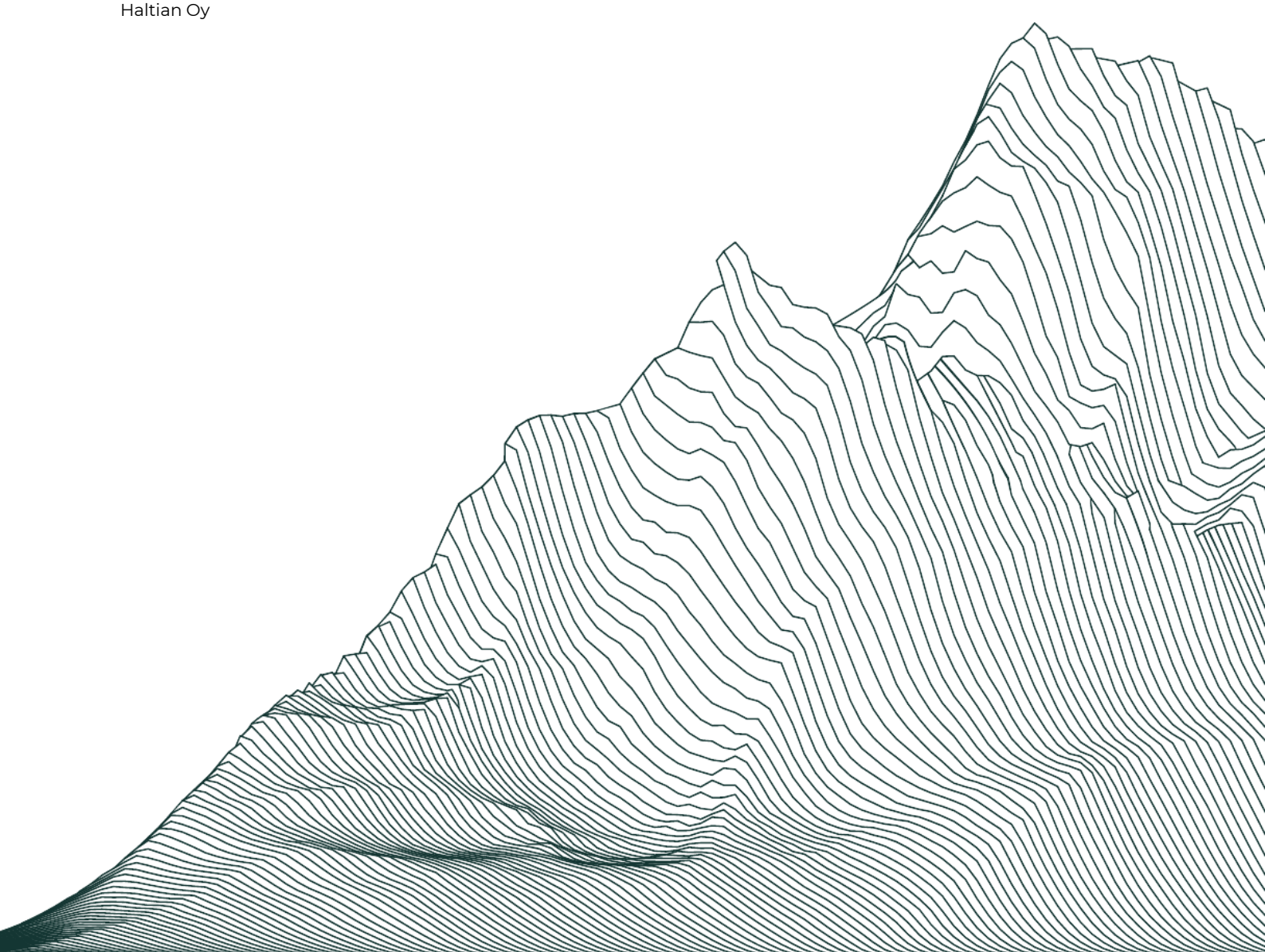
Haltian Radar

Technical note – 60GHz antenna

Device ID : TSRA01

Marko Sarasmo

Haltian Oy



Content

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1. Introduction

This technical note describes Haltian Radar 60GHz radar system antenna design and its technical parameters.

Device is using Acconeer A121 radar chip.

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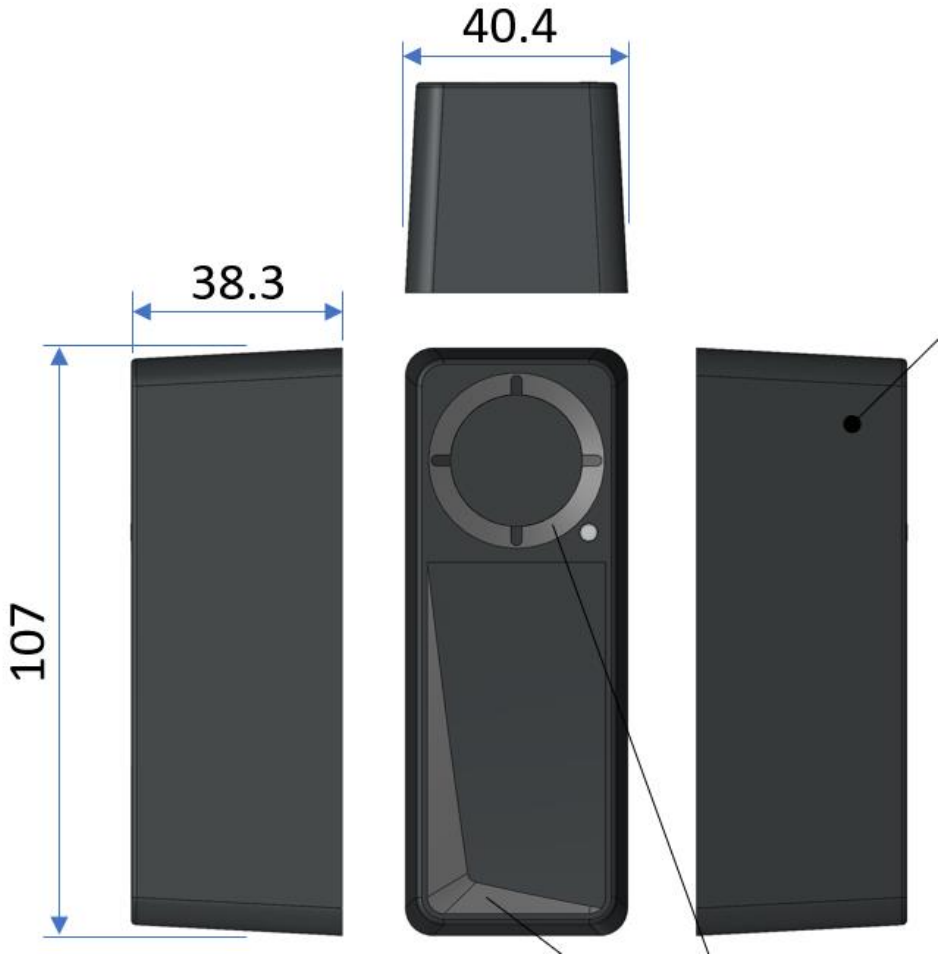
2. Device construction

2.1. Device dimensions [mm]



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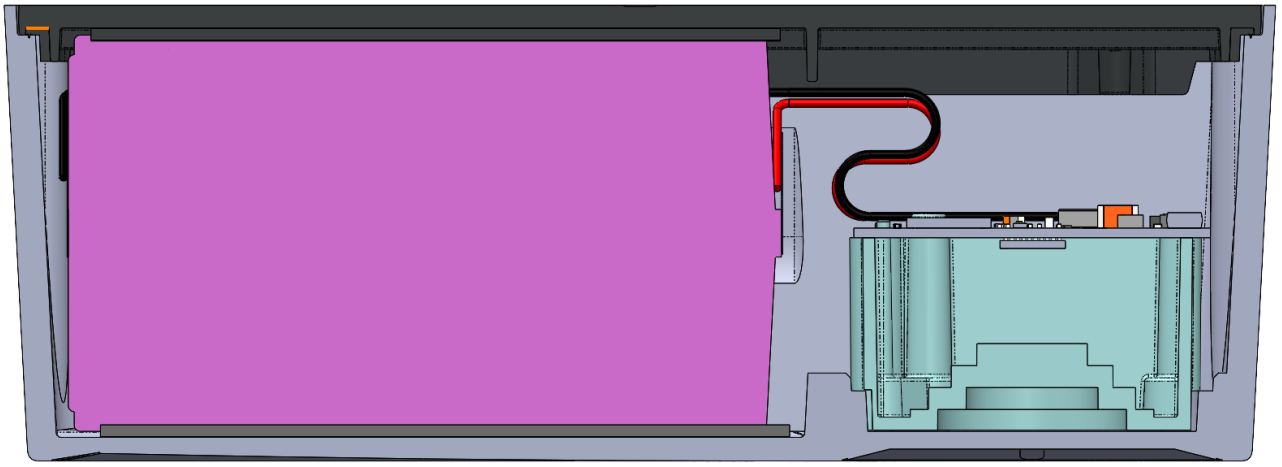
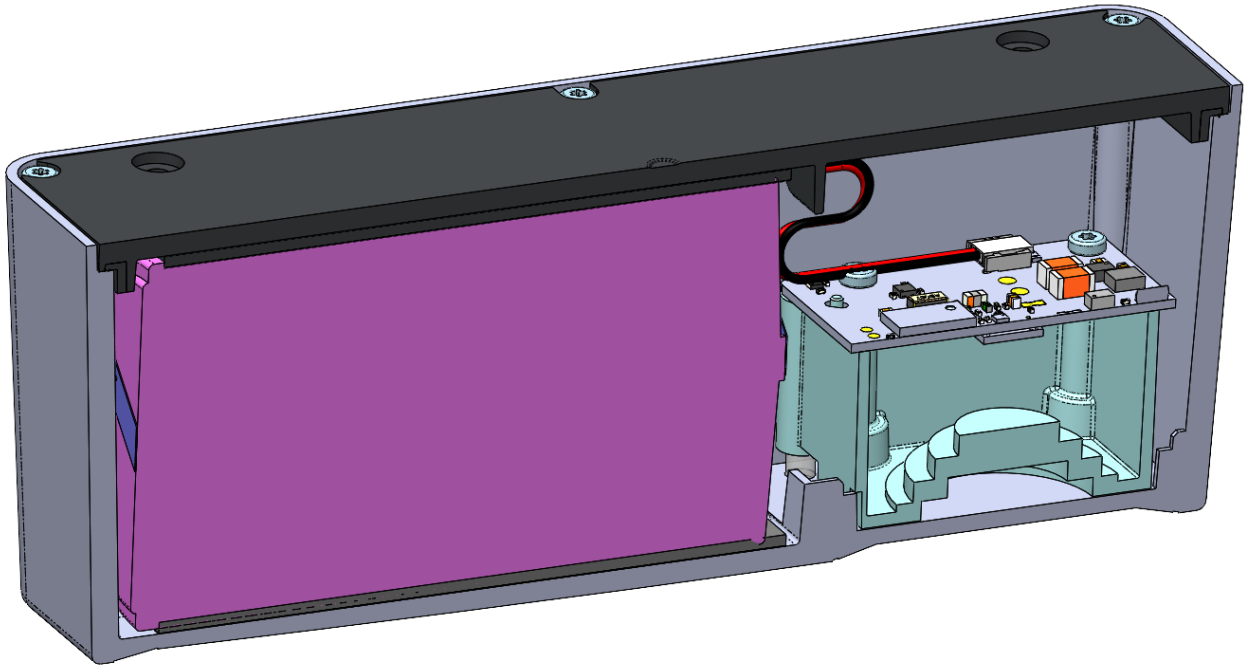
2.2. Cross section images





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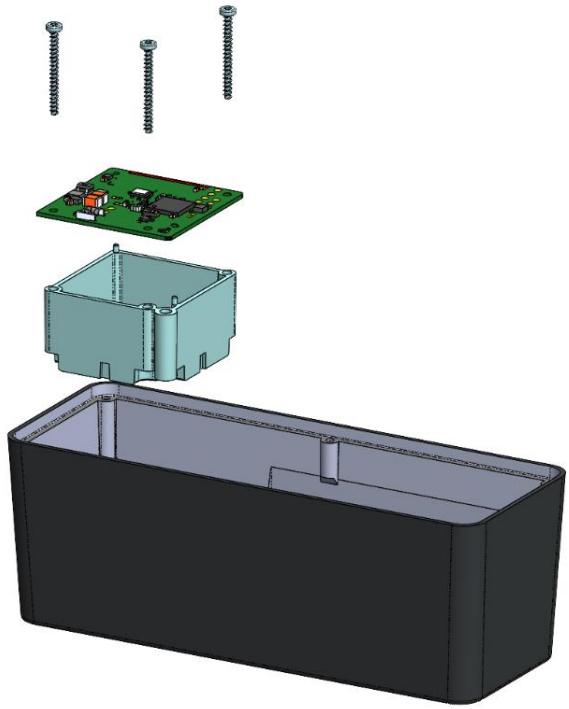
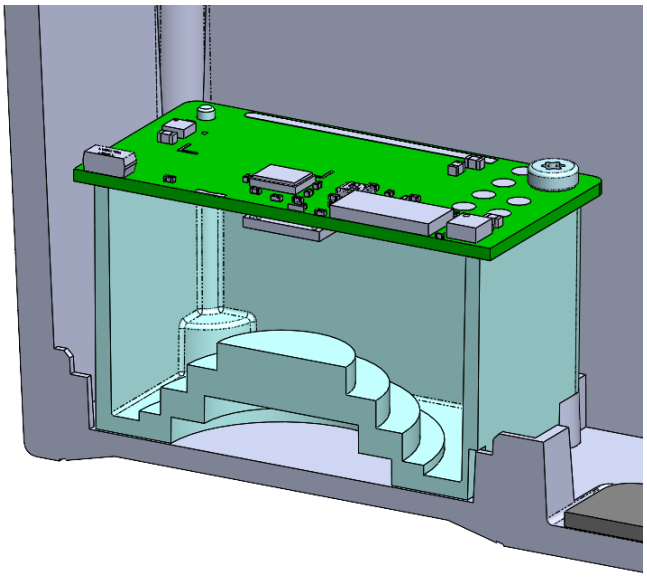
2.3. 60GHz antenna assembly





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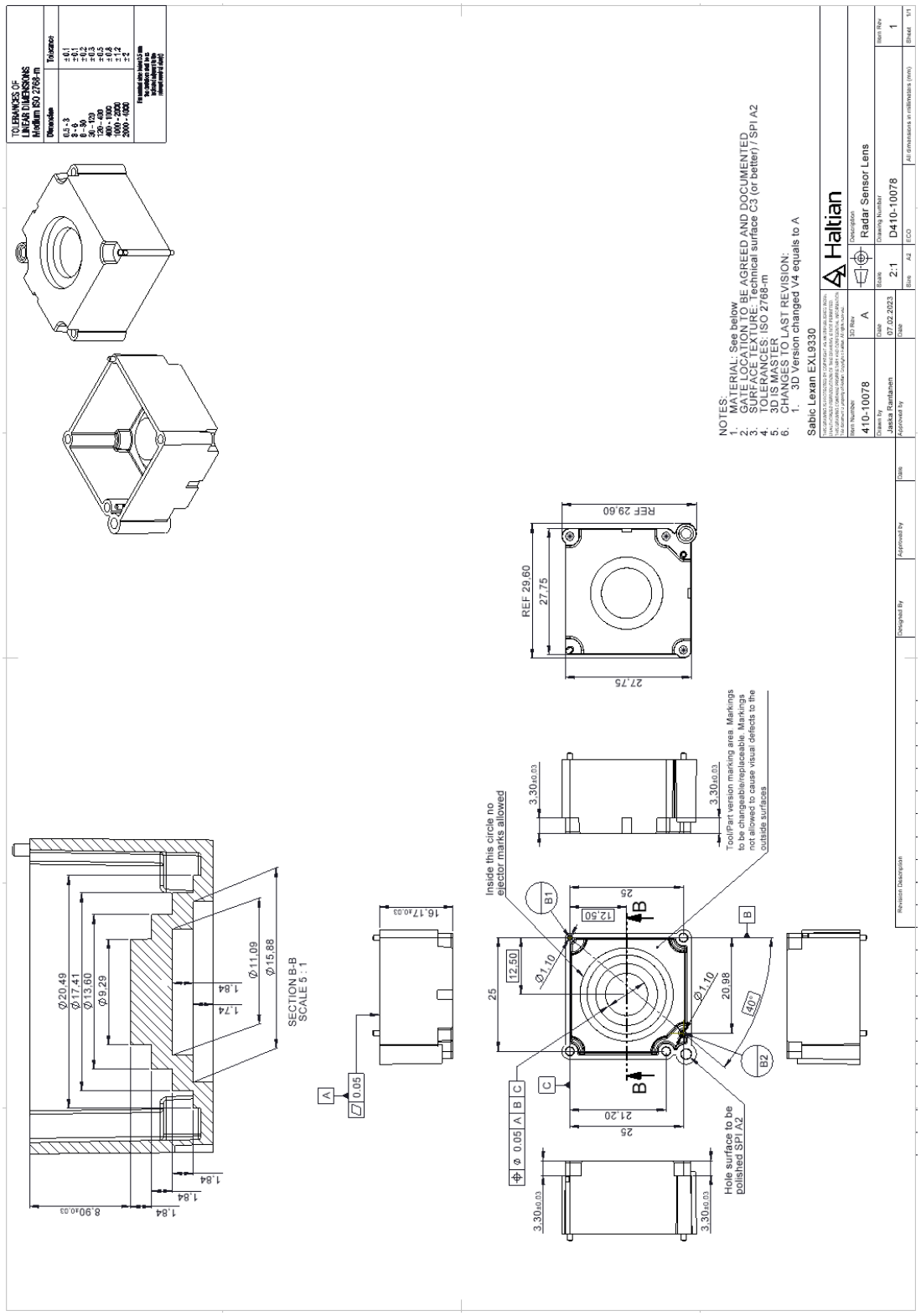
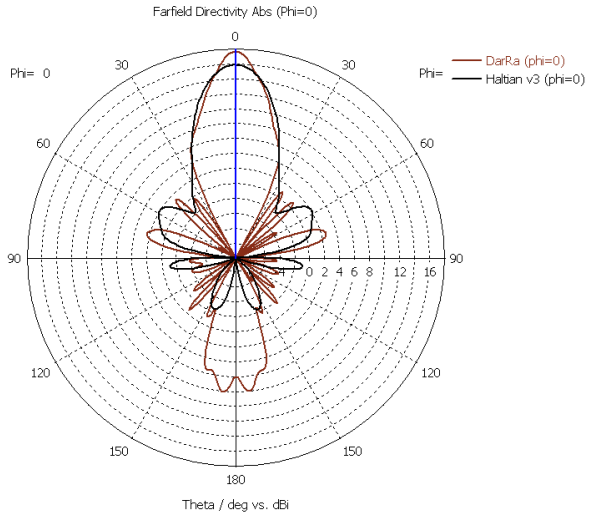
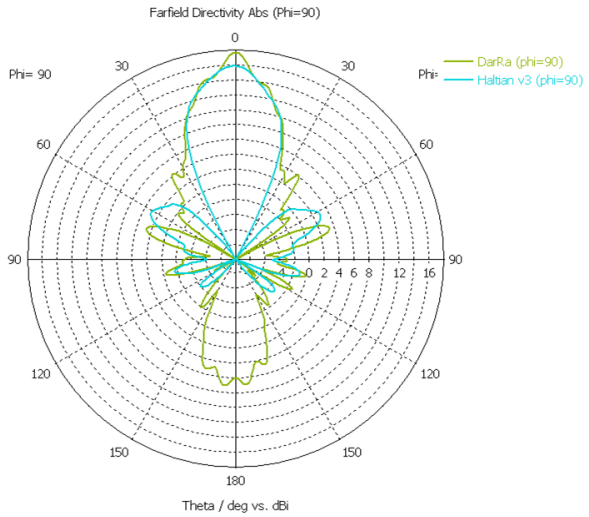
2.4. FZP (Fresnel Zone Plate) radar lens design.



3. Radar antenna gain

Radar chip manufacturer Acconeer has made simulations with used lens design including device cover. Used design is marked with “Haltian v3”.





Black line that represents the V3 version, the TX gain is 16 dBi based on free space gain of 12.6 dBi according to the simulation model, thus the lens TX gain is (16-12.6) = 3.4 dB (which gives a RLG=6.8 dB).

EIRP value for free space peak value is 10.2 dBm (derived from Acconeer FCC A121 test report, chapter 12.2 Maximum EIRP / Transmitter Output Power). The peak EIRP will then be 10.2dBm + 3.4dB (lens gain) = 13.6dBm which is below the FCC limit of 33 dBm.

The simulation is based on peak, continuous TX transmission.

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4. Summary

Acconeer FCC approval requires that applications which are using same radar chip A121, radar antenna gain is below what is used on FCC type approval measurements and peak EIRP is below 33dBm.

Based on simulations, Haltian Radar device does not exceed FCC limit of 33 dBm.

Oulu Finland

4th of November 2024

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