Panchip Microelectronics Co., Ltd.

PAN1020 PCBAntenna Design Guide

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revise history

Version	Revision date	Revised by	describe
V1.0	**2019-01-28**	**Yuan Xuanxuan**	**Initial version creation**

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Table of contents

Overview

This article is used to illustratePAN1020 PCBOnboard antenna design.

1. Printed board antenna design

1.1Printed board antennalayoutdesign

There are two main structures of 2.4G printed board antennas, PIFA antenna and monopole antenna. PIFA antenna

The antenna feed point and the location are connected together, and a capacitive effect is formed between the antenna and the ground, which is the signal

The signal is boosted to the equivalent capacitor through the antenna (equivalent to an inductor), and then the energy is radiated through the capacitor.

The monopole antenna adopts the 1/4 wavelength principle, one of the feed points is a spiral or a single pole, and the other pole is the ground.

The field structures of the two antennas are simple and can be simply equivalent to an LC resonant circuit, in which C is particularly small.

The resonant circuits are coupled one by one, and finally the electromagnetic field is released to the outside.

The capacitance of the PIFA antenna is much larger than that of the monopole antenna, which means that the energy is more concentrated in the resonant cavity.

It is not easy for the outside world to interfere, and it is difficult to change the impedance of the PIFA antenna, so the stability is better than that of a monopole antenna;

But also because its capacitance is too large, the same energy from the outside world enters, and the electricity generated on the PIFA antenna

The voltage change is far less than that of a monopole antenna, so the efficiency and sensitivity are lower than that of a monopole antenna.

Generally, you can choose an external whip monopole antenna. The external whip monopole antenna has a longer communication distance.

However, each set needs to be debugged separately; you can also choose a patch antenna chip, which occupies a small PCB size.

But the price is higher.

In practical applications, considering factors such as cost and mass production stability, printed board antennas are

It is low and can obtain sufficient performance if properly designed, making it the first choice for many wireless applications. This article recommends three types of printing

Board-made antennas can be applied to the small-sized PIFA antenna on the Dongle side and the wireless mouse board.

The monopole antenna and the medium size PIFA antenna applied to the remote control panel, these antennas have corresponding imitation

True and verification results. If you need to refer to the corresponding antenna, you must strictly follow the antenna shape given in this article.

line design.

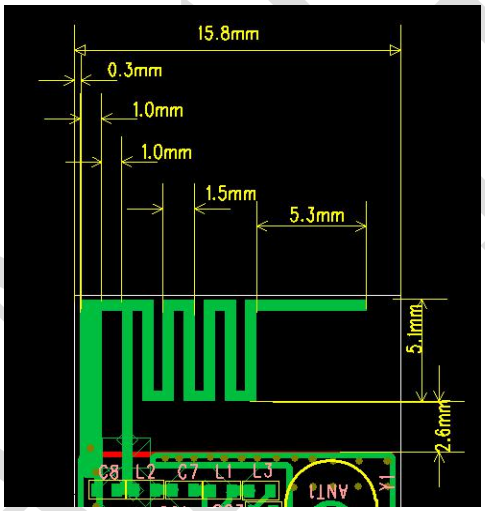
1.2 DongledecentPIFAAntenna design

The Nano Dongle antenna uses an ultra-small PIFA antenna. Due to the limited PCB area, the antenna's

The gain will be smaller than other antennas, which will affect the communication distance. Generally, the communication distance can reach about 15~20 meters.

right. The size of the Dongle PCB completed by this antenna, XN297 and MCU is about 11.6*16.5mm.

PCB thickness is 0.6mm. The specific dimensions of the antenna are shown in Figure 4.

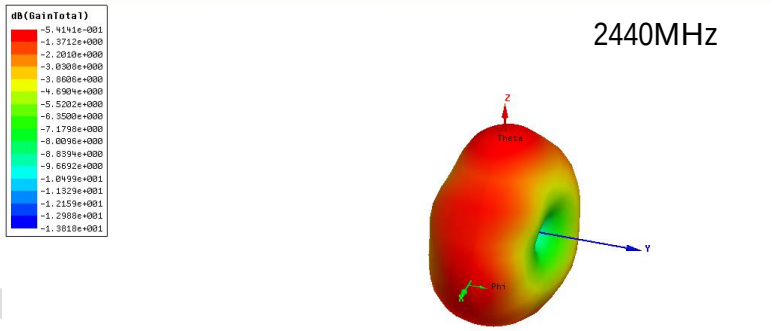


picture4 Nano DongleAntenna design size reference

The S11 test data of the antenna is shown in Figure 5, covering the entire 2.4G frequency band.

picture5 Nano DongleantennaS11

The gain simulation data of the antenna is shown in Figure 6, and the maximum gain is -0.5dB.



picture6 Nano Donglegain sum3Ddirection map (Xaxis for graph4left and right direction,Yaxis for graph4

up and down direction)

1.3Medium size remote control panelPIFAAntenna design

Medium size remote control panelPIFAAntenna size as shown in the figure7As shown,PCBThe thickness is1.0mm.