

Antenna Specification

P170033; Bluetooth on Flexi-tape

David Geiman
March 8, 2019

This document describes the antenna used in the Bluetooth on Flexi-tape product line.

The Bluetooth on Flexi-tape products all use the same controller portion to drive the flexible LED portion. This portion is on a rigid circuit board using a TeLink TLSR8266 programable system on a chip. This chip contains all the Bluetooth transceiver circuitry, except for an external 12 MHz crystal and the antenna. For this design, a trace antenna was chosen. It is located at the end of the rigid controller board, opposite the end that connects to the flexible light strip portion.

Construction:

The design of the trace antenna was taken from the TeLink Antenna Design Guide application note (AN-16080500-E2). Due to the small size of the circuit board, especially in the width dimension, the Sample 1, Small-Dimension Antenna design, was chosen (see page 20). The dimensions of the trace layout are shown in figure 1. The circuit board is a double layer, 0.8 mm thick, FR4 board, with 1 oz copper. Ground fill is used on both sides of the board, but it is pulled back from the antenna end of the board on both layers. White solder mask with black silkscreen are used on the board to match the flexible light strip portion of the product.

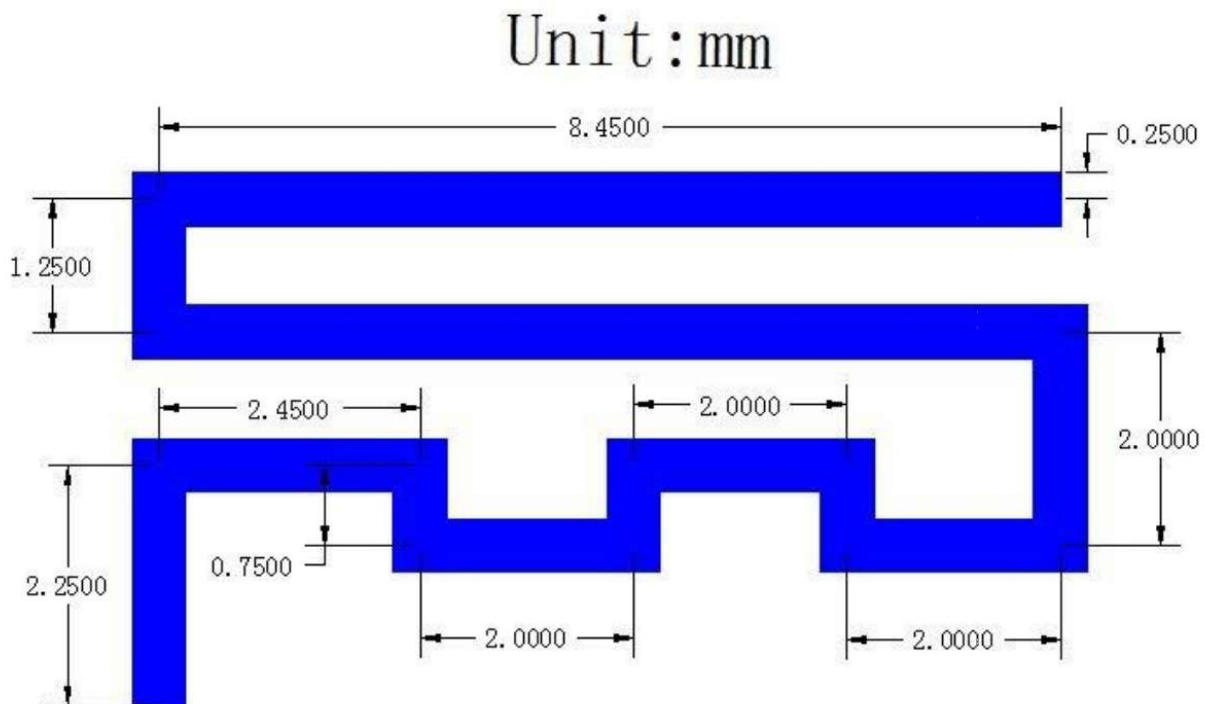


Figure 1, Antenna Trace Dimensions (feed point at bottom of image)

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Matching

The antenna is matched to the chip with a matching network made up of three inductors and two capacitors (See Figure 2). This network matches the antenna well enough to attain a Standing Wave Ratio of 1.28 (See Figure 3).

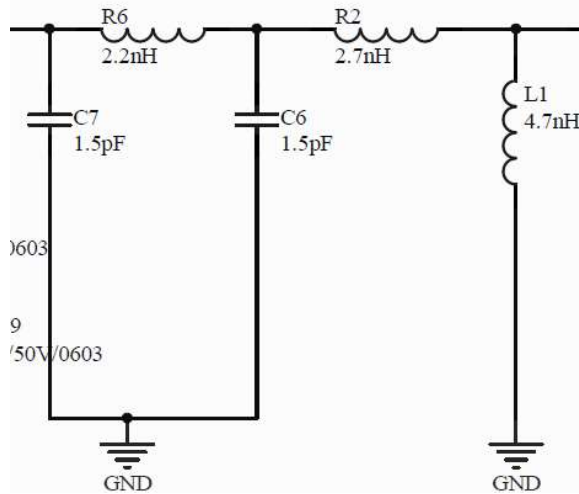


Figure 2, Matching Network Schematic

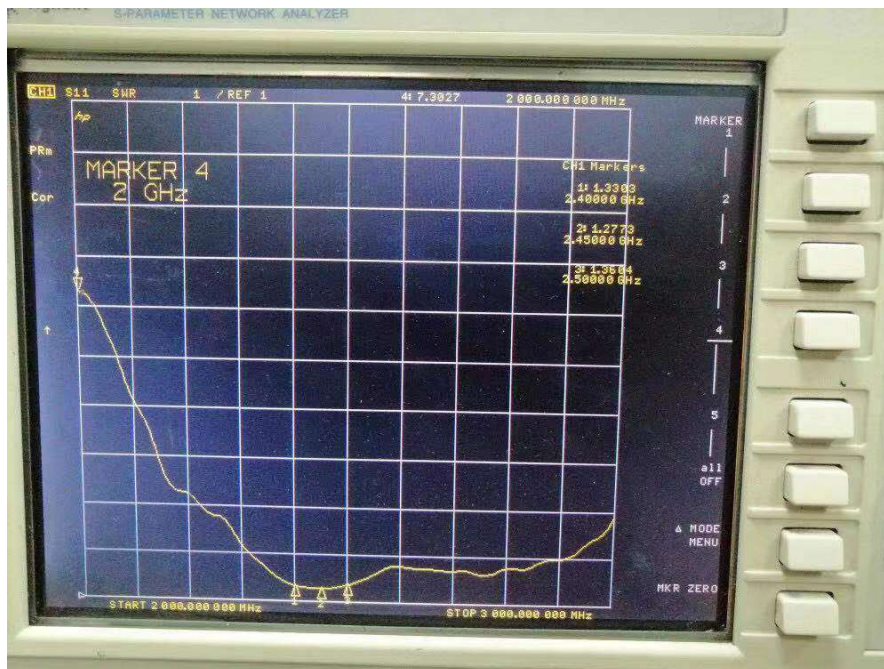


Figure 3, SWR Measurement

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Performance:

The antenna has a maximum gain of 2.1 dBi. The expected radiation pattern is shown in Figure 4. The Z axis is perpendicular to the board and the Y axis is along the length of the board. Impedance plots have not been measured on this design.

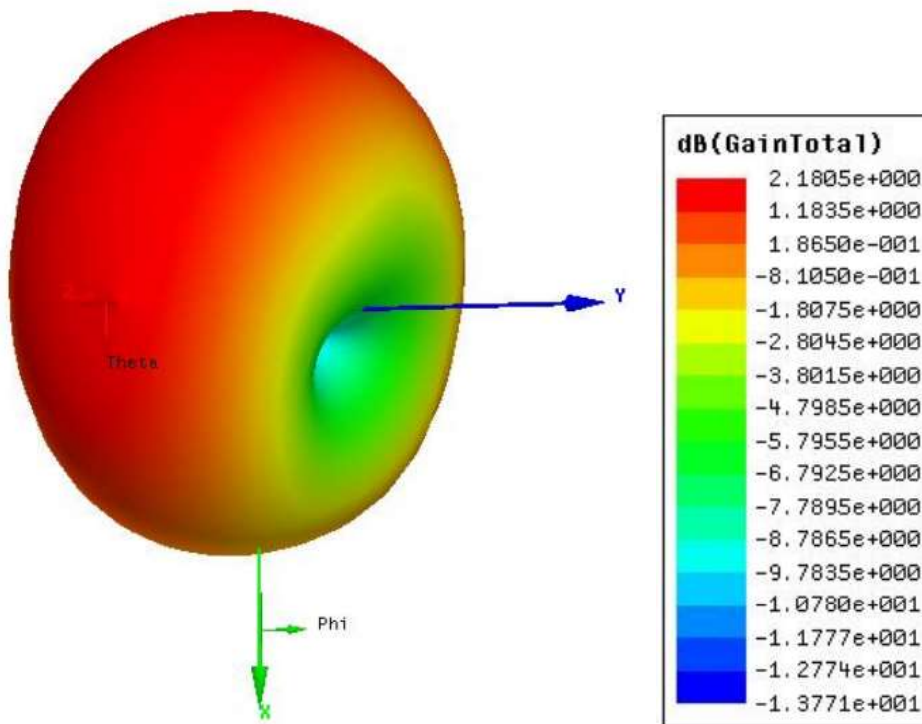


Figure 4, Radiation Figure