Title: WIRELESS DEVICE EXTERIOR CASE ANTENNA

Abstract: The present invention provides an external casing antenna of a wireless device, including an external casing unit having an external shape corresponding to a main body of the wireless device. The external casing antenna includes an antenna portion mounted within the external casing unit and a connector portion electrically connecting a connecting port and the antenna portion. The external casing unit further includes a support portion projecting from a corner portion of the external casing unit. The antenna portion is integrally formed within the external casing unit. The connector portion includes a connection module, a connecting line having one end electrically connected to the connection module and the other end connected to the antenna portion, a mold portion formed to surround and protect the connection module, and a jack portion projecting from the mold portion and inserted into the connecting port of the wireless device main body.
Description

WIRELESS DEVICE EXTERIOR CASE ANTENNA

Technical Field

The present invention relates to an external casing antenna of a wireless device, and more particularly, to an antenna for terrestrial waves, satellite broadcasting watching and Radio Frequency Identification (RFID) service and an external casing antenna of a wireless device, which is incorporated into an external casing unit.

Background Art

In general, wireless devices, such as mobile phones and mobile communication terminals, are divided into a flip type, a folder type, a slide type, a rotary type, a swing type, etc, according to the shapes. In recent years, a thin slim type becomes the mainstream. Terminal devices, enabling watching of terrestrial wave DMB, satellite DMB, etc., has been launched a lot. This is for the purpose of meeting users needs who want to enjoy various broadcasting and employ various mobile services while carrying the terminals.

In order to use the terminals, it's required that a retractable antenna should be built in the terminal so as to be extended lengthily or a reception antenna should be carried on separately.

Furthermore, the wireless device includes an additional external casing for protecting an external shape and preventing introduction of alien substance.

Korean Patent Application No. 2003-4228 discloses a portable phone casing, which is mounted outside a display unit and a keypad unit of a folder type or slide type portable phone and can protect the portable phone from external shock, wherein the portable phone casing comprises an upper casing having an upper plate provided in a shape corresponding to an external shape of the display unit, protruded in a shape corresponding to an external shape of the display unit on an outer circumference of the upper plate, and having an upper wall in which an upper locking jaw latched to an edge portion on an inner surface of the display unit is formed, and a lower casing having a lower plate provided in a shape corresponding to an external shape of the keypad unit, protruded in a shape corresponding to an external shape of the keypad unit on an outer circumference of the lower plate, and having a lower wall in which a lower locking jaw latched to an edge portion on an inner surface of the keypad unit is formed.

However, the conventional portable phone casing is made of opaque material through which the inside of the casing cannot be seen or has low transmittance although it is made of transparent material. Accordingly, the conventional portable phone casing was problematic in that characters or images output on a display screen could not be seen
as its original state.

[7] To supplement this problem, another conventional technology proposed a wireless device casing 10 as shown in FIG. 1.

[8] The conventional wireless device casing 10 includes an upper casing 2 corresponding to a cover member having a shape corresponding to a wireless device 1, and a lower casing 3.

[9] The upper casing 2 includes an upper bottom body 2a coupled to a display unit 1b of the wireless device 1. It also includes an anti-reflective coating unit 2b coated with an anti-reflective coating material at the center of the upper bottom body 2a, an upper side body 2c extending upwardly from a lateral end of the upper bottom body 2b and having an end curved inwardly, and an upper projection 2d protruding on a lateral side of the upper bottom body 2a.

[10] The upper casing 2 is equipped with an uninterruptible coating layer on the remaining surface other than the anti-reflective coating unit 2b. The lower casing 3 includes a lower bottom body 3a having a shape corresponding to a keypad unit 1a of the wireless device 1, a lower side body 3b extending upwardly from a lateral end of the lower bottom body 3ab and having an end curved inwardly, a lower projection 3c formed on an inner lateral portion of the lower side body, and a plurality of slots 3d formed in the lower side body 3b.

[11] This conventional wireless device 1 must be further equipped with an additional antenna 4 in order to receive satellite or terrestrial wave DMB broadcasting or employ RFID service, and further includes a connecting portion 1c for connecting the antenna 4.

[12] However, the conventional wireless device and the wireless device casing therefor include an additional antenna for broadcasting watching or service use by a user. Although not shown in the drawing, a retractable antenna must be extracted from the wireless device by a user. Further, the upper casing and the lower casing for the wireless device corresponding to the cover member are further included. Accordingly, there is a disadvantage in that the conventional wireless device and the wireless device casing therefore are very difficult to use.

[13] Furthermore, the antenna of the conventional wireless device is disadvantageous in that a satellite or retractable antenna is not well compatible with beautiful mobile phone designs in terms of an external shape.

[14] Furthermore, the conventional wireless device requires a dedicated terminal for employing services such as RFID and DMB. The replacement of terminals is also required from a viewpoint of a user who uses an existing wireless device. Therefore, the antenna of the conventional wireless device is disadvantageous in that it is excluded from the service.
Furthermore, the conventional wireless device has a built-in antenna. However, in the design of the built-in antenna, a feed point to which a low frequency signal is input or the position of a ground point must be optimized in addition to the shape of a radiation element while considering the locations of a printed circuit board, a shield casing, and a battery casing, and the influence of a main body cover. The antenna of the conventional wireless device is disadvantageous in that it requires lots of experiences and knowledge and a long development period in the built-in antenna when compared with external antennas having a simple shape and many development cases. In particular, the built-in antenna is designed to be compatible with the shape and constituent elements of the wireless device main body are. Therefore, wireless device makers have to frequently design antennas. In particular, in wireless devices having a short product cycle, there is a need to simplify the design and shorten the development period.

Disclosure of Invention

Technical Problem

Accordingly, the present invention has been made in view of the above problems occurring in the prior art, and an object of the present invention is to provide an external casing antenna of a wireless device, which can solve the problems occurring when designing an antenna for a wireless device.

Another object of the present invention is to provide an external casing antenna of a wireless device, including an external casing unit formed to match a main body of the wireless device, an antenna portion mounted within the external casing unit, and a connector portion connecting a connecting port of the wireless device main body and the antenna portion in a jack-socket connecting manner, so that it is not necessary to carry on or lengthily extend the antenna in order to use terrestrial wave DMB, satellite DMB watching or RFID service.

Still another object of the present invention is to provide an external casing antenna of a wireless device, which can maintain a shape suitable for broadcasting watching while normally using it as an external casing.

Technical Solution

The above objects of the present invention are accomplished by an external casing antenna of a wireless device, including an external casing unit having an external shape corresponding to a main body of the wireless device, the external casing antenna comprising an antenna portion mounted within the external casing unit; and a connector portion electrically connecting a connecting port of the wireless device main body and the antenna portion in a jack-socket connecting manner.

Further, according to the present invention, the external casing unit preferably matches to cover at least the wireless device main body using any one of opaque
material, transparent material, and material including an uninterruptible coating layer or a anti-reflective coating layer.

[21] Further, according to the present invention, the external casing unit preferably further includes a support protruding from a corner portion of the external casing unit so that the external casing unit serves as a support.

[22] Further, according to the present invention, the antenna portion is preferably integrally formed within the external casing unit using insert molding, in-mold injection, Laser Direct Structuring (LDS) technology or Molded Interconnect Device (MID) technology.

[23] Further, according to the present invention, the antenna portion preferably comprises any one of an antenna for terrestrial waves DMB, an antenna for satellite DMB, an antenna for RFID, an antenna for mobile phones, a GPS antenna, a Bluetooth antenna, and a multi-band antenna of a combination of them.

[24] Further, according to the present invention, the connector portion preferably comprises a connection module that complies with communication or antenna standards of the connecting port of the wireless device main body; a connecting line having one end electrically connected to the connection module and the other end connected to the antenna portion; a mold portion formed to surround and protect the connection module; and a jack portion projecting from the mold portion and inserted into the connecting port of the wireless device main body.

[25] Further, according to the present invention, the antenna portion preferably operates as an additional antenna that provides supplementary services, including DMB and RFID.

[26] Further, according to the present invention, the connector portion is preferably coupled to an antenna connection socket, a terminal charging port or a USB port.

Advantageous Effects

[27] As described above, the external casing antenna of a wireless device in accordance with an embodiment of the present invention provides a new type of an antenna product group in which an antenna portion is mounted in an external casing unit, unlike an antenna that is limited by internal space of wireless devices such as mobile communication terminals. Accordingly, there is an advantage in that consumers need can be met by packaging an external casing unit additionally purchased by consumers in an antenna form for a terminal.

[28] Furthermore, the external casing antenna of a wireless device in accordance with the present invention provides convenience when watching broadcasting since it further includes a support so that an external casing unit serves as a support, and can serve as an antenna built in an external casing unit that does not produce externally. In particular, there are advantages in that an antenna fabrication development period can
be shortened relatively and consumer needs can be met with various design since the external casing antenna of the present invention is not limited by types or forms of mobile phones and antenna specification.

[29] The external casing antenna of a wireless device of the present invention is advantageous in that it can obtain a casing price and antenna price by implementing a new type of an antenna.

[30] Furthermore the external casing antenna of a wireless device of the present invention can be modified in various forms such as mounting a thin film type receive module or a connection module that can receive mobile broadcasting even in general mobile phones within the external casing unit or constructing the antenna in a USB type port. The external casing antenna of a wireless device of the present invention is advantageous in that it can be easily used even in the existing mobile phones since an external casing is fabricated to be used with a connection module, such as RFID, and the antenna portion.

Brief Description of the Drawings

[31] Further objects and advantages of the invention can be more fully understood from the following detailed description taken in conjunction with the accompanying drawings in which:

[32] FIG. 1 is an exploded perspective view of a conventional external casing of a wireless device;

[33] FIG. 2 is an exploded perspective view of an external casing antenna of a wireless device in accordance with an embodiment of the present invention;

[34] FIG. 3 is an assembled perspective view of the external casing antenna of a wireless device shown in FIG. 2; and

[35] FIG. 4 is a cross-sectional view illustrating the mounting and connection relationship of the external casing antenna of a wireless device shown in FIG. 2.

Best Mode for Carrying Out the Invention

[36] The present invention will now be described in detail in connection with specific embodiments with reference to the accompanying drawings. In describing the present invention, detailed description on the known functions and constructions will be omitted if they are deemed to make the gist of the present invention unnecessarily vague.

[37] FIG. 2 is an exploded perspective view of an external casing antenna of a wireless device in accordance with an embodiment of the present invention. FIG. 3 is an assembled perspective view of the external casing antenna of a wireless device shown in FIG. 2. FIG. 4 is a cross-sectional view illustrating the mounting and connection relationship of the external casing antenna of a wireless device shown in FIG. 2.
As shown in FIGS. 2 and 3, a slide type terminal is described below as an example in order to help clear and easy understanding in relation to the present invention.

The wireless device main body 20 corresponding to a slide type terminal includes a main body 21 and a slide type display unit 22, and further includes a connecting port 23 corresponding to an antenna connection socket or a terminal charging port.

An embodiment 100 of the present invention includes an external casing unit 110 having an upper casing 111 and a lower casing 112 which are formed to match the wireless device main body 20. An antenna portion 120 is mounted within the external casing unit 110 without changing design whenever designing internal components of the wireless device main body 20. Thus, the embodiment 100 of the present invention includes a technological spirit that is able to create a new installation space of the antenna portion 120.

The external casing unit 110 is formed using opaque material through which an inside cannot be seen, transparent material through which an inside can be seen, uninterruptible coating layer, and material including a anti-reflective coating layer, and is formed to match the terminal main body 20 at least in terms of an external shape. The external casing unit 110 may further include a projection for attachment and detachment for known matching on its inner surface.

The external casing unit 110 preferably further includes a support 115 projecting from a corner portion of the external casing unit 110 so that it serves as a support with reference to FIG. 2.

In particular, the external casing unit 110 is formed integrally with together with a part of the antenna portion 120 and a flexible circuit board 130, a connection module 141, etc. using insert molding, in-mold injection, Laser Direct Structuring (LDS) technology, or Molded Interconnect Device (MID) technology, and it can serve as both an external casing to protect an external shape of the wireless device main body 20 and an antenna.

Here, insert molding is a technology for inserting and injecting other materials or components according to molding materials, enabling a plurality of material formings or components to be integrated.

In-mold injection is a technology for transferring a transfer film, such as a printed circuit board on a surface of an injection forming product in an injection shaping process of the product and printing a surface of the injection forming product. This technology can print and control a transfer film within a molding product to be shaped.

LDS technology is a technology for forming an antenna for DMB, an antenna for satellite DMB, an antenna for RFID, a board antenna, a high-temperature superconducting microstrip antenna, a dual band antenna or patterns corresponding to other conductive paths on resin using a laser, and plating copper (Cu), nickel (Ni) or gold
(Au) to make a circuit that is able to serve as an antenna. This technology can overcome the limit of an existing etching technology, mass-produce micro components, and realize selective plating on special thermoplastic resin. Thus, this technology can save time and cost and implement direct patterns using a laser, so that it can maximize cost efficiency and shorten process.

MID technology is an injection forming technology called 2-color forming. In this technology, a basic part of the external casing unit 110 in which the antenna portion 120 will be mounted is fabricated using typical white resin, a radiation element portion is formed using black resin including catalyst for electroless plating, only the portion formed of the black resin is selectively covered with copper (Cu) plating by dipping the portion in a copper (Cu) electroless plating agent, and nickel (Ni) plating or gold (Au)/nickel (Ni) is then processed on a surface on which copper (Cu) is plated.

The antenna portion 120 integrally mounted within the external casing unit 110 through the above technologies is preferably one of an antenna for terrestrial wave DMB, an antenna for satellite DMB, an antenna for RFID, an antenna for mobile phones, a GPS antenna, a Bluetooth antenna, and a multi-band antenna of a combination of them.

The antenna portion 120 can be used as an antenna that replaces an antenna for wireless communication mounted within a conventional wireless device. Alternatively, the antenna portion 20 can be used as an additional antenna of a wireless device that provides supplementary services such as DMB or RFID. Therefore, even if only the connecting port 23 is formed, the external casing antenna of a wireless device of the present invention can be coupled to existing wireless terminal.

The connector portion 140 functions to connect a connecting port 23 of the wireless device main body 20 and the antenna portion 120 in a jack-socket connecting manner. The connector portion 140 can include the connection module 141 of a System-On-Chip (SOC) type, which complies with corresponding communication or antenna standards such as the connecting port 23 of the wireless device main body 20; a connecting line, for example, the flexible circuit board 130 that has one end electrically connected to the connection module 141 and the other end connected to the antenna portion 120; a mold portion 142 formed to surround and protect the connection module 141; and a jack portion 143 projecting from the mold portion 142 and inserted and mated with the connecting port 23 of the wireless device main body 20 (refer to FIG. 4).

Here, the connection module 141 is a communication module, such as a thin film type receive module or a RFID module which can receive mobile broadcasting even in general mobile phones, and can be configured using known communication technology.
For example, in the case in which the antenna portion 120 is formed as a loop antenna for RFID, the connection module 141 includes a semiconductor circuit, nonvolatile memory, and a radio frequency circuit for a RFID reader, which is coupled to the antenna portion 120, and further includes a sheet made of ferrite material on an inner surface of the external casing unit 110 so as to minimize the influence such as a reduction in conductivity, refractive index, and communication sensitivity.

As described above, since the connection module 141 is included, a user can easily employ supplementary services that are not supported by terminals.

In particular, the connection module 141 can be installed in the mold portion 142. In the case of products occupying a large volume such as the RFID reader, the connection module 141 is preferably integrated with the external casing unit 110 using a method such as insert molding.

The flexible circuit board 130 is made of materials having a high degree of freedom, such as a Flexible Printed Circuit Board (FPCB).

Furthermore, the jack portion 143 preferably has a jack shape, which can be inserted into any one of a phone jack pertinent to a corresponding connecting port 23, a socket of an antenna jack and a terminal charging port.

As shown in FIG. 4, the external casing antenna of a wireless device according to the present invention can create the coexistence of antennas for terrestrial wave and satellite DMB, new space that is able to include a RFID antenna. The external casing antenna is used in such a manner that, after the wireless device main body 20 is coupled to the external casing unit 110 using a common method, the connector portion 140 extending from the antenna portion 120 of the external casing unit 110 through the flexible circuit board 130 is coupled to the connecting port 23 of the wireless device main body 20.

The jack portion 143 of the connector portion 140 can be formed to be coupled to the terminal charging port. In this case, electrical connection between the antenna portion 120 of the external casing unit 110 and the wireless device main body 20 can be performed.

Further, the external casing antenna of a wireless device according to the present invention can include a terminal that can simply perform only electrical connection in the state in which the connection module 141 does not exist in the connector portion 140.

In this case, the external casing antenna of a wireless device according to the present invention has a terminal construction for mutually connecting the external casing unit 110, the antenna portion 120 mounted within the external casing unit 110 and the flexible circuit board 130 extending from the antenna portion 120, and the connecting port of the wireless device main body to which the external casing unit 110 will be
coupled. In this case, the connection module 141 can be formed in a wireless device.

[61] Furthermore, in the external casing antenna of a wireless device according to the present invention, the terminal or the connector portion 140 can be constructed to be utilized for the known Universal Serial Bus (USB) port. In this case, the terminal or the connector portion 140 can be used for connection to the USB port.

[62] Furthermore, a chipset for USB memory is further mounted within the external casing unit 110 through an insert molding method.

[63] Further, the chipset for USB memory and the connecting port of the wireless device main body are mutually connected by the terminal or the connector portion 140 and can double portability and functionality.
Claims

[1] An external casing antenna of a wireless device, including an external casing unit having an external shape corresponding to a main body of the wireless device, the external casing antenna comprising: an antenna portion mounted within the external casing unit; and a connector portion electrically connecting a connecting port of the wireless device main body and the antenna portion in a jack-socket connecting manner.

[2] The external casing antenna of claim 1, wherein the external casing unit matches to cover at least the wireless device main body using any one of opaque material, transparent material, and material including an uninterruptible coating layer or a anti-reflective coating layer.

[3] The external casing antenna of claim 1, wherein the external casing unit further includes a support protruding from a corner portion of the external casing unit so that the external casing unit serves as a support.

[4] The external casing antenna of claim 1, wherein the antenna portion is integrally formed within the external casing unit using insert molding, in-mold injection, Laser Direct Structuring (LDS) technology or Molded Interconnect Device (MID) technology.

[5] The external casing antenna of claim 1, wherein the antenna portion comprises any one of an antenna for terrestrial waves DMB, an antenna for satellite DMB, an antenna for RFID, an antenna for mobile phones, a GPS antenna, a Bluetooth antenna, and a multi-band antenna of a combination of them.

[6] The external casing antenna of claim 1, wherein the connector portion comprises: a connection module that complies with communication or antenna standards of the connecting port of the wireless device main body; a connecting line having one end electrically connected to the connection module and the other end connected to the antenna portion; a mold portion formed to surround and protect the connection module; and a jack portion projecting from the mold portion and inserted into the connecting port of the wireless device main body.

[7] The external casing antenna of claim 1, wherein the antenna portion operates as an additional antenna that provides supplementary services, including DMB and RFID.

[8] The external casing antenna of claim 1, wherein the connector portion is coupled to an antenna connection socket, a terminal charging port or a USB port.
**INTERNATIONAL SEARCH REPORT**

**International application No**

PCT/KR2008/002817

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According to International Patent Classification (IPC) or to both national classification and IPC

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

- Korean Utility models and applications for Utility models since 1975
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

- eKIPASS (KIPO internal) "case", "protective casing", "antenna"

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Date of the actual completion of the international search

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Name and mailing address of the ISA/KR

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