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AN INTEGRATED SOLUTION OF THE FINGERPRINT SENSOR MODULE FOR ANTENNA DESIGN

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An integrated solution of the fingerprint sensor module for antenna design

Abstract:

The increased RF functions and antenna number is the trend of the modern laptop computer design to provide more features and performance. To combine the antenna design with the other component is a way to reduce the placement risk. The application of the combination might induce the antenna performance drop. To combine the antenna with fingerprint sensor as an example the antenna performance drop when user put their finger in the fingerprint sensor. This document will introduce an antenna invention to let fingerprint sensor as a part of the antenna radiation system and provide a secondary antenna performance from the fingerprint sensor when use put their finger on the fingerprint sensor.

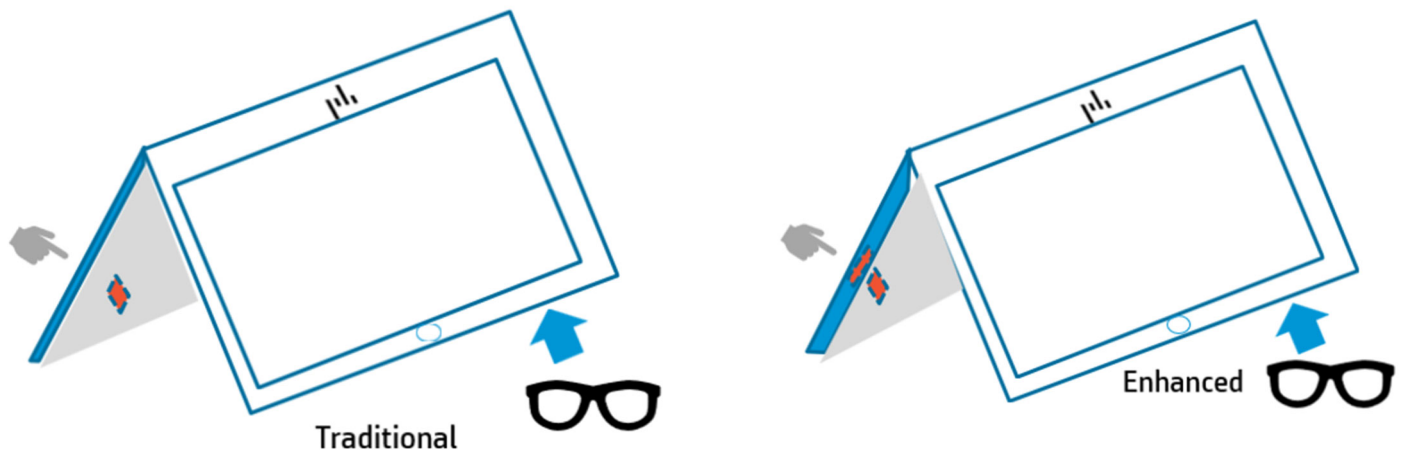
Advantage:

The invention provides the flexibility for finger printer placement without interfered the wireless connection via antenna.

When the laptop is in tent mode, it is difficult for users to find the Finger printer which located in traditional place to unlock the laptop.

The new finger printer can be located on the edge of the C –cover
With strong antenna signal.

The cost of the new antenna design in the finger printer scanner is with similar cost compared to the traditional design.

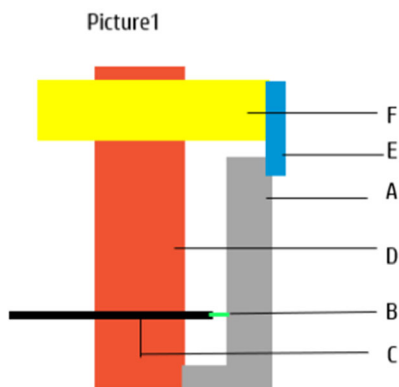


Problem Solved:

antenna design is combined with the fingerprint sensor. Antenna performance is heavy dropped when user put their finger in the fingerprint sensor.

Description:

Disclosure 1: Antenna / Fingerprint sensor integrated

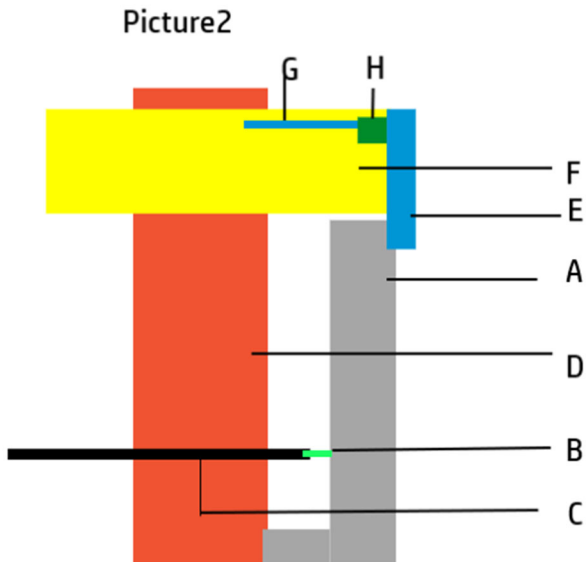


(1) The integrated fingerprint sensor and antenna design is described in picture1

(2) The integrated design includes:

- A. antenna radiator: to provide a correct resonant of the antenna
- B. antenna feed point: connect the signal from the coaxial cable
- C. coaxial cable: transfer the energy between the antenna to RF module
- D. copper foil: provide the reference GND of the antenna radiator and coaxial cable
- E. fingerprint: provide the sensor feature to let user put the finger in, the fingerprint sensor is connected to the end of the antenna radiator
- F. FPC of the fingerprint: transmit the data between the fingerprint sensor to the CPU

Disclosure 2: Antenna extended layout in FPC

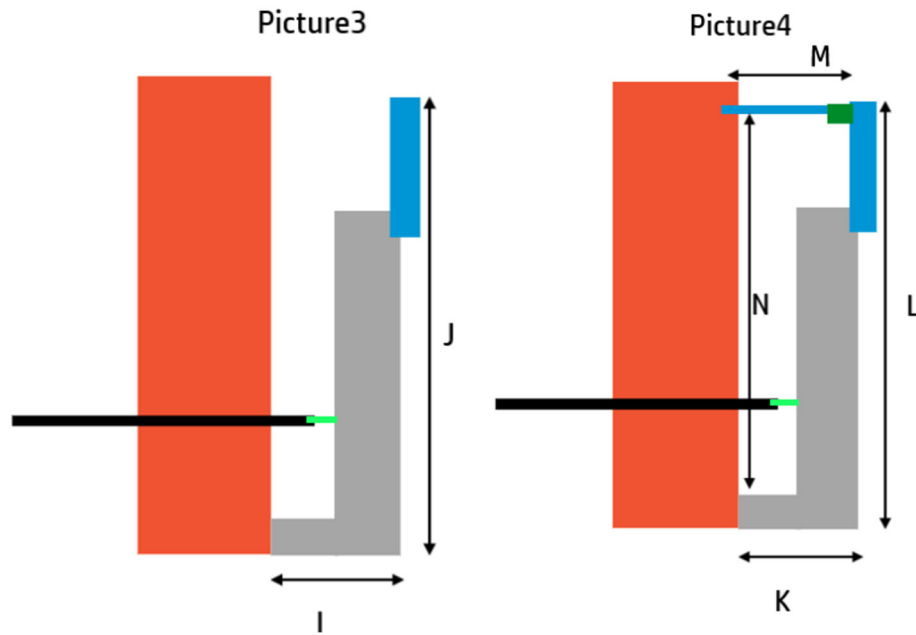


G, H are introduced in the picture 2.

G is the layout to extend the antenna radiator from A to E to G to D

H is a switch which will be turned on when fingerprint sensor is working – means fingerprint sense a user to put his finger in the fingerprint sensor

Disclosure 3 Antenna Scenarios

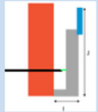
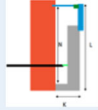


Picture3 describes the antenna distance I+J represent the PIFA type “quarter wavelength” when there is no signal from the fingerprint sensor

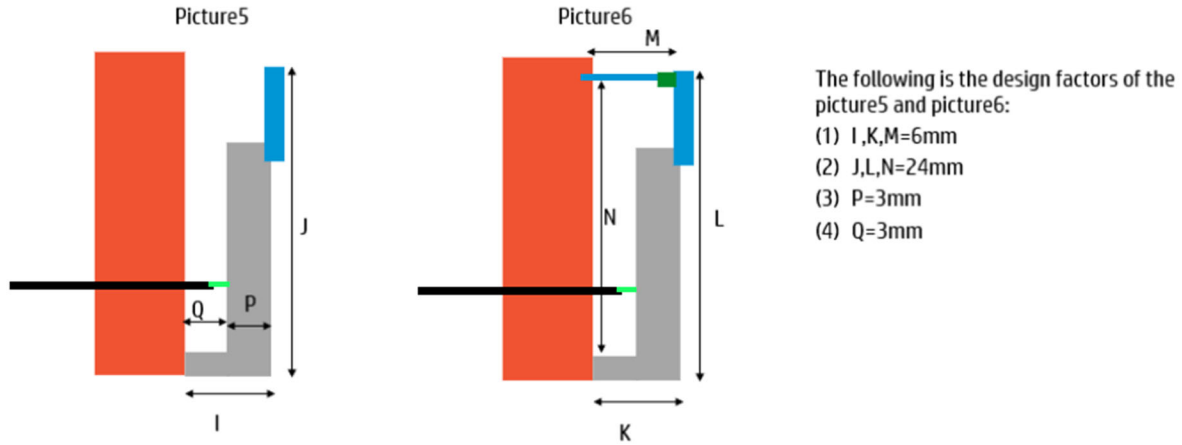
Picture4 describes a different type of antenna layout of picture3, K+L+M+N represent a folded type “half-wavelength” antenna when fingerprint sensor senses a user finger on it.

Result:

Table1

2.4GHz	Free Space	Hand on Fingerprint Sensor
	-3.5dBi	-7dBi
	-4dBi	-5dBi

Disclosure 5 Antenna Factors 2.4Ghz



Picture5

Describes the antenna distance I+J represent the PIFA type “quarter wavelength” when there is no signal from the fingerprint sensor

Picture6

Describes a different type of antenna layout of picture3, K+L+M+N represent a folded type “half-wavelength” antenna when fingerprint sensor senses a user finger on it.

Disclosed by Albert Ma, Lewis Chen and Yen-Ching Lu, HP Inc.