



(86) Date de dépôt PCT/PCT Filing Date: 2005/11/01
(87) Date publication PCT/PCT Publication Date: 2006/05/11
(45) Date de délivrance/Issue Date: 2013/01/08
(85) Entrée phase nationale/National Entry: 2007/04/30
(86) N° demande PCT/PCT Application No.: CN 2005/001818
(87) N° publication PCT/PCT Publication No.: 2006/047942
(30) Priorité/Priority: 2004/11/01 (CN200410094523.3)

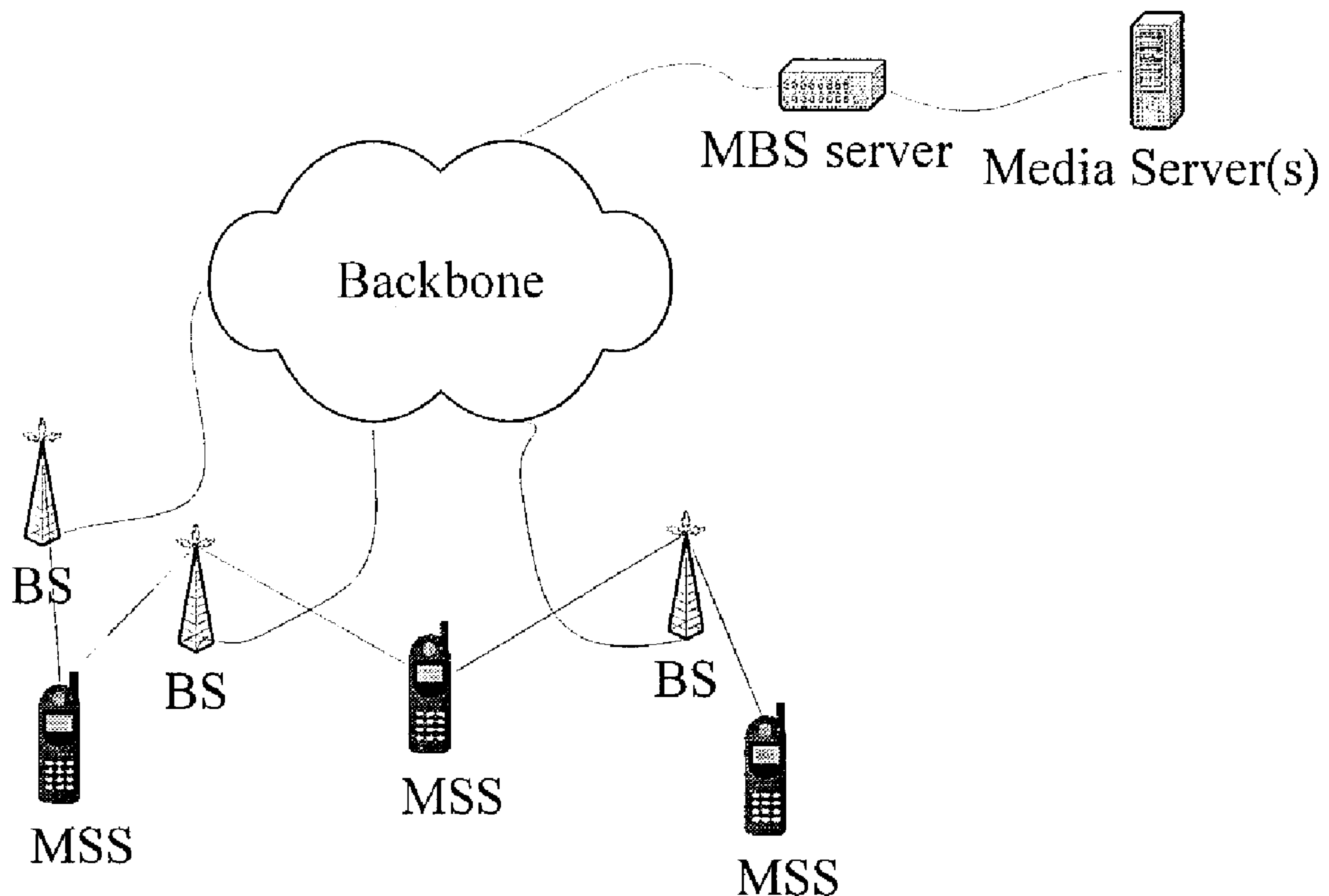
(51) Cl.Int./Int.Cl. *H04W 4/06* (2009.01),
H04H 20/57 (2008.01), *H04H 60/90* (2008.01),
H04W 24/00 (2009.01)

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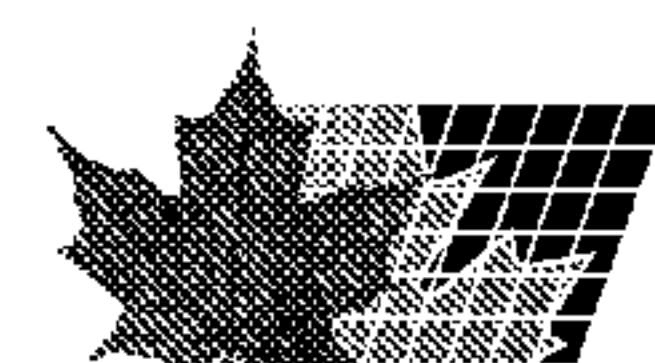
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(54) Titre : METHODE , SYSTEME ET DISPOSITIF DE REALISATION D'UNE RESSOURCE INDIQUANT UN SERVICE DE MULTIDIFFUSION ET DE DIFFUSION
(54) Title: METHOD, SYSTEM AND APPARATUS OF REALIZING INDICATING RESOURCE OF MULTICAST AND BROADCAST SERVICE (MBS)



(57) Abrégé/Abstract:

The present invention discloses a method of realizing indicating resource of MBS, and the method comprises: a Down Link-MAP (DL-MAP) message sent by a Base Station (BS) carries resource information associated Multicast and Broadcast Service (MBS);



(57) Abrégé(suite)/Abstract(continued):

receiving the DL-MAP message sent by BS, Mobile Station (MS) judges whether the service information associated with MBS comprised in this message is identical to that stored by the MS itself, if yes, the MS determines the physical channel resource occupied by MBS according to the resource information which is associated with MBS and carried in this message. The present invention also discloses another method of realizing indicating resource of MBS. The present invention solves the problem that the prior art cannot directly perform resource indication upon multicast service. Through the scheme of the present invention, position of the physical channel resource occupied by the MBS-MAP message corresponding to multicast service can be determined, and various specific positioning measures are provided thereof.

Abstract

The present invention discloses a method of realizing indicating resource of MBS, and the method comprises: a Down Link-MAP (DL-MAP) message sent by a Base Station (BS) carries resource information associated
5 Multicast and Broadcast Service (MBS); receiving the DL-MAP message sent by BS, Mobile Station (MS) judges whether the service information associated with MBS comprised in this message is identical to that stored by the MS itself, if yes, the MS determines the physical channel resource occupied by MBS according to the resource information which is associated with MBS and carried in this
10 message. The present invention also discloses another method of realizing indicating resource of MBS. The present invention solves the problem that the prior art cannot directly perform resource indication upon multicast service. Through the scheme of the present invention, position of the physical channel resource occupied by the MBS-MAP message corresponding to multicast service
15 can be determined, and various specific positioning measures are provided thereof.

Method, System and Apparatus of Realizing Indicating Resource of Multicast and Broadcast Service (MBS)

Field of the Technology

The present invention generally relates to physical resource indicating technique
5 in MBS, more particularly to a method, a system and apparatus of realizing indicating resource of Multicast and Broadcast Service (MBS).

Background of the Invention

With the rapid development of Internet technology, large amounts of multimedia services have emerged, among them some application services requiring that multiple
10 users receive the same data at the same time, namely multicasting the data, and such application services include video on demand, television broadcasting, video conference, online education, interactive games and so on.

Multicast service is the technique that can transfer the data from a data source to multiple destinations, including multicast and broadcast. As to broadcast service, in
15 traditional mobile networks, Cell Broadcast Service (CBS) only allows transferring low speed data to all users through the shared broadcast channel of the cell, which belongs to message services. As to multicast service, there has been IP multicast technique in terms of existing IP network, but the mobile network has special network structure, function entities and wireless interfaces, which are different from those of
20 IP network, so current IP multicast techniques are only applicable for cable IP networks while not applicable for mobile networks. In addition, compared with common services, mobile multimedia services have the characteristics such as large quantity of data, long time of duration, sensitive time delay and so on. Therefore, transmission techniques of current broadcast services and multicast services are not
25 applicable for data transmission of mobile multimedia services.

In order to utilize mobile network resources effectively, on one hand, a Wide Code Division Multiple Access/Global System for Mobile Communications (WCDMA/GSM) global standardization organization, the Third Generation Partnership Project (3GPP), put forward Multimedia Broadcast/Multicast Service
30 (MBMS), and Multicast and Broadcast Service (MBS) is introduced into the latest protocol IEEE802.16e/D5 by the Institute of Electrical and Electronics Engineers

(IEEE) 802.16. MBMS and MBS provide the specifications of transferring the data from one data source to multiple users in the mobile network, so that the mobile network can provide point to multipoint service of transferring the data from one data source to multiple users, thereby network resources can be shared, utilization ratio of network resources is increased, and especially utilization ratio of idle interface resources is increased too. The newly provided MBMS and MBS cannot only implement multicast and broadcast of low speed messages such as plain text, but also that of high speed multimedia services, and this is obviously in trend of future mobile data development.

10 The network structure of MBS put forward by IEEE802.16 protocol is as shown in figure 1. In figure 1, MBS server, a mobile network function entity, is added to support MBS, MBS server acts as the entry to content providers on one hand, and on the other hand, MBS server manages multicast data transmission of underlying Base Stations (BS) as well as distributes the multicast data to the underlying BS. In addition, 15 the function entities, such as Mobile Station (MS), BS and so on, need to be enhanced by adding service functions associated with MBS service.

MBS operations mainly include the following parts: obtaining the list information of MBS, authenticating MBS and obtaining the encryption key of MBS, and receiving the MBS normally. Specifically speaking, before normally receiving MBS service, 20 MS acquires information like MBS content list etc. from MBS server firstly, and then requests BS to authenticate the receiving of MBS content; if the authentication is passed, BS transmits information including MBS downlink service parameters and so on to MS, and then MS requests BS to return the key of MBS; upon receiving the downlink service parameters and the key of MBS, MS can receive related Media 25 Access Control Protocol Data Unit (MAC PDU) and receive the MBS service normally.

The procedure of normally receiving MBS service mainly refers to receiving the MBS service content by using the received MBS downlink service parameters. In current standard draft, MBS downlink service parameters mainly include MBS ZONE 30 identifier and Multicast Connection ID (Multicast CID). After the MBS downlink service parameters are obtained, physical resource indication has to be performed for MS during the service reception of MBS so as to implement the reception of MBS content.

In the latest protocol IEEE802.16e/D5 of current IEEE802.16, MBS-MAP message is introduced, which includes Information Elements (IEs) as shown in table 1.

Syntax	Size	Notes
MBS-MAP Message Format() {		
Management Message Type = ?	8 bits	
Frame number	24 bits	The frame number is identical to the frame number in the DL-MAP
for ($i = 0; i < n; i++$) {		
Multicast CID	12 bits	12 LSB of CID for multicast
Modulation and Coding mode (DIUC)	4 bits	
OFDMA Symbol offset	8 bits	OFDMA symbol offset with respect to start of the MBS zone
Subchannel offset	6 bits	
Power Offset (Boosting)	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: -3dB; 110: -9dB; 111: -12dB;
No. OFDMA Symbols	7 bits	
No. Subchannels	6 bits	
Repetition Coding Indication	2 bits	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
Next MBS frame offset	8 bits	The Next MBS frame offset value is lower 8 bits of the frame number in which the BS shall transmit the next MBS frame.
Next MBS OFDMA Symbol offset	8 bits	The offset of the OFDMA symbol in which the next MBS zone starts, measured in OFDMA symbols from the beginning of the downlink frame in which the MBS-MAP is transmitted.
}		
if !(byte boundary) {		
Padding Nibble	4 bits	Padding to reach byte boundary.
}		
}		

Table 1

MBS-MAP message is used to notify the physical channel resource allocated for specific Multicast CID in the given MBS ZONE. MBS-MAP message provides the modulation and coding mode (which is indicated by Downlink Interval Usage Code(UIDC)) and power offset (which is indicated by Boosting) which are used in the given physical channel resource (i.e. Burst) and position of the next service frame of MBS. Therefore, if only MBS-MAP message can be correctly detected, according to this message, MS can obtain the physical channel resource corresponding to the multicast connection, get the modulation and coding mode and power offset etc, which are used in this physical channel resource, and determine position of the next MBS frame including this multicast connection, thereby normally receive the data

through the multicast connection. Therefore, while receiving the MBS service, MS can implement physical resource indication through the MBS-MAP message.

Due to the above-mentioned reasons, MS has to determine position of the MBS-MAP message when MS is receiving the MBS service initially or the service reception of MBS is desynchronized due to poorer channel quality. IEEE802.16e/D5 protocol offered one implementing mode, which is to introduce an IE, i.e. an MBS-MAP IE (MBS-MAP_IE ()) to indicate position of the MBS-MAP message, into the Downlink channel Map (DL-MAP). The structure of this MBS-MAP_IE () is as shown in figure 2. If MS detects that the MBS ZONE identifier and Multicast CID included in this IE are identical to those of the MBS service expected to be received by this MS, the MS can receive the associated MBS-MAP message at the corresponding OFDM Symbol Offset.

Syntax	Size	Notes
MBS MAP IE {		
Extended DIUC	4 bits	MBS MAP = 0x05
Length	4 bits	Length = 0x03
Multicast CID	12 bits	12 LSB of CID for multicast
MBS ZONE identifier	7 bits	MBS ZONE identifier corresponds to the identifier provided by the BS at connection initiation
OFDMA Symbol offset	8 bits	The offset of the OFDMA symbol in which the MBS zone starts, measured in OFDMA symbols from the beginning of the downlink frame in which the DL-MAP is transmitted.
Macro diversity enhanced	1 bits	0 = Non Macro-Diversity enhanced zone 1 = Macro-Diversity enhanced zone
If (Macro diversity enhanced == 1){		
Permutation	2 bits	0b00 = PUSC permutation 0b01 = FUSC permutation 0b10 = Optional FUSC permutation 0b11 = Adjacent subcarrier permutation
ID cell	6 bits	
}		
else {		
Reserved	8 bits	
}		
}		

Table 2

It can be seen from table 2 that, only the OFDMA symbol offset, in which the MBS zone starts, is the position information of MBS-MAP message in the MBS-MAP_IE (). As to MBS-MAP message, if just the MBS-MAP_IE () in DL-MAP message is indexed, because the practical physical channel resource occupied by the MBS-MAP message cannot be determined only by the information of the OFDMA symbol offset in which the MBS zone starts, thus the physical channel resource

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occupied by MBS cannot be determined, and then the service reception of MBS cannot be implemented.

Summary of the Invention

In view of above, the present invention is to provide a method, a system and
 5 apparatus of realizing indicating resource of MBS, so as to normally receive the MBS service by initially positioning the physical channel resource occupied by the MBS-MAP message.

And the present invention is to provide a method, a system and apparatus of realizing indicating resource of MBS, wherein less system message resource is needed for normally receiving the MBS.

10 The technical scheme of the present invention is implemented as follows:

A method of determining the physical channel resource of the multicast and broadcast service (MBS)-MAP message in multicast and broadcast service (MBS) system, wherein:

resource information associated with the multicast and broadcast service
 15 (MBS)-MAP message is carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP message (DL-MAP) sent by a base station (BS) and identifies the physical channel resource occupied by the MBS-MAP message, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels
 20 occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message; and

a Mobile Station (MS) receives the downlink channel MAP message (DL-MAP) sent by base station (BS), judges whether service information associated with multicast and broadcast service (MBS) zone comprised in this downlink map message (DL-MAP) is identical
 25 to that the Mobile Station (MS) expects to receive and, if yes, the Mobile Station (MS) determines the physical channel resource occupied by the MBS-MAP message utilizing said resource information.

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Wherein, the service information associated with multicast and broadcast service (MBS) zone at least comprises a multicast and broadcast service (MBS) zone identifier.

Wherein, the service information associated with multicast and broadcast service (MBS) zone further comprises a multicast connection identifier (Multicast CID).

Wherein, said resource information uniquely defines the position of the physical channel resource occupied by the MBS-MAP message.

Wherein, modulation and coding mode information relating to the MBS-MAP message is carried in the downlink channel MAP message (DL-MAP); and

the Mobile Station (MS), after determining the physical channel resource occupied by the MBS-MAP message, receives the MBS-MAP message according to the modulation and coding mode information carried in the downlink map message (DL-MAP).

Wherein, said resource information defines the relative position of the physical channel resource occupied by the MBS-MAP message in the multicast and broadcast service (MBS) zone.

Wherein, said OFDMA symbol offset is for determining the starting position of the MBS zone.

A method of transmitting, in a multicast and broadcast service (MBS) system, resource information associated with an MBS-MAP message and service information associated with the multicast and broadcast service (MBS) zone, wherein:

said resource information is carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP message (DL-MAP) sent by a base station (BS) and identifies the physical channel resource occupied by the MBS-MAP message,

wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

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A cellular telecommunications system operable for providing a multicast and broadcast service, comprising

a plurality of base stations operable for transmitting resource information associated with an MBS-MAP message and service information associated with the multicast
5 and broadcast service (MBS) zone,

said resource information being carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP messages (DL-MAP) sent by the base stations (BS) and identifying the physical channel resource occupied by an MBS-MAP message relating to the MBS zone, wherein the resource information comprises orthogonal frequency
10 division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message; and

a plurality of Mobile Stations (MS) operable to receive the downlink channel MAP message (DL-MAP) sent by the base stations (BS), judge whether service information
15 associated with multicast and broadcast service (MBS) zone comprised in this downlink map message (DL-MAP) is identical to that the Mobile Station (MS) expects to receive and, if yes, the Mobile Station (MS) is operable to determine the physical channel resource occupied by the MBS-MAP message utilizing the resource information.

A base station, for a cellular telecommunications system providing a multicast
20 and broadcast service,

wherein said base station is operable for transmitting resource information and service information associated with the multicast and broadcast service (MBS) zone, said resource information being carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP messages (DL-MAP) sent by the base stations (BS) and identifying the
25 physical channel resource occupied by an MBS-MAP message relating to the MBS zone, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

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A Mobile Station (MS) for receiving a multicast and broadcast service from the base station, said Mobile Station being operable to receive the downlink channel MAP message (DL-MAP) sent by the base stations (BS), to judge whether service information associated with multicast and broadcast service (MBS) zone comprised in this downlink map message (DL-MAP) is identical to that the Mobile Station (MS) expects to receive and, if yes, to determine the physical channel resource occupied by the MBS-MAP message utilizing the resource information which is carried in the MBS-MAP-IE of the downlink channel map (DL-MAP) message.

A method of realizing indicating resource of Multicast and Broadcast Service (MBS), comprising:

setting the launching position of an MBS-MAP message in a Downlink channel MAP (DL-MAP) message;

a base station (BS) sending the MBS-MAP message through a Broadcast Connection Identifier (Broadcast CID);

receiving the message sent by the base station (BS) through the Broadcast CID, a Mobile Station (MS) determining the position of this MBS-MAP message if the received message is judged to be MBS-MAP message according to the message type.

In the present invention, after MS determines that the service information associated with MBS included in the DL-MAP message sent by BS is identical to that stored by the MS itself, position of the physical channel resource occupied by MBS is determined according to the resource information associated with MBS.

In the present invention, by directly setting the position information associated MBS-MAP message in the MBS-MAP_IE () in the DL-MAP message, position of the practical physical channel resource occupied by MBS-MAP message can be determined through the MBS-MAP_IE ().

In the present invention, the Multicast CID field in the MBS-MAP_IE () can also further be deleted, so that the Multicast CID in the same MBS ZONE can share one MBS-MAP_IE () to decrease the load of DL-MAP message.

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By setting the relative position information of the physical channel resource occupied by MBS-MAP message in the MBS ZONE, and setting the said modulation and coding mode used in the physical channel resource, the present invention can determine starting position of the MBS ZONE through the MBS-MAP_IE (), so as to position the
5 practical physical channel resource occupied by MBS-MAP message.

In addition, the present invention also provides an implementing scheme for sending the MBS-MAP message through Broadcast CID and for the MS to determine position of the practical physical channel resource corresponding to the received MBS-MAP message. The present invention provides multiple selections for positioning
10 the MBS-MAP message.

In accordance with another aspect, the present invention provides a method of determining physical channel resource of a multicast and broadcast service (MBS)-MAP message in an MBS system, wherein: resource information associated with the MBS-MAP message is carried in an MBS-MAP information element, MBS-MAP-IE, of
15 a downlink channel MAP message (DL-MAP) sent by a base station (BS) and identifies physical channel resource occupied by the MBS-MAP message, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode
20 (DIUC) of the MBS-MAP message; and a Mobile Station (MS) receives the DL-MAP sent by the BS, judges whether service information associated with an MBS zone comprised in the DL-MAP message is identical to that the MS expects to receive, and, if yes, the MS determines the physical channel resource occupied by the MBS-MAP message utilizing the resource information.

25 In accordance with yet another aspect, the present invention provides a method of transmitting, in a multicast and broadcast service (MBS) system, resource information associated with an MBS-MAP message and service information associated with an MBS zone, wherein: said resource information is carried in an MBS-MAP

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information element (MBS-MAP-IE) of a downlink channel MAP message (DL-MAP) sent by a base station (BS) and identifies the physical channel resource occupied by the MBS-MAP message, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, boosting, the
5 number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

In accordance with a further aspect, there is provided a method of determining, in a Mobile Station, the physical channel resource occupied by a multicast and broadcast (MBS)-MAP message utilizing resource information transmitted by a base
10 station in accordance with the method as described herein, wherein the Mobile Station (MS) receives the downlink channel MAP message (DL-MAP) sent by the base station (BS), judges whether service information associated with multicast and broadcast service (MBS) zone comprised in this downlink map message (DL-MAP) is identical to that reserved by the Mobile Station (MS) itself and, if yes, the Mobile Station (MS)
15 determines the physical channel resource occupied by the MBS-MAP message utilizing the resource information comprising orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

20 In accordance with a further aspect, the present invention provides a cellular telecommunications system operable for providing a multicast and broadcast service, comprising a plurality of base stations operable for transmitting resource information associated with an MBS-MAP message and service information associated with an multicast and broadcast service (MBS) zone, said resource information being
25 carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP messages (DL-MAP) sent by the base stations, BS and identifying the physical channel resource occupied by an MBS-MAP message relating to the MBS zone, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the
30 number of subchannels occupied by the MBS-MAP message, and modulation and

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coding mode (DIUC) of the MBS-MAP message; and a plurality of Mobile Stations (MS) operable to receive the DL-MAP message sent by the base stations (BS), judge whether service information associated with MBS zone comprised in the MBS-MAP-IE is identical to that the MS expects to receive and, if yes, the MS is operable to determine the
5 physical channel resource occupied by the MBS-MAP message utilizing the resource information.

In accordance with yet a further aspect, the present invention provides a base station, for a cellular telecommunications system providing a multicast and broadcast service, wherein said base station is operable for transmitting resource
10 information associated with an MBS-MAP message and service information associated with a multicast and broadcast service (MBS) zone, said resource information being carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP messages (DL-MAP) sent by the base stations (BS) and identifying the physical channel resource occupied by an MBS-MAP message relating to the MBS zone, wherein the
15 resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

In accordance with a further aspect, there is provided a Mobile Station
20 (MS) for receiving a multicast and broadcast service from a base station as described herein, said Mobile Station being operable to receive the downlink channel MAP message (DL-MAP) sent by the base stations (BS), to judge whether service information associated with MBS zone comprised in an MBS-MAP-IE of the DL-MAP message is identical to that the MS expects to receive and, if yes, to determine the physical channel
25 resource occupied by an MBS-MAP message utilizing the resource information which is carried in the MBS-MAP-IE of the DL-MAP message, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode
30 (DIUC) of the MBS-MAP message.

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In accordance with still a further aspect, the present invention provides a method of realizing indicating resource of Multicast and Broadcast Service (MBS), comprising: setting the launching position of an MBS-MAP message in a Downlink channel MAP (DL-MAP) message; a base station (BS) sending the MBS-MAP message through a Broadcast Connection Identifier (Broadcast CID); receiving the message sent by the base station (BS) through the Broadcast CID, a Mobile Station (MS) determining the position of this MBS-MAP message if the received message is judged to be MBS-MAP message according to the message type.

Brief Description of the Drawings

Figure 1 is a schematic diagram illustrating the network structure of MBS service put forward in current IEEE802.16 protocol.

Detailed Description of the Invention

The scheme of the present invention will be illustrated in detail hereinafter with reference to specific embodiments.

The first embodiment of the present invention is mainly to add a field describing the specific physical channel resource occupied by the MBS-MAP message to the MBS-MAP_IE () in DL-MAP message, and the structure of the MBS-MAP_IE () with an added field is as shown in figure 3.

Syntax	Size	Notes
MBS MAP_IE {		
Extended DIUC	4 bits	MBS_MAP = 0x05
Length	4 bits	Length = 0x03
Multicast CID	12 bits	12 LSB of CID for multicast
MBS ZONE identifier	7 bits	MBS ZONE identifier corresponds to the identifier provided by the BS at connection initiation
OFDMA Symbol offset	8 bits	The offset of the OFDMA symbol in which the MBS ZONE starts, measured in OFDMA symbols from the beginning of the downlink frame in which the DL-MAP is transmitted.

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Subchannel offset	6 bits	
Power Offset (Boosting)	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: - 3dB; 110: -9dB;111: -12dB;
No. OFDMA Symbols	7 bits	

No. Subchannels	6 bits	
DIUC	4 bits	
Repetition Coding Indication	2 bits	0b00 –No repetition coding 0b01 –Repetition coding of 2 used 0b10 –Repetition coding of 4 used 0b11 –Repetition coding of 6 used
Macro diversity enhanced	1 bits	0 = Non Macro-Diversity enhanced zone 1 = Macro-Diversity enhanced zone
If (Macro diversity enhanced == 1){		
Permutation	2 bits	0b00 = PUSC permutation 0b01 = FUSC permutation 0b10 = Optional FUSC permutation 0b11 = Adjacent subcarrier permutation
ID cell	6 bits	
}		
else {		
Reserved	8 bits	
}		
}		

Table 3

Compared with the original MBS-MAP_IE (), the MBS-MAP_IE () shown in figure 3 mainly adds Subchannel offset, Boosting, No. of OFDMA Symbols, No. of Subchannels and DIUC, wherein these pieces of information together with OFDMA Symbol offset can uniquely determine position of the physical channel resource occupied by the MBS-MAP message as well as the used modulation and coding mode. When MS detects that Multicast CID and MBS ZONE identifier in the MBS-MAP_IE () of DL-MAP message are identical to the ones which the MS expects to receive, MS can directly obtain the position of corresponding MBS-MAP message, and then obtain the physical channel resource allocated for corresponding “Multicast CID” from the MBS-MAP message, thereby the multicast messages can be normally received.

Therein Multicast CID and/or MBS ZONE identifier are service information associated with MBS; MBS-MAP message includes the service information associated with MBS.

Therefore, in the described embodiment, position of the physical channel resource occupied by the MBS-MAP message can be determined by using the MBS-MAP_IE () and then MBS service can be normally received.

Besides, the described first embodiment can be further improved to acquire the second embodiment of the present invention by deleting the Multicast CID field in the MBS-MAP_IE (). As MBS MAP message and MBS ZONE are corresponding to each other, if MS detects that the MBS ZONE identifier in the MBS-MAP_IE () is identical

to the one that the MS expects to receive, MS can determine that the relevant position information in the MBS-MAP message of this IE is the needed position information.

Since MBS-MAP message can carry multiple Multicast CIDs, DL-MAP message needs to carry multiple MBS-MAP_IE () accordingly, but the Multicast CID field is
 5 deleted in the second embodiment of the present invention, so the Multicast CID in the same MBS ZONE can share one MBS-MAP_IE (), so that the load of DL-MAP message is decreased.

The third embodiment is implemented mainly based on the corresponding relation between MBS ZONE and MBS-MAP message. At present, positioning the
 10 MBS ZONE can be implemented through the MBS-MAP_IE () in the DL-MAP message, but MBA-MAP message and MBS ZONE are corresponding to each other, therefore, this embodiment firstly specifies the subchannel defining manner (Permutation and IDCELL) used in MBS ZONE, the relative position of the specific physical channel resource occupied by the MBS-MAP message in MBS ZONE as
 15 well as the used modulation and coding mode. Wherein, this physical channel resource specifically includes subchannels and OFDMA symbols. For instance, it can be specified that the first to the fourth OFDM symbol in MBS ZONE as well as the first to the third subchannel are used to transfer the MBS-MAP messages after the defining mode of a subchannel is specified.

20 With respect to the above setting, MS determines the position information of the MBS ZONE according to the OFDMA Symbol offset in the MBS- MAP_IE () at first after receiving the DL-MAP message, and then determines the physical channel resource according to the relative position of this physical channel resource occupied by the MBS-MAP message in the MBS ZONE. Wherein, the relative position
 25 information of the physical channel resource in the MBS ZONE includes: OFDMA Symbol offset, subchannel offset, No. of the OFDMA symbols and No. of the subchannels.

The fourth embodiment of the preset invention is to send the MBS-MAP message through Broadcast CID, of course, the launching position of the MBS-MAP
 30 message should be specified in the relevant IE in the DL-MAP message beforehand, so that BS can send the MBS-MAP message through this launching position, wherein the relevant IE of the DL-MAP message can be DL-MAP IE (DL-MAP_IE ()). Since

MS receives the information carried by all Broadcast CIDs, if detecting the type of a message is identical to that of MBS-MAP message, MS will determine this message as an MBS-MAP message, and the MS receiving the MBS-MAP message can certainly determine the position of the MBS-MAP message.

- 5 The above are just the preferred embodiments of the present invention, and should not be used to confine the protection scope of the present invention, as detailed by the claim hereinafter.

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CLAIMS:

1. A method of determining physical channel resource of a multicast and broadcast service (MBS)-MAP message in an MBS system, wherein:

resource information associated with the MBS-MAP message is carried
5 in an MBS-MAP information element, MBS-MAP-IE, of a downlink channel MAP message (DL-MAP) sent by a base station (BS) and identifies physical channel resource occupied by the MBS-MAP message, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, boosting, the number of OFDMA symbols and the number of
10 subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message; and

a Mobile Station (MS) receives the DL-MAP sent by the BS, judges whether service information associated with an MBS zone comprised in the DL-MAP message is identical to that the MS expects to receive, and, if yes, the MS
15 determines the physical channel resource occupied by the MBS-MAP message utilizing the resource information.

2. The method according to claim 1, wherein the service information associated with the MBS zone at least comprises an MBS zone identifier.

3. The method according to claim 2, wherein the service information
20 associated with the MBS zone further comprises a multicast connection identifier (Multicast CID).

4. The method according to claim 1, wherein said resource information uniquely defines the position of the physical channel resource occupied by the MBS-MAP message.

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5. The method according to claim 4, wherein

the MS, after determining the physical channel resource occupied by the MBS-MAP message, receives the MBS-MAP message according to the DIUC.

6. The method according to claim 1, wherein said resource information

5 defines the relative position of the physical channel resource occupied by the MBS-MAP message in the MBS zone.

7. The method according to claim 6, wherein said OFDMA symbol offset in the MBS-MAP-IE of the DL-MAP message is for determining the starting position of the MBS zone.

10 8. The method according to claim 1, wherein more than one Multicast CID carried by the MBS-MAP message share the MBS-MAP-IE, and the MBS-MAP-IE comprises no Multicast CID field.

9. A method of transmitting, in a multicast and broadcast service (MBS) system, resource information associated with an MBS-MAP message and service
15 information associated with an MBS zone, wherein:

said resource information is carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP message (DL-MAP) sent by a base station (BS) and identifies the physical channel resource occupied by the MBS-MAP message, wherein the resource information comprises orthogonal
20 frequency division multiple access (OFDMA) symbol offset, subchannel offset, boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

10. The method according to claim 9, wherein said service information
25 associated with MBS zone at least comprises a MBS zone identifier.

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11. The method according to claim 10, wherein said service information associated with the MBS zone further comprises a multicast connection identifier (Multicast CID).

12. The method according to claim 9, wherein said resource information uniquely defines the position of the physical channel resource occupied by the MBS-MAP message.

13. The method according to claim 9, wherein said resource information defines the relative position of the physical channel resource occupied by the MBS-MAP message in the MBS zone.

14. The method according to claim 13, wherein said OFDMA symbol offset in the MBS-MAP-IE of the DL-MAP message is for determining starting position of MBS zone.

15. The method according to claim 9, wherein more than one Multicast CID carried by the MBS-MAP message share the MBS-MAP-IE, and the MBS-MAP-IE comprises no Multicast CID field.

16. A method of determining, in a Mobile Station, the physical channel resource occupied by a multicast and broadcast (MBS)-MAP message utilizing resource information transmitted by a base station in accordance with the method of claim 9, wherein

the Mobile Station (MS) receives the downlink channel MAP message (DL-MAP) sent by the base station (BS), judges whether service information associated with multicast and broadcast service (MBS) zone comprised in this downlink map message (DL-MAP) is identical to that reserved by the Mobile Station (MS) itself and, if yes, the Mobile Station (MS) determines the physical channel resource occupied by the MBS-MAP message utilizing the resource information comprising orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, boosting, the number of OFDMA symbols and the number of

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subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

17. The method according to claim 16, wherein the received service information associated with the MBS zone at least comprises a multicast and
5 broadcast service (MBS) zone identifier.

18. The method according to claim 17, wherein the received service information associated with the MBS zone further comprises a multicast connection identifier (Multicast CID).

19. The method according to claim 16, wherein said received resource
10 information uniquely defines the position of the physical channel resource occupied by the MBS-MAP message.

20. The method according to claim 19, wherein
the Mobile Station (MS), after determining the physical channel resource occupied by the MBS-MAP message, receives the MBS-MAP message
15 according to the DIUC.

21. The method according to claim 16, wherein said received resource information defines the relative position of the physical channel resource occupied by the MBS-MAP message in the multicast and broadcast service (MBS) zone.

22. The method according to claim 21, wherein said an OFDMA symbol
20 offset is for determining the starting position of the MBS zone.

23. The method according to claim 16, wherein more than one Multicast CID carried by the MBS-MAP message share the MBS-MAP-IE, and the MBS-MAP-IE comprises no Multicast CID field.

24. A cellular telecommunications system operable for providing a multicast
25 and broadcast service, comprising

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a plurality of base stations operable for transmitting resource information associated with an MBS-MAP message and service information associated with an multicast and broadcast service (MBS) zone,

5 said resource information being carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP messages (DL-MAP) sent by the base stations, BS and identifying the physical channel resource occupied by an MBS-MAP message relating to the MBS zone, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels
10 occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message; and

a plurality of Mobile Stations (MS) operable to receive the DL-MAP message sent by the base stations (BS), judge whether service information associated with the MBS zone comprised in the MBS-MAP-IE is identical to that the
15 MS expects to receive and, if yes, the MS is operable to determine the physical channel resource occupied by the MBS-MAP message utilizing the resource information.

25. The system according to claim 24, wherein said base stations are operable so that the service information associated with MBS zone at least comprises
20 a MBS zone identifier.

26. The system according to claim 25, wherein said base stations are operable so that the service information associated with MBS zone further comprises a multicast connection identifier (Multicast CID).

27. The system according to claim 24, wherein said base stations are
25 operable so that said resource information uniquely defines the position of the physical channel resource occupied by the MBS-MAP message.

28. The system according to claim 27, wherein

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said MS are operable to receive the MBS-MAP message according to the DIUC after determining the physical channel resource occupied by the MBS-MAP message.

29. The system according to claim 24, wherein said base stations are operable so that said resource information defines the relative position of the physical channel resource occupied by the MBS-MAP message in the MBS zone.

30. The system according to claim 29, wherein said OFDMA symbol offset in the MBS-MAP-IE of the DL-MAP message is for determining the starting position of the MBS zone.

31. The system according to claim 24, wherein more than one Multicast CID carried by the MBS-MAP message share the MBS-MAP-IE, and the MBS-MAP-IE comprises no Multicast CID field.

32. A base station, for a cellular telecommunications system providing a multicast and broadcast service,

wherein said base station is operable for transmitting resource information associated with an MBS-MAP message and service information associated with a multicast and broadcast service (MBS) zone, said resource information being carried in an MBS-MAP information element (MBS-MAP-IE) of a downlink channel MAP messages (DL-MAP) sent by the base stations (BS) and identifying the physical channel resource occupied by the MBS-MAP message relating to the MBS zone, wherein the resource information comprises orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

33. The base station according to claim 32, operable so that the service information associated with MBS zone at least comprises a MBS zone identifier.

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34. The base station according to claim 33, operable so that the service information associated with MBS zone further comprises a multicast connection identifier (Multicast CID).

5 35. The base station according to claim 32, operable so that said resource information uniquely defines the position of the physical channel resource occupied by the MBS-MAP message.

36. The base station according to claim 32, operable so that said resource information defines the relative position of the physical channel resource occupied by the MBS-MAP message in the MBS zone.

10 37. The base station according to claim 32, operable so that said OFDMA symbol offset in the MBS-MAP-IE of the DL-MAP message is for determining the starting position of the MBS zone.

38. The base station according to claim 32, operable so that more than one Multicast CID carried by the MBS-MAP message share the MBS-MAP-IE, and the
15 MBS-MAP-IE comprises no Multicast CID field.

39. A Mobile Station (MS) for receiving a multicast and broadcast service from a base station according to claim 32, said Mobile Station being operable to receive the downlink channel MAP message (DL-MAP) sent by the base stations (BS), to judge whether service information associated with MBS zone comprised in
20 an MBS-MAP-IE of the DL-MAP message is identical to that the MS expects to receive and, if yes, to determine the physical channel resource occupied by an MBS-MAP message utilizing the resource information which is carried in the MBS-MAP-IE of the DL-MAP message, wherein the resource information comprises
25 orthogonal frequency division multiple access (OFDMA) symbol offset, subchannel offset, Boosting, the number of OFDMA symbols and the number of subchannels occupied by the MBS-MAP message, and modulation and coding mode (DIUC) of the MBS-MAP message.

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40. The Mobile Station according to claim 39, operable to receive a MBS zone identifier provided in said service information associated with MBS.

41. The Mobile Station according to claim 40, operable to receive a multicast connection identifier (Multicast CID) provided in the service information
5 associated with MBS zone.

42. The Mobile Station according to claim 39, operable to receive resource information which uniquely defines the position of the physical channel resource occupied by the MBS-MAP message.

43. The Mobile Station according to claim 42, operable to receive the
10 MBS-MAP message according to the DIUC after determining the position of the physical channel resource occupied by the MBS-MAP message.

44. The Mobile Station according to claim 39, operable to receive said resource information which defines the relative position of the physical channel resource occupied by the MBS-MAP message in the MBS zone.

15 45. The Mobile Station according to claim 44, operable to receive said resource information, wherein the OFDMA symbol offset in the MBS-MAP-IE of the DL-MAP message is for determining the starting position of the MBS zone.

46. A method of realizing indicating resource of Multicast and Broadcast Service (MBS), comprising:

20 setting the launching position of an MBS-MAP message in a Downlink channel MAP (DL-MAP) message;

a base station (BS) sending the MBS-MAP message through a Broadcast Connection Identifier (Broadcast CID);

25 receiving the message sent by the base station (BS) through the Broadcast CID, a Mobile Station (MS) determining the position of this MBS-MAP

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message if the received message is judged to be MBS-MAP message according to the message type.

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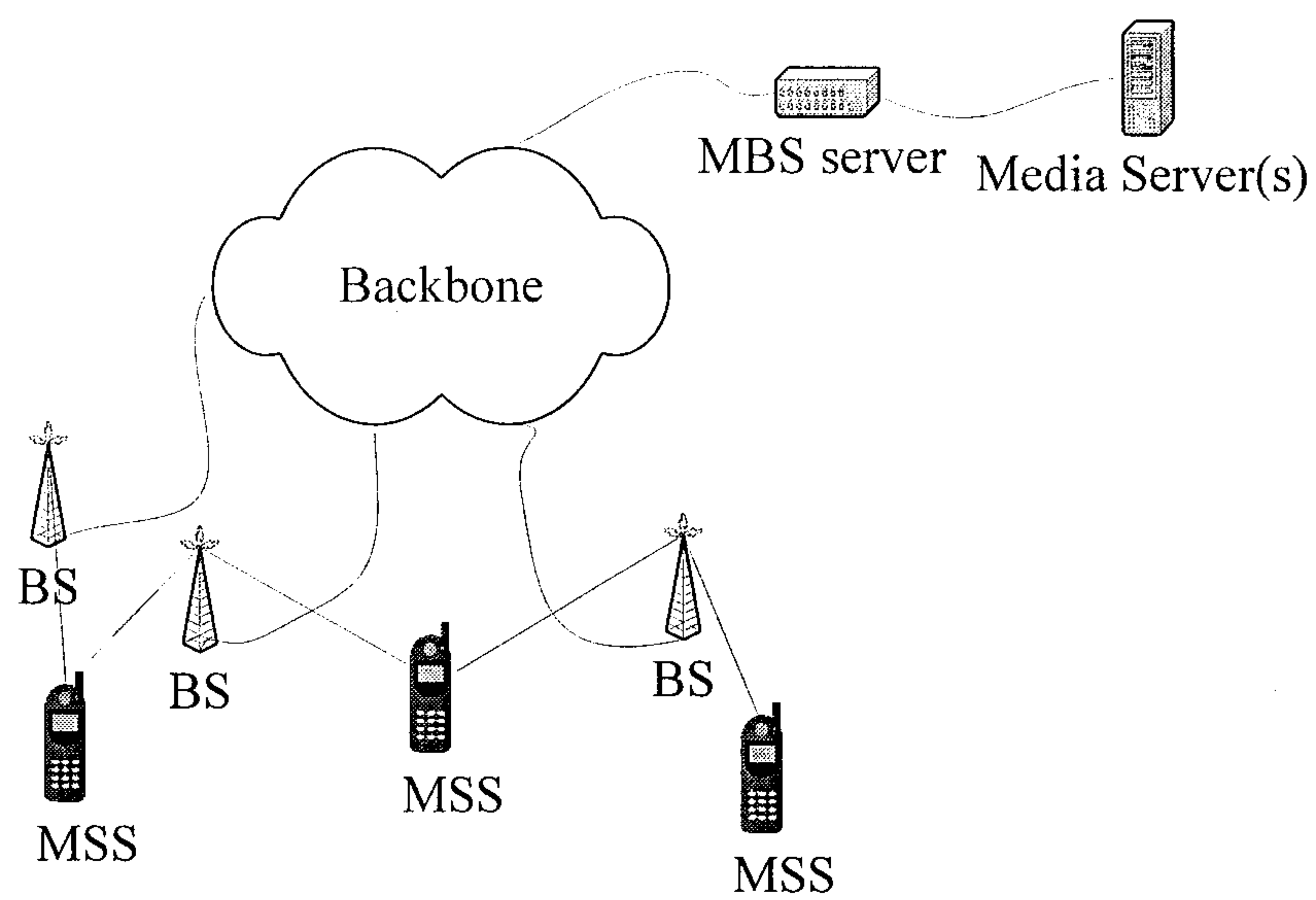


Figure 1

