2G, 3G Network Planning and Optimization...

Archives

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1.17 CBS

Cell Broadcast Service (CBS) is similar to paging station broadcast information. It means the mobile network operator broadcasts the public information to the mobile users within a certain area. The information that the users can read is called CBS message. It is generated by the Cell Broadcast Entity (CBE) and sent to the Cell Broadcast Center (CBC) for processing. After the processing, it is forwarded to the BSC and broadcast to the users through CBCH. The MS can only receive the CBS message in idle mode. Unlike the Point to Point Short Message service, the CBS message is broadcast without the acknowledgement of the user terminal.

CBS includes:
- Common public information service, such as weather, news, stock market, exchange rate, and lottery.
- Special public information service, such as people search, traffic navigation, and call charge prompt.
- Advertising service, such as information about stores, restaurants, and theaters.

1.17.1 CBS Mechanism

Operators or information providers can define the cell broadcast area through CBE. The minimal area is a cell and the maximal area can be all the cells of the BSCs that the CBC connects with. Features such as intervals, duration, and priority levels can also be specified to meet different requirements. The field length of the CBS message sent to BSC from CBC must be 82 bytes. If the length is shorter than 82 bytes, fill codes are added to it. If the length exceeds 82 bytes, the message is broken to a maximum of 15 pages. If the sending fails, the message may be sent again and the message with high priority level is sent first. The CBS information is sent to the proper cells through four continuous SMS BROADCAST REQUEST messages or one SMS BROADCAST COMMAND message. Each CBS message contains 82-byte user information and 6-byte header. The CBS message can be sent to BTS in the form of SMS BROADCAST REQUEST or SMS BROADCAST COMMAND. For details, see 1.17.2

BTS can send the CBCH Load Indication message to BSC and the system will speed up or delay the message sending according to this message. Although the BSC considers the CBCH capacity when sending the message and the BTS can indicate the status of the current CBCH, when the CBCH LOAD INDICATION mode is enabled, the BTS can send CBCH LOAD INDICATION to request for immediate broadcast of the $m(1-15)$ SMSCB timeslot message when the CHCB is idle. After the BSC sends the m timeslot message, it sends messages according to its own schedule. If the message volume that the BTS requests exceeds the volume that the BSC can provide, the BSC only sends the messages within its volume limit. When the CBCH LOAD INDICATION mode is enabled, the BTS can send CBCH LOAD INDICATION to stop the sending of the $m(1-15)$ timeslot message if overload occurs. Then the BSC will continue the sending according to its own schedule.

CBCH LOAD INDICATION is only used in DRX mode.

The CBCH is of two types: basic CBCH and extended CBCH. They are four continuous multiframes. The TB of basic CBCH is 0, 1, 2, or 3; The TB of extended CBCH is 4, 5, 6, or 7. TB = (FN DIV 51) mod (8).

For the basic CBCH, the CBS message head is sent on the multiframe with TB being 0; for the extended CBCH, it is sent on the multiframe with TB being 4. The system message on BCCH indicates whether the CBS is available or not. When SMSCB is used, the BS_AG_BLKS_RES is set as 1 or above. When the CBCH is mapped to the CCCH+SDCCH/4, the number of BS_AG_BLKS_RES will not be limited by SMSCB.

MS recomposes the CBS message and displays it for the user.

MS obtains the CBS message from the CBCH. BTS informs MS of the short message information during the schedule in the form of bitmap by sending schedule message. There are three reception modes for MS on CBCH:
- Non-DRX mode. MS reads the first block of all message timeslots. The rest blocks will be read if the message head indicates that the following timeslots are used. If the MS does not support other reception mode, or it does not receive the scheduling for the next message timeslot, Non-DRX mode is used.
- First DRX mode. If MS receives the scheduling for the next message timeslot, but the first scheduling message of the last scheduling period, or all the information of the last period or even earlier period is not received, first DRX mode is used.
- Second DRX mode. If MS receives the important information of the last scheduling period and reads the first scheduling message of the current period, second DRX mode is used.

Whether the network uses DRX to receive the broadcast short message can be set through the maintenance console in BSC.

1.17.2 BSC-BTS Message Transmission Mode

A CBS message consists of eighty eight 8-bit bytes. These bytes are divided into four message blocks with each block containing twenty two 8-bit bytes. Each block is added by an 8-bit block type, and the length of the block is twenty three 8-bit bytes. A CBS message contains four continuous blocks: first block, second block, third block, and fourth block.

When the SMS BROADCAST REQUEST mode is used, the message is sent to BTS from BSC. The BSC handles the queuing, repetition, and short message sending. It also considers the CBCH capacity and takes charge of the SMS segmentation at radio interface. In the SMS BROADCAST REQUEST message, each SMSCB Information cell carries a complete frame that can be transmitted on CBCH and the layer 2 information that indicates the radio path. SMSCB Channel Indicator cell indicates the CHCH used for broadcast. If this cell does not provide the information, the basic CBCH will be used.

When the SMS BROADCAST COMMAND mode is used, SMS BROADCAST COMMAND message is sent to BTS from BSC. BSC requires the immediate message sending during the next CBCH time. The

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default broadcast mode for BTS can also be set through this message. In the default broadcast mode, if there is no other message to broadcast, BTS will send the default message.

In the SMS BROADCAST COMMAND message, the SMSCB message cell contains the information to be broadcast on CBCH. It has four continuous blocks with a maximum of 88 bytes. BTS segments the message and establishes the block format. It also adds bytes to the block if required. SMSCB Channel Indicator cell indicates the CHCH used for broadcast. If this cell does not provide the information, the basic CBCH will be used.
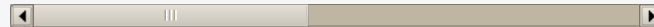
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