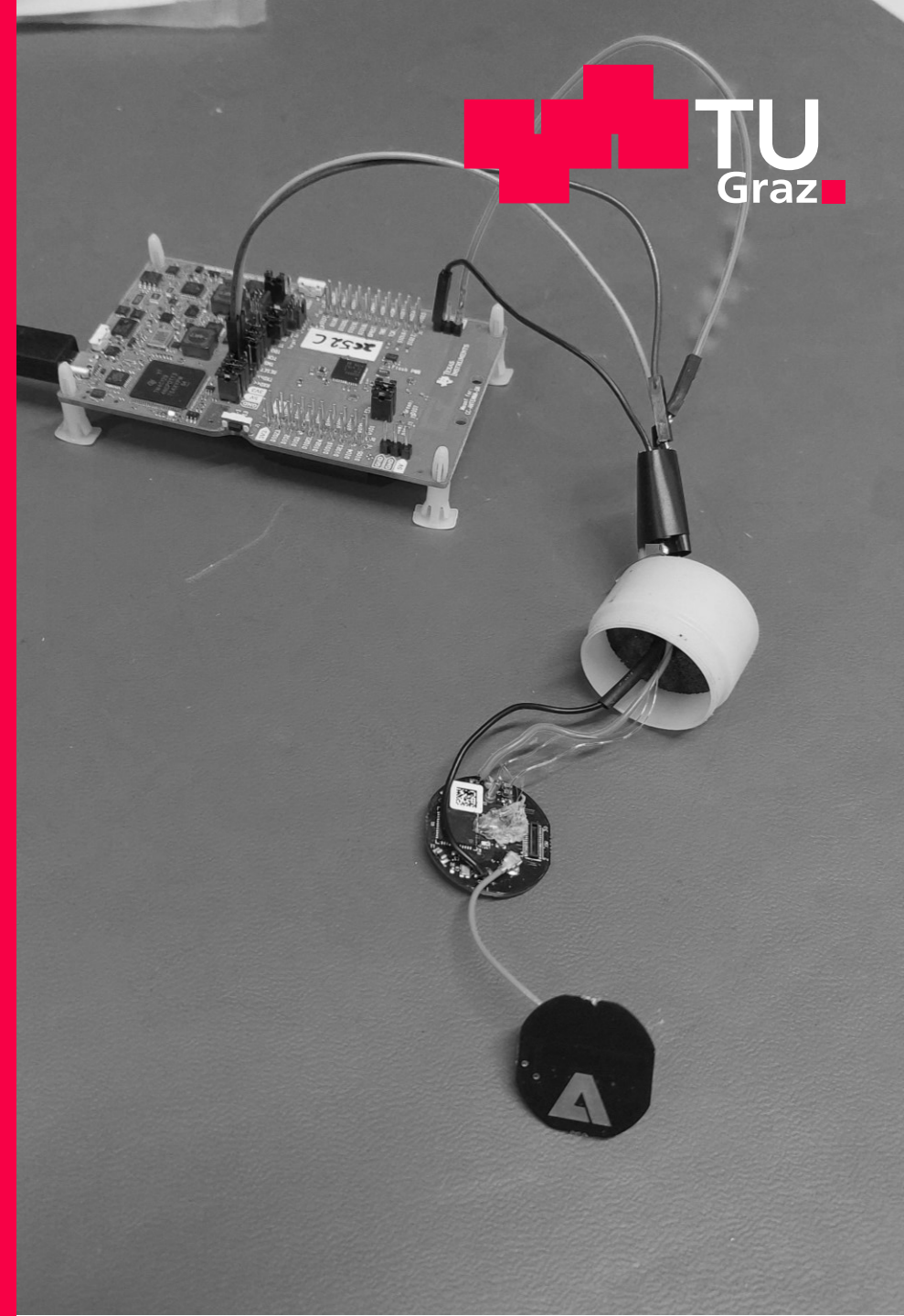


Bluetooth Vibration Sensor – Antenna design

A. ARSANJANI, M. MEDEBACH, M. GADRINGER

06/09/2023

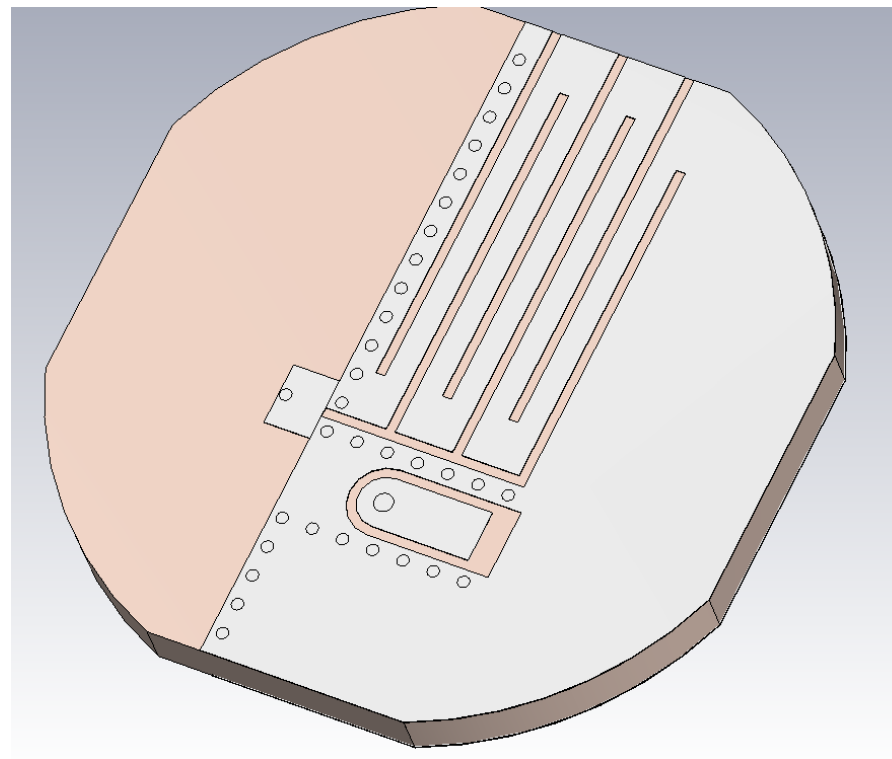
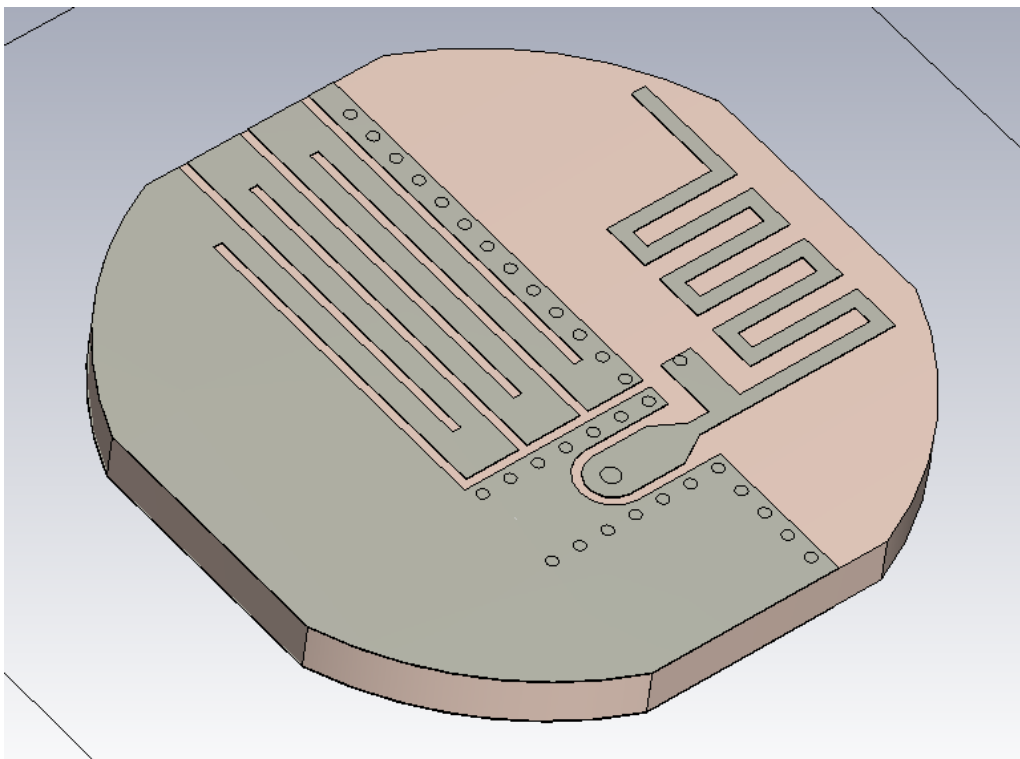
Institute of Microwave and Photonic Engineering



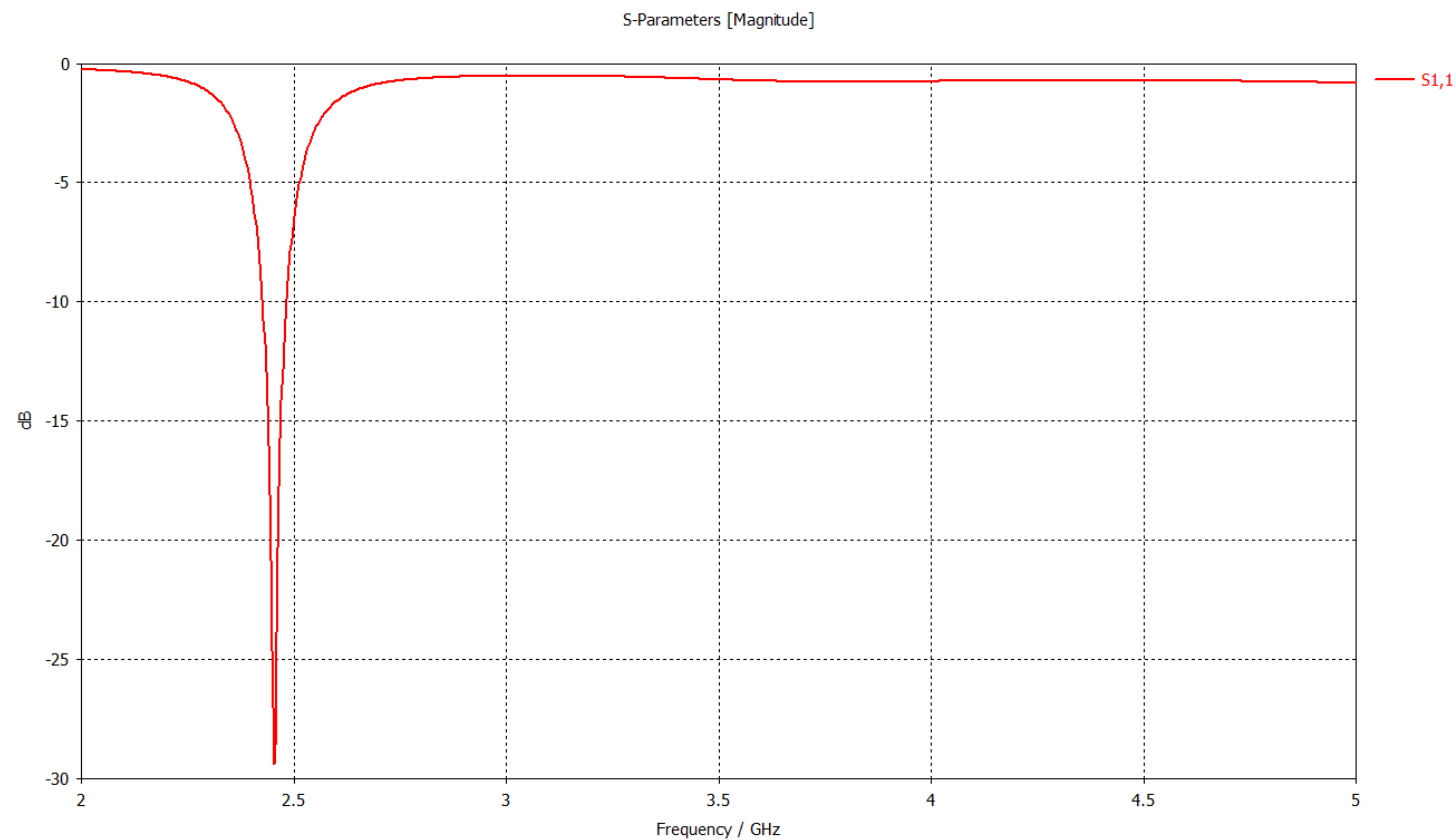
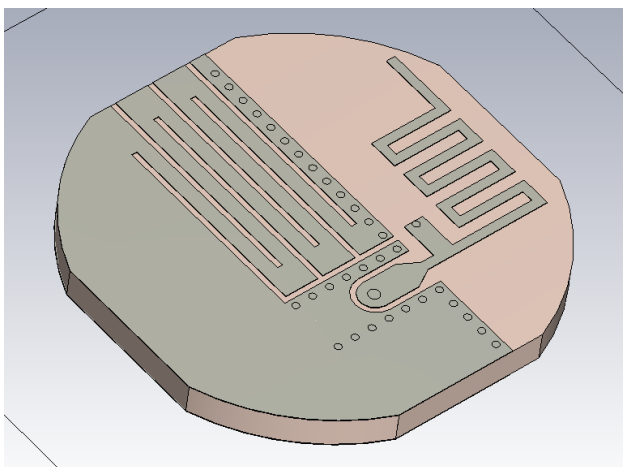
Design an antenna for 2.45 GHz

- Improved radiation performance
- Rejection of second harmonic

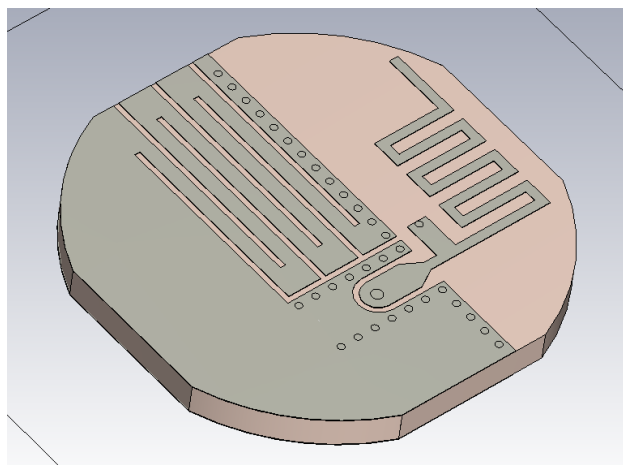
Preliminary antenna design



Preliminary antenna design

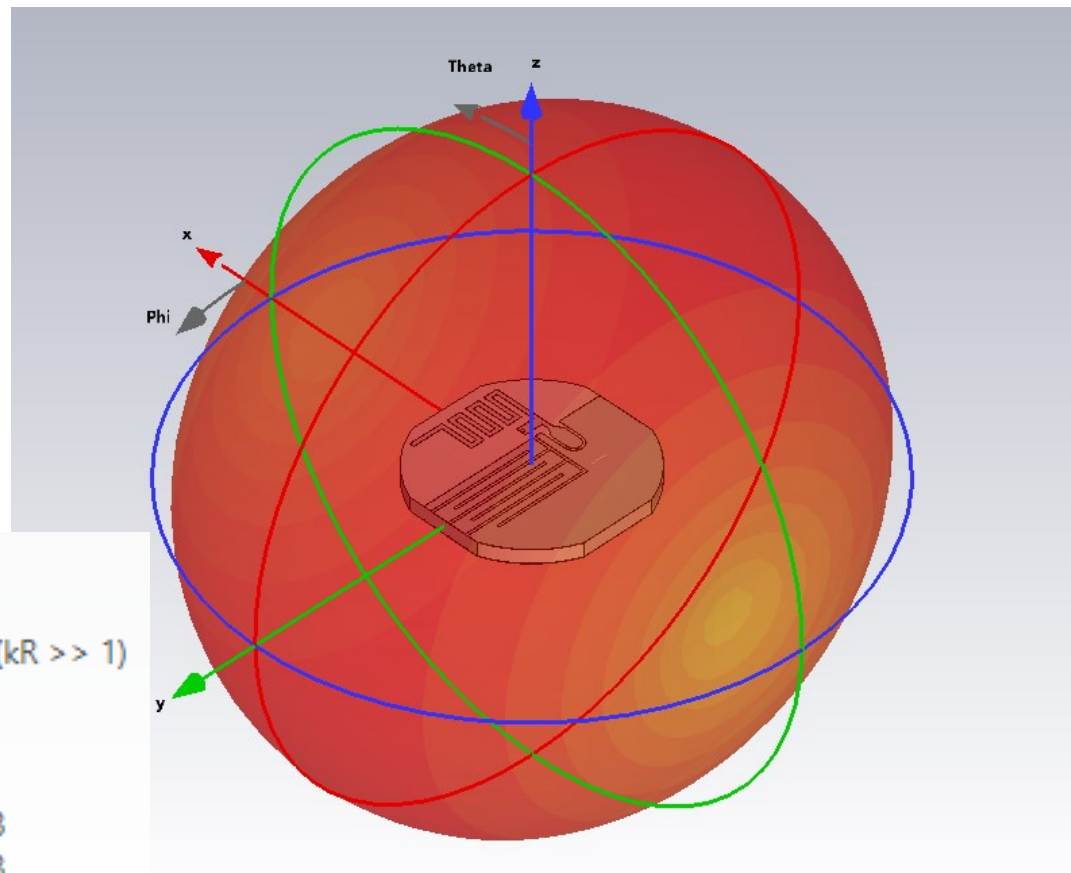


Preliminary antenna design



farfield (f=2.45) [1]

Type	Farfield
Approximation	enabled ($kR \gg 1$)
Component	Abs
Output	Gain
Frequency	2.45 GHz
Rad. Effic.	-2.146 dB
Tot. Effic.	-2.161 dB
Gain	-0.3663 dBi



Why we need to know exact dimensions of the antenna board?

“Ground plane effects on planar inverted-F antenna (PIFA) performance”: <https://doi.org/10.1049/ip-map:20030551>

1. The gain of PIFA is low for a ground plane size $< 0.4 \cdot \lambda$
2. Ground plane size significantly influences antenna radiation pattern

- Why this is not a problem with other devices?

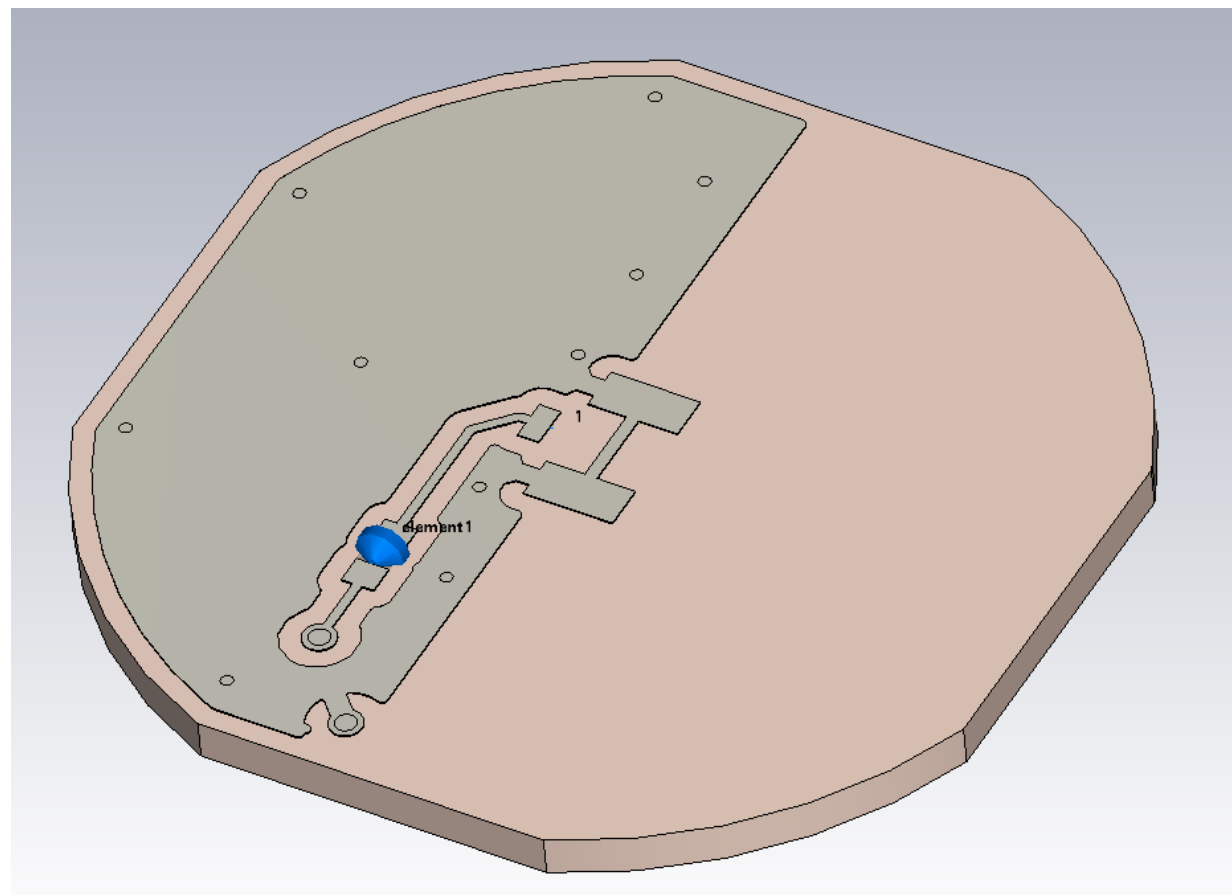
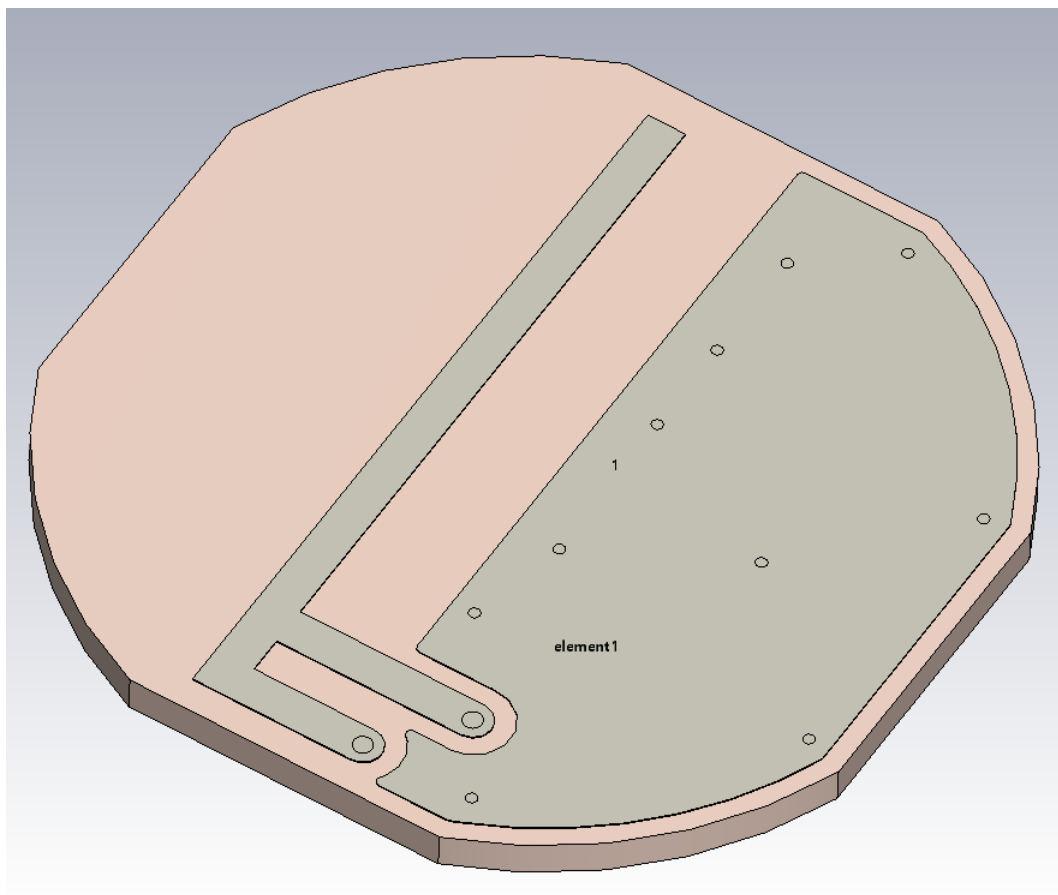
Usually in handheld devices the antenna is connected to a large ground which will improve the radiation and performance of the antenna, however, since we have a small ground in this scenario, the design of the antenna is more tricky, and susceptible to changes if



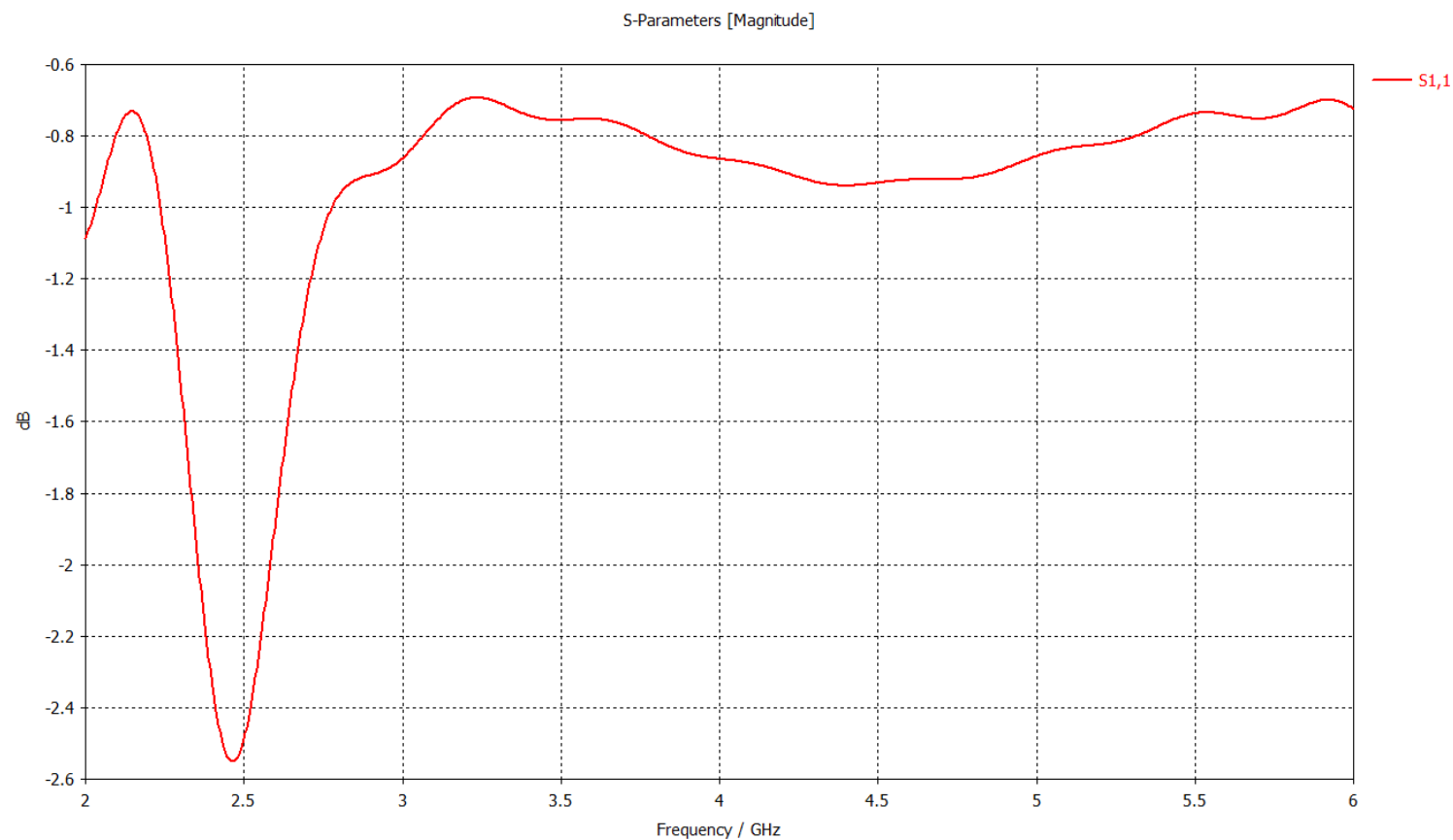
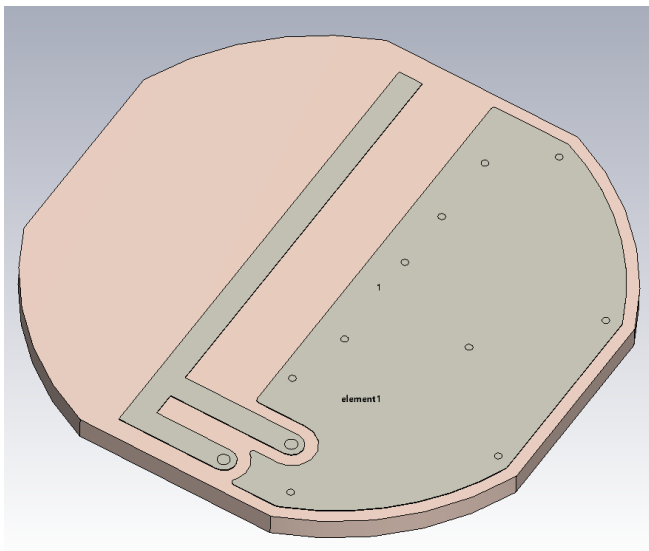
Michael Gadringer
Graz University of Technology

Contact:
michael.gadringer@tugraz.at

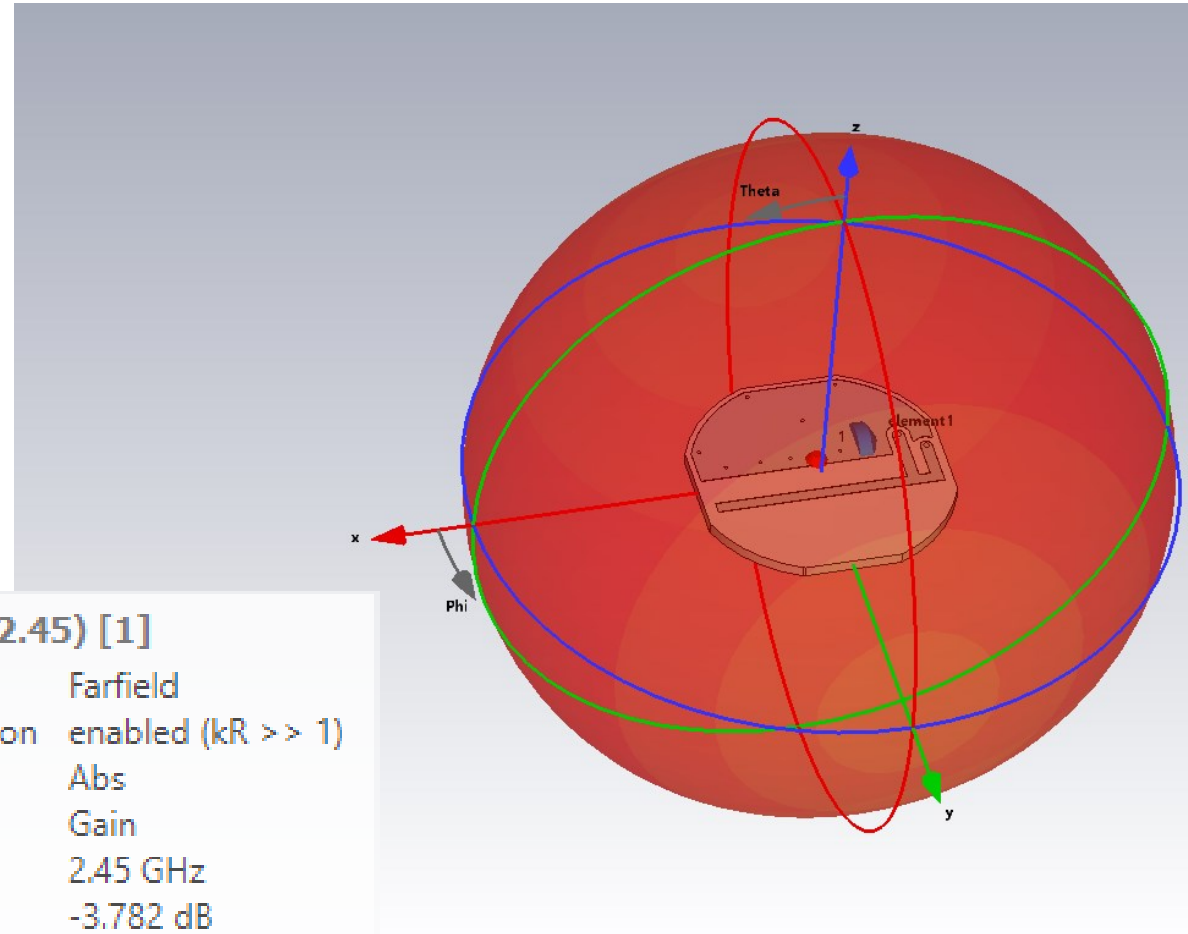
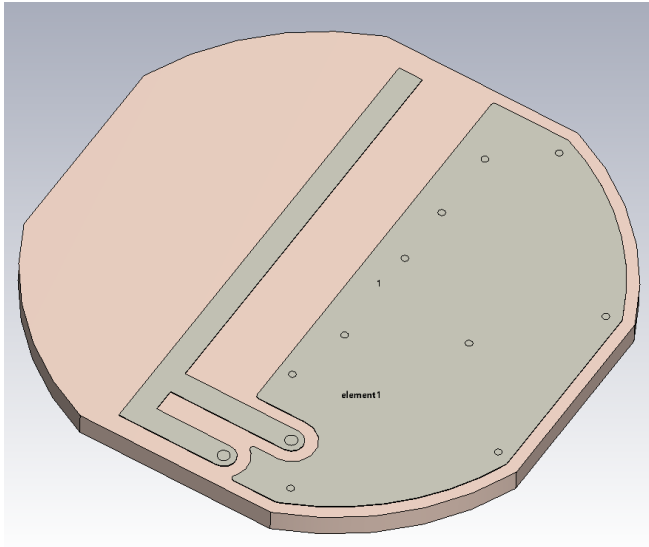
Andritz antenna design



Andritz antenna design



Andritz antenna design



farfield (f=2.45) [1]

Type	Farfield
Approximation	enabled ($kR \gg 1$)
Component	Abs
Output	Gain
Frequency	2.45 GHz
Rad. Effic.	-3.782 dB
Tot. Effic.	-7.322 dB
Gain	-2.778 dBi