

**CLAIMS**

What is claimed is:

1. In a portable electronics device having a printed circuit board assembly, an antenna system comprising:
  - a first antenna provided on the printed circuit board assembly, wherein a ground plane of the printed circuit board assembly serves as a counterpoise for the first antenna; and
  - a first balanced antenna and a second balanced antenna provided on the printed circuit board assembly, wherein the first balanced antenna and the second balanced antenna each have dipole ends that are configured and oriented to approximately minimize coupling to the ground plane to increase isolation between the first antenna, the first balanced antenna, and the second balanced antenna; and
  - a connecting element that electrically couples the first balanced antenna to the second balanced antenna.
2. The antenna system of claim 1, wherein the connecting element causes electrical currents to flow between the first balanced antenna and the second balanced antenna.
3. The antenna system of claim 2, wherein a first antenna mode excited by a first antenna port of the first balanced antenna is electrically isolated from a second antenna mode excited by a second antenna port of the second balanced antenna.
4. The antenna system of claim 1, wherein the first antenna is provided at opposite ends of the printed circuit board assembly from one of the first balanced antenna, the second balanced antenna, the connecting element, or any combination thereof.

6. The antenna system of claim 1, wherein one of the first balanced antenna, the second balanced antenna, the connecting element, or any combination thereof, comprise a conductive foil pattern printed on a carrier attached to the printed circuit board assembly.

7. The antenna system of claim 1, wherein one of the first balanced antenna, the second balanced antenna, the connecting element, or any combination thereof, comprise a stamped metal part.

8. The antenna system of claim 1, wherein one of the first balanced antenna, the second balanced antenna, the connecting element, or any combination thereof, comprise two antenna pieces, and wherein each of the antenna pieces is attached to an opposite side of the printed circuit board assembly.

9. The antenna system of claim 8, wherein each of the two antenna pieces is soldered to a pad on opposite sides of the printed circuit board assembly, and wherein the pads are connected to form an inductive connecting element.

10. The antenna system of claim 1, wherein one of the first balanced antenna, the second balanced antenna, or a combination thereof, comprise a center fed dipole antenna having capacitive end plates on opposite sides of the printed circuit board assembly, the capacitive end plates being connected by an inductive connecting element.

11. The antenna system of claim 1, wherein one of the first balanced antenna, the second balanced antenna, or a combination thereof, comprise two approximately symmetrical dipole ends positioned approximately equidistant from the printed circuit board assembly on opposite sides of the printed circuit board assembly.

12. The antenna system of claim 1, wherein one of the first balanced antenna, the second balanced antenna, or a combination thereof, has a C-shaped cross section, and is disposed around an edge of the printed circuit board assembly.

13. The antenna system of claim 1, wherein the first antenna operates in a WiMAX frequency band and the second balanced antenna operates in a WiFi frequency band.

14. The antenna system of claim 1, further comprising one or more additional antennas attached to an edge of the printed circuit board assembly such that the ground plane of the printed circuit board assembly serves as a counterpoise for the one or more additional antennas.

15. The antenna system of claim 1, wherein the first antenna and one of the first balanced antenna, the second balanced antenna, or a combination thereof, are in close proximity, and wherein near fields created by the first antenna and the second balanced antenna do not overlap thereby reducing Specific Absorption Rate (SAR) values when both antennas are used for simultaneous transmission.

16. An antenna system for a portable electronics device having two or more radios operating independently and simultaneously, the antenna system comprising:  
a printed circuit board assembly having a ground plane;  
a first antenna provided on a printed circuit board assembly, wherein a ground plane of the printed circuit board assembly serves as a counterpoise for the first antenna;  
a first balanced antenna and a second balanced antenna comprising two approximately symmetrical dipole ends that are configured and oriented to minimize coupling to the ground plane to increase isolation between the first antenna and the second balanced antenna; and  
a connecting element that electrically couples the first balanced antenna to the second balanced antenna.

17. The antenna system of claim 16, wherein the dipole ends are oriented such that an axis of polarization is approximately normal to the ground plane of the printed circuit board assembly.

18. The antenna system of claim 16, wherein one of the first balanced antenna, the second balanced antenna, the connecting element, or any combination thereof, are provided at opposite ends of the printed circuit board assembly.

19. A communication device, comprising:  
a plurality of radios; and  
an antenna system coupled to the plurality of radios, wherein the antenna system comprises:  
a first antenna provided on a printed circuit board assembly, wherein a ground plane of the printed circuit board assembly serves as a counterpoise for the first antenna;  
a first balanced antenna and a second balanced antenna comprising dipole ends; and  
a connecting element that electrically couples the first balanced antenna to the second balanced antenna.
20. The antenna system of claim 19, wherein one of the first balanced antenna, the second balanced antenna, or a combination thereof, has a C-shaped cross section, and is disposed around an edge of the printed circuit board assembly.