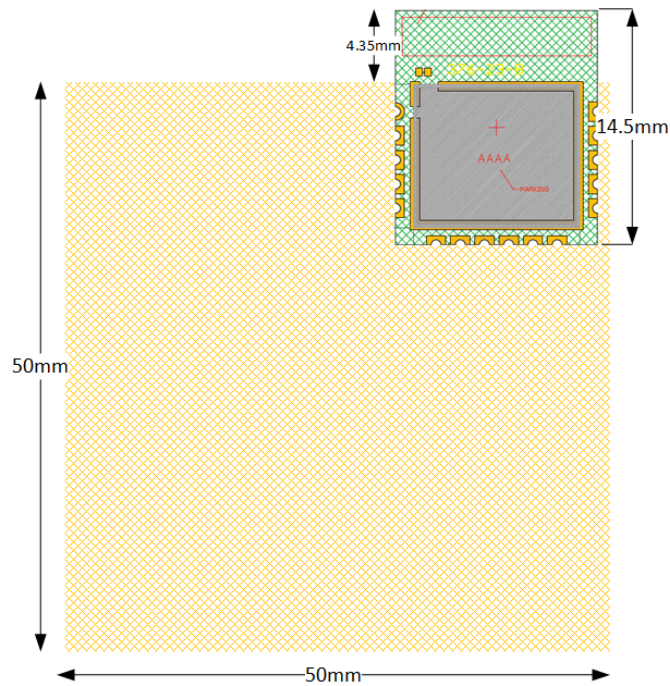


**Figure 9: Antenna Performance in Proximity of Copper (Left), Laminate (Middle) and Laminate under Antenna (Right)**

The actual TINY™ module evaluation board layout that has been used to conduct measurements is shown in Figure 10.



**Figure 10: DA14531 TINY™ Module Evaluation Board**

## 8.2 Antenna Graphs

The antenna VSWR measurements for the three installation positions are given in the following figures.

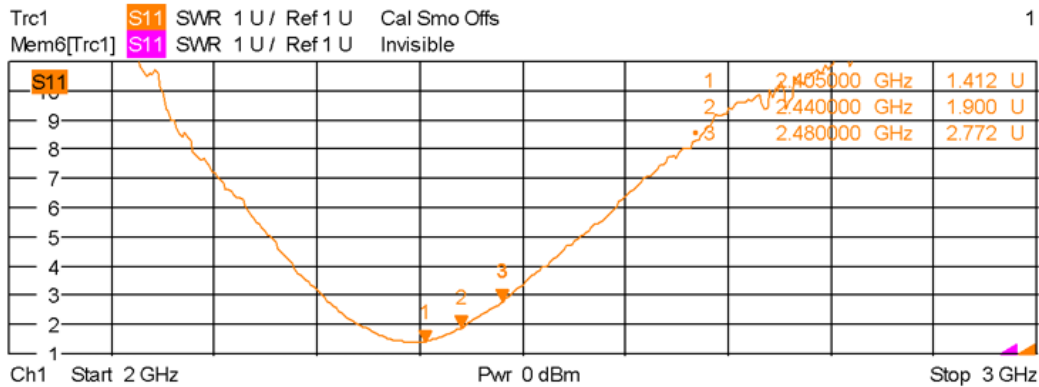


Figure 11: VSWR Installed in the Upper Left Corner (Position #1) of Evaluation Board

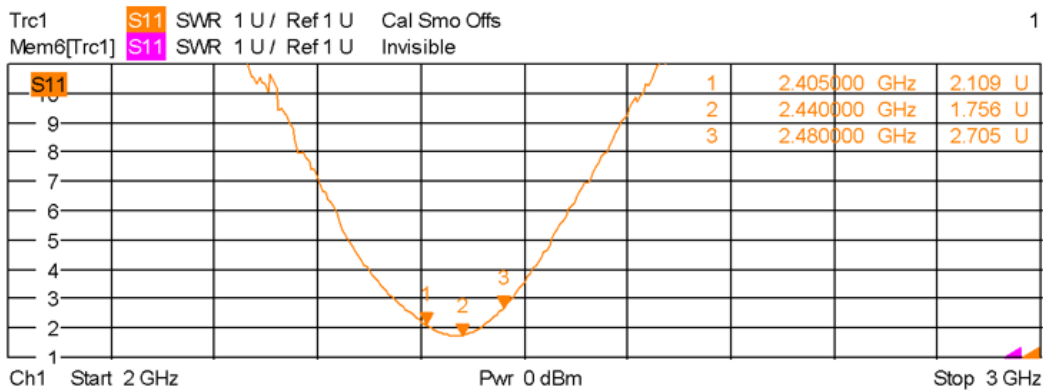


Figure 12: VSWR with Module Installed in Center (Position #2) of the Evaluation Board

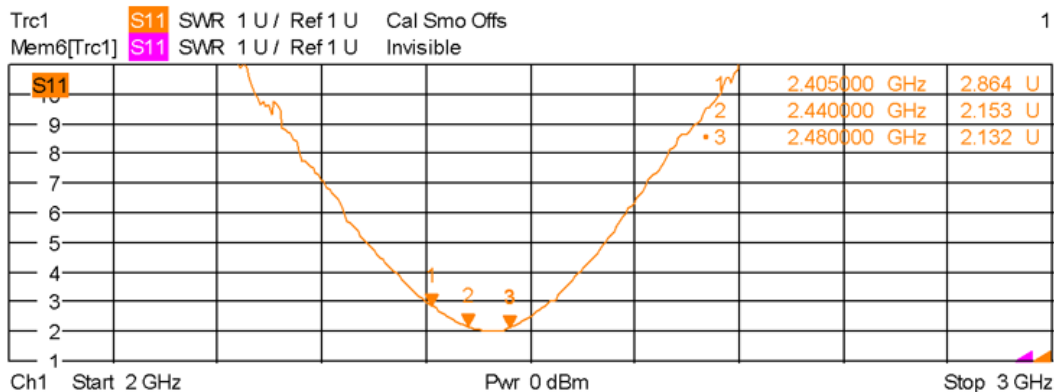
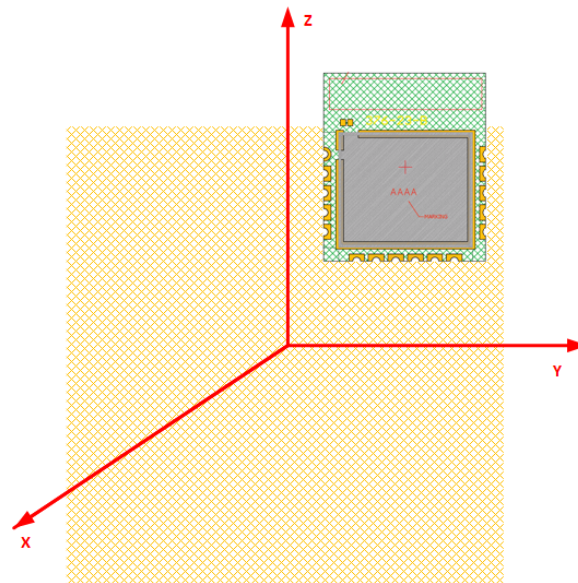


Figure 13: VSWR with Module Installed in the Upper Right Corner (Position #3) of the Evaluation Board

### 8.3 Radiation Pattern

The antenna radiation pattern measurements are carried out in an anechoic chamber. Radiation patterns are presented for three measurement planes: XY-, XZ- and YZ- planes with horizontal and vertical polarization of the receiving antenna.



**Figure 14: Measurement Plane Definition**

Measurements are carried out for the module installed in the upper right corner on the reference board with no laminate below the antenna trace.

**Radiation Pattern for Antenna Trace**

Horizontal polarization

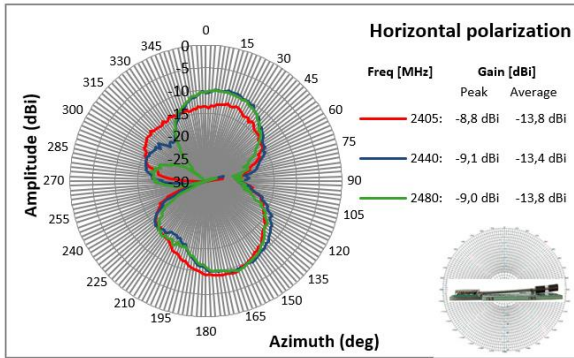


Figure 15: Radiation Pattern for XY-Plane, Horizontal Polarization

Vertical polarization

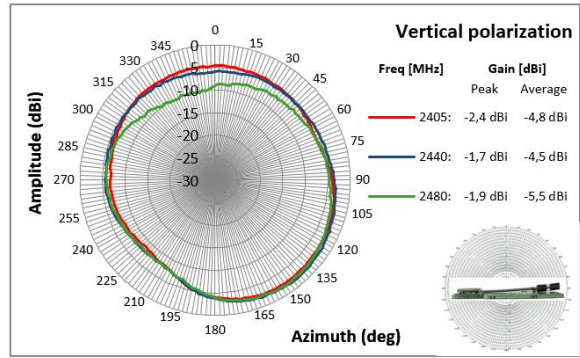


Figure 16: Radiation Pattern for XY-Plane, Vertical Polarization

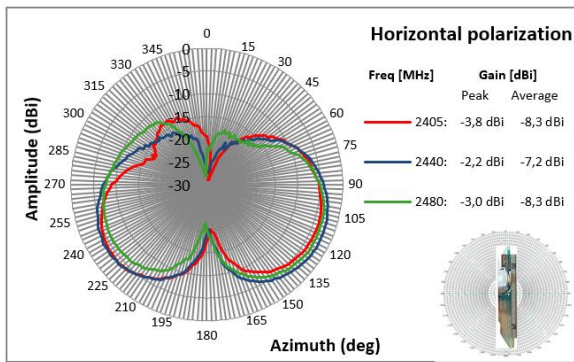


Figure 17: Radiation Pattern for XZ-Plane, Horizontal Polarization

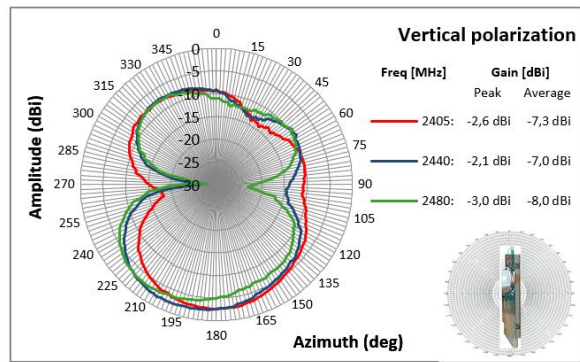


Figure 18: Radiation Pattern for XZ-Plane, Vertical Polarization

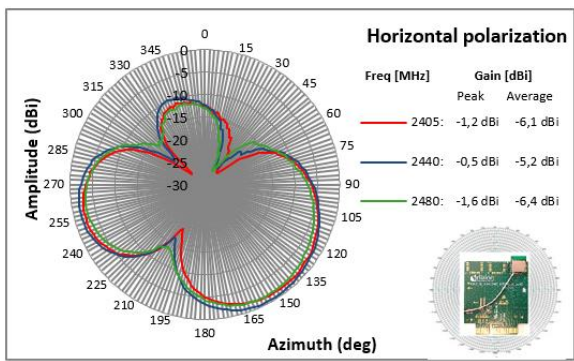


Figure 19: Radiation Pattern for YZ-Plane, Horizontal Polarization

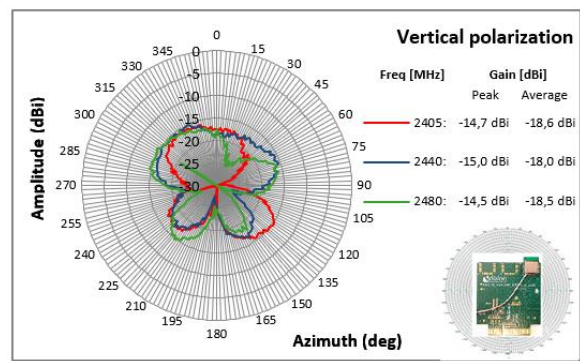


Figure 20: Radiation Pattern for YZ-Plane, Vertical Polarization