



Antennas for GNSS receivers

Beyond Gravity Space 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.

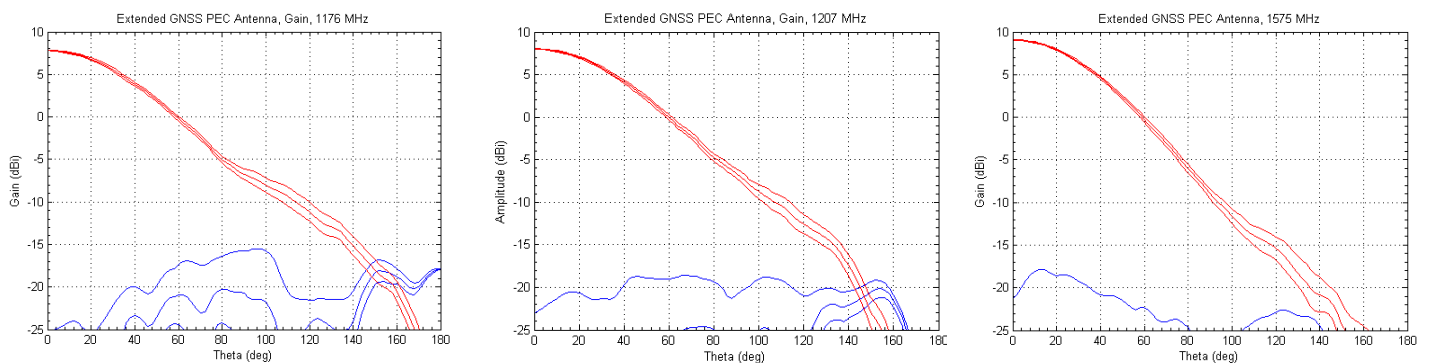
The antenna operates at all GNSS bands, from L5/E5a, E5b, L2 to L1/E1, and it has a near hemispherical coverage.

The antenna diameter is 200 mm, the maximum height is 87 mm and the mass is 735 g. It has a female SMA connector as 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.

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



Extended GNSS PEC antenna



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

GNSS PEC antenna



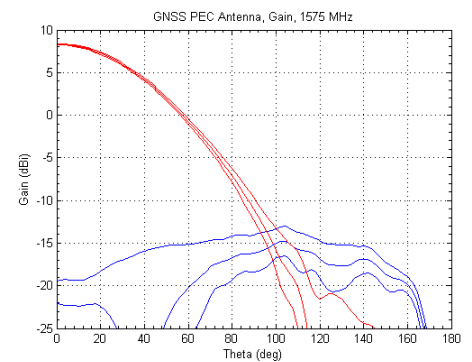
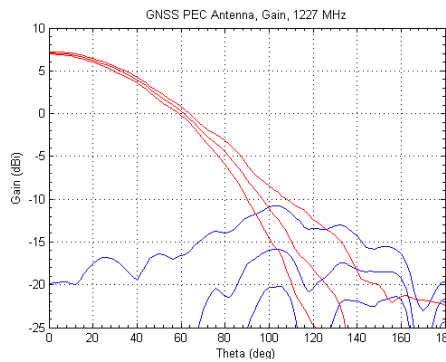
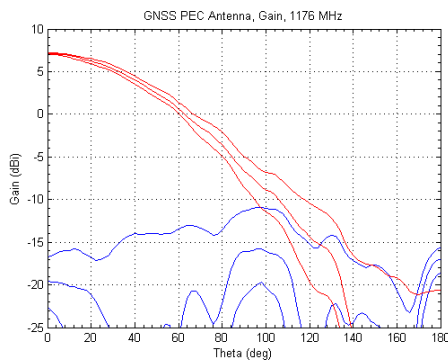
GNSS PEC antenna

For smaller spacecraft where the quadrifilar helix antenna and the extended PEC antenna can be too high, a lower profile antenna is available. It also operates at all GNSS bands, from L5/E5a, E5b, L2 to L1/E1. It is a PEC antenna with highly stable RF performance over the GNSS frequency bands.

The antenna diameter is 160 mm, the maximum height is 55 mm and the mass is 325g. It has a female SMA connector as RF interface.

It is designed to cope with very demanding vibration loads, as normally used or boom mounted TT&C antennas.

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.



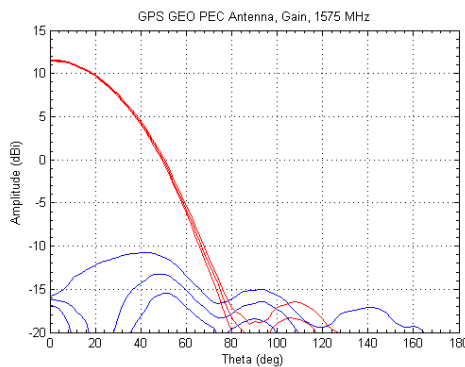
Radiation patterns for GNSS PEC antenna, L5/E5a, L2 and L1/E1 frequencies.

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.

The antenna operates at the GNSS L1/E1 band (also capable of Glonass G1 use).

The antenna diameter is 239 mm, the maximum height is 179 mm and the mass is 715 g. It has a female SMA connector as RF interface.



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



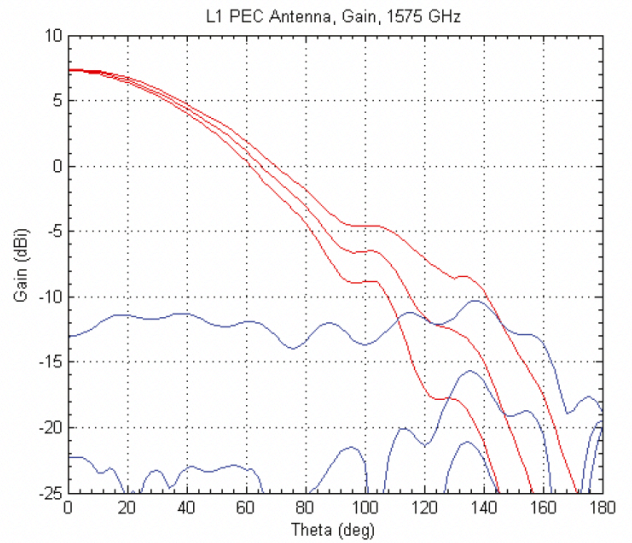
GEO GNSS PEC antenna

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.

The antenna operates at the GNSS L1/E1 band and is also capable of Glonass G1 use.

The antenna diameter is 144 mm, the maximum height is 35 mm and the mass is 220 g. It has a female SMA connector as RF interface. The SMA interface faces directly into the spacecraft.



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



L1 PEC antenna

Typical measured radiation pattern performance of the antennas 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.

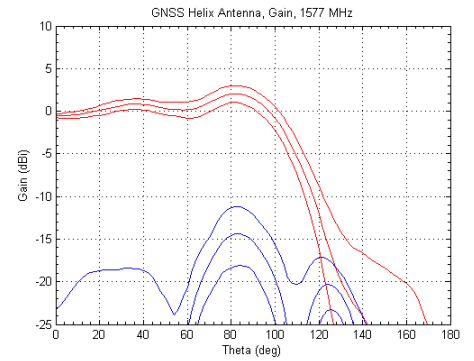
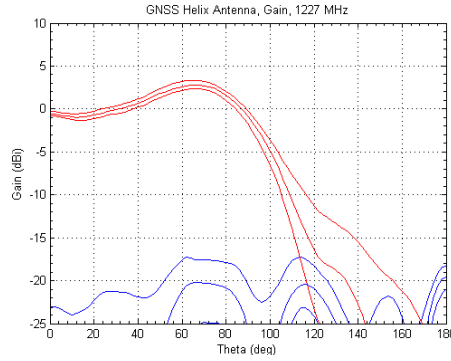
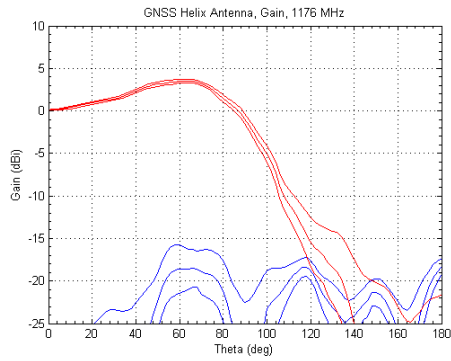
The antenna operates at GNSS frequencies from 1.176 GHz (L5/ E5a), 1.227 GHz (L2) to 1.575 GHz (L1/E1) and it has a hemispherical coverage.

The antenna diameter is 90 mm, the maximum height is 410 mm and the mass is 815g. It has a female TNC connector as RF interface.



GNSS helix antennas

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.



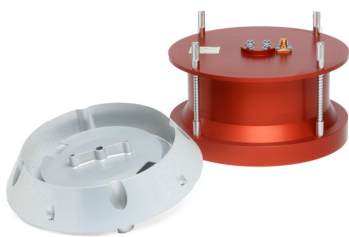
GNSS Helix test cap/hat for ambient use



GNSS PEC 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