HC977

TALLYSMAN®
A CALIAN® COMPANY

HC977 Triple-Band Helical Antenna + L-Band

Frequency Coverage: **GNSS/QZSS-L1/L2/L5, GLONASS-G1/G2/G3, Galileo-E1/E5a/E5b, BeiDou-B1/B2/B2a, NavIC-L5 + L-Band correction services**

The patented HC977 helical antenna is designed for precision positioning, covering the GPS/QZSS-L1/L2/L5, GLONASS-G1/G2/G3, Galileo-E1/E5a/E5b, BeiDou-B1/B2/B2a, and NavIC-L5 frequency bands, including the satellite-based augmentation system (SBAS) available in the region of operation [WAAS (North America), EGNOS (Europe), MSAS (Japan), or GAGAN (India)], as well as L-Band correction services.

Weighing only 42 g, the light and compact HC977 features a precision-tuned helix element that provides excellent axial ratios and operates without the requirement of a ground plane, making it ideal for a wide variety of applications, including unmanned aerial vehicles (UAVs).

The HC977 features an industry-leading low current, low-noise amplifier (LNA) that includes an integrated low-loss pre-filter to prevent harmonic interference from high-amplitude signals, such as 700 MHz band LTE and other nearby in-Band cellular signals.

All Tallysman housed helical antenna elements are protected by a robust military-grade IP67-compliant plastic enclosure. The enclosure's base provides three threaded inserts for secure attachment, as well as a rubber O-ring around the outer edge to seal the antenna base and its integrated male SMA connector.

Tallysman's helical family has passed a rigorous 30-hour vibration test procedure, consisting of five cycles of 2-hour tests per axis (x, y, z):

- Cycle 1: 1.05 Grms;
- Cycle 2: 1.20 Grms;
- Cycle 3: 1.35 Grms;
- Cycle 4: 3.67 Grms;
- Cycle 5: 3.67 Grms.

For mounting instructions, visit:
https://www.tallysman.com/downloads/Helical_Mounting_Instruction.pdf

*The HC977 replaces the HC975.



Applications

- Autonomous unmanned aerial vehicles (UAVs)
- Precision GNSS positioning
- Precision land survey positioning
- Mission-critical GNSS timing
- Network timing and synchronization
- Sea and land container tracking
- Fleet management and asset tracking
- Marine and avionics systems
- Law enforcement and public safety

Features

- Very low noise preamp (1.6 dB typ.)
- Axial ratio (≤ 0.5 dB at zenith)
- LNA gain (28 dB typ. | 35 dB typ.)
- Low current (15 mA typ. | 21 mA typ.)
- ESD circuit protection (15 kV)
- Invariant performance from 2.2 to 16 VDC
- IP67, REACH, and RoHS compliant

Benefits

- Extremely light (42 g)
- Ideal for RTK and PPP surveying systems
- Excellent RH circular polarized signal reception
- Great multipath rejection
- Increased system accuracy
- Excellent signal-to-noise ratio
- Industrial temperature range
- Rugged design, ideal for harsh environments

About Tallysman: With global headquarters and manufacturing in Ottawa, Canada, Tallysman is a leading manufacturer of high-precision antennas and components for Global Navigation Satellite System (GNSS) applications. Tallysman's mission is to support the needs of a new generation of positioning systems by delivering unprecedented antenna precision at competitive prices. Learn more at **www.tallysman.com**

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Revision: 1.0

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Antenna

Technology Triple-frequency, RHCP quadrifilar helix

		Gain	Axial Ratio
		dBic typ. at Zenith	dB at Zenith
GNSS			
GPS / QZSS	L1	2.5	≤ 0.5
	L2	2.0	≤ 0.5
	L5	1.0	≤ 0.5
GLONASS	G1	1.5	≤ 0.5
	G2	1.1	≤ 0.5
	G3	2.6	≤ 0.5
Galileo	E1	2.5	≤ 0.5
	E5a	1.1	≤ 0.5
	E5b	2.2	≤ 0.5
	E6	-	-
BeiDou	B1	2.5	≤ 0.5
	B2	2.7	≤ 0.5
	B2a	1.0	≤ 0.5
	B3	-	-
IRNSS / NavIC	L5	1.0	≤ 0.5
QZSS	L6	-	-
L-band correction services		1.5	≤ 0.5
Satellite Communications			
Iridium		-	-
Globalstar		-	-
Phase Centre			
Phase Centre Variation (PCV)		± 3.0 mm (all freq.)	
Phase Centre Offset (PCO)		32 mm @ L1 |37 mm @ L2/L5	

Mechanicals

Mechanical Size	44.2 mm (dia.) x 62.4 mm (h.)
Weight	42 g
Available Connectors	SMA (male)
Radome / Enclosure	Radome and Base: EXL9330
Mount	3x M2.5 screws

Environmental

Operating Temperature	-40 °C to + 85 °C
Storage Temperature	-50 °C to + 95 °C
Random Vibration	MIL-STD-810E - Test method 514.5 4 hours per axis (x, y, z) at 3.674 Grms
Shock and Drop	-
Salt Fog	-
IP Rating (housing)	IP67
Compliance	IPC-A-610, FCC, RED / CE Mark, RoHS, REACH

Warranty:

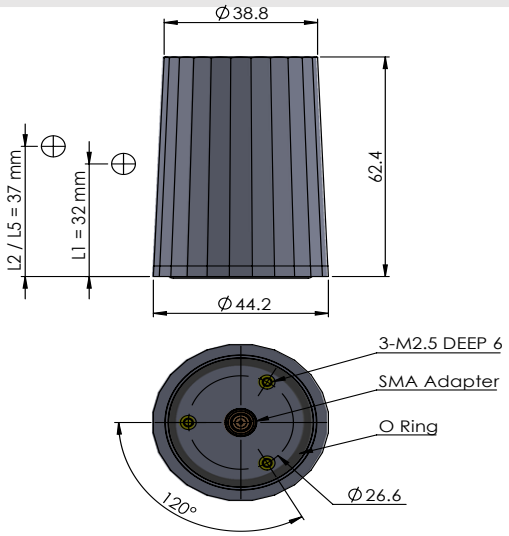
Parts and Labour	3-year standard warranty

Low Noise Amplifier (LNA) - Measured at 3.0 VDC and 25°C

Frequency Bandwith		Out-of-Band Rejection
Lower Band	**1160 - 1255 MHz**	**> 63 dB @ < 1000 MHz** **> 38 dB @ < 1100 MHz** **> 57 dB @ < 1325 MHz**
L-band corrections services	**1539 - 1559 MHz**	
Upper Band	**1559 - 1606 MHz**	**> 36 dB @ < 1400 MHz** **> 44 dB @ < 1450 MHz** **> 28 dB @ > 1700 MHz**

Architecture	Pre-filter → LNA
Gain	28 dB typ. | 35 dB typ.
Noise Figure	1.6 dB typ.
VSWR	< 1.5:1 typ. | 1.8:1 max.
Supply Voltage Range	2.2 to 16 VDC
Supply Current	15 mA typ. (28 dB) | 21 mA typ. (35 dB)
ESD Circuit Protection	15 kV air discharge
P 1dB Output	22.7 dBm @ L1 | 25.1 dBm @ L2/L5
Group Delay Variation	2 ns @ L1 | 5 ns @ L2

Installation Instructions



Ordering Information

Part Number **33-HC977-xx**

where xx = gain (28 or 35 dB)

Please refer to our **Ordering Guide** to review available radomes and connectors at:
https://www.tallysman.com/resource/tallysman-ordering-guide/

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