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Alpha 4A

Compact Active Single-Band GPS L1 Adhesive Antenna

Key Features

- Supports GPS L1, Galileo E1, BeiDou B1C, and QZSS L1
- High RHCP gain up to 27.6 dBiC at zenith
- Consistent coverage across ±90° and ±120° from zenith
- Low VSWR (1.15 typical) with excellent return loss (–23 dB)
- Integrated 26 ± 2 dB LNA with ≤ 1.3 dB noise figure
- Compact IP67 waterproof design with adhesive or optional magnetic mount

General Description

The Alpha 4A is a compact, waterproof, self-adhesive GNSS antenna designed for reliable L1-band performance. Delivering strong RHCP gain of 27.6 dBiC at zenith, the Alpha 4A also maintains excellent top-hemisphere uniformity with consistent performance across 90° and 120° angular sectors from zenith.

This gain stability ensures dependable satellite visibility and reduced fix times in outdoor environments. The integrated low-noise amplifier (26 ± 2 dB) enhances weak signals, providing robust performance for vehicle tracking, fleet management, asset monitoring, and GNSS timing systems.

Supplied as standard with SMA Male connectors and 1 m or 5 m RG174 cable. Alternative cable lengths and connector types can be specified for high-volume projects.

Typical Applications

- Vehicle and fleet tracking
- Asset monitoring and telematics
- Outdoor GNSS positioning and timing
- Smart infrastructure and IoT

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ANTENNA TEST LAB Verified™

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Electrical Specifications

Impedance:	50 Ohm
Polarisation:	RHCP
Frequency Range:	1575.42 MHz (GPS L1, Galileo E1, BeiDou B1C, QZSS L1)
Return Loss:	–23 dB
VSWR:	1.15 typical
Ground Plane Independent:	No
Filter Insertion Loss:	<3 dB
RHCP Gain:	Up to 27.6 dBiC (zenith)
LNA Gain:	26 ± 2 dB
Noise Figure:	≤ 1.3 dB
Supply Voltage:	2.5 – 5 V DC
Current Consumption:	10 - 26 mA

Environmental Specifications

Operational Temperature Range:	–40 °C to +85 °C
Storage Temperature Range:	–40 °C to +85 °C
Relative Humidity:	Up to 95%
Ingress Protection:	IP67 equivalent

Mechanical Specifications

Dimension:	38 × 34 × 13 mm
Weight:	33 g
Connector:	SMA Male
Cable:	RG174
Mounting Methods:	Adhesive (magnetic available for high-volume projects)

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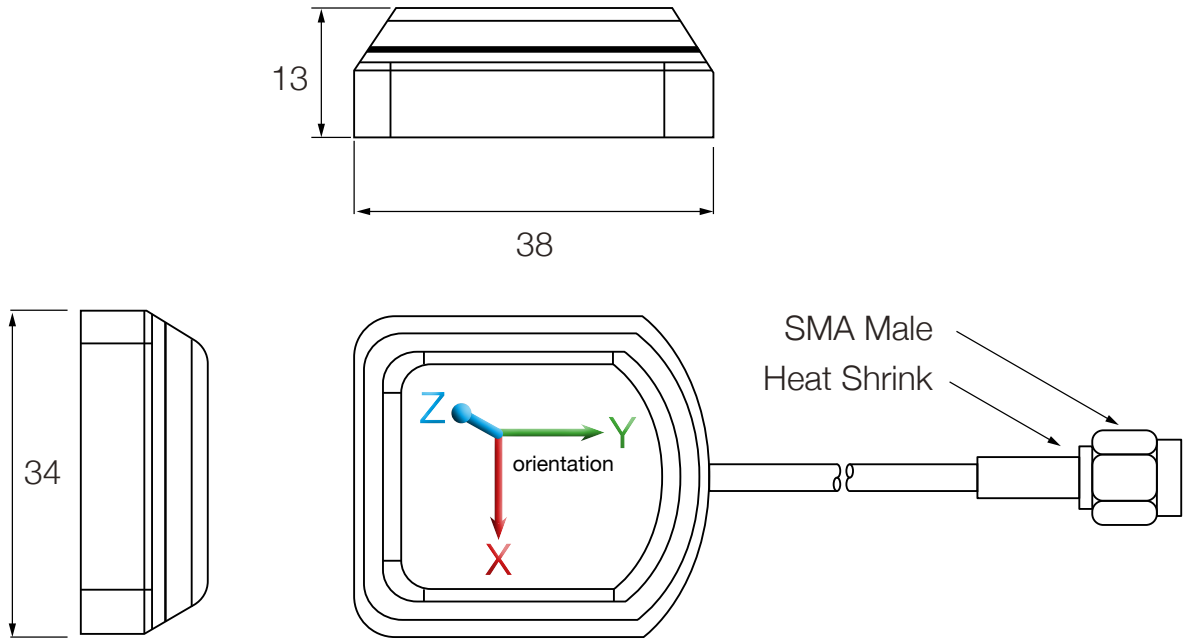
Dimensional Drawing

Unit: mm



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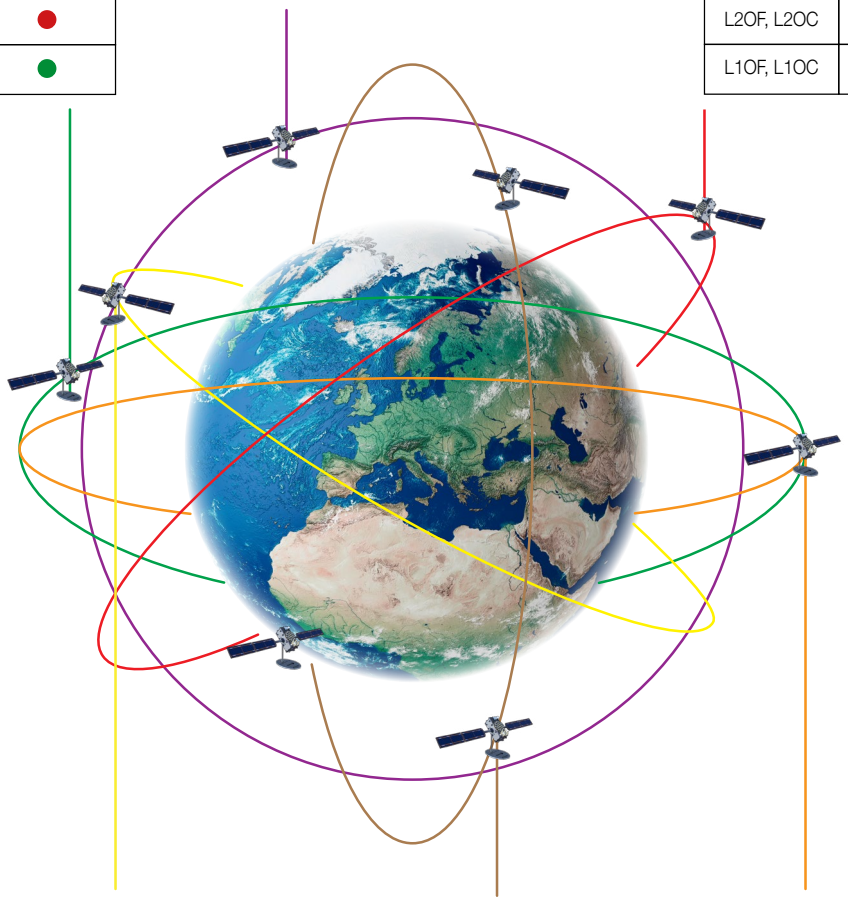
Spectrum Coverage

GPS		
Band	**Frequency**	**Use Indicator**
L5	1176.45	●
L2	1227.6	●
L1	1575.42	●

NavIC		
Band	**Frequency**	**Use Indicator**
L5	1176.45	●

GLONASS		
Band	**Frequency**	**Use Indicator**
L3OC	1202.025	●
L2OF, L2OC	1246	●
L1OF, L1OC	1602	●



Galileo		
Band	**Frequency**	**Use Indicator**
E5a	1176.45	●
E5b	1207.14	●
E6-I, E6-Q	1278.75	●
E1-I, E1-Q	1575.42	●

BeiDou		
Band	**Frequency**	**Use Indicator**
B2a	1176.45	●
B2I, B2b	1207.14	●
B3I	1268.52	●
B1I	1561.098	●
B1C	1575.42	●

QZSS		
Band	**Frequency**	**Use Indicator**
L5	1176.45	●
L2	1227.6	●
L6	1278.75	●
L1	1575.42	●

● Suitable band ● Adequate band in good signal conditions ● Likely to be unsuitable

GNSS Standards Band Support

	Electrical Interface		Spherical RF Measurements			
Centre Frequency (MHz)	VSWR	Return Loss (dB)	Average RHCP Gain (dBiC)	Peak RHCP Gain (dBiC)	Median Axial Ratio (dB)	Minimum Axial Ratio (dB)
1575.42	1.1485	-23.2122	20.65	27.58	5.80	0.44

	Top hemisphere RF Measurements				Gain at Zenith
Centre Frequency (MHz)	Average RHCP Gain (dBiC)	Peak RHCP Gain (dBiC)	Median Axial Ratio (dB)	Minimum Axial Ratio (dB)	RHCP Gain at Zenith (dBiC)
1575.42	25.36	27.58	5.49	1.77	27.22

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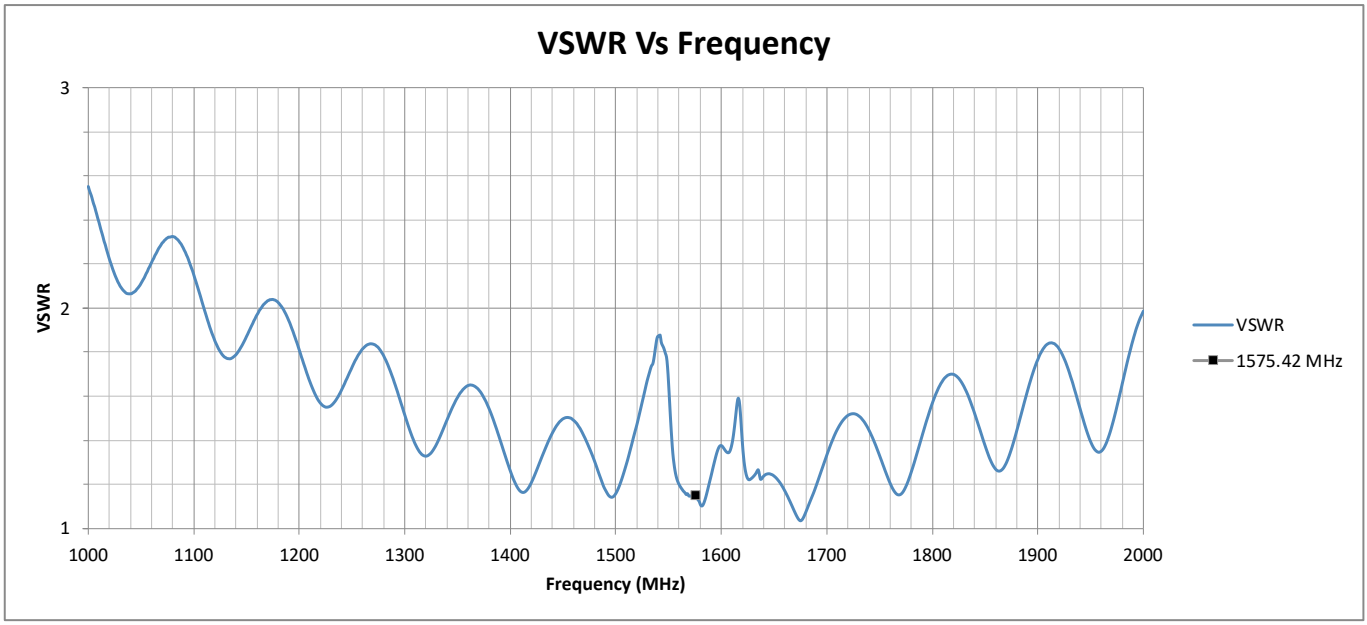
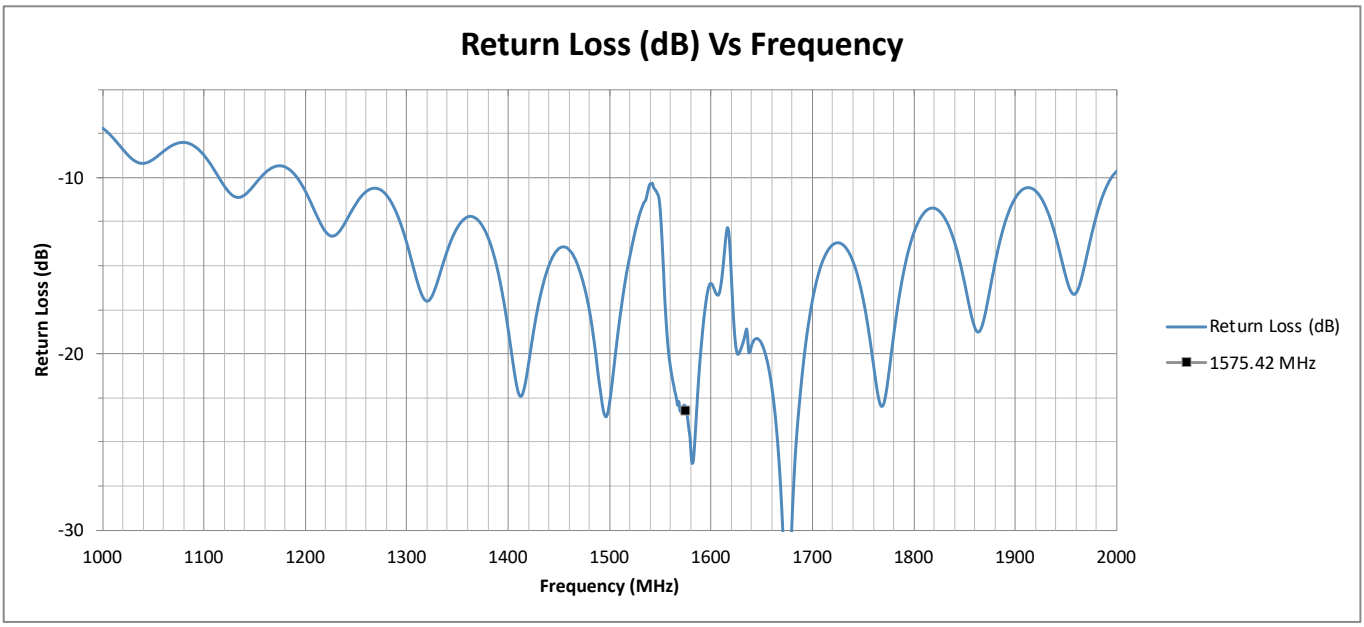
Electrical





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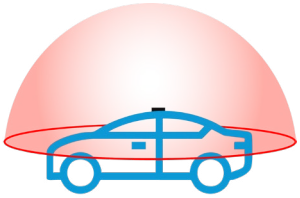
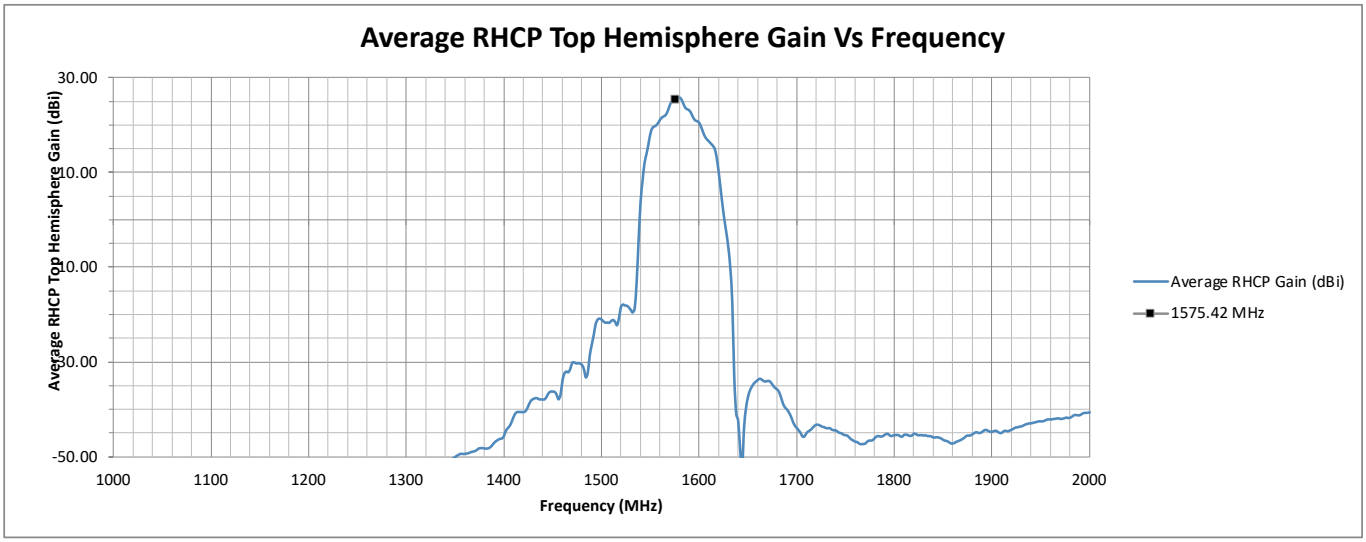
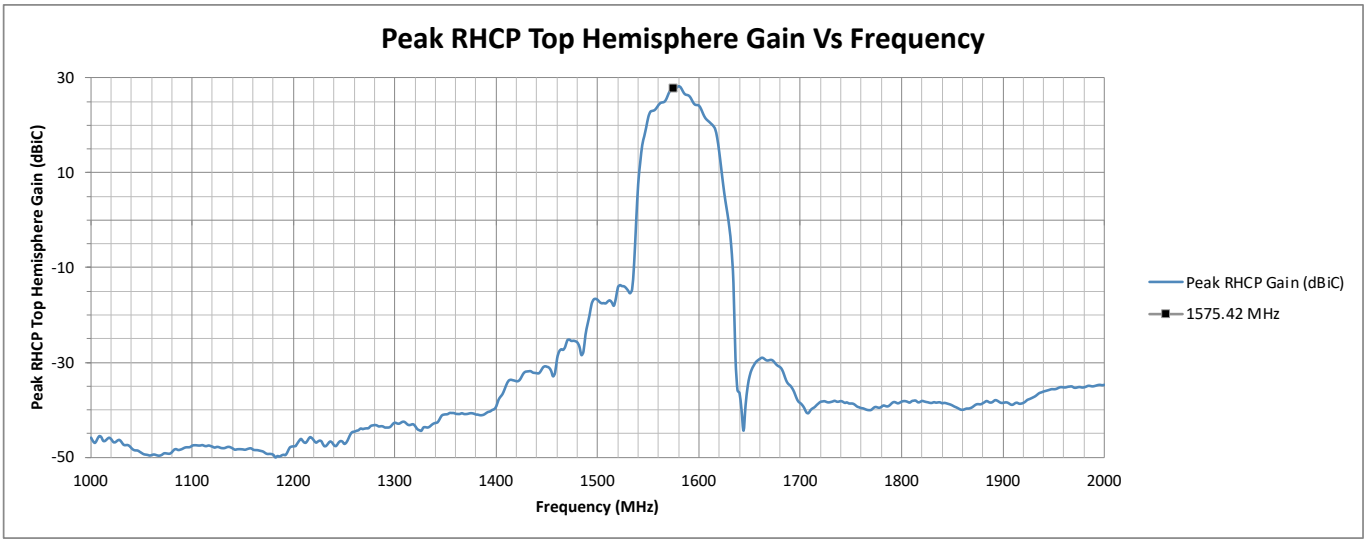
RF Top Hemisphere

The graphs on this page showcase the Average and Peak RHCP Gain in the Top Hemisphere. These measurements assess how effectively the antenna receives signals from satellites positioned in the upper half of the sky. Strong RHCP gain in this region is critical for reliable GNSS reception, especially in environments where satellites may not always be directly overhead.







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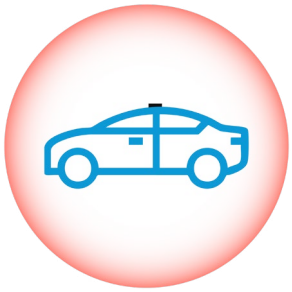
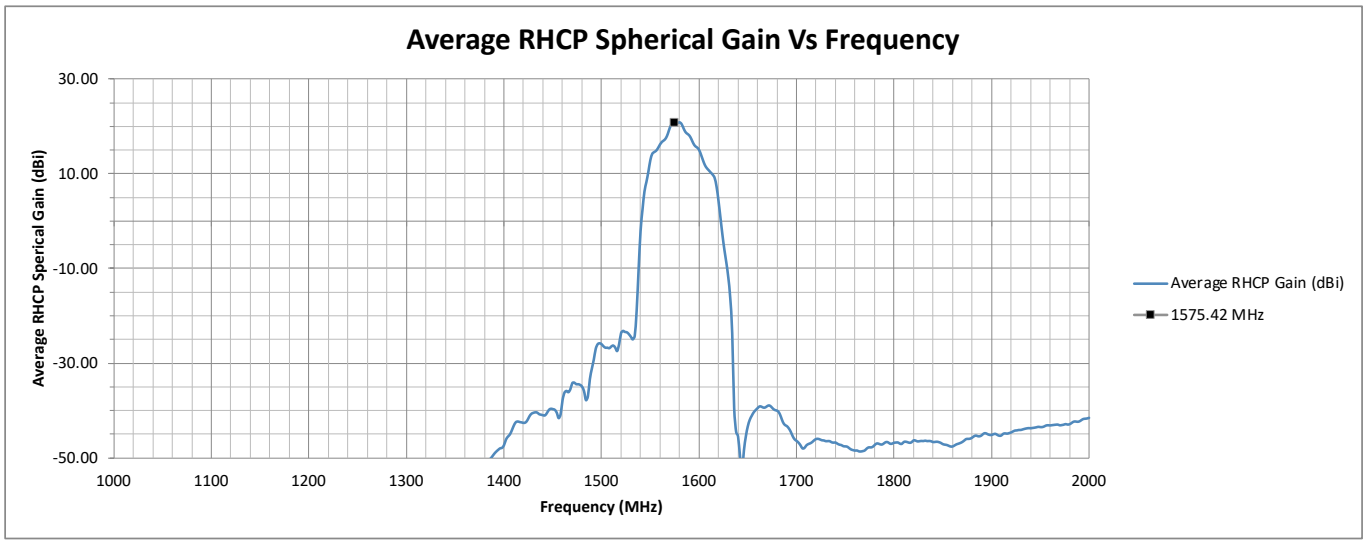
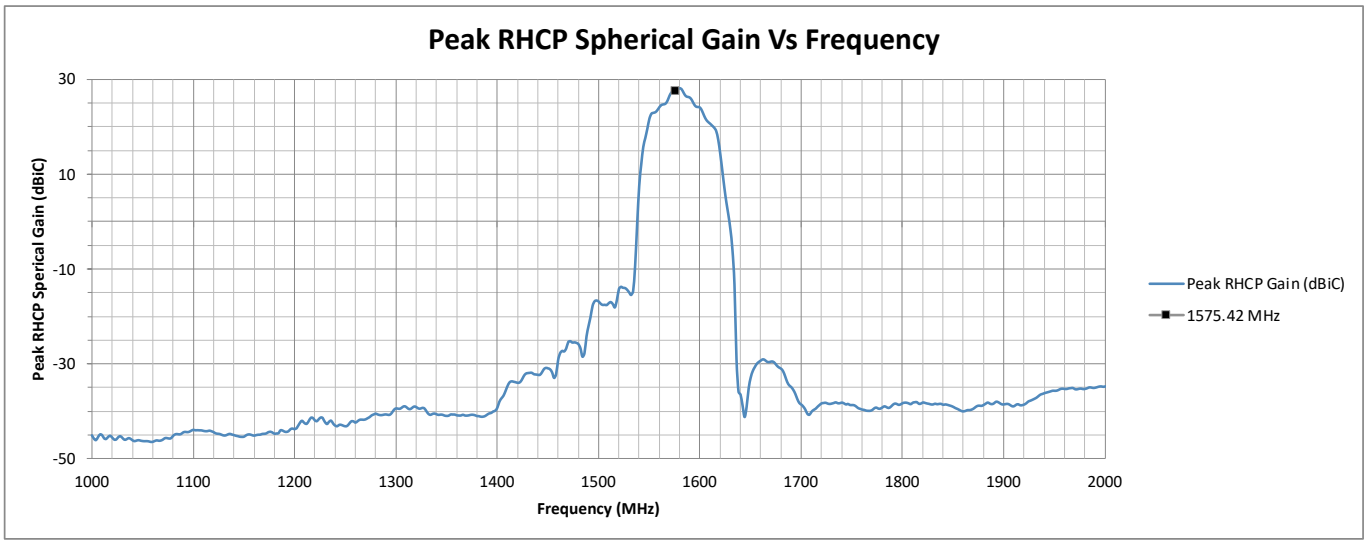
RF Spherical

This page displays the Average and Peak RHCP Gain across the entire spherical coverage of the antenna. These metrics provide a comprehensive view of the antenna's ability to receive signals from satellites at all elevations and directions. Consistently high gain across the sphere ensures strong and stable GNSS reception in a variety of operating conditions.







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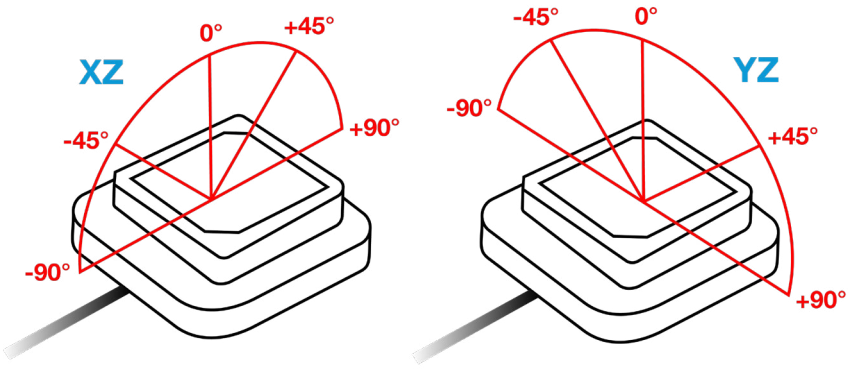
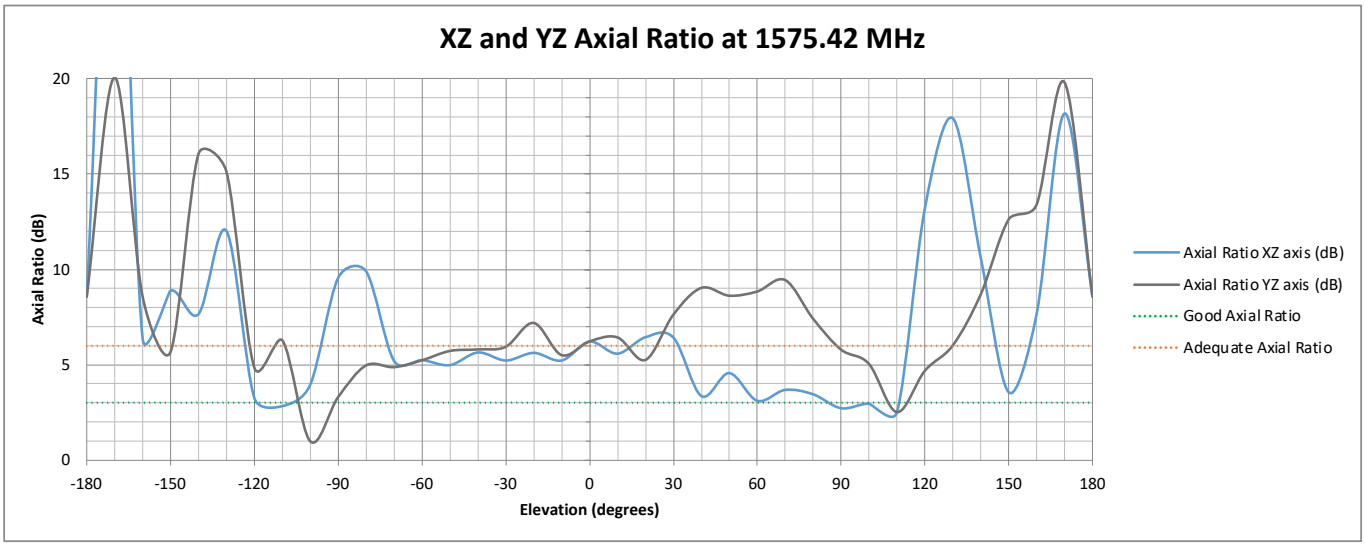
ZX and YZ Plane Axial Ratio Plots (Zenith is at 0 degrees)

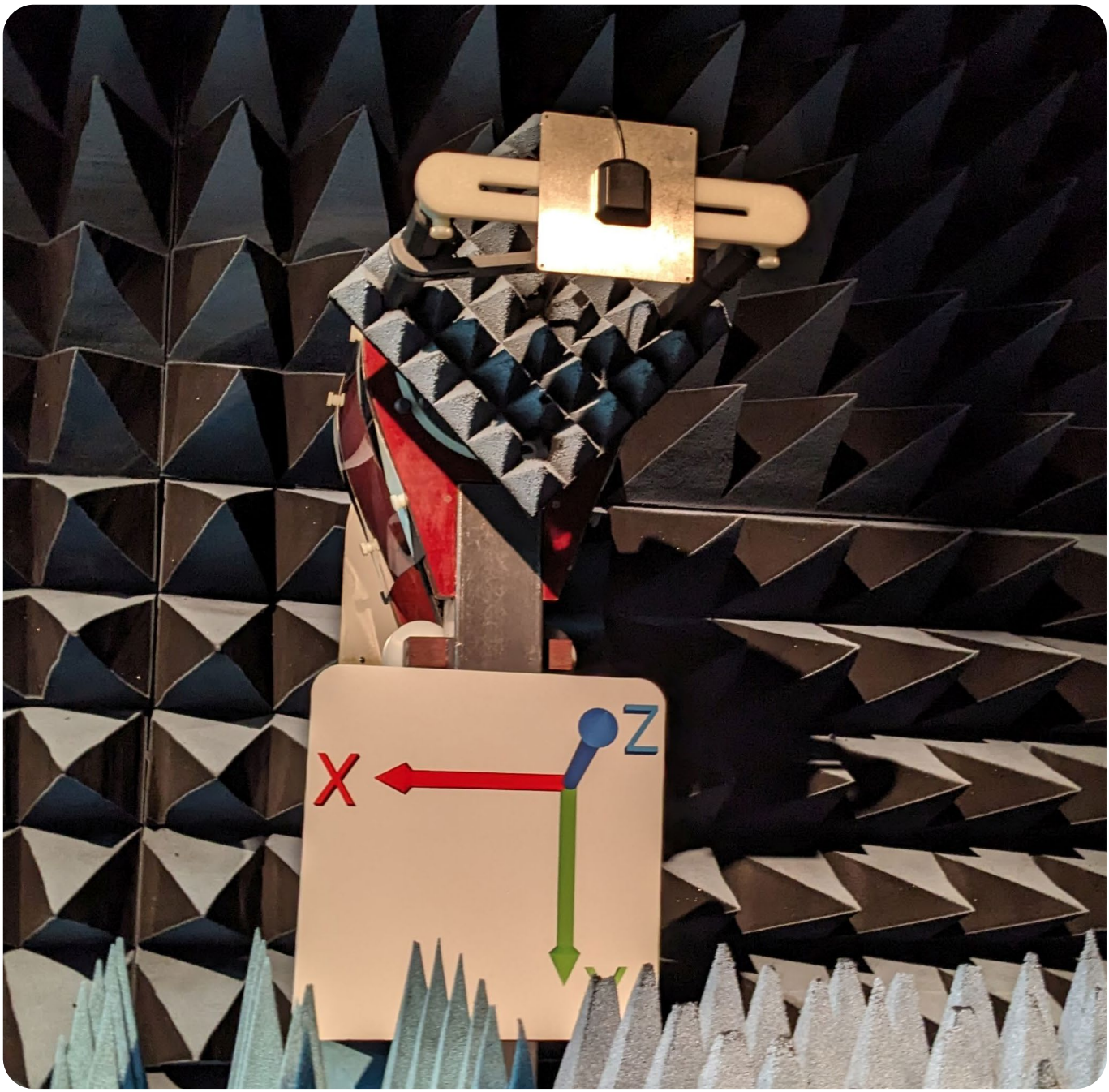
This page shows how well the antenna maintains circular polarization at different elevation angles.

A lower axial ratio ensures better GNSS signal reception, especially at low elevations, which is crucial for applications requiring strong performance in obstructed environments or wide-angle satellite visibility.





Test Setup (in 100 x 100 mm Ground Plane)



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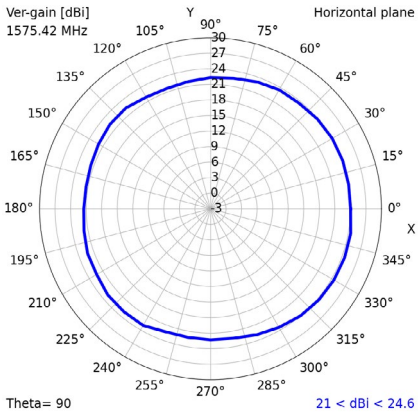
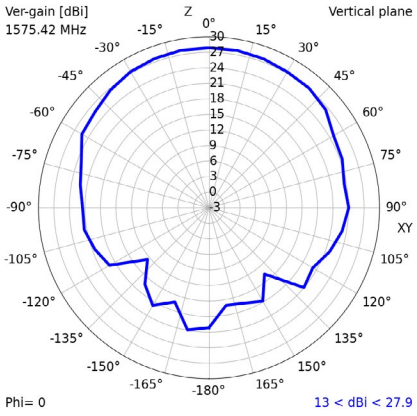
2D Radiation Plots (1575.42 MHz)

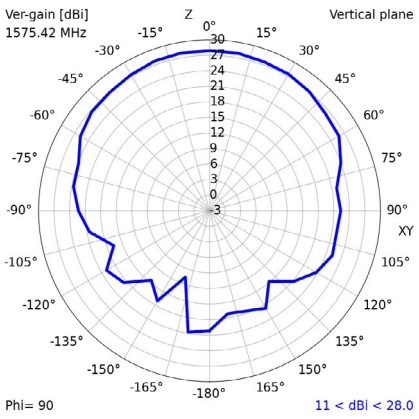
XY



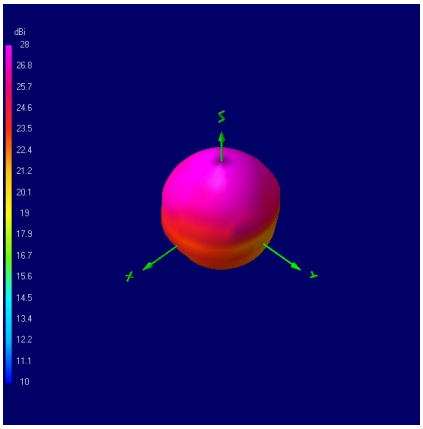
XZ



YZ



3D Radiation Plot (1575.42 MHz)



NOTE: All 3D radiation plots are shown with Theta = 45 and Phi = 45.

Ordering Details:

Part Number	Description
ALPHA4A/1M/SMAM/S/S/26	Compact Active Single-Band GPS L1 Adhesive Antenna 1 Meter RG174 cable SMA Male
ALPHA4A/5M/SMAM/S/S/26	Compact Active Single-Band GPS L1 Adhesive Antenna 5 Meter RG174 cable SMA Male