

HC977XF



HC977XF 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

Overview

The patented HC977XF 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.

Tallysman's eXtended Filter (XF) antenna technology has been designed to mitigate out-of-band signals and prevent GNSS antenna saturation. The radio frequency spectrum has become more congested as new LTE bands are activated and their signals or harmonic frequencies [e.g. 800MHz x 2 = 1600MHz (GLONASS-G1)] can affect GNSS antennas and receivers. In North America, planned Ligado signals at 1525 - 1536 MHz can especially impact GNSS antennas that support space-based L-band correction services (1539 - 1559 MHz). New LTE signals in Europe [Band 32 (1452 - 1496 MHz)] and Japan [Bands 11 and 21 (1476 - 1511 MHz)] have also been observed to interfere with GNSS signals. In addition, Inmarsat satellite communication (uplink: 1626.5 - 1660.5 MHz) can also affect GNSS signals. Tallysman's custom XF filtering mitigates all existing signals and new Ligado and LTE signals, enabling the antennas and attached GNSS receivers to perform optimally.

Weighing only 42 g, the light and compact HC977XF 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).

All Tallysman housed helical antenna elements are protected by a robust military-grade IP67-compliant plastic enclosure. The enclosure's base provides two 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



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 (2.5 dB typ.)
- Axial ratio (≤ 0.5 dB at zenith)
- LNA gain (28 dB typ. | 35 dB typ.)
- Low current (25 mA typ. | 31 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
- Extended RF Filtering

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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+ L-Band correction services

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	≤0.5
	L5	1	≤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	≤0.5
	B3	-	-
IRNSS / NavIC	L5	1	≤0.5
QZSS	L6	-	-
L-Band Services (1525 MHz - 1559 MHz)		1.5	≤0.5
Satellite Communications			
Iridium		-	-
Globalstar		-	-
Other			
Axial Ratio at 10°		-	Efficiency
PC Variation		± 3.0 mm (all freq.)	PCO

Mechanicals

Mechanical Size	42 g
Weight	Radome and Base: EXL9330
Radome	SMA (male)
Mount	-40 °C to +85 °C
Available Connectors	3x M2.5 screws

Environmental

Operating Temperature	-40 °C to +85 °C
Storage Temperature	-50 °C to +95 °C
Vibration	MIL-STD-810E - Test method 5143.5
Shock	-
Salt Fog	-
IP Rating	IP67
Compliance	IPC-A-610, FCC, RED / CE Mark, RoHS, REACH

Warranty:

Parts and Labour 3-year standard warranty

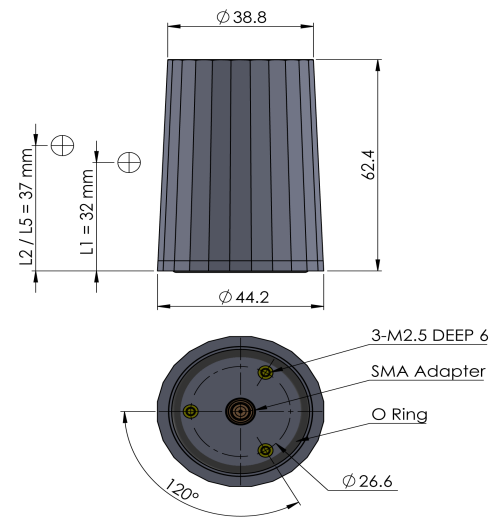
Low Noise Amplifier (LNA) - Measured at 3V and 25°C

Frequency Bandwith	Out of Band Rejection
Lower Band	1164 - 1254 MHz
L-Band - Correction Services	1540 - 1559 MHz
Upper Band	1559 - 1606 MHz

> 65 dB @ < 1000 MHz
> 82 dB @ < 1100 MHz
> 42 dB @ < 1325 MHz
> 75 dB @ < 1400 MHz
> 65 dB @ > 1400 MHz
> 40 dB @ < 1526 MHz
> 06 dB @ < 1536 MHz
> 50 dB @ > 1626 MHz
> 65 dB @ > 1700 MHz

Architecture	Pre-filter → LNA
Gain	28 dB typ. 35 dB typ.
Noise Figure	2.5 dB typ.
VSWR	< 1.5:1 typ. 1.8:1 max.
Supply Voltage Range	2.2 to 16 VDC
Supply Current	25 mA typ. (28 dB) 31 mA typ. (35 dB)
ESD Circuit Protection	15 kV air discharge
P 1dB Output	13.3 dBm @ L1 13.1 dBm @ L2/L5
Group Delay	20 ns @ L1 18 ns @ L2 36 ns @ L5

Mechanical Diagram



Ordering Information

Part Number **33-HC977XF-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/>