



TAOGLAS®

Rideshare Project

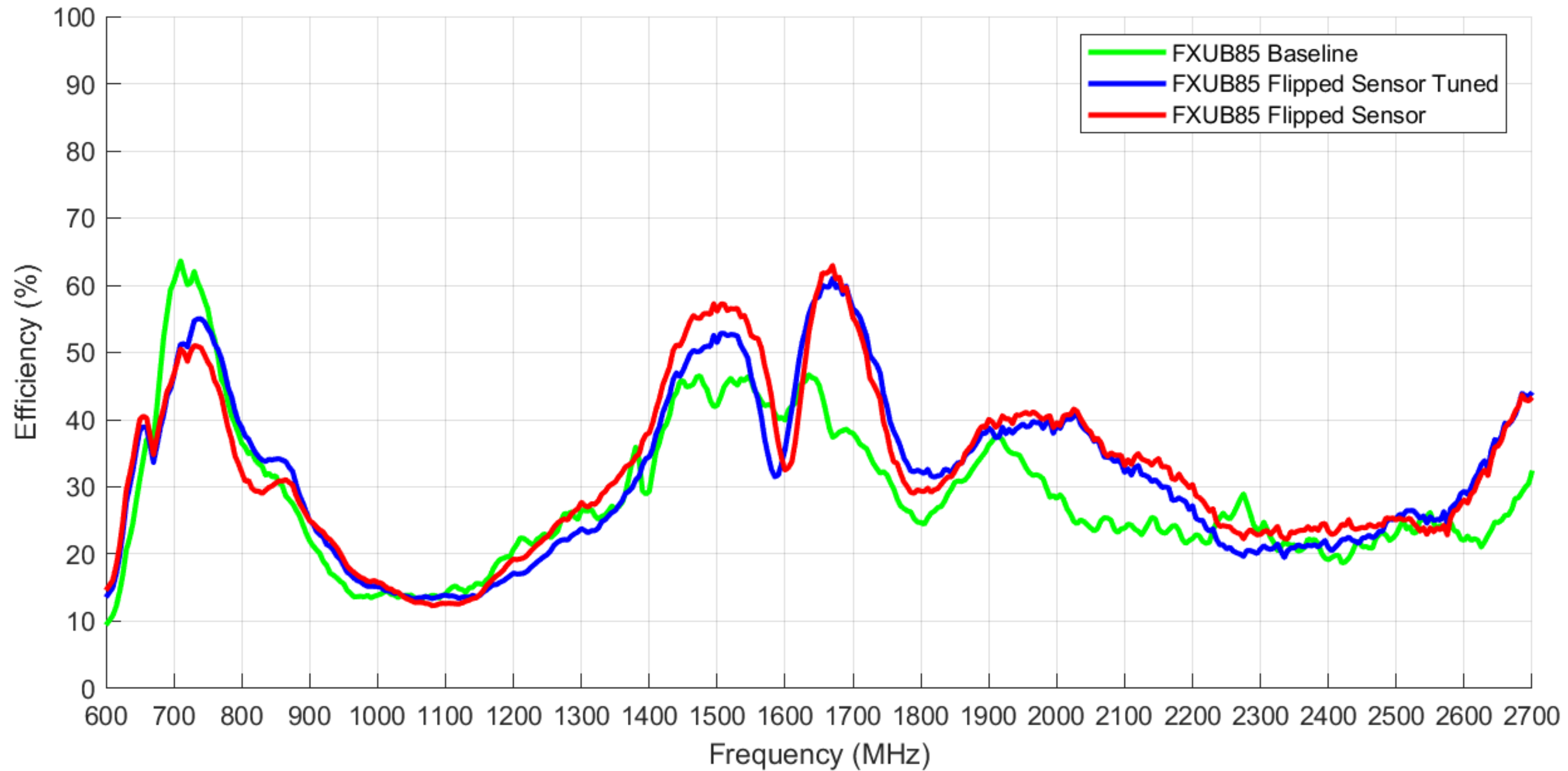
Test Update for: Bosch
Report by: Eric Johnson
Date: 5/15/20

Introduction

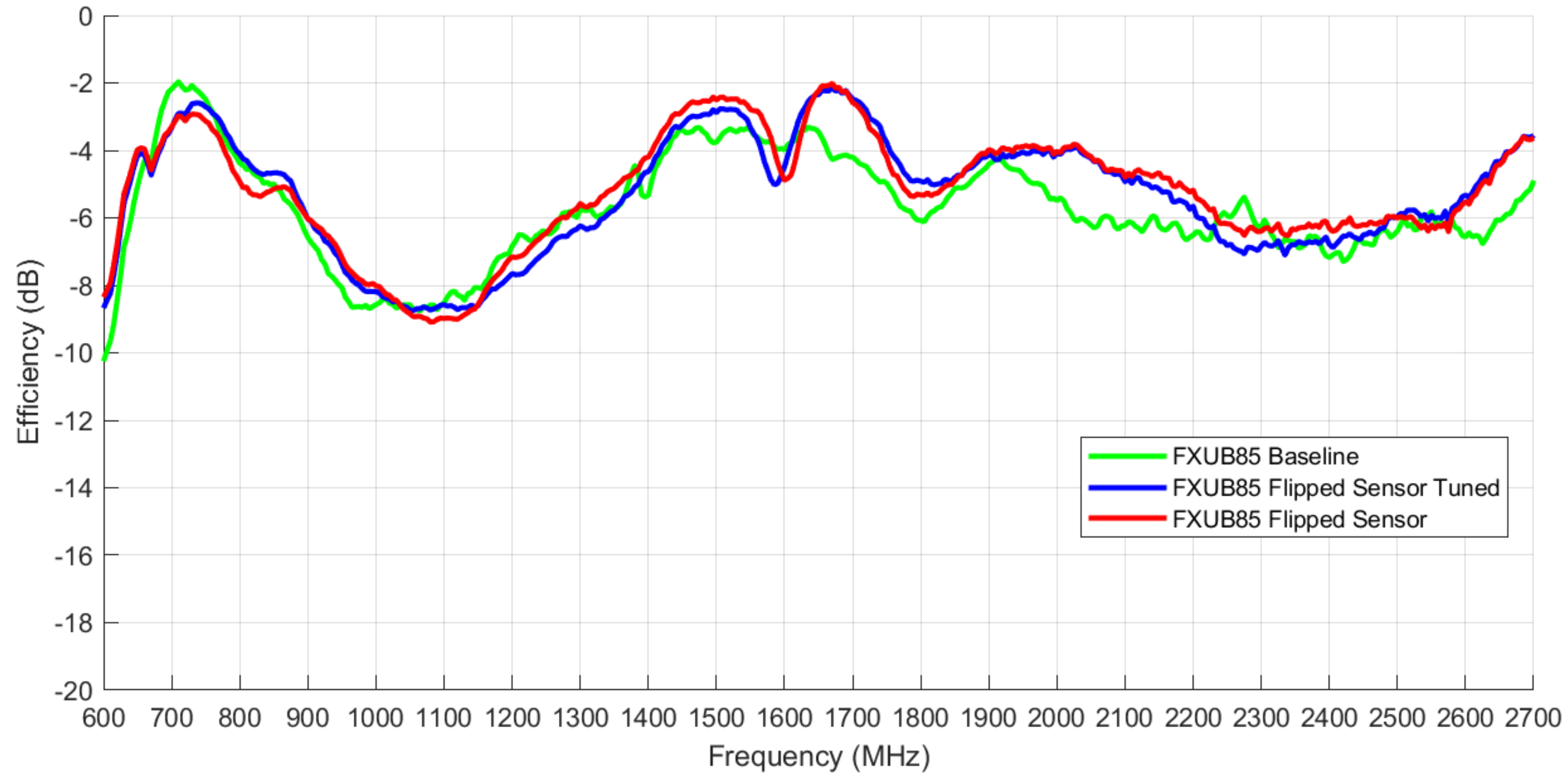
This feasibility report summarizes the test that has been conducted on the latest samples of the Bosch Rideshare Sensor project. All testing was conducted in free space with a sensor install inside device to simulate realistic application of the ground plane as seen by the antennas. The purpose of this report is to document current existing antenna performance as a baseline and find acceptable solution that meets recommended EU carrier certifications that are supported by the module. Keeping in mind that this device will go to US market, it should also be noted that covering US bands would also be preferable. The LTE goal specifications are listed below:

- Should support EU LTE Bands B1, B3, B7, B8, B20, & B28
 - o The low bands (700-960MHz) goal of at least 20% efficient
 - o The high bands (1700-2150MHz) goal of at least 30% efficient
- Gain should be less than 6.0 dBi for all antenna
- The Antennas should have good omnidirectional radiation

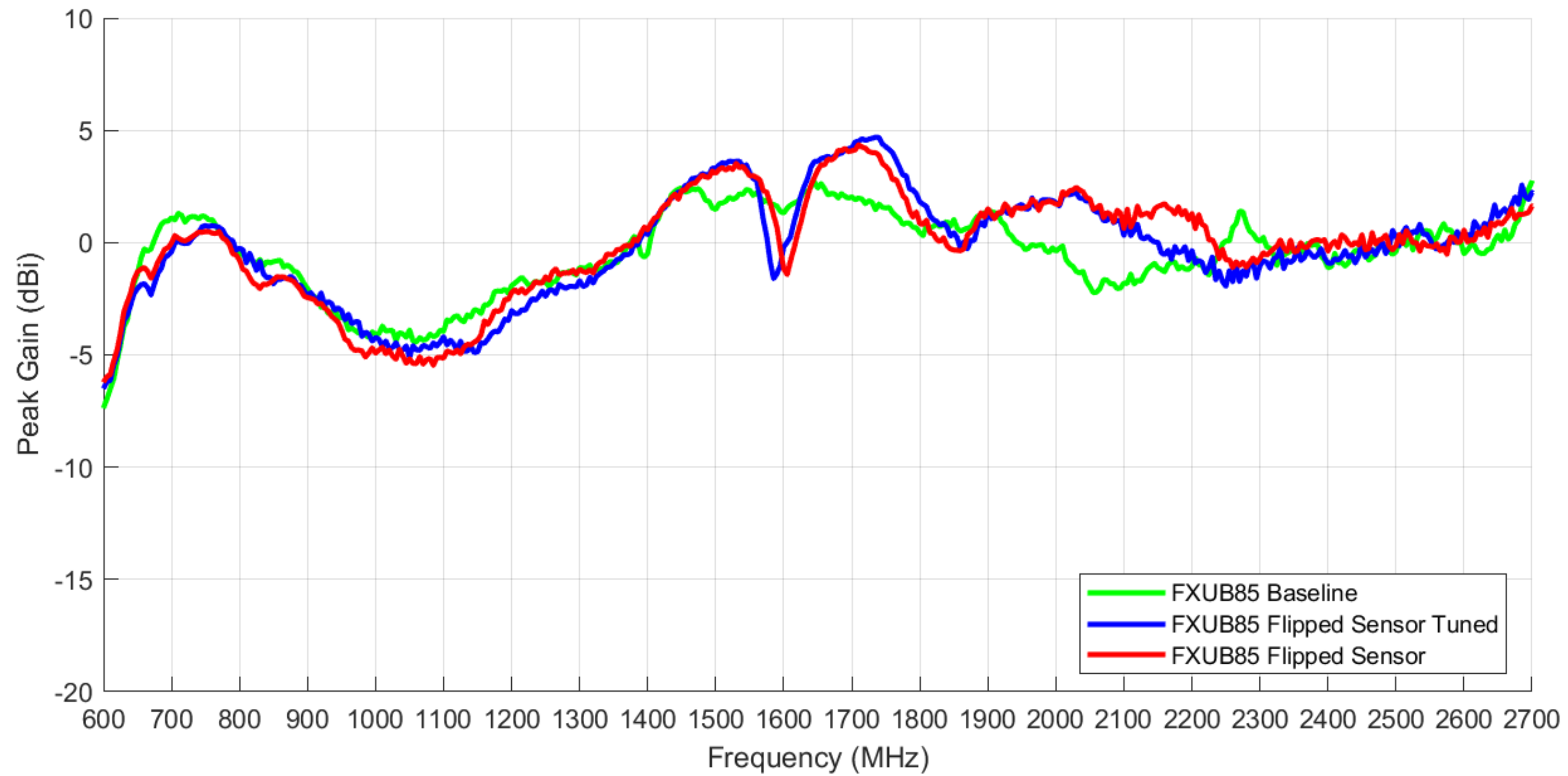
LTE Efficiency



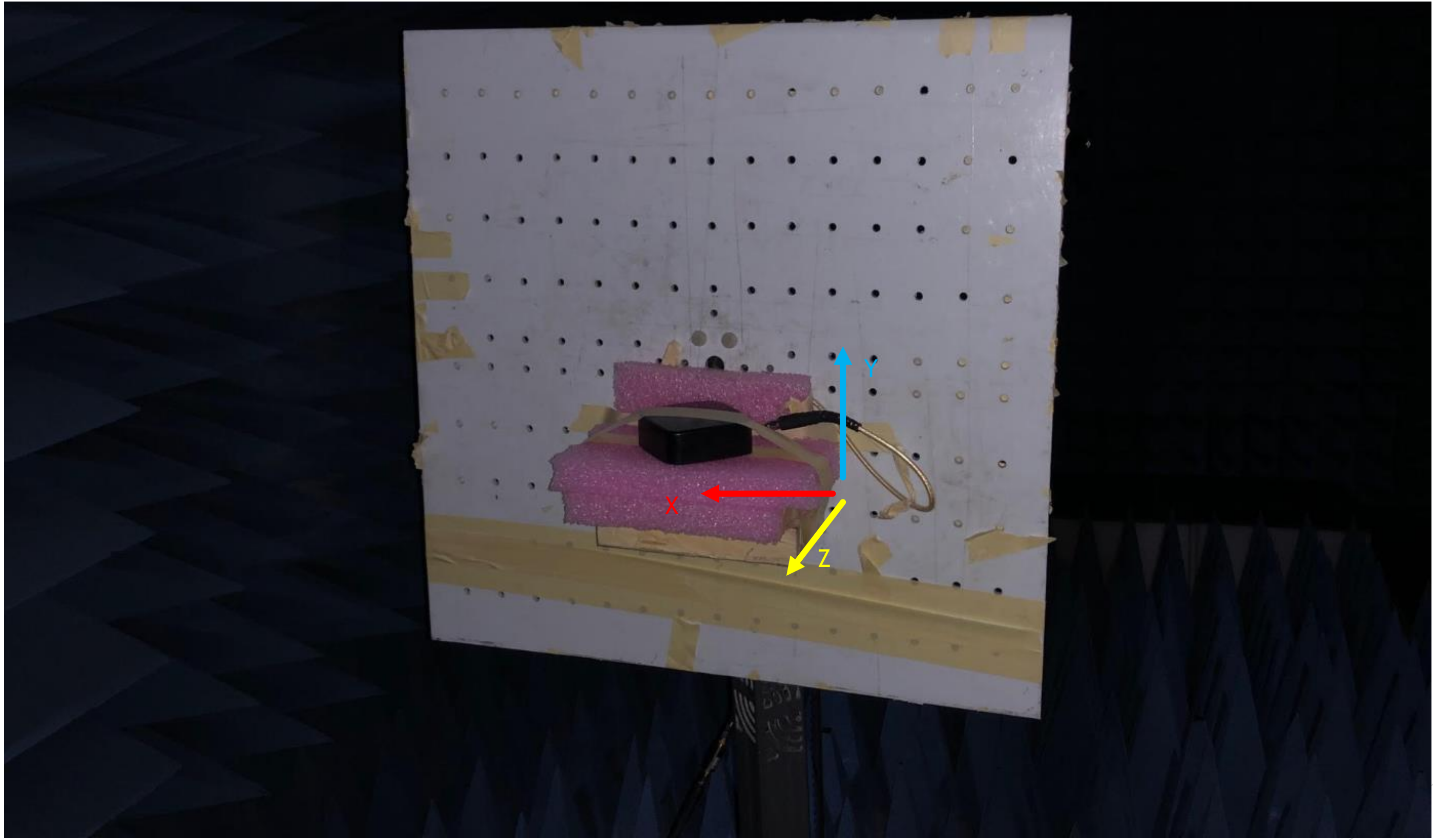
LTE Average Gain



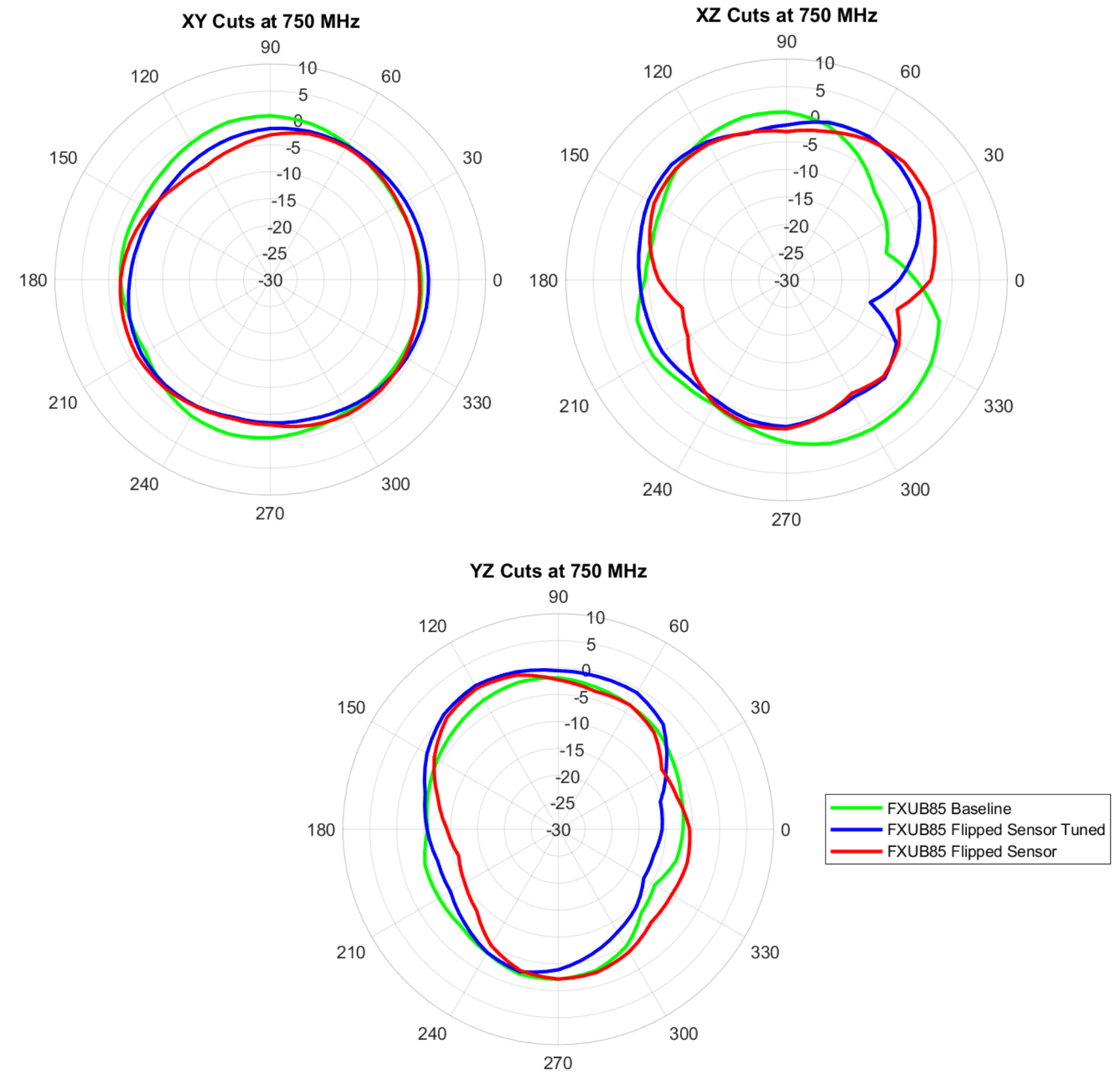
LTE Peak Gain



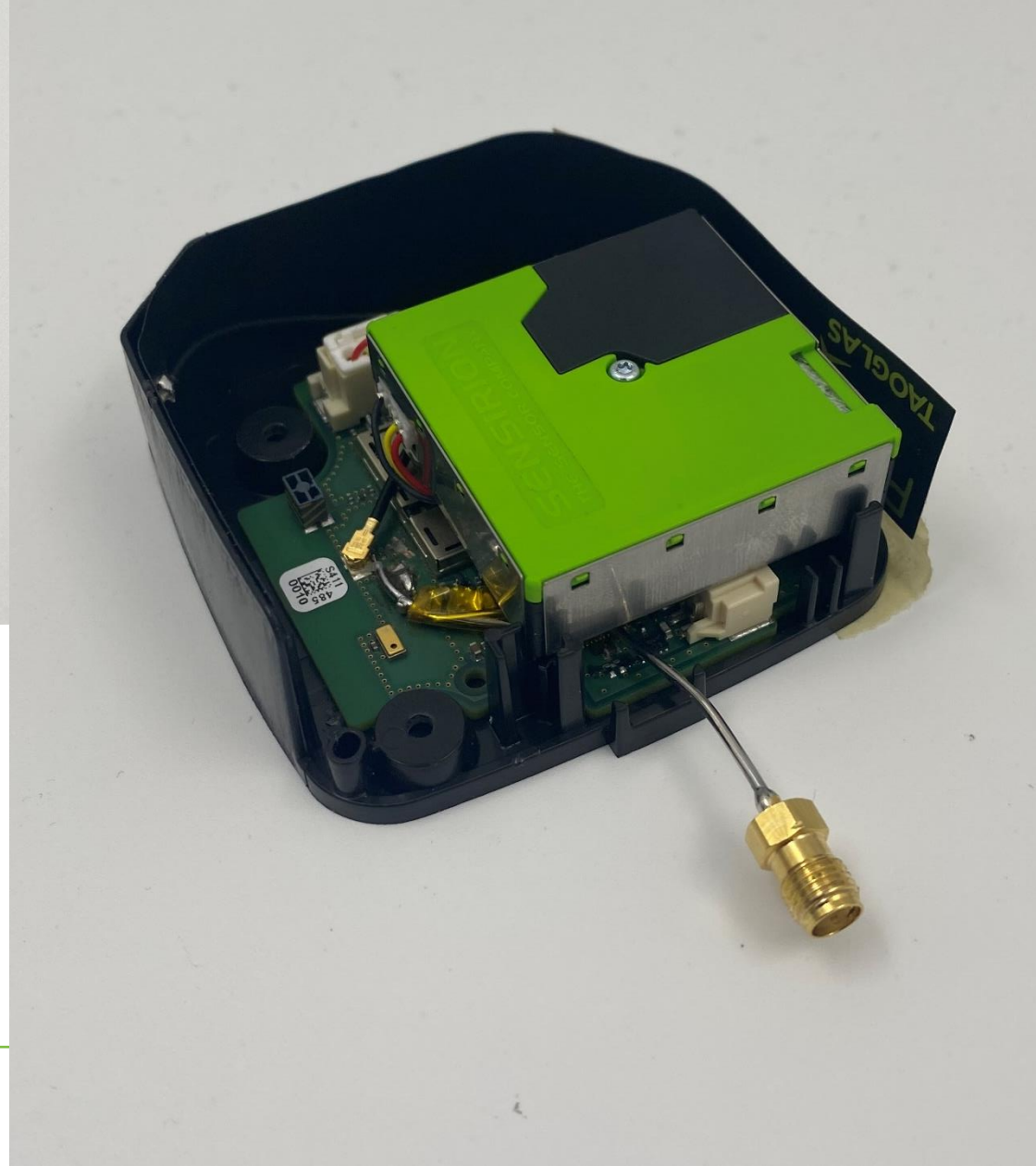
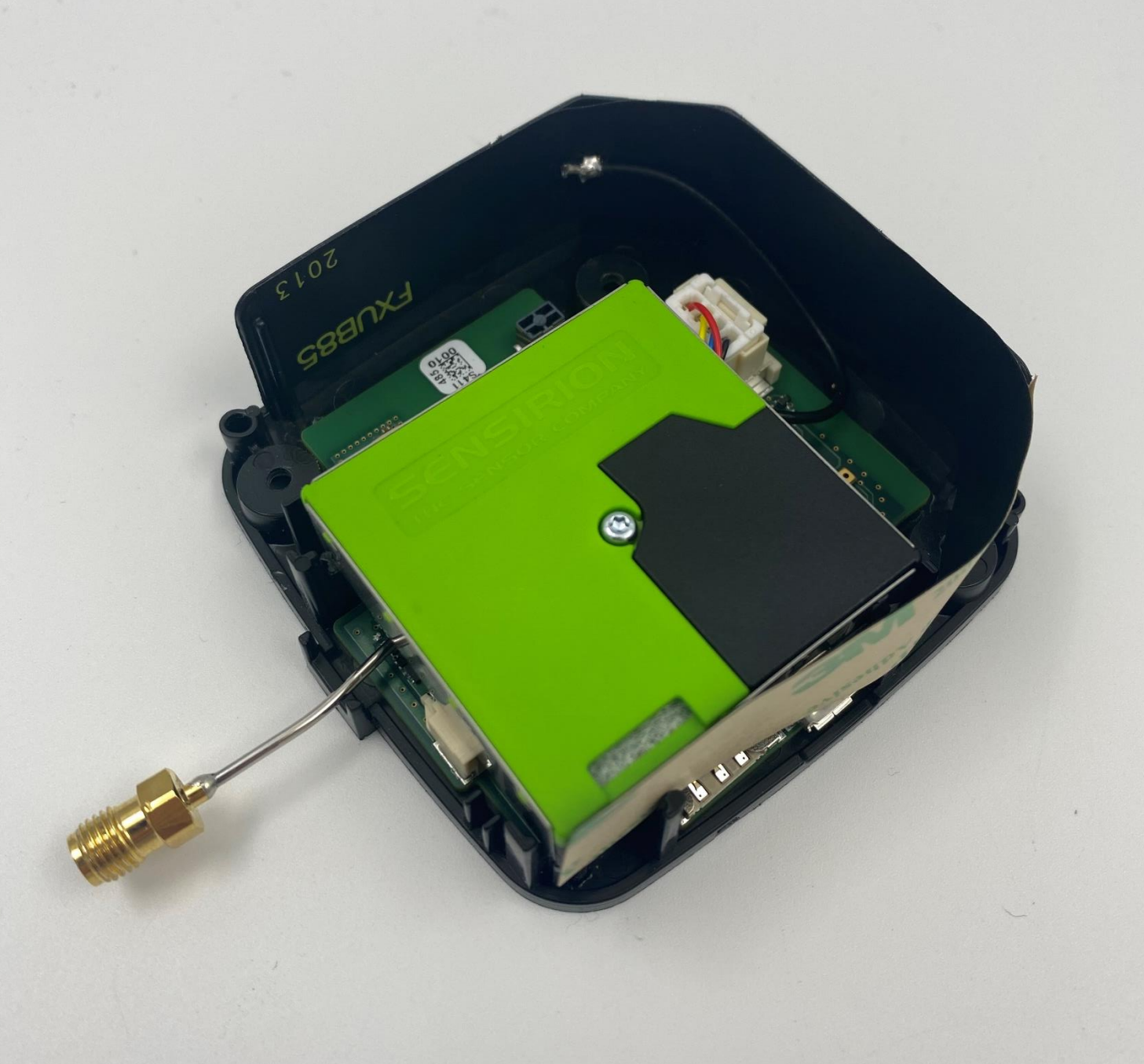
LTE Test Setup



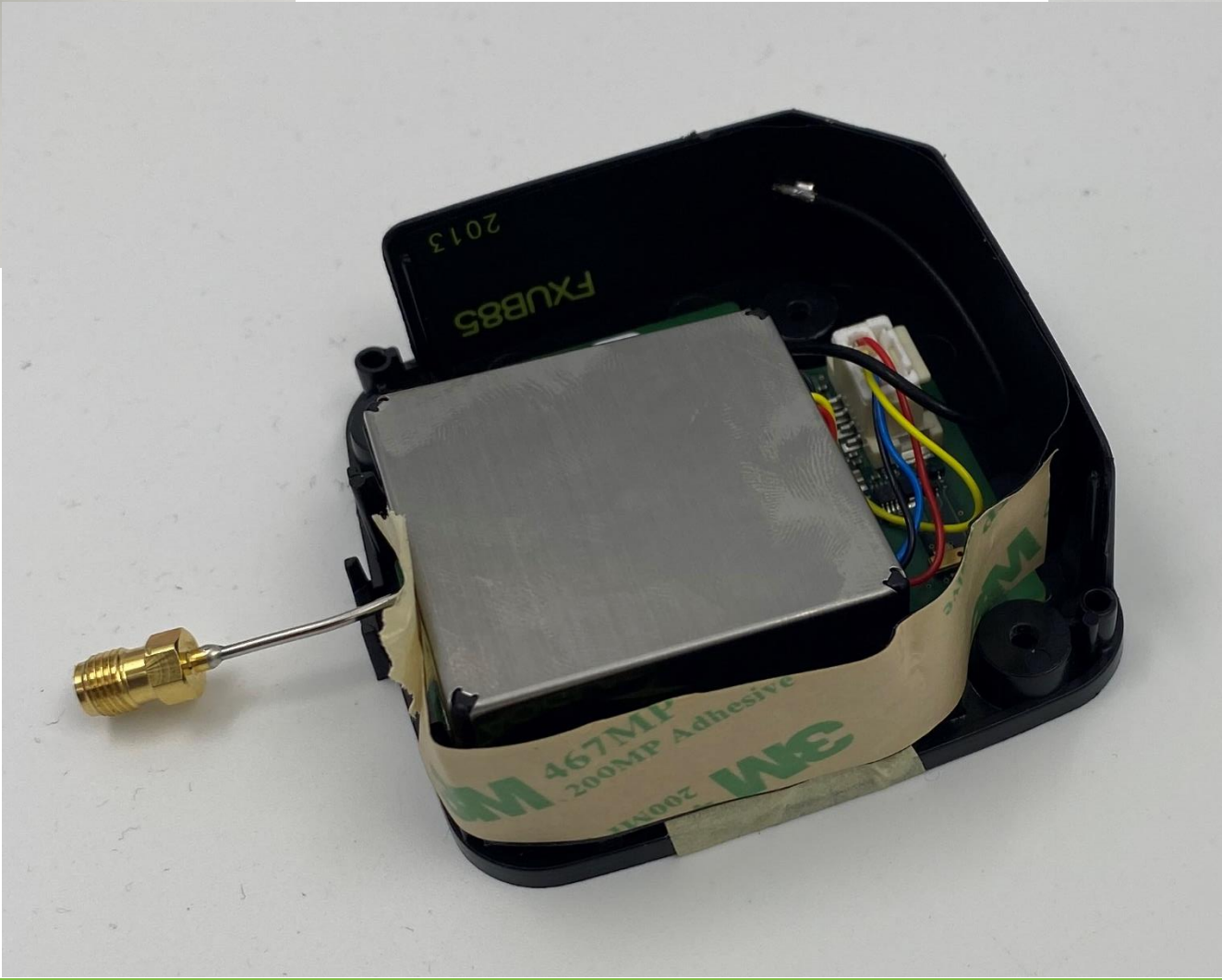
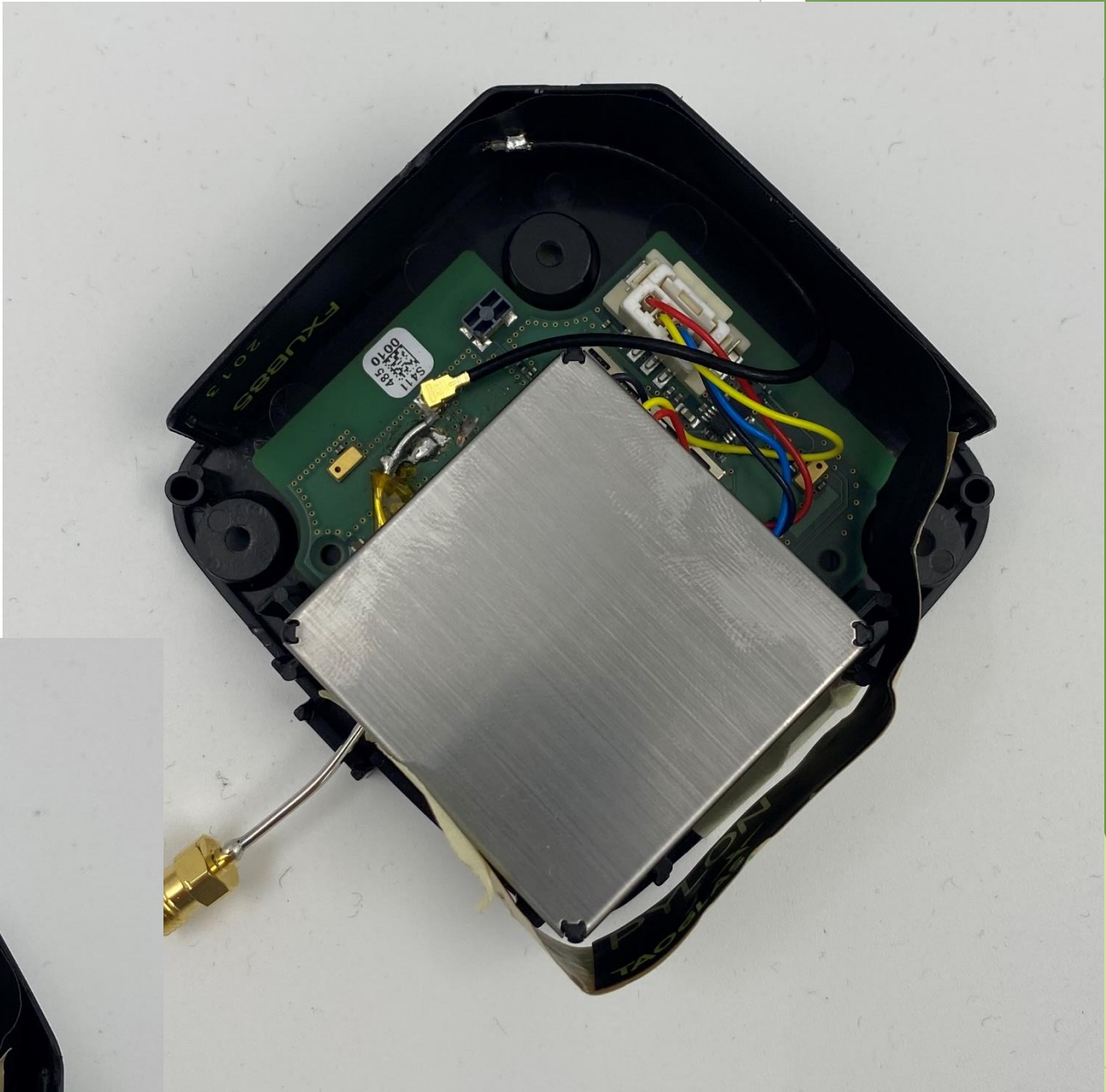
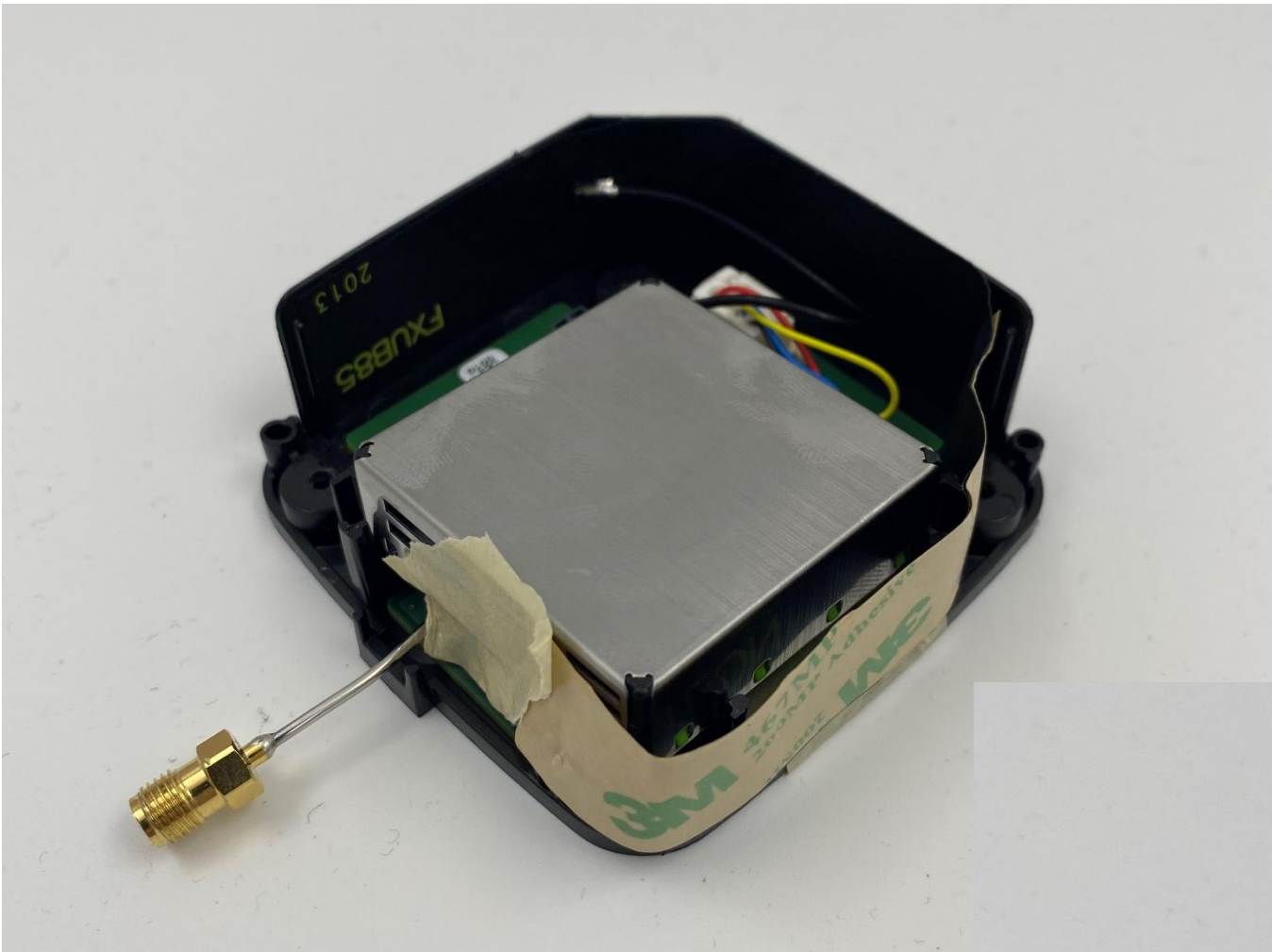
LTE 2D Radiation Patterns



LTE Proposed Antenna Placement



LTE Baseline Antenna Placement



LTE Antenna Placement Pictures



Modified/Removed Rib shown in RED

Conclusion

Based on the results in this report, Taoglas recommends using the a custom FXUB85 for both US and EU markets. This yields the best performance for low bands elements and good performance for high bands. Using the FXUB85, a small tool change needs to be made for the antenna to fit inside the device, shown in slide 9. This antenna can be tuned to perform better for EU bands or US bands by trimming the length of the ground.

In low bands 8, 20, and 28, performance is above 20%

In high bands 1,3, and 7 performance is above 30%

The gain is less than 6.0 dBi for all antennas tested

The 2D radiation patterns show the antenna has nice omnidirectional behavior