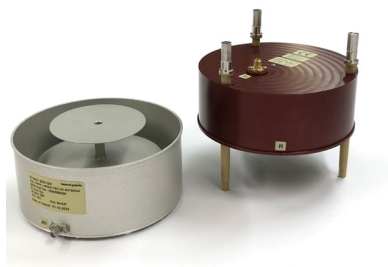


## Test Caps

Test caps/hats are available to all our GNSS antennas. The caps/hats for all antennas, except the L1 PEC antenna, are absorptive with a set coupling value (e.g. 10, 15, 20 dB etc.). The L1 PEC antenna test cap/hat is of a 0 dB coupling type.



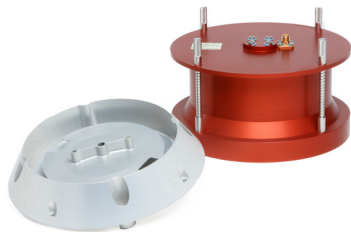
GNSS Helix test cap/hat for ambient use



GNSS PEC G3 test cap/hat for TVAC use



GEO GNSS PEC test cap/hat for TVAC use



L1 PEC test cap/hat for TVAC use



Extended GNSS PEC test cap/hat for TVAC use