AC-ADAPTER TYPE ANTENNA TO ENHANCE WIRELESS PERFORMANCE

HP INC
AC-Adapter type antenna to enhance wireless performance

[Abstract]
In this invention, a “antenna” is integrated into the barrel plug of an AC adapter and called AC-adapter type antenna. The device such a laptop can benefit better antenna performance (transmission range and throughput) when users plug this antenna-integrated AC adapter to charging the laptop.

[Content]
As Figure 1, due to more crowded and strict space in a laptop ID design trend, the size of an embedded antenna should be smaller and smaller, and thus, antenna design and performance will be more and more challenge. The communication distance and quality are impacted and thus, users might get worse use experience.

![Figure 1](image1.png)

Figure 1   The embedded antenna is limited by size and location due to crowded space.

As Figure 2, this invention implements an extra AC-adapter antenna with better performance to improve communication distance and quality when users plug their AC adapters.

1. An external antenna with good performance is integrated into the barrel plug of adapter.
2. The user benefit better antenna performance when plugging the barrel plug of AC adapter into the DC power jack.
3. A RF switch is used to switch the wireless signal path to either the embedded antenna or the external AC-adapter antenna.
4. A wireless device could control the switch by comparing the received wireless signal quality between the embedded antenna and the AC-adapter antenna.
5. The wireless signal received by the external antenna can pass through the barrel plug, DC power jack, power trace, RF cable #2, RF switch and finally the wireless devices.
Through the present invention, users can benefit:

1. When the AC adapter is plugged in, the wireless performance is enhanced.
2. Even if the notebook lid closed, the wireless performance is still good.
3. Users benefit from better transmission distance and throughput.
4. Users will be more willing to buy AC adapters due to multiple functionality
5. Since the antenna is located farther from the human body, the concern on regulatory SAR requirement is reduced.

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