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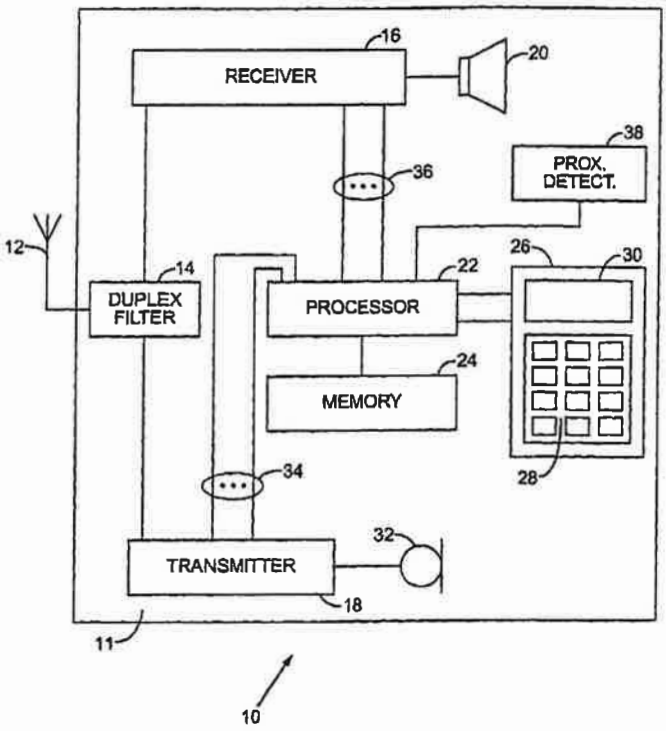
(54) Title: PORTABLE COMMUNICATION DEVICE WITH RF OUTPUT POWER CAPPED WHEN THE DEVICE OPERATES IN VERY CLOSE PROXIMITY TO A HUMAN BODY



(57) Abstract: A mobile terminal used in a wireless communication system is operable to limit transmitter power if proximate a human body. The mobile terminal includes a housing. A transmitter in the housing is connected to an antenna. The transmitter has a power control loop controlling transmitter power. A detector detects if the housing is proximate a human body. A control is operatively connected to the transmitter power control loop and to the detector, the control limiting transmitter power if the detector detects that the housing is proximate a human body.

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PORTABLE COMMUNICATION DEVICE WITH RF OUTPUT POWER CAPPED WHEN THE DEVICE OPERATES IN VERY CLOSE PROXIMITY TO A HUMAN BODY

FIELD OF THE INVENTION

This invention relates to a mobile terminal used in a wireless communication system and, more particularly, to a mobile terminal operable to limit transmitter power if proximate a human body.

BACKGROUND OF THE INVENTION

A mobile terminal used in wireless communication systems, such as cellular telephone systems, is generally a portable device. In fact, mobile terminals are becoming small enough to fit into a user's pocket, and therefore be very close to the user's body. The mobile terminal includes a transmitter for transmitting a radio frequency (RF) signal through the air.

In a cellular communication system the mobile terminal conducts radio communications with a base station located proximate the mobile terminal. Cellular communication systems include control systems for limiting power. Typically, the base station instructs the mobile terminal to use the least power to avoid interference with other mobile terminals. The base station does so by measuring signal strength and returning instructions to the mobile terminal to modify transmitter power output.

While conducting a voice call, the mobile terminal is placed in a "talk" position next to the user's head. Although there is no basis for concerns regarding an antenna being proximate the user, for psychological comfort the user can hold the mobile terminal spaced away or at an angle so that the antenna is farther from the user's head. Mobile

terminals are also used to provide wireless connection for personal computers and the like to gain access to the Internet. With smaller mobile terminals the user might slip the mobile terminal into a shirt pocket or the like while the call is being conducted.

Again, to provide psychological comfort regarding RF transmitters being very close to a human body, there is a need to control RF power output under such situations.

SUMMARY OF THE INVENTION

In accordance with the invention, there is provided a mobile terminal that caps or limits RF power output when the mobile terminal is very close to the user, and yet permit the mobile terminal to operate without a power cap otherwise.

Broadly, there is disclosed herein a portable communication device operable to limit transmitter power if proximate a human body. The device includes a housing. A transmitter in the housing is connected to an antenna. A detector detects if the housing is proximate a human body. A control is operatively connected to the transmitter and to the detector. The control controls transmitter power and limits transmitter power if the detector detects that the housing is proximate a human body.

It is a feature of the invention that the transmitter is connected to the antenna through a circulator and the detector senses reflected power from the circulator.

It is another feature of the invention that the transmitter is connected to the antenna through a directional coupler and the detector measures voltage standing wave ratio using the directional coupler.

It is a further feature of the invention that the control comprises a programmed processor and the detector is implemented by the programmed processor.

It is yet another feature of the invention that the detector comprises a photo detector proximate an opening in the housing. The photo detector is proximate a speaker

opening in the housing so that if the device is in a "talk" position next to a user's head, then amount of light at the photo detector decreases.

It is still another feature of the invention that the detector comprises a touch-sensitive detection circuit. The detection circuit comprises a conductive element proximate speaker openings in the housing so that if a device is in a "talk" position next to a user's head, then the conductive element is in contact with the user's head.

It is still a further feature of the invention that the portable communication device comprises an AMPS mobile terminal and the controller resets a mobile attenuation code if the detector detects that the housing is proximate a human body

It is still an additional feature of the invention that the control integrates transmitter power if the detector detects that the housing is proximate a human body and limits transmitter power after the integrated transmitter power exceeds a select threshold.

There is disclosed in accordance with another aspect of the invention a mobile terminal used in a wireless communication system and operable to limit transmitter power if proximate a human body. The mobile terminal includes a housing. A transmitter in the housing is connected to an antenna. The transmitter has a power control loop controlling transmitter power. A detector detects if the housing is proximate a human body. A control is operatively connected to the transmitter power control loop and to the detector, the control limiting transmitter power if the detector detects that the housing is proximate a human body. Further features and advantages of the invention will be readily apparent from the specification and from the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a mobile terminal in accordance with the invention;

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