



TAOGLAS®

Antenna Feasibility Study for EXFO Raptor

EXFO

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Overview

EXFO is looking for a Flex Antenna solution for the Raptor device comprising 2xLTE CAT1 and 1xGNSS.

Cellular module: C10QM-EA-22GNN (CAT 1 Module)

Cellular Bands Supported:

EMEA / APAC : LTE - B1 / B3 / B5 / B8 / B20 / B40 | GSM - 900/1800 MHz

NA : LTE - B2 / B4 / B5 / B12 / B13 / B25 / B26 / B66 | GSM - 900 / 1800 MHz

Frequency Range: 700-2400

Supported Location Services:

GPS / GLONASS / BeiDou / Galileo

Frequency range: 1559-1602 MHz

Overview

Taoglas will test the following flexible cellular antennas:

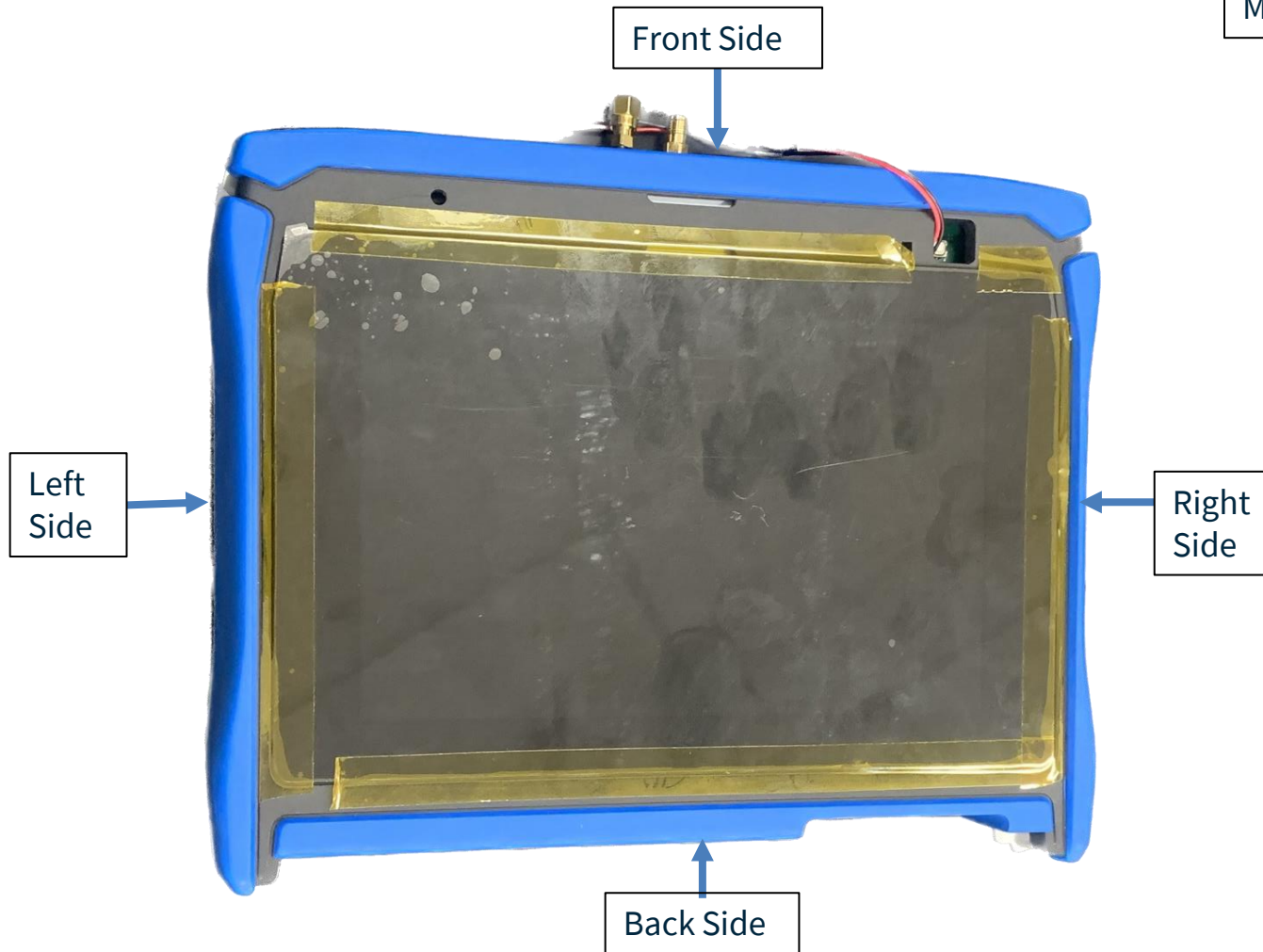
1. Pylon (FXUB85)
2. Cyclone (FXUB64)
3. Minima (FXUB68)
4. Maximus (FXUB66)
5. FXUB63/ MFX3

And for GNSS, the following antennas will be tested:

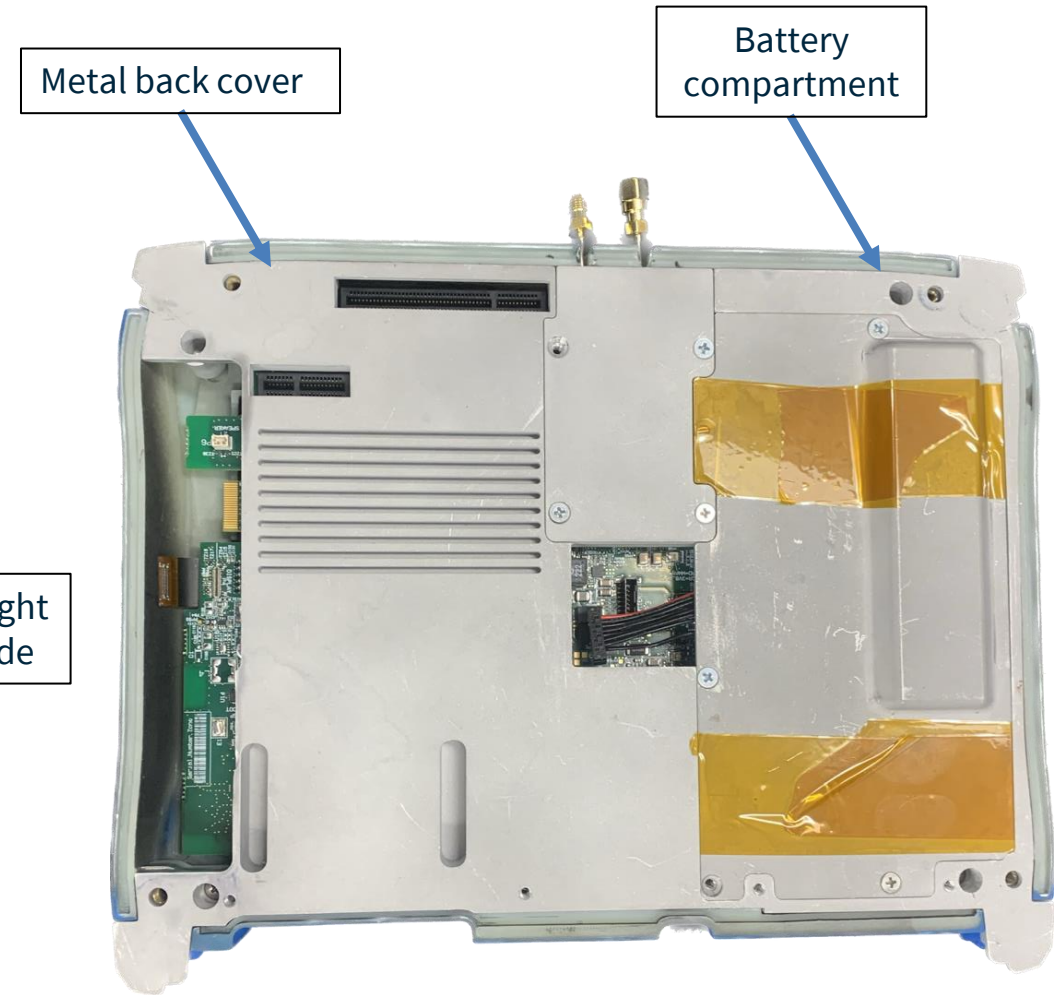
1. FXP050
2. FXP611

Antenna Integration

EXFO Device Physical Description

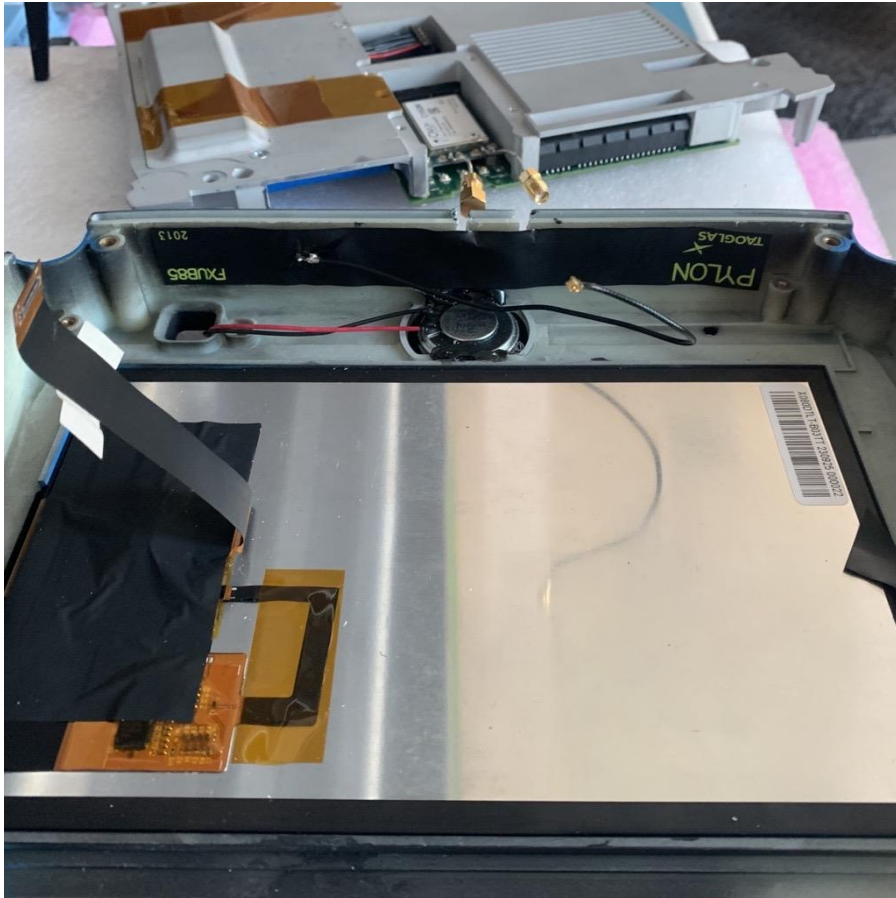


EXFO Device Top Side

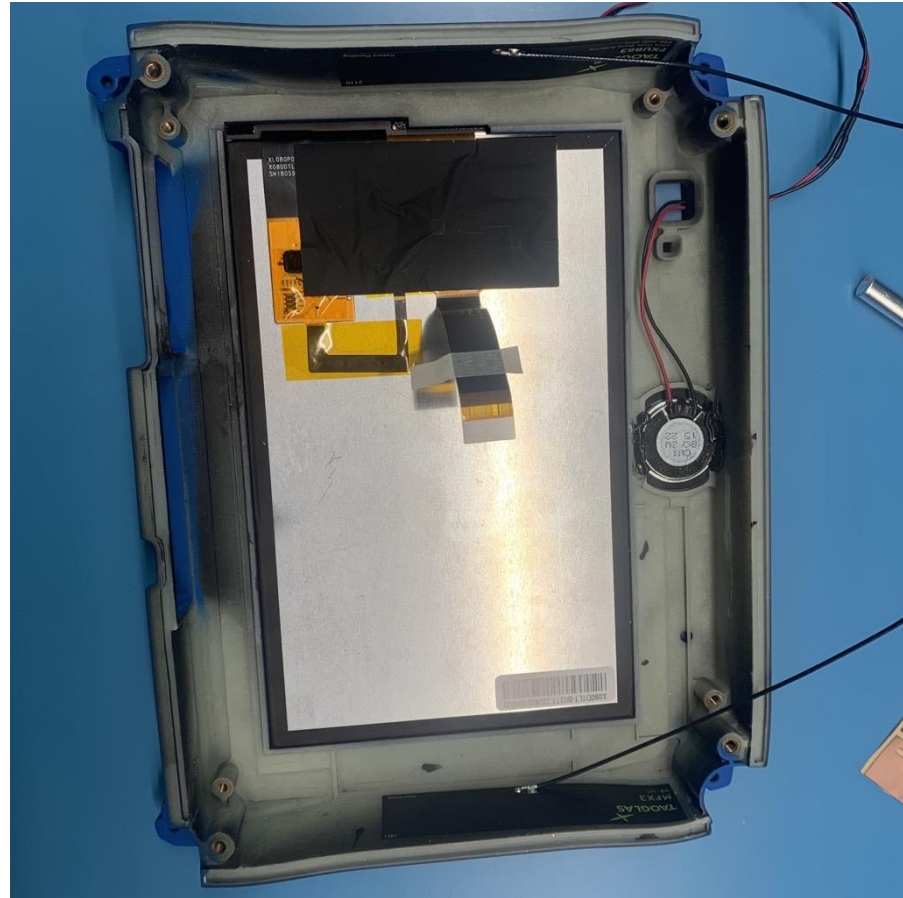


EXFO Device Bottom Side

Cellular Antenna Placement

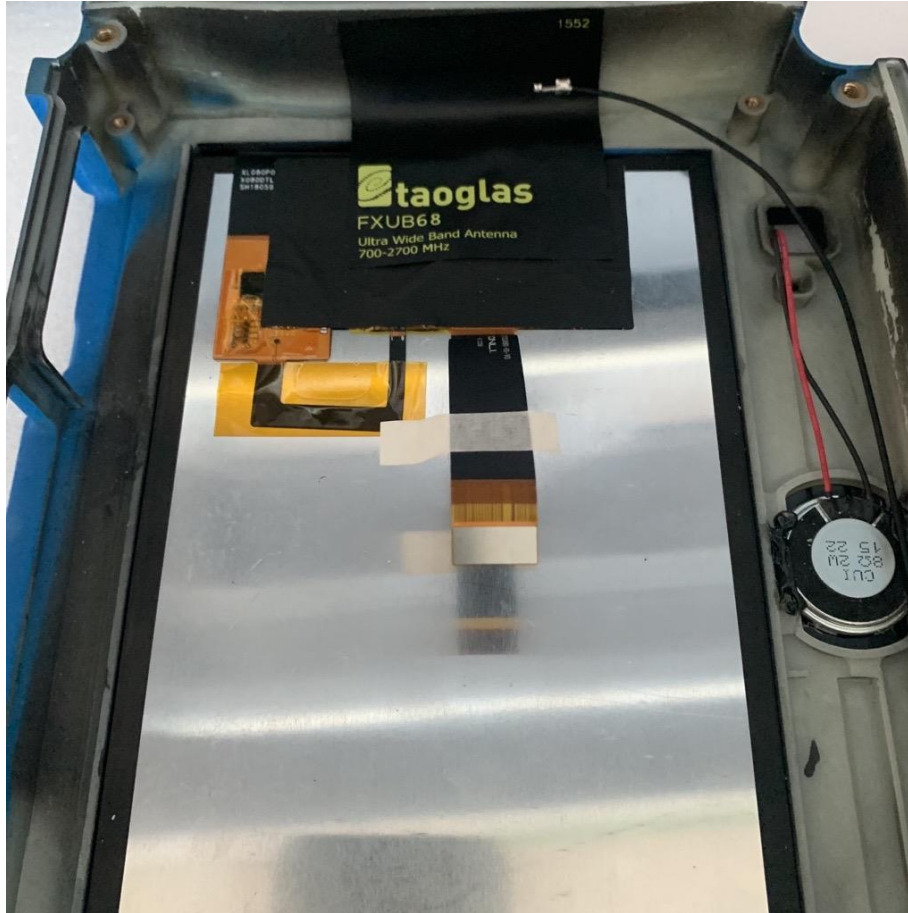


FXUB85 on the front side wall
of the device

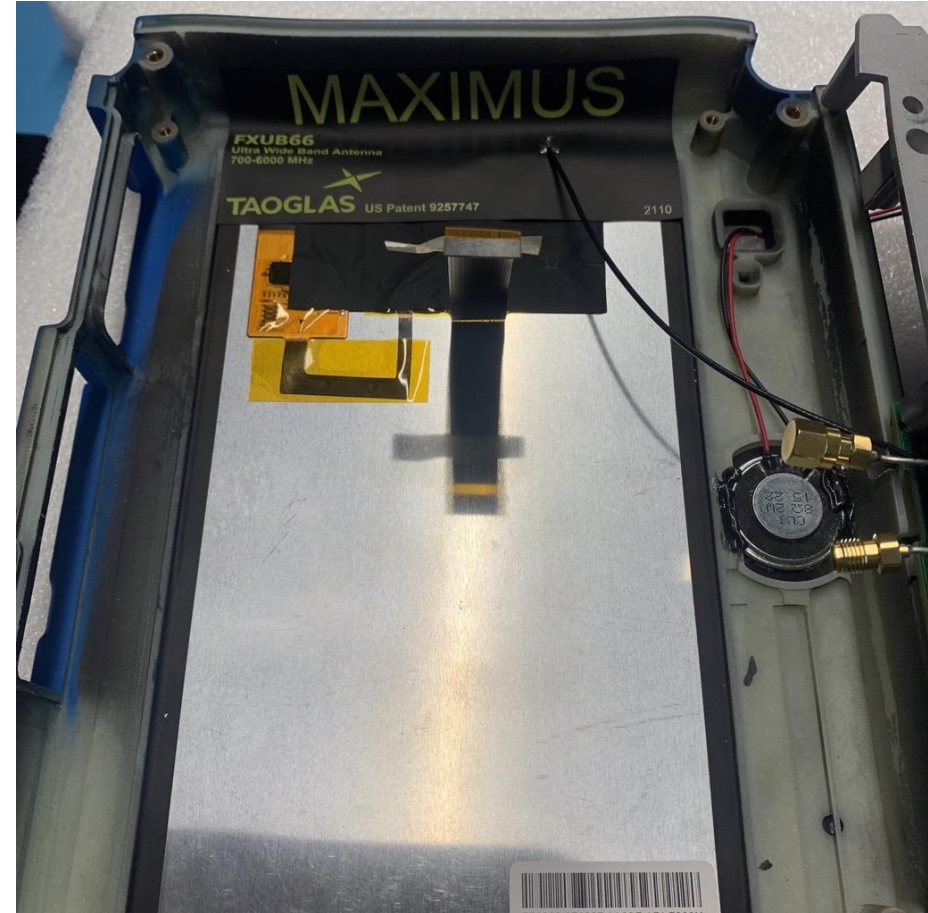


FXUB63 on the right-side wall
MFX3 on the left-side wall

Cellular Antenna Placement



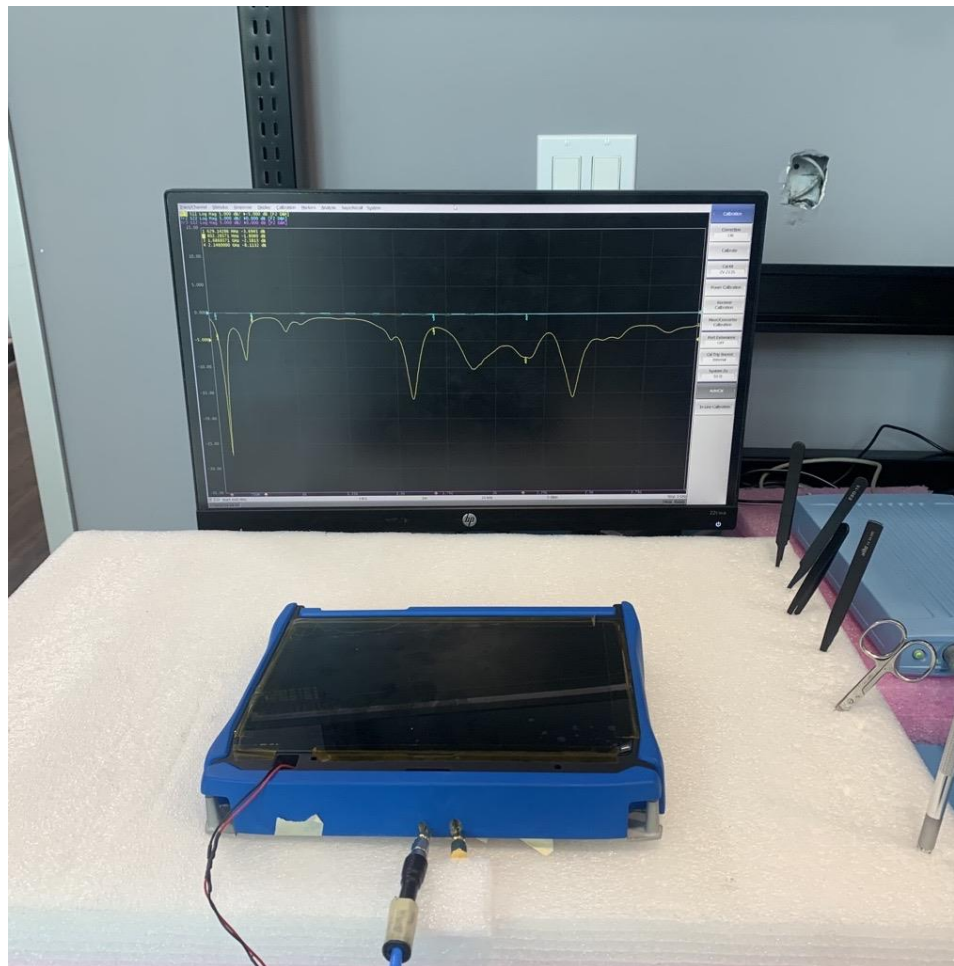
FXUB68 on the right-side wall of the device
Not enough space for the antenna to keep it flat



FXUB66 on the right-side wall of the device
No enough space for the antenna to keep it flat

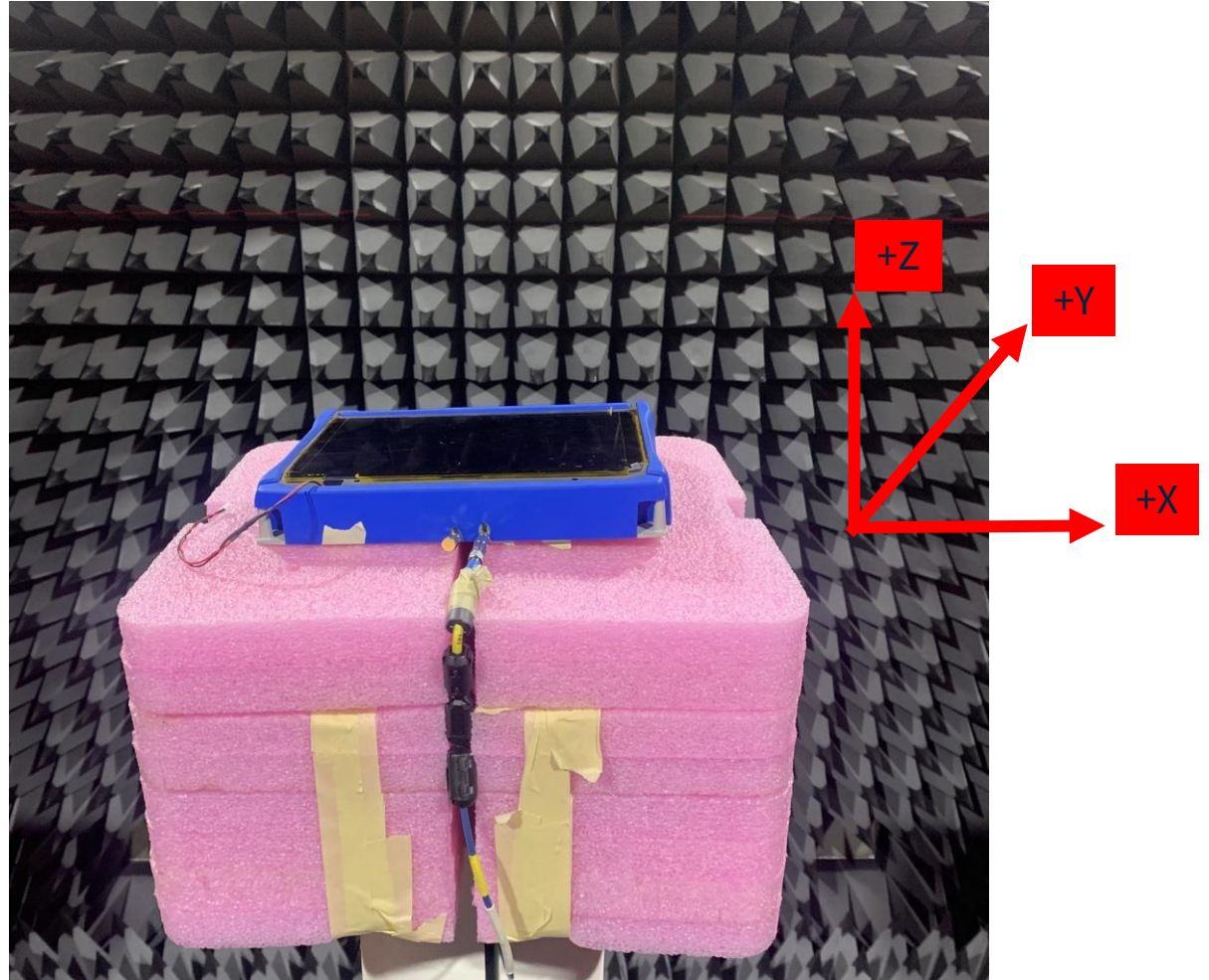
VNA & Anechoic Chamber Test Set up

VNA Test Setup



VNA Setup

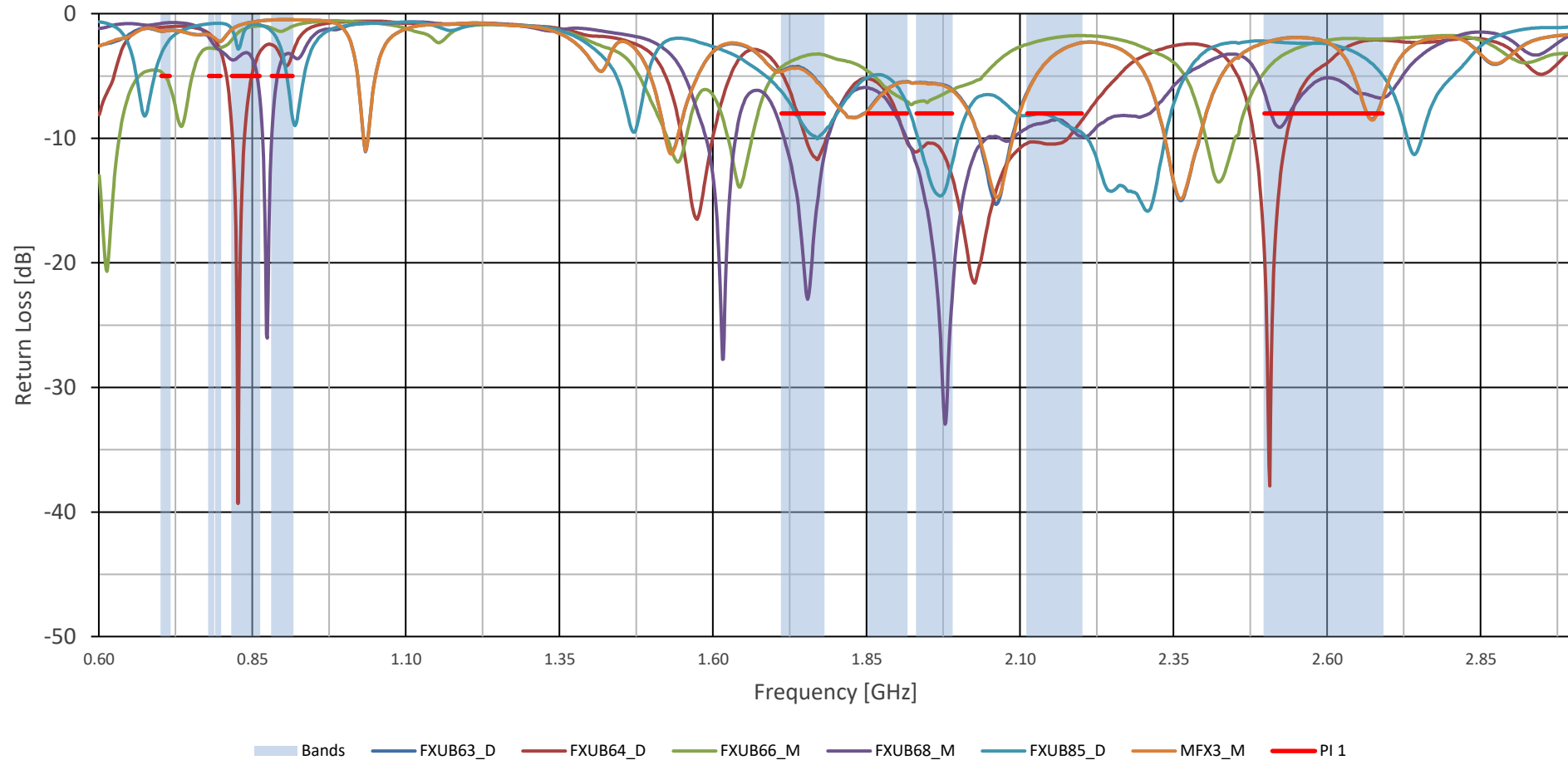
Anechoic Chamber Test Setup



SG24L Chamber Setup

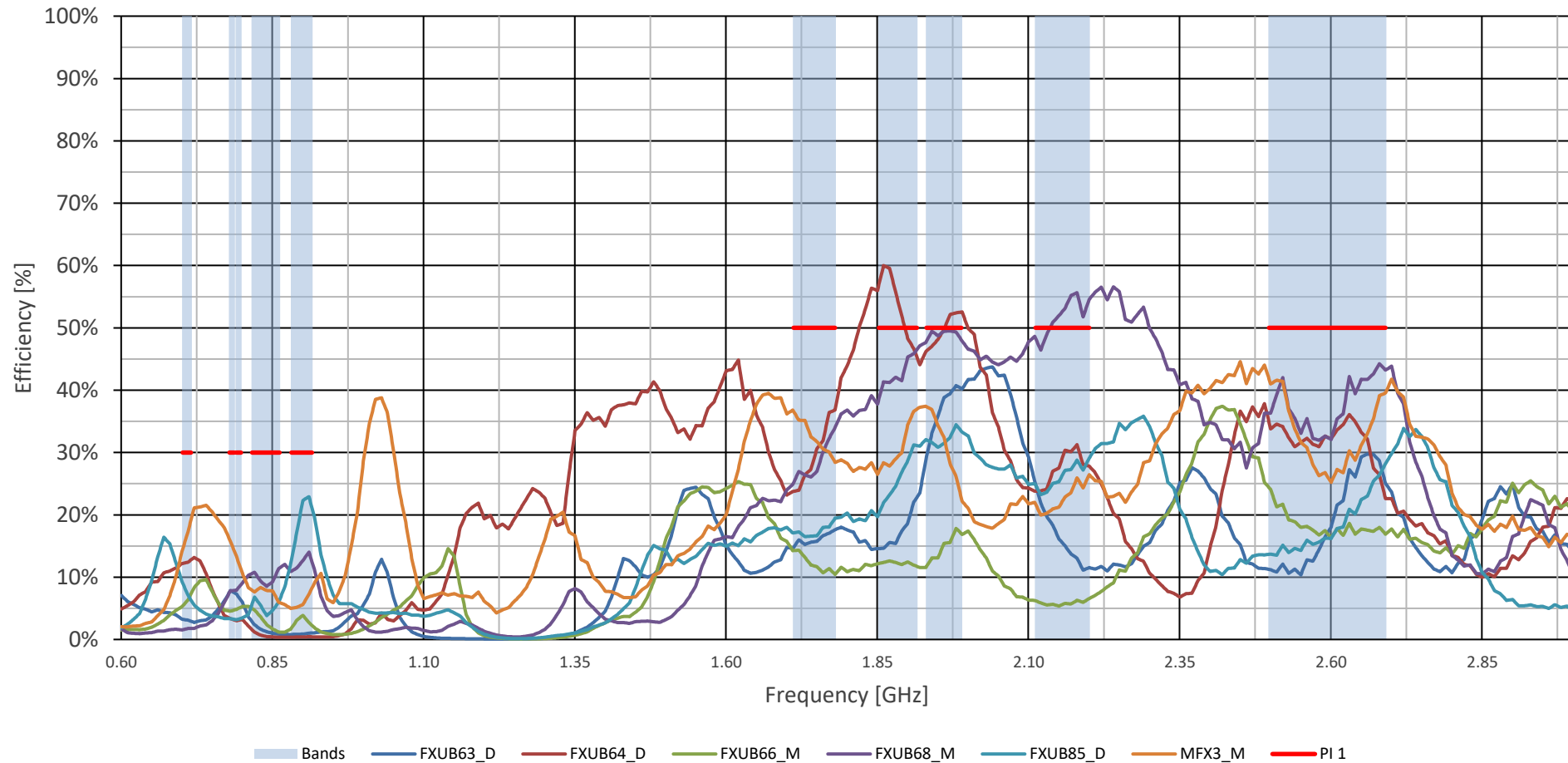
Antenna Performance

Return Loss



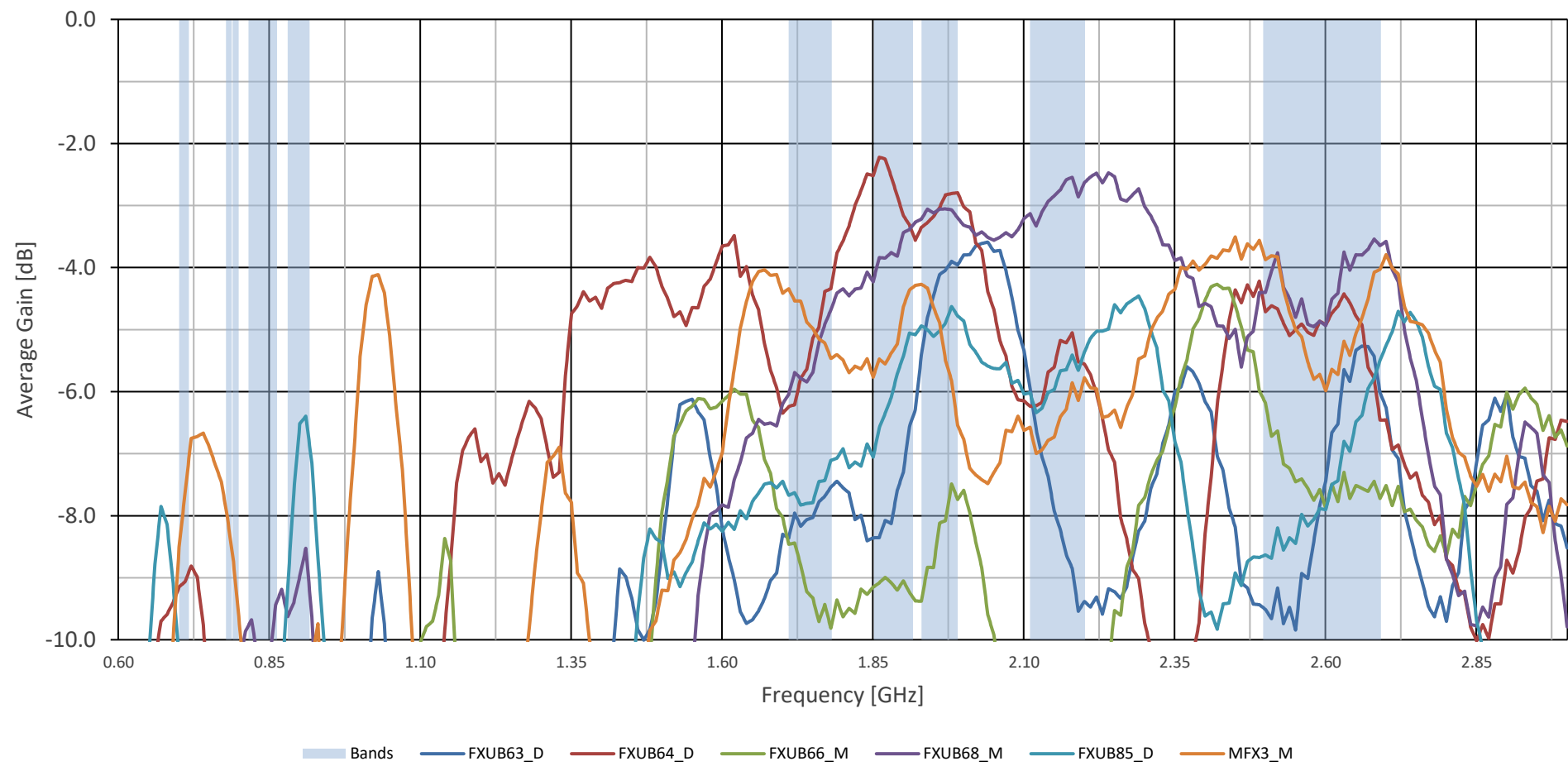
From the above graph, none of the antennas can cover all low bands required with 5dB return loss and all high bands with 8dB return loss.

Efficiency

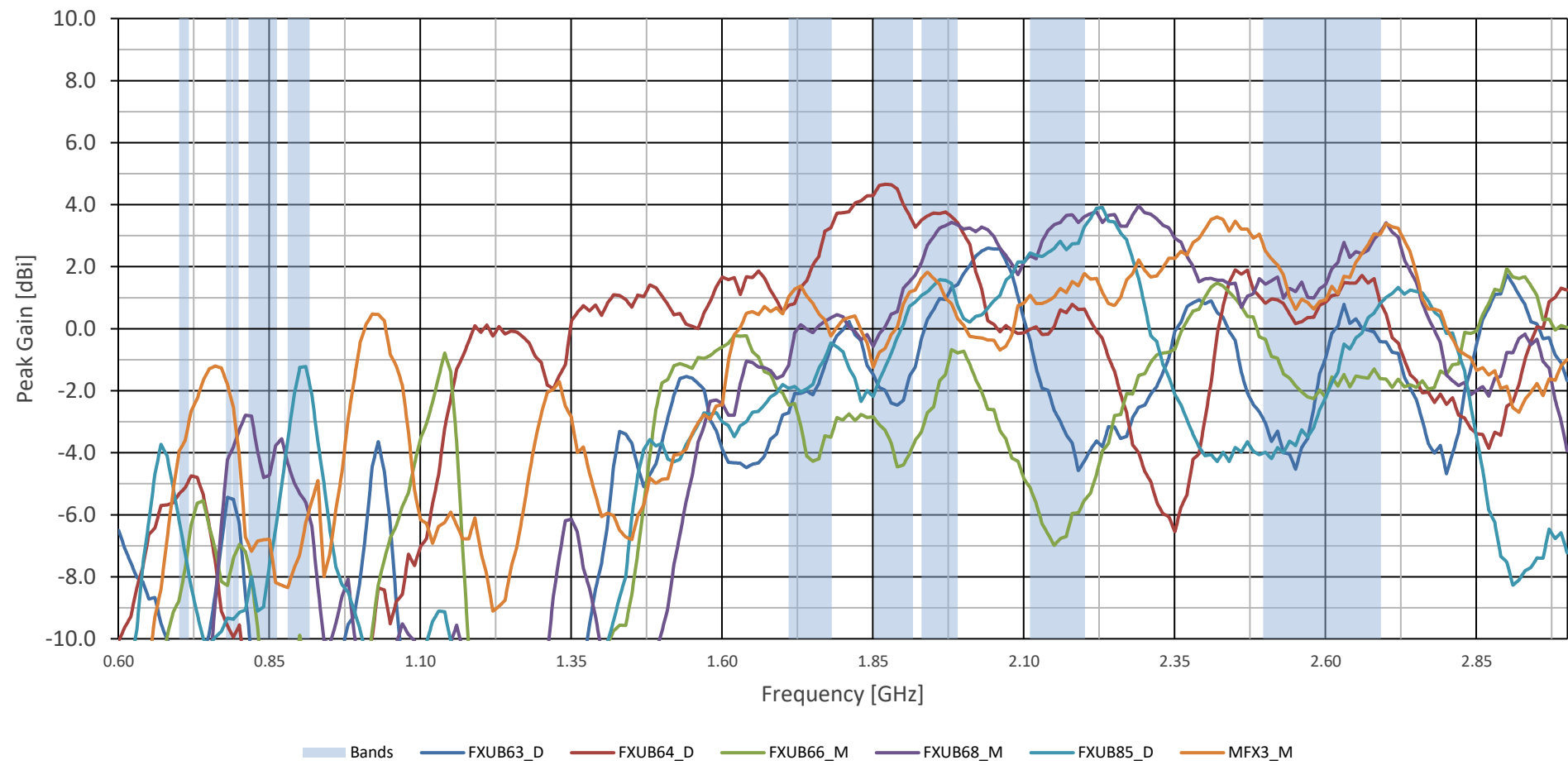


From the above efficiency graphs non of the antennas shows performance across the entire band that can passes carriers requirements in the US.

Average Gain



Peak Gain



Conclusions and Next Steps

Conclusions

- The device has a very large metal parts and large battery which has degraded the antenna performance. The antenna to metal clearance is not adequate for optimal operation.
- None of the suggested standard LTE antennas showed a performance that meet the carrier's requirements in the US.
- FXUB66 and FXUB68 antennas did not fit on any flat surface inside the device due to their large sizes.

Next Steps

- Test flex GNSS antenna solution.
- Discuss the report with EXFO.
- Taoglas' proposed solution will be designing custom flex LTE antennas to work around current limitation inside the Raptor device.



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