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(57) Abstract

The utility model provides a shell of a terminal front shell and a terminal, wherein a near field communication (NFC) antenna is embedded into a preset region of the shell. The utility model adopts the technical means of embedding the NFC antenna into the shell preset region of the terminal front shell, so the problems in the related art that conventional NFC antenna is limited by the terminal size so the performance thereof is affected, the terminal thickness is increased and the service life of the NFC antenna is influenced by the conventional NFC antenna mounting mode such as rear cover type mounting are solved, the performance of the NFC antenna in the terminal is improved, and the service life of the NFC antenna is prolonged. (Fig. 3)

Shell of terminal front shell and terminal

Technical field

[0001] The present utility model relates to the field of electronic communications, specifically, relates to a shell of terminal front shell and a terminal.

Background

[0002] Near Field Communication (NFC), as a kind of near field wireless communication technology, evolved from radio frequency identification technology and interconnection technology. Among them, a radio frequency identification system comprises the following three parts: tags, also known as contactless IC cards, each tag having a unique electronic code, attached to an identification object; a reader, which is used to read and write label information; an antenna that is used to transmit RF signals between the tag and the reader. An NFC terminal is to integrate an NFC module into various portable electronic devices, such as game consoles, players, etc., the most commonly used of which is to integrate the NFC module into a mobile terminal, with the help of the mobile terminal for the contactless IC card to expand more applications.

[0003] At present, the NFC antenna consists of a set of coils, which can be a single-end type with two contacts (as shown in FIG. 1) and a differential type with three contacts (as shown in FIG. 2). The NFC reader generates a magnetic flux through the current of the antenna coil, which passes through the antenna coil of the tag and induces a current in the tag coil to supply power to the tag. The conventional NFC terminal antenna adopts a printed circuit board or a flexible circuit board, and the installation method can be PCB built-in, battery package or back-cover type. In terms of RF performance, the back-cover type has the best performance, but the Flexible Printed Circuit (FPC) terminal of the back-cover type usually makes the antenna in the form of FPC and pastes it on the back cover, leaving the contacts to connect to the motherboard. However, because it is a pasting method, it may affect the stability of the structure, and because the back cover is often disassembled, the contact performance of the feed point will become worse and worse with the use of the terminal, and at the same time, in order to

reduce the impact of the battery, it is often necessary to add a ferrite film for isolation, which increases the thickness of the terminal. For the above problems in related technologies, no effective solutions have been proposed.

Summary of Utility Model

[0004] Regarding the problems in the related art that conventional NFC antenna is limited by the terminal size so the performance thereof is affected, the terminal thickness is increased and the service life of the NFC antenna is influenced by the conventional NFC antenna mounting mode such as rear cover type mounting, the object of the utility model is to provide a shell of terminal front shell and a terminal, to solve at least the above technical problems.

[0005] According to an aspect of the present utility model, a shell of terminal front shell is provided, wherein an NFC antenna is embedded in a preset region of the shell.

[0006] Further, the preset region is a frame region of the shell.

[0007] Further, the preset region is a frame region of a touch screen of the shell.

[0008] Further, the shell is a touch screen shell, and the NFC antenna is built into the frame region of the touch screen of the shell.

[0009] Further, the touch screen is a resistive touch screen, and the resistive touch screen comprises a plastic sheet layer, an upper transparent conductor layer, an isolation layer, a lower transparent conductor layer, and a glass layer that are sequentially arranged from top to bottom; and the NFC antenna is arranged at any layer of the plastic sheet layer, the upper transparent conductor layer, the isolation layer, the lower transparent conductor layer and the glass layer.

[0010] Further, the NFC antenna is embedded in the preset region of the shell by one of the following ways: evaporation, etching, spraying, pasting.

[0011] Further, the shell is made of metal or insulating material. An insulating member is provided outside of the NFC antenna.

[0012] Another aspect of the present utility model provides a terminal comprising the aforesaid shell.

[0013] Further, a feeder of the NFC antenna is connected to an NFC chip located inside of the terminal through a connector on a motherboard of the terminal.

[0014] The present utility model adopts the technical means of embedding the NFC antenna in the shell preset region of the terminal front shell, the problems in the related art that conventional NFC antenna is limited by the terminal size so the performance thereof is affected, the terminal thickness is increased and the service life of the NFC antenna is influenced by the conventional NFC antenna mounting mode such as rear cover type mounting are solved, so that the performance of the NFC antenna in the terminal is improved, and the service life of the NFC antenna is prolonged.

Brief description of drawings

[0015] The drawings illustrated herein are used to provide a further understanding of the present utility model and form part of the present application, the illustrative embodiments of the present utility model and the description are used to interpret the present utility model and do not constitute an undue definition of the present utility model. In the drawings:

[0016] FIG. 1 is a schematic diagram of a single-end type of NFC antenna structure according to related technology;

[0017] FIG. 2 is a schematic diagram of a differential type of NFC antenna structure according to related technology;

[0018] FIG. 3 is a schematic cross-sectional diagram of the shell of the terminal front shell according to an embodiment of the present utility model;

[0019] FIG. 4 is a schematic diagram of the structure of the touch screen according to an embodiment of the present utility model;

[0020] FIG. 5 is a schematic explosive diagram of the structure of the resistive touch screen according to an embodiment of the present utility model.

Embodiment

[0021] The present utility model is described in detail below with reference to the drawings and in conjunction with embodiments. It should be noted that, without conflict, the embodiments in the present application and the features in the embodiments may be combined with each other.

[0022] FIG. 3 is a schematic cross-sectional diagram of the shell of the terminal front shell according to an embodiment of the present utility model. As shown in FIG. 3, an NFC antenna 3 is embedded in a preset region 2 of a shell 1.

[0023] In the above embodiment, due to the NFC antenna being embedded in the preset region of the shell of the terminal front shell, the NFC antenna is located at the terminal front shell, away from the PCB motherboard and the battery, thereby reducing the impact on the antenna performance, and because the NFC antenna and the shell can be an integrated design, poor contact and other problems caused by disassembly in the conventional installation method of the NFC antenna, namely the terminal back shell installation are reduced, and the stability is higher.

[0024] In the specific implementation, as shown in FIG. 4, the NFC antenna 3 can also be built into the frame region 4 of the touch screen of the shell 1. It should be pointed out that, in the specific implementation, the frame region 2 and the frame region 4 can partially overlap or completely overlap. That is to say, in practical application, the NFC antenna 3 can be arranged in the frame region 2 or the frame region 4.

[0025] In the specific implementation, the NFC antenna comprises a plurality of symmetrical coils, the coils are etched on the touch screen panel, specifically the non-visible region of the edge of the touch screen panel. As shown in FIG. 4, the antenna is connected to the RF circuit on the motherboard of the NFC terminal through the FPC 6 connector of the touch screen. It should be noted that the handheld device in this example is a mobile phone or a portable multimedia terminal. The coil of the NFC antenna is rectangular or other ring-shaped.

[0026] In the above embodiment, the touch screen can be a resistive touch screen or a capacitive touch screen or other screen panel with touch function. When it is a resistive touch screen, as shown in FIG. 5, the resistive touch screen may comprise a plastic

sheet layer 401, an upper transparent conductor layer 403, an isolation layer 405, a lower transparent conductor layer 407, and a glass layer 409 arranged sequentially from top to bottom. The NFC antenna 3 is arranged in any layer of the plastic sheet layer 401, the upper transparent conductor layer 403, the isolation layer 405, the lower transparent conductor layer 407 and the glass layer 409.

[0027] In the specific application, the NFC antenna 3 is embedded in the preset region 2 of the shell 1 by one of the following ways: evaporation, etching, spraying, pasting. In the specific implementation, the NFC antenna 3 can also be embedded in the frame region 4 by the above-mentioned process. In an optimal implementation, the etching process can be preferred due to the good stability of the etching process.

[0028] In the specific application, if the shell 1 is made of metal, an insulating member is provided outside of the NFC antenna 3. Of course, the shell 1 can also be an insulating material such as glass, resin, etc., and in this case it is not necessary to provide an insulating member outside of the NFC antenna 3.

[0029] In the specific application, since the shell 1 is generally used in combination with the terminal, the present embodiment provides a terminal comprising the shell described above. In a preferred implementation, a feeder of the NFC antenna 3 is connected to an NFC chip located inside of the terminal through a connector on a motherboard of the terminal.

[0030] In order to better understand the above embodiments, the following is detailed in conjunction with the relevant drawings and specific examples.

[0031] Since the touch screen is generally pasted on the shell of the handheld device, it is generally divided into a transparent region 5 and a touch screen frame region 4, as shown in FIG. 4. The transparent region 5 is generally of the same size as the LCD display region, which is a transparent material, and it is also the region used for actual touch. The touch screen frame region 4 is generally opaque, and the adhesive glue is pasted in this region. The coordinate signal and control signal of the touch screen are led out through FPC and connected to the connector on the motherboard.

[0032] The following takes a resistive touch screen as an example to illustrate the implementation of the NFC antenna of this example:

[0033] The general resistive touch screen is divided into five layers, as shown in FIG. 4. The resistive touch screen is composed of a plastic sheet layer 401, an upper transparent conductor layer 403, an isolation layer 405, a lower transparent conductor layer 407, a glass layer 409 and electrodes 411 at both ends from top to bottom, and the upper and lower electrodes are perpendicular to each other. The commonly used resistive touch screen is controlled by four signal lines, which are led out by means of FPC.

[0034] In order not to affect the use and appearance of the touch screen, in this example, the NFC antenna coil is placed in the frame region of the touch screen, the feeder of the antenna is drawn out by the FPC 6 of the touch screen, and then connected to the RF end of the NFC chip through the connector on the motherboard of the handheld device.

[0035] In this example, the NFC antenna coil is made of metal, can be a single-end type as shown in FIG. 1, can also be a differential type shown in FIG. 2. In this example, the NFC antenna coil can be rectangular, round, or a ring structure of other shapes.

[0036] In this example, the NFC antenna coil can be embedded in the plastic sheet layer 401, the upper transparent conductor layer 403, the isolation layer 405, the lower transparent conductor layer 407, the glass layer 409 and the electrodes 411 at both ends are composed. If the NFC antenna coil is placed in two conductor layers, the conductors of the coil and the conductor layers are in an insulated state and are not shorted with the conductors.

[0037] In this example, the NFC antenna coil is located in the touch screen frame region 4, does not enter the touch screen transparent region 5.

[0038] In this example, the NFC antenna coil can be placed in the corresponding layer of the touch screen by evaporation, etching, spraying or pasting process.

[0039] In this example, if the NFC antenna coil is in a single-end type, two feeders are led out from the coil, and the two feeders of the coil are made on the same FPC with the touch screen control line. In this example, if the NFC antenna coil is in a differential

type, three feeders are led out from the coil, and the three feeders of the coil are made on the same FPC with the touch screen control line.

[0040] This example takes a resistive touch screen as an example to illustrate, and the NFC antenna of the present utility model can also be applied in a capacitive touch screen or other touch panels.

[0041] The NFC antenna in this example can be composed of a plurality of symmetrical coils, these coils are etched inside of the touch screen, and the feeder of the coil is led out through the FPC together with the touch screen coordinate control line. Since the NFC antenna and the touch screen are produced together as an integrated component, one component is reduced. In addition, compared with the conventional NFC antenna that is made on the substrate of the flexible circuit board and then pasted on the structural part, this example saves the flexible circuit board. Due to the good consistency of the etching process, and because the feeder is made through the connector, the defects caused by pasting and other defects are avoided, and the stability of the antenna is enhanced. In addition, since the touch screen is located on top of the terminal, away from the motherboard PCB, the impact of the PCB board on the antenna is reduced, and the appearance of the handheld device is not affected, making full use of the space.

[0042] From the above description, it can be seen that the present utility model has achieved the following technical effects:

[0043] In the above embodiments, the NFC antenna and the shell of the terminal front shell is applied to the touch screen terminal as a whole component, which greatly reduce the space of the terminal. Since the NFC antenna is located at the top, it is easy to swipe the card, and the antenna is above the LCD, away from the PCB board and battery, which reduces the impact on the antenna performance. At the same time, the NFC antenna is made together, with good consistency, and the connection mode of FPC and the connector avoids the problem of poor contact during the disassembly or use of the conventional NFC antenna, and has high stability.

[0044] Obviously, those skilled in the art should understand that the modules or steps of the present utility model can be implemented with a general computing device, they can be centralized on a single computing device, or distributed on a network composed of a plurality of computing devices. Optionally, they can be implemented by using program codes executable by computing devices, thus, they can be stored in a storage device to be executed by a computing device, and in some cases, the steps shown or described can be performed in a different order than here, or they can be made into individual integrated circuit modules, or multiple modules or steps of them can be made into a single integrated circuit module. In this way, the utility model is not limited to any particular combination of hardware and software.

[0045] The above are merely preferred embodiments of the present utility model, and is not intended to limit the present utility model. For those skilled in the art, the present utility model may have various changes and variations. Any modification, equivalent replacement, improvement, etc., made within the spirit and principles of the present utility model shall be included in the protection scope of the present utility model.

WHAT IS CLAIMED:

1. A shell of a terminal front shell, characterized in that a near field communication (NFC) antenna is embedded into a preset region of the shell.
2. The shell according to claim 1, characterized in that the preset region is a frame region of the shell.
3. The shell according to claim 1, characterized in that the preset region is a frame region of a touch screen of the shell.
4. The shell of claim 3, characterized in that,
the touch screen is a resistive touch screen, and the resistive touch screen comprises a plastic sheet layer, an upper transparent conductor layer, an isolation layer, a lower transparent conductor layer, and a glass layer that are sequentially arranged from top to bottom; and
the NFC antenna is arranged at any layer of the plastic sheet layer, the upper transparent conductor layer, the isolation layer, the lower transparent conductor layer, and the glass layer.
5. The shell according to any one of claims 1 to 4, characterized in that the NFC antenna is embedded in the preset region of the shell by one of the following processes:
evaporation, etching, spraying, pasting.
6. The shell according to any one of claims 1 to 4, characterized in that,
the shell is made of metal material; and
an insulating member is provided outside of the NFC antenna.
7. The shell according to claim 5, characterized in that,
the shell is made of metal material; and
an insulating member is provided outside of the NFC antenna.
8. The shell according to any one of claims 1 to 4, characterized in that,
the shell is made of insulating material.
9. A terminal characterized in that it comprises the shell according to any one of claims 1 to 4.

10. The terminal according to claim 9, characterized in that a feeder of the NFC antenna is connected to an NFC chip located inside of the terminal through a connector on a motherboard of the terminal.

Attached drawings

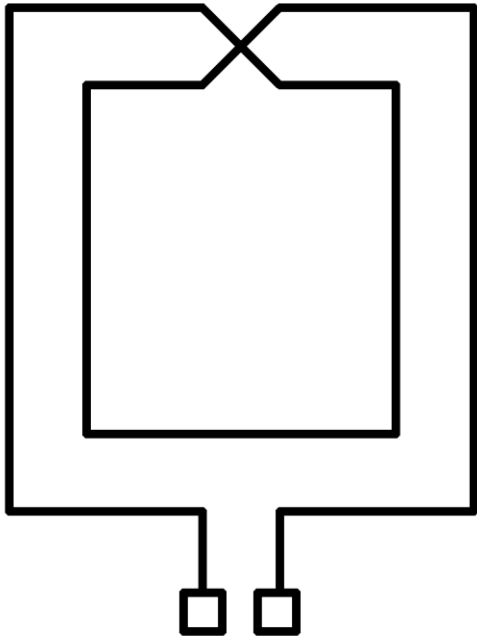


FIG. 1

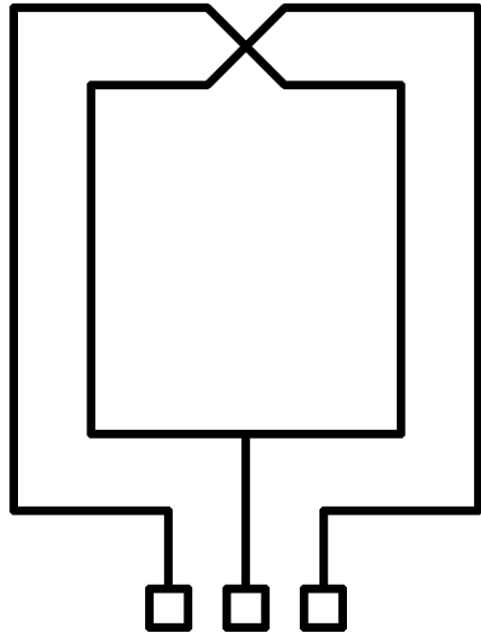


FIG. 2

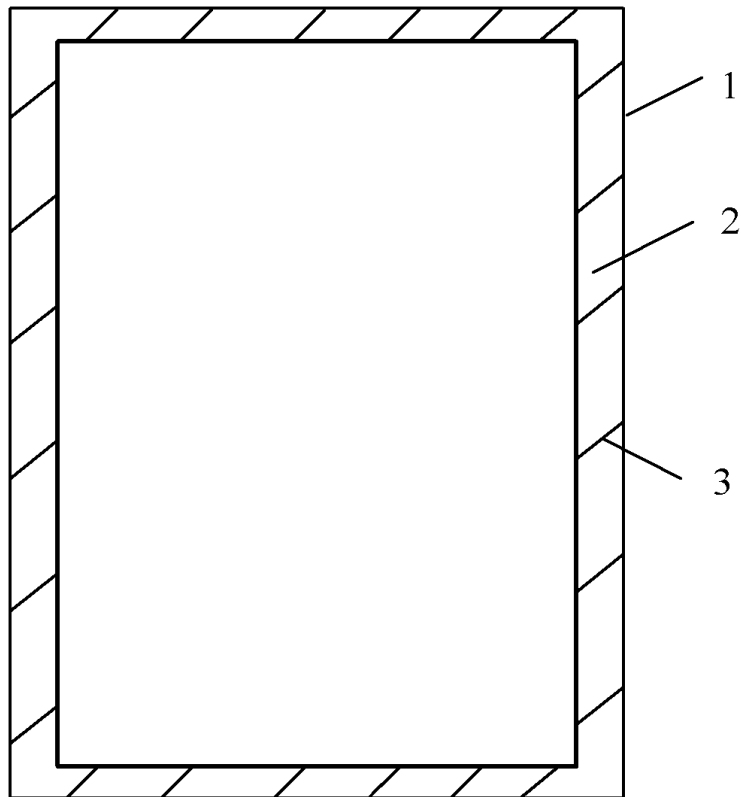


FIG. 3

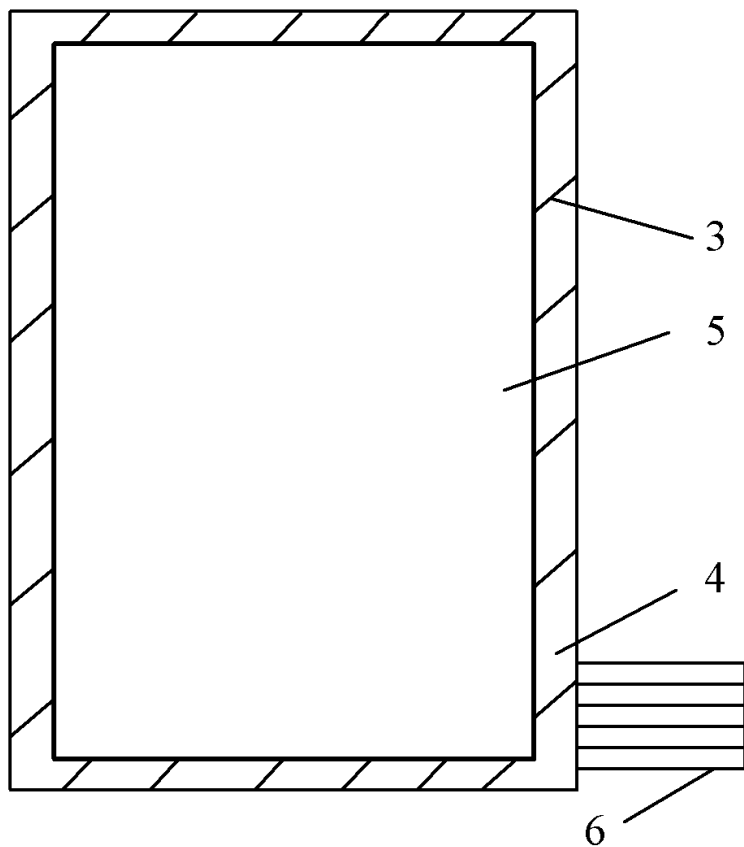


FIG. 4

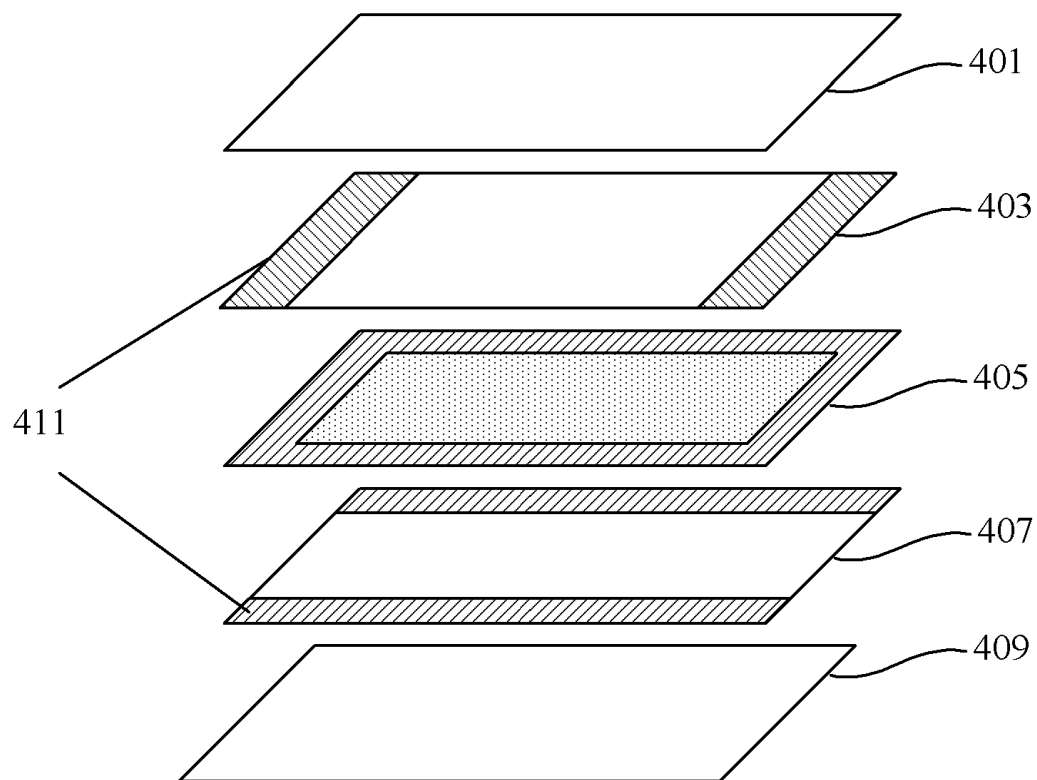


FIG. 5