



Colosseum X Active Multiband GNSS Antenna

XAHP.50.A.301111

Description:

Features:

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1. Introduction



The Taoglas Colosseum X XAHP.50 is an active multi-band GNSS antenna has been carefully designed to work well on the full GNSS spectrum including GPS/QZSS L1/L2/L5, GLONASS G1/G2/G3, Galileo E1/E5a/E5b/E6, BeiDou B1/B2a/B2b/B3, QZSS L6, NAVIC L5, as well as SBAS (WAAS/EGNOS/GAGAN/SDCM/SNAS. This allows the user to achieve higher location accuracy, as well as stability of position tracking in urban environments. The XAHP.50 has excellent performance across the full bandwidth of the antenna and its design has an even gain across the hemisphere giving almost excellent, broad axial ratio which in turn makes it resilient to multipath rejection and excellent phase centre stability.

The LNA used in the XAHP.50 ensures excellent out of band rejection and provides excellent positioning stability and reliability of GNSS signals. The robust, vandal resistant, permanent mount IP67 rated ASA enclosure is just 57mm in height and designed for ease of installation. It can be mounted on any surface; however, performance can be affected when mounted on metal surfaces.

Typical Applications Include:

- Autonomous Driving
- Precision Positioning for Robotics
- Precision Agriculture
- Inventory Management & Container tracking
- Telematics & Asset Tracking
- Timing Accuracy Synchronization

The XAHP.50 is the latest external addition to an ongoing product road map of high precision antennas by Taoglas. For RTK applications when used on the base and/or the rover, the XAHP.50 can achieve genuine cm-level accuracy.

Cable and connectors are customizable. Please contact your regional Taoglas customer support team for further information.



2. Specifications

	GNSS Frequency Bands Covered						
GPS	L1	L2	L5				
GLONASS	G1	G2	G3				
Galileo	E1	E5a	E5b	E6			
	•	•	•	•			
BeiDou	B1	B2a	B2b	В3			
	•	•	•	•			
QZSS (Regional)	L1	L2C	L5	L6			
	•			•			
IRNSS (Regional)	L5						
	•						
SBAS	L1/E1/B1	L5/B2a/E5a	G1	G2	G3		

*SBAS systems: WASS(L1/L5), EGNOSS(E1/E5a), SDCM(G1/G2/G3), SNAS(B1,B2a), GAGAN(L1/L5), QZSS(L1/L5), KAZZ(L1/L5).



GNSS Bands and Constellations



GNSS Electrical						
Frequency (MHz)	1176.45	1227.6	1278.75	1561	1575.42	1602
VSWR (max.)	1.3:1	1.3:1	1.5:1	1.5:1	1.5:1	1.4:1
Passive Antenna Efficiency (%)	72	77	53	35	45	53
Passive Antenna Gain at Zenith (dBi)	7.4	6.2	6.8	3.2	4.2	4.2
Axial Ratio (dB) Ground Plane	1.2	0.6	0.2	1.2	1.2	1.3
Group Delay	5	5	4	15	15	15
PCO (cm)	0.5	0.01	0.6	1	1	1
PCV (cm)	1.9	1.1	1.04	0.6	0.6	0.6
Polarization	Right-Hand Circularly Polarized (RHCP)					
Impedance	50Ω					
Cable	3m RG-174 as Standard					
Connector	SMA(M)ST as Standard					

Note: The antenna was tested on a 30X30 cm ground plane

LNA and Filter Electrical Properties								
Frequency (MHz)	L5 1176.45	GAL E5b 1207	GPS L2 1227	L6/E6 1278.7	· 5	B1 1561	L1 1575.42	L1PT 1602
Gain (typical)	25 dB	26 dB	25 dB	22 dB		27 dB	28 dB	28 dB
Noise Figure (typical)	4.0 dB	3.7 dB	3.8 dB	4.5 dB	3	3.1 dB	2.6 dB	2.6 dB
Group Delay Variation (typical)	9.4 ns	4.0 ns	3.7 ns	1.3 ns	;	3.0 ns	10 ns	8.8 ns
Current Draw (typical)	< 20 mA							
Input Voltage	+1.8 to +5 VDC							
	100 - 900 MHz				> 50			
	900 - 1000 MHz				> 30			
Out-Of-Band Attenuation (dB)	1350 - 1520 MHz				> 25			
	1700 - 2000 MHz				> 35			
	2000 - 6000 MHz				> 45			



Mechanical					
Height	58 mm				
Planner Dimension	95 mm diameter				
Casing	ASA				
Cable	3m of RG-174 as standard				
Connector	SMA(M)ST as standard				
Base and Thread	Zinc Alloy				
Weight	395g				
Maximum Assembly Torque	30 N•m				
	Environmental				
Protection	IP67				
Temperature Range	-40°C to 85°C				
Humidity	Non-condensing 65°C 95% RH				
RoHS Compliant	Yes				
REACH Compliant	Yes				





3.1 Return Loss



3.2 Efficiency





3.3 Average Gain



3.4 Peak Gain





3.5 Axial Ratio











4.1 Test Setup





4.2 L2 & L5 3D and 2D Radiation Patterns





*2D Radiation Patterns: Show the total gain including LNA + antenna with a 20dB attenuator

SPE-20-8-037-G



4.3 L1 3D and 2D Radiation Patterns





*2D Radiation Patterns: Show the total gain including LNA + antenna with a 20dB attenuator

SPE-20-8-037-G







5.











Field Test Results

6.

In this section Taoglas will present the field test result for XAHP.50 antenna. The test was performed when the antenna was mounted on a static rooftop test set up in an open sky environment for at least **6 hours**.

Taoglas will show the field test results using the following receivers:

6.1 Ublox ZED-F9P

Receiver features:

- Multi-band GNSS: 184-channel GPS L1C/A L2C, GLONASS: L1OF L2OF, Galileo: E1B/C E5b, BeiDou: B1I B2I, QZSS: L1C/A L2C
- Multi-band RTK with fast convergence times and reliable performance
- Nav. update rate RTK up to 20 Hz
- Position accuracy = RTK 0.01 m + 1 ppm CEP

Positioning Accuracy Table (2D Accuracy)					
Test Condition	Correction Service	CEP (50%)	DRMS (68%)	2DRMS (95-98.2%)	TTFF (sec)
Free	RTK DISABLED	47.08 cm	56.53 cm	113.06 cm	20
Space	RTK ENABLED	1.51 cm	1.83 cm	3.66 cm	20
30x30 cm	RTK DISABLED	46.69 cm	54.83 cm	110.65 cm	19
Ground Plane	RTK ENABLED	0.47 cm	0.57 cm	1.14 cm	19





6.2 Septentrio AsteRx-U S/N

Receiver features:

- Multi-band GNSS: 544 channels
- GPS: L1, L2, L5 GLONASS: L1, L2, L3 Galileo: E1, E5ab, AltBoc, E6 BeiDou: B1, B2, B3 NavIC: L51 QZSS: L1, L2, L5, L6
- SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM(L1, L5)
- RTK (base and rover), Integrated dual-channel L-band receiver, Support for PPP
- Nav. update rate up to 100 Hz
- Position accuracy = RTK 0.6 cm + 0.5 ppm

Positioning Accuracy Table (2D Accuracy)						
Test Condition	Correction Service	CEP (50%)	DRMS (68%)	2DRMS (95-98.2%)		
Free	RTK DISABLED	39.22 cm	47.08 cm	94.17 cm		
Space	RTK ENABLED	0.99 cm	1.2 cm	2.4 cm		
30x30 cm	RTK DISABLED	37.08 cm	45.04 cm	90.08 cm		
Ground Plane	RTK ENABLED	0.96 cm	1.16 cm	2.31 cm		









7.







Maximum torque for mounting is 30 N•m



9. Packaging

1pc XAHP.50.A.301111 per Small Box Dimensions - 135*130*140mm Weight - 395g





8pcs XAHP.50.A.301111 per Carton Dimensions - 588*296*142mm Weight – 3.9Kg



Changelog for the d	Changelog for the datasheet					
SPE-20-8-037 – XAHP.50.A.301111						
Revision: G (Current Version)						
Date:	2025-02-13					
Changes:	Updated max torque figure.					
Changes Made by:	Conor McGrath					

Previous Revisions

Revision: F		
Date:	2022-02-21	
Changes:	Updated GNSS Bands & Constellations Graphics	
Changes Made by:	Cesar Sousa	

Revision: E					
Date:	2021-11-03				
Changes:	Updated Installation information				
Changes Made by:	Jack Conroy				

Revision: D		
Date:	2020-11-04	
Changes:	Updated Drawing	
Changes Made by:	Jack Conroy	

Revision: C					
Date:	2020-09-30				
Changes:	Updated Drawing				
Changes Made by:	Jack Conroy				

Revision: B	
Date:	2020-05-28
Changes:	Updated to include Field Test data
Changes Made by:	Victor Pinazo



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