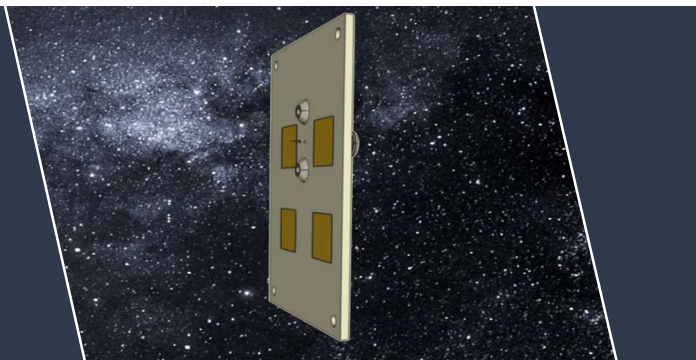


X-Band Patch Antenna with SMA Interface Control Document

- Quad Patch Antenna with SMA
- 40 x 60 mm, 8250 MHz

HIGHLIGHTS

- Circular polarization (RHCP)
- TRL 9 for basic design
- Flight Heritage since 2017
- Compatible with 1U CubeSats
- Robust design



This **COTS antenna** is designed for small satellite applications to realize satellite radio links.

With circular polarization, the antenna provides a robust solution regarding the steering accuracy to the ground station antenna and in case of a randomly rotation of wave polarization plane by refracts of the ionosphere.

As an RF connector, a robust SMA female connector (manufactured by RADIALL) is used. A proper mounting of the antenna can be provided by 4 screws. The antenna backside shall be grounded properly to the satellite chassis.

As dielectric, ROGERS™ laminate for space applications is used. Patches and conductors are copper with gold surface finish.

With the basic design, TRL 9 has been achieved with various successful LEO missions.

FEATURES

- Flight grade tested design
- Patch antenna design matched to customer specific frequencies
- Short delivery time

KEY SPECIFICATIONS

Tx frequency range:
8000 - 8450 MHz

RF bandwidth Tx:
450 MHz

**Maximum gain:
(main direction)**
10 dBi

Polarization:
RHCP

Connector type:
SMA

Beam width:
 $\pm 40^\circ \times \pm 40^\circ$

RF power input:
< 2W

**Temperature range:
(operationally)**
-30°C ... +60°C

VSWR:
< 2 (over RF BW)

Impedance:
50 Ω

Type:
Quad Patch

Mass:
 ≈ 12 grams

**Outer dimensions
(x/y/z, w/o connector):**
40 x 60 x 1.8 mm³

Document Information

Action	Name / Signature	Company	Date
Prepared by	SPI Stefan Pirwitz	IQ wireless	2021-03-09
Checked by	KJÄ Klaus Jäckel	IQ wireless	2021-03-09
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Issue	Date	Page and/or paragraph affected	Change description	Responsible
00	2020-12-01		Initial issue	Author
01	2021-03-09		parameter improvements	KJA
02	2022-03-23		Update Company Name & Address	SPI
03	2026-04-22		Updated design and name	JML
04	2026-06-25	1	Updated wording	TMA

Mechanical Dimensions

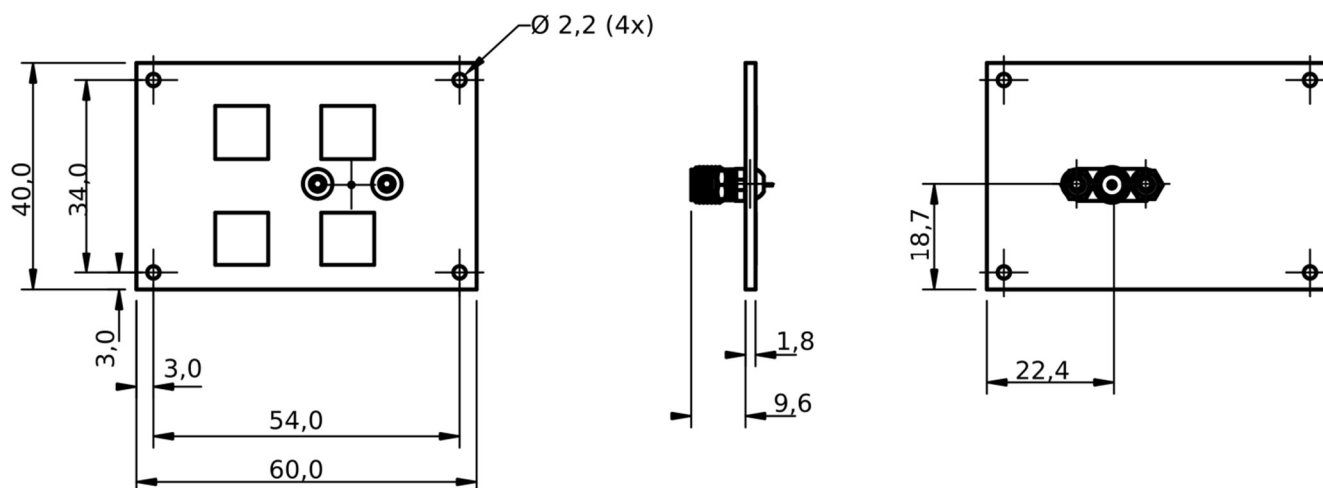


Figure 1: Mechanical dimensions and positions of RF connectors

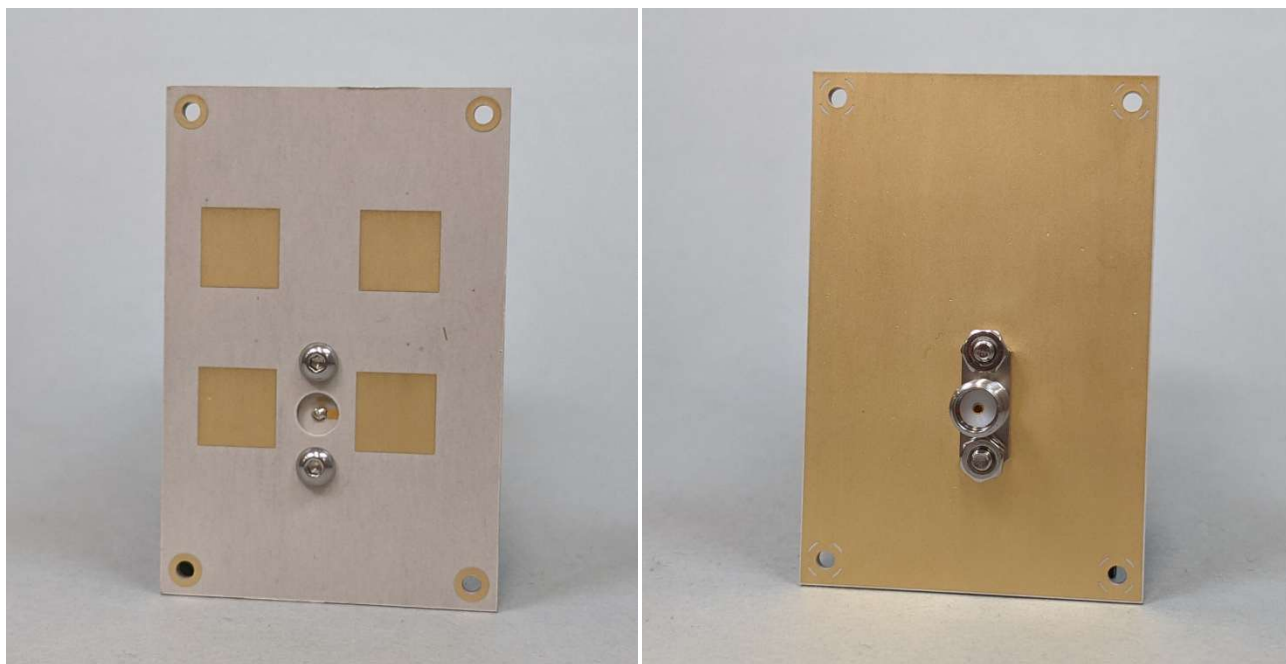


Figure 2: Antenna realization

Simulated Data

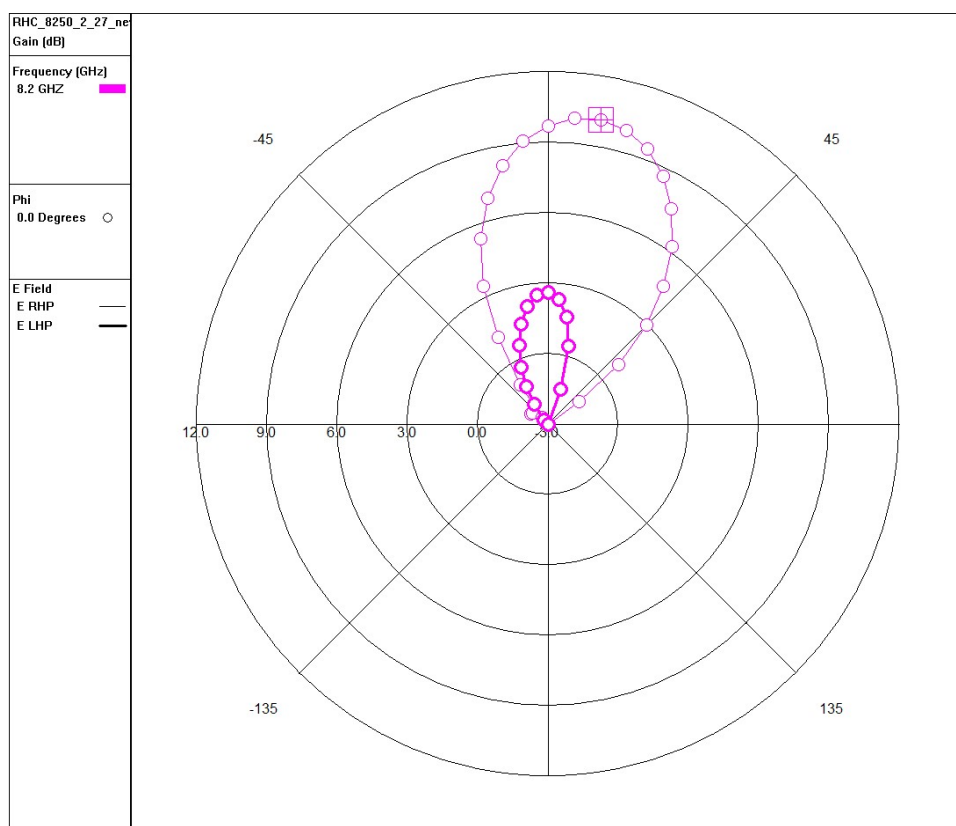


Figure 3: Simulation results of antenna pattern 0°, RHC vs. LHC (bold)

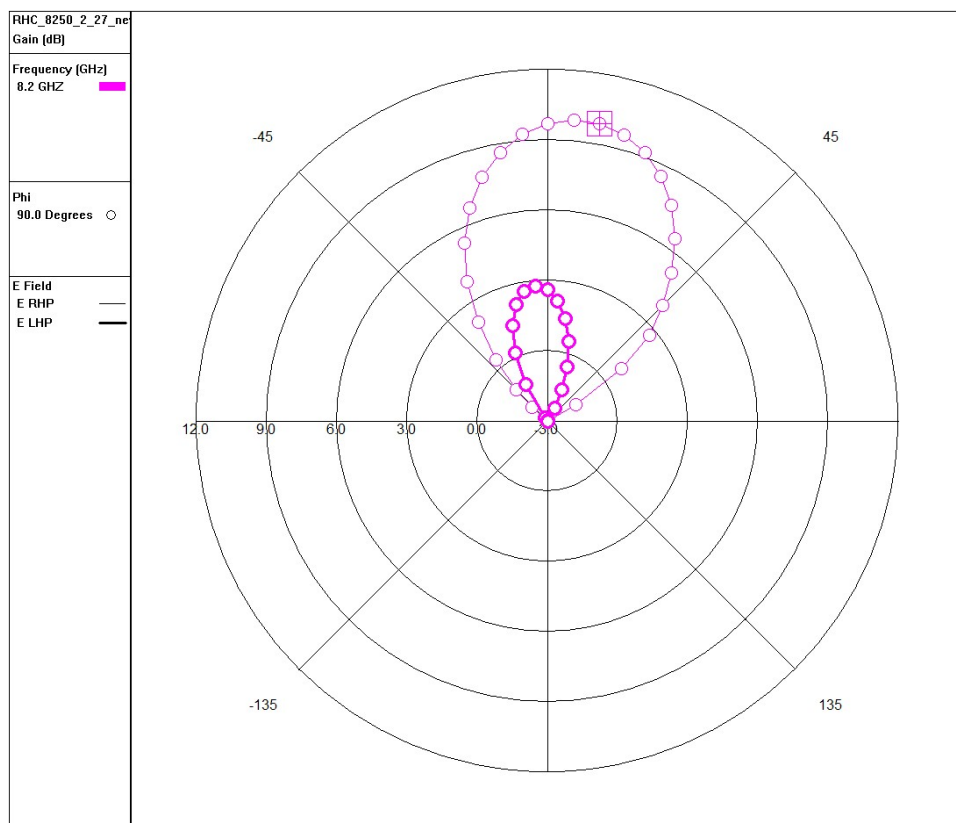


Figure 4: Simulation results of antenna pattern, 90° RHC vs. LHC (bold)

Interfacing and Mounting Hints for the Antenna

Please use suitable screws and washers according to your specific requirements for mounting the antenna to the satellite chassis. Mounting of the antenna is by 6 of those screws and washers with positions as indicated in figure 1. Please ensure that the mounting area is plane.

A step file for the antenna could be provided on request.

CAUTION:



Although all external interfaces are protected against ESD, proper precautions and grounding must still be observed when handling the device. Antenna backside and outer conductors of RF connectors and feeders have electrical ground potential. They should be connected properly to satellite chassis (ground).

CAUTION:



When interfacing and operating the antennas with radio transmitters, generators or similar equipment, special care is required regarding a potential irregular radio wave radiation. Please ensure that maximum power ratings are kept. RF interfaces to be connected to the antenna ports should be free of DC.

Please make sure that no obstacles are arranged or mounted in beam direction of the antenna patches.

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