

DESCRIPTION**Title of Invention**

IMPROVED INTERSYSTEM CHANGE BETWEEN DIFFERENT RADIO ACCESS NETWORKS

5

Technical Field

[0001]

The invention relates to intersystem change and in particular to an improved intersystem change of a wireless terminal between different radio access networks.

10

Background Art

[0002]

Radio access networks (RANs) of different wireless cellular communication systems operate according to various different defined sets of standards each having different respective radio access technologies (RAT). Wireless terminals operated by users of such systems are usually configured so that they can operate with more than one such radio access network. Therefore it is often required that a terminal must be able to connect to more than one type of network operating according to different respective standards, and must be able to switch dynamically between such different networks. Such a switching process is often termed an inter-RAT 'handover'.

20

[0003]

GSM (Global System for Mobile Communications, originally Groupe Spécial Mobile), is a set of standards developed by the European Telecommunications Standards Institute (ETSI) to define technologies for so-called second generation (2G) digital cellular networks. Developed as a replacement for first generation (1G) analog cellular networks, the GSM standard originally described a digital, circuit switched network optimized for full duplex voice telephony. The standard was expanded over time to include first circuit switched data transport, then packet data transport via GPRS (General Packet Radio Services).

25

[0004]

Enhanced Data rates for GSM Evolution (EDGE) (also known as Enhanced GPRS (EGPRS)) is a digital mobile telephone technology that is a backward-compatible extension of GSM and allows improved data transmission rates. EDGE is considered a pre-third generation (3G) radio technology and was deployed on GSM networks beginning in 2003. EDGE is

30

standardized by the international organisation known as 3GPP (3rd Generation Partnership Project) as part of the GSM family. A network that operates according to the GSM and/or EDGE standards is known as a GSM/EDGE radio access network (GERAN).

[0005]

5 Universal Mobile Telecommunications System (UMTS) is a third generation mobile cellular technology for communication networks based on the GSM standard. Developed by 3GPP, UMTS is a component of a set of standards specified and maintained by the International Telecommunications Union (ITU), this set of standards known as IMT-2000. IMT-2000 is comparable to, but different from, the CDMA2000 set of standards for networks based on the
10 competing cdmaOne™ technology deployed in the USA and internationally elsewhere.

[0006]

UMTS employs Wideband Code Division Multiple Access (W-CDMA) radio access technology to offer greater spectral efficiency and bandwidth. UMTS specifies a complete network system, covering the radio access network (UMTS Terrestrial Radio Access Network, or
15 UTRAN), the core network (Mobile Application Part, or MAP) and the authentication of users via SIM cards (Subscriber Identity Module).

[0007]

UMTS and GSM/EDGE can share a Core Network (CN), making UTRAN an alternative radio access network to GERAN, and allowing (mostly) transparent switching
20 between these radio access networks (RANs) according to available coverage and service needs. Because of that, UMTS and GSM/EDGE radio access networks are sometimes collectively referred to as UTRAN/GERAN. Most cells of European mobile cellular communication systems, and most handsets or mobile terminals used in such networks, can support both UTRAN and GERAN operation.

25 [0008]

Since 2006, UMTS networks in many countries have been or are in the process of being upgraded with High Speed Downlink Packet Access (HSDPA), sometimes known as 3.5G. Currently, HSDPA enables downlink transfer speeds of up to 21 Mbit/s. Work is also progressing on improving the uplink transfer speed with the High-Speed Uplink Packet Access
30 (HSUPA). Longer term, the 3GPP Long Term Evolution (LTE™) set of standards, termed fourth generation (4G), aims to provide data transfer rates of 100 Mbit/s on the downlink and 50 Mbit/s on the uplink, using a 4G air interface technology based upon orthogonal frequency-division multiplexing (OFDM).

[0009]

E-UTRAN is an abbreviation for evolved UMTS Terrestrial Radio Access Network. E-UTRAN or eUTRAN is the radio access network defined by the LTE™ standards.

[0010]

E-UTRAN uses a simplified single node architecture consisting of eNBs (E-UTRAN
5 Node B) – see Fig. 1.

[0011]

Referring to Figs. 1 and 2, an eNB 102 communicates with an Evolved Packet Core (EPC) 202 using an S1 interface 104. Specifically the eNB 102 communicates with a MME (Mobility Management Entity) node 106, 206 and a UPE (User Plane Entity) node identified
10 here as a S-GW (Serving Gateway) 108, 208 using S1-C and S1-U interfaces 104 for control plane and user plane respectively. The MME node 106, 206 and the UPE node 108, 208 are preferably implemented as separate network nodes so as to allow independent scaling of the control and user plane. Also any eNB can communicate with other eNBs using an X2 interface (X2-C and X2-U for control and user plane respectively). eNBs transmit signals to, and receive
15 signals from, wireless terminals or ‘user equipments (UEs). Thus a wireless terminal can be connected to the MME via a eNB.

[0012]

A HSS (Home Subscriber Server) (not shown) is a central database that contains user-related and subscription-related information. Functions of the HSS include mobility
20 management, call and session establishment support, user authentication and access authorization.

[0013]

The MME (Mobility Management Entity) is the key control-node for the E-UTRAN access network. It is responsible for idle mode UE (User Equipment) tracking and paging
25 procedures including retransmissions. It is involved in bearer activation/deactivation processes and is also responsible for choosing the serving gateway (S-GW) for a UE when the UE initially attaches to the network and during intra-E-UTRAN handover involving Core Network (CN) node relocation. It is responsible for authenticating the user (by interacting with the HSS).

[0014]

30 Non Access Stratum (NAS) signalling terminates at the MME and the MME is responsible for generation and allocation of temporary identities to UEs. The MME checks the authorization of the UE to register with the service provider’s Public Land Mobile Network (PLMN) and enforces UE roaming restrictions. The MME also provides the control plane function for mobility between LTE and UTRAN/GERAN access networks with the S3 interface

terminating at the MME from the SGSN of the UTRAN/GERAN network.

[0015]

The Serving GPRS Support Node (SGSN) of a UTRAN/GERAN network has a similar overall function to that of the MME of the E-UTRAN network. The SGSN is responsible for the delivery of data packets from and to the wireless terminals ('mobile stations') within its geographical service area. Its tasks include packet routing and transfer, mobility management (attach/detach and location management), logical link management, and authentication and charging functions. The location register of the SGSN stores location information (e.g., current cell, current visitor location register, VLR) and user profiles (e.g., IMSI, address(es) used in the packet data network) of all GPRS users registered with the SGSN.

[0016]

Among other functions, the SGSN performs functions associated with mobility management required when a wireless terminal in standby mode moves from one Routing Area (RA) to another Routing Area.

[0017]

E-UTRAN specifies an Idle mode Signaling Reduction (ISR) function which provides a mechanism to limit or reduce signaling in idle mode during any inter-RAT cell-reselection between E-UTRAN and UTRAN/GERAN. According to this mechanism a wireless terminal (User Equipment, UE) in idle mode, when ISR is activated, is registered with both the MME of the E-UTRAN and the SGSN of a UTRAN/GERAN (see 3GPP TS23.401, Annex J1). Both the SGSN and the MME have a control connection with the serving gateway (S-GW). The MME and SGSN are both registered at the HSS. The UE receives and stores mobility management (MM) parameters provided to the UE by the SGSN (e.g. P-TMSI and RA) and provided to the UE by the MME (e.g. GUTI and TA(s)) and the UE stores session management (bearer) contexts that are common to E-UTRAN and GERAN/UTRAN accesses.

[0018]

Using these stored parameters and contexts, the UE when it is in idle state can reselect between E-UTRAN and GERAN/UTRAN radio access cells when the UE is within the registered radio access routing areas (RAs) and tracking areas (TAs) without any need to perform any tracking area update (TAU) or radio access update (RAU) procedures by interacting with the network.

Citation List

Non Patent Literature

[0019]

NPL 1: 3GPP TS 23.401 V9.0.0 (2009-03)

Summary of Invention

5 Technical Problem

[0020]

Situations sometimes occur which cause unsynchronized state information in one or more of the UE, MME and SGSN (see 3GPP TS23.401, annex J6). There are no ISR-specific procedures that could handle such special situations and could thereby avoid additional
10 complexity and error cases. All such special situations that would cause context in the UE, MME and SGSN to become asynchronous are handled by de-activation of the ISR function. The de-activation of the ISR function involves de-registering the UE from the RAN other than the RAN to which the UE is connected in connected mode. The known RAU and/or TAU procedures then serve to synchronize contexts between the MME and the SGSN and, when the
15 synchronization is done, the ISR function is activated again when desired by the network.

[0021]

Another situation which causes a problem during an inter-RAT handover has not been appreciated until now, and is illustrated in Fig. 3.

[0022]

20 Fig. 3. is an event diagram showing operations (represented by boxes) performed by entities (wireless terminal 302 for example a mobile terminal, E-UTRAN MME 304 and GERAN SGSN 306) wherein time is represented by a downward vertical direction (not to scale). One or more signals between entities are represented by horizontal arrows. In this example only one signal is shown and only operations performed by the wireless terminal are shown.

25 [0023]

In box 310, the wireless terminal 302 is connected to the E-UTRAN MME by means of signalling that takes place between the wireless terminal and the E-UTRAN MME. As a result of this connection, the wireless terminal is in a connected state in which the wireless terminal can transmit and receive traffic data via the E-UTRAN. The wireless terminal is considered to be in
30 E-UTRAN connected mode. ISR is active or activated i.e. ON in the wireless terminal and therefore the wireless terminal is registered with both the E-UTRAN and the GERAN, the registration of the wireless terminal being associated with a registration area (Tracking Area, TA) by the E-UTRAN and also being associated with a registration area (Routing Area, RA) by the GERAN. The GERAN associates the wireless terminal with a registration area/ routing area

‘RA1’.

[0024]

As indicated by arrow 312, the wireless terminal receives a signal comprising an indication in the form of a message termed ‘Mobility from E-UTRAN Command’ having a
5 ‘purpose’ parameter set to ‘Cell Change Order’ (CCO) and a target RAT type set to GERAN as specified in 3GPP TS36.331, s5.4.3.3. The message also indicates a target GERAN cell (this being located within routing area RA1).

[0025]

In box 314, the wireless terminal starts the indicated CCO procedure and also starts a
10 designated timer T3174 for CCO completion control and the terminal performs a reselection which serves to re-select the terminal to the target GERAN cell using the information provided in the ‘Mobility from E-UTRAN Command’ message. In this situation, the target GERAN cell is within the same RA1 with which the wireless terminal is associated by its registration (that is, the target GERAN cell is within the same routing area RA1 with which the wireless terminal is
15 effectively already registered).

[0026]

Because of this, and because ISR is ON, and if there is no pending uplink data in the mobile terminal, there is no trigger for access to the GERAN cell (for example, a Routing Area Update request message). Such a trigger is required for a successful completion of the CCO
20 procedure as specified in 3GPP TS44.060, s8.4.1. This represents a problem.

[0027]

In box 316, the timer T3174 expires and in box 318, the CCO procedure fails.

[0028]

The present invention seeks to address the problem represented by the above-described
25 CCO-to-GERAN failure when the mobile terminal is in E-UTRAN connected mode, ISR is ON and the RA is not changed, and seeks to provide a more robust and reliable intra-cell handover between different radio access networks.

Solution to Problem

30 [0029]

According to the invention there is provided a wireless terminal as claimed in Claim 1.

[0030]

The claimed subject matter provides a more robust and reliable inter-cell inter-RAT handover between different radio access networks and is well suited for use in the performing of

an inter-RAT handover between a E_UTRAN network and a UTRAN or GERAN network.

[0031]

Embodiments will now be described, by way of example only, with reference to the accompanying drawings.

5

Advantageous Effects of Invention

[0032]

The present invention can provide to address the problem represented by the above-described CCO-to-GERAN failure when the mobile terminal is in E-UTRAN connected
10 mode, ISR is ON and the RA is not changed, and provide a more robust and reliable intra-cell handover between different radio access networks.

Brief Description of Drawings

[0033]

15 [Fig. 1] Fig. 1 is a simplified representation of a node architecture of an E-UTRAN network;
[Fig. 2] Fig. 2 is a simplified representation of various elements of an E-UTRAN network;
[Fig. 3] Fig. 3 is an event diagram showing operations performed by entities of an E-UTRAN network according to current state of the art;
[Fig. 4] Fig. 4 is an event diagram showing operations performed by entities of an E-UTRAN
20 network according to an embodiment;
[Fig. 5] Fig. 5 is an event diagram showing operations performed by entities of an E-UTRAN network according to another embodiment.

Description of Embodiments

25 [0034]

Turning to Fig. 4, an event diagram shows operations (represented by boxes) performed by entities (wireless terminal 302 for example a mobile terminal, E-UTRAN MME 304 and GERAN SGSN 306) wherein time is represented by a downward vertical direction (not to scale). One or more signals between entities are represented by horizontal arrows. In this example
30 only one signal is shown and only operations performed by the wireless terminal are shown.

[0035]

In box 310, the wireless terminal 302 is connected to the E-UTRAN MME by means of signalling that takes place between the wireless terminal and the E-UTRAN MME. As a result of this connection, the wireless terminal is in a connected state in which the wireless terminal can

transmit and receive traffic data via the E-UTRAN to which it is connected. The wireless terminal considered to be in connected mode. ISR is active or activated i.e. ON in the wireless terminal and therefore the wireless terminal is registered with both the E-UTRAN and the GERAN, the registration of the wireless terminal being associated with a registration area by the E-UTRAN and also being associated with a registration area by the GERAN. The GERAN associates the wireless terminal with a registration area 'RA1'.

[0036]

As indicated by arrow 312, the wireless terminal receives a signal comprising an indication in the form of a message termed 'Mobility from E-UTRAN Command' having a 'purpose' parameter set to 'Cell Change Order' (CCO) and a target RAT type set to GERAN as specified in 3GPP TS36.331, s5.4.3.3. The message also indicates a target GERAN cell or RA (this being located within RA1).

[0037]

In box 314, the wireless terminal starts the indicated CCO procedure and also starts a designated timer T3174 for CCO completion control and the terminal performs a reselection which serves to re-select the terminal to the target GERAN cell using the information provided in the 'Mobility from E-UTRAN Command' message. In this situation, the target GERAN cell is within the same RA1 with which the wireless terminal is associated by its registration (that is, the target GERAN cell is within the same routing area RA1 with which the wireless terminal is effectively registered).

[0038]

As indicated by arrow 417, the wireless terminal then triggers a routing area update (RAU) as soon as it 'camps' successfully on the target GERAN cell.

[0039]

The wireless terminal can trigger RA update regardless of any pending uplink data or request. Alternatively the wireless terminal triggers RA update provided that the registered RA is not changed (during the intersystem change from E-UTRAN to GERAN) and there is no pending uplink data or request.

[0040]

In box 419, the CCO is successfully completed as the RAU by the mobile terminal completes the CCO procedure according to the requirements specified in TS44.060, s 8.4.1 which says:

"The mobile station shall regard the network controlled cell reselection procedure as successfully completed when it has performed access and successfully completed contention

resolution in the new cell."

[0041]

In box 420, the wireless terminal then stops the timer T3174.

[0042]

5 Turning to Fig. 5, an event diagram, similar to that shown in Fig. 4, shows operations (represented by boxes) performed by entities (wireless terminal 302 for example a mobile terminal, E-UTRAN MME 304 and GERAN SGSN 306) wherein time is represented by a downward vertical direction (not to scale). One or more signals between entities are represented by horizontal arrows. In this example only one signal is shown and only operations
10 performed by the wireless terminal are shown.

[0043]

In box 310, the wireless terminal 302 is connected to the E-UTRAN MME by means of signalling that takes place between the wireless terminal and the E-UTRAN MME. As a result of this connection, the wireless terminal is in a connected state in which the wireless terminal can
15 transmit and receive traffic data via the E-UTRAN node to which it is connected. The wireless terminal is considered to be in E-UTRAN connected mode. ISR is active or activated i.e. ON in the wireless terminal and therefore the wireless terminal is registered with both the E-UTRAN and the GERAN, the registration of the wireless terminal being associated with a registration area or cell by the E-UTRAN and also being associated with a registration area or cell by the
20 GERAN. The GERAN associates the wireless terminal with a registration area 'RA1'.

[0044]

As indicated by arrow 312, the wireless terminal receives a signal comprising an indication in the form of a message termed 'Mobility from E-UTRAN Command' having a 'purpose' parameter set to 'Cell Change Order' (CCO) and a target RAT type set to GERAN as
25 specified in 3GPP TS36.331, s5.4.3.3. The message also indicates a target GERAN cell or RA (this being located within RA1).

[0045]

In box 314, the wireless terminal starts the indicated CCO procedure and also starts a designated timer T3174 for CCO completion control and the terminal performs a reselection
30 which serves to re-select the terminal to the target GERAN cell using the information provided in the 'Mobility from E-UTRAN Command' message. In this situation, the target GERAN cell is within the same RA1 with which the wireless terminal is associated by its registration (that is, the target GERAN cell is within the same routing area RA1 with which the wireless terminal is effectively registered).

[0046]

In box 515, the wireless terminal locally deactivates ISR, in this example by setting its TIN to "GUTI", as soon as it successfully reselects to (i.e. camps on) the target GERAN cell.

[0047]

5 The wireless terminal can deactivate ISR regardless of any pending uplink data or request. Alternatively the wireless terminal shall deactivate ISR provided that the registered RA is not changed (during the intersystem change from E-UTRAN to GERAN) and there is no pending uplink data or request.

[0048]

10 De-activating the ISR function, when the RA is not changed and there is no pending uplink data or request, serves to overcome a problem that is caused by the situation in which the RA is not changed and there is no pending uplink data or request. As already outlined above it has now been recognized that, in this situation, there exists no trigger that would cause an initiation of an access to the target GERAN cell (Routing Area update request message for
15 example) needed for the successful completion of the CCO (intersystem change).

[0049]

As indicated by arrow 417, the wireless terminal then triggers a routing area update (RAU) procedure as a result of the intersystem (inter-RAT) change and as a result of the local ISR deactivation.

20 [0050]

The wireless terminal can trigger RA update regardless of any pending uplink data or request. Alternatively the wireless terminal triggers RA update provided that the registered RA is not changed and there is no pending uplink data or request.

[0051]

25 The wireless terminal triggering a routing area update, when the RA is not changed and there is no pending uplink data or request, serves to overcome a problem that is caused by the situation in which the RA is not changed and there is no pending uplink data or request. As already outlined above, it has now been recognized that in this situation there exists no trigger that would cause an initiation of an access to the target GERAN cell (Routing Area update
30 request message for example) needed for the successful completion of the CCO (intersystem change).

[0052]

In box 419, the CCO is successfully completed as the RAU by the mobile terminal completes the CCO procedure according to the requirements specified in TS44.060, s 8.4.1

which says:

“The mobile station shall regard the network controlled cell reselection procedure as successfully completed when it has performed access and successfully completed contention resolution in the new cell.”

5 [0053]

In box 420, the wireless terminal then stops the CCO completion control timer T3174.

[0054]

If the CCO completion control timer T3174 expires after the mobile terminal has locally deactivated ISR but before CCO completion (access to GERAN with successful completed
10 contention resolution in the new cell) then the wireless terminal cancels the local ISR deactivation by setting its TIN back to ‘RAT related TMSI’ before it goes back to the source E-UTRAN cell and initiates connection re-establishment as specified in TS36.331, s5.4.3.5.

[0055]

The inventive features described above and illustrated by the accompanying drawings
15 allow successful CCO completion in a situation in which a wireless terminal performs an intersystem change from a E-UTRAN-connected state to a GERAN cell by CCO, when ISR is active, within the same RA and there is no pending uplink data or request. This allows the wireless terminal to consistently and reliably succeed in performing the intersystem change in the above-described situation which would otherwise result in a failure and a negative user
20 experience.

[0056]

The inventive features serve to align a E-UTRAN to GERAN intersystem change via CCO in connected mode to a E-UTRAN to GERAN intersystem change via handover in connected mode since, according to the claimed inventive features, in each of these intersystem
25 changes the wireless terminal will trigger a RA update after successful selection to GERAN, regardless of the ISR status. The level of alignment depends on whether the pending uplink data or request in CCO is considered or not.

[0057]

It should be understood that the invention may be implemented in software and/or in
30 hardware. If it is implemented in software, the software may be provided on a carrier medium such as, for example, CD ROM, electronic memory or a signal transmitted over a computer network. The software may be integrated with software or programming code for performing functions other than the functions relating directly to the claimed features. The software may not exist as a separate module and it may be integrated with an operating system for a computer

or processor.

[0058]

This application is based upon and claims the benefit of priority from United Kingdom patent application No. 1205827.7, filed on March 30, 2012, the disclosure of which is

5 incorporated in its entirety by reference.

Industrial Applicability

[0059]

The invention relates to intersystem change and in particular to an improved intersystem
10 change of a wireless terminal between different radio access networks.

Reference Signs List

[0060]

102 eNB

15 106 MME/S-GW

108 MME/S-GW

202 EPC

206 MME

208 S-GW

20 302 wireless terminal

304 E-UTRAN MME

306 GERAN SGSN

CLAIMS**[Claim 1]**

A wireless terminal for use in a wireless cellular communication system comprising a
5 radio access network (RAN) of a first type and also for use in a wireless cellular communication
system comprising a radio access network (RAN) of a second type different from the first type,
each RAN comprising at least one base station, the base stations of respective RANs being
located in respective radio access cells that may be the same or different radio access cell, the
wireless terminal being capable of being registered with a RAN of the first type and a RAN of
10 the second type at the same time and being capable of being wirelessly connected to a RAN of
either the first type or the second type in a connected state,

wherein:

the wireless terminal is arranged, when registered with both a first RAN of the first type
and a second RAN of the second type and when wirelessly connected to the first RAN in the
15 connected state,

to receive a mobility signal via the first RAN indicating a RAN of the second type and,
in response to receiving the mobility signal and in response to being so registered with
the first RAN and second RAN,

to transmit an access trigger signal for receipt by the second RAN, the trigger signal
20 indicating that the wireless terminal is to be connected to the second RAN in the connected state.

[Claim 2]

A wireless terminal as claimed in Claim 1, wherein the wireless terminal is arranged to
transmit the access trigger signal provided that the routing area (RA) is not changed during the
25 intersystem change from the first RAN to the second RAN.

[Claim 3]

A wireless terminal as claimed in Claim 1 or 2, wherein the wireless terminal is
arranged to transmit the access trigger signal when the mobility signal indicates that the wireless
30 terminal is to remain registered to the second RAN via a radio access cell of the second RAN,
and the terminal is already registered to the second RAN.

[Claim 4]

A wireless terminal as claimed in any one of Claims 1 to 3, wherein the wireless

terminal is arranged to transmit the access trigger signal provided that the wireless terminal has, stored in it, no pending uplink data which is to be transmitted by the wireless terminal.

[Claim 5]

5 A wireless terminal as claimed in any one of Claims 1 to 4, wherein the wireless terminal is arranged to transmit the access trigger signal on condition that the wireless terminal has, stored in it, no pending request, received by the wireless terminal, for data for transmission by the wireless terminal.

10 [Claim 6]

A wireless terminal as claimed in any one of Claims 1 to 5, wherein the wireless terminal is further arranged to, prior to transmitting the trigger signal, de-register itself from the second RAN.

15 [Claim 7]

A wireless terminal as claimed in any one of Claims 1 to 6, wherein the radio access network of first type is an evolved UMTS Terrestrial Radio Access Network (E-UTRAN) and the radio access network of second type is a UMTS Terrestrial Radio Access Network (UTRAN) or GSM/EDGE radio access network (GERAN), and the wireless terminal is registered with the
20 first RAN via a mobility management entity (MME) node of the first RAN and the wireless terminal is registered with the second RAN via a serving gateway support node (SGSN) of the second RAN and the mobility signal indicates a cell change order (CCO).

[Claim 8]

25 A wireless terminal as claimed in Claim 7, wherein the wireless terminal is further arranged to, prior to transmitting the access trigger signal and when it is in an idle mode signalling reduction (ISR) mode, de-register itself from the second RAN by deactivating the idle mode signalling reduction mode.

30 [Claim 9]

A wireless terminal as claimed in Claim 8, wherein the wireless terminal is further arranged to deactivate the idle mode signalling reduction mode in response to the indicated RAN of the second type indicated by the received mobility signal.

[Claim 10]

A wireless terminal as claimed in Claim 8 or 9, wherein the wireless terminal is further arranged to deactivate the idle mode signalling reduction mode by setting a temporary identity number (TIN) associated with the wireless terminal to a globally unique temporary user equipment identity (GUTI).

[Claim 11]

A wireless terminal substantially as described herein for operating with a radio access network substantially as described herein and/or substantially as shown in one or more of the accompanying drawings.

[Claim 12]

A method for use in a wireless terminal for use both (a) in a wireless cellular communication system comprising a radio access network (RAN) of a first type and also (b) in a wireless cellular communication system comprising a radio access network (RAN) of a second type different from the first type, each RAN comprising at least one base station, the base stations of the respective RANs being located in respective radio access cells that may be the same cell or different radio access cells, the wireless terminal being capable of being registered with a RAN of the first type and a RAN of the second type at the same time and being capable of being wirelessly connected to a RAN of either the first type or the second type in a connected state,

the method comprising:

when the wireless terminal is registered with both a first RAN of the first type and a second RAN of the second type and is wirelessly connected to the first RAN in the connected state,

receiving a mobility signal via the first RAN indicating a RAN of the second type and, in response to receiving the mobility signal and in response to being so registered with the first RAN and second RAN,

transmitting an access trigger signal for receipt by the second RAN, the trigger signal indicating that the wireless terminal is to be connected to the second RAN in the connected state.

[Claim 13]

A method as claimed in Claim 12, wherein the access trigger signal is transmitted provided that the routing area (RA) is not changed during the intersystem change from the first RAN to the second RAN.

[Claim 14]

A method as claimed in Claim 12 or 13, wherein the transmitting the access trigger signal is dependent on the mobility signal indicating that the wireless terminal is to remain
5 registered to the second RAN via a radio access cell of the second RAN, and is dependent on the terminal being already registered to the second RAN.

[Claim 15]

A method as claimed in any one of Claims 12 to 14, wherein transmitting the access
10 trigger signal depends on the wireless terminal having, stored in it, no pending uplink data which is to be transmitted by the wireless terminal.

[Claim 16]

A method as claimed in any one of Claims 12 to 15, wherein transmitting the access
15 trigger signal depends on the wireless terminal having, stored in it, no pending request, received by the wireless terminal, for data for transmitting by the wireless terminal.

[Claim 17]

A method as claimed in any one of Claims 12 to 16, further comprising, prior to
20 transmitting the access trigger signal, de-registering the wireless terminal from the second RAN.

[Claim 18]

A method as claimed in any one of Claims 12 to 17, wherein the method can be carried
out when the radio access network of first type is an evolved UMTS Terrestrial Radio Access
25 Network (E-UTRAN) and the radio access network of second type is a UMTS Terrestrial Radio Access Network (UTRAN) or GSM/EDGE radio access network (GERAN), and the wireless terminal is registered with the first RAN via a mobility management entity (MME) node of the first RAN and the wireless terminal is registered with the second RAN via a serving gateway support node (SGSN) of the second RAN and the mobility signal indicates a cell change order
30 (CCO).

[Claim 19]

A method as claimed in Claim 18, further comprising, prior to transmitting the access trigger signal and when the wireless terminal is in an idle mode signalling reduction (ISR) mode,

de-register itself from the second RAN by deactivating the idle mode signalling reduction mode.

[Claim 20]

5 A method as claimed in Claim 19, wherein the wireless terminal is further arranged to deactivate the idle mode signalling reduction mode in response to the indicated RAN of the second type indicated by the received mobility signal.

[Claim 21]

10 A method as claimed in Claim 19 or 20, wherein the wireless terminal is further arranged to deactivate the idle mode signalling reduction mode by setting a temporary identity number (TIN) associated with the wireless terminal to a globally unique temporary user equipment identity (GUTI).

[Claim 22]

15 A method substantially as described herein for operating with a radio access network substantially as described herein and/or substantially as shown in one or more of the accompanying drawings.