M9706CWT

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

Part #: 100-00090-01





Description

The M9706CWT 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's excellent radiation pattern, exceptional out-of-band rejection, minimal group delay variation, and low noise figure ensures optimal performance of GNSS systems. It features a 5 m cable with an integrated SMA, SMB, or MCX connector (customer choice). The M9706CWT is ideal for applications requiring minimal integration effort or for retrofitting existing products and is rated IP67. The antenna is manufactured using automotive grade housing.

Passive Antenna Performance

Parameter	Specification	
Frequency	1197-1249 MHz (L2, B2, G2, G3, E5B)	1559-1606 MHz (L1, E1, B1, B1-2, G1)
Peak Efficiency	39%	40%
Polarization	RHCP	RHCP
Realized Gain	2.6 dB	3.3 dB
Axial Ratio	Max 1.5 dB at the Zenith	Max 2.7 dB at the Zenith
VSWR	Max 2:1	Max 2.3:1
Beamwidth	117˚	100˚

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	28 dB ± 3 dB
Noise Figure	2 dB max
Voltage	3.0 - 5.0 V
Current	35 mA (max)
Out of Band Rejection	40 dB (typical)
Group Delay Variation	Less than 5 ns over GNSS bands
EMI Immunity Out of Band	30 V/m
ESD Circuit Protection	15 kV human body model air discharge

Features

- Low profile design
- Concurrent GNSS reception on L1: GPS, GLONASS, Galileo, Beidou and L2: GPS L2C, Galileo E5B, and GLONASS L3OC
- Rugged IP67 rating
- Small form factor
- GIS, RTK and other high accuracy GNSS applications
- Low power consumption
- Minimal phase center variation over azimuth and elevation
- Negligible group delay variation
- Automotive grade housing

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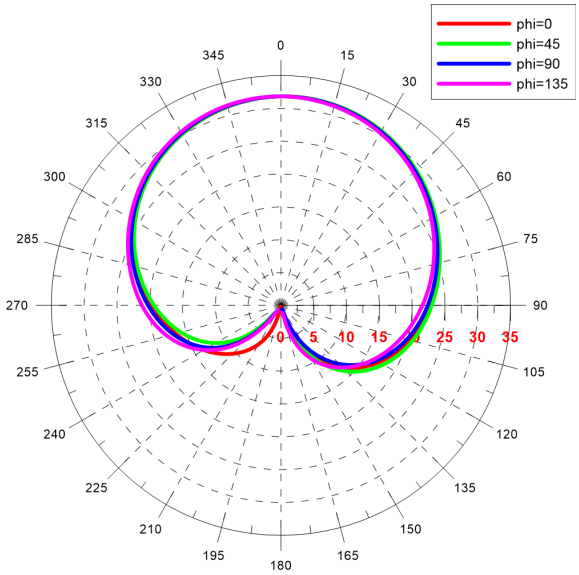
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L2 band radiation patterns

Maxtena M9706CWT has unique features that make it the best option for high-accuracy GNSS applications.

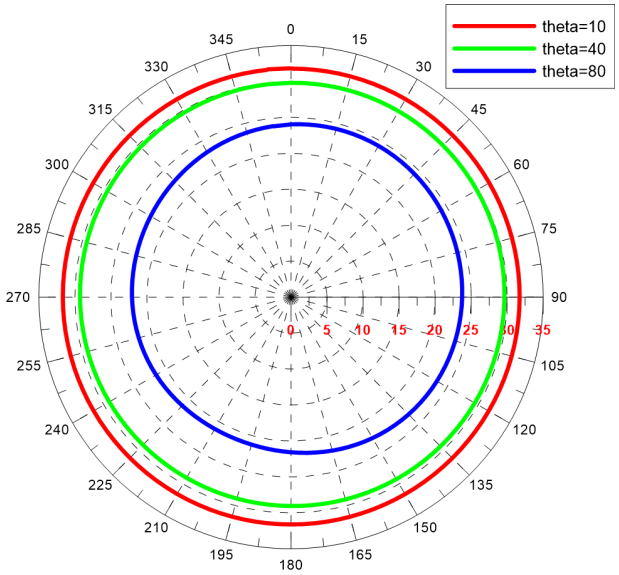
1. Low axial ratio not only at the zenith, but also in other elevation angles ensures multipath error is mitigated.
2. Full hemispherical coverage is achieved by an exceptionally large 3 dB beamwidth, ensuring full view of sky and satellites at lower elevation angles.
3. Highly symmetric radiation pattern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

RHCP Realized Gain [dBic] - Elevation Cuts



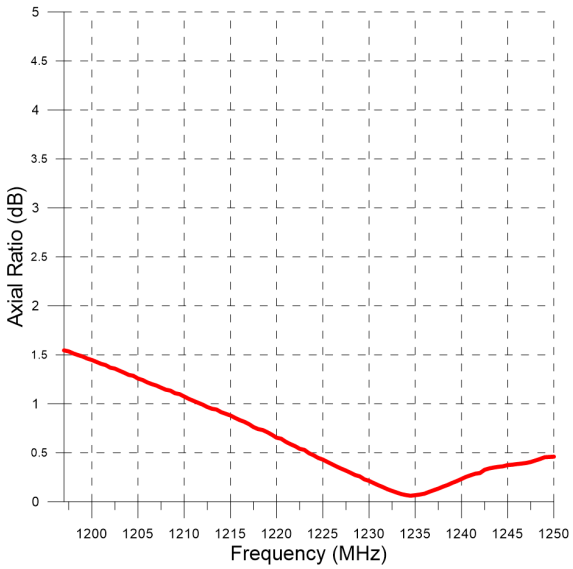
A 117 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBic] - Azimuth Cuts

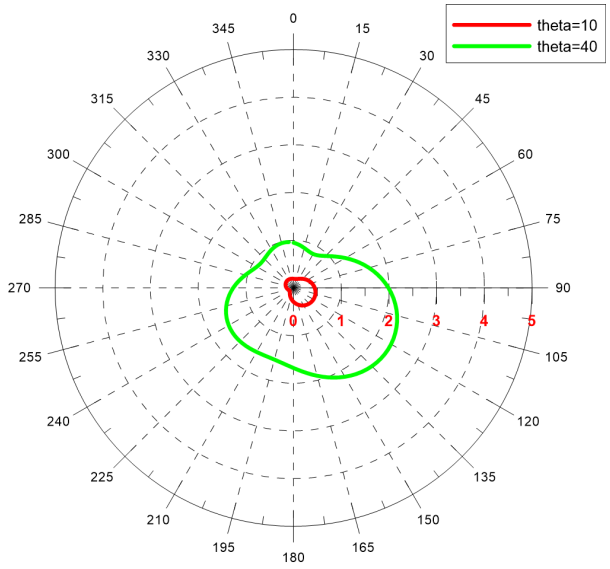


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith



Axial Ratio [dB] - Azimuth Cuts

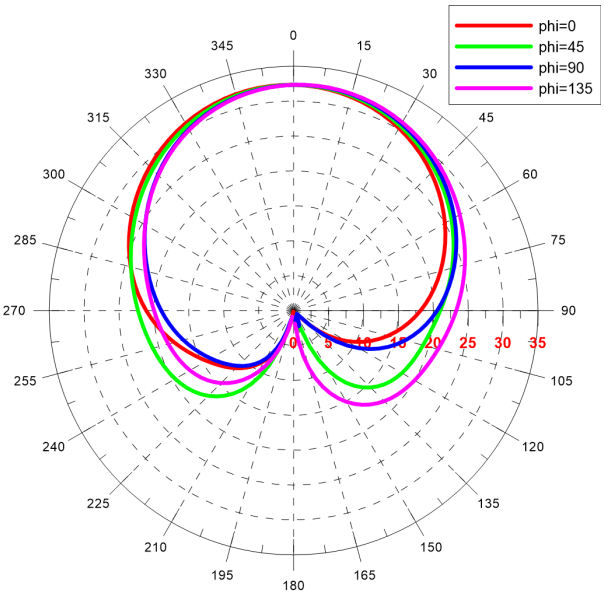


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L1 band radiation patterns

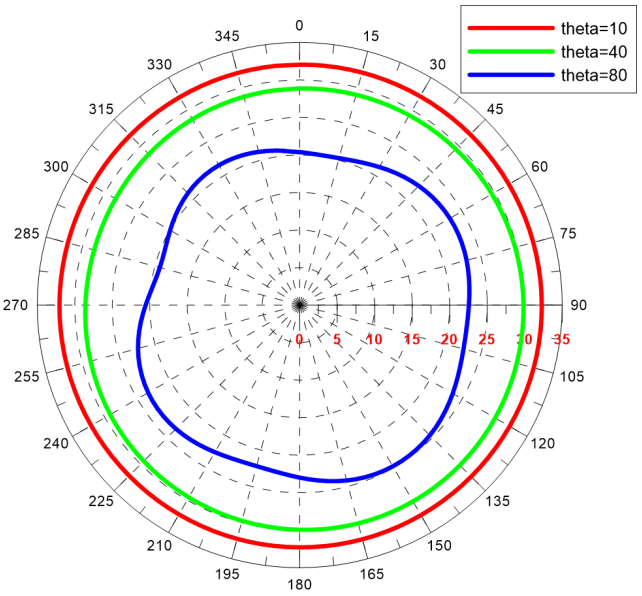
Maxtena's M9706CWT uses patented optimized microstrip technology which results in minimal dependence on frequency and features wide beamwidth, low axial ratio and radiation pattern symmetry across all desired frequencies in L1 and L2 bands.

RHCP Realized Gain [dBic] - Elevation Cuts



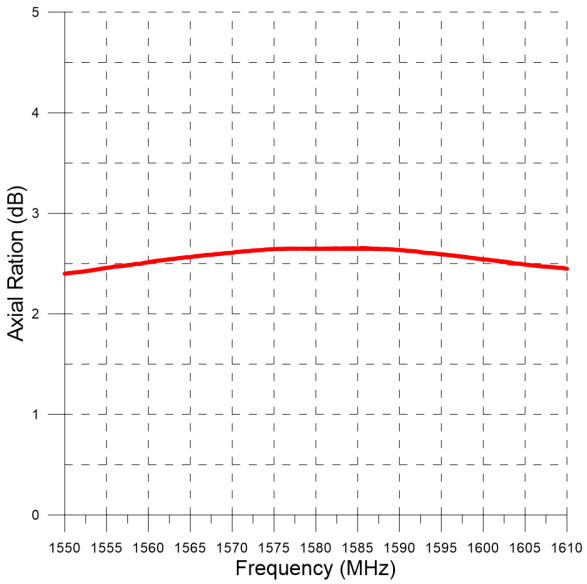
A 100 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBic] - Azimuth Cuts

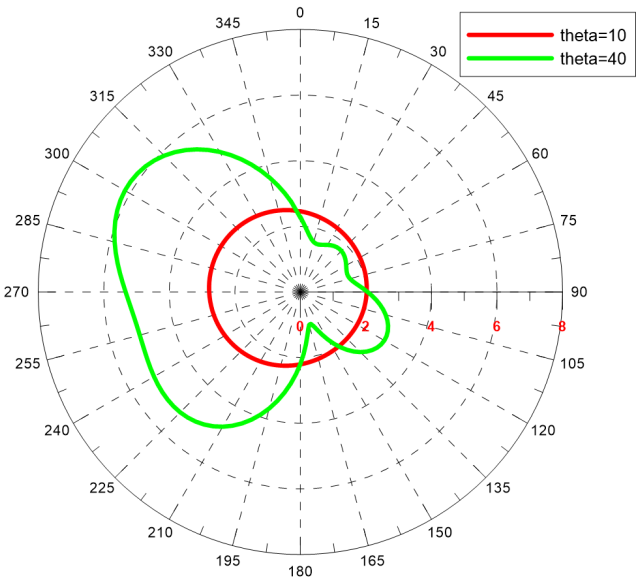


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith



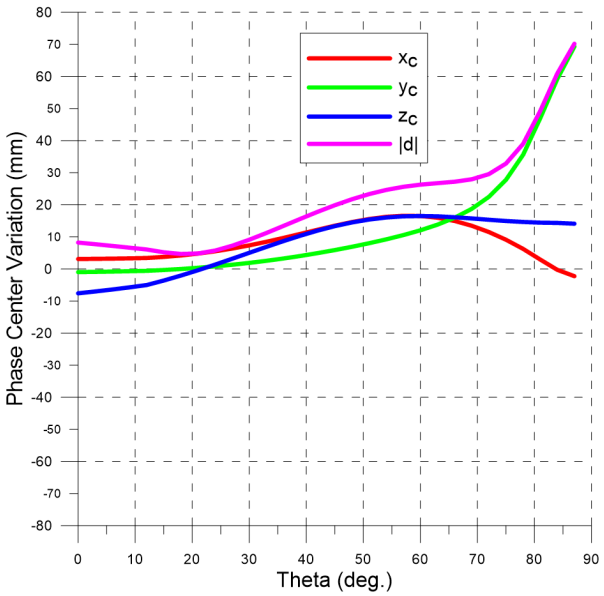
Axial Ratio [dB] - Azimuth Cuts



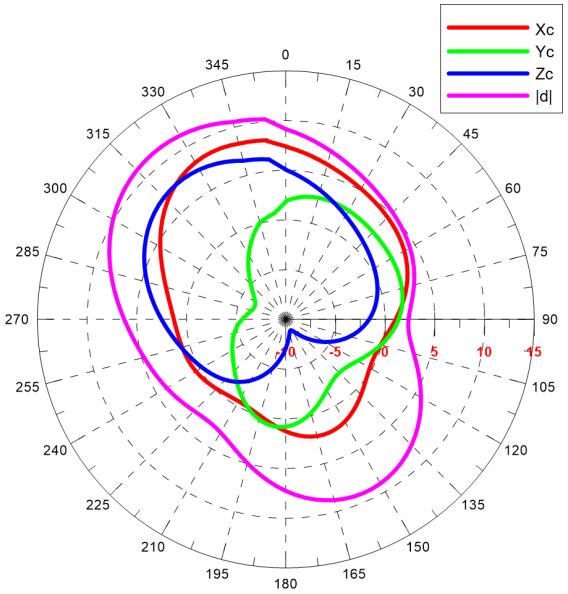
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Phase Center Variation

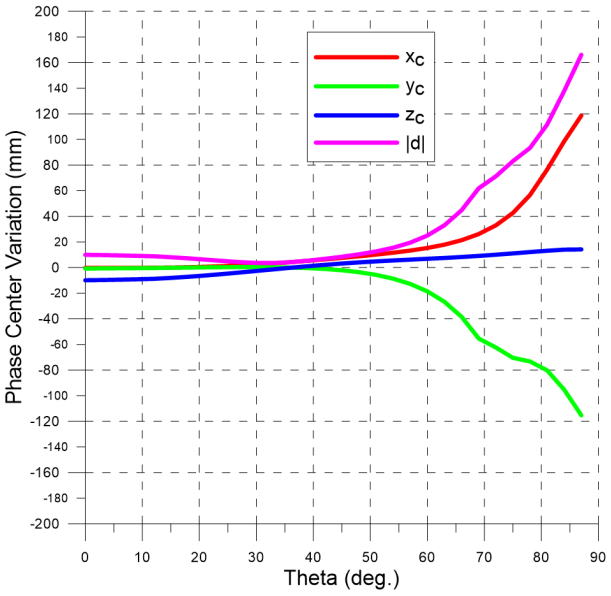
Maxtena's M9706CWT has minimal phase center variation over azimuth and elevation in L1 and L2 bands.



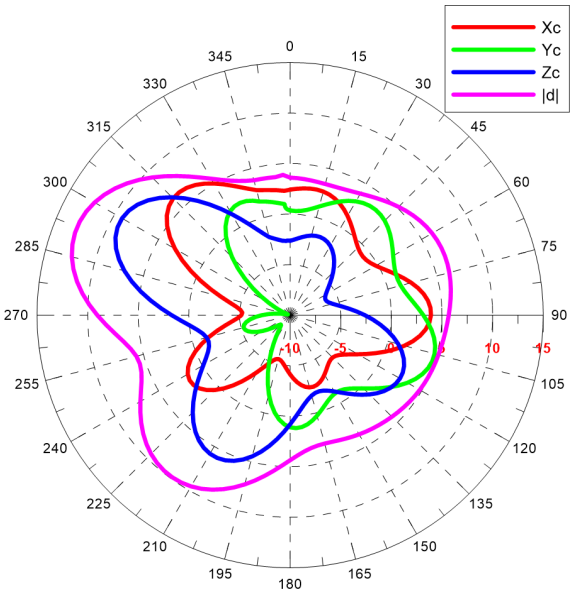
Phase Center Variation vs. Elevation in L2 band.



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.

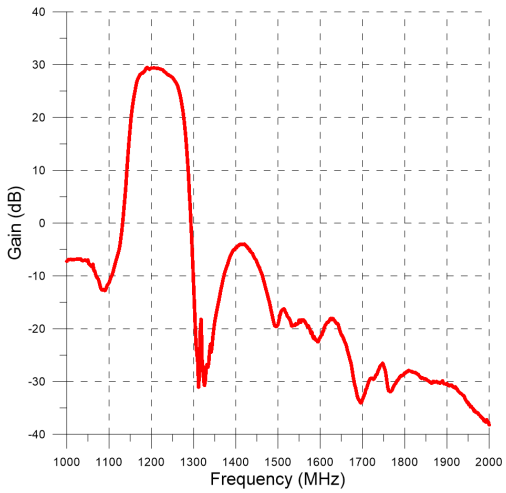
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Excellent Group Delay Variation

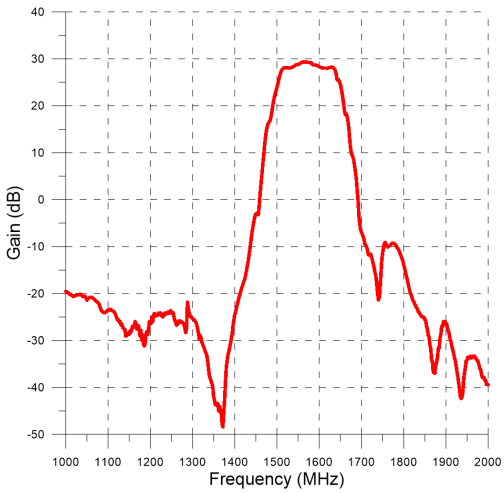
Using GPS carrier phase to increase accuracy in GNSS applications has been proven reliable and has made mm-level accuracy possible. However, in resolving carrier phase ambiguity, it is necessary to make sure carrier phase is received and measured accurately and the effect of antenna and receiver on carrier phase is minimized. Maxtena's M9706CWT has a flat response over its specified GNSS bands and has minimal group delay variation over frequency.

Filtering and LNA Performance

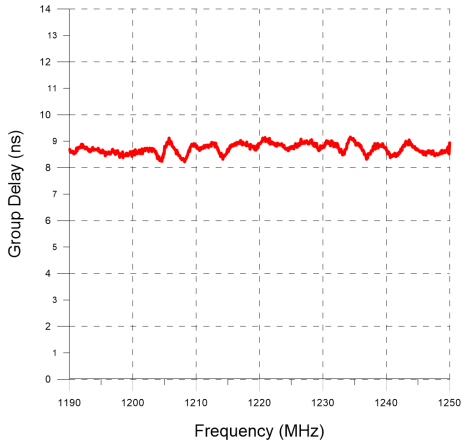
Maxtena's M9706CWT antenna has a flat response over both L1 and L2 GNSS bands, with less than 1 dB variation over each band. The superior out-of-band rejection ensures minimal interference.



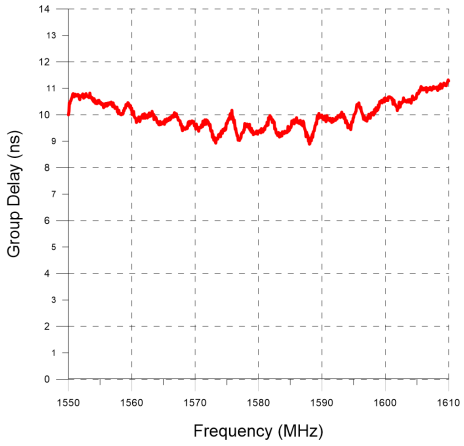
Outstanding out-of-band rejection and less than 1dB fluctuation of in-band frequency response over L2-band.



Outstanding out-of-band rejection and less than 1dB fluctuation of in-band frequency response over L1-band.



< 2 ns group delay variation over L2-band.

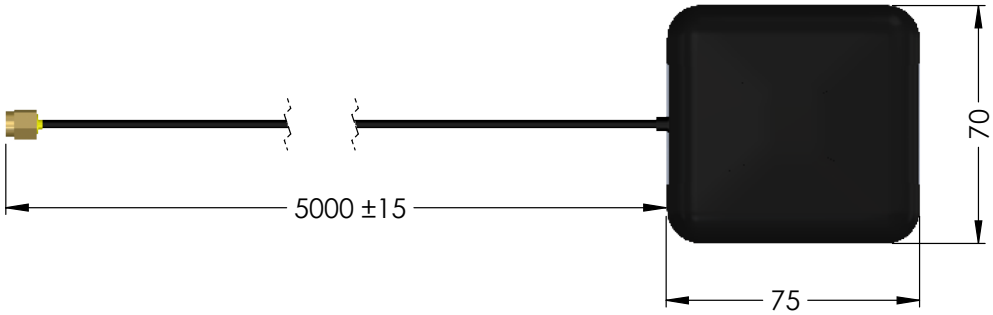


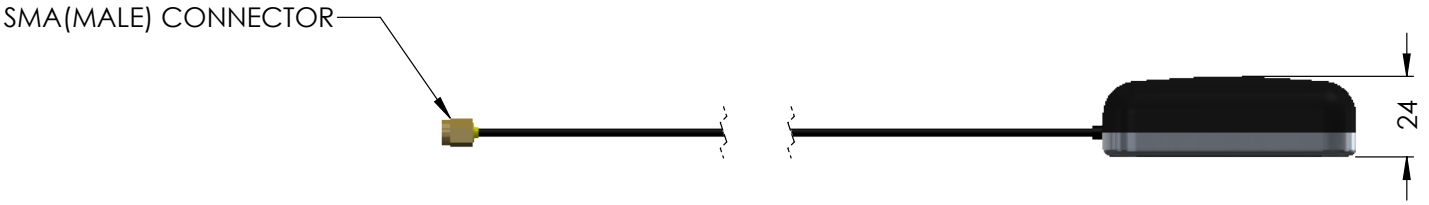
< 2 ns group delay variation over L1-band.

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Mechanical Specifications

Parameter	Specification
Weight	230 g (w/ cable) 167 g (w/o cable)
Size	75 x 70 x 23 mm
Cable	5 m RG174 standard
Connector	SMA, SMB, MCX (customer choice)
Mounting	Magnetic base, fixed installation option
Ground Plane	150 mm x 150 mm
Color	Black
Operating Temperature Range	-40 to +105˚C





Dimensions are in mm.

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