

# M8HCT-A-SMA

## FEATURING PROPRIETARY HELICORE™ TECHNOLOGY

The M8HCT-A-SMA is the world's most advanced patented GNSS antenna. Designed for high precision & autonomous multi-frequency applications. The rugged active quadrifilar helix antenna is manufactured using automotive grade electronics for GIS, RTK and other GNSS applications. The revolutionary design offers concurrent reception on L1: GPS, GLONASS, Galileo, Beidou L2: GPS L2C, Galileo E5B, GLONASS L30C and L5: the most advanced GNSS signal yet.

# M8HCT-A-SMA

L1: GPS, GLONASS, GALILEO, BEIDOU  
 L2: GPS L2C, GALILEO E5B, GLONASS L3OC  
 L5: GPS

Part #: 100-00124-01

## Description

The M8HCT-A-SMA is an active multi-frequency, high-accuracy, GNSS antenna for the L1/L2/L5 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 M8HCT-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)	1164-1189 MHz (L5)
Peak Efficiency	46%	49%	40%
Polarization	RHCP	RHCP	RHCP
Realized Gain	1.1 dB	0.5 dB	0.5 dB
Axial Ratio	Max 1.2 dB at the Zenith	Max 0.9 dB at the Zenith	1.1 dB at the Zenith
VSWR	Max 2:1	Max 2:1	Max 1:1
Beamwidth	135°	125°	112°

## 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



Antenna images not to scale

## Features

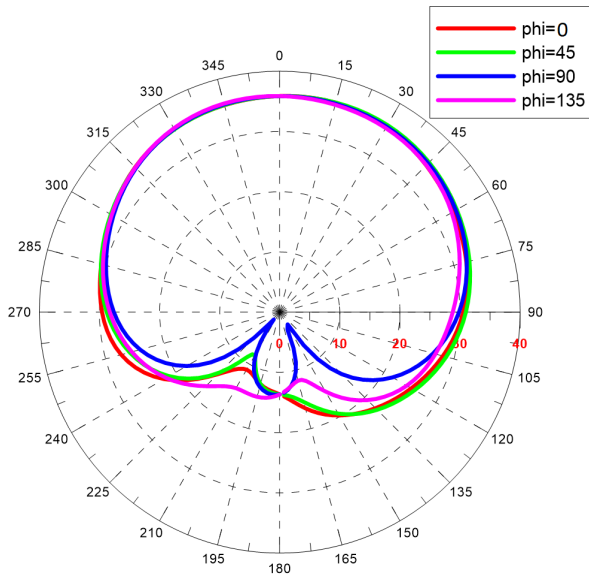
- Quadrifilar helix antenna
- Concurrent GNSS reception on L1: GPS, GLONASS, Galileo, Beidou L2: GPS L2C, Galileo E5B, GLONASS L3OC and L5: GPS
- Rugged IP67 rating with SMA mount
- Small form factor
- Ground plane independent
- GIS, RTK and other high accuracy GNSS applications
- Low power consumption
- Low phase center variation over azimuth and elevation and among different samples
- Ultra-lightweight
- Automotive grade electronics

## L2 band radiation patterns

Maxtena's M8HCT-A-SMA has unique features that make it the best option for high-accuracy GNSS applications.

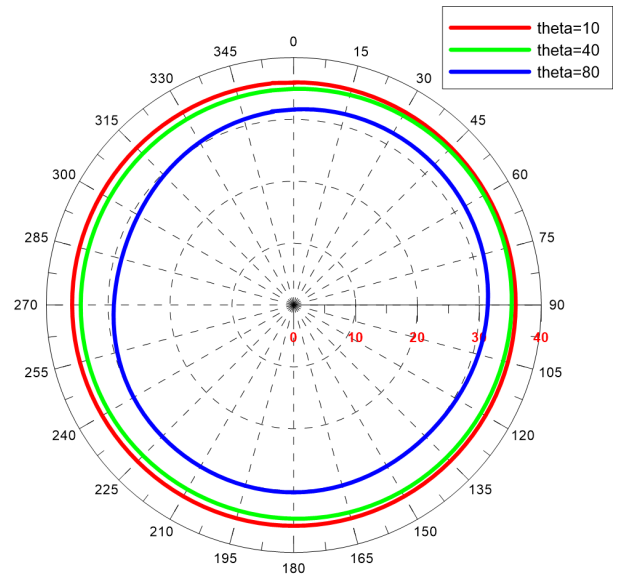
1. Low axial ratio not only at the zenith, but also in other elevation angles ensures multipath error is mitigated.
2. Full hemispherical coverage is achieved by an exceptionally large 3 dB beamwidth, ensuring full view of sky and satellites in lower elevation angles.
3. Highly symmetric radiation pattern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

RHCP Realized Gain [dBic] - Elevation Cuts



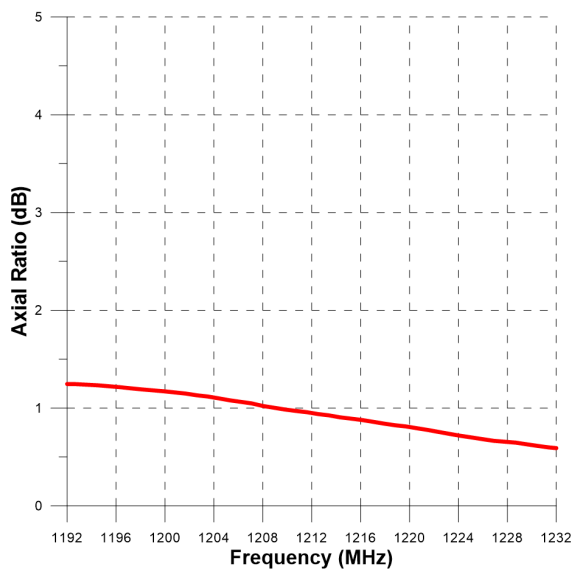
A 135 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBic] - Azimuth Cuts

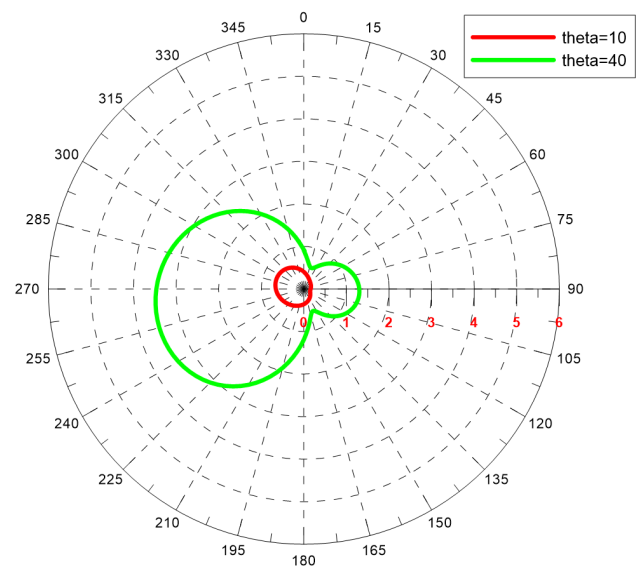


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith



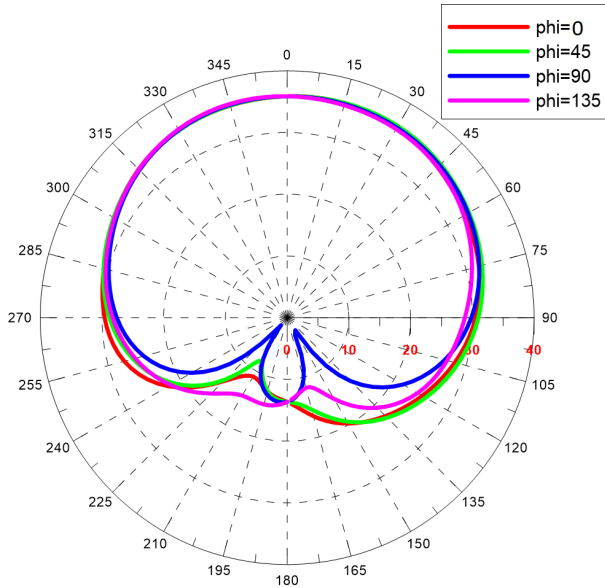
Axial Ratio [dB] - Azimuth Cuts



### L1 band radiation patterns

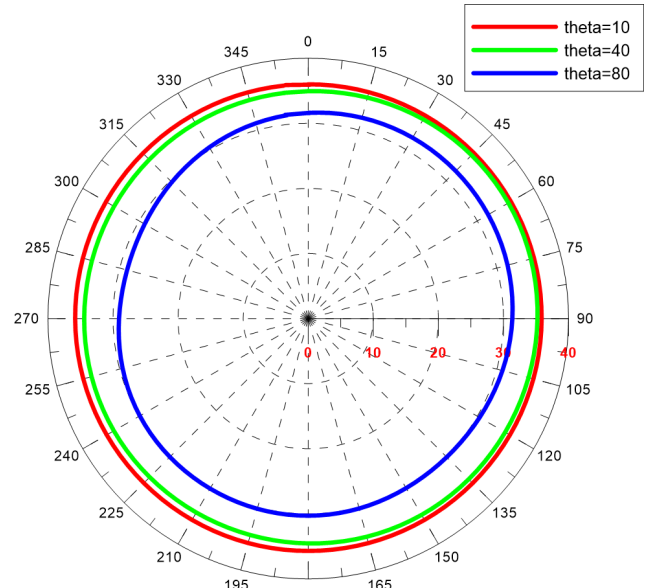
Maxtena's M8HCT-A-SMA uses patented Helicore technology which results in minimal dependence on frequency and features a wide beamwidth, low axial ratio and radiation pattern symmetry across all desired frequencies in L1, L2 and L5 bands.

**RHCP Realized Gain [dBic] - Elevation Cuts**



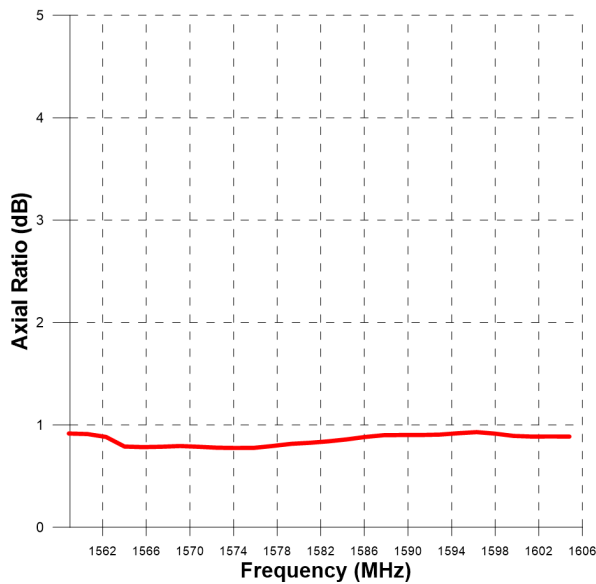
A 125 degree beamwidth ensures excellent hemispherical coverage.

**RHCP Realized Gain [dBic] - Azimuth Cuts**

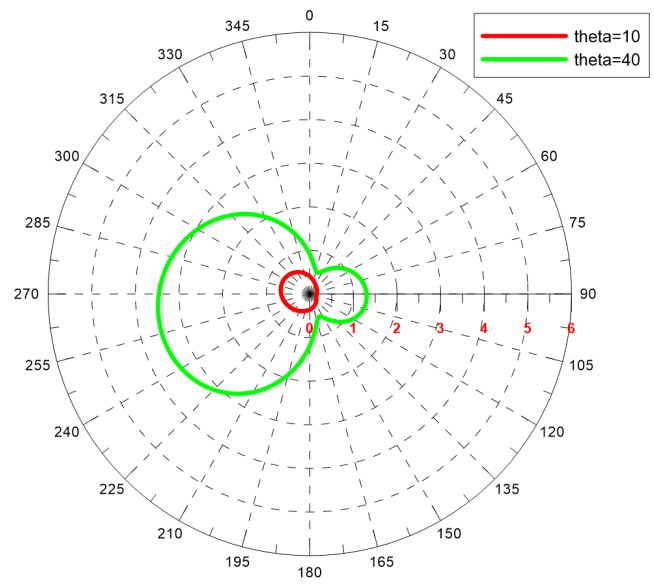


Symmetric coverage even in low elevation enhances accuracy.

**Axial Ratio [dB] - Zenith**



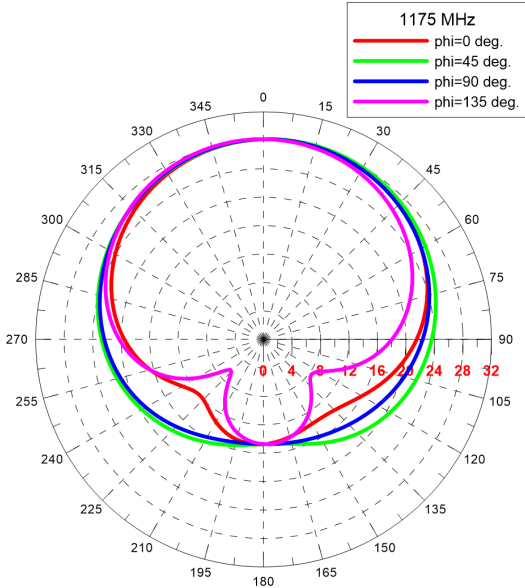
**Axial Ratio [dB] - Azimuth Cuts**



**L5 band radiation patterns**

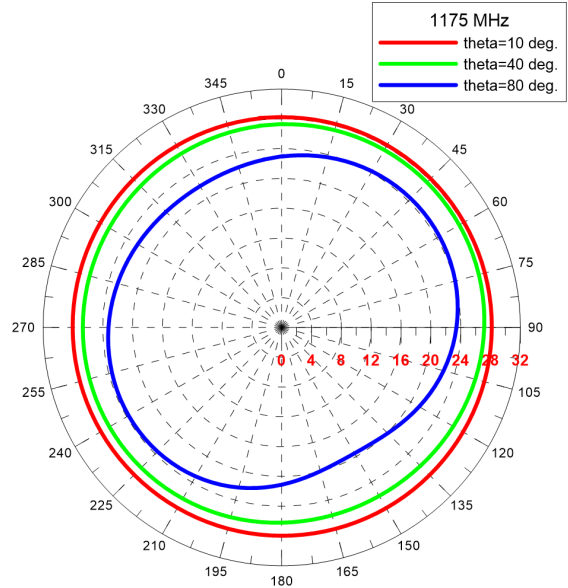
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**RHCP Realized Gain [dBic] - Elevation Cuts**



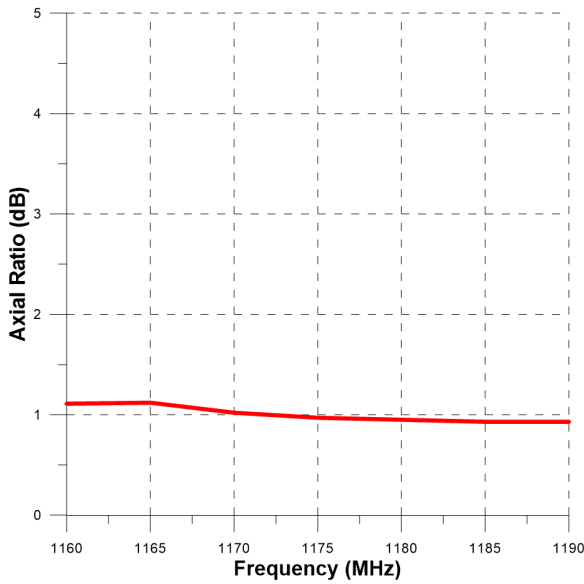
A 125 degree beamwidth ensures excellent hemispherical coverage.

**RHCP Realized Gain [dBic] - Azimuth Cuts**

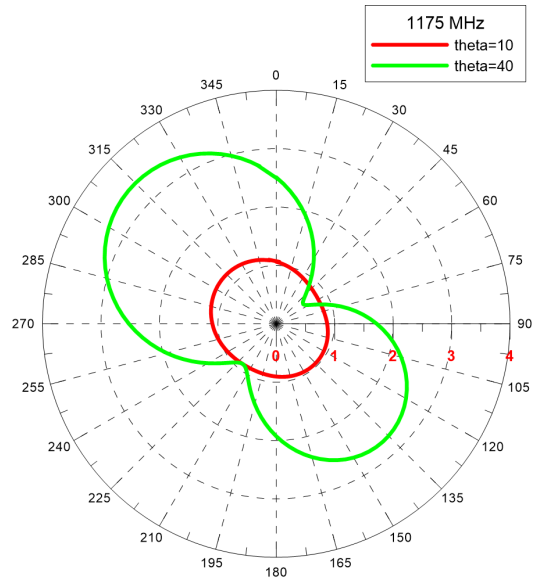


Symmetric coverage even in low elevation enhances accuracy.

**Axial Ratio [dB] - Zenith**

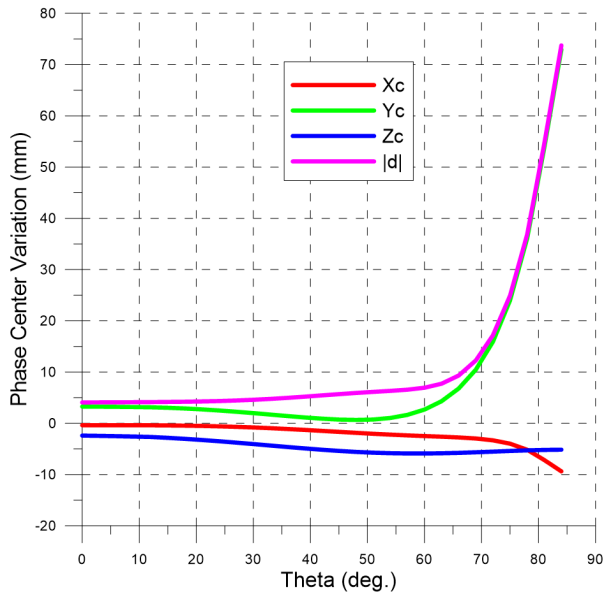


**Axial Ratio [dB] - Azimuth Cuts**

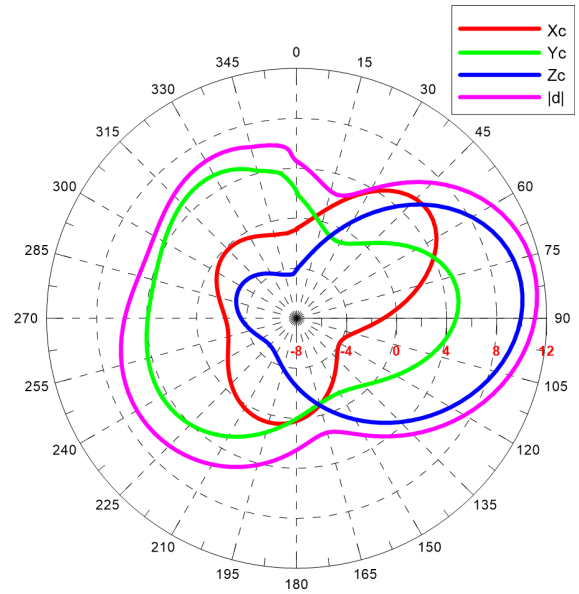


## Phase Center Variation

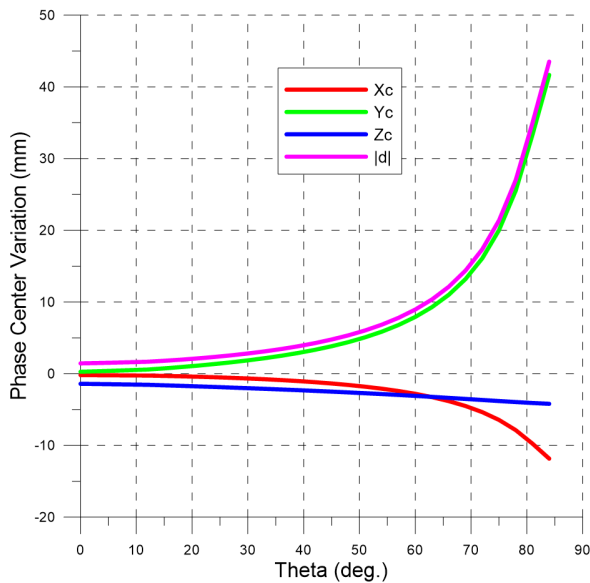
Maxtena's M8HCT-A-SMA has minimal phase center variation over azimuth and elevation in L1, L2 and L5 bands.



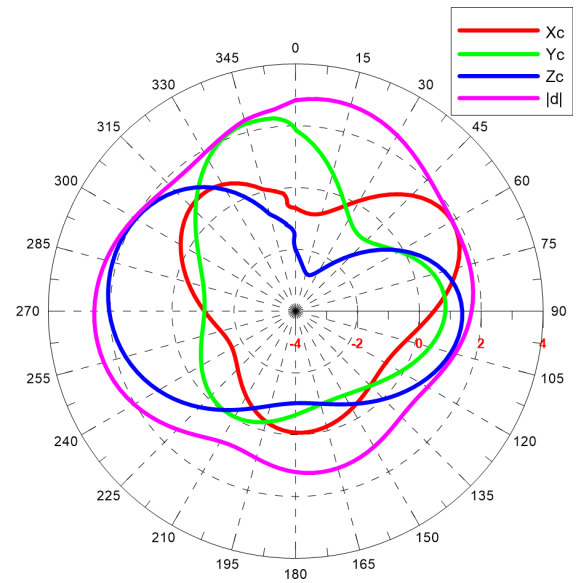
Phase Center Variation vs. Elevation in L2 band.



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



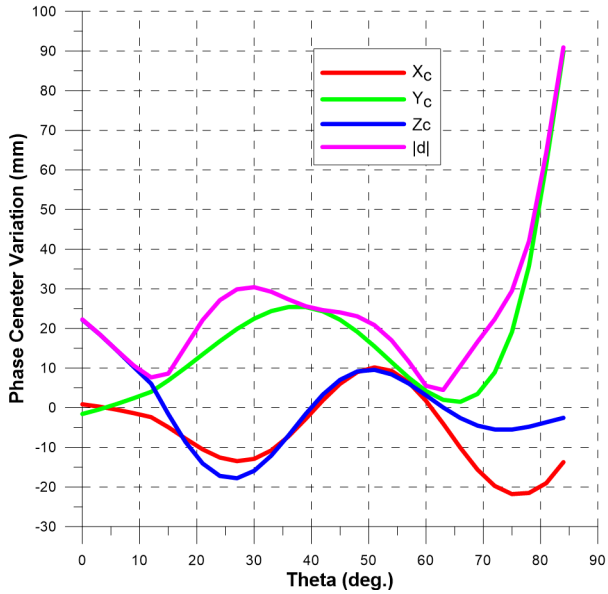
Phase Center Variation vs. Elevation in L1 band.



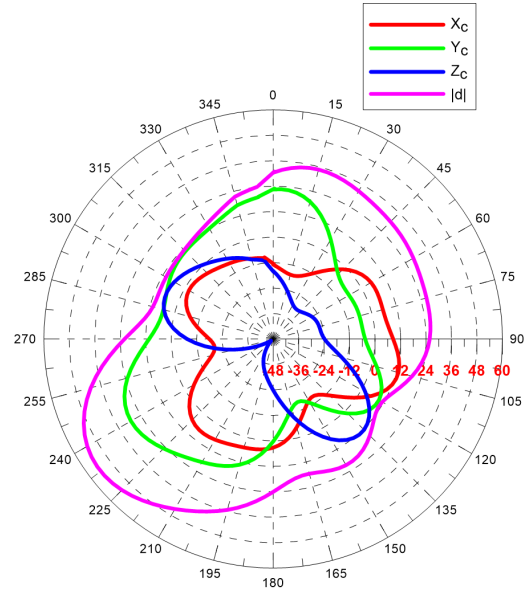
Phase Center Variation vs. Azimuth at Theta=30° in L1 band.

### Phase Center Variation

Maxtena's M8HCT-A-SMA has minimal phase center variation over azimuth and elevation in L1, L2 and L5 bands.



Phase Center Variation vs. Elevation in L5 band.



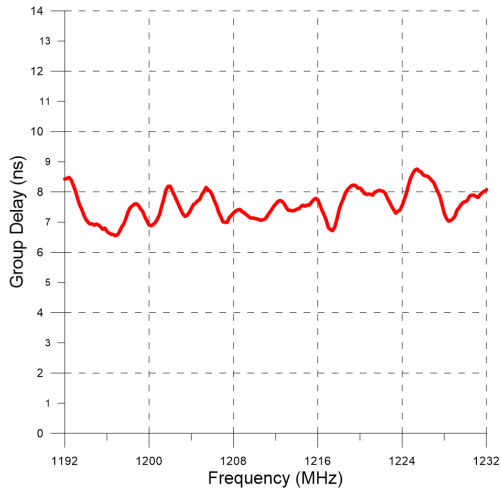
Phase Center Variation vs. Azimuth at Theta=30° in L5 band.

### Excellent Group Delay Variation

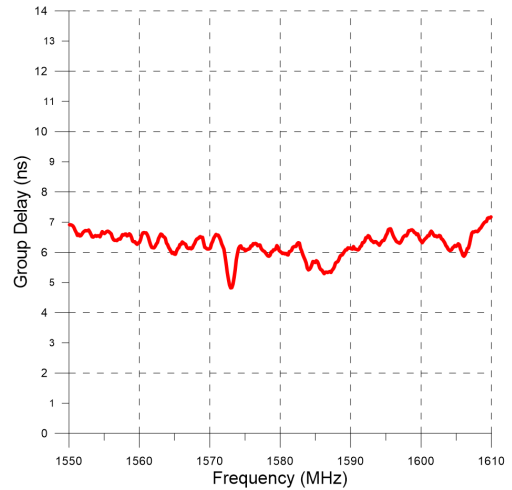
Using GPS signal carrier phase to increase accuracy in GNSS applications has been proven reliable and has made mm-level accuracy possible. However, in resolving carrier phase ambiguity, it is necessary to make sure carrier phase is received and measured accurately and that the effect of antenna and receiver on carrier phase is minimized. Maxtena's M8HCT-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

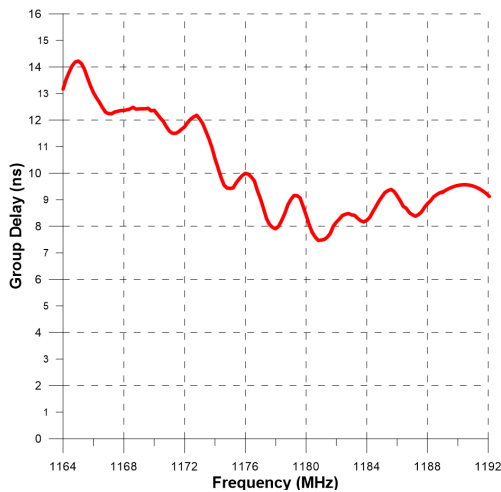
Maxtena's M8HCT-A-SMA antenna has a flat response over the L1, L2 and L5 GNSS bands, with less than 1 dB variation over each band. The superior out-of-band rejection ensures minimal interference.



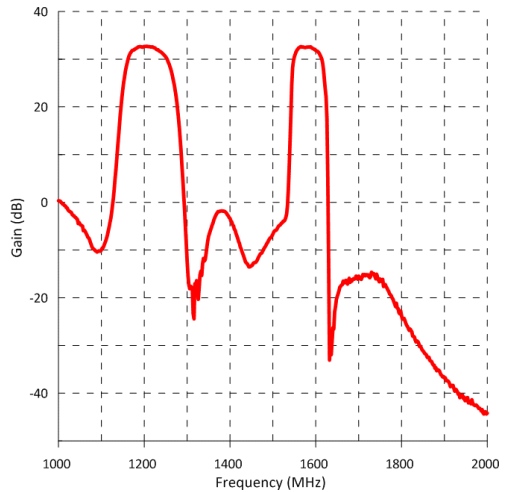
< 2 ns group delay variation over L2-band.



< 2 ns group delay variation over L1-band.



< 2 ns group delay variation over L5-band.

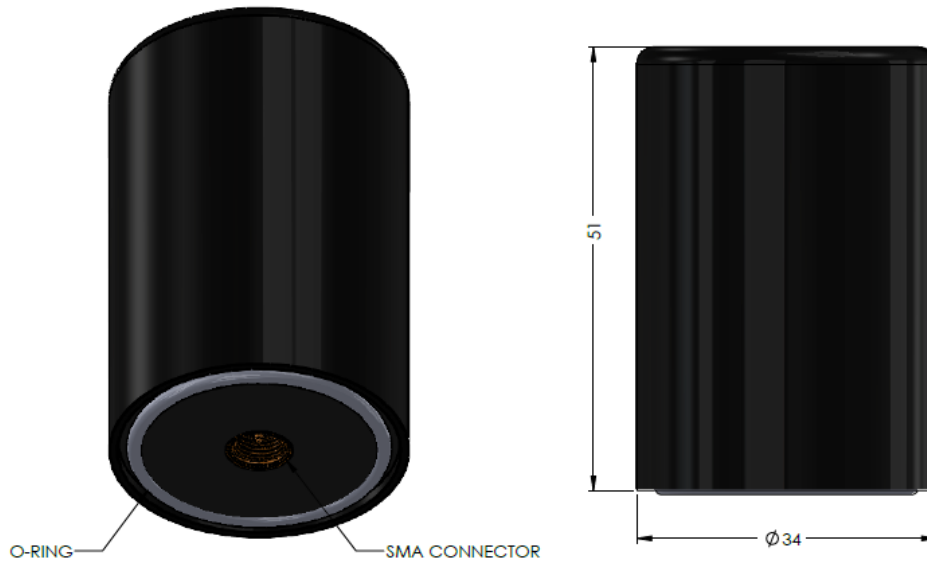


Flat conducted gain response.



### 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.



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