DATA SHEET

Manufacturer : Guangdong Chaozhou Dema Technology Co., Ltd.

Address : Fengyu Road Fairy Tale City

Modle : 2BoYX Antenna

Peak gain :2.0

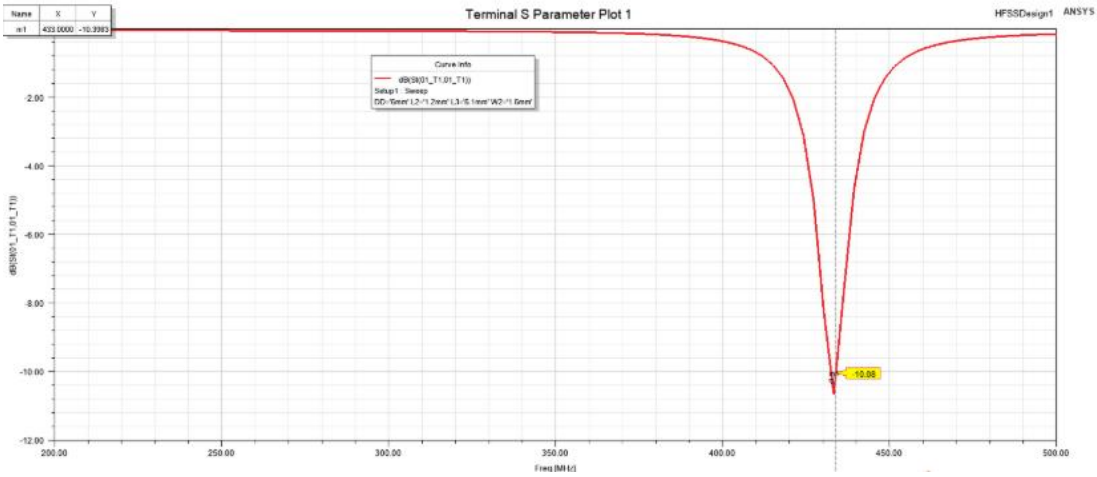
Antenna mode:3D

4 ANTENNA DESIGN

The PCB antenna on the 2BoYX USB dongle reference design is a meandered Inverted FAntenna (IFA). The IFA was designed to match an impedance of 50 ohm at 433Hz. Thusno additional matching components are necessary.

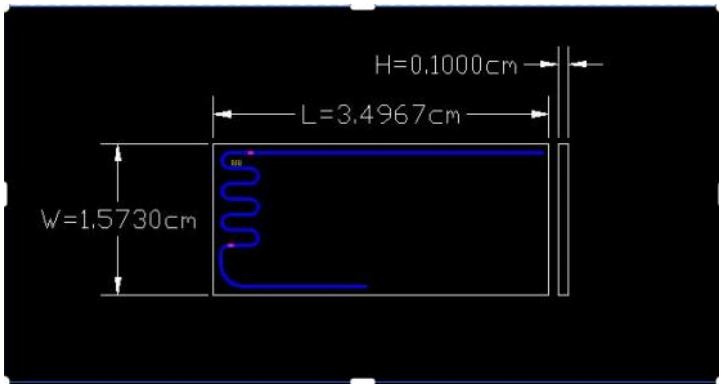
Design Goals4

The reflection at the feed point of the antenna determines how much of the applied power isdelivered to the antenna. A reflection of less than -10 dB across the 433



4.3 Layout and Implementation

Minor variations in antenna size can have a significant impact on performance. Therefore, it is strongly recommended to precisely replicate the reference design to achieve the best performance. The simplest way to implement the antenna is to import Gerber or DXF files that display the antenna layout. The imported files can be used as templates for drawing the antenna. Through this process, an accurate copy should be able to be made. If the PCB CAD tool used does not support importing DXF or Gerber files, then use Figure 3 and Table 1 to ensure correct implementation. It is recommended to generate a Gerber file during manual implementation for comparison with lFA_USB.spl. Most Gerber viewers have the function of importing multiple Gerber files simultaneously. Therefore, by placing the Gerber file that displays the manually implemented antenna on top of lFA USB.spl, it is easy to verify whether the antenna is implemented correctly. It is also recommended to use the same thickness and type of PCB material as that used in the reference design. Information about the PCB can be found in the separate explanatory file in the reference design. To compensate for thicker or thinner PCBs, the antenna can be slightly shorter or longer.



H1	10mm
L1	34.967mm
W1	15.73mm

TEST RESULTS

Rellection, radiation pattermn and variation of oulput power across a wide frequency band weremeasured to verify the performance of the PCB antenna. Measurements of the dongle in freespace and when connected to a laptop were performed to verily that the antenna is suitableboth for USB donale designs and in a standalone application. Free space is in this documentnterpreted as a measurement performed without connecting the dongle to a computer. Insuch a measurement the dongle is only powered by a battery.

5.1 Reflection

All the reflection measurements were perlormed with a network analyzer connected to asemi-rigid coax cable, which was soldered to the feed point of the antenna. Because of thesmall size antenna and the small ground plane this kind of measurements is heavily affectedpy the presence and placement of the coax cable, This influence can result in a smaluncertainty in resonance frequency and measured reflection, Typically different placement ofthe semi-rigid coax cable could change the resonance frequency with 5 -10 MHz and theeflection with 3-4 dB.

Hz ISM band, whenconnected to a 50 ohm source, was a design goal. Reflection of less than -10 dB. or VSWRless than 2, ensures that more than g0% of the available power is delivered to the antenna.Bandwidth is in this document defined as the frequency band where more than 90% of theavailable power is delivered to the antenna, Another design goal was to fit the size of the PCBantenna on a USB dongle and to obtain good performance also when the dongle isconnected to a computer.

4.2Simulation

lE3D from Zeland, which is an electromagnetic simulation tool, was used to design theantenna. The accuracy of the simulation is controlled by the mesh. An increase of the meshincreases the simulation time. Thus, for initial simulations mesh = 1 should be used. When afairly good result is achieved a higher mesh should be used to obtain more accurate results.Comparison of simulation and measurement results shows that the measured reflection isbetween the result obtained with mesh = 5 and mesh = 1; see Figure 2 for details.

File History

General Information

Software Revision Date

2025-05-06

Final translation:

Change:

No changes yet.