



Antenna Report

MPR Series 300 Module

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Test Lab

Resolute Product Design

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Trace Antenna Manufacturer

Advanced Assembly

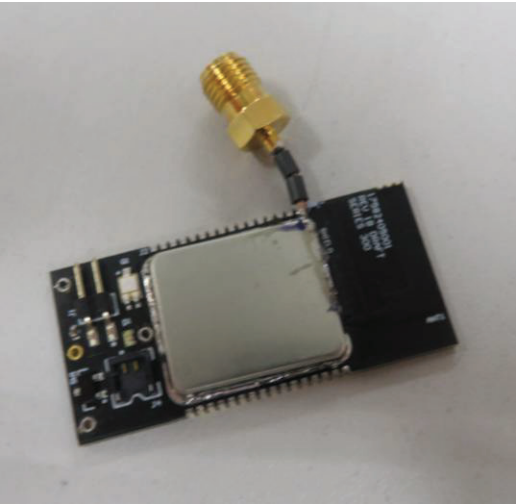
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Lydia Arriaga (lydia.arriaga@summitinterconnect.com)

SUMMARY

- MPR module Rev.1B was tuned and measured in three cases:
 - With TL-2450 battery
 - With TL-5934 battery
 - On PCB
- After tuning S11 is better than -12 dB in every measurement case.
- Efficiency after tuning:
 - With TL-2450 battery: >-2.7 dB
 - With TL-5934 battery: >-1.3 dB
 - On PCB: > -1.4 dB
- Final Peak Gain
 - 2.4GHz ISM
 - +1.73dBi (maximum)

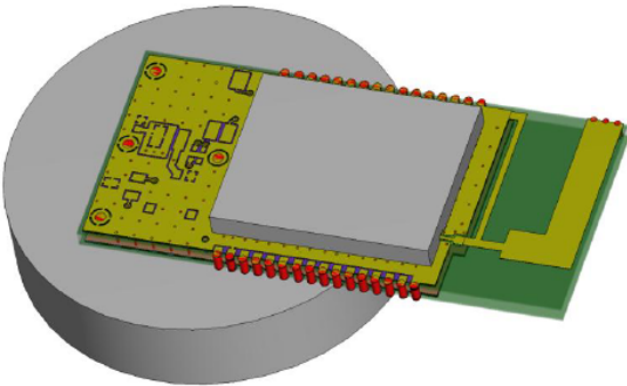
DUTs



DUT (R1B)

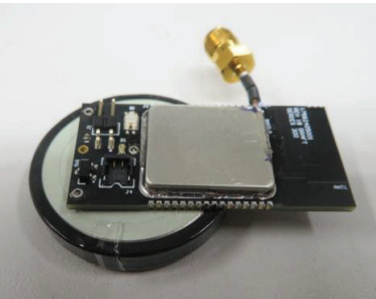
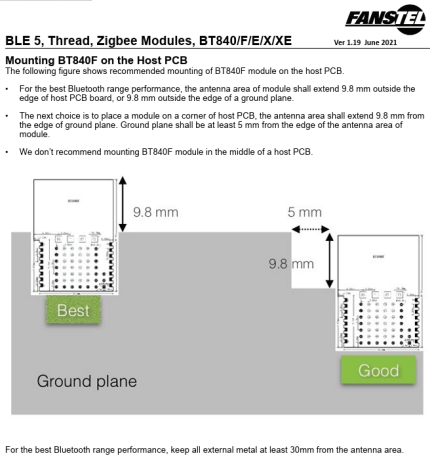
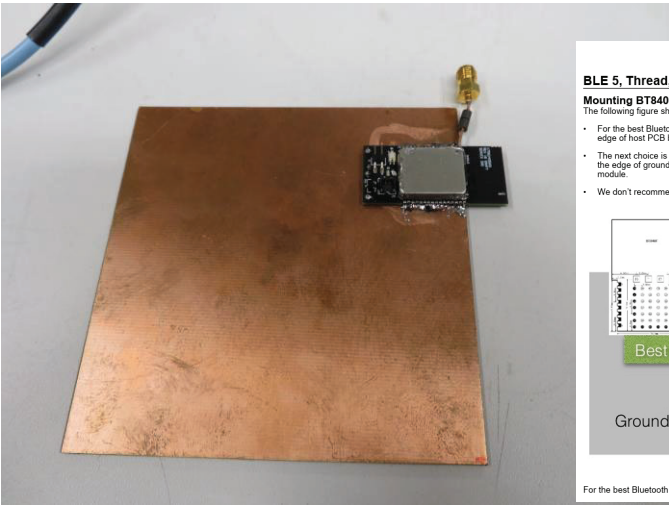


2450 / 5934
batteries

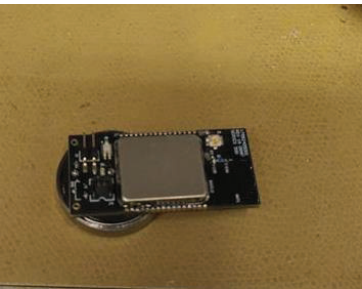


The antenna is an integrated PCB trace antenna permanently attached to the module.
No external antenna connectors are provided.

DUT on PCB



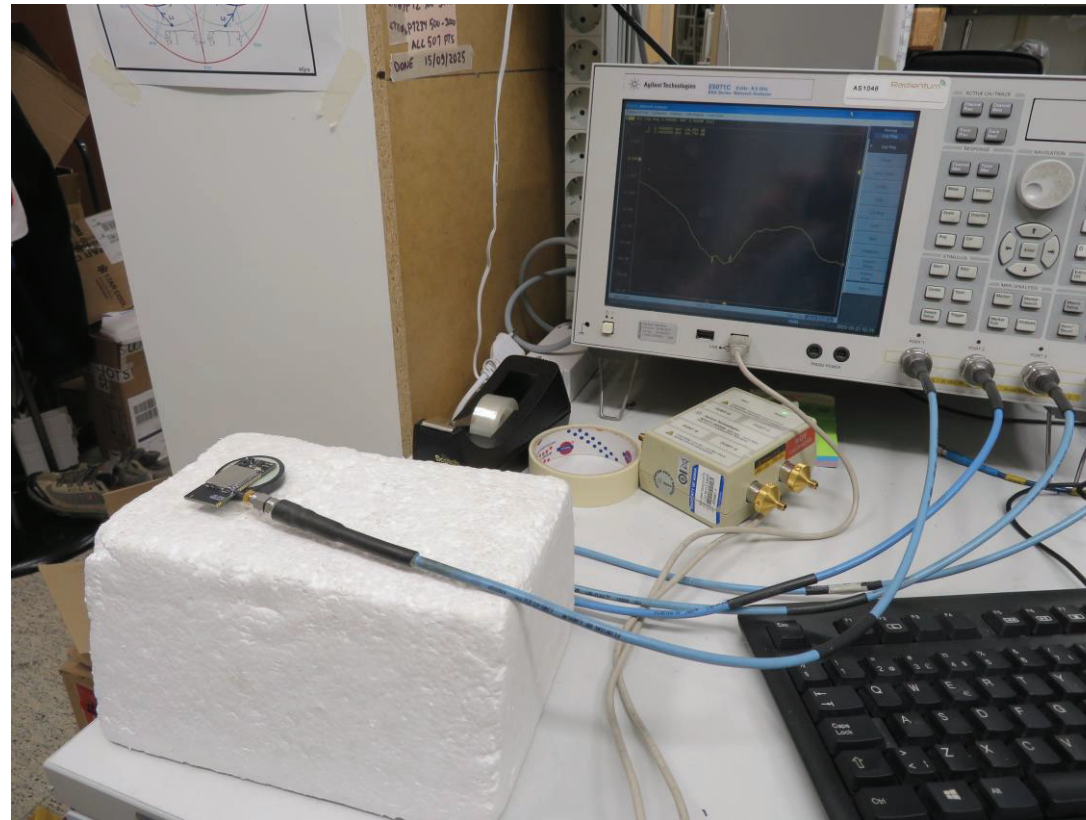
DUT+ 5934 battery



DUT + 2450 battery

S11 TEST SETUP

- Antenna tuning (S11) was measured with VNA

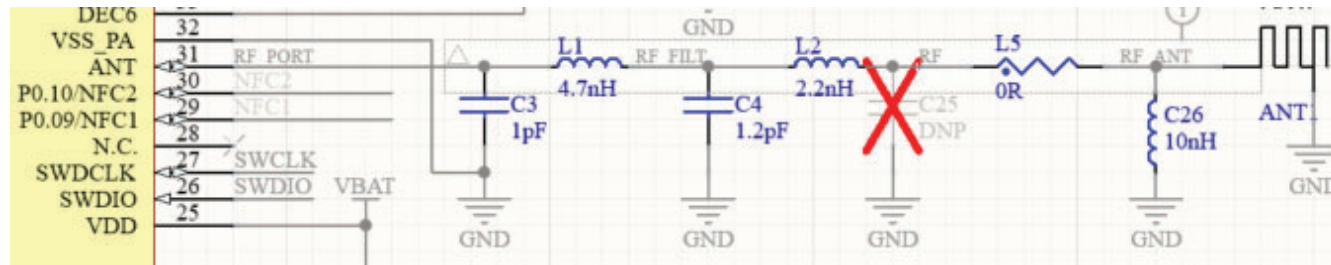


EFFICIENCY AND TRP TEST SETUP

- Efficiency and gain measurements were done in an anechoic antenna chamber

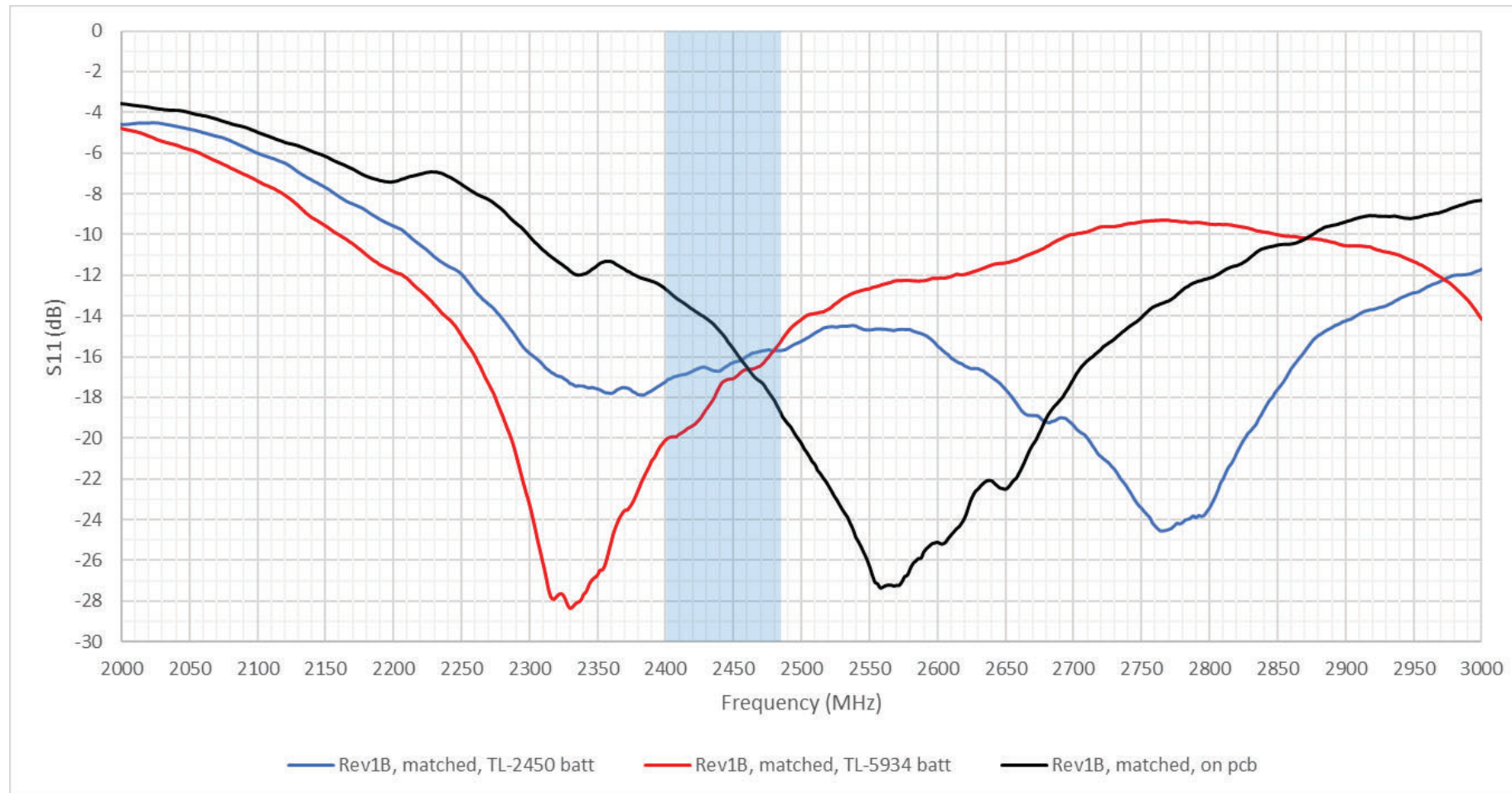


NEW MATCHING COMPONENTS

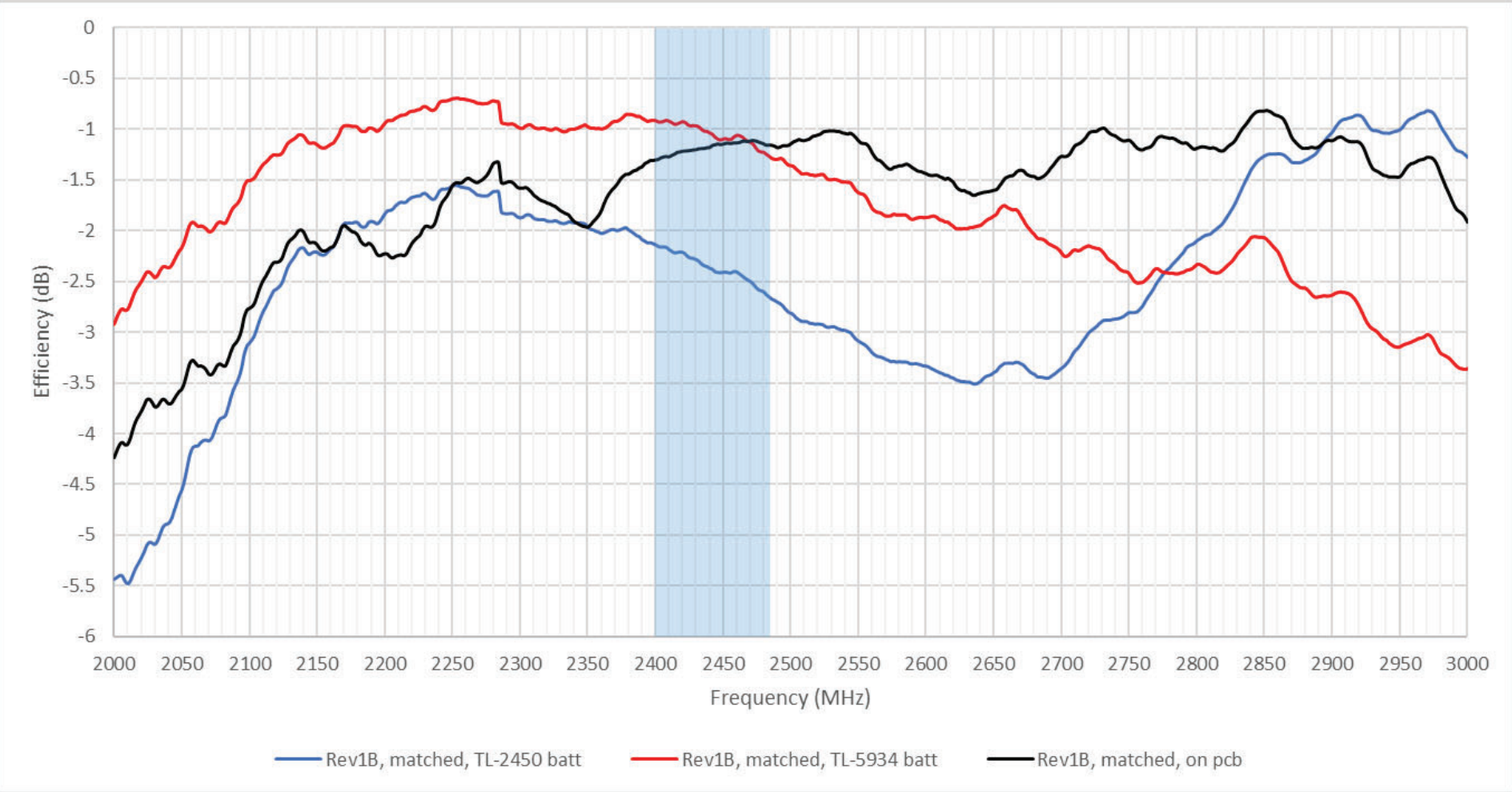


- C26: 10 nH Murata LQP03TN10NH02

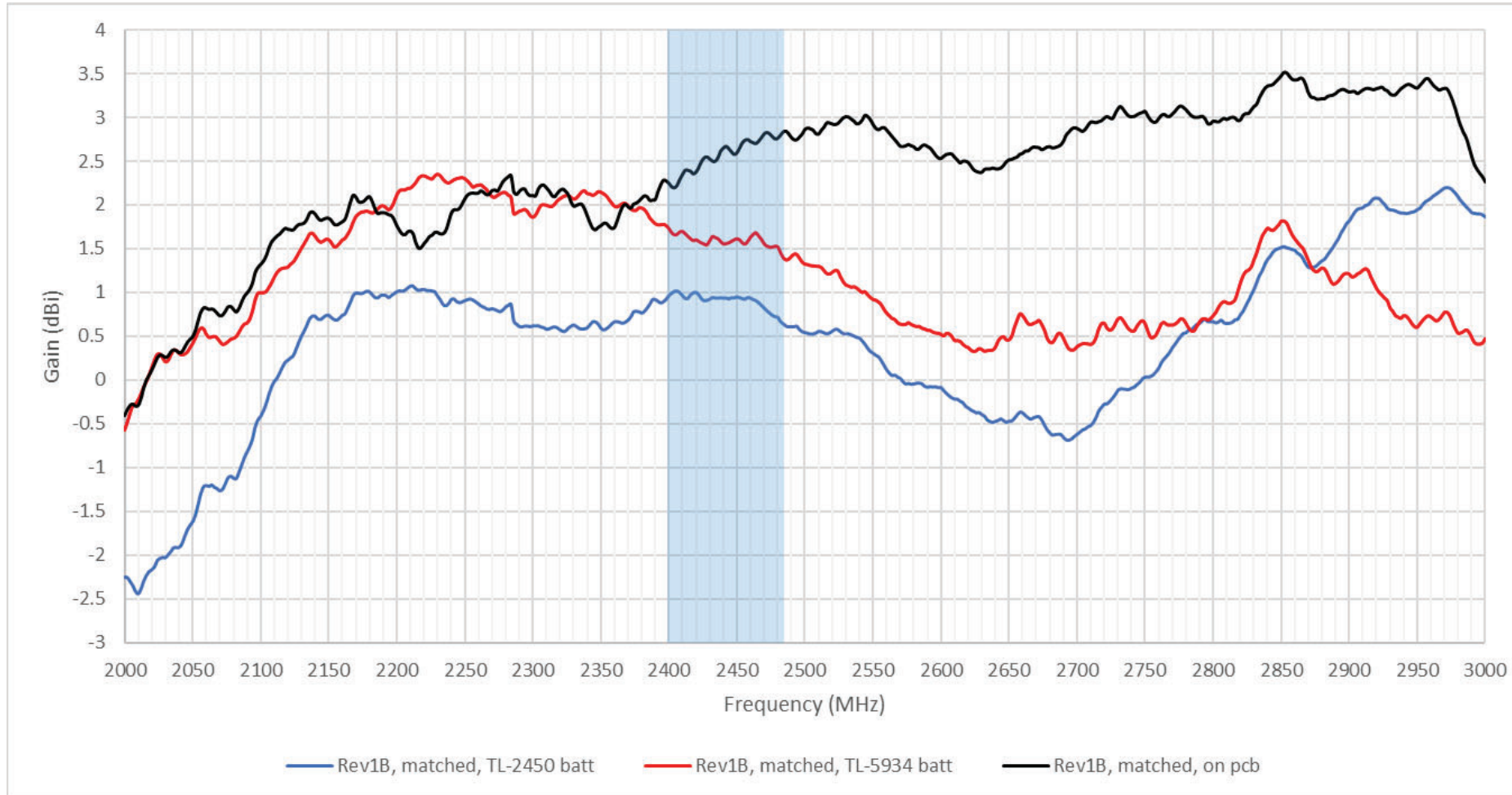
S11 RESULTS



EFFICIENCY RESULTS



GAIN RESULTS



Notes:

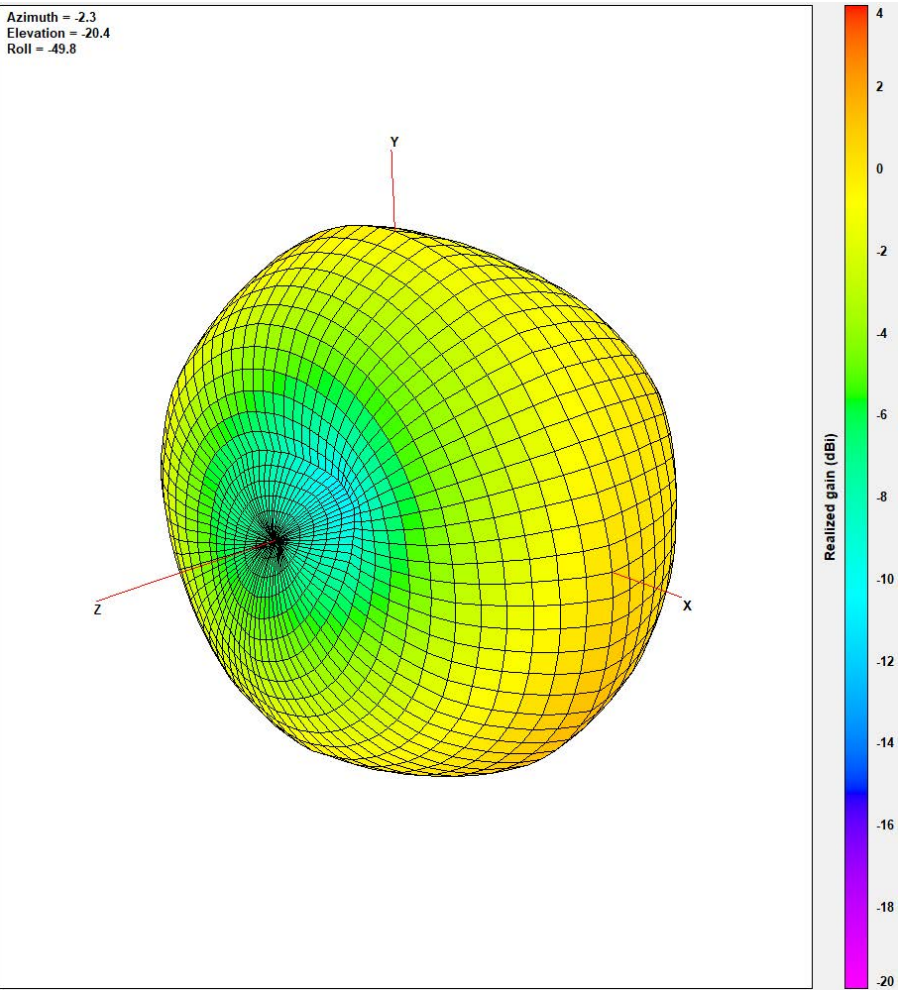
1. the module is being certified based on the TL-5934 battery application (+1.73dBi peak gain)
2. the TL-2450 battery application creates a lower antenna gain (+1.02dBi). Therefore the transmitter EIRP is reduced.

GLOSSARY

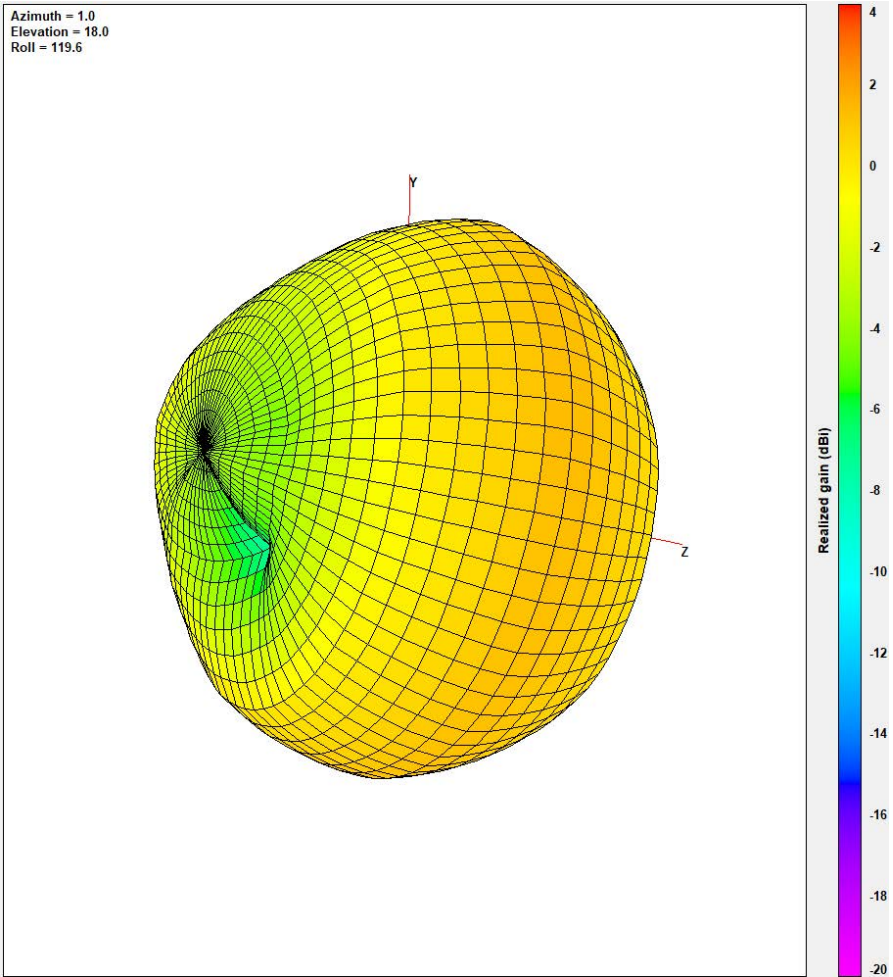
- S11 (Reflection coefficient) – power reflected by impedance mismatch
- Radiation (rad.) efficiency - antenna efficiency excluding mismatch loss
- Total efficiency - antenna efficiency including mismatch loss
- System total efficiency - antenna efficiency including mismatch loss, including matching and losses from external matching network
- TRP (total radiated power) – power radiated from the antenna, including all losses
- EIRP (effective isotropic radiated power) – power radiated from the antenna to the strongest beam direction compared to isotropic radiator
- ERP (effective radiated power) power radiated from the antenna to the strongest beam direction compared to ideal half wavelength dipole. $ERP\ (dB) = EIRP\ (dB) - 2,15\ dB$
- TIS (total isotropic sensitivity) - total available receive performance of a device with a real antenna

FINAL RADIATION PATTERNS

Rev1B_matched_TL-5934_2440MHz_3D_1

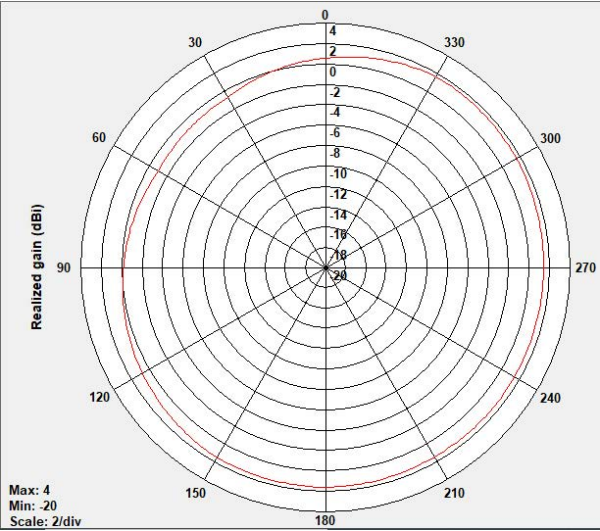


Rev1B_matched_TL-5934_2440MHz_3D_2

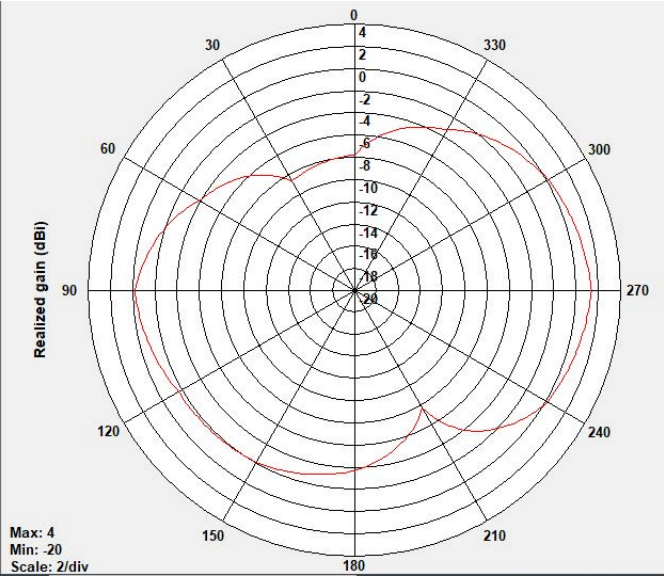


FINAL RADIATION PATTERNS

Rev1B_matched_TL-5934_2440MHz_3D_X0Y90



Rev1B_matched_TL-5934_2440MHz_3D_Z0Y90



Rev1B_matched_TL-5934_2440MHz_3D_Z0X90

