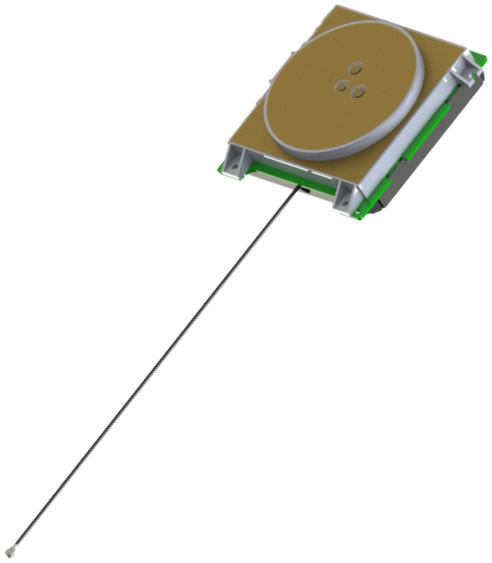
M9708CWT-UFL

L1: GPS, GLONASS, GALILEO, BEIDOU
L2: GPS L2C, GALILEO E5B, GLONASS L3OC
L5: GPS L5, GALILEO E5A

Part #: 108-00067-01



Description

The M9708CWT-UFL 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's excellent radiation pattern, exceptional out-of-band rejection, minimal group delay variation, and low noise figure ensures optimal performance of GNSS systems. The M9708CWT-UFL is ideal for applications requiring minimal integration effort or for retrofitting existing products. The antenna is mounted on the inside of the applications housing, allowing it to be hidden. The antenna element is custom tuned to the applications enclosure.

Passive Antenna Performance

Parameter	Specification		
Frequency	1197-1249 MHz (L2, B2, G2, G3, E5B)	1559-1606 MHz (L1, E1, B1, B1-2, G1)	1164-1189 MHz (L5, E5A)
Peak Efficiency	39%	40%	35%
Polarization	RHCP	RHCP	RHCP
Realized Gain	2.6 dB	3.3 dB	-2 dB
Axial Ratio	Max 1.5 dB at the Zenith	Max 2.7 dB at the Zenith	Max 3 dB at the Zenith
VSWR	Max 2:1	Max 2.3:1	Max 3:1
Beamwidth	117˚	100˚	74˚

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
  - L2: GPS L2C, Galileo E5B, and GLONASS L3OC
  - L5: GPS L5, Galileo E5A
- 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
- Custom tuned to applications enclosure

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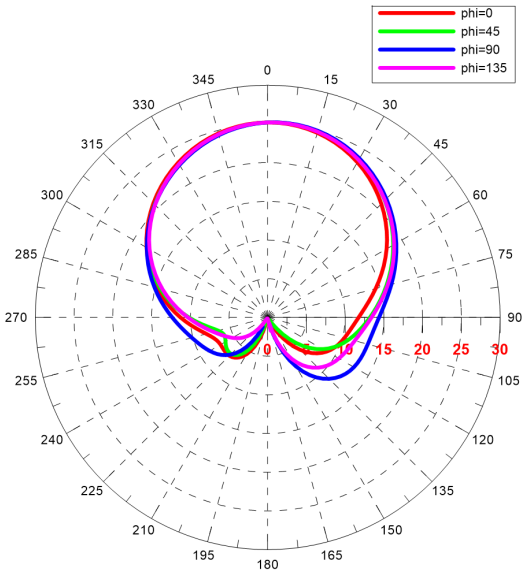
L5 band radiation patterns

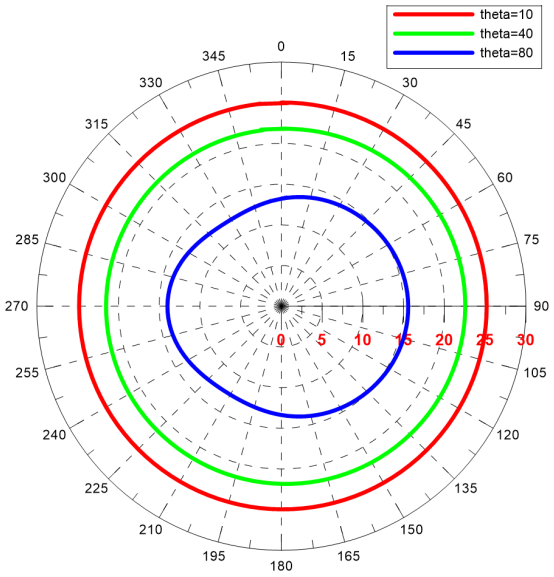
Maxtena M9708CWT-UFL uses patented optimized microstrip technology which results in minimal dependence on frequency and features a wide beam-width, low axial ratio and radiation pattern symmetry across all desired frequencies in L1, L2, and L5 bands.

RHCP Realized Gain [dBic] - Elevation Cuts



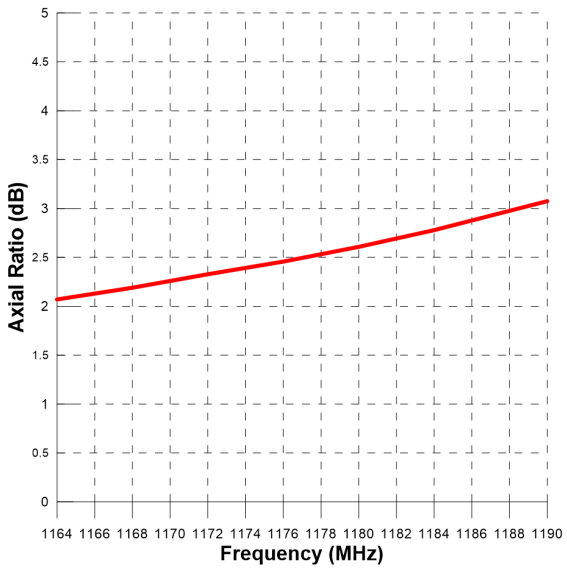
A 117 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBic] - Azimuth Cuts

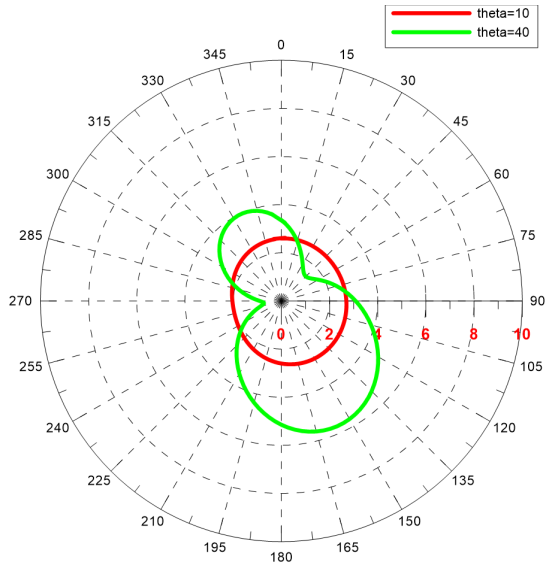


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith



Axial Ratio [dB] - Azimuth Cuts



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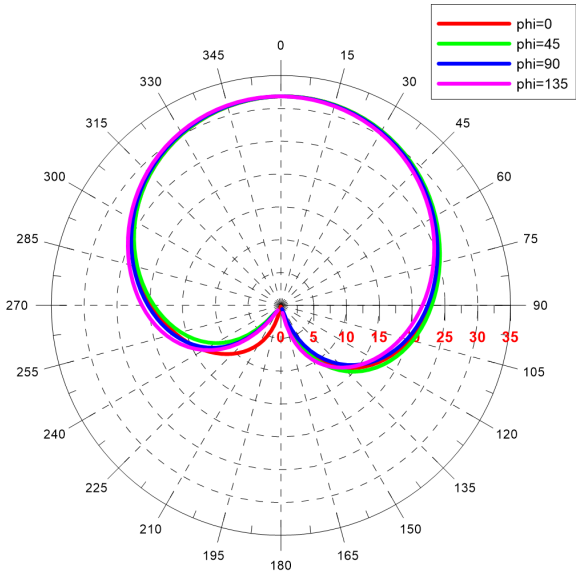
L2 band radiation patterns

Maxtena M9708CWT-UFL has unique features that make it the best option for high-accuracy GNSS applications.

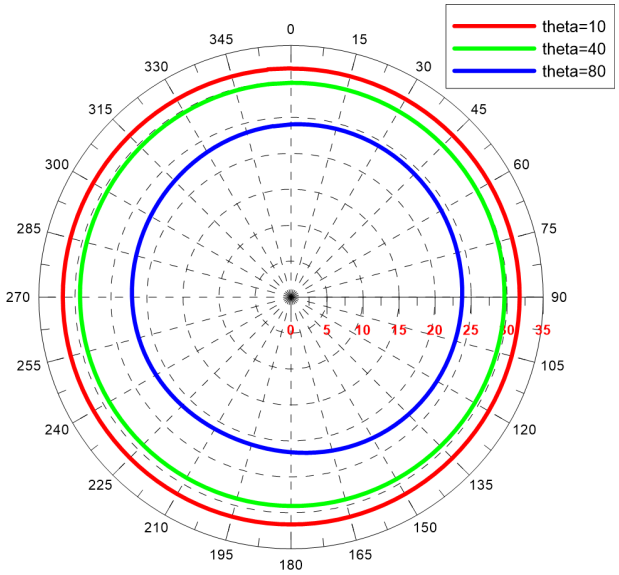
1. Low axial ratio not only at the zenith, but also in other elevation angles ensures multipath error is mitigated.
2. Full hemispherical coverage is achieved by an exceptionally large 3 dB beamwidth, ensuring full view of sky and satellites at lower elevation angles.
3. Highly symmetric radiation pattern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

RHCP Realized Gain [dBic] - Elevation Cuts



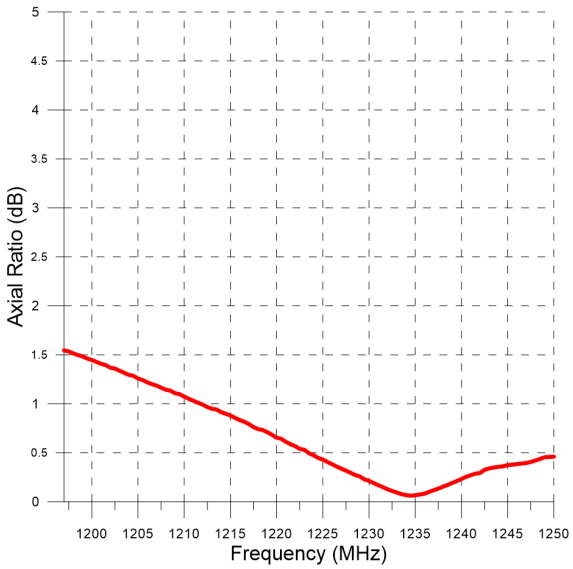
A 117 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBic] - Azimuth Cuts

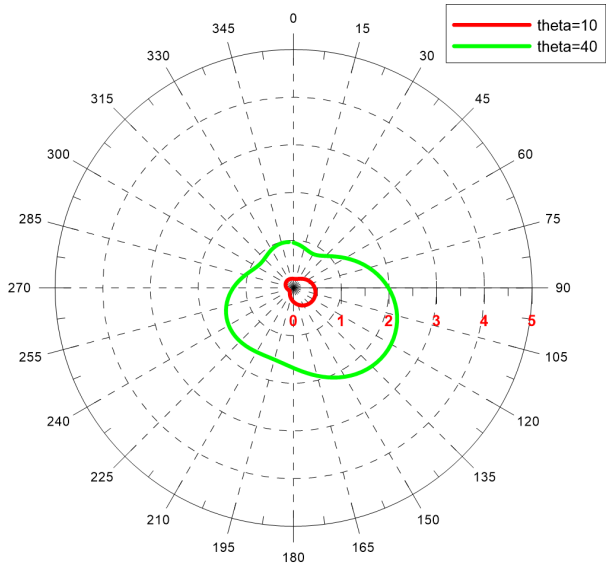


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith



Axial Ratio [dB] - Azimuth Cuts



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L1 band radiation patterns

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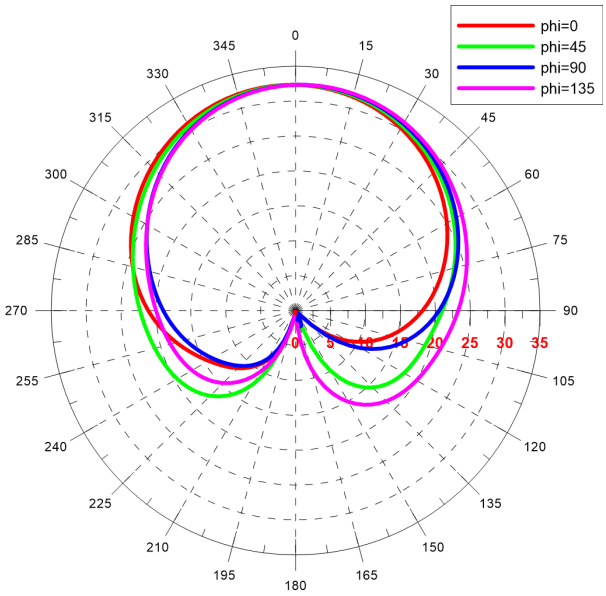
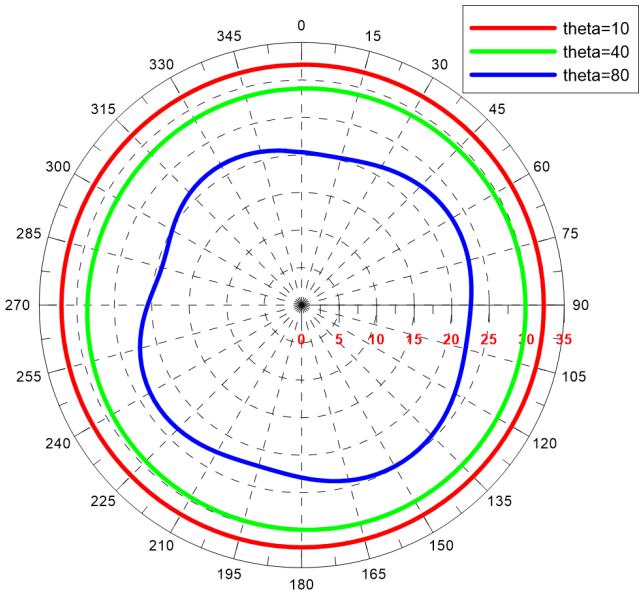
RHCP Realized Gain [dBic] - Elevation Cuts



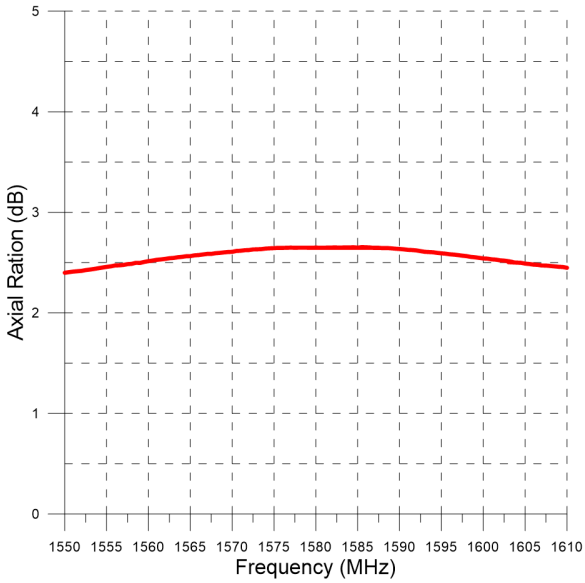
A 100 degree beamwidth ensures excellent hemispherical coverage.

RHCP Realized Gain [dBic] - Azimuth Cuts

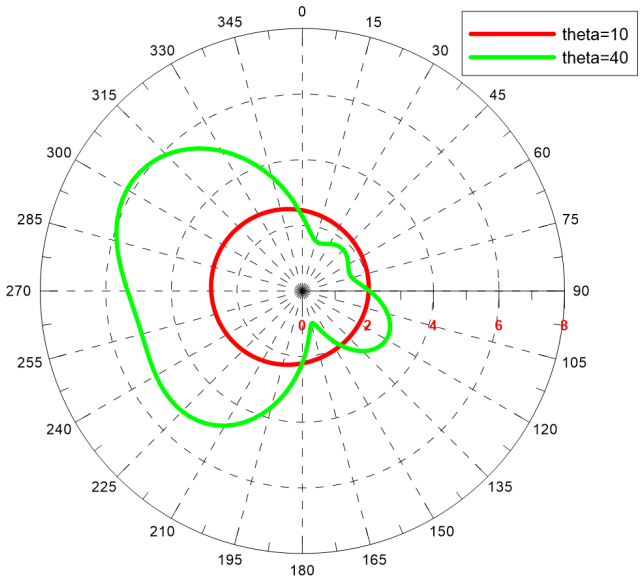


Symmetric coverage even in low elevation enhances accuracy.

Axial Ratio [dB] - Zenith



Axial Ratio [dB] - Azimuth Cuts



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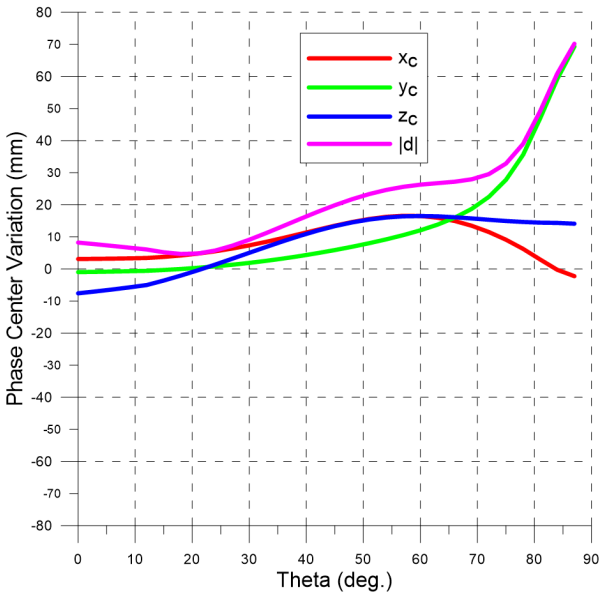
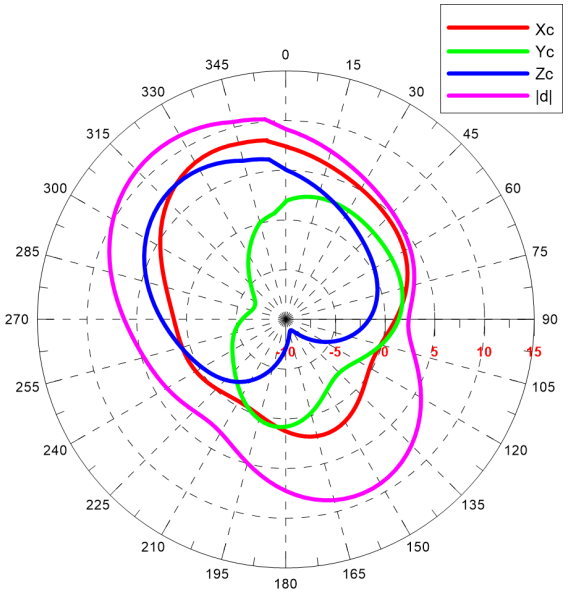
Phase Center Variation

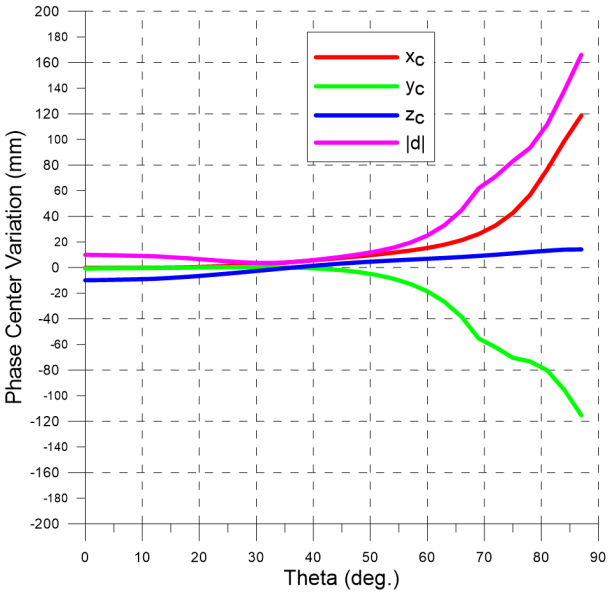
Maxtena's M9708CWT-UFL has minimal phase center variation over azimuth and elevation in L1 and L2 bands.



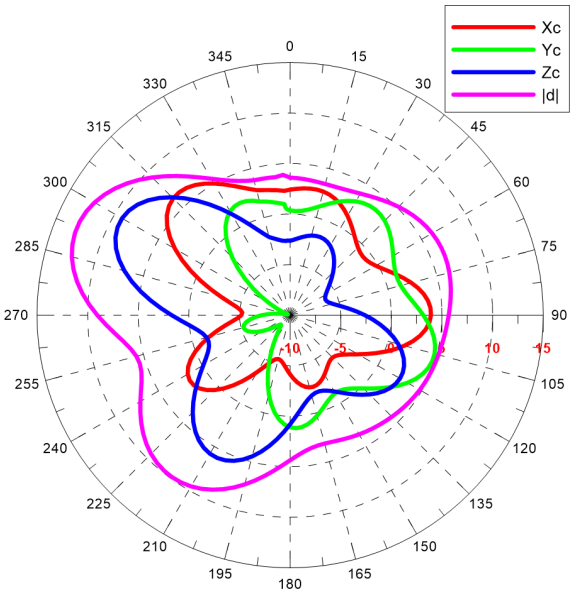
Phase Center Variation vs. Elevation in L2 band.



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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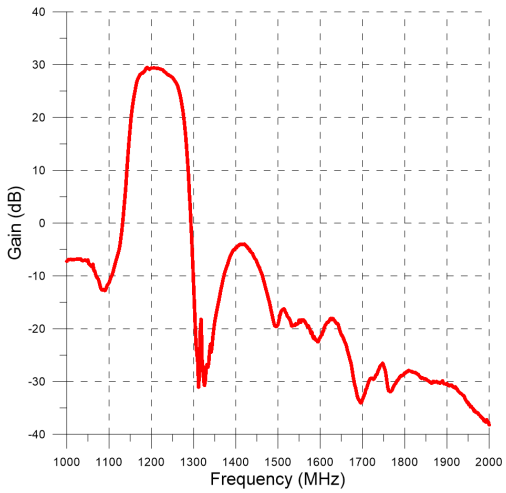
Excellent Group Delay Variation

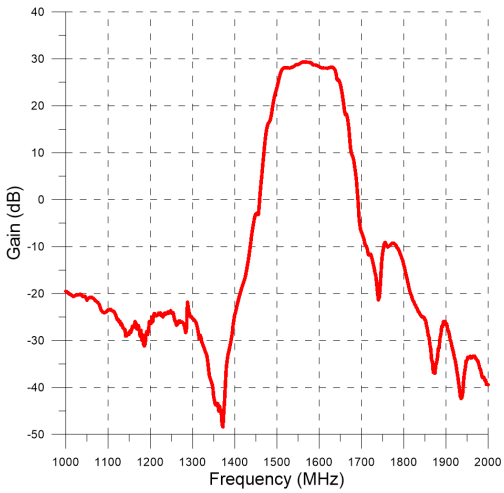
Using GPS carrier phase to increase accuracy in GNSS applications has been proven reliable and has made mm-level accuracy possible. However, in resolving carrier phase ambiguity, it is necessary to make sure carrier phase is received and measured accurately and the effect of antenna and receiver on carrier phase is minimized. Maxtena's M9708CWT-UFL has a flat response over its specified GNSS bands and has minimal group delay variation over frequency.

Filtering and LNA Performance

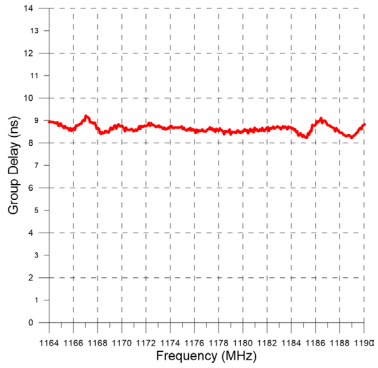
Maxtena's M9708CWT-UFL antenna has a flat response over L1 and L2 GNSS bands, with less than 1 dB variation over each band. The superior out-of-band rejection ensures minimal interference.



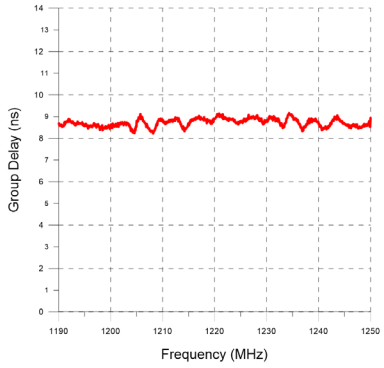
Outstanding out-of-band rejection and less than 1dB fluctuation of in-band frequency response over L2-band.



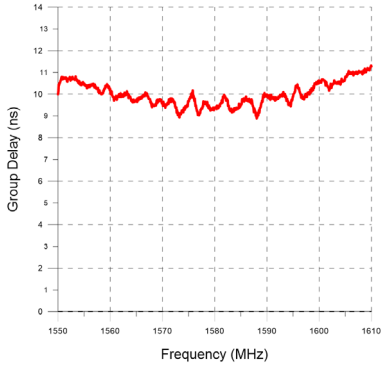
Outstanding out-of-band rejection and less than 1dB fluctuation of in-band frequency response over L1-band.



< 2 ns group delay variation over L5-band.



< 2 ns group delay variation over L2-band.



< 2 ns group delay variation over L1-band.

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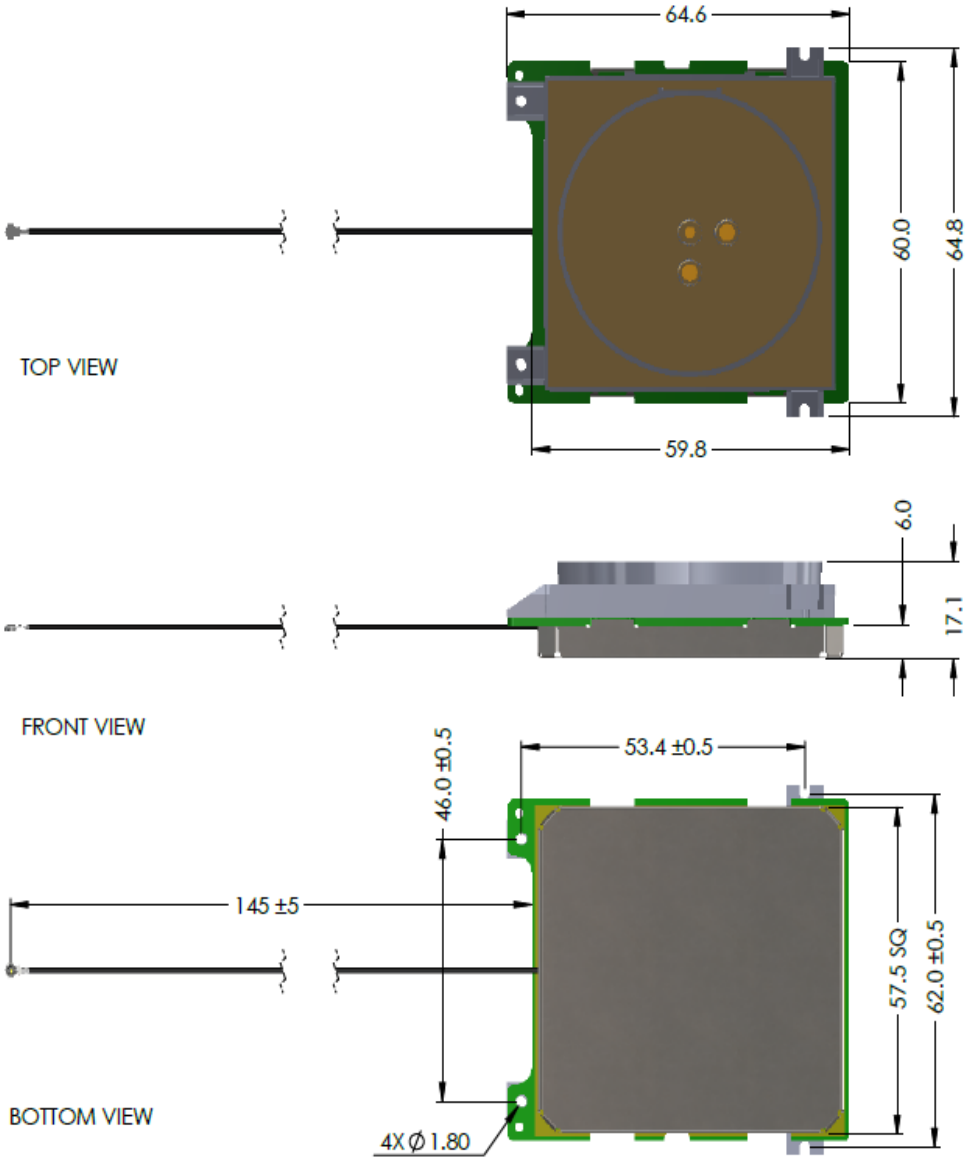
Mechanical Specifications

Parameter	Specification
Weight	80 g
Size	65 x 65 x 17 mm
Cable	150 mm u.fl
Mounting	Embedded
Operating Temperature Range	-40 to +105˚C



Dimensions are in mm.

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