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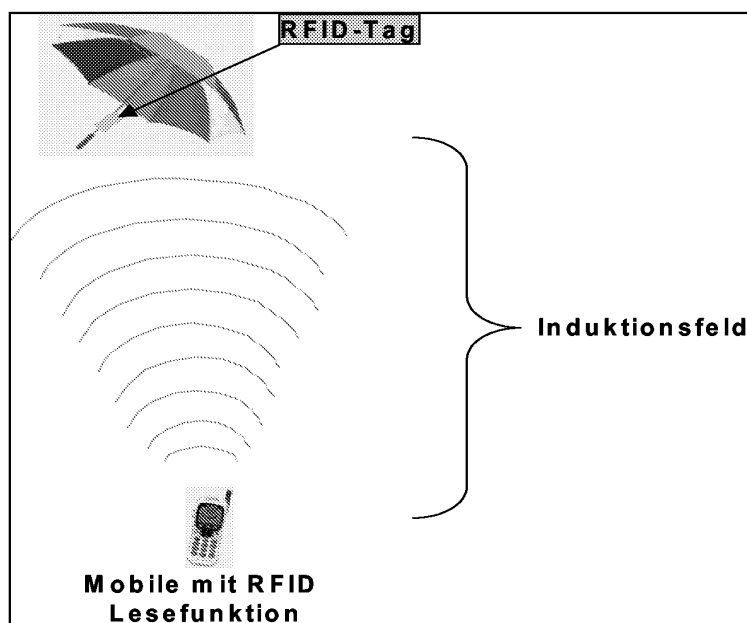
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(54) **Intelligent Mobile controlled anti-theft System**

(57) To provide an easy configurable solution for guaranteeing a control on different objects labelled using RFID tags, it is proposed to apply a method to control the distance of an object labelled by a RFID tag from a telecommunications terminal equipped with a RFID reader and a register module. The method comprises the preliminary step to register the RFID tag at the register module.

After an activation of a RFID detection procedure e.g. by the user of that telecommunications terminal, the further step of that method is applied consisting on the measure at repeated time using the RFID reader of the signal strength transmitted via the RFID link between the tag and the RFID reader. An alarm signal is automatically initiated in case that measured signal strength is below a predefined threshold value.



**Fig. 1**

## Description

### Technical Field

**[0001]** The present invention relates to a method to control the distance of an object labelled by a Radio Frequency IDentity [RFID] tag from a telecommunications terminal equipped with a RFID reader and a register module. That method comprises the step to register the RFID tag at the register module. The present invention is also related to a telecommunications terminal comprising a RFID reader and a register module for registering a RFID tag labelling an object. Furthermore, the present invention is related to a computer readable medium comprising codes to be executed on a telecommunications terminal with a RFID reader and a register module to store RFID tag labelling some object.

### Background of the invention

**[0002]** Radio frequency identification or RFID, is a method of identifying unit items using radio waves. RFID is a promising technology for many corporations that seek to improve their processes. However, RFID cannot provide the fullest benefits as a standalone technology. Corporations look for an integrated solution of RFID with their existing infrastructure and wish to smoothly incorporate RFID into their mobile enterprise applications. In this context is described in a white paper from Dora Karali with the title "Integration of RFID and Cellular Technologies" with the reference UCLA-WINMEC-2004-205-RFID-M2M an overview of the technology with some example applications describing the benefits and the challenges for integrating RFID with cell phone.

**[0003]** One of the examples from that white paper refers to a smartphone with a RFID tag as a handheld device that can connect to GSM or another wireless phone network. Such device has embedded or attached a RFID chip with some identification information programmed on it. Apart from the cellphone antenna used to connect to the wireless network operator, the device also contains a RF antenna to allow for communication with the RFID reader. When the smartphone with the RFID tag and the RFID reader are within range they can communicate; the RFID tag information is sent to the reader and the reader can write some information back to the smartphone's RFID tag. A second example from that white paper is a smartphone with RFID reader as a handheld device that can connect to the wireless phone network. It contains a RFID reader that can collect data from various RFID tags. Such smartphone should also include a RF antenna.

**[0004]** One of the application concerns the collection of real-time information like location information about a position or status to some centre. Such location based application competes with GPS while being quite different in a technical point of view. RFID's can give relative position in contrast to GPS that provides absolute position. With RFID, the reader has to be relatively close to

the tags hence users have to be conscious of the tagged object. And location based applications using RFID technology limits the accessibility of a network on the physical tagging of spaces and objects. If the tag is lost or removed the accessibility to this location's services is lost.

**[0005]** In WO 2005008575 is described a reader device for RFID transponders, which implements enhanced RFID transponder functionality. In particular, such reader device is capable to serve as a RFID transponder. It comprises a reader logic unit, a radio/high frequency (RF/HF) interface and an antenna. The reader device is adapted to communicate with RFID transponders in a reader operation mode. The reader device comprises additionally a transponder logic unit connected to the reader device in particular to the RF/HF interface such that the reader device acts as a RFID transponder in a transponder operation mode. Such reader device can be attached, connected, implemented and/or embedded in electronic device particularly portable electronic devices. In JP2005157787 is described a radio tag search report system consisting of a mobile terminal device and a radio tag search report program that ensures that a user of the mobile terminal device can purchase merchandise or the like advertised by such advertising media as hanging posters. The use of such radio tag search report system allows the following configuration: from an advertising RFID tag attached to a hanging poster, advertising information is recorded into the tag information table of a cellular phone as an entry upon an instruction of the user of the cellular phone via an RFID tag reader attached to the cellular phone. The RFID tag reader of the cellular phone periodically searches nearby areas; if it reads merchandise information from the merchandise RFID tag of a piece of merchandise and if an entry matching this merchandise information has been registered in the tag information table the cellular phone uses an image or voice to report to the user that the piece of merchandise exists nearby.

### Summary of the invention

**[0006]** The object of the present invention is to provide an easy configurable solution for guaranteeing a control on different objects labelled using RFID tags.

**[0007]** This object is achieved in accordance with the invention by applying a method to control the distance of an object labelled by a RFID tag from a telecommunications terminal equipped with a RFID reader and a register module. The method comprises the preliminary step to register the RFID tag at the register module. After an activation of a RFID detection procedure e.g. by the user of that telecommunications terminal, the further step of that method is applied consisting on the measure at repeated time using the RFID reader of the signal strength transmitted via the RFID link between the tag and the RFID reader. An alarm signal is automatically initiated in case that measured signal strength is below a predefined threshold value.

**[0008]** In an advantageous embodiment of the invention different objects are labelled each by a specific RFID tag registered at the register module of the telecommunications terminal. In that case, after the RFID procedure is activated then is measured the signal strength of the different RFID links to the different RFID tags. An alarm signal is then initiated after measuring the first signal strength being below the predefined threshold value. In an alternative embodiment according to the invention, the telecommunications terminal is blocked rendering any further use of that telecommunications terminal impossible in the case the signal strength from more than a single RFID link is below the predefined threshold value. It is conceivable in that case when the mobile phone is blocked that an alarm is sent to a provider. Such an alarm may be identified by the provider to the situation that at least two different RFID links between the telecommunications terminal and two different registered RFID tags are lost which could correspond to the missing of the telecommunications terminal.

**[0009]** In a further embodiment according to the invention, the RFID tag labelling the object comprises information allowing to identify the owner of that object. That embodiment has the advantage among other things to enable the setup of a personalized matching between the telecommunications terminal and one or different objects of the owner of that telecommunications terminal while the objects are labelled by RFID tags. With that personalized matching it is possible for the user of the telecommunications terminal to keep a control on that telecommunications terminal and/or the different objects labelled by the RFID tags registered at the telecommunications terminal.

**[0010]** The invention further relates to a telecommunications terminal comprising a RFID reader and a register module. The telecommunications terminal comprises furthermore a detection module. At first is registered on the register module from the telecommunications terminal a RFID tag labelling an object. Afterwards the detection module at the telecommunications terminal can be activated for performing a repeated measurement using the RFID reader of the signal strength transmitted via the RFID link between the RFID tag and the RFID reader. The result of such measurement is compared to a predefined threshold value. And in the case the measured signal strength is below that predefined threshold value, then the detection module initiates an alarm signal. In some embodiment according to the invention, such alarm signal can activate an alarm bell on the telecommunications terminal possibly together with the display on the monitor of that telecommunications terminal of some information like an identification of that object. Such telecommunications terminal according to the invention can be advantageously used in the case that more than one RFID tags are registered at the registered module from the telecommunications terminal. In that case, the detection module performs a measurement of signals strength corresponding to the different RFID links between the

telecommunications terminal and the different RFID tags labelling different objects. The use of a telecommunications terminal according to the invention allows to keep control on that telecommunications terminal and/or the different labelled objects. This can be advantageously achieved when the measurement by the detection module of the telecommunications terminal of a signal strength for more than one RFID link below the threshold value initiates together with the alarm signal the blocking of the telecommunications terminal. In such a way, when the owner of the telecommunications terminal loose the telecommunications terminal e.g. while being stolen, the telecommunications terminal is then automatically blocked by the detection module. This is particular advantage for a telecommunications terminal being a mobile phone since in a blocking state the thief will be unable to use that telecommunications terminal. The blocking procedure of the telecommunications terminal can be initiated together with the transmission of an alarm signal to some provider to which that telecommunications terminal is possibly registered.

**[0011]** The invention also relates to a computer readable medium comprising codes to be executed on a telecommunications terminal with a RFID reader and a register module for storing RFID tag labelling some object. Such codes comprise codes that when executed activate a RFID detection procedure using that RFID reader and the stored RFID tag. The detection procedure is based on a repeated measurement of the signal strength transmitted via the RFID link between the RFID tag and the RFID reader. The codes comprises also codes to initiate an alarm signal in case that measured signal strength is below a predefined threshold value.

**[0012]** Advantageous developments of the invention are described in the dependent claims, the following description and the drawings.

#### Description of the drawings

**[0013]** An exemplary embodiment of the invention will now be explained further with the reference to the attached drawing in which:

Fig. 1 is a schematic view of a telecommunications terminal together with an object according to the invention.

#### Detailed description of preferred embodiments

**[0014]** In figure 1 is described a telecommunications terminal according to the invention being preferably but not exclusively a mobile phone comprises a RFID reader and a register module for registering RFID tag labelling an object in the present case an umbrella. Such RFID tag can be attached to the umbrella by the owner of the umbrella. The owner has then to register that RFID on his mobile phone allowing then to perform a detection procedure with that mobile phone according to the inven-

tion of the umbrella. For that, the user has to activate that detection procedure on his mobile phone. After being activated, the mobile phone performs a detection measurement at regular time interval possibly defined by the user himself. The choice of the time interval could be defined according to the actual use case. For example, in some other overcrowd surrounding it may be preferable to define a very short time interval of e.g. less than 1 minute. In contrast, in a more peaceful surrounding, the time interval could be set to more than few minutes which may be less power consuming.

[0015] Since nowadays every telecommunications terminal comprises a keyboard, it may be easy for the user to register that RFID tag and any new RFID tags on that telecommunications terminal. After the user activates the detection procedure at the telecommunications terminal - here the mobile device - then the RFID reader of the telecommunications terminal set up RF link with the RFID tag of the umbrella. The detection module on the telecommunications terminal measures the signal strength of that RFID link. Such signal strength is directly proportional to the distance between the telecommunications terminal and the umbrella and comes from the induction field of the RFID link. Such induction field can have a typical range of 3 to 10 metres while in some embodiments the user could fix himself starting at which range an alarm signal has to be initiated by the telecommunications terminal. Accordingly, such a choice will define the predefined threshold radio at which the alarm signal has to be initiated.

[0016] At the moment the umbrella starts to be in a range beyond the predefined tolerable range an alarm signal is initiated on the telecommunications terminal. Such alarm signal could be a ringing at the telecommunications terminal possibly together with some information displayed on the telecommunications terminal like the identification of the object corresponding to the RFID tag beyond the tolerable range in the present case the umbrella. Such implementation of the invention would advantageously help the user to realize e.g. that he is missing his umbrella.

[0017] In a further implementation of the invention, the detection procedure could be used for different RFID tags labelling different objects. In that case, the measurement could be performed almost simultaneously or in some alternative way i.e. one after the other between the different RFID tags. And in the case the signal range of at least more than one RFID link fall below the predefined threshold, a different alarm signal could be initiated which could comprising possibly but not exclusively an automatic blocking of the telecommunications terminal. Indeed, such situation could correspond to the loss from the user of his telecommunications terminal possibly due to some theft. In such a way, the thief of the telecommunications terminal would be unable to use that telecommunications terminal and possibly help to determine the initial owner of that telecommunications terminal. Optionally, the different RFID tags labelling the objects owned

by the owner of the telecommunications terminal could comprise personal information of that owner. This could help in the case the object is really lost i.e. allowing for example a third person with a different RFID reader to identify the owner of that umbrella e.g. by name and possibly also by address or email.

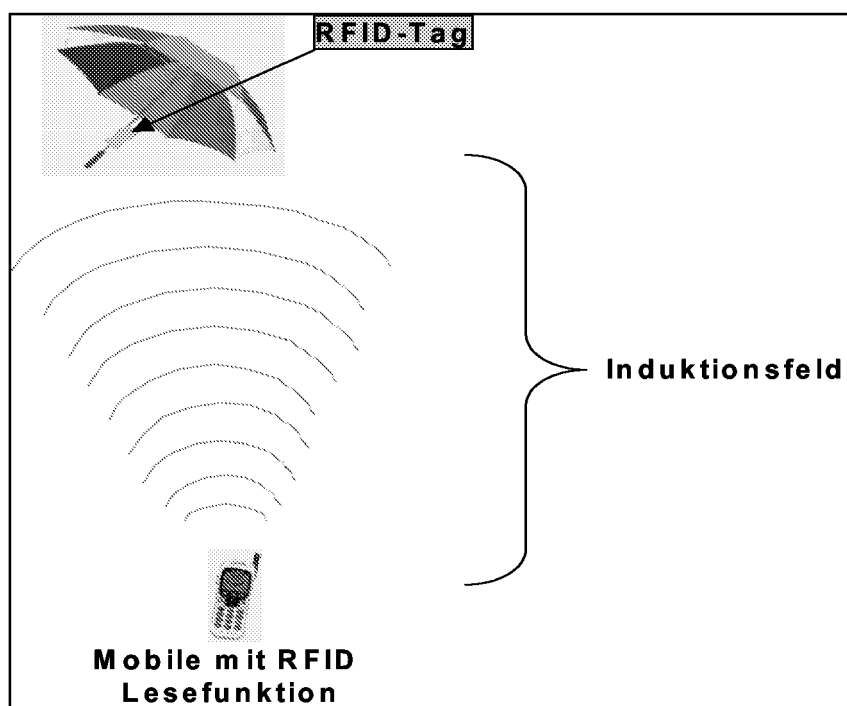
[0018] It is possible that the alarm signal initiates different kinds of alarms like a ringing or sending some message and/or SMS. The use of an embodiment according to the invention has the great advantage that an RFID link can be set up between the RFID reader of the telecommunications terminal and a RFID tag without requiring some direct contact neither optical nor electrical since the RF signal penetrates through different kinds of material like fabric (textile) e.g. clothes or wood, leather. RFID tags are very cheap allowing a full range of applications.

## Claims

1. A method to control the distance of an object labelled by a Radio Frequency IDentity [RFID] tag from a telecommunications terminal equipped with a RFID reader and a register module, the method comprises the steps
  - to register the RFID tag at the register module; while being **characterized by** the step
  - to activate a RFID detection procedure comprising the step to measure repeatedly with the RFID reader the signal strength transmitted via the RFID link between the tag and the RFID reader while initiating an alarm signal in case that measured signal strength is below a predefined threshold value.
2. The method according to claim 1 whereby different objects are labelled each by a specific RFID tag registered at register module of the telecommunications terminal while when the RFID procedure is activated then is measured the signal strength of the different RFID links to the different RFID tags.
3. The method according to claim 2 whereby when the signal strength from more than one RFID link is below the predefined threshold value then the telecommunications terminal is blocked.
4. The method according to claim 3 whereby the telecommunications terminal is a mobile phone while when blocked an alarm is sent to a provider.
5. The method according to claim 1 whereby the RFID tag comprises information allowing to identify the owner of the object labelled with that RFID tag.
6. A telecommunications terminal comprises a Radio

Frequency IDentity [RFID] reader and a register module for registering a RFID tag labelling an object while the telecommunications terminal is **characterized in that** it comprises a detection module for performing a repeated measurement after being activated with the RFID reader of the signal strength transmitted via the RFID link between the RFID tag and the RFID reader while the detection module initiates an alarm signal in case that measured signal strength is below a predefined threshold value.

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7. The telecommunications terminal according to claim 6 wherein at the register module are registered different RFID tags labelling each an object while the detection module after being activated performs repeated measurement of the signal strength transmitted via the different RFID links between the RFID-tags and the RFID reader.
8. The telecommunications terminal according to claim 7 wherein the measurement by the detection module of the telecommunications terminal of signal strengths for more than one RFID link below the threshold value blocks that telecommunications terminal.
9. The telecommunications terminal according to claim 8 wherein it is a mobile phone while when blocked an alarm is sent to a provider.
10. A computer readable medium comprising codes to be executed on a telecommunications terminal with a Radio Frequency IDtentity [RFID] reader and a register module to store RFID tag labelling some object, while the codes are **characterized in that** some codes when executed activate a RFID detection procedure using that RFID reader and the stored RFID tag, that detection procedure being based on a repeated measurement of the signal strength transmitted via the RFID link between the RFID tag and the RFID reader while an alarm signal is initiated in case that measured signal strength is below a predefined threshold value.



**Fig. 1**



European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 06 30 0465

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Place of search The Hague		Date of completion of the search 6 November 2006	Examiner Meister, Mark
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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