2. Description of Invention:

2.1 Adding close proximity communication to Active tag

The current active tag device can only exchange data between the device and host via long range mesh-network communication. This has a limitation on close proximity direct reading/writing information into the device without using the wireless mesh RF network . This can be done using a non-similar system devices such as NFC(near field communication) reader.

By using the external NFC reader the following can be read or written into **NFC Active Tag**.

1. Store information – A NFC reader could be placed near to the **NFC Active Tag** and transmit necessary information into the **NFC Active Tag.**
2. Configuration – A NFC reader could be placed near to the **NFC Active Tag** to configure the device such as:-

a. Deactivate the **NFC Active Tag**
b. Activate the **NFC Active Tag** into information downloading mode
c. Wake **NFC Active Tag** from deep sleep mode
d. Configure the NFC Active Tag into different operating mode such as turn on/off button feature, different sleep time, configure the I2C port and other chip related functionalities

3. Identification – **NFC Active Tag** could be place next to a NFC reader to verify it/user identification without worry about fake or unauthorized identity
4. Extract information - NFC reader is placed next to **NFC Active Tag** to download the intended information from the system onto the reader to be processed

2.2 Using long range communication via mesh network

The information exchanged and updated with the NFC reader, can be uploaded to the back-end server using the wireless mesh network that the Active Tag is coupled to. This provides a means for the NFC transaction to be reported back with relevant information, in areas where no other long range back-haul communication systems are available, for eg. inside large complexes, underground facilities, outfield sites without mobile coverage, etc.

Title: NFC Active Tag

1. Description of Invention:

1.1 Adding close proximity communication to Active tag

The current active tag device can only exchange data between the device and host via long range mesh-network communication. This has a limitation on close proximity direct reading/writing information into the device without using the wireless mesh RF network . This can be done using a non-similar system devices such as NFC(near field communication) reader.

By using the external NFC reader the following can be read or written into **NFC Active Tag**.

1. Store information – A NFC reader could be placed near to the **NFC Active Tag** and transmit necessary information into the **NFC Active Tag.**
2. Configuration – A NFC reader could be placed near to the **NFC Active Tag** to configure the device such as:-
   a. Deactivate the **NFC Active Tag**
   b. Activate the **NFC Active Tag** into information downloading mode
   c. Wake **NFC Active Tag** from deep sleep mode
   d. Configure the NFC Active Tag into different operating mode such as turn on/off button feature, different sleep time, configure the I2C port and other chip related functionalities
3. Identification – **NFC Active Tag** could be place next to a NFC reader to verify it/user identification without worry about fake or unauthorized identity
4. Extract information - NFC reader is placed next to **NFC Active Tag** to download the intended information from the system onto the reader to be processed

1.2 Using long range communication via mesh network

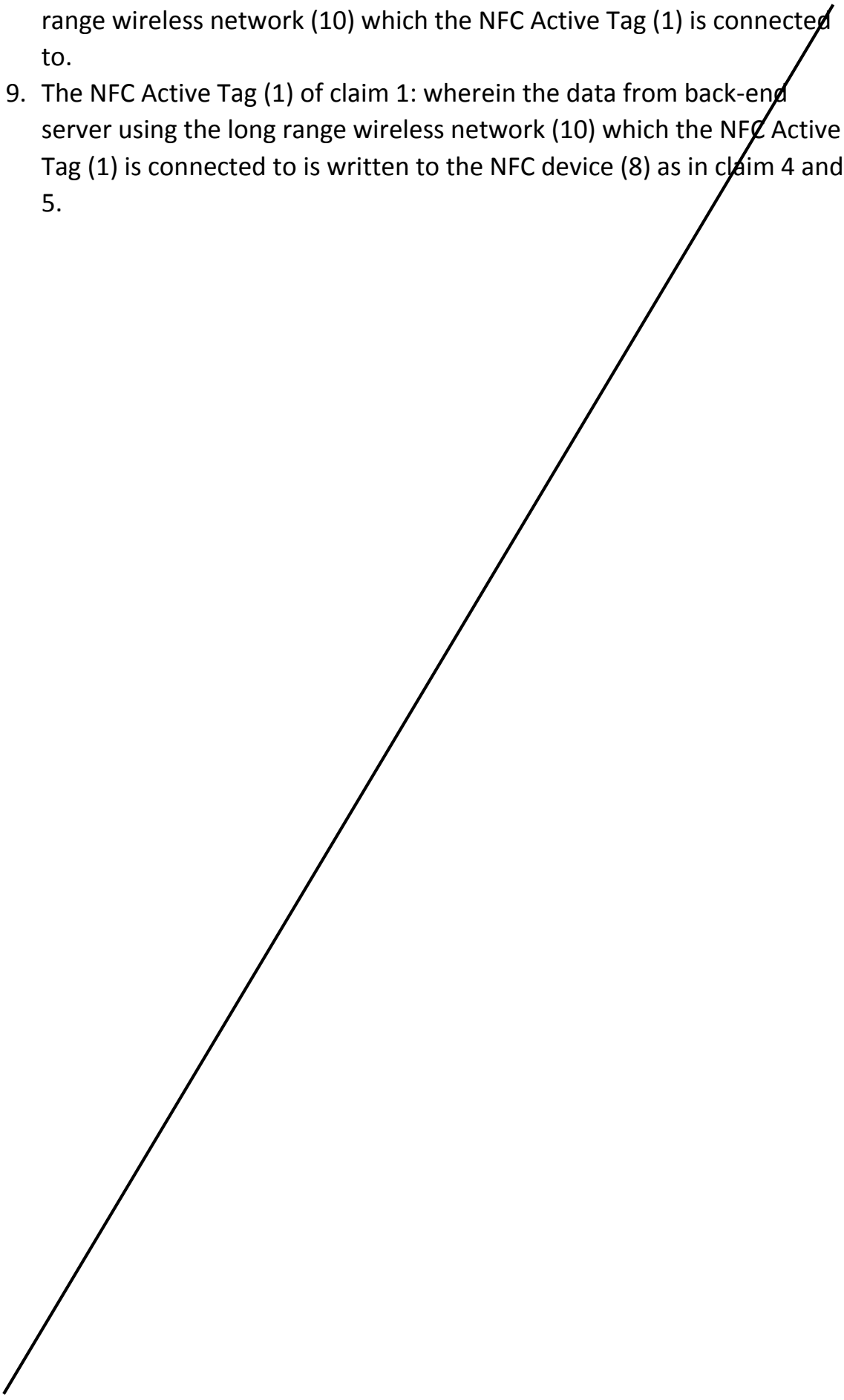
The information exchanged and updated with the NFC reader, can be uploaded to the back-end server using the wireless mesh network that the Active Tag is coupled to. This provides a means for the NFC transaction to be reported back with relevant information, in areas where no other long range back-haul communication systems are available, for eg. inside large complexes, underground facilities, outfield sites without mobile coverage, etc.

Claims

1. An NFC Active Tag (1) comprising of
    a. a radio frequency (RF) transceiver chip (2) for long range communication with wireless network (10); and
    b. a near field communication (NFC) chip (3) for close proximity wireless communication (7) reading/writing of information with an NFC device (8).
2. An NFC Active Tag (1) of claim 1, wherein the said RF transceiver is connected to the NFC chip (3) via an electrical interface bus (5).
3. The NFC Active Tag (1) of claim 1 further comprising:
    a. an RF antenna (6); and
    b. a short range NFC antenna (4);
    wherein the RF antenna (6) is connected to the RF transceiver chip (2) and the NFC antenna (4) is connected to the NFC chip (3)
4. The NFC Active Tag (1) of claim 1: wherein data exchanging between the said RF transceiver chip (2) and the NFC chip (3) via the electrical interface bus (5) ; the NFC chip (3) , having been activated by external NFC device (8) (eg. NFC enabled mobile phone), sending an interrupt signal to the RF transceiver chip (2) ; the RF transceiver chip (2) communicating with the NFC chip (3) via the electrical interface bus (5) to exchange data to and from the external NFC device (8) via the NFC chip (3) .
5. The NFC Active Tag (1) of claim 1: wherein data exchanging between the said RF transceiver chip (2) and the NFC chip (3) via the electrical interface bus (5); the RF transceiver chip (2) periodically checking with the NFC chip (3) if any new data is present, if so exchanging data to and from the NFC chip (3) via the electrical interface bus (5).
6. The claim 4 and 5 further comprising of securing the data exchange between the RF transceiver chip (2) and the NFC chip (3) via an electrical interface bus (5);
7. The claim 6 wherein the RF transceiver chip (2) and NFC chip (3) will use scrambling techniques or encryption methods to read and write data so that the data exchanging will not be in plain text or actual values.
8. The NFC Active Tag (1) of claim 1: wherein the data from NFC device (8) as in claim 4 and 5 is uploaded to the back-end server using the long

range wireless network (10) which the NFC Active Tag (1) is connected to.

9. The NFC Active Tag (1) of claim 1: wherein the data from back-end server using the long range wireless network (10) which the NFC Active Tag (1) is connected to is written to the NFC device (8) as in claim 4 and 5.



2. Claims

2.1. An NFC Active Tag (1) comprising of
   a. a radio frequency (RF) transceiver chip (2) for long range communication with wireless network (10); and
   b. a near field communication (NFC) chip (3) for close proximity wireless communication (7) reading/writing of information with an NFC device (8).

2.2. An NFC Active Tag (1) of claim 1, wherein the said RF transceiver is connected to the NFC chip (3) via an electrical interface bus (5).

2.3. The NFC Active Tag (1) of claim 1 further comprising:
   a. an RF antenna (6); and
   b. a short range NFC antenna (4);

   wherein the RF antenna (6) is connected to the RF transceiver chip (2) and the NFC antenna (4) is connected to the NFC chip (3)

2.4. The NFC Active Tag (1) of claim 1: wherein data exchanging between the said RF transceiver chip (2) and the NFC chip (3) via the electrical interface bus (5) ; the NFC chip (3) , having been activated by external NFC device (8) (eg. NFC enabled mobile phone), sending an interrupt signal to the RF transceiver chip (2) ; the RF transceiver chip (2) communicating with the NFC chip (3) via the electrical interface bus (5) to exchange data to and from the external NFC device (8) via the NFC chip (3) .

2.5. The NFC Active Tag (1) of claim 1: wherein data exchanging between the said RF transceiver chip (2) and the NFC chip (3) via the electrical interface bus (5); the RF transceiver chip (2) periodically checking with the NFC chip (3) if any new data is present, if so exchanging data to and from the NFC chip (3) via the electrical interface bus (5).

2.6. The claim 4 and 5 further comprising of securing the data exchange between the RF transceiver chip (2) and the NFC chip (3) via an electrical interface bus (5);

2.7. The claim 6 wherein the RF transceiver chip (2) and NFC chip (3) will use scrambling techniques or encryption methods to read and write data so that the data exchanging will not be in plain text or actual values.

2.8. The NFC Active Tag (1) of claim 1: wherein the data from NFC device (8) as in claim 4 and 5 is uploaded to the back-end server using the long range wireless network (10) which the NFC Active Tag (1) is connected to.

2.9. The NFC Active Tag (1) of claim 1: wherein the data from back-end server using the long range wireless network (10) which the NFC Active Tag (1) is connected to is written to the NFC device (8) as in claim 4 and 5.