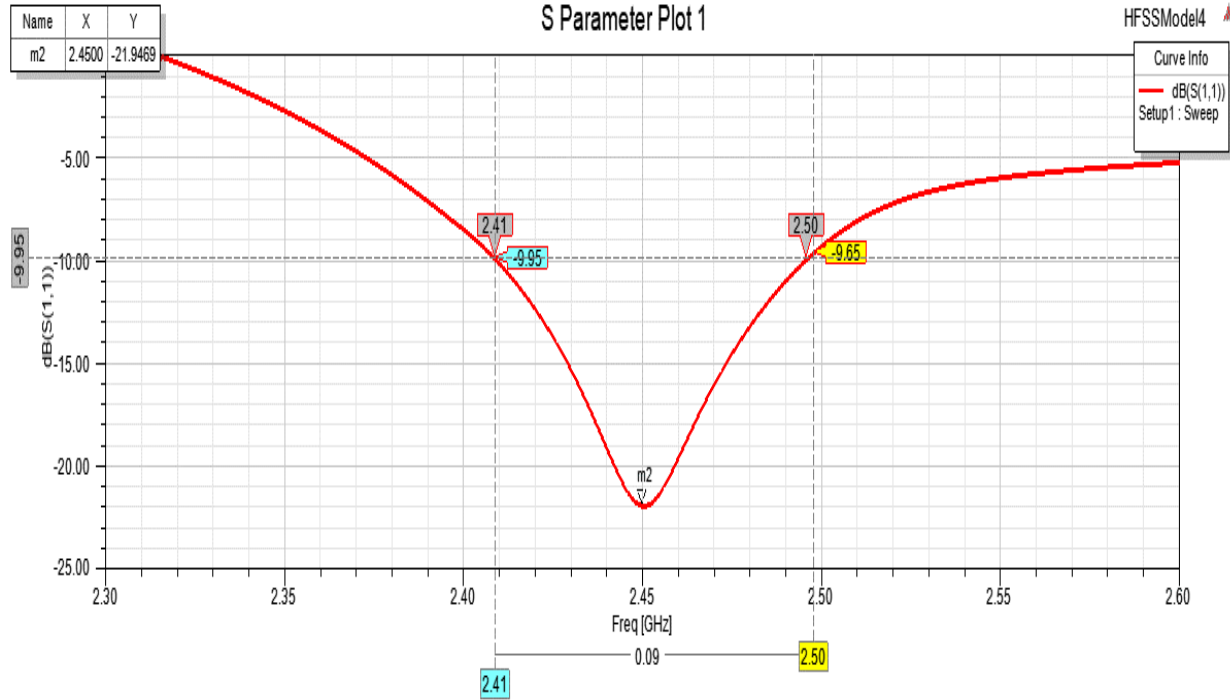
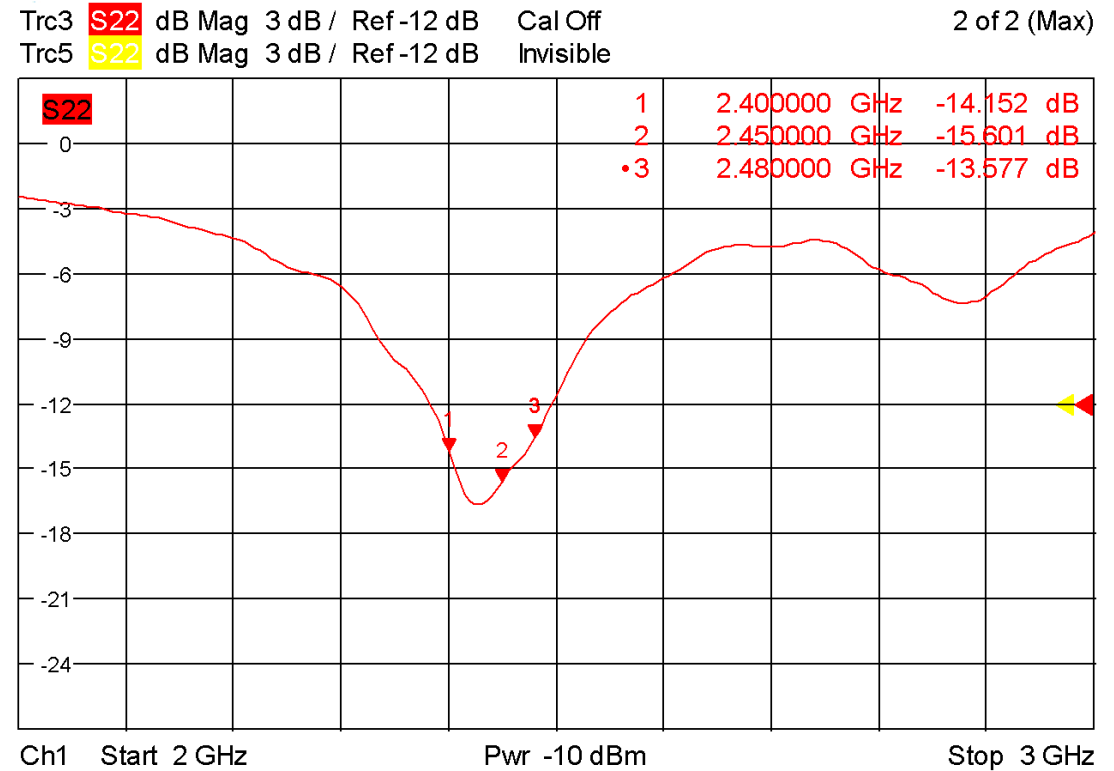


SIMULATION VS. MEASUREMENTS



Simulation

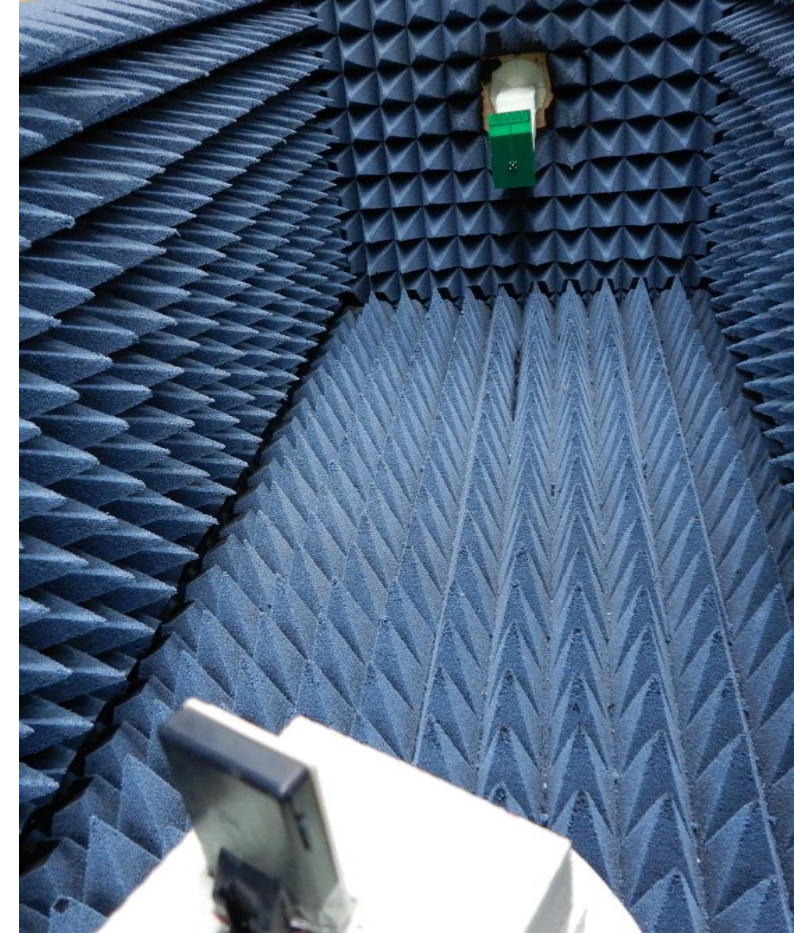


Measurement

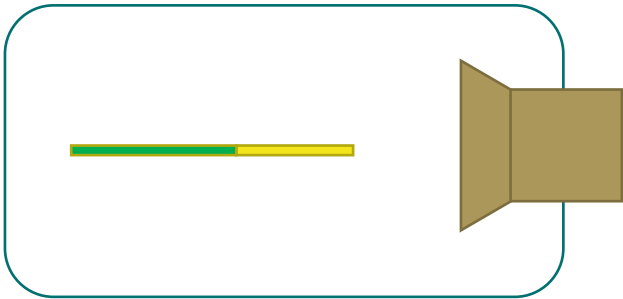
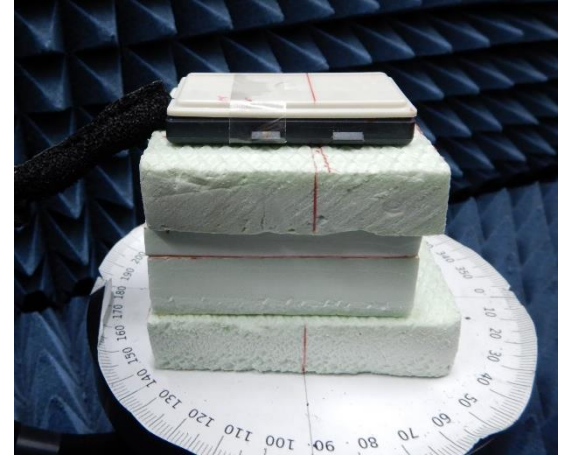
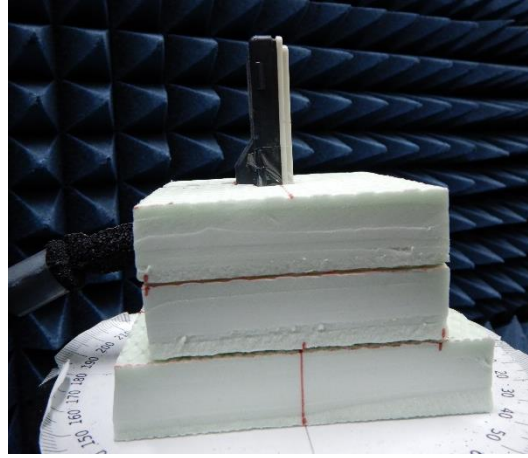
Comperable results => equal behavior

MEASUREMENT SETUP

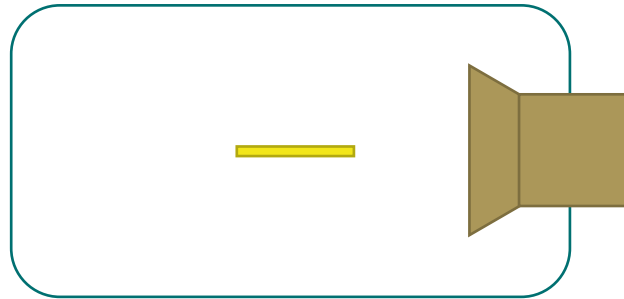
- Measurements are done inside a anachonic chamber.
- As reference a PCB antenna is used
- The measured parameter is S_{21} (mag) => 2 Port VNA
- The VNA is calibrated on the two feeding points of the antennas (reference and DUT)
- The antenna pattern of the xy -, xz -, yz -planes is calculated
- Stepsize => 3°



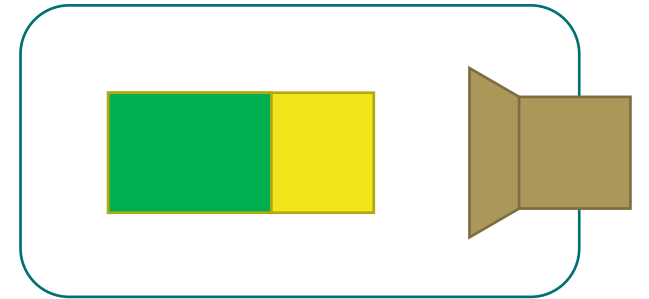
SAMPLE ORIENTATIONS



xz - plane

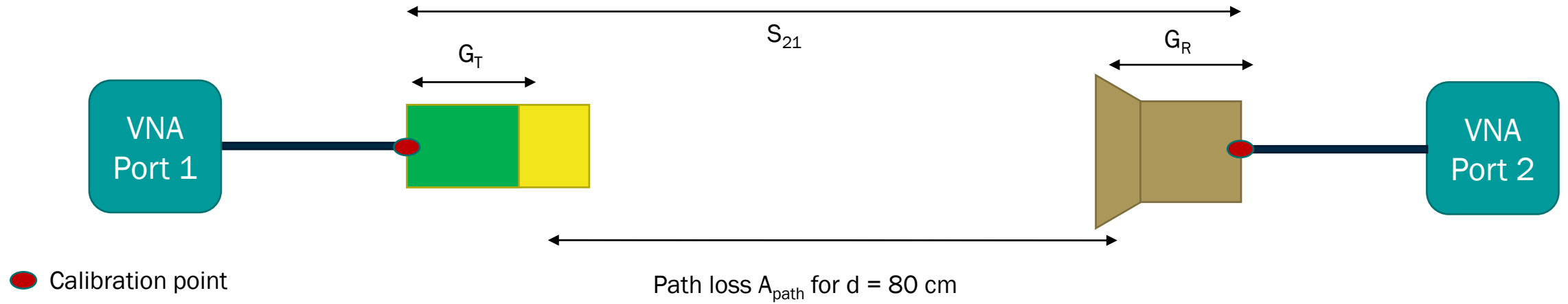


yz - plane



xy - plane

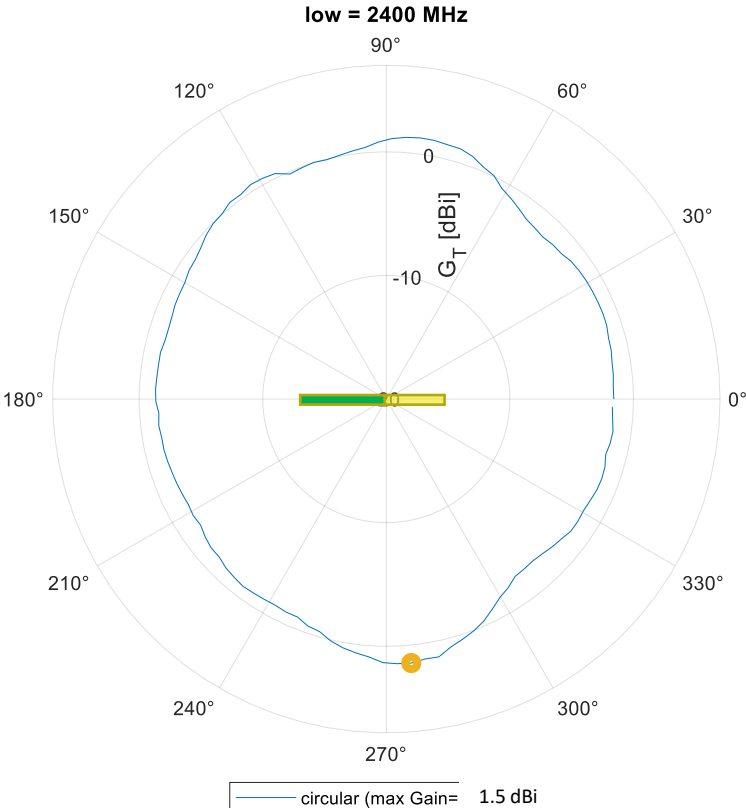
CALCULATION OF THE ANTENNA GAIN



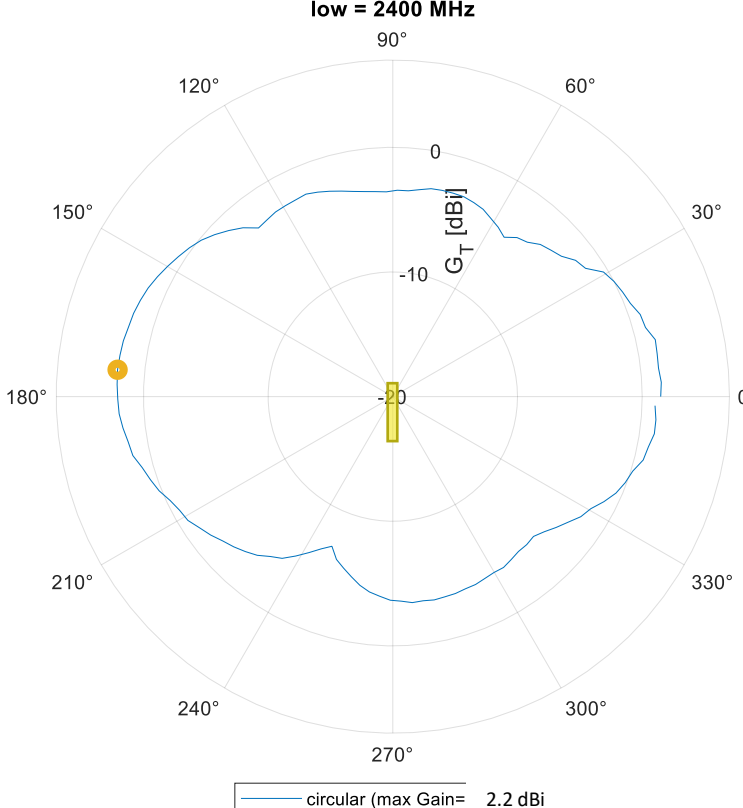
$$G_T = S_{21} - G_R - A_{path}$$

- A_{path} = friis path loss
- S_{21} = measured with VNA
- G_R = gain of reference antenna

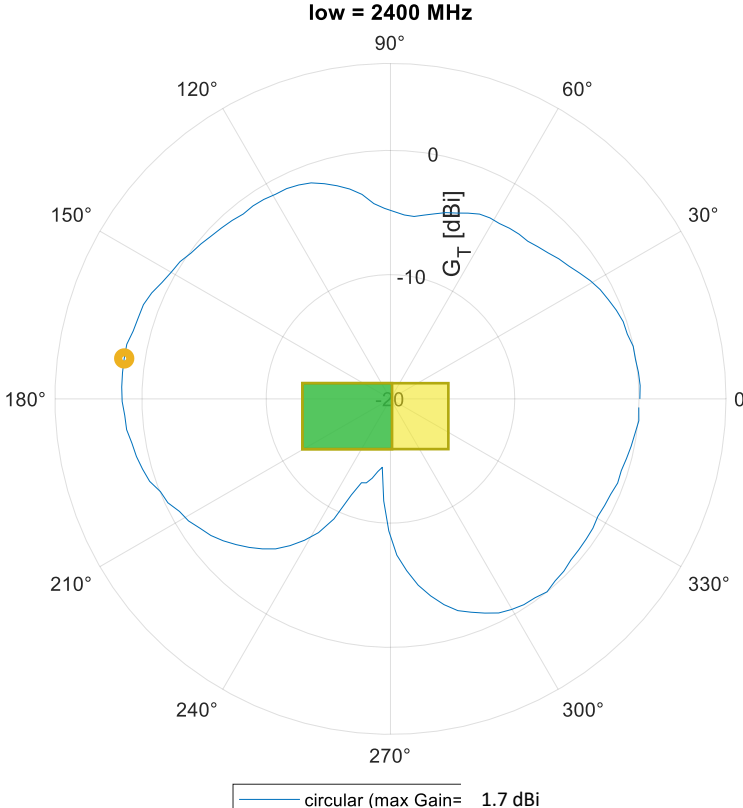
LOW – CIRCULAR (TOTAL GAIN)



xz - plane

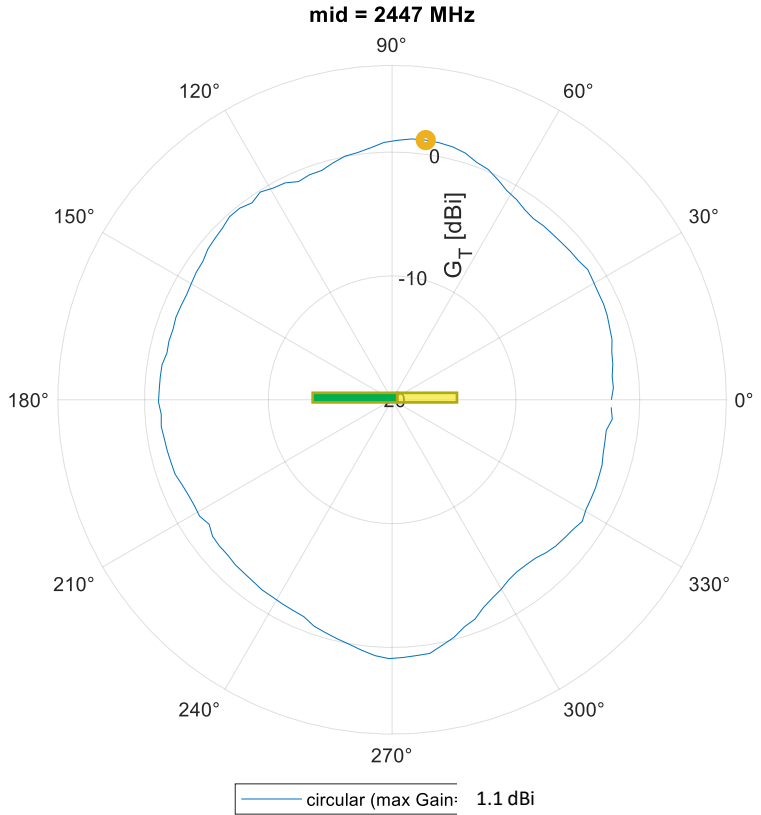


yz - plane

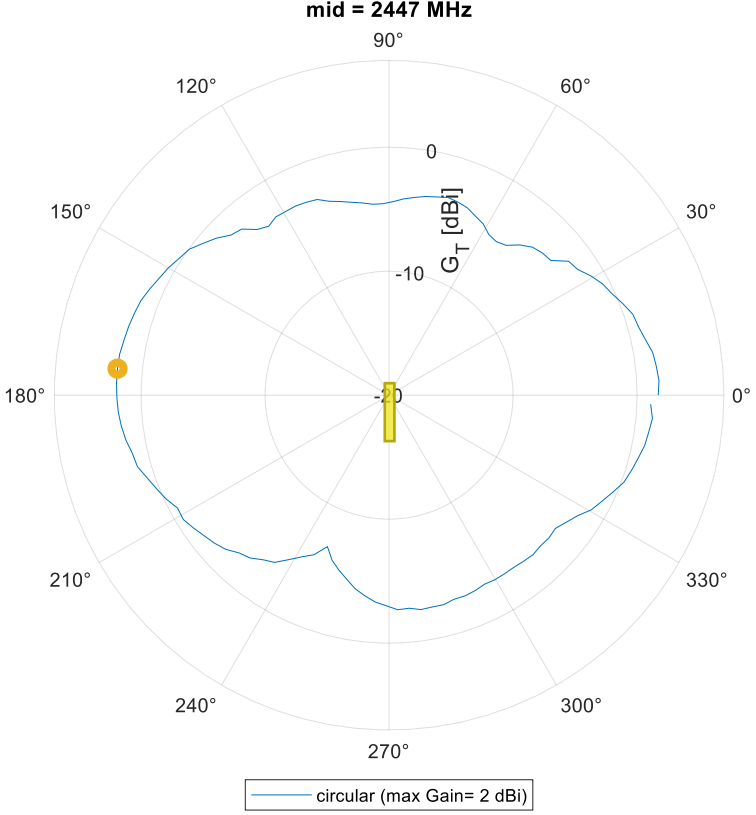


xy - plane

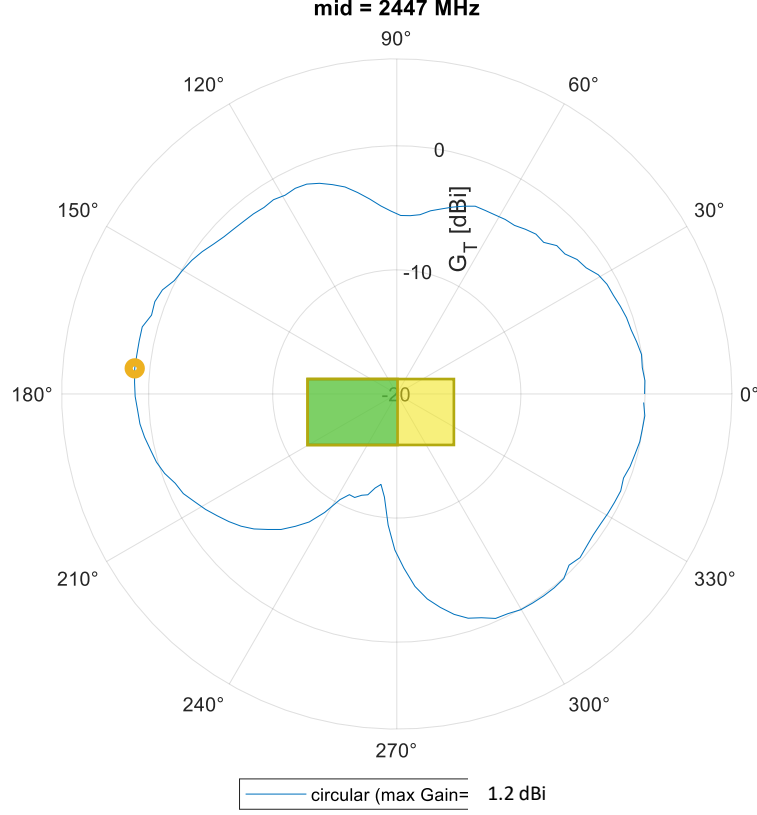
MID – CIRCULAR (TOTAL GAIN)



xz - plane

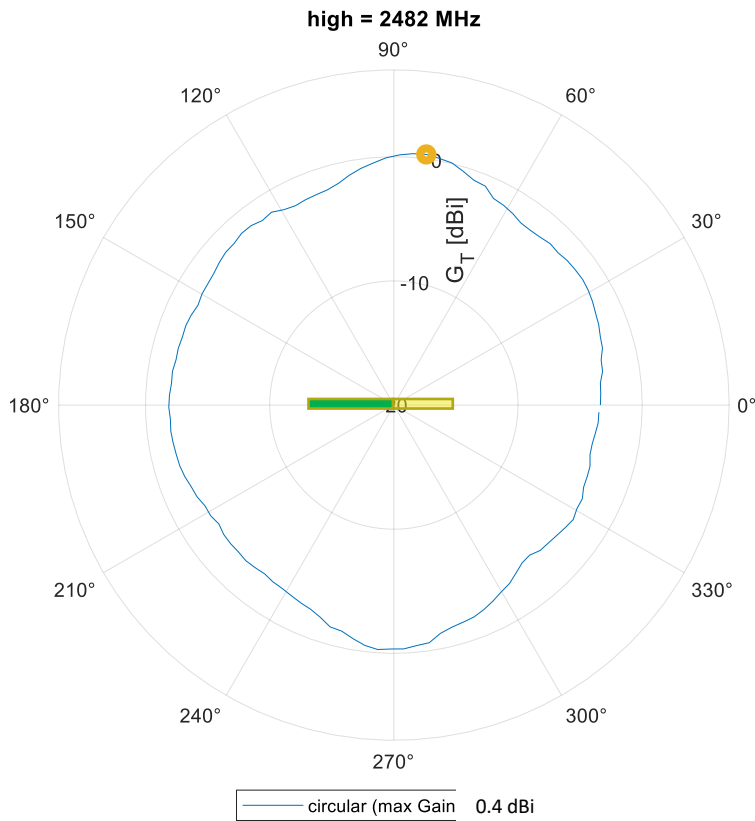


yz - plane

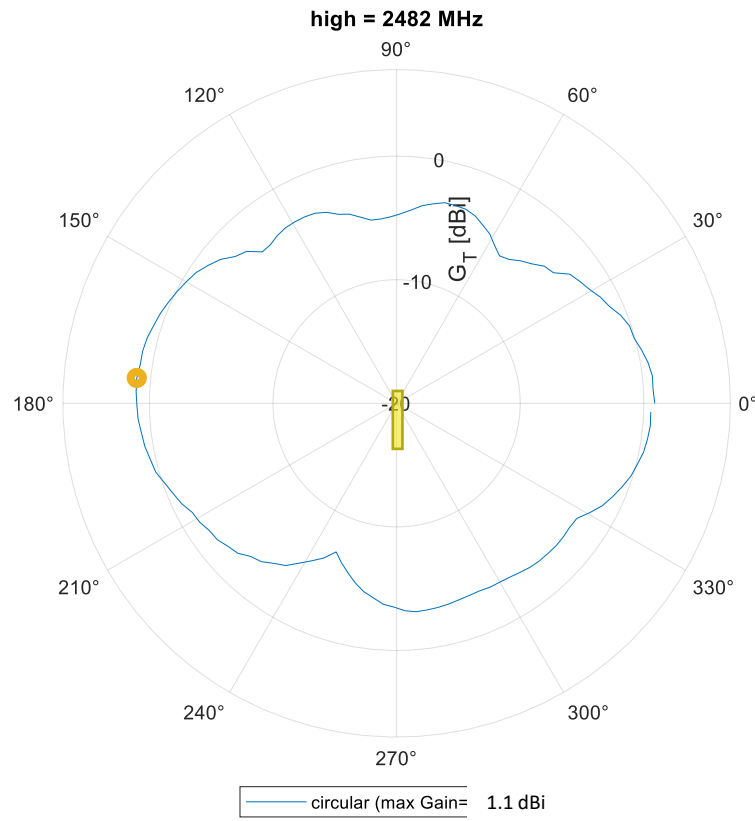


xy - plane

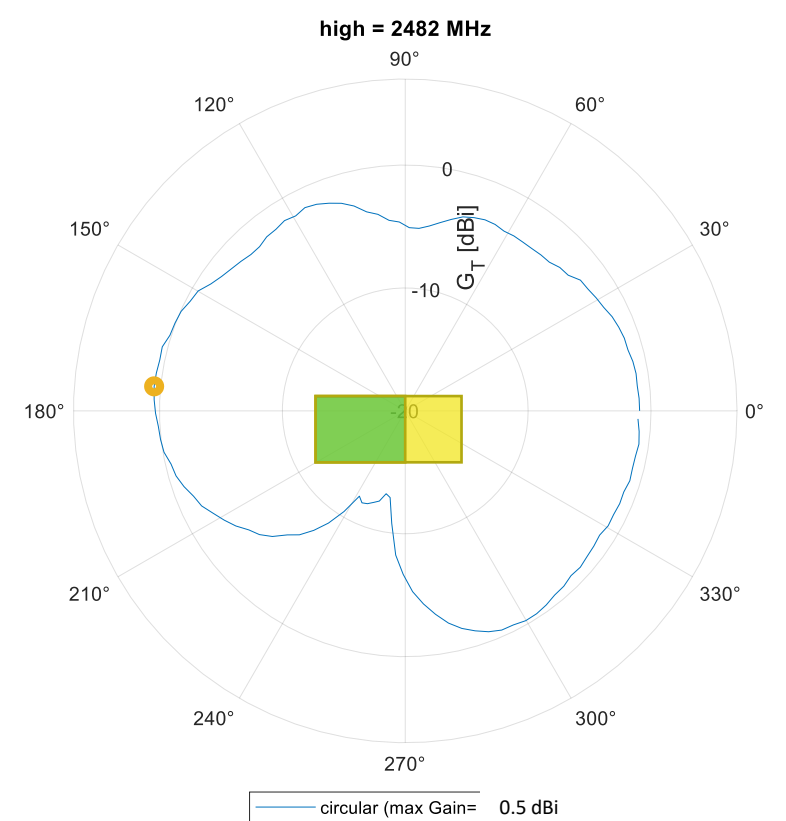
HIGH – CIRCULAR (TOTAL GAIN)



xz - plane



yz - plane



xy - plane

Max Gain = 2.2dBi

- Antenna Manufacturer: Marquardt GmbH
- Manufacturer Address: Schloss-str.16,78604 Rietheim-Weilheim,Germany
- Model: BLE: MQBANTK
- Antenna Type: PCB Antenna