Panchip Microelectronics Co., Ltd.

PAN1020 PCBAntenna Design Guidelines

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Revision History

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

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Overview

This article is used to explainPAN1020 PCBOnboard antenna design.

1. PCB antenna design

1.1Printed Circuit Board Antennalayoutdesign

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

The antenna feed point and ground are connected together, forming a capacitive effect between the antenna and the ground.

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

The monopole antenna uses the 1/4 wavelength principle, where one feeding point is a spiral or a single rod 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, where C is very small.

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

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

It is not easy to be interfered by the outside world, and it is also difficult to change the impedance of the PIFA antenna, so the stability is stronger than that of the monopole antenna;

However, because its capacitance is too large, the same energy from the outside enters and generates an electric charge on the PIFA antenna.

The pressure change is far less than that of a monopole antenna, so its efficiency and sensitivity are lower than those of a monopole antenna.

Generally, an external whip monopole antenna can be used. The external whip monopole antenna has a longer communication distance.

However, each set needs to be debugged separately; you can also use patch antenna chips, which occupy a small PCB size.

But the price is higher.

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

Low cost and proper design can achieve sufficient performance, making it the first choice for many wireless applications.

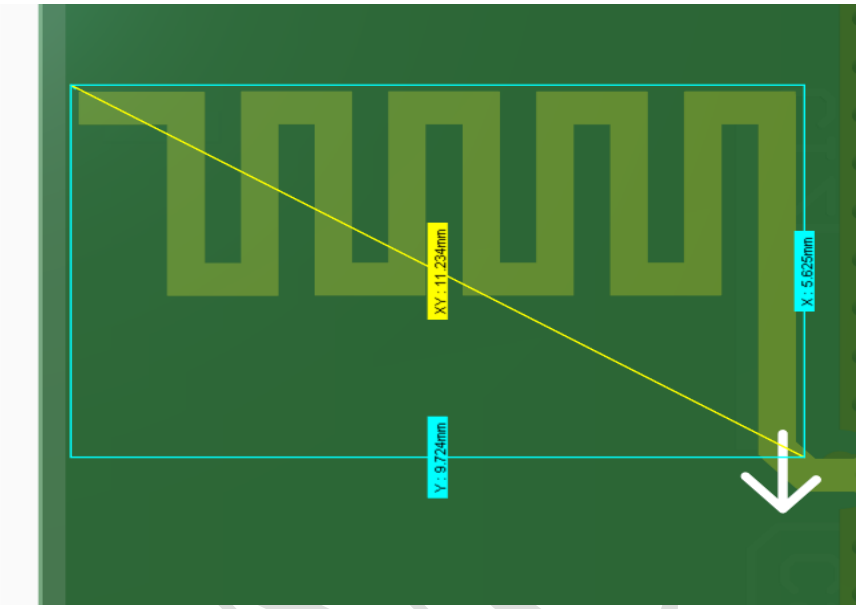
The board antenna can be applied to the small-size PIFA antenna at the Dongle end and the wireless mouse board.

The monopole antenna and the medium-sized PIFA antenna applied to the remote control panel have corresponding analog antennas.

If you need to refer to a corresponding antenna, you must strictly follow the antenna shape given in this article.

Line design.

1.2 DongleEndPIFAAntenna Design



picture4 Nano DongleAntenna design size reference

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

picture5. Nano DongleantennaS11

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

2440MHz

picture6 Nano DongleGain and3DDirection diagram (XAxis for the graph4The left and right directions,YAxis for the graph4