# CTC4110WL / CTC6110WL Antenna report

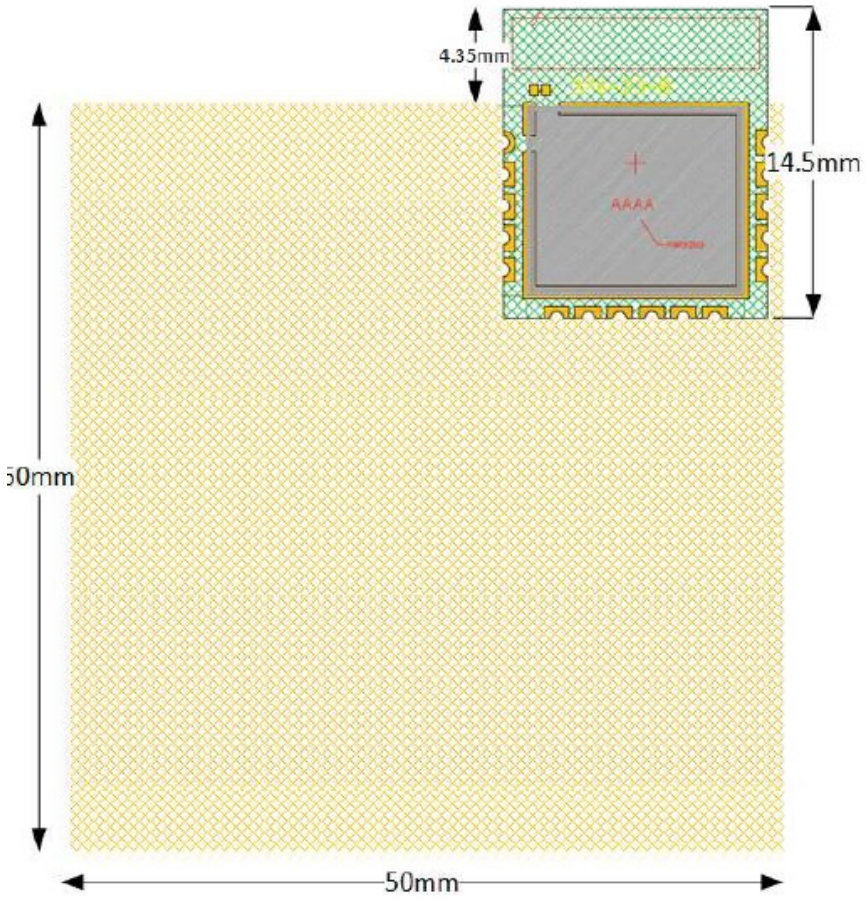
Manufacturer: Dialog Semiconductor B.V.
Address: Het Zuiderkruis 53, ‘s-Hertogenbosch, 5215 MV, THE NETHERLANDS
Brand name: Renesas
Model: DA14531MOD

## Design Guidelines

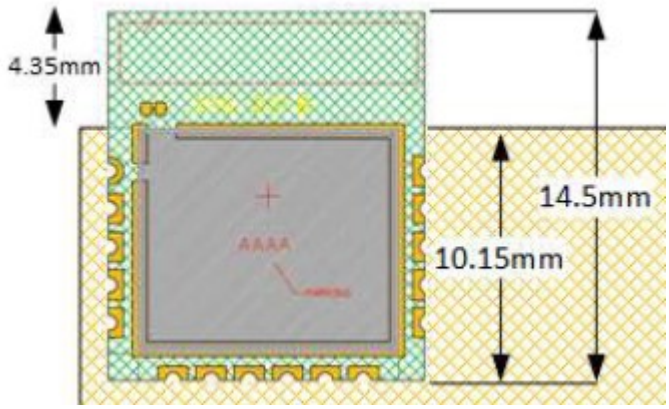
The DA14531 SmartBond TINY Module comes with an integrated PCB trace antenna. The antenna area is 12x4 mm.

The antenna's Voltages Standing Wave Ratio (VSWR) and efficiency depend on the installation location.The radiation performance of the PCB trace antenna depends on the host PCB layout.

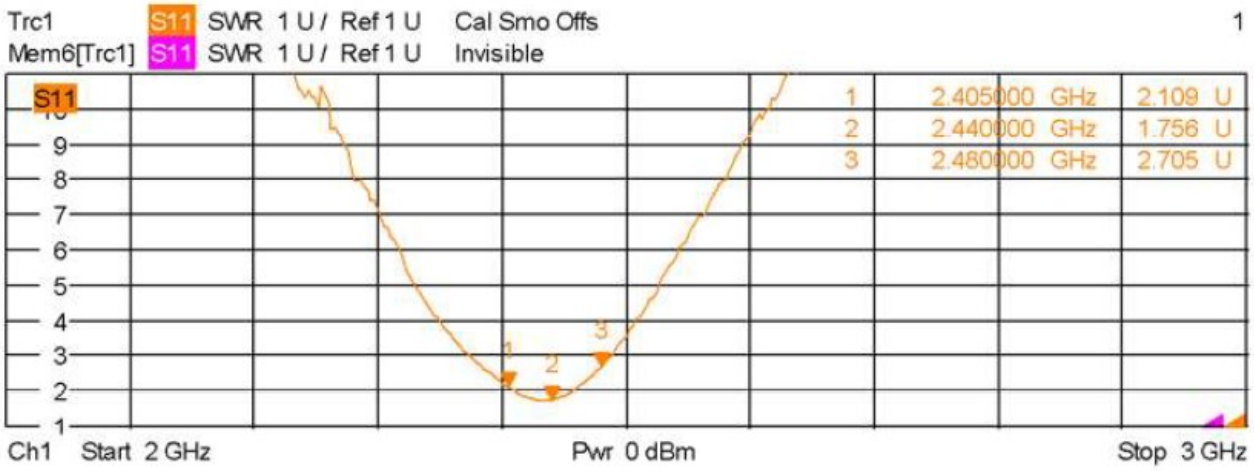
**The maximum antenna gain 2402~2480MHz is -0.5dBi** when installed on a 50x50 mm reference board.




The radiation pattern is omnidirectional. The RF front end is optimized to achieve the maximum possible efficiency for various installation positions of the module on a host PCB. The actual TINYTM module evaluation board layout that has been used to conduct measurements as below.



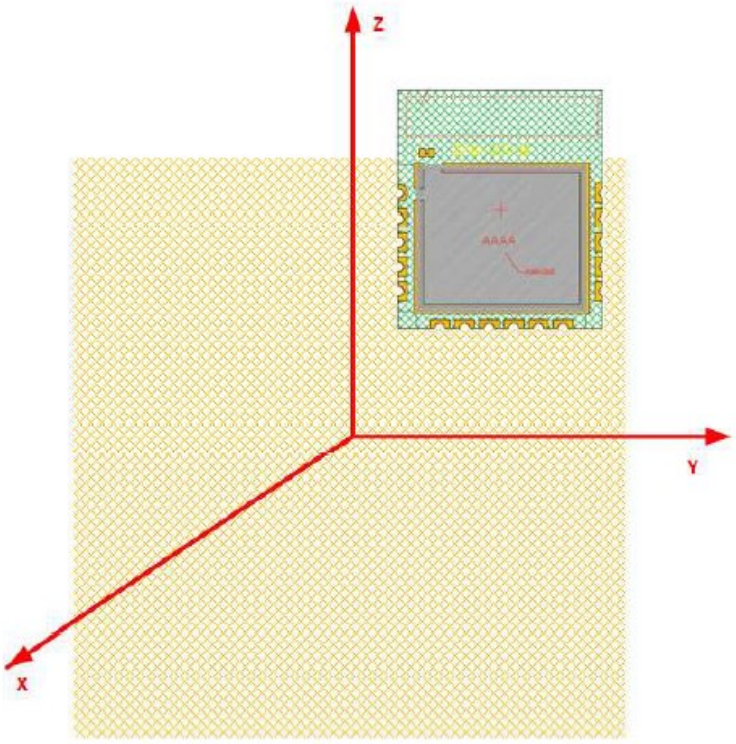

| Freq | Antenna efficiency | |
|---|---|---|
| [MHz] | [%] | [dB] |
| 2405 | 40 | -4,0 |
| 2440 | 34 | -4,7 |
| 2480 | 40 | -4,0 |



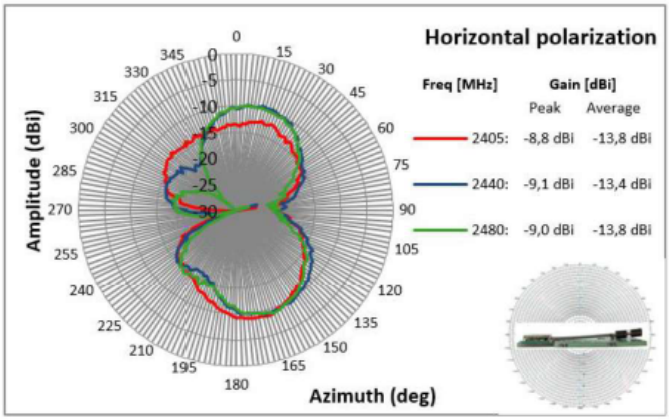
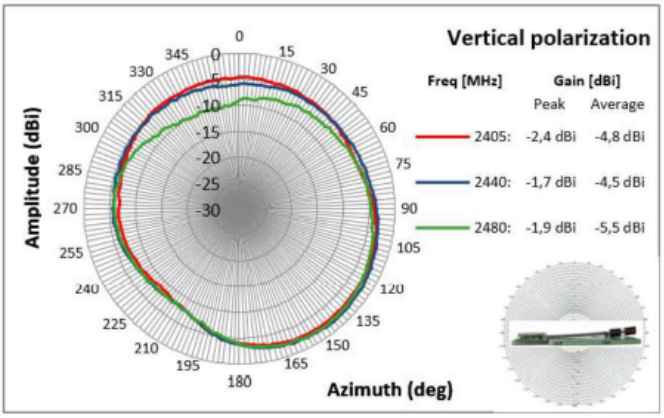
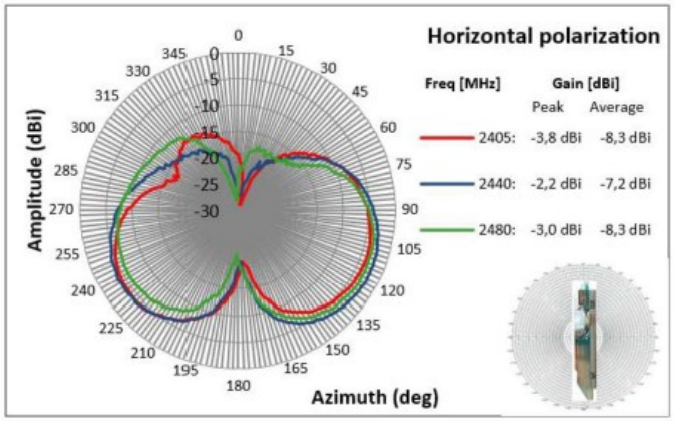
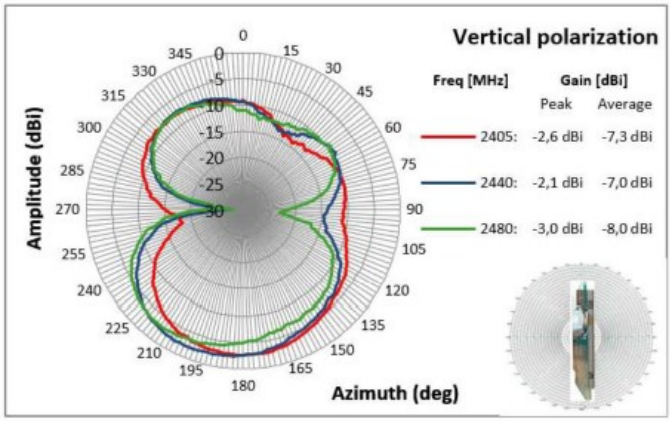
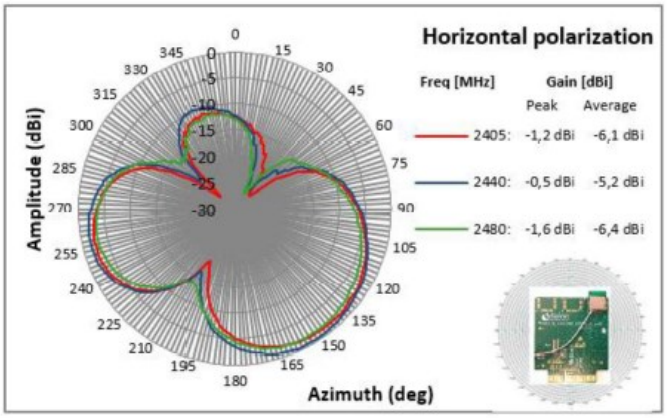
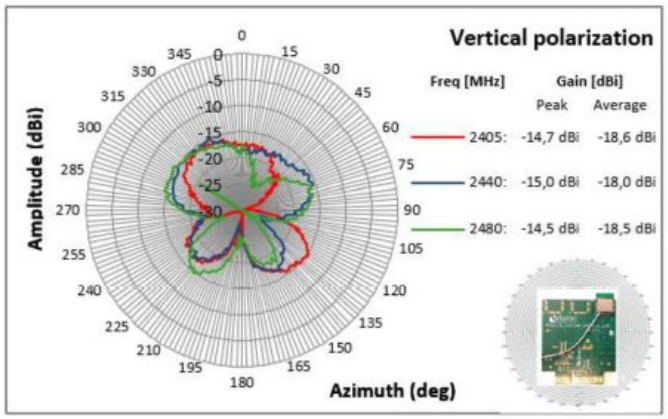

VSWR with Module Installed in Center

## 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.



## Radiation Pattern for Antenna Trace

| Horizontal polarization | Vertical polarization |
|---|---|
|  |  |
| Figure 15: Radiation Pattern for XY-Plane, Horizontal 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 |