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A NOVEL ANTENNA FEEDING-OPEN ENDED WAVEGUIDE

HP INC

A Novel Antenna Feeding-Open Ended Waveguide

Abstract: A novel antenna feeding structure that fits into the ultra-narrow border of portable computers.

This disclosure relates to the field of portable computers.

An antenna feeding technique is disclosed which employs an open-ended waveguide that directly feeds into the slot metal cover of an ultra-narrow border of a laptop or notebook computer.

Laptop and notebook computers use one or more antennas for wireless communication and have been decreasing the width of the border region of elements such as the display. Up to now, these antennas have typically been made using copper foil on a PCB or FPC, where the antenna routing traces on the PCB/FPC dominate the radiation modes. Such antennas typically have an antenna dimension of at least 3.5mm, with a cable diameter of 1.37mm or 1.13mm. At these dimensions, the ratio of cable to antenna dimension, the antenna resonance is still under control. However, with ultra-narrow borders, in computers the antenna dimension shrinks to 2.2mm. At this point the cable to antenna dimension exceeds 50% occupied by the cable line. This ratio makes antenna resonances difficult to control, and a different solution is needed.

According to the present disclosure, and as understood with reference to the Figure, the antenna design selects an appropriate size to generate waveguide fundamental mode over cut-off frequency. The fundamental mode employed may be TE11 O, and this structure is an element of antenna feeding. This antenna feeding scheme can fit into the slot metal cover and generate slot resonant mode. Both waveguide mode and slot mode enhance frequency bandwidth. Because of the multi-resonant mode achieved, the combination of resonance enhances the variety of this antenna radiation. This approach results in the smallest V-dimension in antenna design.

A triplexer may be produced according to the technique in which each band is fine-tuned individually. In this implementation, a dual slot is created on the metal cover. Three cavities are created for each of the three required frequency range, respectively. Three microstrip lines feed into 3 different boxes, respectively. The feeding strips not only excite the boxes' fundamental mode, but also excite the slot mode to meet WLAN bandwidth requirements. The resulting structure implements, in one example, a triplexer 10 for tri-band WLAN applications.

The disclosed technique advantageously brings a new resonant mode, called cavity mode, to WLAN antenna designs. In combination with all resonant modes, it can generate a wider bandwidth for WLAN applications. The cavity design also results in good environment immunity.

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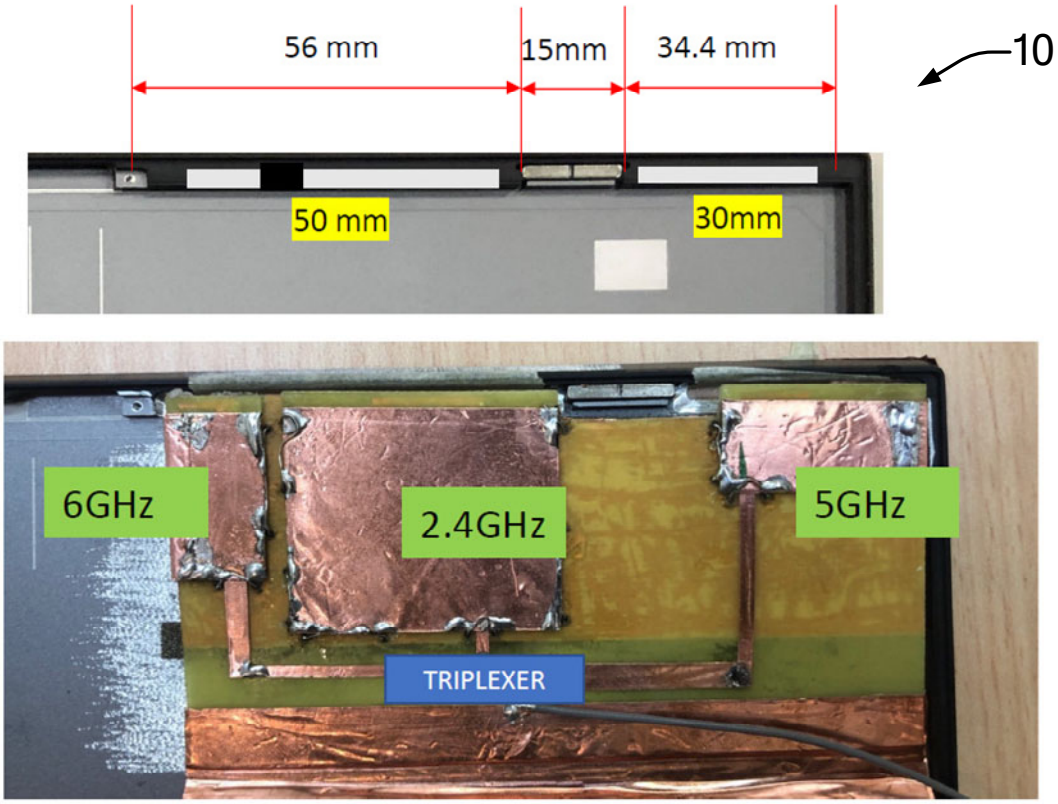
56 mm
15mm
34.4 mm
10
50 mm
30mm
6GHz
2.4GHz
5GHz
TRIPLEXER