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(54) **APPARATUS AND METHOD FOR CONTROLLING WHETHER TO PROVIDE LOCATION INFORMATION IN BROADBAND WIRELESS ACCESS SYSTEM**

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(51) **Int. Cl.**

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H04W 64/00	(2009.01)
H04W 8/16	(2009.01)
H04W 12/02	(2009.01)

(52) **U.S. Cl.**

CPC ***H04W 64/00*** (2013.01); ***H04W 8/16*** (2013.01); ***H04W 12/02*** (2013.01)

(58) **Field of Classification Search**

CPC H04W 64/00; H04W 8/16; H04W 12/02

USPC 455/404.1, 404.2, 456.1, 456.2, 456.3, 455/456.4, 456.5, 456.6, 457, 432.1, 434, 455/435.1, 435.2, 435.3; 370/252, 328, 329

See application file for complete search history.

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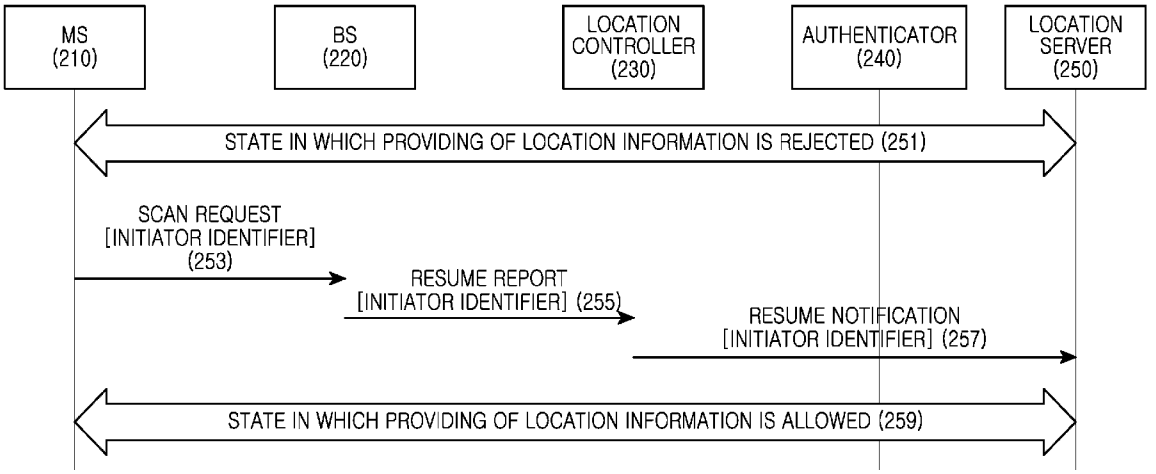
(57) **ABSTRACT**

A method and an apparatus for operating a server in a wireless access system are provided. The method includes receiving a request for location information of a mobile station, transmitting a measurement request message for requesting measurement data used for location determination of the mobile station, receiving a measurement response message comprising at least one of a rejection code and a rejection duration, and transmitting a notification that the request for the location information is rejected.

16 Claims, 10 Drawing Sheets



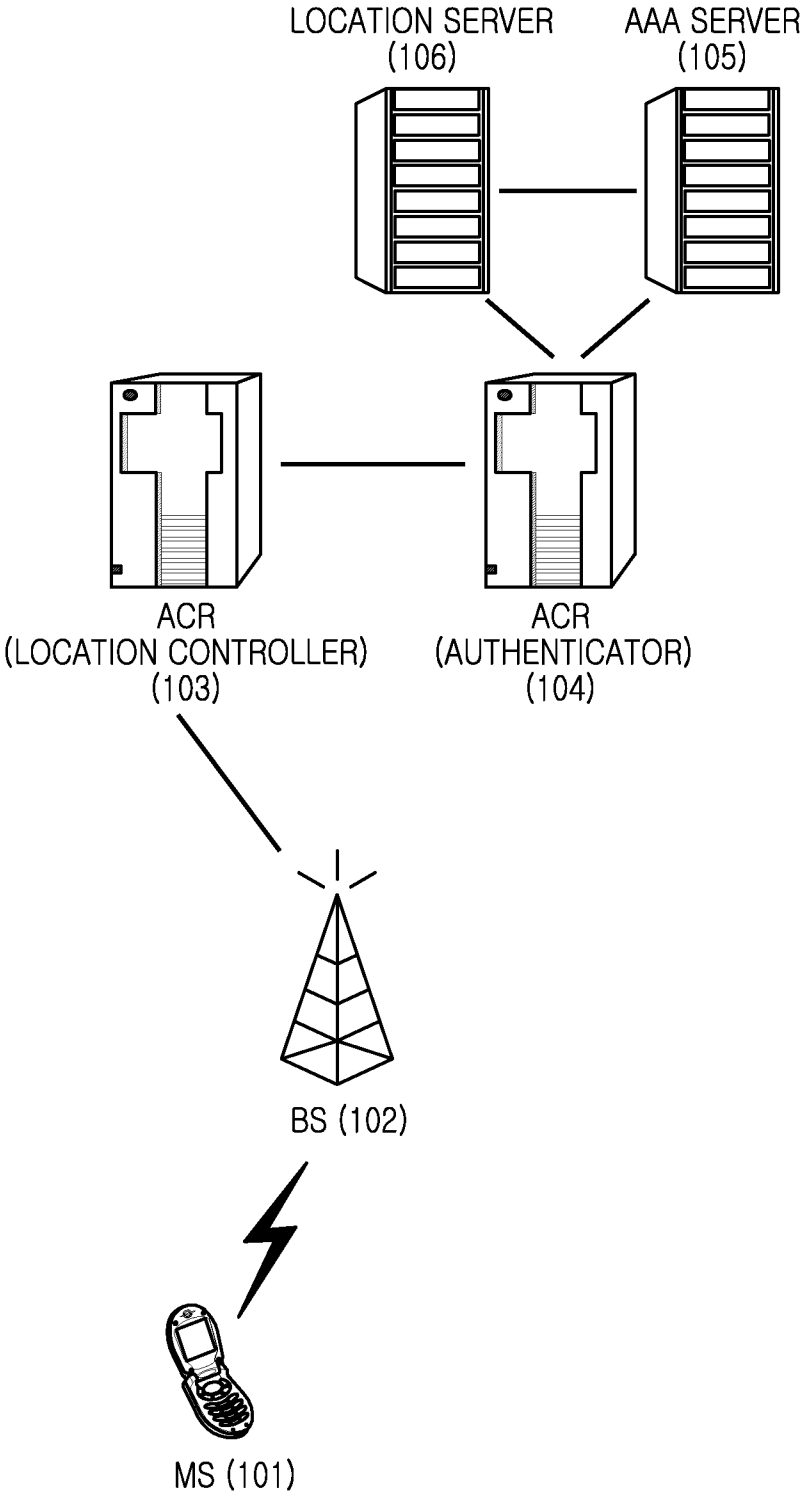

LOCATION SERVER
(106)
AAA SERVER
(105)
ACR
(LOCATION CONTROLLER)
(103)
ACR
(AUTHENTICATOR)
(104)
BS (102)
MS (101)

FIG.1

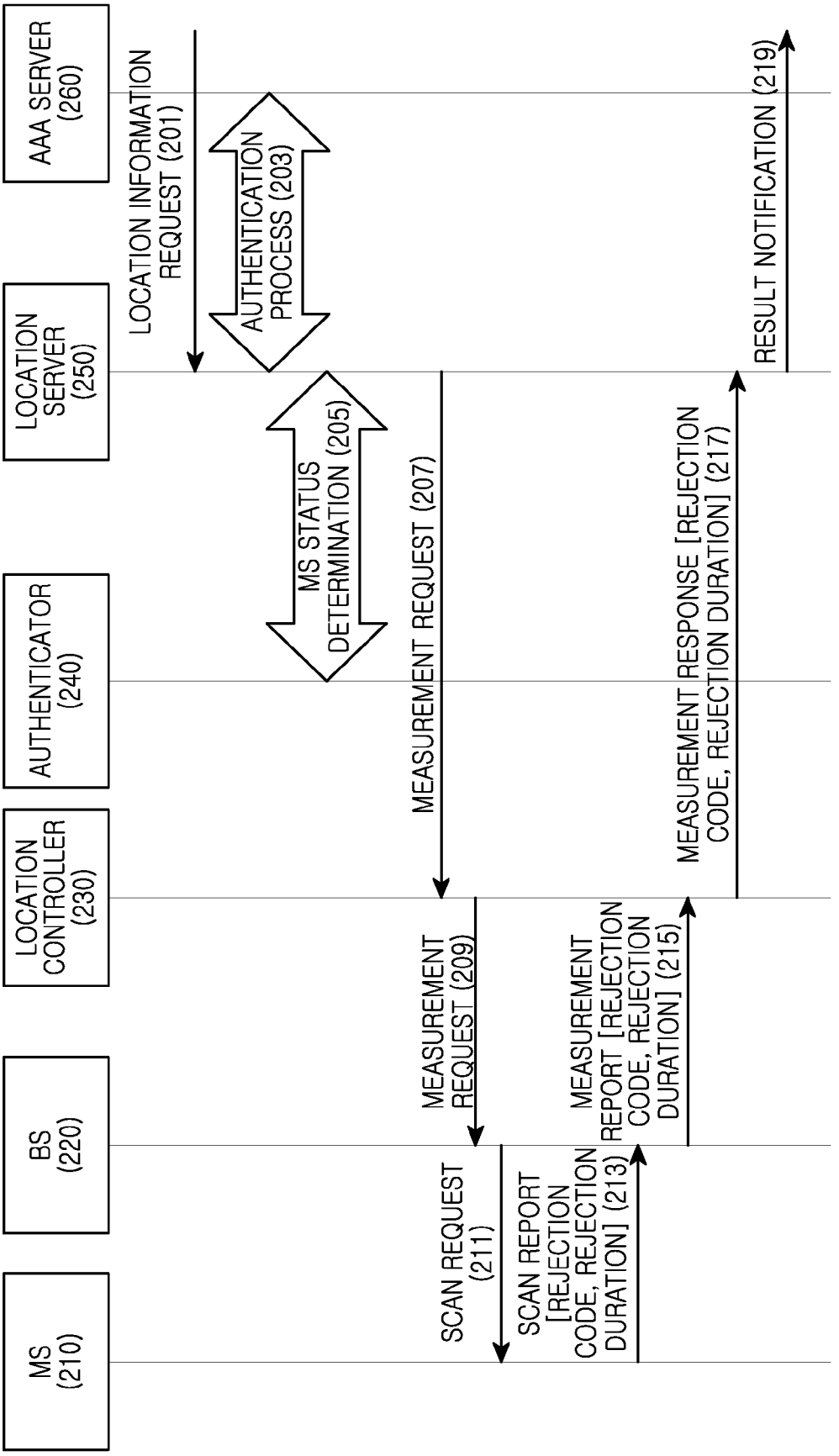

MS (210)
BS (220)
LOCATION CONTROLLER (230)
AUTHENTICATOR (240)
LOCATION SERVER (250)
AAA SERVER (260)
LOCATION INFORMATION REQUEST (201)
AUTHENTICATION PROCESS (203)
MS STATUS DETERMINATION (205)
MEASUREMENT REQUEST (207)
MEASUREMENT REQUEST (209)
SCAN REQUEST (211)
SCAN REPORT [REJECTION CODE, REJECTION DURATION] (213)
MEASUREMENT REPORT [REJECTION CODE, REJECTION DURATION] (215)
MEASUREMENT RESPONSE [REJECTION CODE, REJECTION DURATION] (217)
RESULT NOTIFICATION (219)

FIG.2A

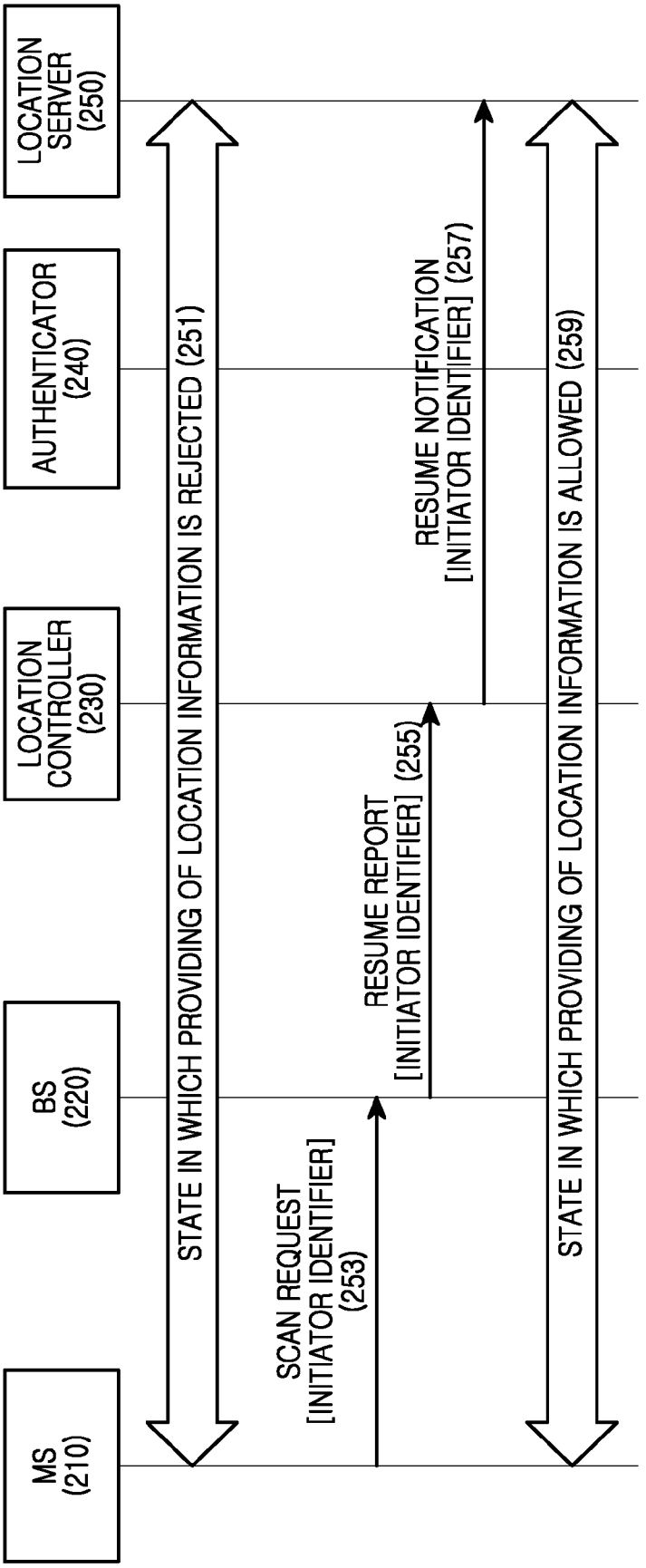

MS (210)
BS (220)
LOCATION CONTROLLER (230)
AUTHENTICATOR (240)
LOCATION SERVER (250)
STATE IN WHICH PROVIDING OF LOCATION INFORMATION IS REJECTED (251)
SCAN REQUEST [INITIATOR IDENTIFIER] (253)
RESUME REPORT [INITIATOR IDENTIFIER] (255)
RESUME NOTIFICATION [INITIATOR IDENTIFIER] (257)
STATE IN WHICH PROVIDING OF LOCATION INFORMATION IS ALLOWED (259)

FIG.2B

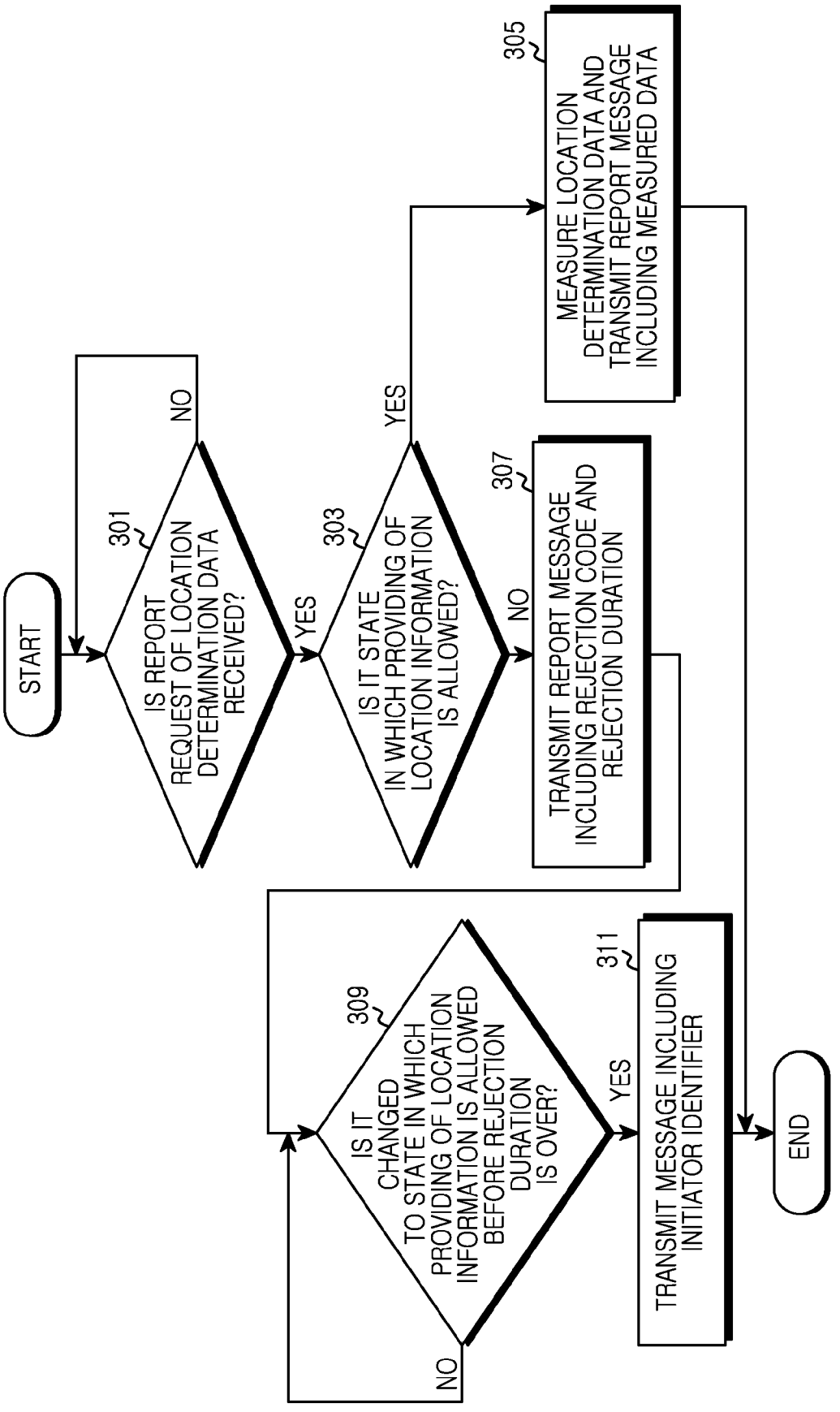

START
301
IS REPORT REQUEST OF LOCATION DETERMINATION DATA RECEIVED?
NO
YES
303
IS IT STATE IN WHICH PROVIDING OF LOCATION INFORMATION IS ALLOWED?
YES
NO
305
MEASURE LOCATION DETERMINATION DATA AND TRANSMIT REPORT MESSAGE INCLUDING MEASURED DATA
307
TRANSMIT REPORT MESSAGE INCLUDING REJECTION CODE AND REJECTION DURATION
309
IS IT CHANGED TO STATE IN WHICH PROVIDING OF LOCATION INFORMATION IS ALLOWED BEFORE REJECTION DURATION IS OVER?
NO
YES
311
TRANSMIT MESSAGE INCLUDING INITIATOR IDENTIFIER
END

FIG.3

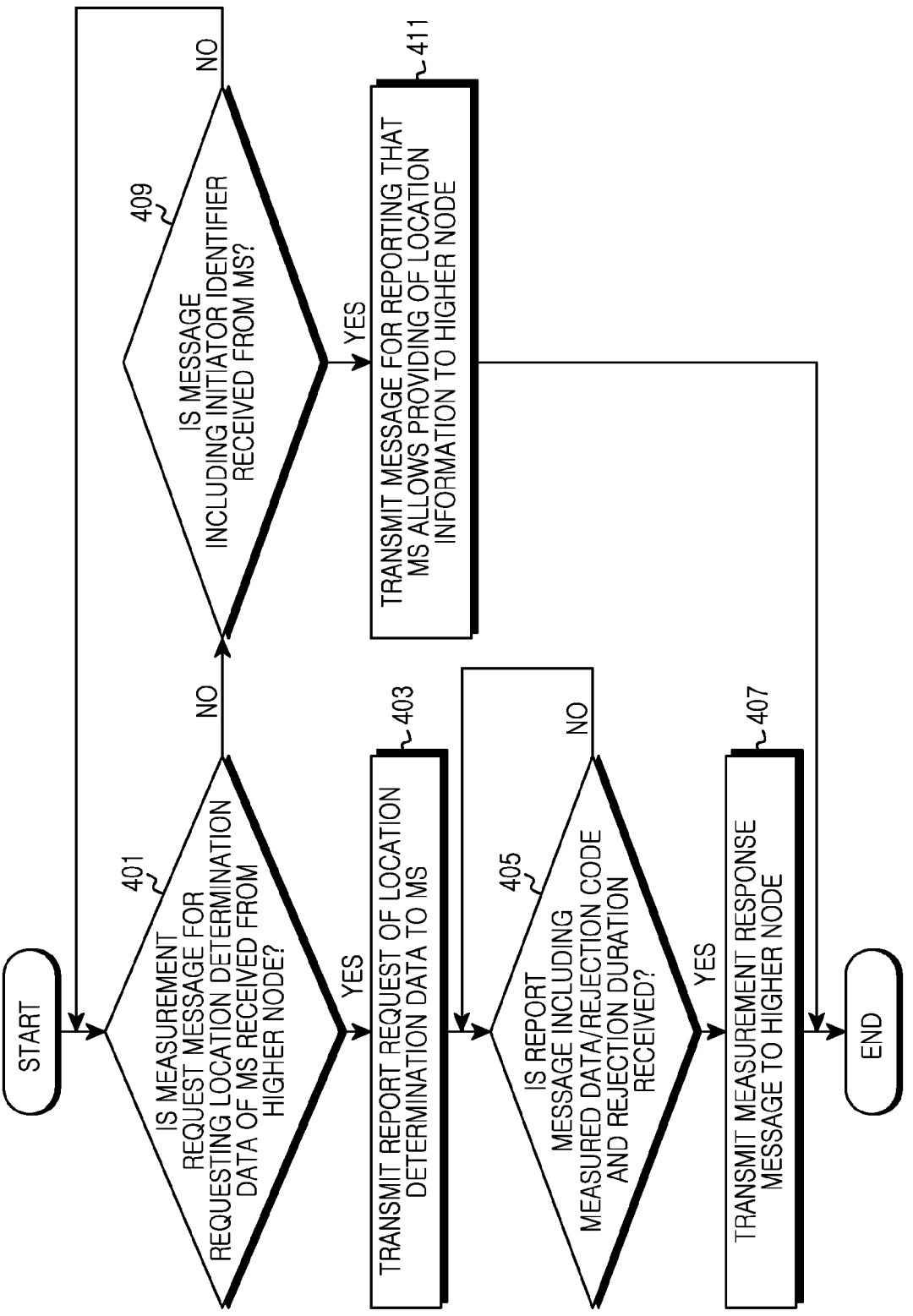

START
401
IS MEASUREMENT REQUEST MESSAGE FOR REQUESTING LOCATION DETERMINATION DATA OF MS RECEIVED FROM HIGHER NODE?
NO
YES
403
TRANSMIT REPORT REQUEST OF LOCATION DETERMINATION DATA TO MS
405
IS REPORT MESSAGE INCLUDING MEASURED DATA/REJECTION CODE AND REJECTION DURATION RECEIVED?
NO
YES
407
TRANSMIT MEASUREMENT RESPONSE MESSAGE TO HIGHER NODE
END
409
IS MESSAGE INCLUDING INITIATOR IDENTIFIER RECEIVED FROM MS?
NO
YES
411
TRANSMIT MESSAGE FOR REPORTING THAT MS ALLOWS PROVIDING OF LOCATION INFORMATION TO HIGHER NODE

FIG.4

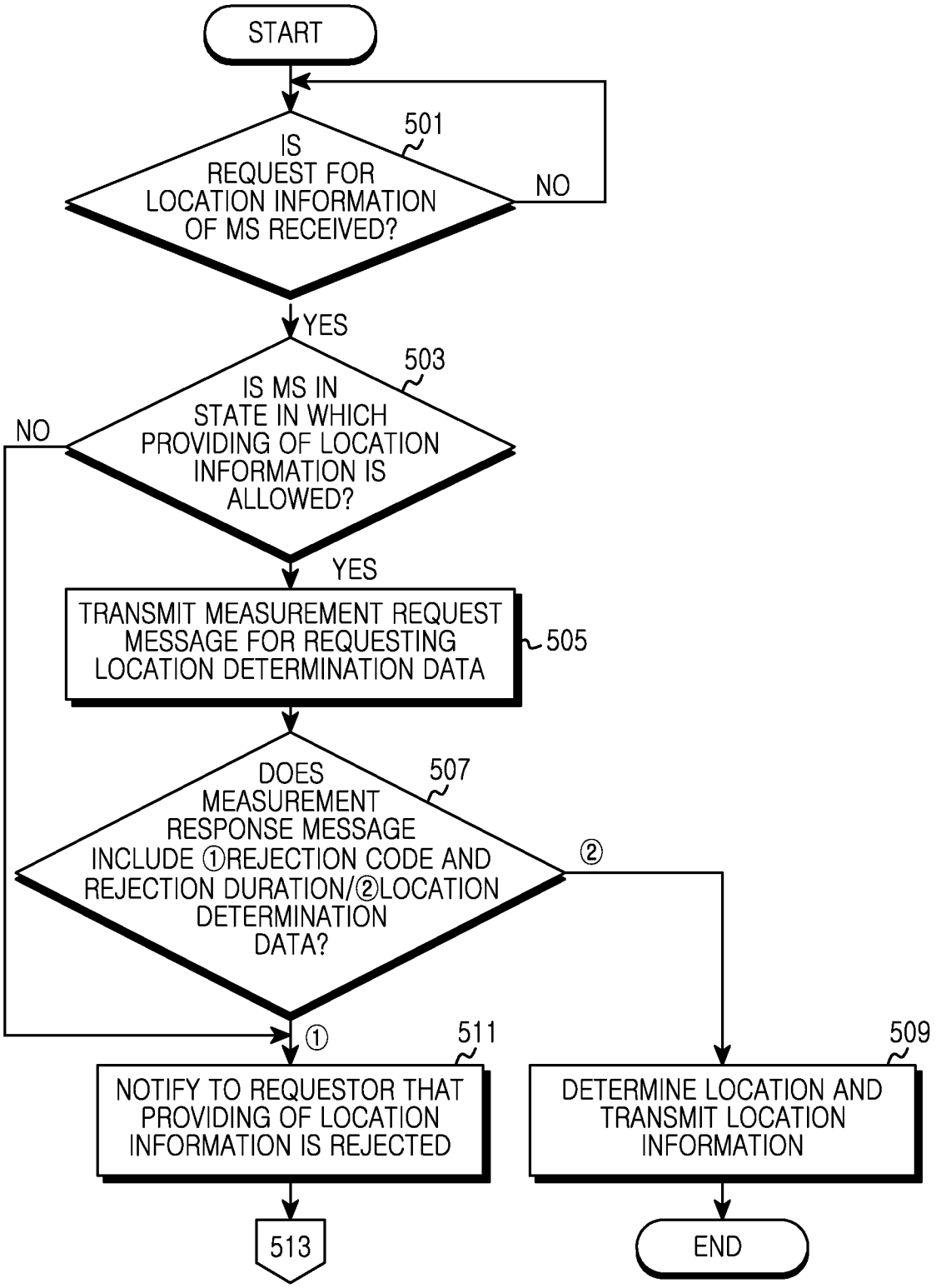

START
501
IS REQUEST FOR LOCATION INFORMATION OF MS RECEIVED?
NO
YES
503
IS MS IN STATE IN WHICH PROVIDING OF LOCATION INFORMATION IS ALLOWED?
NO
YES
TRANSMIT MEASUREMENT REQUEST MESSAGE FOR REQUESTING LOCATION DETERMINATION DATA
505
507
DOES MEASUREMENT RESPONSE MESSAGE INCLUDE ①REJECTION CODE AND REJECTION DURATION/②LOCATION DETERMINATION DATA?
②
①
511
NOTIFY TO REQUESTOR THAT PROVIDING OF LOCATION INFORMATION IS REJECTED
509
DETERMINE LOCATION AND TRANSMIT LOCATION INFORMATION
513
END

FIG.5A

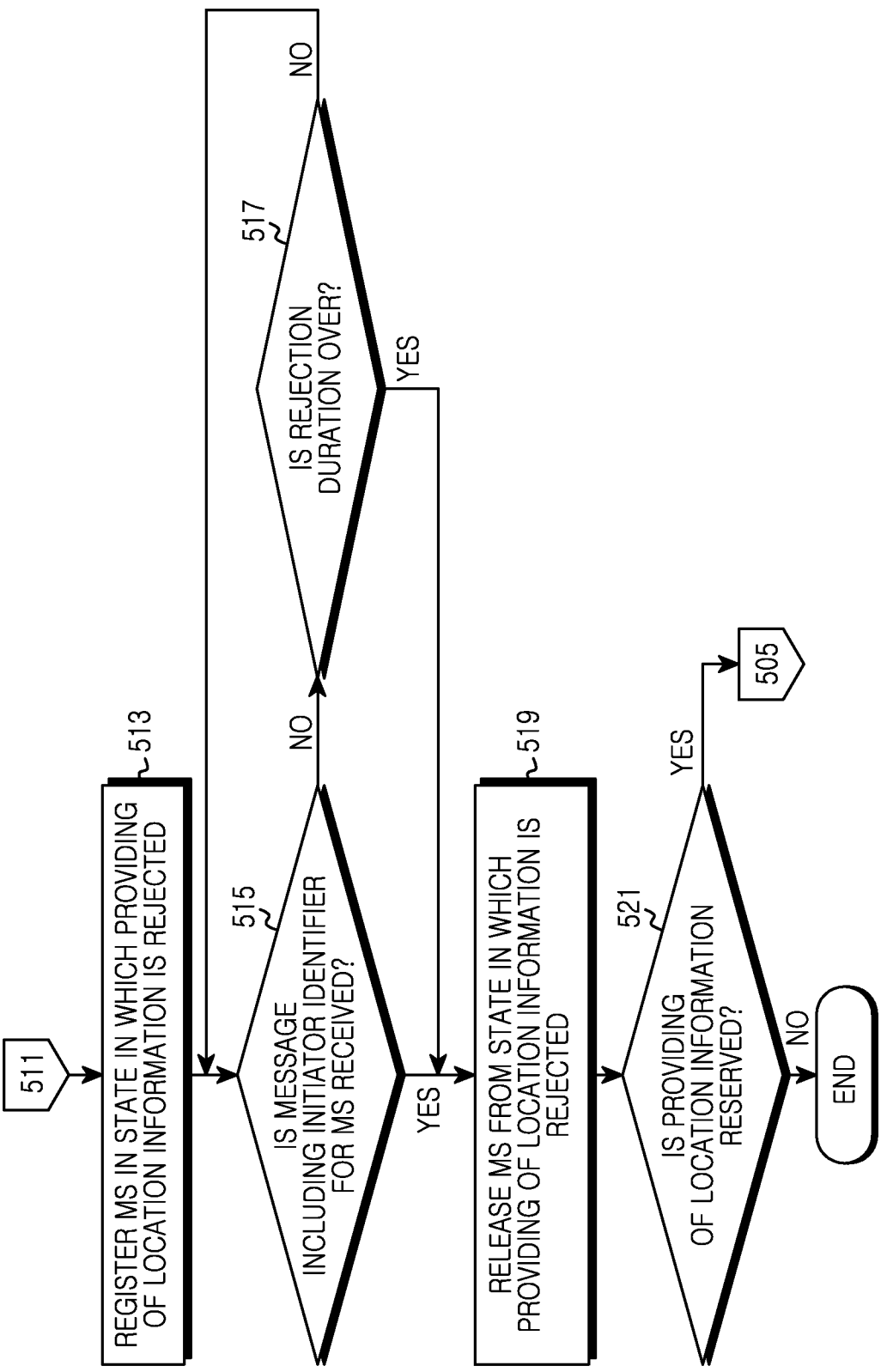

511
REGISTER MS IN STATE IN WHICH PROVIDING OF LOCATION INFORMATION IS REJECTED
513
IS MESSAGE INCLUDING INITIATOR IDENTIFIER FOR MS RECEIVED?
515
NO
YES
IS REJECTION DURATION OVER?
517
NO
YES
RELEASE MS FROM STATE IN WHICH PROVIDING OF LOCATION INFORMATION IS REJECTED
519
IS PROVIDING OF LOCATION INFORMATION RESERVED?
521
YES
NO
505
END

FIG.5B

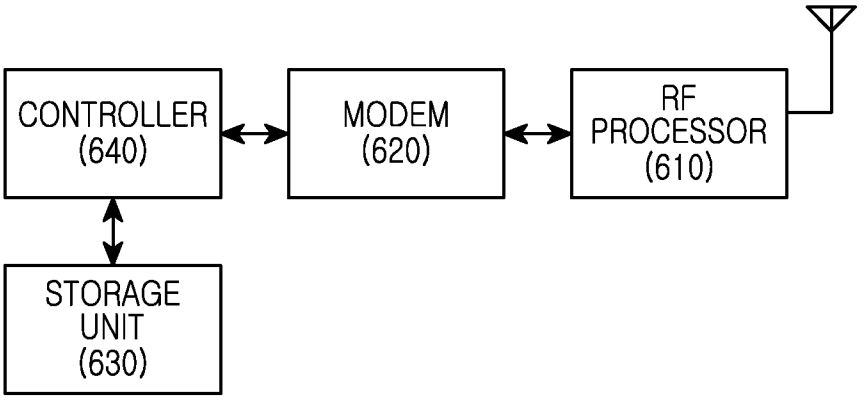


FIG.6

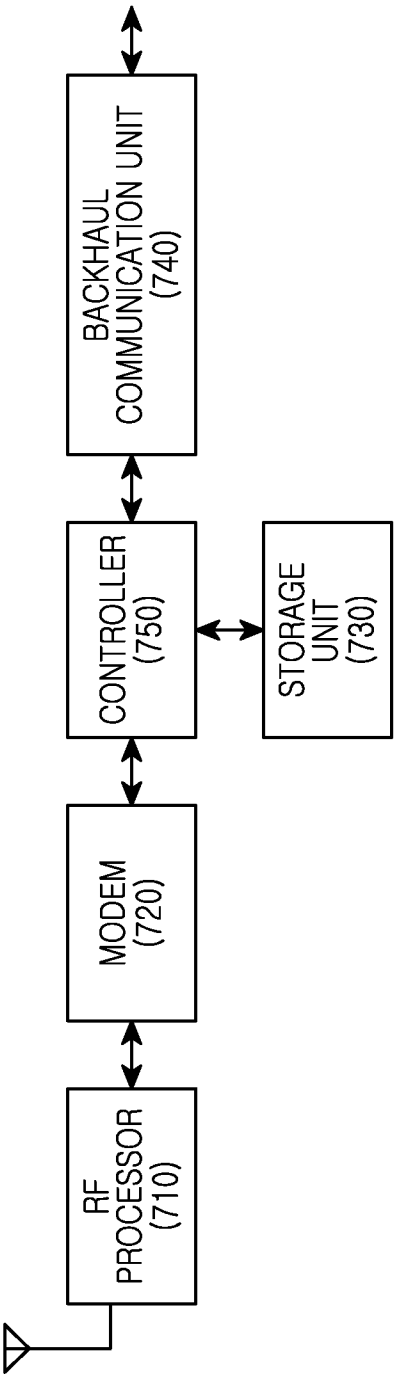

RF PROCESSOR (710)
MODEM (720)
CONTROLLER (750)
STORAGE UNIT (730)
BACKHAUL COMMUNICATION UNIT (740)

FIG. 7

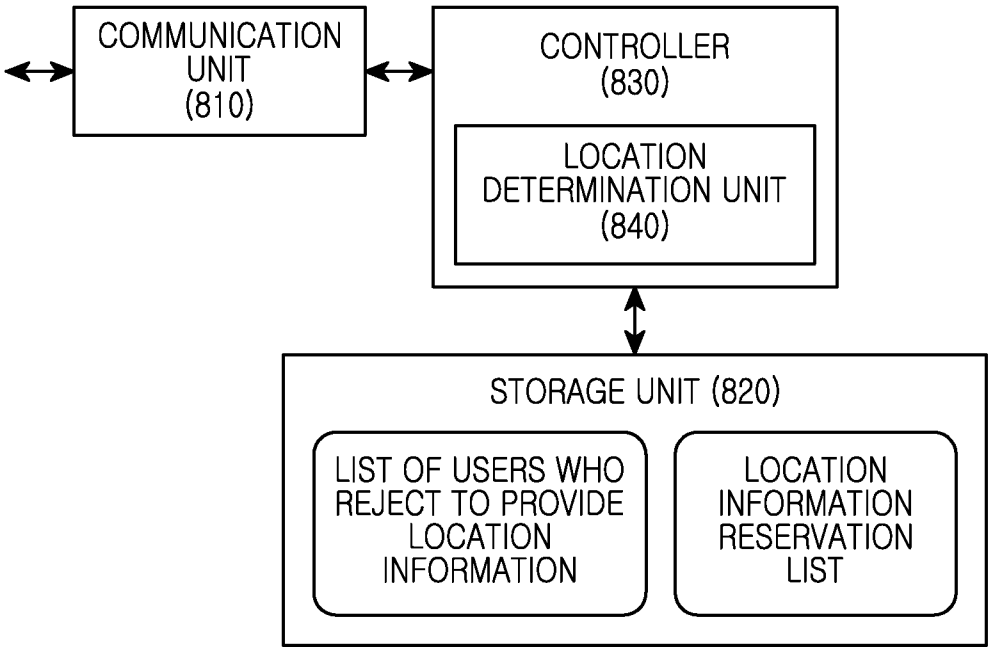

COMMUNICATION UNIT (810)
CONTROLLER (830)
LOCATION DETERMINATION UNIT (840)
STORAGE UNIT (820)
LIST OF USERS WHO REJECT TO PROVIDE LOCATION INFORMATION
LOCATION INFORMATION RESERVATION LIST

FIG.8

APPARATUS AND METHOD FOR CONTROLLING WHETHER TO PROVIDE LOCATION INFORMATION IN BROADBAND WIRELESS ACCESS SYSTEM

PRIORITY

This application is a continuation of prior application Ser. No. 13/367,838, filed on Feb. 7, 2012, which claimed the benefit under 35 U.S.C. §119(a) of a Korean patent application filed in the Korean Intellectual Property Office on Feb. 8, 2011 and assigned Serial No. 10-2011-0010904, the entire disclosure of which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a broadband wireless access system.

2. Description of the Related Art

In a next generation system, i.e., a 4th Generation (4G) communication system, research and commercialization are underway to provide users with various services having a data rate of about 100 Mbps or higher. More particularly, the 4 G communication system is currently being developed to ensure mobility and Quality of Service (QoS) in a Broadband Wireless Access (BWA) communication system, such as a Wireless Local Area Network (WLAN) system and a Wireless Metropolitan Area Network (WMAN) system. A representative example of such a communication system is an Institute of Electrical and Electronics Engineers (IEEE) 802.16 communication system.

According to a service protocol based on an IEEE 802.16e/m and Worldwide Interoperability for Microwave Access (WiMAX) network location, the following procedure proceeds upon receiving a request for delivering location information of a Mobile Station (MS). First, the location server requests a Base Station (BS) to deliver location measurement data of the MS. Upon receiving a request message, the BS delivers a SCaN-ReSPonse (SCN-RSP or Advanced Air Interface (AAI)_SCN-RSP) message, the MS measures a metric indicated by the SCN-RSP (or AAI_SCN-RSP) message and delivers a measurement value to the BS by using a SCaN-REPort (SCN-REP or AAI_SCN-REP) message. Upon receiving the measurement value, the BS delivers the measurement value to the location server. The location server calculates a location of the MS by using measurement data according to a pre-defined location calculation algorithm, and delivers location information to the MS which has requested the location information.

As described above, according to a current wireless protocol, upon receiving the SCN-RSP (or AAI_SCN-RSP) message, the MS always transmits the SCN-REP (or AAI_SCN-REP) message in response thereto. Furthermore, the location server can request location measurement data of one MS up to 16 times according to a configuration of a vendor. However, upon receiving a location measurement data request, the MS can reject transmission of measurement data for reasons of protecting a user's privacy, and the like. In this case, the BS cannot know why the location measurement data is not delivered from the MS, and determines that collecting of the measurement data has failed due to a bad a wireless environment of the MS. As a result, the BS repetitively retransmits the SCN-RSP (or AAI_SCN-RSP) message. Accordingly, although the MS does not transmit the measurement data, wireless resources are wasted due to the repetitive measurement data request of the BS.

Therefore, a need exists for an apparatus and a method for avoiding an unnecessary request of measurement data required to determine a location in a broadband wireless access system.

SUMMARY OF THE INVENTION

Aspects of the present invention are to address at least the above-mentioned problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the present invention is to provide an apparatus and a method for avoiding an unnecessary request of measurement data required to determine a location in a broadband wireless access system.

Another aspect of the present invention is to provide an apparatus and a method for reporting whether a user or a Mobile Station (MS) rejects delivery of measurement data in a broadband wireless access system.

Another aspect of the present invention is to provide an apparatus and a method for reporting a duration in which a user or an MS rejects delivery of measurement data in a broadband wireless access system.

Another aspect of the present invention is to provide an apparatus and a method for reporting that a user or a MS allows delivery of measurement data in a broadband wireless access system.

In accordance with an aspect of the present invention, a method of operating an MS in a broadband wireless access system is provided. The method includes receiving a request to report measurement data required for location determination, determining whether it is in a state in which providing of location information is rejected, and if it is determined that it is in the state in which providing of location information is rejected, transmitting a message for reporting that providing of the location information is rejected.

In accordance with another aspect of the present invention, a method of operating a BS in a broadband wireless access system is provided. The method includes transmitting a request to report measurement data required for location determination to an MS, receiving a message for reporting that providing of location information is rejected, and notifying to a higher node that providing of location information is rejected.

In accordance with another aspect of the present invention, an MS apparatus in a broadband wireless access system is provided. The apparatus includes a modem for receiving a request to report measurement data required for location determination, and a controller for determining whether it is in a state in which providing of location information is rejected, and if it is determined that it is in the state in which providing of location information is rejected, for transmitting a message for reporting that providing of the location information is rejected.

In accordance with another aspect of the present invention, a BS apparatus in a broadband wireless access system is provided. The apparatus includes a modem for transmitting a request to report measurement data required for location determination to an MS, and for receiving a message for reporting that providing of location information is rejected, and a controller for notifying to a higher node that providing of location information is rejected.

Other aspects, advantages, and salient features of the invention will become apparent to those skilled in the art from the following detailed description, which, taken in conjunction with the annexed drawings, discloses exemplary embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other aspects, features, and advantages of certain exemplary embodiments of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a schematic view illustrating a structure of a broadband wireless access system according to an exemplary embodiment of the present invention;

FIG. **2**A illustrates a process of exchanging signals to reject providing of location information in a broadband wireless access system according to an exemplary embodiment of the present invention;

FIG. **2**B illustrates a process of exchanging signals to resume providing of location information in a broadband wireless access system according to an exemplary embodiment of the present invention;

FIG. **3** illustrates a process of operating a Mobile Station (MS) in a broadband wireless access system according to an exemplary embodiment of the present invention;

FIG. **4** illustrates a process of operating a Base Station (BS) in a broadband wireless access system according to an exemplary embodiment of the present invention;

FIGS. **5**A and **5**B illustrate a process of operating a location server in a broadband wireless access system according to an exemplary embodiment of the present invention;

FIG. **6** is a block diagram of an MS in a broadband wireless access system according to an exemplary embodiment of the present invention;

FIG. **7** is a block diagram of a BS in a broadband wireless access system according to an exemplary embodiment of the present invention; and

FIG. **8** is a block diagram of a location server in a broadband wireless access system according to an exemplary embodiment of the present invention.

Throughout the drawings, it should be noted that like reference numbers are used to depict the same or similar elements, features, and structures.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of exemplary embodiments of the invention as defined by the claims and their equivalents. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the invention. In addition, descriptions of well-known functions and constructions may be omitted for clarity and conciseness.

The terms and words used in the following description and claims are not limited to the bibliographical meanings, but are merely used by the inventor to enable a clear and consistent understanding of the invention. Accordingly, it should be apparent to those skilled in the art that the following description of exemplary embodiments of the present invention is provided for illustration purposes only and not for the purpose of limiting the invention as defined by the appended claims and their equivalents.

It is to be understood that the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to "a component surface" includes reference to one or more of such surfaces.

By the term "substantially" it is meant that the recited characteristic, parameter, or value need not be achieved exactly, but that deviations or variations, including for example, tolerances, measurement error, measurement accuracy limitations and other factors known to those of skill in the art, may occur in amounts that do not preclude the effect the characteristic was intended to provide.

An exemplary embodiment of the present invention relates to an apparatus and a method for controlling whether to provide location information by a user in the broadband wireless access system. Exemplary embodiments of the present invention described hereinafter relate to a technique for avoiding an unnecessary request for measurement data required for location determination in a broadband wireless access system. Hereinafter, Orthogonal Frequency Division Multiplexing (OFDM)/Orthogonal Frequency Division Multiple Access (OFDMA)-based wireless communication system will be described.

For convenience of explanation, terms and names defined in a Long Term Evolution (LTE) standard are used in exemplary embodiments of the present invention. However, exemplary embodiments of the present invention are not limited to these terms and names, and thus can also apply to a system conforming to another standard.

An exemplary embodiment of the present invention provides a process of reporting a rejection duration and an intention of rejecting to provide location information of a Mobile Station (MS) and a process of resuming a location-based service by using a resume identifier in the rejection duration in a system including the MS, a Base Station (BS), and a location server.

Hereinafter, the MS includes the concept of an Advanced MS (AMS), the BS includes the concept of an Advanced BS (ABS), and an Access Control Router (ACR) includes the concept of an advanced ACR.

FIGS. **1** through **8**, discussed below, and the various exemplary embodiments used to describe the principles of the present disclosure in this patent document are by way of illustration only and should not be construed in any way that would limit the scope of the disclosure. Those skilled in the art will understand that the principles of the present disclosure may be implemented in any suitably arranged communications system. The terms used to describe various embodiments are exemplary. It should be understood that these are provided to merely aid the understanding of the description, and that their use and definitions in no way limit the scope of the invention. Terms first, second, and the like are used to differentiate between objects having the same terminology and are in no way intended to represent a chronological order, unless where explicitly stated otherwise. A set is defined as a non-empty set including at least one element.

FIG. **1** is a schematic view illustrating a structure of a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **1**, the broadband wireless access system includes an MS **101**, a BS **102**, ACRs **103** and **104**, an Authentication, Authorization, and Accounting (AAA) server **105**, and a location server **106**.

The MS **101** is a user equipment, and communicates with the BS **102** in a wireless fashion by accessing the BS **102**. The MS **101** performs wireless communication according to a system protocol. For example, the MS **101** can support a wireless protocol provided by Institute of Electrical and Electronics Engineers (IEEE) 802.16e, 16m, or 16n.

The BS **102** communicates with the MS **101** through a wireless channel, and takes a role as an intermediate device for accessing the ACR **103** which is a higher node. For example, the BS **102** can support a wireless protocol provided by IEEE 802.16e, 16m, or 16n.

The ACRs **103** and **104** control BSs including the BS **102** located in a macro vendor network, and connect the BSs to a core network. That is, the ACRs **103** and **104** route a data flow between a data core network and the BS **102**, and deliver measurement data provided from the MS **101** to the location server **106** at the request of the location server **106**. For example, in a case of a Worldwide Interoperability for Microwave Access (WiMAX) system, the ACR **103** can be referred to as an Access Service Network GateWay (ASN-GW). According to a function to be executed, the ACRs **103** and **104** can be referred to as a paging controller, an authenticator, a Data Path Function (DPF), etc. More particularly, when providing a location-based service, the ACRs **103** and **104** can be referred to as a location controller.

The AAA server **105** performs authentication and accounting of MSs including the MS **101**. The location server **106** generates location information of the MS **101**. That is, the location server **106** requests a 2nd MS to provide measurement data for determining location information of the 2nd MS at the request of a 1st MS, determines a location of the 2nd MS by using the measurement data, and generates information for reporting the location. In this case, the location server **106** determines whether the 2nd MS rejects to provide the measurement data for location determination, and requests the measurement data according to the determination result.

FIG. **2**A illustrates a process of exchanging signals to reject providing of location information in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **2**A, a location server **250** receives a request for location information of an MS **210** in step **201**. A requester which requests the location information may be another MS.

In step **203**, upon receiving the request of the location information, the location server **250** performs an authentication process with respect to an AAA server **260** to confirm whether the MS **210** is a user registered to a corresponding network, and obtains information of an authenticator **240** for managing the MS **210**. In other words, the location server **250** confirms authentication information on the MS **210** via the authenticator **240**, and confirms information for accessing an ACR capable of reporting state information of the MS **210**.

In step **205**, the location server **250** confirms a state of the MS **210** via the authenticator **240**. In other words, the location server **250** confirms an operation mode of the MS **210**. If the MS **210** operates in an idle mode, although not shown, the location server **250** requests the ACR for performing a paging operation to wake up the MS **210**. That is, the location server **250** allows the MS to measure data for location determination and to change to a state capable of providing the measurement data.

In step **207**, the location server **250** transmits to a location controller **230** a measurement request message for requesting data measurement for location determination. In step **209**, the location controller **230** transmits to a BS **220** a measurement request message for requesting data measurement for location determination.

In step **211**, the BS **220** transmits a scan request message to the MS **210**. For example, the scan request message may be an unsolicited SCaN-ReSPonse (SCN-RSP) message or an unsolicited Advanced Air Interface_SCN-RSP (AAI_SCN-RSP) message. In this case, the scan request message includes information for reporting a metric to be measured by the MS **210**. For example, the metric can include at least one of a Carrier Interference and Noise Ratio (CINR), a Received Signal Strength Indicator (RSSI), a Round Trip Delay (RTD), and a Relative Delay (RD).

In step **213**, upon receiving the scan request message, the MS **210** determines whether to measure a metric requested according to a user's configuration, and transmits a scan report message. Herein, the scan report message may be a SCaN-REPort (SCN-REP) message or an AAI_SCN-REP message. In this case, an exemplary embodiment of the present invention assumes that providing of location information is rejected in the configuration. Accordingly, the MS **210** transmits the scan report message including information for reporting that providing of the location information is rejected and information for reporting a duration in which the rejection is maintained. For convenience of explanation, hereinafter, the 'information for reporting that providing of location information is rejected' is referred to as a rejection code and the 'information for reporting a duration in which rejection is maintained" is referred to as a rejection duration. For example, the rejection code may be one field, and may be set by a value for indicating a specific reason of rejection. For example, a value of the rejection code field may be set by 'privacy'. For example, the scan report message may include fields of Table 1 below.

TABLE 1

Field	Size (bits)	Descriptions
Rejection Code	1	Indicates whether AMS is allowed to be measured
Duration	variable	Indicates the interval AMS cannot be measured.

In addition, the scan report message may further include fields shown in Table 2 below.

TABLE 2

Field	Size (bits)	Descriptions	Condition
Scan duration	8	Duration (in units of AAI subframes) of the requested scanning period.	
Interleaving interval	8	The period of AMS's Active Mode (in units of AAI subframes), which is interleaved between Scan Durations.	
Scan Iteration	6	The requested number of iterating scanning interval by an AMS.	

TABLE 2-continued

Field	Size (bits)	Descriptions	Condition
Recommended start super frame number	6	Represents the 6 least significant bits of the absolute super frame index for which the AMS recommends the first Scanning Interval to start. This field is set to 0 if an AMS has no preferred value.	Present if AMS recommends a start super frame
Recommended start frame index	2	Recommended start frame index within a super frame. 0b00: the 1st frame in a super frame 0b01: the 2nd frame in a super frame 0b10: the 3rd frame in a super frame 0b11: the 4th frame in a super frame	Present if AMS recommends a start super frame
N_Recommended_ABS_Index	6	This is the number of neighboring ABS the AMS plans to scan, which are included in AAI-Narrow Band Receiver (NBR)-ADVanced (ADV) message [0 . . . 63]. When an AMS receives AAI-SCNRSP message from ABS in response to AAI-SCN-REQ message, the AMS shall determine whether Configuration Change Count stored by the AMS is the same as one included in AAISCN-RSP message sent by the ABS. If an AMS detects mismatch of Configuration Change Counts, it may retransmit AAI-SCN-REQ message to the ABS.	Present if AMS uses index instead of full 48-bits BS IDentification (BSID) to identify an ABS it plans to scan
If(N_Recommended_ABS_Index > 0) {			
Configuration Change Count of AAI-NBR-ADV	3	The value of Configuration Change Count in AAI-NBR-ADV message used for neighbor ABS index references	
If (Nbr_Bitmap_Index is present) {			
Nbr_Bitmap_Index	8	Each bit position corresponds to a ABS Index of the corresponding AAINBR-ADV message, where the least significant bit corresponds to the first ABS Index, each next significant bit corresponds to the next ABS Index in sequential order, the most significant bit corresponds to the ABS Index of the last requested ABS, and ABSs with ABS Index greater than the last requested ABS are not requested and do not have a corresponding bit position in the bitmap. Bitmap position bit value: 0: the corresponding ABS is not requested. 1: the corresponding ABS is requested Maximum size of the bitmap is 256 bits	

TABLE 2-continued

Field	Size (bits)	Descriptions	Condition
For(i=0; i< Num of bit which is set to 1 in Nbr_Bitmap_Index; i++) {			
N_Recommended_Carrier_Index	6	Number of carriers the AMS plans to scan at each neighbor ABS [0 . . . 63]	Present when a neighbor ABS is a multicarrier ABS
For(j=0; j<N_Recommended_Carrier_Index; j++) {			
Recommended Carrier Index	6	Requested physical carrier index for scan at each neighbor ABS	
}			
}			
} else {			
For(i=0; i<N_Recommended_ABS_Index; i++) {			
Neighbor ABS index	8	ABS index corresponds to the position of ABS in AAI-NBR-ADV message.	
N_Recommended_Carrier_Index	6	Number of carriers the AMS plans to scan at each neighbor ABS [0 . . . 63]	Present when a neighbor ABS is a multicarrier ABS
For(j=0; j<N_Recommended_Carrier_Index; j++) {			
Recommended Carrier Index	6	Requested physical carrier index for scan at each neighbor ABS	Present when a neighbor ABS is a multicarrier ABS
}			
}			
}			
}//end of If(N_Recommended_ABS_Index > 0)			
N_Recommended_ABS_Full	6	Number of neighbor ABS the AMS plans to scan which are using full 48-bit ABSID [0 . . . 63].	Present if AMS decides to use full 48 bits BSID to identify an ABS
For(i=0; i< N_Recommended_ABS_Full; i++) {			
Recommended ABS ID	48	ABS ID of the ABSs the AMS plans to scan	
N_Recommended_Carrier_Index	6	Number of carriers the AMS plans to scan at each neighbor ABS [0 . . . 63].	Present when a neighbor ABS is a multicarrier ABS
For(j=0; j<N_Recommended_Carrier_Index; j++) {			
Recommended Carrier Index	6	Requested physical carrier index for scan at each neighbor ABS	Present when a neighbor ABS is a multicarrier ABS
}			
}			
N_Recommended_SA_Preamble_Index	4	Number of SA preambles the AMS plans to scan [0 . . . 15]	Present if AMS requests to scan SA preambles
For(i=0;			

TABLE 2-continued

Field	Size (bits)	Descriptions	Condition
i<N_Recommended_SA_ Preamble_Index; i++) {			
SA Preamble Index	6	SA Preamble indices the AMS plans to scan	Present if AMS requests to scan SA preambles
}			
N_Recommended_Carrier_Index_at_Serving_ABS	6	Number of carriers the AMS plans to scan at each neighbor ABS.	Present if AMS decides to scan other carriers of the S-ABS
For(i=0; i<N_Recommended_Carrier_Index_at_Serving_ABS; i++) {			
Recommended Carrier index at S-ABS	6	Recommended physical carrier index of the S-ABS the AMS plans to scan	Present if AMS decides to scan other carriers of the S-ABS
}			
for (i=0; i<N_CSG_ID_Infos; i++) {		N_CSG_ID_Infos is the number of CSG ID Information blocks [0 . . . 15].	Optional for loop. May be included for quick CSG membership detection or ABS reselection assistance
Operator ID of the CSG Femtocell	24	The Operator ID of the CSG Femtocell	Present if the Operator ID is different from the one of the ABS
for (j=0; j<N_CSG_IDs; j++) {		N_CSG_IDs is the number of Carrier Services Gateway (CSG) IDs belongs to this Operator ID.	
CSGID	variable	The CSGID within the Operator ID. It may be part of the BS ID, with certain bits inside indicating its length. If the CSG has single BS, it may be of maximum length which is the LSB-24 bits of the full BS ID.	
}			
]			

In step **215**, upon receiving the scan report message including the rejection code and the rejection duration, the BS **220** transmits a measurement response message to the location controller **230**. In this case, the measurement response message includes the rejection code and the rejection duration included in the scan report message.

In step **217**, upon receiving the measurement response message, the location controller **230** transmits a measurement response message to the location server **250**. In this case, the measurement response message includes the rejection code and the rejection duration.

In step **219**, upon receiving the measurement response message including the rejection code and the rejection duration, the location server **250** recognizes that the MS **210** rejects to provide the location information, and notifies that providing of the location information to the MS which has requested the location information in step **201** is rejected. Furthermore, the location server **250** recognizes that providing of the location information is rejected during a duration indicated by the rejection duration included in the measurement response message. Therefore, even if the location information of the MS **210** is requested during the duration indicated by the rejection duration, the location server **250** immediately notifies that providing of the location information is not possible without transmission of the measurement request message of step **207**. That is, the location server **250** registers the MS **210** as an MS not capable of providing the location information during the rejection duration. In other words, the location server **250** manages the MS **210** during the rejection duration in a state in which providing of the location information is rejected.

An MS which has received the notification for reporting that providing of the location information is rejected can request providing of the location information of the MS **210** when providing of the location information of the MS **210** is allowed. In this case, when the rejection duration is over, the location server **250** can perform a process for determining the location of the MS **210**, and can provide the location information.

However, if it is notified that the location information will be provided from the MS **210** before the rejection duration is

over, the location server **250** releases the MS **210** registered as the MS not capable of providing the location information. The process of releasing the MS **210** from the MS not capable of providing the location information will be described below with reference to FIG. **2**B.

FIG. **2**B illustrates a process of exchanging signals to resume providing of location information in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **2**B, in step **251**, the MS **210** is in a state in which providing of location information is rejected, and the location server **250** also recognizes that providing of location information is rejected.

In step **253**, the MS **210** recognizes that providing of location information is allowed by a user's manipulation, and transmits to the BS **220** a scan request message including information for reporting that providing of location information is allowed. For convenience of explanation, the 'information for reporting providing of location information is allowed is hereinafter referred to as an 'initiator identifier'. The initiator identifier can be referred to as a Location Based Service (LBS) indicator. For example, the scan request message may be an SCN-REQ message or an AAI_SCN-REQ message. For example, the scan request message may include fields of Table 3 below.

TABLE 3

Field	Size (bits)	Descriptions
LBS Indication	1	

In addition, the scan request message may further include fields of Table 4 below.

TABLE 4

Field	Size (bits)	Descriptions	Condition
Scan duration	8	Duration (in units of AAI subframes) of the requested scanning period.	
Interleaving interval	8	The period of AMS's Active Mode (in units of AAI subframes), which is interleaved between Scan Durations.	
Scan Iteration	6	The requested number of iterating scanning interval by an AMS.	
Recommended start super frame number	6	Represents the 6 least significant bits of the absolute super frame index for which the AMS recommends the first Scanning Interval to start. This field is set to 0 if an AMS has no preferred value.	Present if AMS recommends a start super frame
Recommended start frame index	2	Recommended start frame index within a super frame. 0b00: the 1st frame in a super frame 0b01: the 2nd frame in a super frame 0b10: the 3rd frame in a super frame 0b11: the 4th frame in a super frame	Present if AMS recommends a start super frame
N_Recommended_ABS_Index	6	This is the number of neighboring ABS the AMS plans to scan, which are included in AAI-NBR-ADV message [0 . . . 63]. When an AMS receives AAI-SCNRSP message from ABS in response to AAI-SCN-REQ message, the AMS shall check whether Configuration Change Count stored by the AMS is the same as one included in AAISCN-RSP message sent by the ABS. If an AMS detects mismatch of Configuration Change Counts, it may retransmit AAI-SCN-REQ message to the ABS.	Present if AMS uses index instead of full 48-bits BSID to identify an ABS it plans to scan
If(N_Recommended_ABS_Index > 0) {			
Configuration Change Count of AAI-NBR-ADV	3	The value of Configuration Change Count in AAI-NBR-ADV message used for	

TABLE 4-continued

Field	Size (bits)	Descriptions	Condition
		neighbor ABS index references	
If (Nbr_Bitmap_Index is present) {			
Nbr_Bitmap_Index	8	Each bit position corresponds to a ABS Index of the corresponding AAINBR-ADV message, where the least significant bit corresponds to the first ABS Index, each next significant bit corresponds to the next ABS Index in sequential order, the most significant bit corresponds to the ABS Index of the last requested ABS, and ABSs with ABS Index greater than the last requested ABS are not requested and do not have a corresponding bit position in the bitmap. Bitmap position bit value: 0: the corresponding ABS is not requested. 1: the corresponding ABS is requested Maximum size of the bitmap is 256 bits	
For(i=0; i< Num of bit which is set to 1 in Nbr_Bitmap_Index; i++) {			
N_Recommended_Carrier_Index	6	Number of carriers the AMS plans to scan at each neighbor ABS [0 . . . 63]	Present when a neighbor ABS is a multicarrier ABS
For(j=0; j<N_Recommended_Carrier_Index; j++) {			
Recommended Carrier Index	6	Requested physical carrier index for scan at each neighbor ABS	
}			
}			
} else {			
For(i=0; i<N_Recommended_ABS_Index; i++) {			
Neighbor ABS index	8	ABS index corresponds to the position of ABS in AAI-NBR-ADV message.	
N_Recommended_Carrier_Index	6	Number of carriers the AMS plans to scan at each neighbor ABS [0 . . . 63]	Present when a neighbor ABS is a multicarrier ABS
For(j=0; j<N_Recommended_Carrier_Index; j++) {			
Recommended Carrier Index	6	Requested physical carrier index for scan at each neighbor ABS	Present when a neighbor ABS is a multicarrier ABS
}			
}			
}			
}//end of If(N_Recommended_ABS_Index > 0)			
N_Recommended_ABS_Full	6	Number of neighbor ABS the AMS plans to scan which are using full 48-bit ABSID [0 . . . 63].	Present if AMS decides to use full 48 bits BSID to identify an ABS
For(i=0; i< N_Recommended_ABS_Full; i++) {			
Recommended ABS ID	48	ABS ID of the ABSs the AMS plans to scan	

TABLE 4-continued

Field	Size (bits)	Descriptions	Condition
N_Recommended_Carrier_Index	6	Number of carriers the AMS plans to scan at each neighbor ABS [0 . . . 63].	Present when a neighbor ABS is a multicarrier ABS
For(j=0; j<N_Recommended_Carrier_Index; j++) {			
Recommended Carrier Index	6	Requested physical carrier index for scan at each neighbor ABS	Present when a neighbor ABS is a multicarrier ABS
}			
}			
N_Recommended_SA_Preamble_Index	4	Number of SA preambles the AMS plans to scan [0 . . . 15]	Present if AMS requests to scan SA preambles
For(i=0; i<N_Recommended_SA_ Preamble_Index; i++) {			
SA Preamble Index	6	SA Preamble indices the AMS plans to scan	Present if AMS requests to scan SA preambles
}			
N_Recommended_Carrier_Index_at_Serving_ABS	6	Number of carriers the AMS plans to scan at each neighbor ABS.	Present if AMS decides to scan other carriers of the S-ABS
For(i=0; i<N_Recommended_Carrier_Index_at_Serving_ABS; i++) {			
Recommended Carrier index at S-ABS	6	Recommended physical carrier index of the S-ABS the AMS plans to scan	Present if AMS decides to scan other carriers of the S-ABS
}			
for (i=0; i<N_CSG_ID_Infos; i++) {		N_CSG_ID_Infos is the number of CSG ID Information blocks [0 . . . 15].	Optional for loop. May be included for quick CSG membership detection or ABS reselection assistance
Operator ID of the CSG Femtocell	24	The Operator ID of the CSG Femtocell	Present if the Operator ID is different from the one of the ABS
for (j=0; j<N_CSG_IDs; j++) {		N_CSG_IDs is the number of CSG IDs belongs to this Operator ID.	
CSGID	variable	The CSGID within the Operator ID. It may be part of the BS ID, with certain bits inside indicating its length. If the CSG has single BS, it may be of maximum length which is the LSB-24 bits of the full BS ID.	
}			
]			

In step **255**, upon receiving the scan request message including the initiator identifier, the BS **220** transmits to the location controller **230** a resume notify message including the initiator identifier. In step **257**, upon receiving the resume notify message, the location controller **230** transmits to the location server **250** the resume notify message including the initiator identifier. Accordingly, the location server **250** recognizes that the MS **210** allows providing of the location information.

In step **259**, the MS **210** is in a state in which providing of location information is allowed, and the location server **250** also recognizes that the MS **210** allows providing of location information through step **257**. Therefore, when the location server **250** receives the location information of the MS **210** after step **257**, the location server **250** transmits a measurement request message to request the MS **210** to measure data required for location determination.

If a requestor which is rejected to receive location information of the MS **210** requests providing of the location information of the MS **210** when providing of the location information of the MS **210** is allowed, although not shown, the location server **250** can perform a process of determining

a location of the MS **210** after step **257**, and can provide the location information. That is, the requestor of the location information can reserve providing of location information when the MS **210** is in the state in which providing of location information is allowed. In this case, when the MS **210** is in the state in which providing of location information is allowed, the location server **250** provides the location information of the MS **210** to the requestor.

Hereinafter, an operation and structure of an MS, a BS, and a location server for controlling whether to provide location information as described above will be described with reference to the accompanying drawings.

For convenience of explanation, 'data measured by the MS and required for location determination of the location server' is hereinafter referred to as 'location determination data'.

FIG. **3** illustrates a process of operating an MS in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **3**, the MS confirms whether a report request of location determination data is received in step **301**. For example, the report request may be an unsolicited SCN-RSP message or an unsolicited AAI_SCN-RSP message. In this case, the report request may include information for indicating a metric to be measured by the MS. For example, the metric may include at least one of CINR, RSSI, RTD, and RD.

Upon receiving the report request, the MS determines whether providing of location information is allowed in a current state in step **303**. In other words, the MS confirms whether it is in a state in which providing of location information is allowed by using user's configuration information. In this case, although not shown, the MS can inquire the user whether to allow providing of location information and can confirm a choice of the user. The inquiry can be achieved by displaying of an inquiry screen on a display means or by outputting announcement words for the inquiry through a speaker.

If it is determined in step **303** that the state in which providing of location information is allowed, the MS measures the location determination data and transmits a report message including measured data in step **305**. That is, the MS measures a parameter corresponding to a metric included in the report request. Thereafter, the MS transmits a report message including a measurement result. For example, the report message may be an SCN-REP message or an AAI_SCN-REP message.

In contrast, if it is determined in step **303** that it is not the state in which providing of location information is allowed, in other words, if it is in a state in which providing of location information is rejected, the MS transmits a report message including a rejection code and a rejection duration in step **307**. In this case, the rejection duration can be set by a pre-defined value, and can be set by any value selected by the user. For example, the rejection code and the rejection duration can be defined as shown in Table 1 above.

In step **309**, the MS confirms whether the current state changes to the state in which providing of location information is allowed before the rejection duration is over. In other words, the MS confirms whether configuration information is changed to allow providing of location information before the rejection duration is over. Herein, the configuration information can be changed by a user's manipulation or when a pre-defined condition is satisfied.

If the current state is changed to the state in which providing of location information is allowed before the rejection duration is over, the MS transmits a message including an initiator identifier in step **311**. For example, the message may be an SCN-REQ message or an AAI_SCN-REQ message. For example, the initiator identifier can be defined as shown in Table 3 above.

FIG. **4** illustrates a process of operating a BS in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **4**, the BS confirms whether a measurement request message for requesting location determination data of an MS is received from a higher node in step **401**. For example, the higher node can be an ACR for performing a function of a location controller.

Upon receiving the measurement request message, the BS transmits a report request of the location determination data to the MS in step **403**. For example, the report request may be an unsolicited SCN-RSP message or an unsolicited AAI_SCN-RSP message. In this case, the report request may include information for indicating a metric to be measured by the MS. For example, the metric may include at least one of CINR, RSSI, RTD, and RD.

In step **405**, the BS confirms whether a report message including measured data or a report message including a rejection code and a rejection duration is received. That is, if the MS is in the state in which providing of location information is allowed, the report message including the measured data is received, and if the MS is in the state in which providing of location information is rejected, the report message including the rejection code and the rejection duration is received. For example, the rejection code and the rejection duration can be defined as shown in Table 1 above. For example, the report message may be an SCN-REP message or an AAI_SCN-REP message.

Upon receiving the report message, the BS transmits to the higher node a measurement response message including information included in the report message in step **407**. In other words, the BS transmits to the higher node the measurement response message including the measured data or the measurement response message including the rejection code and the rejection duration.

If the measurement request message is not received in step **401**, the BS confirms whether a message including an initiator identifier is received from the MS in step **409**. The initiator identifier is information for reporting that the MS in the state in which providing of location information is rejected allows providing of location information. For example, the message may be an SCN-REQ message or an AAI_SCN-REQ message. For example, the initiator identifier can be defined as shown in Table 3 above.

Upon receiving the message including the initiator identifier, the BS transmits a message for reporting that the MS allows providing of location information to the higher node in step **411**. For example, the message can be referred to as a resume notify message. For example, the BS transmits the resume notify message including the initiator identifier to the higher node.

FIGS. **5**A and **5**B illustrate a process of operating a location server in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIGS. **5**A and **5**B, the location server confirms whether a request for location information of an MS is received in step **501**. The request for location information includes identification information for the MS. A requester which requests the location information may be another MS.

Upon receiving the request for location information of the MS, the location server confirms whether the MS is in a state in which providing of location information is allowed in step **503**. For example, the location server can manage a list of users who reject to provide location information. In this case,

the location server confirms whether the list includes the identification information of the MS. In this case, although not shown, the location server can perform an authentication process with respect to the MS, and can confirm whether the MS operates in an active mode by using an authenticator for managing the MS. If the MS operates in an idle mode, the location server can request an ACR for performing a paging operation to wake up the MS. If it is determined in step **503** that the MS is not in the state in which providing of location information is allowed, in other words, if the MS is in a state in which providing of location information is rejected, the procedure proceeds to step **511**.

In contrast, if the MS is in the state in which providing of location information is allowed, the location server transmits a measurement request message for requesting the location determination data in step **505**. The measurement request message may include information for specifying a metric to be measured by the MS. For example, the metric may include at least one of CINR, RSSI, RTD, and RD. The measurement request message can be transmitted to the ACR for performing a function of the location controller.

In step **507**, the location server receives a measurement response message in response to the measurement request message, and confirms whether the measurement response message includes a rejection code and a rejection duration or whether the measurement response message includes the location determination data. That is, when the MS remains in the state in which providing of location information is allowed, the location determination data is included, and when the MS changes to the state in which providing of location information is rejected, the rejection code and the rejection duration are included. For example, the rejection code and the rejection duration can be defined as shown in Table 1 above.

If the location determination data is included in the measurement response message, the location server determines a location of the MS by using the location determination data, and transmits location information of the MS to the requestor in step **509**. In other words, the location server estimates the location of the MS by using data measured by the MS according to a pre-defined location calculation algorithm, and transmits the location information to the requestor.

In contrast, if the measurement response message includes the rejection code and the rejection duration, the location server notifies to the requestor that providing of location information is rejected in step **511**. According to another exemplary embodiment of the present invention, although not shown, after notifying that providing of the location information is rejected, the location server can receive a reservation for providing the location information from the requestor. That is, the requestor can reserve providing of the location information when the rejection of providing the location information of the MS is released. In this case, the location server records reservation contents. For example, the location server can manage a list of reservation contents. In this case, the location server appends identification information of the requestor and the MS to the list. According to yet another exemplary embodiment of the present invention, the reservation can be included preliminarily in the location information request of step **501**.

In step **513**, the location server registers the MS in the state in which providing of location information is rejected. For example, the location server can manage a list of users who reject to provide location information. In this case, the location server appends the identification information of the MS to the list.

After registering the MS in the state in which providing of location information is rejected, the location server confirms whether a message including an initiator identifier for the MS is received in step **515**. The initiator identifier is information for reporting that the MS in the state in which providing of location information is rejected allows providing of location information. For example, the message can be referred to as a resume notify message. If it is determined in step **515** that the message including the initiator identifier is not received, the location server determines in step **517** whether the rejection duration confirmed in step **507** is over.

If it is determined in step **515** that the message including the initiator identifier is received or if it is determined in step **517** that the rejection duration is over, the location server releases the MS from the state not capable of providing location information in step **519**. For example, the location server can manage the list of users who reject to provide location information. In this case, the location server deletes the identification information of the MS from the list.

After releasing the MS from the state not capable of providing location information, the location server determines whether there is a reservation for providing location information of the MS in step **521**. For example, the location server can manage a list of reservation contents. In this case, the location server confirms whether the list includes the identification information of the MS. If the reservation of providing the location information of the MS exists, the location server confirms identifier information of the requestor corresponding to the reservation from the list, and the procedure returns to step **505**. That is, if the reservation exists, the location server performs a process of determining a location of the MS.

FIG. **6** is a block diagram of an MS in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **6**, the MS includes a Radio Frequency (RF) processor **610**, a modem **620**, a storage unit **630**, and a controller **640**.

The RF processor **610** performs a function for transmitting and receiving a signal through a wireless channel by performing signal band conversion, amplification, etc. That is, the RF processor **610** up-converts a baseband signal provided from the modem **620** into an RF signal, and transmits the RF signal through an antenna, and also down-converts an RF signal received through the antenna into a baseband signal. For example, the RF processor **610** can include an amplifier, a mixer, an oscillator, a Digital to Analog Converter (DAC), an Analog to Digital Converter (ADC), etc.

The modem **620** performs a function for performing conversion between the baseband signal and a bit-stream according to a physical layer protocol. For example, when using Orthogonal Frequency Division Multiplexing (OFDM), in data transmission, the modem **620** generates complex-valued symbols by coding and modulating a transmission bit-stream, maps the complex-valued symbols to subcarriers, and performs an Inverse Fast Fourier Transform (IFFT) operation and a Cyclic Prefix (CP) insertion, thereby constituting OFDM symbols. In addition, in data reception, the modem **620** splits the baseband signal provided from the RF processor **610** on an OFDM symbol basis, restores signals mapped to the subcarriers by using a Fast Fourier Transform (FFT) operation, and restores a reception bit-stream by performing demodulation and decoding.

The storage unit **630** stores data, such as a basic program for operating the MS, an application program, system configuration information, user configuration information, etc.

Furthermore, the storage unit **630** provides the stored data at the request of the controller **640**.

The controller **640** provides overall control to the MS. For example, the controller **640** generates a transmission packet to provide it to the modem **620**, and interprets a reception packet provided from the modem **620**. In addition, the controller **640** measures location determination data at the request of the location server, and controls a function for providing the location determination data. The controller **640** controls whether to provide the location determination data. For example, the controller **640** controls the MS to operate as described above with reference to FIG. **3**.

To control whether to provide the location determination data, the controller **640** operates as follows. Upon receiving a report request of the location determination data, the controller **640** determines whether a current state is a state in which providing of location information is allowed. In this case, the controller **640** can inquire a user whether to allow providing of location information and can confirm a choice of the user. If it is in the state in which providing of location information is allowed, the controller **640** measures the location determination data and transmits a report message including measured data. In contrast, if it is in the state in which providing of location information is rejected, the controller **640** generates a report message including a rejection code and a rejection duration, and transmits the report message via the modem **620** and the RF processor **610**. For example, the rejection code and the rejection duration can be defined as shown in Table 1 above. Thereafter, when the current state is changed to the state in which providing of location information is allowed before the rejection duration is over, the controller **640** generates a message including an initiator identifier, and transmits the message including the initiator identifier via the modem **620** and the RF processor **610**. For example, the initiator identifier can be defined as shown in Table 3 above.

FIG. **7** is a block diagram of a BS in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **7**, the BS includes an RF processor **710**, a modem **720**, a storage unit **730**, a backhaul communication unit **740**, and a controller **750**.

The RF processor **710** performs a function for transmitting and receiving a signal through a wireless channel by performing signal band conversion, amplification, etc. That is, the RF processor **710** up-converts a baseband signal provided from the modem **720** into an RF signal, and transmits the RF signal through an antenna, and also down-converts an RF signal received through the antenna into a baseband signal. For example, the RF processor **710** can include an amplifier, a mixer, an oscillator, a DAC, an ADC, etc.

The modem **720** performs a function for performing conversion between the baseband signal and a bit-stream according to a physical layer protocol. For example, when using OFDM, in data transmission, the modem **720** generates complex-valued symbols by coding and modulating a transmission bit-stream, maps the complex-valued symbols to subcarriers, and performs an IFFT operation and a CP insertion, thereby constituting OFDM symbols. In addition, in data reception, the modem **720** splits the baseband signal provided from the RF processor **710** on an OFDM symbol basis, restores signals mapped to the subcarriers by using a FFT operation, and restores a reception bit-stream by performing demodulation and decoding.

The storage unit **730** stores data, such as a basic program for operating the BS, an application program, system configuration information, etc. Furthermore, the storage unit **730** provides the stored data at the request of the controller **750**. The backhaul communication unit **740** provides an interface through which the BS can communicate with ACRs for performing a function of higher nodes, e.g., a location controller, an authenticator, etc. That is, the backhaul communication unit **740** converts a bit-stream transmitted from the BS to the higher node into a physical layer signal, and converts a physical signal received from the higher node into a bit-stream.

The controller **750** provides overall control to the BS. For example, the controller **750** generates a transmission packet to provide it to the modem **720**, and interprets a reception packet provided from the modem **720** or the backhaul communication unit **740**. More particularly, the controller **750** processes a message for controlling whether to provide location determination data of the MS. For example, the controller **750** controls the BS to operate as described above with reference to FIG. **4**.

To process the message for controlling whether to provide the location determination data of the MS, the controller **750** operates as follows. Upon receiving a measurement request message for requesting the location determination data of the MS from a higher node, the controller **750** transmits a report request of the location determination data to the MS. Thereafter, upon receiving the report message from the MS via the RF processor **710** and the modem **720**, the controller **750** generates a measurement response message including information included in the report message, and transmits the measurement response message to the higher node via the backhaul communication unit **740**. In this case, if the MS is in the state in which providing of location information is allowed, the report message including the measured data is received, and if the MS is in the state in which providing of location information is rejected, the report message including the rejection code and the rejection duration is received. For example, the rejection code and the rejection duration can be defined as shown in Table 1 above. Upon receiving a message including an initiator identifier from the MS via the RF processor **710** and the modem **720**, the controller **750** generates a message for reporting that the MS allows providing of location information, and transmits the message to the higher node via the backhaul communication unit **740**. For example, the initiator identifier can be defined as shown in Table 3 above.

FIG. **8** is a block diagram of a location server in a broadband wireless access system according to an exemplary embodiment of the present invention.

Referring to FIG. **8**, the location server includes a communication unit **810**, a storage unit **820**, and a controller **830**.

The communication unit **810** provides an interface for performing communication with other entities in a network. The storage unit **820** stores basic programs for operating the location server, configuration information, etc. More particularly, the storage unit **820** stores a list of users who reject to provide location information, and the list includes identification information of the users who reject to provide the location information. In addition, the storage unit **820** can store a location information reservation list including contents reserved to provide location information of an MS which rejects to provide location information.

The controller **830** provides overall control to the location server. For example, the controller **830** requests the MS to report location determination data according to a location information request of the MS. A location determination unit **840** included in the controller **830** calculates a location of the MS according to a pre-defined location calculation algorithm. More particularly, the controller **830** determines whether there is a request of location determination data according to

whether the MS rejects to provide location information. For example, the controller **830** controls the location server to operate as described above with reference to FIG. **5**.

To control a process of requesting location determination data according to whether the user rejects to provide location information, the controller **830** operates as follows. Upon generation of a location information request of the MS from a requestor, the controller **830** confirms whether the MS is in a state in which providing of location information is allowed. For example, the controller **830** confirms whether identification information of the MS is included in the list showing users who reject to provide location information and stored in the storage unit **820**. If the MS is in the state in which providing of location information is rejected, the controller **830** notifies to the requestor that providing of location information is rejected. In contrast, if the MS is in the state in which providing of location information is allowed, the controller **830** generates a measurement request message for requesting location determination data, and transmits the measurement determination data via the communication unit **810**.

Thereafter, the controller **830** confirms whether a measurement response message received via the communication unit **810** includes a rejection code and a rejection duration, or whether the measurement response message includes location determination data. That is, when the MS remains in the state in which providing of location information is allowed, the location determination data is included, and when the MS changes to the state in which providing of location information is rejected, the rejection code and the rejection duration are included. For example, the rejection code and the rejection duration can be defined as shown in Table 1 above. If the measurement response message includes the rejection code and the rejection duration, the controller **830** notifies the requestor that providing of location information is rejected. Furthermore, the controller **830** registers the MS in the state in which providing of location information is rejected. For example, the controller **830** can append identification information of the MS to the list showing users who reject to provide location information and stored in the storage unit **820**. After registering the MS in the state in which providing of location information is rejected, if the message including the initiator message is received or if the rejection duration is over, the controller **830** releases the MS from the state of not capable of providing location information.

According to another exemplary embodiment of the present invention, after notifying that providing of location information is rejected, the controller **830** can receive a reservation for providing location information from the requestor. Upon receiving the reservation, the controller **830** appends identification information of the requestor and the MS to the location information reservation list stored in the storage unit **820**. According to yet another exemplary embodiment of the present invention, the reservation may be preliminarily included in an initial location information request. Furthermore, upon occurrence of the reservation, if the MS is released from the state in which providing of location information is rejected, the controller **830** performs a process of determining a location of the MS without an additional request.

According to exemplary embodiments of the present invention, since an MS delivers user's rejection information in a broadband wireless access system, measurement data can be prevented from being requested again from a location server when a BS retransmits a request message or when a timeout occurs. In addition, when a user intends to resume a service within a rejection duration delivered to a location server, an initiator identifier can be delivered to effectively resume a location-based service.

While the invention has been shown and described with reference to certain exemplary embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims and their equivalents.

What is claimed is:

1. A method for operating a server in a wireless access system, the method comprising:
- receiving a request for location information of a mobile station;
- transmitting a measurement request message for requesting measurement data used for location determination of the mobile station;
- receiving a measurement response message comprising a rejection duration in which providing of location information is rejected;
- transmitting a notification that the request for the location information is rejected;
- receiving an indication message indicating that providing of the measurement data is allowed; and
- changing a state of the mobile station into a first state in which the providing of the measurement data is allowed, based on the indication message.

2. The method of claim **1**, further comprising:
- determining a state of the mobile station as a second state in which providing of the measurement data is rejected.

3. The method of claim **2**, further comprising:
- generating a list of mobile stations in the second state.

4. The method of claim **1**, further comprising:
- receiving a request for reserving to provide the location information.

5. The method of claim **1**, wherein the request for the location information comprises a request for reserving to provide the location information.

6. The method of claim **1**, further comprising:
- changing a state of the mobile station into the first state in which providing of the measurement data is allowed, upon an expiration of the rejection duration.

7. The method of claim **1**, further comprising:
- changing a state of the mobile station into the first state in which providing of the measurement data is allowed; and
- transmitting a measurement request message for requesting data for determining the location information of the mobile station.

8. The method of claim **1**, further comprising:
- determining whether the mobile station operates in an idle mode; and
- transmitting a request message to page the mobile station, based on a determination that the mobile station operates in the idle mode.

9. An apparatus for a server in a wireless access system, the apparatus comprising:
- a communication unit configured to:
  - receive a request for location information of a mobile station,
  - transmit a measurement request message for requesting measurement data used for location determination of the mobile station,
  - receive a measurement response message comprising a rejection duration in which providing of location information is rejected,
  - transmit a notification that the request for the location information is rejected, and

receive an indication message indicating that providing of the measurement data is allowed; and

a controller configured to change a state of the mobile station into a first state in which the providing of the measurement data is allowed, based on the indication message.

10. The apparatus of claim **9**,

wherein the controller is further configured to determine a state of the mobile station as a second state in which providing of the measurement data is rejected.

11. The apparatus of claim **10**, wherein the controller is further configured to generate a list of mobile stations in the second state.

12. The apparatus of claim **9**, wherein the communication unit is further configured to receive a request for reserving to provide the location information.

13. The apparatus of claim **9**, wherein the request for the location information comprises a request for reserving to provide the location information.

14. The apparatus of claim **9**,

wherein the controller is further configured to, change a state of the mobile station into the first state in which providing of the measurement data is allowed, upon an expiration of the rejection duration.

15. The apparatus of claim **9**,

wherein the controller is further configured to change a state of the mobile station into the first state in which providing of the measurement data is allowed, and

wherein the communication unit is further configured to transmit a measurement request message for requesting data for determining the location information of the mobile station.

16. The apparatus of claim **9**,

wherein the controller is further configured to determine whether the mobile station operates in an idle mode, and

wherein the communication unit is further configured to transmit a request message to page the mobile station, based on a determination that the mobile station operates in the idle mode.

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