

Introduction

SC20 Bluetooth-WiFi solution is implemented on a daughter PCB using a transceiver module IC from Murata and in-house antenna design as explained in following sections.

Table 1 - Antenna RF Performance

Parameter	Minimum	Typical	Maximum
Operating Frequency (MHz)	2400	2441	2483.5
Antenna Gain (dBi)		-3.0 (average)	2.5* (peak gain)
Return-loss (dB)		12 B	6dB

* +1.0dBi maximum gain was measured with the tested unit (at 180⁰ angle on Figure 4).
Allowing +/-1.5dB measurement uncertainty, peak gain of the antenna is +2.5dBi.

Antenna Physical Design

An inverted F-type (PIFA) antenna structure as shown in Figure 1 and Figure 2 was chosen for its compactness and reasonably omnidirectional radiation pattern.

“L” shaped $\lambda/4$ antenna structure; RF feed towards top of “L”. Antenna element was folded in order to fit within the chosen size of the module PCB (19.5mm width by 21.5 mm height).

A series capacitor of 1.8pF is required to match the antenna to 50 ohm (i.e. to Murata RF transceiver port).

Antenna was placed towards the top edge of the product and the Murata module away from the board to board connector on the back.

The antenna (module) is designed for use in the complete product only and not intended for stand-alone use.

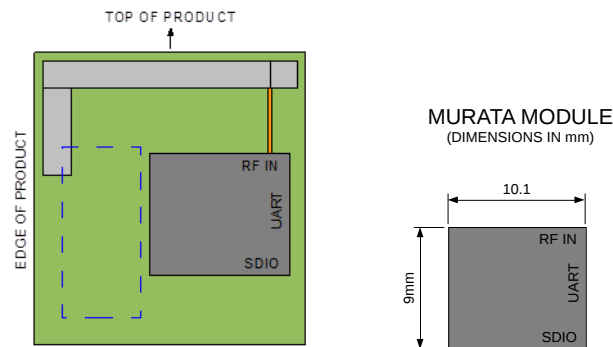


Figure 1: Antenna on daughter PCB and dimensions of the Murata transceiver

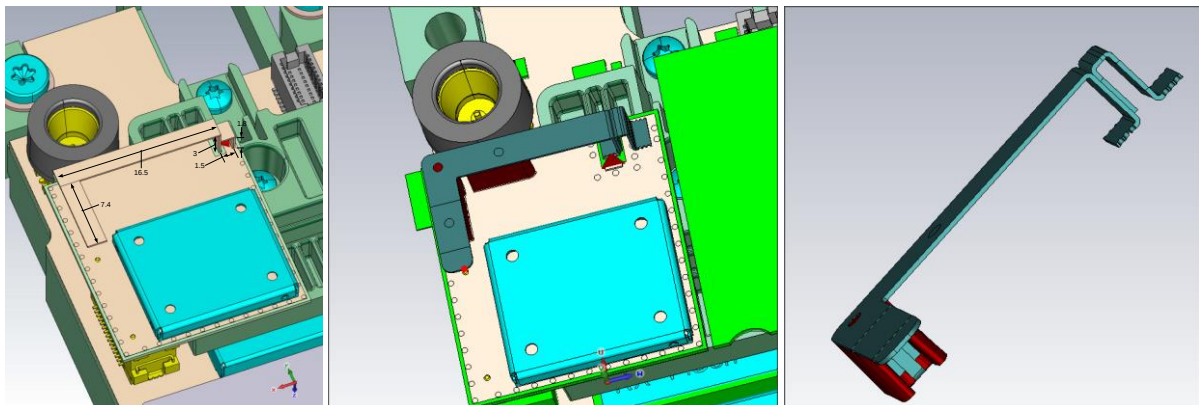


Figure 2: Further details about the antenna design

Measured performance

The measured antenna gain (dBi) performance is shown in Figure 3, Figure 4 and Figure 5.

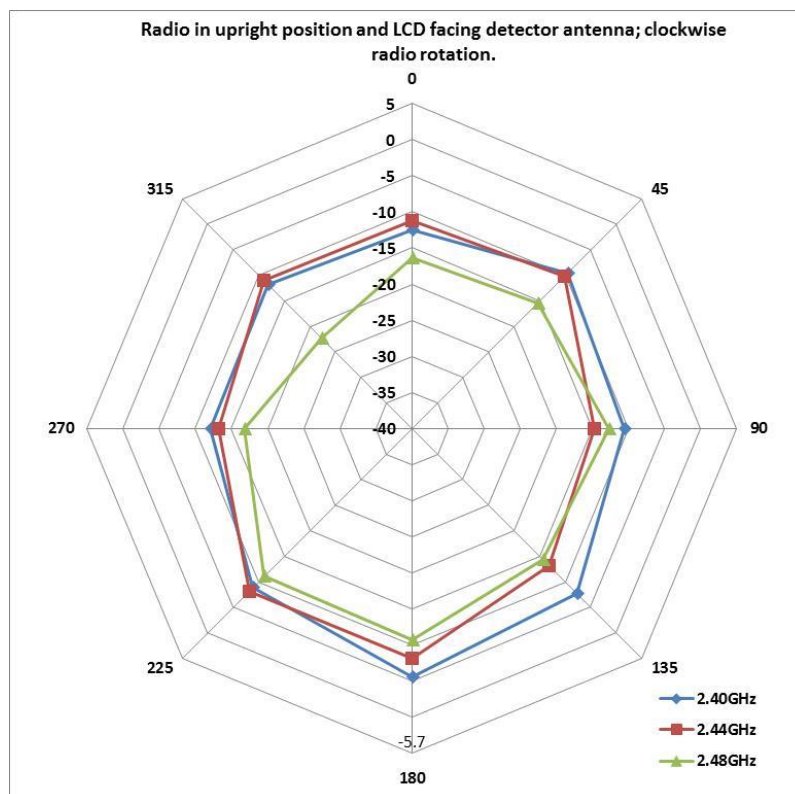


Figure 3: Radio in upright (i.e. vertical) position (0^0 equals facing LCD)

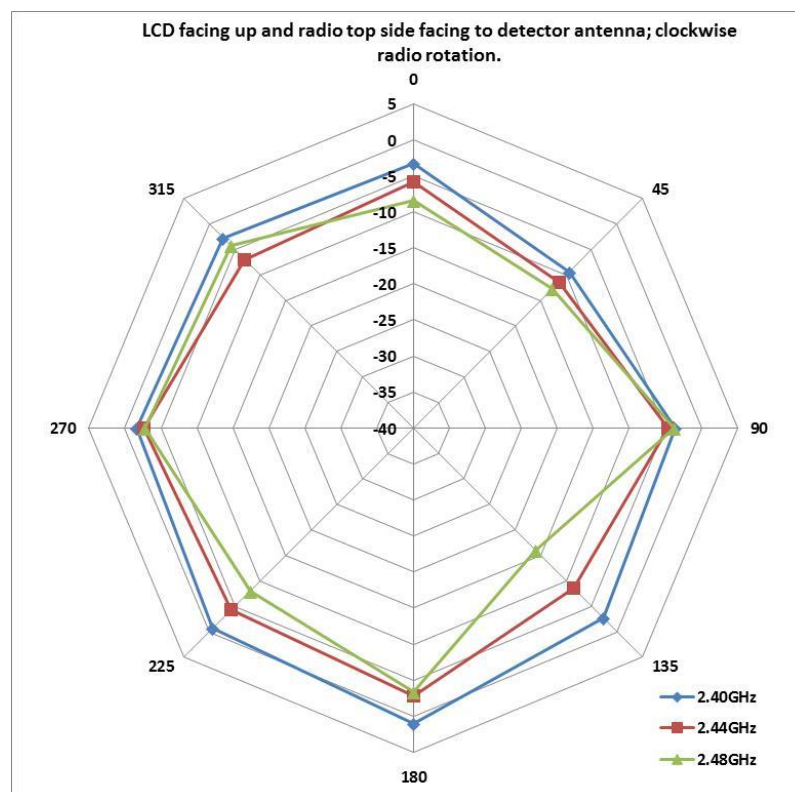


Figure 4: Radio in horizontal position (i.e. resting on battery side; 0^0 equals TETRA antenna pointing towards the detector antenna)

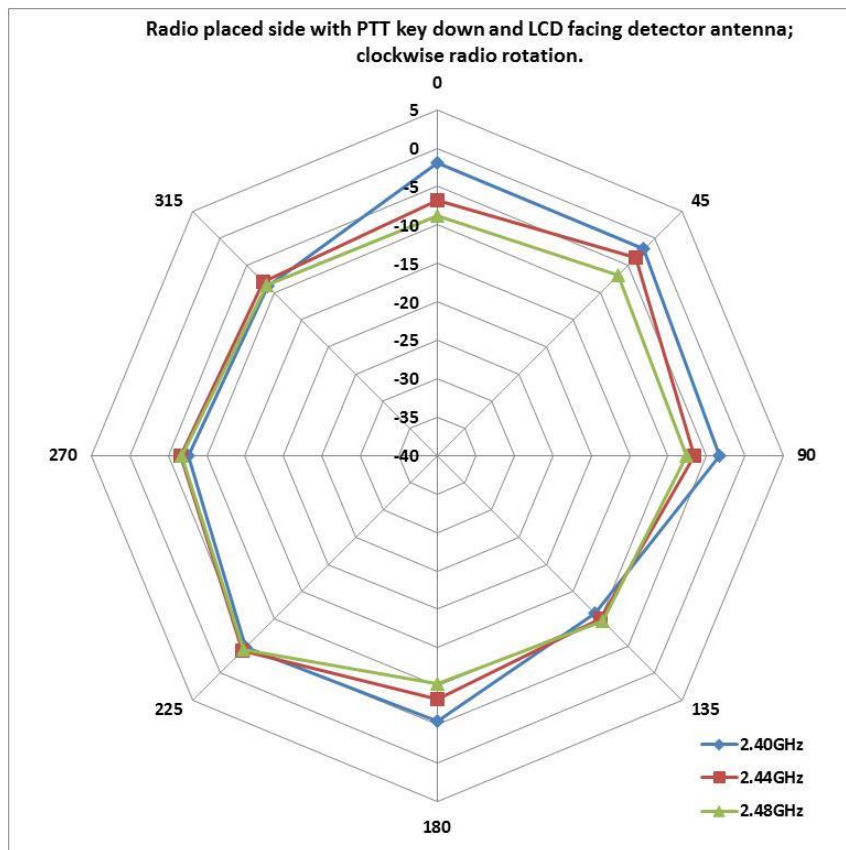


Figure 5: Radio placed on its side (PTT key facing down) and LCD facing detector antenna