



USER MANUAL

S-Band Patch Antenna Type I

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S-BAND PATCH ANTENNA TYPE I

USER MANUAL

This user manual details the applications, features and operation of the EnduroSat S-Band Patch Antenna Type I.

Please read carefully the manual before unpacking the antenna in order to ensure safe and proper use.

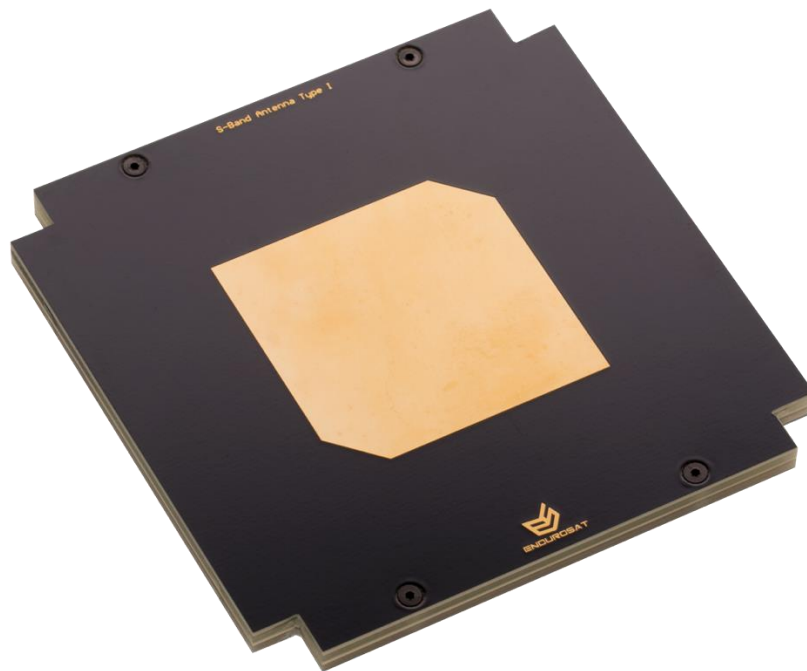


Figure 1 – EnduroSat S-Band Patch Antenna Type I

1 CHANGE LOG

Date	Version	Note
10/04/2016	Rev 1	
21/11/2016	Rev 1.1	Minor changes in the text
18/09/2018	Rev 1.2	Text modification

2 ACRONYMS LIST

ISM	Industrial, Scientific and Medical
COMM	Communication Module
UHF	Ultra-High Frequency
FT	Functional Test
SMA	Shape Memory Alloy

3 OVERVIEW

EnduroSat's S-Band Patch Antenna Type I is designed to operate primarily in the 2.4-2.45 GHz ISM band. It's outer dimensions and mounting holes are designed according to the CubeSat standard, so that it can be mounted on any satellite structure following that standard.

4 HIGHLIGHTED FEATURES

- Operating frequency: 2400-2450 MHz
- RF output power: up to 4 W
- Gain up to 8.3 dBi
- Circularly polarized: Left Hand Circular Polarization
- Half Power Beam Width (HPBW) 71deg
- Compatible with lens up to 21 mm
- Custom design for any side of body
- Weight: 64 g

5 ANTENNA LAYOUT

The antenna uses a slanted form of the nearly-square-patch so that it has a circular polarization (left-hand circularly polarized).

Figure 2 shows the dimensions of the PCB, the four mounting holes of the body and the five holes needed by the RF connector.

The stacked configuration of the antenna is shown in Figure 3.

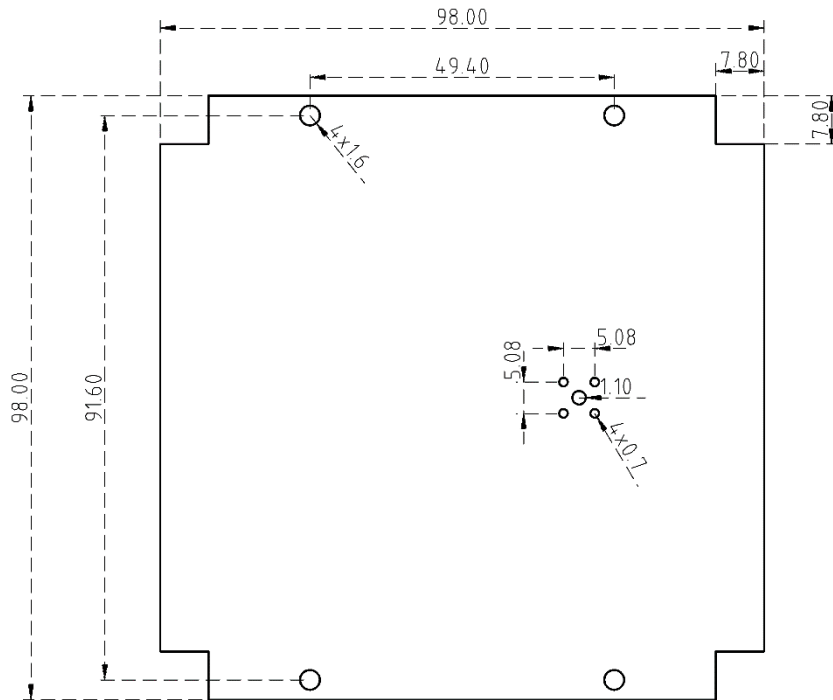


Figure 2 – S-band Antenna (bottom side). All dimensions in mm

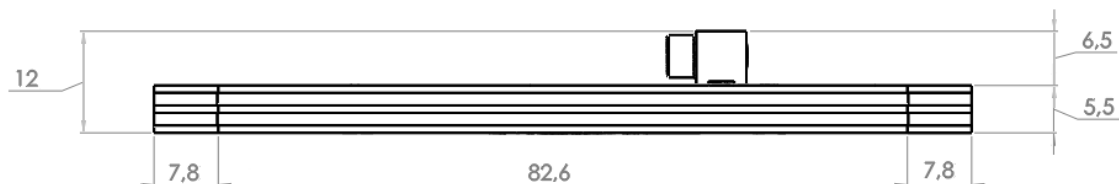


Figure 3- S-Band Antenna (side view). All dimensions in mm

The antenna is matched to 50 Ohms. For connection to a receiver (or transmitter), it uses a right angle through hole MCX connector which is shown in figure 4.

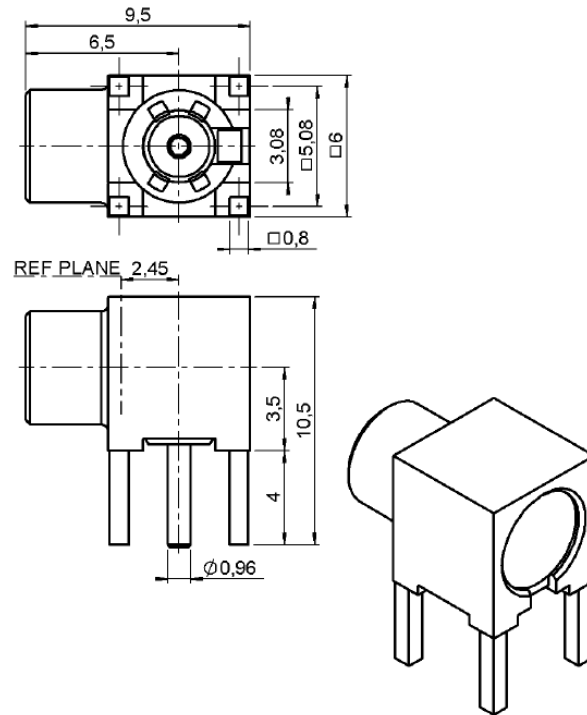


Figure 4 - MCX Connector

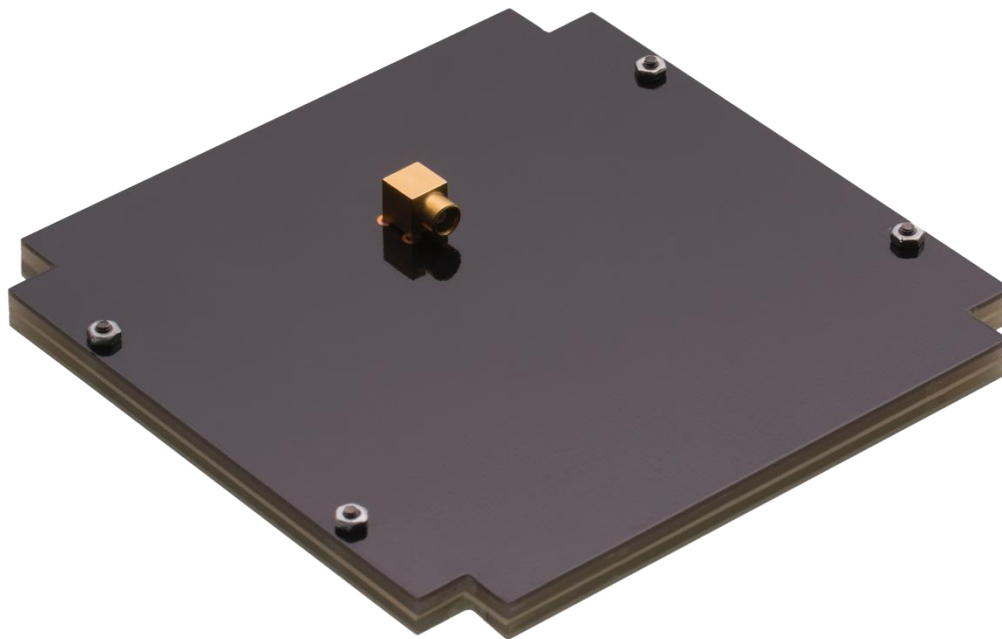


Figure 5 – Bottom side

6 ANTENNA PARAMETERS

Figure 6 shows the measured return loss of the antenna.

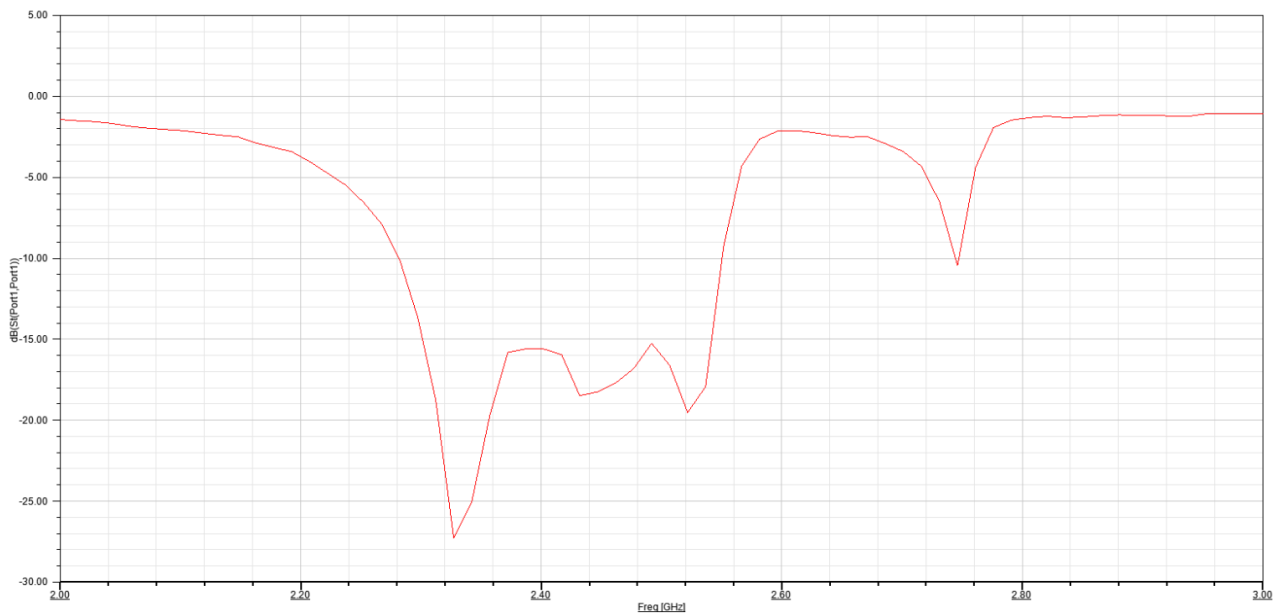


Figure 6 – Measured return loss of the antenna

Figure 7 shows the measured radiation pattern for the co-polarization and cross-polarization of the antenna at 2,425GHz.

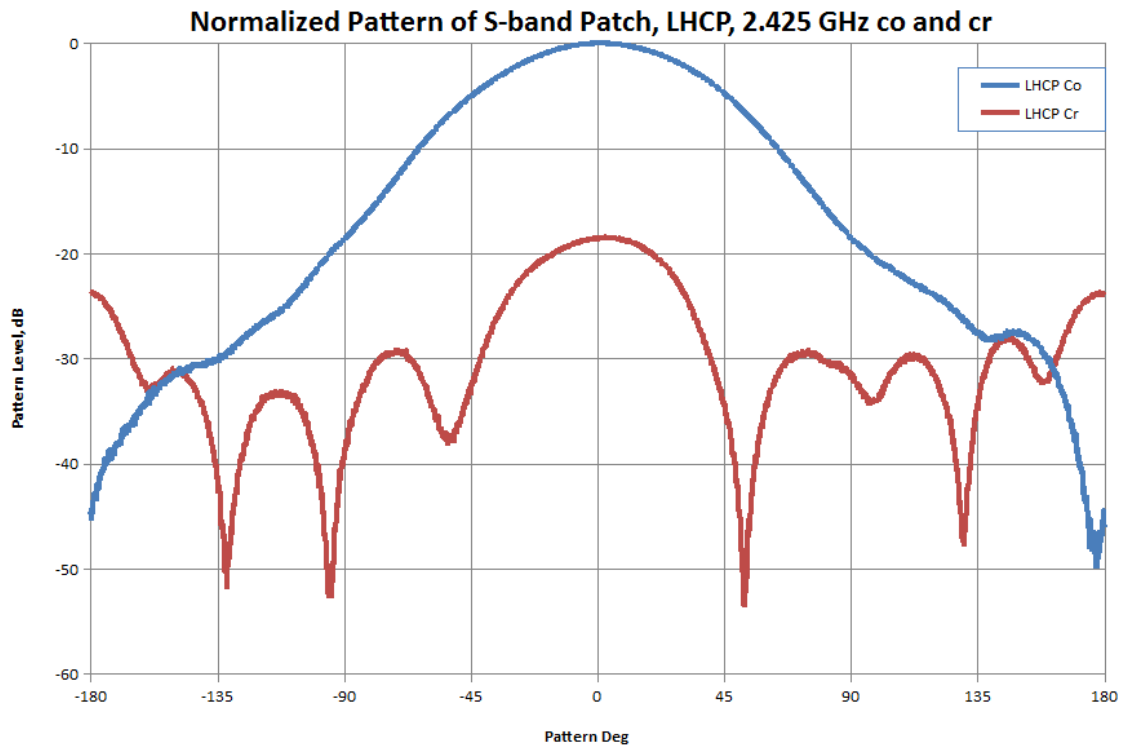


Figure 7 - Radiation pattern

7 INCLUDED IN THE SHIPMENT

EnduroSat provides additional items with the S-Band Patch Antenna:

- 2 Coaxial cables 50 Ohm, MCX to MCX and MCX to SMA connectors
- USB stick with user manual

Customized cables and connectors can be provided upon request.

8 MECHANICAL AND ENVIRONMENTAL TEST

A full campaign of tests at qualification level was performed on the qualification engineering model. Qualification tests level and duration follow the ESA standard ECSS-E-ST-10-03C and GEVS: GSFC-STD-7000A. Tests performed:

- Thermal Cycling
- Thermal Vacuum
- Random Vibration
- Sine Vibration
- Shock Test

9 HANDLING AND STORAGE

Particular attention shall be paid to the avoidance of damage to the S-Band patch antenna during handling, storage and preservation. The handling of the UHF antenna module should be performed in compliance with the following instructions:

- Handle using PVC, latex, cotton (lint free) or nylon gloves.
- The environment where the S-Band patch antenna module will be handled shall meet the requirements for a class environment 100,000, free of contaminants such as dust, oil, grease, fumes and smoke from any source.
- Store in such a manner as to preclude stress and prevent damage.
- To prevent deterioration, the S-Band patch antenna must be stored in a controlled environment, i.e. the temperature and humidity levels shall be maintained in the proper ranges:
 - Ideal storage temperature range: 15°C to 27°C
 - Ideal storage humidity range: 30% to 60% relative humidity (RH)

10 WARNINGS



This product uses very fragile components. Observe precautions for Handling.