Technical Report # TR221012-01
Mortise Antenna Characterization for IEEE802.15.4

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Revision Tracking

Rev.	Author	Revision Description	Date
1.0	JL	Initial Draft	12 Oct 2022

Antenna Gain Measurement for IEEE802.15.4

This document details the measured antenna performance for the Mortise PCB antenna in a Yale Lock for the IEEE802.15.4 standard. Measurements were taken in CAE's Piper anechoic chamber.

Measured Antenna Parameters (@ 2450 MHz)
- Total Isotropic Gain: -3.07 dBi
- Peak Gain: 2.05 dBi
- Antenna Efficiency: 49.3 %

**Note:** Antenna gain measurements are within an error range of +/- 1 dBi.

Radiation Plots

RF radiation patterns show the antenna gain (dBi) performance - at different antenna orientations in a spherical sweep. Four different orientations associated with the antenna are shown. These same orientations are shown for the RF spherical radiation patterns in the following pages. The radiation patterns include 3D plots for both horizontal and vertical polarizations of the receiving horn antenna.

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Mortise Test Orientation

In the photo below, Top and Bottom orientation labels are the top or bottom of the Yale Lock. Front and Back orientation labels are the Front and Back of the lock. These orientation labels correspond to the radiation patterns that follow.
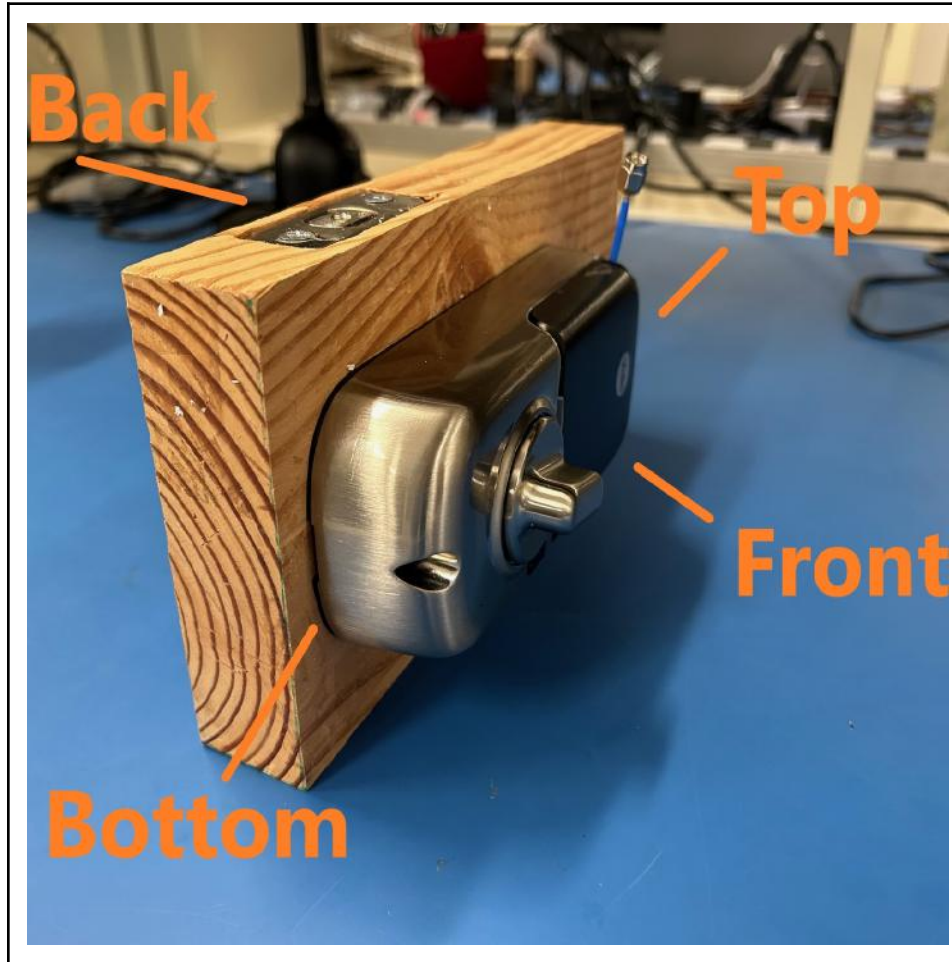
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Each 3D antenna gain plot has the X, Y, Z axes showing orientation of the lock in 3D space. The radiation plots show the radiation from the X-Y axis perspectives and not the Z axis. A key showing which Axis corresponds to a specific DUT orientation is shown below. In the radiation plots a solid dot indicates that the positive axis is pointing out of the screen, otherwise it is the negative axis pointing out.
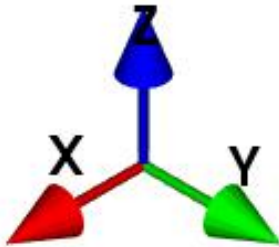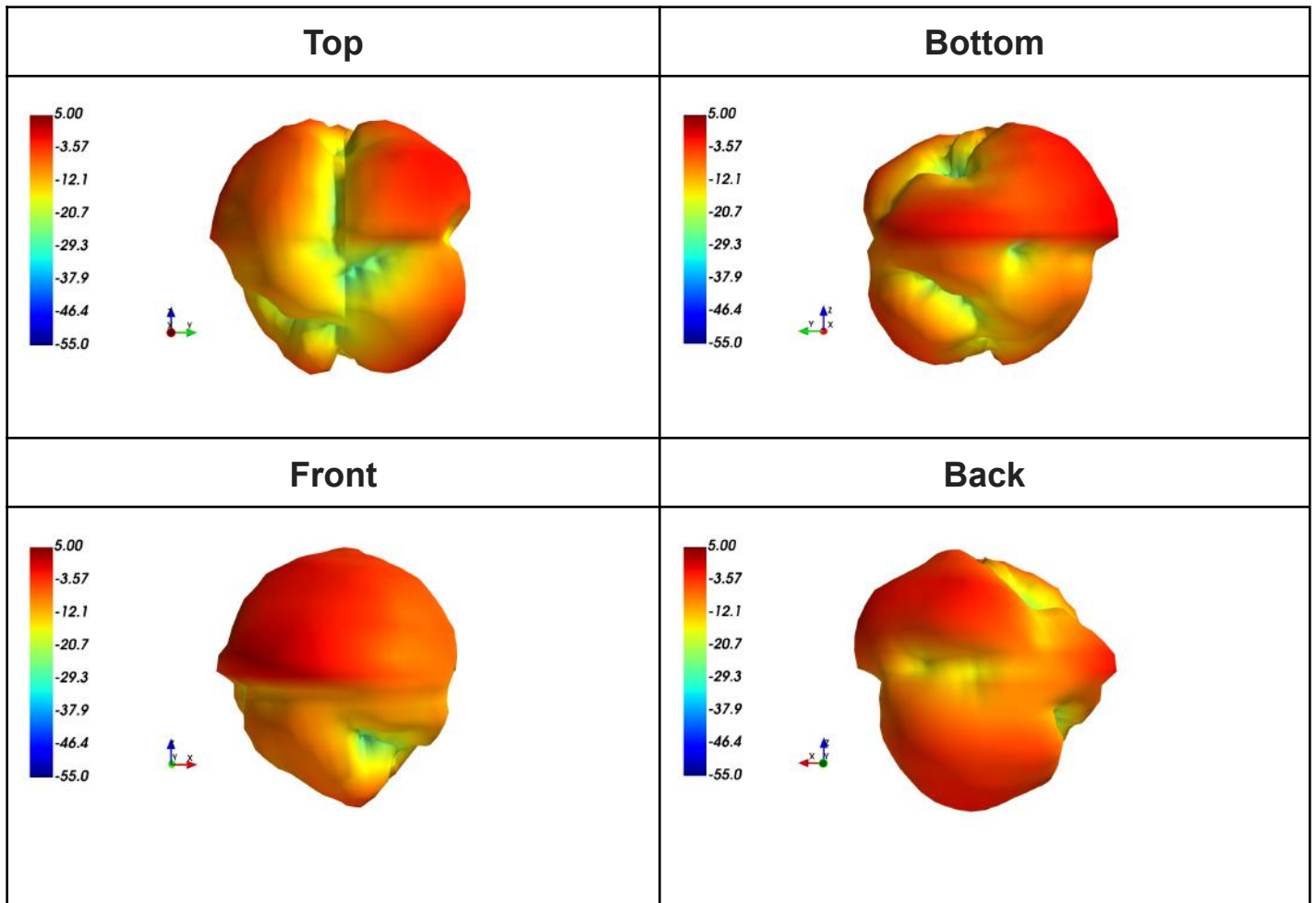
Axis:	DUT Orientation:
Positive X Axis	Top
Negative X Axis	Bottom
Positive Y Axis	Back
Negative Y Axis	Front

Mortise Radiation Patterns

Vertical Polarization @ 2450 MHz

Top	Bottom
Front	**Back**

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Horizontal Polarization @ 2450 MHz
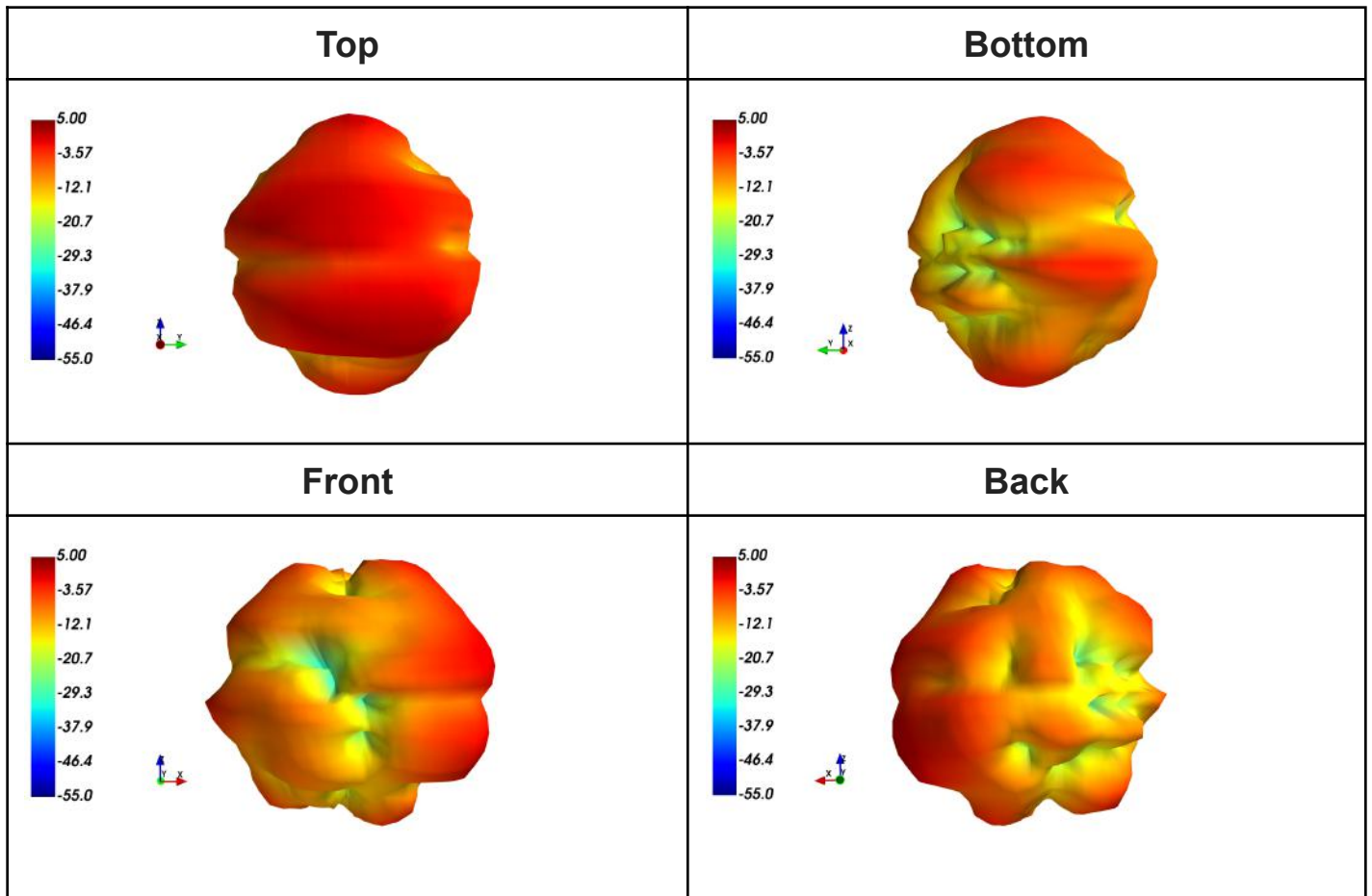
Top	Bottom

Front	Back

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Additional Product Photos
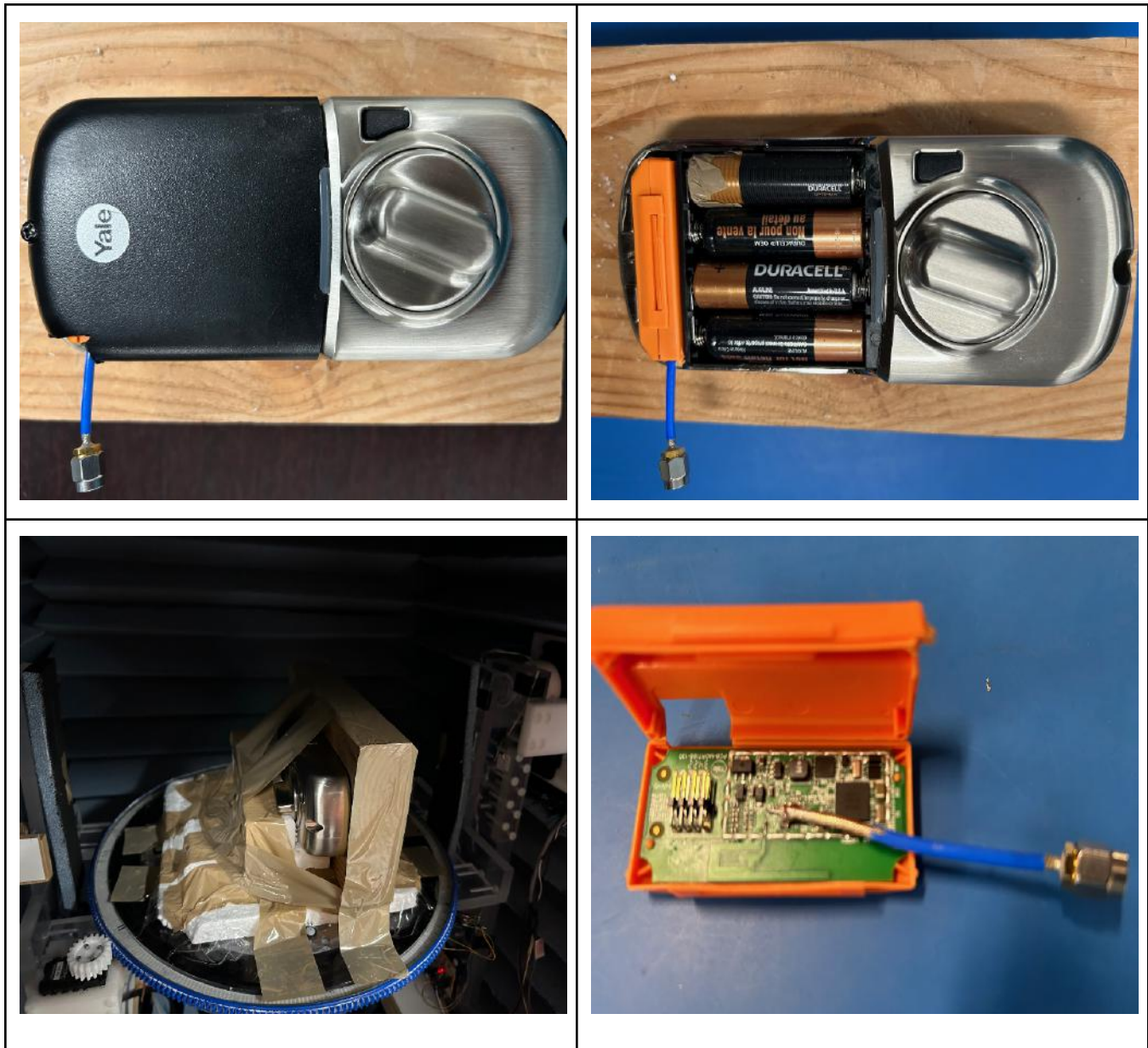
Conclusion

The Mortise antenna measured well. Recent adjustments to the antenna impedance matching done by Tom Hore provided almost 1 dB increase in peak antenna gain and 0.5 dB increase in total isotropic gain. The radiation pattern of the antenna is very good with great coverage at both horizontal and vertical polarizations. This Mortise antenna for IEEE802.15.4 will perform very well.

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