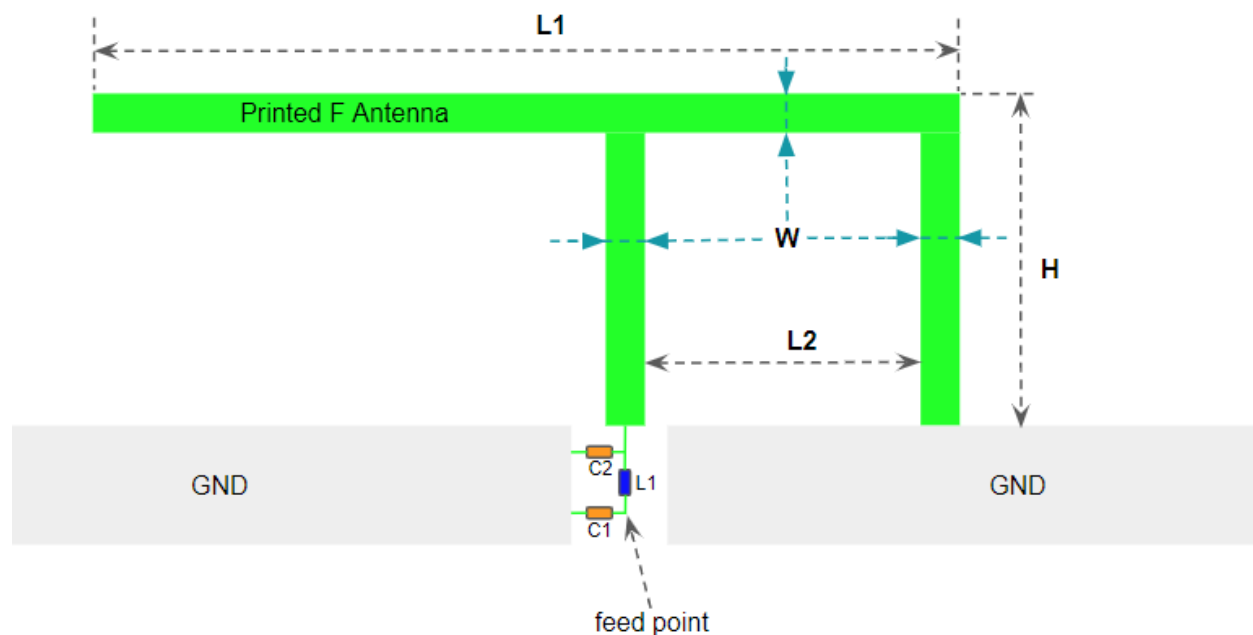


Printed F antenna reference design and its implementation and performance in the Bluetooth Keyboard, Model YR0089

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1. Printed F antenna reference design

The printed F antenna could offer needed RF performance for the mobility BLE keyboard with effective cost. Reference design as shown below. The RF performance would be checked in each project, and all sizes and matching values needed to be finetuned accordingly, as the real RF performance could be impacted by PCB layout (GND plane), membrane, metal-plate, cases and cables, which are different in each project.

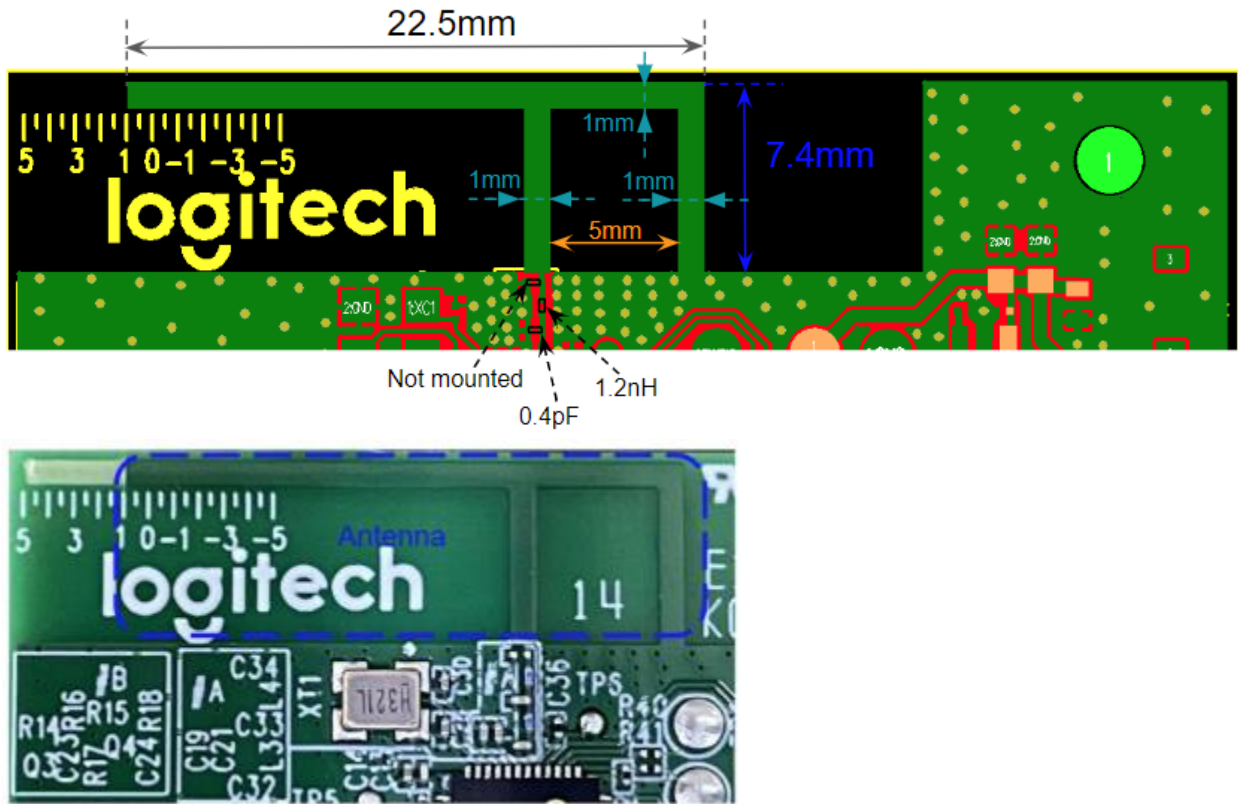


- Antenna ref. sizes: $L1=26.5\text{mm}$ / $L2=5\text{mm}$ / $H=7.4\text{mm}$ / $W=1\text{mm}$

- L1, C1, C2 are Antenna matching components, ref. value: L1=1.2nH / C1=0.4pF / C2 not mounted.
- All sizes and components values could be finetuned in each project based on the real RF performance.

2. Printed F Antenna in Sage project

2.1 Antenna implementation in Sage project



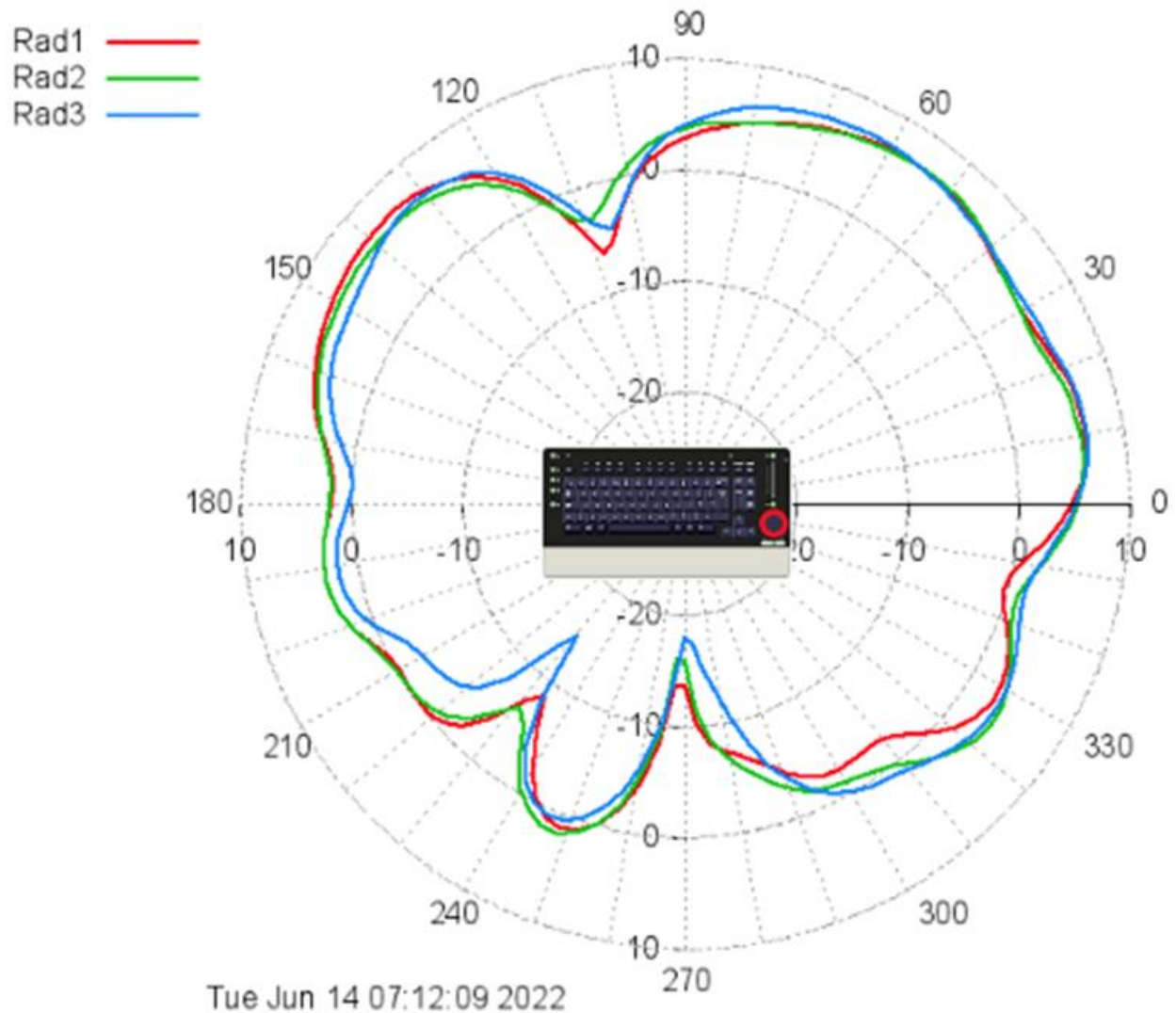
Fine tune based on the product

- Reduce L1 by 4mm, other sizes kept.
- Antenna matching BOM kept.

2.2 Radiation pattern and Antenna gain

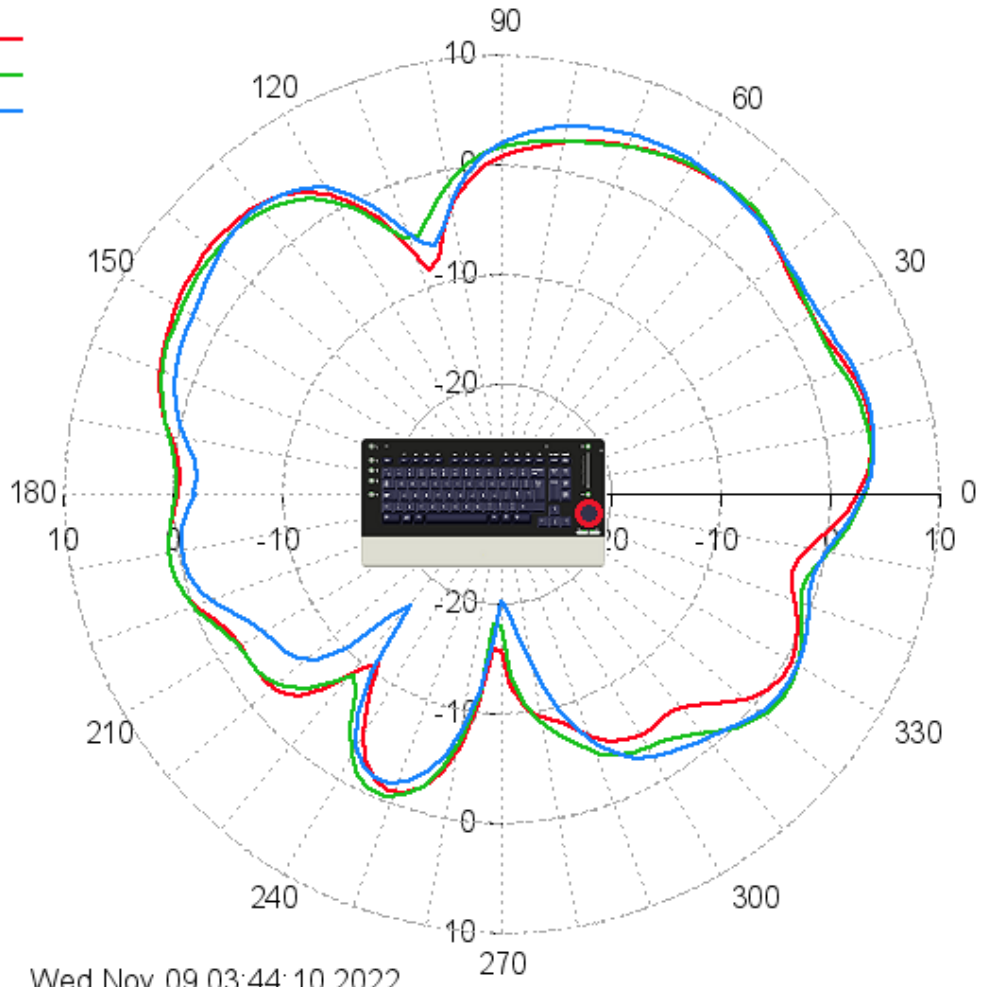
- Rad1/Rad2/Rad3=CH02/CH40/CH80
- Conducted power of CH02/CH40/CH80 is 2.82 / 2.91 / 2.89 dBm
- Antenna gain of CH02/CH40/CH80 is 4.98 / 4.27 / 4.284 dBi (EIRP-Conducted power)
- So Antenna gain is 5dBi(max)

Product radiation pattern(EIRP)



Antenna radiation pattern (Antenna gain = EIRP - Conudeted power)

- Rad1 —
- Rad2 —
- Rad3 —

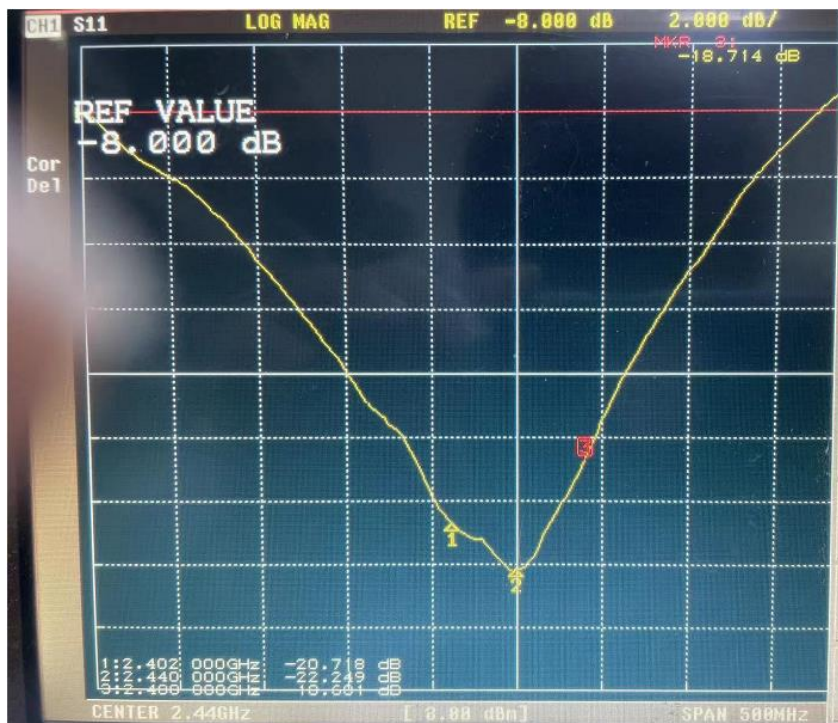


2.3 S11 Measurement

- S11_main board only, $< -5.9\text{dB}$



- S11_full keyboard assembly, $< -18.7\text{dB}$



2.4 Summay

Brand	Logitech
Model No.	210-002510
Antenna type	Printed F Antenna
Operating band	2402~2480MHz
Antenna gain	5dBi (max)
S11_full keyboard assembly	<-18.7dB
Antenna size	22.5mm x7.4mm