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Base Station Controller - Cell Broadcast Centre (BSC-CBC)
interface specification;
Cell Broadcast Service Protocol (CBSP)
(3GPP TS 48.049 version 13.0.0 Release 13)**

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1 Scope

The present document specifies the *Cell Broadcast Service Protocol (CBSP)* between the Cell Broadcast Centre (CBC) and the Base Station Controller (BSC).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".
- [2] 3GPP TS 23.003: "Numbering, addressing and identification".
- [3] 3GPP TS 44.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".
- [4] 3GPP TS 23.038: "Alphabets and language-specific information".
- [5] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols".
- [6] IETF RFC 793 (September 1981): "Transmission Control Protocol".
- [7] IETF RFC 2507 (February 1999): "IP header compression".
- [8] IETF RFC 1990 (August 1996): "The PPP Multilink Protocol (MP)".
- [9] IETF RFC 2686 (September 1996): "The Multi-Class Extension to Multi-Link PPP".
- [10] IETF RFC 2509 (February 1999): "IP Header Compression over PPP".
- [11] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [12] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".
- [13] 3GPP TS 44.060: "General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol".
- [14] 3GPP TS 23.002: "Network architecture".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

CBS message: An information message broadcasted on the basic or extended cell broadcast channel (CBCH) in unacknowledged mode to mobile stations located within the Cell Broadcast area. A CBS message may contain information such as road traffic or weather information, originating from a Cell Broadcast Entity (CBE) communicating with the CBC (see 3GPP TS 23.041 [1]).

CBS message reference: Uniquely identifies a CBS message by the four elements: Message Identifier, Serial Number, Cell Identifier and Channel Indicator.

Cell Broadcast area: An area comprising of one or more cells in which the CBS message or the emergency message is broadcasted. A Cell Broadcast area is always contained within a BSC area (see 3GPP TS 23.002 [14]).

CBS message operational state: A cell in CBS message operational state is able to broadcast CBS messages.

Emergency message: A warning message conveying a small amount of data to indicate the imminent occurrence of an emergency such as earthquake, tsunami etc. The emergency message is broadcasted to mobile stations in idle mode, packet idle mode and dedicated mode (see 3GPP TS 44.018 [12]) and to mobile stations in packet transfer mode and dual transfer mode (see 3GPP TS 44.060 [13]) located within the Cell Broadcast area.

Emergency message operational state: A cell in emergency message operational state is able to broadcast emergency messages.

Emergency message reference: Uniquely identifies an emergency message by the three elements: Message Identifier, Serial Number and Cell Identifier.

Elementary Procedure: CBSP consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interactions between the CBC and the BSC. These EPs are defined separately and are intended to be used to build up complete sequences in a flexible manner. If the independence between some EPs is restricted, it is described under the relevant EP description. Unless otherwise stated by the restrictions, the EPs may be invoked independently of each other as stand alone procedures, which can be active in parallel. Support of parallel procedures in the BSC is optional.

An EP consists of an initiating message and possibly a response message. Two kinds of EPs are used:

- **Class 1:** Elementary Procedures with response (success or failure)
- **Class 2:** Elementary Procedures without response.

For Class 1 EPs, the types of responses can be as follows:

Successful

- A signalling message explicitly indicates that the EP is successfully completed.

Unsuccessful

- A signalling message explicitly indicates that the EP failed.
- On time supervision expiry (i.e. absence of expected response).

Class 2 EPs are always considered as successful.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

BSC	Base Station Controller
CBC	Cell Broadcast Centre
CBCH	Cell Broadcast Channel
CBE	Cell Broadcast Entity
CBS	Cell Broadcast Service
CBSP	Cell Broadcast Service Protocol
EP	Elementary Procedure
ETWS	Earthquake and Tsunami Warning System
MS	Mobile Station
SMSCB	Short Message Service Cell Broadcast

4 General

4.1 Procedure Specification Principles

The principle for specifying the procedure logic is to specify the functional behaviour of the BSC exactly and completely. The CBC functional behaviour is left unspecified.

The following specification principles have been applied for the procedure text in clause 7:

- The procedure text discriminates between:
 - 1) Functionality which "shall" be executed:
 - The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the REQUEST message of a Class 1 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.
 - 2) Functionality which "shall, if supported" be executed:
 - The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

4.2 Specification Notations

For the purposes of the present document, the following notations apply:

Procedure	When referring to an Elementary Procedure in the specification the procedure name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Write-Replace procedure.
Message	When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. WRITE-REPLACE message.
IE	When referring to an information element (IE) in the specification the <i>Information Element Name</i> is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. <i>Old Serial Number</i> IE.
Value of an IE	When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in subclause 8.2 enclosed by quotation marks, e.g. "Abstract Syntax Error (Reject)" or "Background".

5 Transport and Data Link layer

5.1 General

TCP over IP shall be supported as the transport for data streams on the BSC-CBC interface. The data link layer is as specified in subclause 5.3.

During normal operation the CBC initiates all message transfer and query operations. The BSC responds to the message transfer and query operations initiated by the CBC.

The BSC only initiates the message transfer in case an error (Failure Indication procedure) or recovery (Restart Indication procedure) is to be reported.

The node initiating the message transfer is also responsible for the establishment of the TCP connection, in case no TCP connection already exist. An already established TCP connection may be used for message transfer.

The initiator of a connection is responsible for the termination of the TCP connection.

5.2 TCP /IP

The transport protocol used shall be TCP, which is specified in RFC 793 [6].

The transport bearer is identified by the TCP port number and the IP address (source TCP port number, destination TCP port number, source IP address, destination IP address).

The TCP Destination Port number for CBSP messages is 48049/tcp. It is the registered port number for 3GPP Cell Broadcast Service Protocol CBSP (3gpp-cbsp).

The 3gpp-cbsp destination port number 48049/tcp shall be used by both entities (BSC or CBC) whenever it sets up a new TCP connection. When it sends CBSP messages on an existing TCP connection, the sending entity (BSC or CBC) shall use as TCP destination port number either 48049/tcp if it was the initiator of this TCP connection, or the TCP source port number that was received from the peer entity that had initiated this existing TCP connection.

An IP BSC/CBC-node shall support IPv4. The support of IPv6 is optional.

IP dual stack support is recommended for the potential transition period from IPv4 to IPv6 in the transport network.

5.3 Data Link layer

It is recommended that a BSC/CBC using IP transport implement the data link layer using Ethernet.

NOTE: This does not preclude the single implementation and use of any other data link layer protocol fulfilling the GERAN requirements toward the upper layers.

A BSC/CBC using IP transport having interfaces connected via low bandwidth PPP links like E1/T1 shall also support IP Header Compression [7] and the PPP extensions ML/MC-PPP [8], [9]. In this case the negotiation of header compression [7] over PPP shall be performed according to [10].

6 Functions of CBSP

The CBSP has the following functions:

- **Message Handling:** This function is responsible for enabling the broadcast of new CBS and emergency messages, replacing CBS and emergency messages currently being broadcasted and for terminating the broadcast of specific CBS and emergency messages. This function may also be used to obtain the message status of a specific CBS message.
- **DRX Handling:** This function is responsible for the configuration of the SMS CB DRX parameters.
- **Load Handling:** This function determines the load status of the broadcast channels at any particular point in time.
- **Reset:** This function terminates the broadcasting of all CBS and emergency messages in one or more cells.
- **Error Handling:** This function allows reporting of general error situations, for which function specific error messages have not been defined.
- **Supervision Handling:** This function handles the supervision of the CBSP availability between the CBC and the BSC.

These functions are implemented by one or several CBSP elementary procedures described in clause 7.

7 CBSP Procedures

7.1 Elementary Procedures

In the following tables, all EPs are divided into Class 1 and Class 2 Procedures.

Table 7.1.1: Class 1 Procedures

Elementary Procedure	Initiating Message	Successful Outcome	Unsuccessful Outcome
		Response message	Response message
Write-Replace	WRITE-REPLACE	WRITE-REPLACE COMPLETE	WRITE-REPLACE FAILURE
Kill	KILL	KILL COMPLETE	KILL FAILURE
Load Status Enquiry	LOAD QUERY	LOAD QUERY COMPLETE	LOAD QUERY FAILURE
Message Status Query	MESSAGE STATUS QUERY	MESSAGE STATUS QUERY COMPLETE	MESSAGE STATUS QUERY FAILURE
Set DRX	SET-DRX	SET-DRX COMPLETE	SET-DRX FAILURE
Reset	RESET	RESET COMPLETE	RESET FAILURE
Keep Alive	KEEP-ALIVE	KEEP-ALIVE COMPLETE	-

Table 7.1.2: Class 2 Procedures

Elementary Procedure	Message
Restart Indication	RESTART
Failure Indication	FAILURE
Error Indication	ERROR INDICATION

7.2 Write-Replace

7.2.1 General

The purpose of the Write-Replace procedure is to broadcast a new CBS message or emergency message or to replace an ongoing CBS message or emergency message broadcast with a new CBS message or emergency message.

7.2.2 Successful Operation

7.2.2.1 General

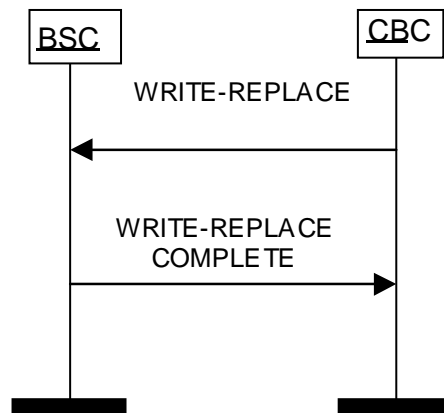


Figure 7.2.2.1.1: Write-Replace Procedure: Successful Operation

The Write-Replace procedure is initiated by the CBC sending the WRITE-REPLACE message to the BSC (see figure 7.2.2.1.1).

The WRITE-REPLACE message may be sent as a request to broadcast a new CBS message or emergency message without replacing an ongoing CBS message or emergency message broadcast, or as a request to replace an ongoing CBS message or emergency message broadcast with a new CBS message or emergency message. A WRITE-REPLACE message shall not contain a simultaneous broadcast request of a CBS message and an emergency message.

Broadcast request of a CBS message is defined in subclause 7.2.2.2 while broadcast request of an emergency message is defined in subclause 7.2.2.3.

7.2.2.2 Broadcast request of a CBS message

A CBS message is uniquely identified by the four elements *Message Identifier IE*, Cell Identifier field in the *Cell List IE*, Serial Number field in the *New Serial Number IE* or in the *Old Serial Number IE* and the *Channel Indicator IE*. If only the *New Serial Number IE*, and not the *Old Serial Number IE*, is included in the WRITE-REPLACE message, then the BSC shall interpret the message as a write request, i.e. a broadcast request of a new CBS message without replacing an ongoing CBS message broadcast. The new CBS message is identified by the four elements *Message Identifier IE*, the twelve most significant bits of the *New Serial Number IE*, Cell Identifier field in the *Cell List IE* and the *Channel Indicator IE*.

If both the *New Serial Number IE* and the *Old Serial Number IE* are present in the WRITE-REPLACE message, then the BSC shall interpret the message as a replace request, i.e. a request to replace an ongoing CBS message broadcast with a new CBS message. In this case the BSC shall start the Write-Replace procedure by terminating the ongoing CBS message broadcast, as defined in subclause 7.3.2.2, before broadcasting the new CBS message. The replaced CBS message is identified by the four elements *Message Identifier IE*, the twelve most significant bits of the *Old Serial Number IE*, Cell Identifier field in the *Cell List IE* and the *Channel Indicator IE*.

If termination of the replaced CBS message fails in a cell, then the BSC shall not proceed with the broadcast of the new CBS message for this particular cell. After completing the Write-Replace procedure in the remaining cells, the BSC shall return the WRITE-REPLACE FAILURE message to the CBC, see subclause 7.2.3.

A CBS message may be broadcasted on one of two different cell broadcast channels, a basic channel or an extended channel (see 3GPP TS 45.002 [11]), as indicated by the *Channel Indicator IE*.

The BSC initiates broadcasting of the CBS message within the Cell Broadcast area, i.e. in the cell(s) as indicated by the Cell Identifier field in the *Cell List IE*.

The BSC shall broadcast the CBS message according to the value of the *Number of Broadcasts Requested IE* and the *Repetition Period IE*. If the value of *Number of Broadcasts Requested IE* is set to "0", the BSC shall broadcast the CBS