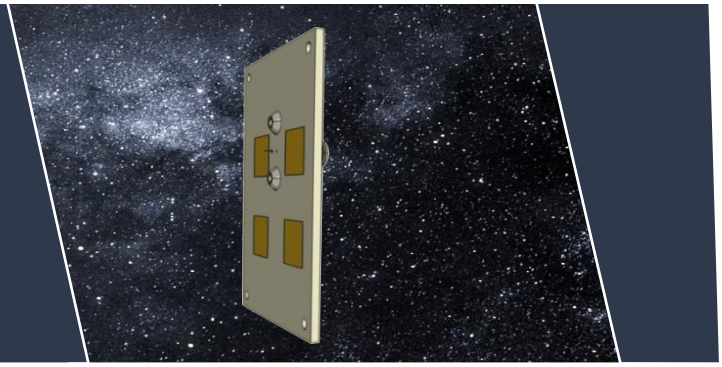
X Band Patch Antenna
Interface Control Document

⇢ Quad Patch Antenna 202162
⇢ 40 x 60 mm, 8.00 - 8.45 GHz

HIGHLIGHTS

- Circular polarization (RHCP)
- Compatible to CubeSat Dimensions
- Robust design



This **COTS antenna** is designed for pico and nano satellite applications to realize high-performance satellite-to-ground satellite radio links.

With circular polarization, the antenna provides a robust antenna 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 RF connectors, connectors of SMA type (manufacturer RADIALL) are used. A proper mounting of the antenna can be provided by 4 screws. The antenna backside shall be ground-ed properly to the satellite chassis.

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

With the basic design, TRL9 has been achieved with various successful LEO missions.
The antenna backside shall be grounded properly to the satellite chassis.

FEATURES

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

KEY SPECIFICATIONS

Connector type:
SMA

RF bandwidth:
8.00 – 8.45 GHz

Maximum gain:
(main direction)
10 dBi

Polarization:
RHCP

Beam width:
± 20° x ± 20°

RF power input:
< 2W

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

VSWR:
< 2 (over RF BW)

Type:
Quad Patch

Mass:
≈ 12 grams

Impedance:
50 Ω

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

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01	2021-03-09		parameter improvements	KJA
02	2022-03-23		Update Company Name & Address	SPI
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Mechanical Dimensions

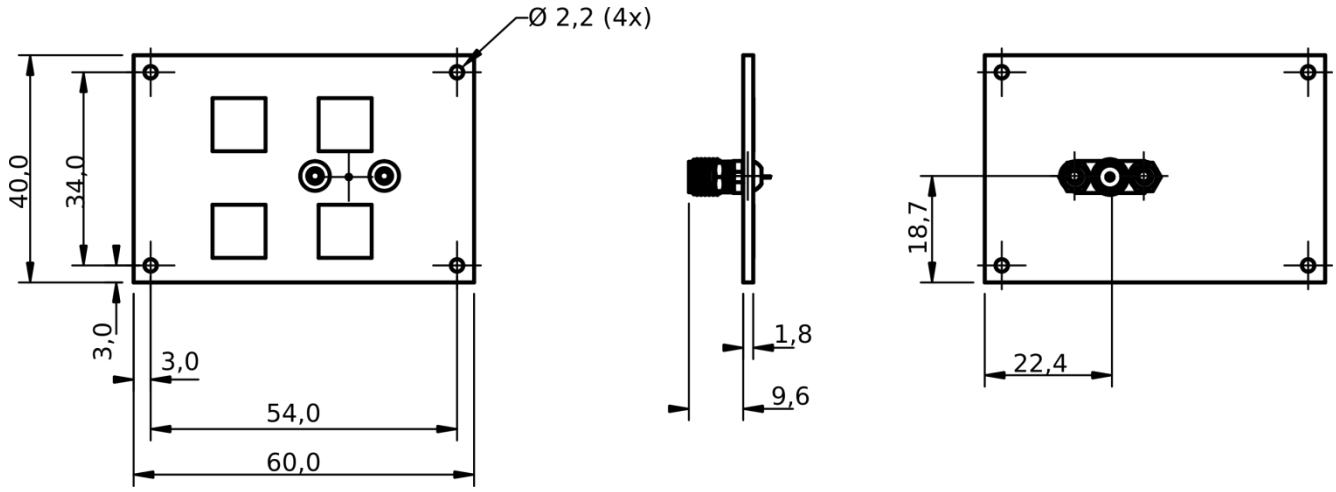

Figure 1: Mechanical dimensions and positions of RF connectors. All tolerances for all mechanical dimensions are ± 0.1mm, for connector ± 0.5mm and high (z-dimension) ±10%. These are based on manufacturing tolerances by the PCB manufacturer.

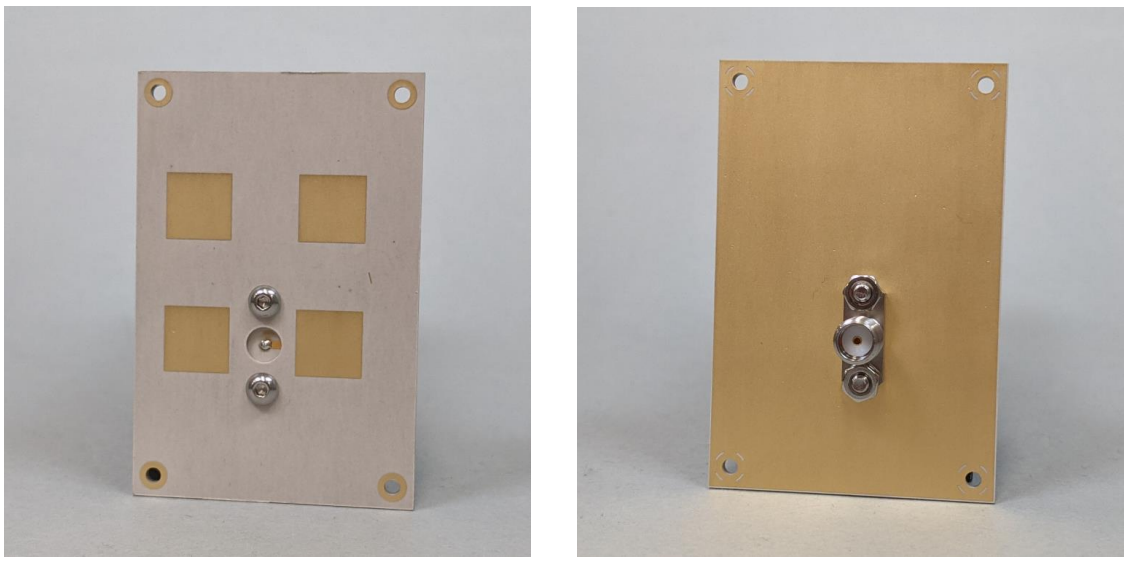

Figure 2: Antenna realization

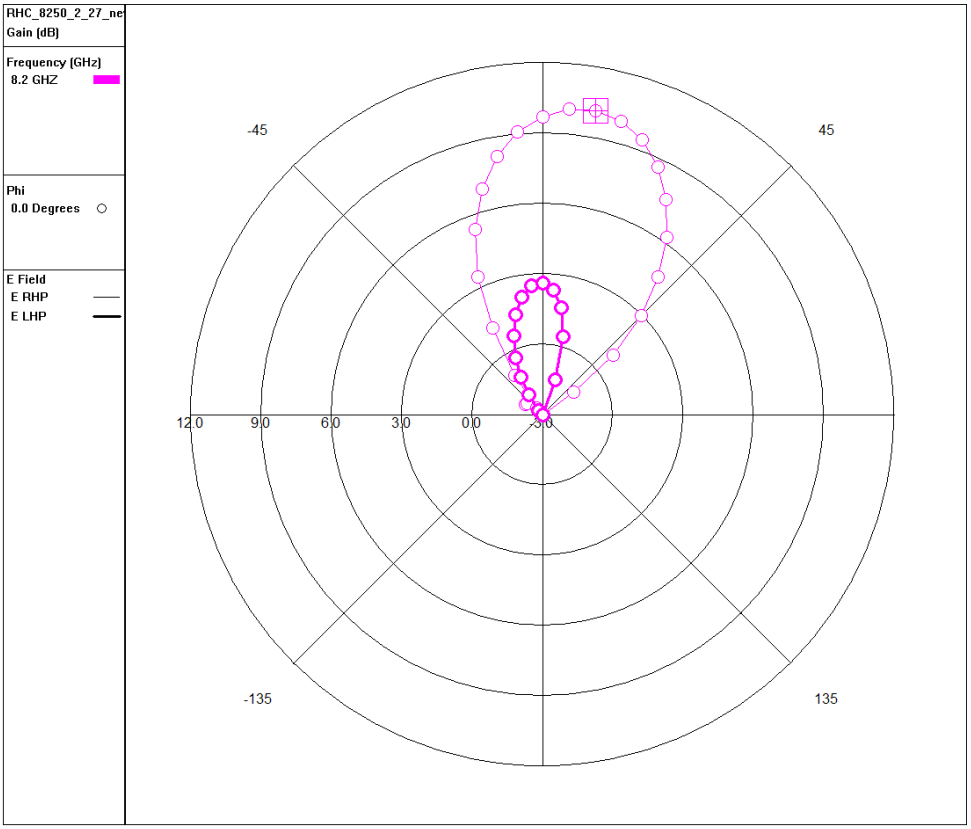

Figure 3: Simulation results of antenna pattern 0°, RHC vs. LHC (bold)

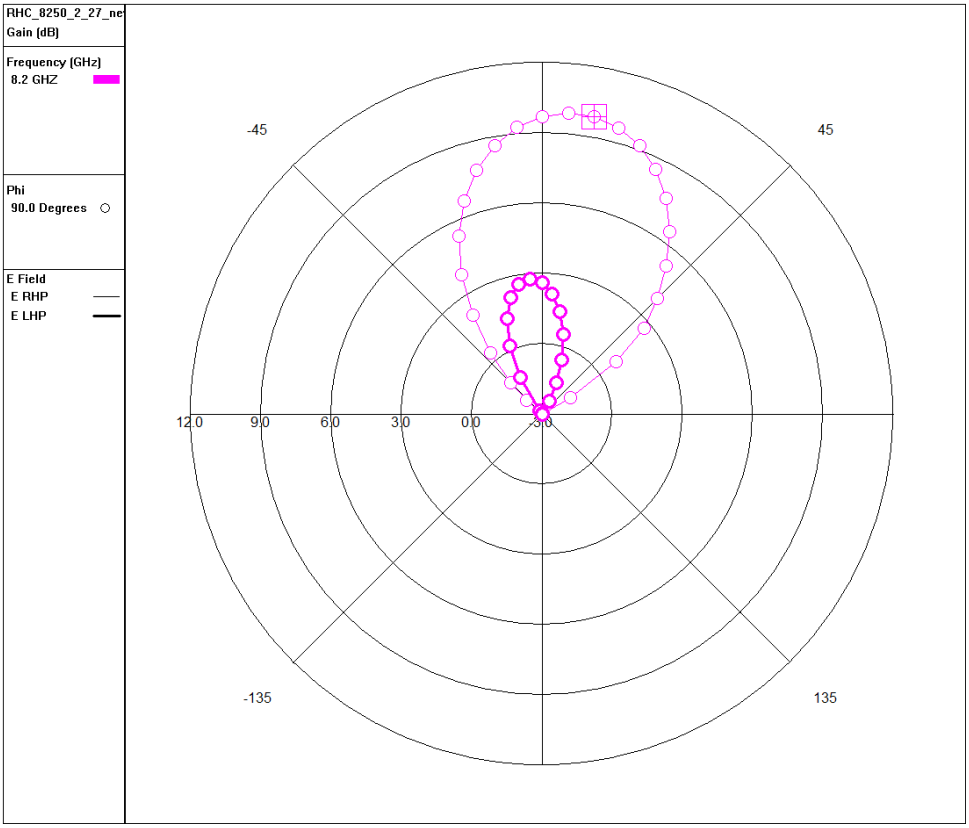

Figure 4: Simulation results of antenna pattern, 90° RHC vs. LHC (bold)

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 4 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.