

M7HCT-A-SMA

L1: GPS, GLONASS, GALILEO, BEIDOU
L2: GPS L2C, GALILEO E5B, GLONASS L3OC

Part #: 100-00069-01



Antenna images not to scale

Description

The M7HCT-A-SMA is an active multi-frequency, high-accuracy, GNSS antenna for the L1/L2 GPS, Galileo, Beidou and GLONASS bands. The antenna is designed for applications requiring greater accuracy than L1-only antennas can provide. The antenna is built on proprietary Maxtena Helicore® technology providing exceptional pattern control, polarization purity and high-efficiency in a compact form factor. It features an integrated SMA connector and rugged IP67 automotive grade components. The M7HCT-A-SMA is ideal for applications requiring minimal integration effort or for retrofitting existing products. The antenna is equipped with an O-ring.

Passive Antenna Performance

| Parameter | Specification | |
|-----------------|-------------------------------------|--------------------------------------|
| Frequency | 1192-1231 MHz (L2, B2, G2, G3, E5B) | 1559-1606 MHz (L1, E1, B1, B1-2, G1) |
| Peak Efficiency | 46% | 49% |
| Polarization | RHCP | RHCP |
| Realized Gain | 1.1 dB | 0.5 dB |
| Axial Ratio | Max 1.2 dB at the Zenith | Max 0.9 dB at the Zenith |
| VSWR | Max 2:1 | Max 2:1 |
| Beamwidth | 135° | 125° |

Phase Center Variation

| Maximum Phase Center Variation (mm) | |
|-------------------------------------|-----------|
| In azimuth plane | Max 10 mm |
| As low as 40 degree elevation | Max 10 mm |
| Between samples | Max 5 mm |
| Over frequency band | Max 10 mm |

RF Specifications

| Parameter | Specification |
|--------------------------|--------------------------------------|
| Conducted Gain | 30 dB ±3 dB |
| Noise Figure | 1.5 dB typical, 2 dB max |
| Voltage | 3.0 to 5.0 V |
| Current | 25 mA max |
| Out of Band Rejection | 40 dBc |
| Group Delay Variation | Less than 5ns over GNSS bands |
| EMI Immunity Out of Band | 30 V/m |
| ESD Circuit Protection | 15 kv human body model air discharge |

Features

- Quadrifilar helix antenna
- Concurrent GNSS reception on L1: GPS, GLONASS, Galileo, Beidou and L2: GPS L2C, Galileo E5B, and GLONASS L3OC
- Rugged IP67 rating with SMA mount
- Small form factor
- Ground plane independent
- GIS, RTK and other high accuracy GNSS applications
- Low power consumption
- Low phase center variation over azimuth and elevation and among different samples
- Ultra-lightweight
- Automotive grade electronics

Applications

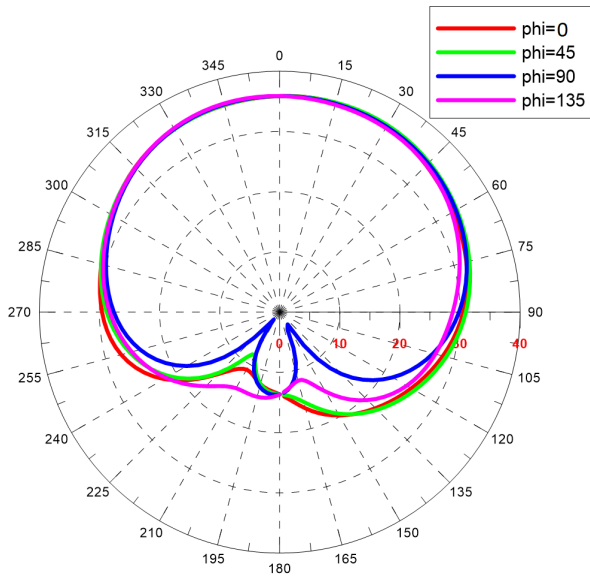
- UAV/Drones
- Unmanned Ground Vehicles (UGV)
- Unmanned Systems
- High Precision Navigation
- Military & Security
- Agriculture & FarmTech
- Handheld GNSS Devices

L2 band radiation patterns

Maxtena's M7HCT-A-SMA has unique features that make it the best option for high-accuracy GNSS applications.

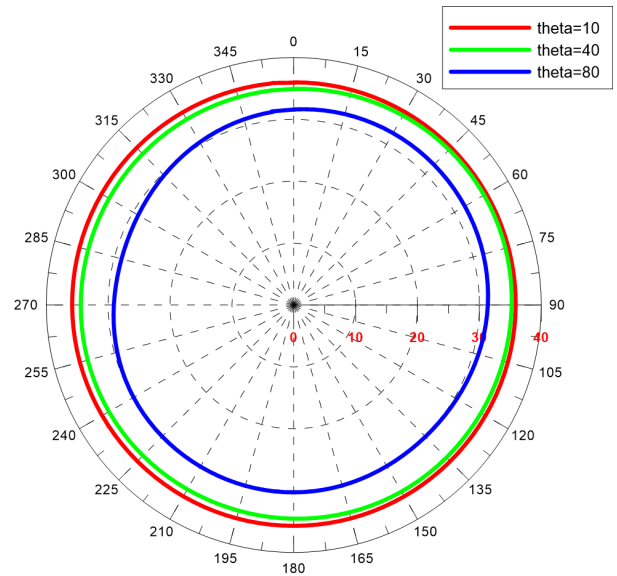
1. Low axial ratio not only at the zenith, but also in other elevation angles ensures multipath error is mitigated.
2. Full hemispherical coverage is achieved by an exceptionally large 3 dB beamwidth, ensuring full view of sky and satellites in lower elevation angles.
3. Highly symmetric radiation pattern guarantees there will be no direction of weak reception or blind spots.

RHCP Realized Gain [dBic] - Elevation Cuts



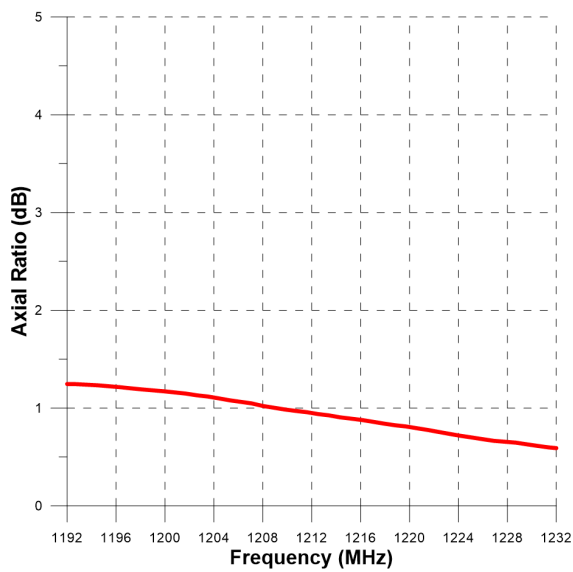
A 135 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBic] - Azimuth Cuts

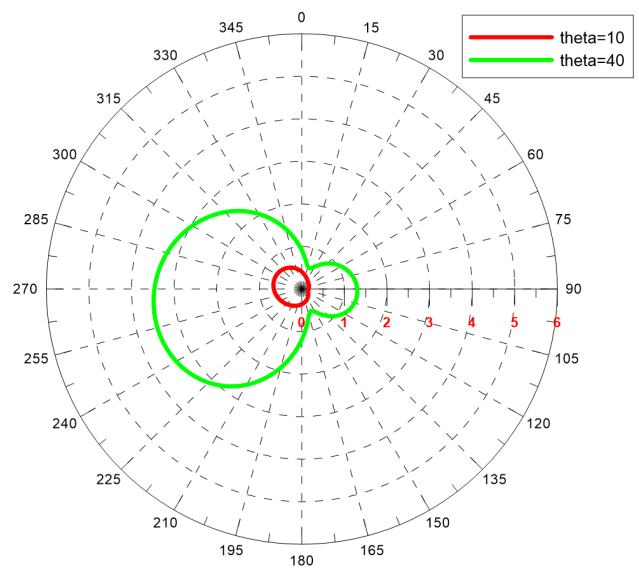


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith



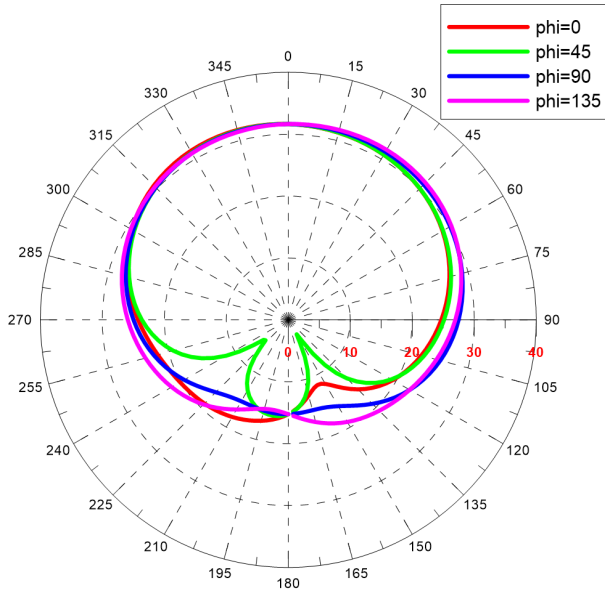
Axial Ratio [dB] - Azimuth Cuts



L1 band radiation patterns

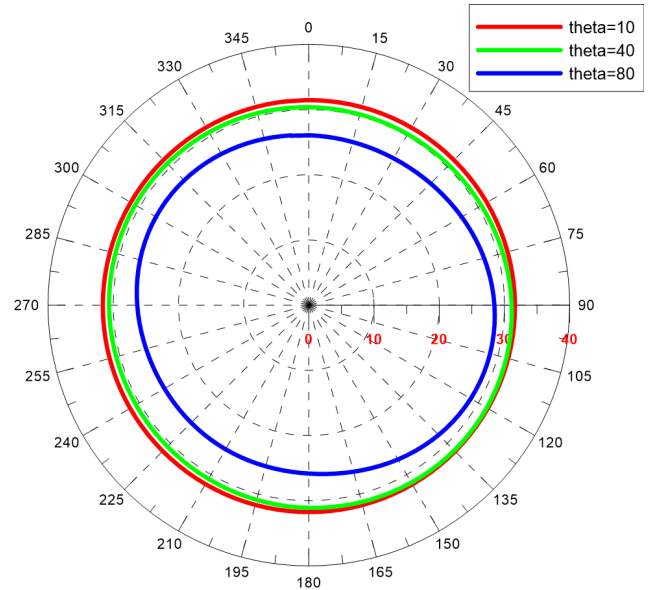
Maxtena's M7HCT-A-SMA uses patented Helicore technology which results in minimal dependence on frequency and features a wide beamwidth, low axial ratio and radiation pattern symmetry across all desired frequencies in L1 and L2 bands.

RHCP Realized Gain [dBiC] - Elevation Cuts



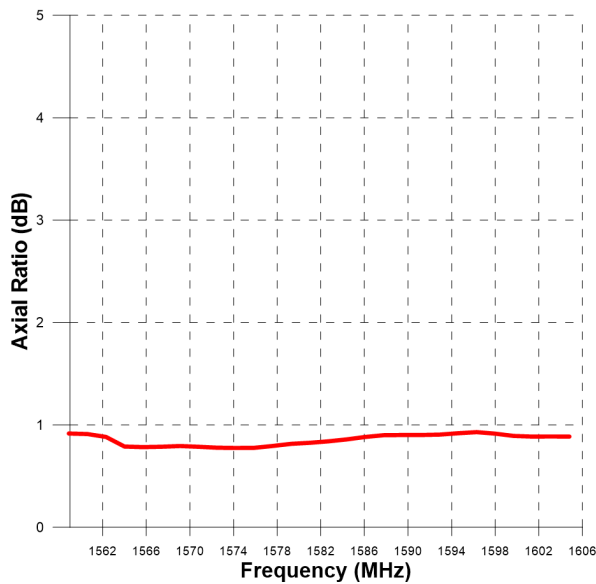
A 125 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBiC] - Azimuth Cuts

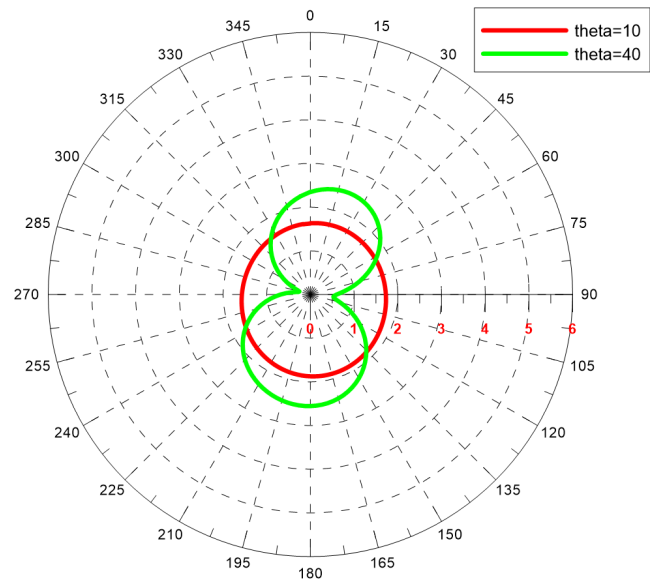


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith

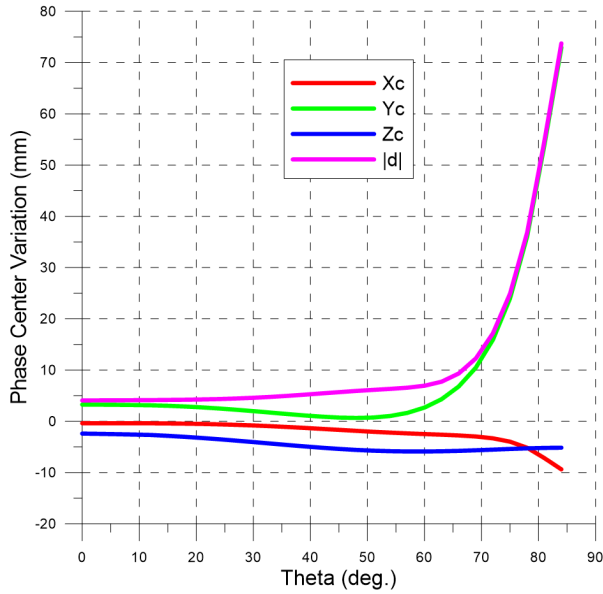


Axial Ratio [dB] - Azimuth Cuts

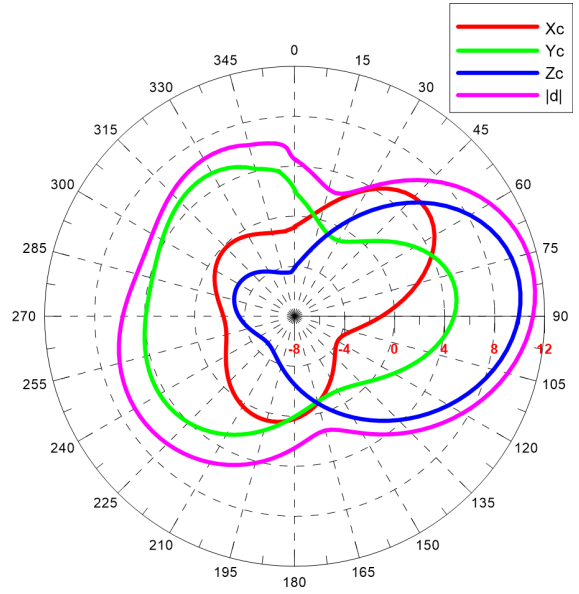


Phase Center Variation

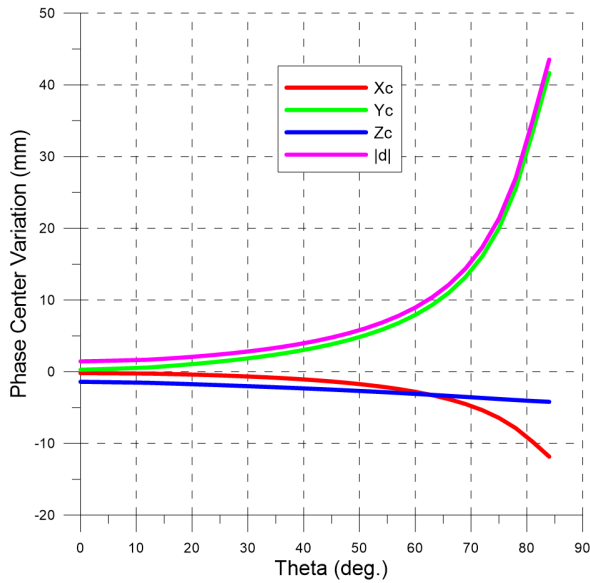
Maxtena's M7HCT-A-SMA has minimal phase center variation over azimuth and elevation in L1 and L2 bands.



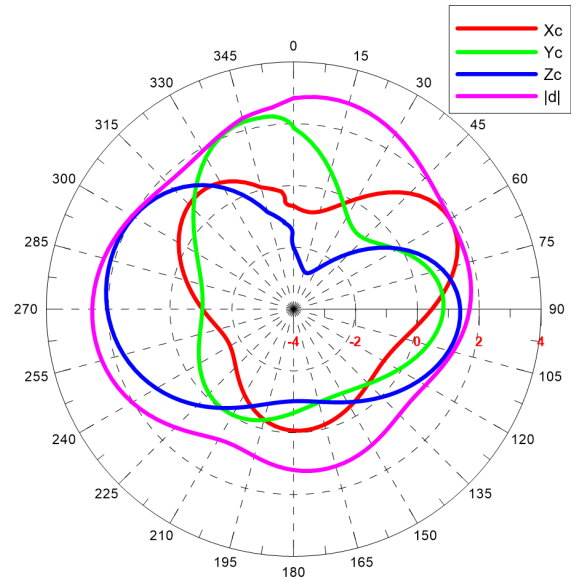
Phase Center Variation vs. Elevation in L2 band.



Phase Center Variation vs. Azimuth at Theta=30° in L2 band.



Phase Center Variation vs. Elevation in L1 band.



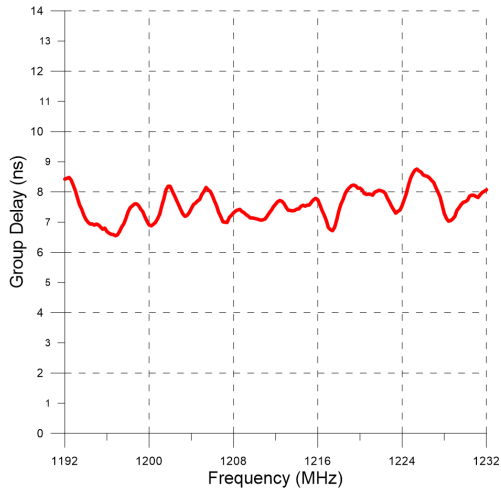
Phase Center Variation vs. Azimuth at Theta=30° in L1 band.

Excellent Group Delay Variation

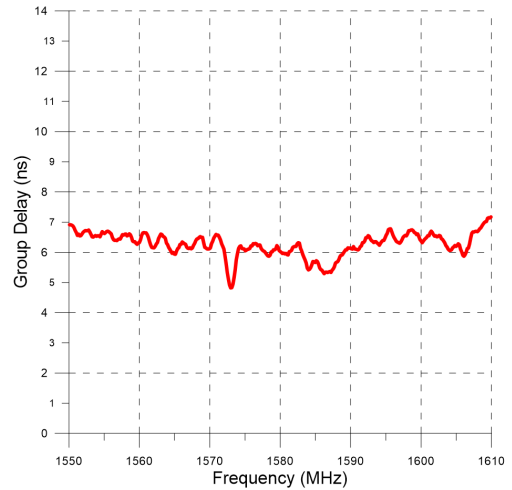
Using GPS signal carrier phase to increase accuracy in GNSS applications has been proven reliable and has made mm-level accuracy possible. However, in resolving carrier phase ambiguity, it is necessary to make sure carrier phase is received and measured accurately and that the effect of antenna and receiver on carrier phase is minimized. Maxtena's M7HCT-A-SMA has a flat response over all GNSS bands that it covers and has minimal group delay variation over frequency.

Filtering and LNA Performance

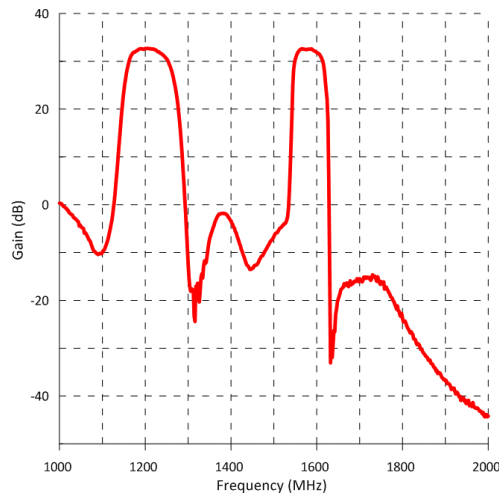
Maxtena's M7HCT-A-SMA antenna has a flat response over both L1 and L2 GNSS bands, with less than 1 dB variation over each band. The superior out-of-band rejection ensures minimal interference.



< 2 ns group delay variation over L2-band.



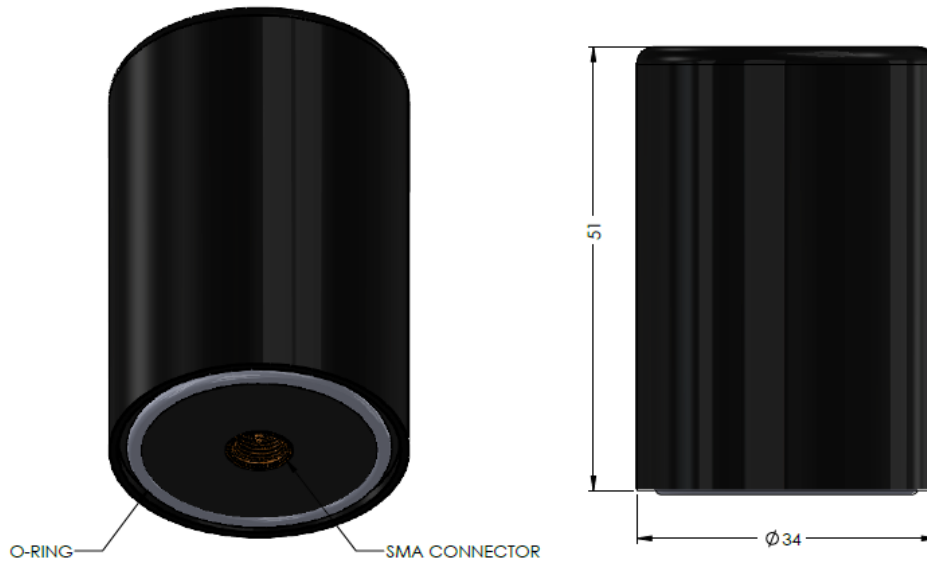
< 2 ns group delay variation over L1-band.



Flat conducted gain response.

Mechanical Specifications

| Parameter | Specification |
|-----------------------------|------------------------------|
| Operating Temperature Range | -40 to +105°C |
| Environmental Standards | IP67 rating |
| Cabling and Connector | No cable, male SMA connector |
| Weight | 25 grams |



Dimensions are in mm.