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(54) **Title:** METHODS AND APPARATUS FOR REPORTING MEASUREMENT INFORMATION

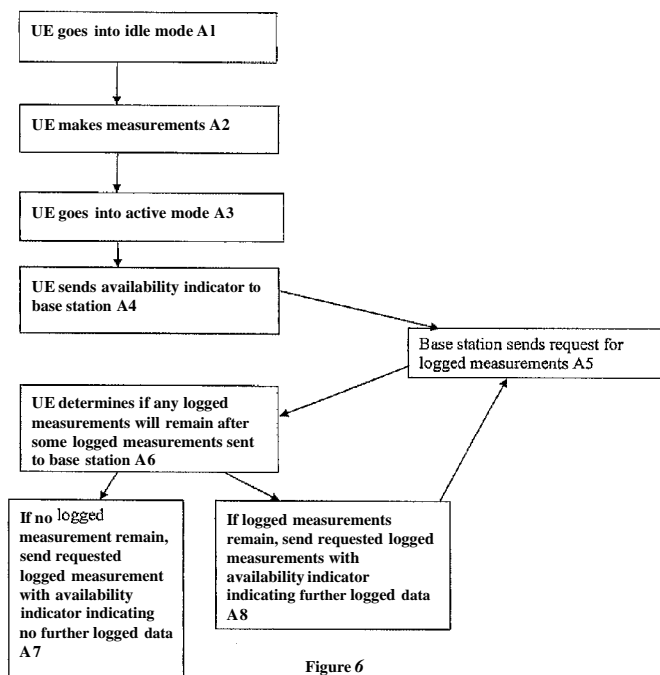


Figure 6

(57) **Abstract:** A method comprising causing a plurality of measurements to be performed by a user equipment to provide measurement information; causing a message to be sent from the user equipment to a network element indicating that measurement information is available; and responsive to a message from said network element requesting said measurement information, causing a response to be sent from the user equipment to said network with only some of said measurement information and information indicating that further measurement information is available.

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**METHODS AND APPARATUS FOR REPORTING MEASUREMENT**  
**INFORMATION**

5 Some embodiments of the present invention relate to methods and apparatus and in particular but not exclusively to methods and apparatus for the reporting of measurement information.

A communication system can be seen as a facility that enables  
10 communication sessions between two or more entities such as user terminals, base stations and/or other nodes by providing carriers between the various entities involved in the communications path. A communication system can be provided for example by means of a communication network and one or more compatible communication  
15 devices. The communications may comprise, for example, communication of data for carrying communications such as voice, electronic mail (email), text message, multimedia and/or content data and so on. Non-limiting examples of services provided include two-way or multi-way calls, data communication or  
20 multimedia services and access to a data network system, such as the Internet.

In a wireless communication system at least a part of communications between at least two stations occurs over a wireless  
25 link. Examples of wireless systems include public land mobile networks (PLMN), satellite based communication systems and different wireless local networks, for example wireless local area networks (WLAN). The wireless systems can typically be divided into cells, and are therefore often referred to as  
30 cellular systems.

A user can access the communication system by means of an appropriate communication device or terminal. A communication device of a user is often referred to as user equipment (UE). A  
35 communication device is provided with an appropriate signal

receiving and transmitting apparatus for enabling communications, for example enabling access to a communication network or communications directly with other users. The communication device may access a carrier provided by a station, for example  
5 a base station of a cell, and transmit and/or receive communications on the carrier.

The communication system and associated devices typically operate in accordance with a given standard or specification  
10 which sets out what the various entities associated with the system are permitted to do and how that should be achieved. For example, it can be defined if carrier aggregation is used. Communication protocols and/or parameters which shall be used for the connection are also typically defined. An example of attempts  
15 to solve the problems associated with the increased demands for capacity is an architecture that is known as the long-term evolution (LTE) of the Universal Mobile Telecommunications System (UMTS) radio-access technology. The LTE is being standardized by the 3<sup>rd</sup> Generation Partnership Project (3GPP).  
20 The various development stages of the 3GPP LTE specifications are referred to as releases. The aim of the standardization is to achieve a communication system with, inter alia, reduced latency, higher user data rates, improved system capacity and coverage, and reduced cost for the operator. A further development of the  
25 LTE is referred to as LTE-Advanced (LTE-A). The LTE-Advanced aims to provide further enhanced services by means of even higher data rates and lower latency with reduced cost.

According to an embodiment, there is provided a method comprising  
30 causing a plurality of measurements to be performed by a user equipment to provide measurement information; causing a message to be sent from the user equipment to a network element indicating that measurement information is available; and responsive to a message from said network element requesting said measurement  
35 information, causing a response to be sent from the user equipment

to said network element with only some of said measurement information and information indicating that further measurement information is available.

5 According to another embodiment, there is provided a method comprising receiving a message from a user equipment at a network element indicating that measurement information is available; responsive to said message, sending a request for at least some measurement information; and receiving a further message from  
10 said user equipment with only some of said measurement information and information indicating that further measurement information is available.

According to a further embodiment, there is provided an  
15 apparatus comprising at least one processor and at least one memory comprising computer program code, the at least one memory and the computer program code configured, with the at least one processor to cause the apparatus to: cause a plurality of measurements to be performed by a user equipment to provide  
20 measurement information; cause a message to be sent from the user equipment to a network element indicating that measurement information is available; and responsive to a message from said network element requesting said measurement information, cause a response to be sent from the user equipment to said network  
25 element with only some of said measurement information and information indicating that further measurement information is available .

According to a further embodiment, there is provided an apparatus  
30 comprising at least one processor and at least one memory comprising computer program code, the at least one memory and the computer program code configured, with the at least one processor to cause the apparatus to: receive a message from a user equipment at a network element indicating that measurement information is  
35 available; responsive to said message, send a request for at least

some measurement information; and receive a further message from said user equipment with only some of said measurement information and information indicating that further measurement information is available.

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According to another embodiment, there is provided an apparatus comprising means for receiving a message from a user equipment at a network element indicating that measurement information is available; responsive to said message, means for sending a request for at least some measurement information; and means for receiving a further message from said user equipment with only some of said measurement information and information indicating that further measurement information is available.

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According to another embodiment, there is provided an apparatus comprising means for causing a plurality of measurements to be performed by a user equipment to provide measurement information; means for causing a message to be sent from the user equipment to a network element indicating that measurement information is available; and means, responsive to a message from said network element requesting said measurement information, for causing a response to be sent from the user equipment to said network element with only some of said measurement information and information indicating that further measurement information is available .

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Some embodiments will now be described, by way of example only, with reference to the following examples and accompanying drawings in which:

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Figure 1 shows an example of a communication system in which some embodiments of the present invention may be implemented;

Figure 2 shows an example of a communication device;

Figure 3 shows a first signal flow between a UE and a base

35 station embodying the present invention;

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