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GSM
GLOBAL SYSTEM FOR
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Digital cellular telecommunications system (Phase 2+); Example protocol stacks for interconnecting Cell Broadcast Centre (CBC) and Base Station Controller (BSC) (GSM 03.49)

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Foreword

This Global System for Mobile communications Technical Specification (GTS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This GTS specifies three alternative approaches to the specification of protocol stacks of communication protocols for the purpose of fulfilling the service requirements of the primitives specified for the CBC - BSC interface in GSM 03.41 within the digital cellular telecommunications system (Phase 2/Phase 2+).

This GTS is a TC-SMG approved GSM technical specification version 5, which contains GSM Phase 2+ enhancements/features to the version 4 GSM technical specification. The ETR from which this Phase 2+ GTS has evolved is Phase 2 GSM ETR 107 edition 3 (GSM 03.49 version 4.6.0).

GTS are produced by TC-SMG to enable the GSM Phase 2 + specifications to become publicly available, prior to submission for the formal ETSI standards approval procedure. This ensures the earliest possible access to GSM Phase 2 + specifications for all Manufacturers, Network operators and implementors of the Global System for Mobile communications.

The contents of this GTS are subject to continuing work within TC-SMG and may change following formal TC-SMG approval. Should TC-SMG modify the contents of this GTS it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

- y the third digit is incremented when editorial only changes have been incorporated in the specification;

- x the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These TSs may have subsequently become I-ETSs (Phase 1), or ETSs/ETSI Technical Reports (ETRs) (Phase 2). TC-SMG has also produced ETSI GSM TSs which give the technical specifications for the implementation of Phase 2+ enhancements of the digital cellular telecommunications system. These version 5.x.x GSM Technical Specifications may be referred to as GTSs.

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1 Scope

No mandatory protocol between the Cell Broadcast Centre (CBC) and the Base Station Controller (BSC) is specified by GSM; this is a matter of agreement between CBC and PLMN operators.

This Global System for Mobile communications Technical Specification (GTS) specifies three alternative approaches to the specification of protocol stacks of communication protocols for the purpose of fulfilling the service requirements of the primitives specified for the CBC - BSC interface in GSM 03.41.

One approach is based upon the use of the complete OSI reference model (see X.200), another approach is based upon the use of only the lower 3 OSI layers, and another approach is based upon the use of CCITT Signalling System No. 7 (see Q.700).

Specifications are based upon individual contributions. Any judgement concerning functionality, completeness and advantages/disadvantages of implementation is intentionally omitted.

1.1 References

This GTS incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this GTS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1] GSM 01.04 (ETR 100): "Digital cellular telecommunication system (Phase 2); Abbreviations and acronyms".

[2] GSM 03.41 (ETS 300 537): "Digital cellular telecommunication system (Phase 2); Technical realization of Short Message Service Cell Broadcast (SMSCB)".

[3] GSM 12.20 (ETS 300 622): "Digital cellular telecommunication system (Phase 2); Network Management (NM) procedures and messages".

[4] CCITT Recommendation Q.700: "Introduction to CCITT Signalling System No.7".

[5] CCITT Recommendation Q.931: Integrated services digital network.(ISDN) User-Network interface layer 3 specification for basic control".

[6] CCITT Recommendation Q.932: "Generic procedures for the control of ISDN supplementary services".

[7] CCITT Recommendation Q.941: "ISDN user-network interface protocol profile for management".

[8] CCITT Recommendation Q.1400: "Architecture framework for the development of signalling and organization, administration and maintenance protocols using OSI concepts".

[9] CCITT Recommendation X.2 (1988): "International data transmission services and optional user facilities in public data networks and ISDNs".

[10] CCITT Recommendation X.200: "Reference Model of Open Systems Interconnection for CCITT Applications".

[11] CCITT Recommendation X.213: "Information technology - Network service definition for Open Systems Interconnection".

[12] CCITT Recommendation X.215: "Session service definition for open systems interconnection for CCITT applications".

[13] CCITT Recommendation X.217: "Association control service definition for open systems interconnection for CCITT applications".

[14] CCITT Recommendation X.219: " Remote operations: model, notation and service definition".

[15] CCITT Recommendation X.225: "Session protocol specification for Open Systems Interconnection for CCITT Applications".

[16] CCITT Recommendation X.227: "Information technology - Open Systems Interconnection - protocol specification for the association".

[17] CCITT Recommendation X.229: "Remote operations Protocol specification".

1.2 Abbreviations

Abbreviations used in this report are listed in GSM 01.04.

2 A protocol stack which utilizes an application-network layer convergence function for interconnecting CBC and BSC

A convergence function (see Draft CCITT Recommendation Q.941 Report R 22 May 1990) which maps an application entity protocol directly to the Network Layer service defined by X.213 can provide a practical alternative to ACSE, ROSE and OSI layers 6, 5 and 4.

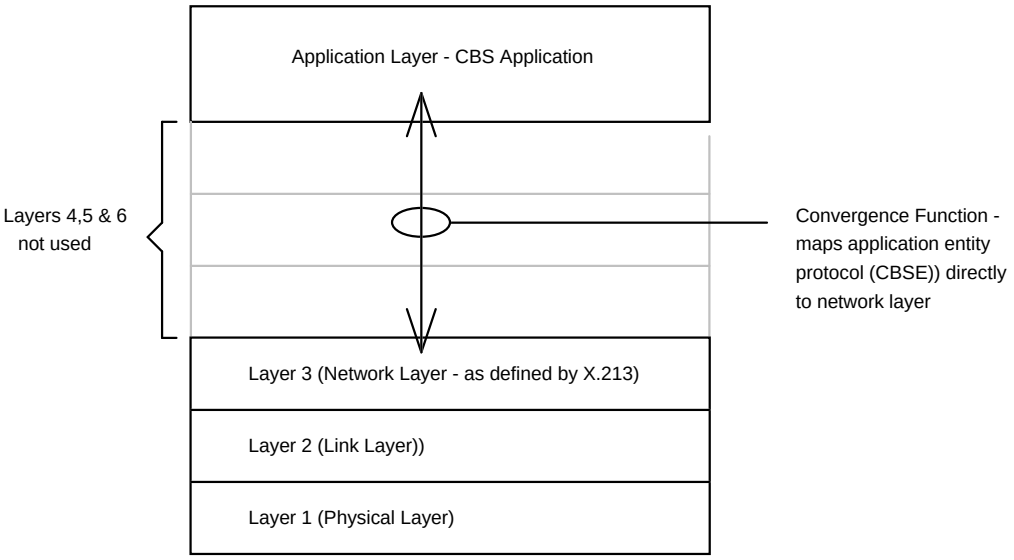


Figure 1

Draft CCITT Recommendation Q.941 proposes to map application layer protocols ACSE and ROSE via a convergence function to network layers defined by CCITT Recommendations Q.931 and Q.932.

The complexity of dealing with the many different network layer protocols is avoided by mapping the application protocols to the Network Layer Service defined by X.213. ACSE and ROSE are specifically defined in terms of the full OSI stack. The use of ACSE and ROSE is avoided by incorporating the functionality provided by ACSE and ROSE into the CBS protocol. The convergence function is embedded in the CBS protocol.

2.1 CBSE Definition

The Cell Broadcast Short Message Service Element (CBSE) is defined in terms of the following service:

CBSE-BIND

This operation must be invoked by the party which is responsible for establishing the application association; only after the application association has been established may the remaining CBSE services be used. This operation reports either success (via CBSE-Bind-Confirm) or failure (via CBSE-Bind-Failure).

CBSE-BIND will be mapped to/from N-CONNECT request/indication with CBSE-BIND parameters carried in NS-user-data (if the network layer does not support NS-user-data of 128 octets then CBSE-BIND parameters may be carried by the first N-DATA request/indication following establishment of the network layer connection - see section 2.4).

CBSE-BIND-CONFIRM

This operation must be invoked by a party to accept an application association.

CBSE-BIND-CONFIRM will be mapped to/from N-CONNECT confirm/response with CBSE-BIND-CONFIRM parameters carried in NS-user-data (if the network layer does not support NS-user-data of 128 octets then CBSE-BIND-CONFIRM may be carried as the second N-DATA request/indication following establishment of the network layer connection - see Section 2.4).

CBSE-BIND-FAILURE

This operation must be invoked by a party to reject an attempted application association.

CBSE-BIND-FAILURE will be mapped to/from N-DISCONNECT request/indication with CBSE-BIND-FAILURE parameters carried in NS-user-data (if the network layer does not support NS-user-data of 128 octets then CBSE-BIND-FAILURE parameters will not be carried by the network layer - i.e. NS-user-data will be discarded).

CBSE-UNBIND

This operation must be invoked by a party to release the application association.

CBSE-UNBIND will be mapped to/from N-DISCONNECT request/indication with CBSE-UNBIND parameters be carried in NS-user-data (if the network layer does not support NS-user-data of 128 octets then CBSE-UNBIND parameters may be carried by the N-DATA request/indication preceding N-DISCONNECT - see Section 2.4).

CBSE-WRITE-REPLACE, CBSE-KILL-MESSAGE, CBSE-REPORT-SUCCESS,

CBSE-STATUS-CBCH-QUERY, CBSE-STATUS-CBCH-QUERY-RESP, CBSE-STATUS-MESS.-QUERY, CBSE-STATUS-MESS.-QUERY-RESP, CBSE-REPORT-FAILURE, CBSE-BSC-RESTART, CBSE-SET-DRX. CBSE-SET-DRX-RESP

Application data units CBSE-WRITE-REPLACE, CBSE-KILL-MESSAGE, CBSE-REPORT-SUCCESS, CBSE-STATUS-CBCH-QUERY, CBSE-STATUS-CBCH-QUERY-RESP, CBSE-STATUS-MESSAGE-QUERY, CBSE-STATUS-MESS.-QUERY-RESP, CBSE-REPORT-FAILURE, CBSE-BSC-RESTART, CBSE-SET-DRX. CBSE-SET-DRX-RESP provide the services specified via primitives Write-Replace, Kill-Message, Report-Success, Status-CBCH, Status-CBCH-Response, Status-Message, Status-Message-Response, Report-Failure, BSC-Restart, Set-DRX. and Set-DRX-Response respectively in GSM 03.41.

These application data units will be mapped to/from N-DATA request/indication.

2.2 ASN1 Specification

The Abstract Syntax Notation of the Cell Broadcast Short Message Service Element

CBSE

1st module of 2:

CBS-UsefulDefinitions

```
CBS-UsefulDefinitions     {
        ccitt identified-organization (4) etsi (0) mobile-domain (0)
        gsm-messaging (4) gsm-sms3 (12) usefulDefinitions (10) }

DEFINITIONS

IMPLICIT TAGS
::=
BEGIN

        ID      ::= OBJECT IDENTIFIER

mobile-domain ID  ::= {ccitt identified-organization (4) etsi (0) mobile-domain(0)}

--      root for all sms allocations

gsm-messaging ID ::= { mobile-domain gsm-messaging(4) }

--      categories

gsm-sms3 ID                ::= { gsm-messaging 12 }

END
```

2nd module of 2:

Application Protocol

```
ApplicationProtocol {
        ccitt identified-organization (4) etsi (0) mobile-domain(0)
        gsm-messaging(4) gsm-sms3 (12) applicationProtocol(11) }

DEFINITIONS

IMPLICIT TAGS
::=
BEGIN

        --      CBSE-BIND will be carried as N-CONNECT request/indication
        --      CBSE-BIND-Parameters will carried in the User Data field of the N-CONNECT
        --      request/indication message.

CBSE-BIND-Parameters ::=  SEQUENCE {
                        initiatorID     [0] Name,
                        password        [1] Password   OPTIONAL
                                }

--      Above and in CBSE-BIND-CONFIRM
        --      initiatorID/respID: identify the initiating/responding telecommunication subsystem
        --      password: may assist in authentication

Name ::=    SEQUENCE {
        operator                [0] Operator          OPTIONAL,
        bilateralAgreem         [1] BilateralAgreemOPTIONAL,
        dataNetworkAddress      [2] Xl2lAddress       OPTIONAL,
        iSDNAddress             [3] CBS-Address       OPTIONAL
                        }

--      operator is a text string containing the name of the CBC/PLMN operator. bilateralagreem is a text
--      string identifying the bilateral agreement between the CBC and the PLMN operators which allows
--      for this association to be established.
--      dataNetworkAddress is the PSPDN X.121 address of the CBC/BSC issuing the BIND or
--      CONFIRM, occurring only if a PSPDN is used.
--      iSDNAddress is the PLMN address of the CBC (same datum in both BIND and CONFIRM).
--      Any pair of subsets of these parameters may be used to identify the CBC and the BSC to one
--      another.

--      upper bound settings

Operator ::= PrintableString (SIZE (0..20))

BilateralAgreem  ::=  PrintableString  (SIZE (0 .. 20))

Xl2lAddress ::= NumericString  (SIZE(0..15))
```

```
--      Definition of Cell Broadcast Short Message Service address

CBS-Address        ::= [APPLICATION 0]  SEQUENCE {
    address-type      INTEGER {  unknown-type(0),
                                 international-number(1),
                                 national-number(2),
                                 network-specific-number(3),
                                 short-number(4) },
    numbering-plan  INTEGER   { unknown-numbering(0),
                                 SDN-numbering(1),
                                 data-network-numbering(3),
                                 telex-numbering(4),
                                 national-numbering(8),
                                 private-numbering(9) },
   address-value     CHOICE   {
                                 octet-format
                                       SemiOctetString
                          -- other formats are for further study
                                 }
}

--      each octet contains two binary coded decimal digits

SemiOctetString ::=  OCTET STRING (SIZE(1..10))

Password    ::=   PrintableString  (SIZE(0..20))

--      CBSE-BIND-CONFIRM will carried as N-CONNECT response/confirm
--      CBSE-BIND-CONFIRM parameters will be carried in User Data of the N-CONNECT
--      response/confirm message

CBSE-BIND-CONFIRM-Parameters ::=    SEQUENCE {
        respId          [0] Name,
        password     [1] Password     OPTIONAL
        }

--      The following defines the choices and tags for the N-DISCONNECT.request/indication User Data.

Applic-protocol-discs       ::= CHOICE {
        bindfail [1] CBSE-BIND-FAILURE,
        unbindreq [2] CBSE-UNBIND
                }

CBSE-BIND-FAILURE     ::= Connect-failure-reason

--      connect-failure-reason provides one of the error indications given in the following table.
```

Table 1

Error indications	**Reason**
not-entitled	The responder is not entitled to accept a request for an association between itself and the initiator.
temporary-overload	The responder is not capable of establishing an association due to temporary overload.
temporary-failure	The responder is not capable of establishing an association due to a temporary failure.
incorrect-ID-or-password	The responder will not accept the request to establish an association between itself and the initiator due to incorrect identity or password.

```
--
        Connect-failure-reason    ::=  INTEGER {
                        not-entitled (0),
                        temporary-overload (1),
                        temporary-failure (2),
                        incorrect-ID-or-password (3)
                        }

CBSE-UNBIND  ::= NULL

--      The following defines the choices and tags for the N-DATA.request/indication User Data

CBSMSEapdus             ::=     CHOICE {
        cbse-WRITE-REPLACE                  [1] Write-Replace,
        cbse-KILL-MESSAGE                   [2] Kill-Message,
        cbse-REPORT-SUCCESS                 [3] Report-Success,
        cbse-STATUS-CBCH-QUERY              [4] Status-CBCH,
        cbse-STATUS-CBCH-QUERY-RESP         [5] Status-CBCH-Resp,
        cbse-STATUS-MESSAGE-QUERY           [6] Status-Message,
        cbse-STATUS-MESS-QUERY-RESP         [7] Status-Mess-Resp,
        cbse-REPORT-FAILURE                 [8] Report-Failure,
        cbse-BSC-RESTART                    [9] BSC-Restart,
        cbse-RESET                          [10] Reset,
        cbse-FAILURE-IND                    [11] Failure-Ind
        }

Write-Replace       ::= SEQUENCE {
        message-Identifier              INTEGER (0 .. 65535),
        new-Serial-Number               Serial-Number,
        no-of-Pages                     INTEGER (1 .. 15),
        data-coding-scheme              INTEGER (0 .. 255),
        cell-list                       Cell-List,
        repetition-Rate                 INTEGER (1 .. 7),
        no-of-broadcast-req             INTEGER (0 .. 2880),
        cbs-Page-Inf                    SEQUENCE OF Page-Inf,
        old-Serial-Number               [3] Serial-Number   OPTIONAL,
        category                        INTEGER (0..2)      OPTIONAL,
        channel-indicator               [2] Channel         OPTIONAL
        }

Channel       ::= INTEGER {
        basic channel (0),
        extended channel (1),
        }

Page-Inf      ::=     SEQUENCE {
        message-info-useful-octets      INTEGER (0..82),
        message-info-page               Message-Info-Page
        }

Message-Info-Page       ::=     OCTET STRING (SIZE(82))

Cell-Id-Disc  ::=     OCTET-STRING (SIZE(1))
        -- values from the following table

        lacAndCi    ::=     '00000001' -- 2 Octet lac followed by 2 Octet Cell Id
        ciOnly::=   '00000010' -- Cell Id only

Cell-Id                 ::=     OCTET-STRING (SIZE(4))

        NOTE:       If Cell-Id-Disc equals ciOnly then only the last 2 octets of Cell-ID are to be considered
                    and the first 2 octets are filler octets.
```

```
Cell                ::=     SEQUENCE OF {
        disc        Cell-Id-Disc,
        id          Cell-Id
        }

Cell-List       ::= SEQUENCE {
        length      INTEGER, -- number of cells in the list
        disc        Cell-Id-Disc,
        list        SEQUENCE OF Cell-Id
        }

Serial-Number       ::= INTEGER (0 .. 65535)

Kill-Message        ::= SEQUENCE {
        message-Identifier      INTEGER (0 .. 65535),
        old-Serial-Number       Serial-Number,
        cell-List               Cell-List,
        channel-indicator       [4] Channel         OPTIONAL
        }

Report-Success      ::= SEQUENCE {
        message-Identifier INTEGER (0 .. 65535),
        serial-Number           Serial-Number
        SEQUENCE OF SEQUENCE {
                cell-id                 Cell,
                no-of-broadcasts-compl  INTEGER
        }OPTIONAL
        SEQUENCE OF SEQUENCE {
                cell-id                 Cell,
                cause                   Failure-Reason,
                diagnostic              Diagnostic-Info     OPTIONAL
        }OPTIONAL,
        channel-indicator               [4] Channel         OPTIONAL
}

Status-CBCH             ::= SEQUENCE{
        cell-List               Cell-List,
        channel-indicator       [4] Channel         OPTIONAL
}

Status-CBCH-Resp        ::= SEQUENCE
        SEQUENCE OF SEQUENCE{
                cell-id         Cell,
                cbch-loading    INTEGER (0 .. 1019)
                -- indicates total number of messages broadcast
                -- across the air interface within the last 32
                -- minutes (min: 0, max: 1019)
        SEQUENCE OF SEQUENCE{
                cell-id         Cell,
                cause           Failure-Reason,
                diagnostic      Diagnostic-Info     OPTIONAL
        }OPTIONAL,
        channel-indicator       [4] Channel         OPTIONAL
}
```

```
Status-Message    ::= SEQUENCE {
        message-Identifier INTEGER (0..65535),
        current-Serial-No  Serial-Number,
        cell-List                  Cell-List,
        channel-indicator          [4] Channel          OPTIONAL
        }

Status-Mess-Resp ::= SEQUENCE {
        message-Identifier         INTEGER (0 .. 65535),
        old-serial-number          Serial-Number,
        SEQUENCE OF SEQUENCE {
                cell-id                    Cell,
                no-of-broadcasts-compl     INTEGER
        }
        SEQUENCE OF SEQUENCE {
                cell-id                    Cell,
                cause                      Failure-Reason,
                diagnostic                 Diagnostic-Info      OPTIONAL
        }OPTIONAL,
        channel-indicator          [4] Channel          OPTIONAL
}

Report-Failure ::= SEQUENCE {
        cause              Failure-Reason,
        diagnostic         Diagnostic-Info      OPTIONAL,
        message-Identifier INTEGER (0 .. 65535)     OPTIONAL,
        serial-Number      Serial-Number      OPTIONAL
        }

Failure-Reason ::= INTEGER {
        parameter-not-recognized (0),
        (1), -- not used
        parameter-value-invalid (2),
        valid-CBS-message-not-identified (3),
        cell-identity-not-valid (4),
        unrecognised-message (5),
        missing-mandatory-element (6),
        bss-capacity-exceeded (7),
        cell-memory-exceeded (8),
        bss-memory-exceeded (9),
        unspecified-error (10),
        incompatible-DRX-parameter (11)
        }

        Diagnostic-Info ::= OCTET STRING (SIZE (1..20))

BSC-Restart::= SEQUENCE {
        cell-list                  Cell-List,
        recovery-Indication        BOOLEAN          OPTIONAL
        }

Reset             ::= SEQUENCE {
        cell-list          Cell-List
        }

Set-DRX     ::= SEQUENCE {
        cell-list                  Cell-List,
        schedule-Period            INTEGER (0 .. 48)        OPTIONAL,
        reserved-Slots             INTEGER (0 .. 48)        OPTIONAL,
        channel-indicator          [4] Channel              OPTIONAL
        }
```

```
Set-DRX-Resp      ::= SEQUENCE {
        cell-list                       Cell-List,
        SEQUENCE OF SEQUENCE {
                cell-id                 Cell,
                cause                   Failure-Reason}     OPTIONAL,
        channel-indicator               [4] Channel         OPTIONAL
        }

Failure-Ind   ::= cell-list         Cell-List

END
```

2.3 Application Rules for Avoidance of Collision of CBSE Operations

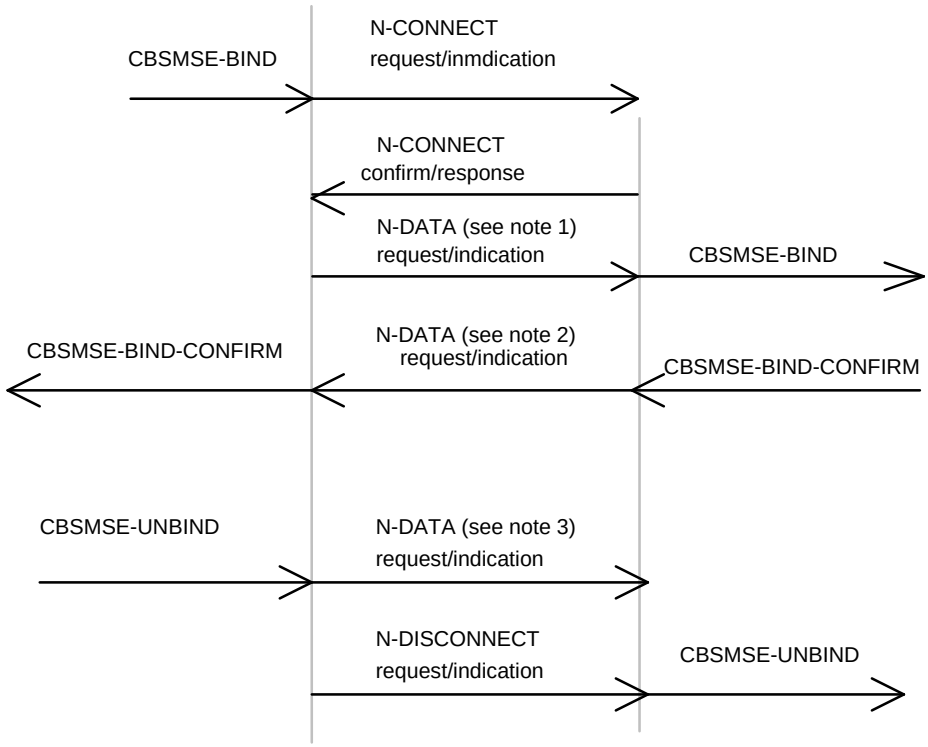
For the purpose of establishing the association between CBSEs in CBC and BSC then either the CBC or the BSC shall be designated as the entity responsible for initiating the association by the operation CBSE-BIND.

Following premature release of the association by N-DISCONNECT then either the CBC or the BSC shall be designated as the entity responsible for re-establishing the association.

Following receipt of N-RESET any command sent by the CBC, for which no corresponding response has been received by the CBC, will be re-sent to the BSC.

2.4 Non Support of 128 bytes of NS-user-data in Network Connection and Network Connection Release phases

It is generally intended to make the support of 128 bytes of NS user-data mandatory (see Sections 12.2.8 and 13.2.3 of X.213). CCITT Recommendation X.2 regards provision of Fast Select as essential, thereby ensuring support of 128 bytes of NS-user-data in network connection and network connection release phases. For an interim period support of 128 bytes of NS-user-data in network connection and network connection release phases will remain a provider option. The following figures are therefore provided in order to indicate how CBSE-BIND, CBSE-BIND-CONFIRM and CBSE-UNBIND should be mapped to/from an OSI Network Service definition which does not support 128 bytes of NS-user-data in network connection and network connection release phases.



NOTE 1: CBSMSE-BIND parameters are carried as NS-user-data

NOTE 2: CBSMSE-BIND-CONFIRM is carried as NS-user-data

NOTE 3: CCBSMSE-UNBIND parameters are carried as NS-user-data

Figure 2

3 An OSI Protocol Stack For Interconnecting CBC and BSC

This section specifies a stack of communication protocols in terms of the OSI Reference Model (see X.200) and therefore makes use of all seven layers for the purpose of fulfilling the service requirements of the primitives specified for the CBC - BSC interface in GSM 03.41. The CBS application layer (layer 7) is mapped to the Presentation Layer via ACSE (see X.217 and X.227) and ROSE (see X.219 and X.229). Only the Kernel functional unit of the Presentation Layer is used. Only the Kernel and Duplex functional units are used in the Session Layer (see X.215 and X.225).

3.1 Service elements on the application layer

An association (class 3) between CBRSEs is formed via ACSE and ROSE operations (class 2 and 5) are used to implement the service requirements specified for the CBC - BSC interface in GSM 03.41.

This results in an asynchronous asymmetric situation where the application entity in the CBC or BSC can invoke a CBRSE operation at any time.

The new CBRSE service element is first defined in the following section, and then specified in ASN.1 notation in section 3.2.

CBRSE definition

This service element defines the following services:

CBRSE-BIND — This operation will normally be invoked by the CBC to establish the application association, but in exceptional circumstances (e.g. following loss of data) the BSC may invoke the operation; only thereafter the remaining CBRSE services may be used. This operation reports either success or failure (result or error).

CBR-WRITE-REPLACE, CBR-KILL-MESSAGE, CBR-STATUS-CBCH-QUERY, CBR-STATUS-MESSAGE-QUERY, CBR-RESET, CBR-SET-DRX — These operations may be invoked by the application entity in the CBC; They are used to relay commands from the CBC to a given BSC. The operations report either success or failure.

CBR-RESTART, CBR-FAILURE — This operation may be invoked by the application entity in the BSC. The operation reports success or failure.

CBR-UNBIND — This operation must be invoked by the CBC as the last CBRSE operation before releasing the application association. This operation reports success only.

Of the services defined above, CBR-WRITE-REPLACE semantically means the relay of cell broadcast messages across the CBC-BSC-connection in order to add them to the message list in the BSC, whereas CBR-KILL-MESSAGE is used to delete messages from the message list. The CBR-STATUS-CBCH-QUERY command inquires after the current loading of a specific cell broadcast channel, while the CBR-STATUS-MESSAGE-QUERY command requests status information concerning a specific message. The CBR-SET-DRX command sets the DRX related parameters. These five services combine the primitives defined in GSM 03.41, which can be invoked by the CBC.

The CBR-BIND service is used to exchange identifications, passwords, etc., and in order to negotiate the usage of the other services. The CBR-UNBIND service prepares for the release of the application association.

3.2 Detailed specification of the CBRSE services

On the following pages, the new CBRSE service element is specified with the ASN.1 notation, together with the entire protocol.

The Abstract Syntax Notation of
the Cell Broadcast Relay Service Element

CBRSE

1st module of 3:

CBS-UsefulDefinitions

```
CBS-UsefulDefinitions     {
        ccitt identified-organization (4) etsi (0) mobile-domain(0)
        gsm-messaging(4)  gsm-sms4(13)  usefulDefinitions(0) }

DEFINITIONS

IMPLICIT TAGS
::=
BEGIN

        EXPORTS         id-cb-ot-CBC, id-cb-ot-BSC, id-cb-port,
                                id-cb-ac-so, id-cb-CBRSE, id-cb-as-CBRSE;

        ID      ::= OBJECT IDENTIFIER

mobile-domain ID  ::= { ccitt identified-organization (4) etsi (0) mobile-domain (0)}

--      root for all sms allocations

        gsm-messaging     ID ::= { mobile-domain gsm-messaging (4) }

        gsm-sms4    ID      ::= {gsm-messaging (13)}

--      categories

        id-cb-mod     ID ::= { gsm-messaging 1 } -- modules
        id-cb-ot              ID ::= { gsm-messaging 2 } -- object type
        id-cb-pt              ID ::= { gsm-messaging 3 } -- port types
        id-cb-ac              ID ::= { gsm-messaging 4 } -- appl. contexts
        id-cb-ase             ID ::= { gsm-messaging 5 } -- ASEs
        id-cb-as              ID ::= { gsm-messaging 6 } -- abstract syntaxes

--      modules

        usefulDefinitions           ID ::= { gsm-sms4 0 }
        relayProtocol               ID ::= { gsm-sms4 1 }
        relayAbstractService        ID ::= { gsm-sms4 2 }

--      object types

        id-cb-ot-CBC                ID ::= { id-cb-ot 0 }
        id-cb-ot-BSC                ID ::= { id-cb-ot 1 }
```

```
--      port types

        id-cb-port              ID ::= { id-cb-pt 0 }

--      application contexts

        id-cb-ac-so             ID ::= { id-cb-ac 0 }


--      application service elements

        id-cb-CBRSE                     ID ::= { id-cb-ase 0 }


--      abstract syntaxes

        id-cb-as-CBRSE          ID ::= { id-cb-as 0 }

END
```

2nd module of 3

RelayAbstractService

```
RelayAbstractService      {
        ccitt identified-organization (4) etsi (0) mobile-domain(0)
        gsm-messaging(4) gsm-sms4(13)  relayAbstractService(2) }

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

IMPORTS

        BIND, UNBIND
FROM Remote-Operations-Notation {
        joint-iso-ccitt remote-operations(4) notation(0) }

        OBJECT, PORT, ABSTRACT-BIND, ABSTRACT-UNBIND,
        ABSTRACT-OPERATION, ABSTRACT-ERROR
FROM AbstractServiceNotation {
        joint-iso-ccitt mhs-motis(6) asdc(2) modules(0) notation(1) }

        id-cb-ot-CBC, id-cb-ot-BSC, id-cb-port
FROM CBS-UsefulDefinitions{
        ccitt identified-organization (4) etsi (0) mobile-domain(0)
        gsm-messaging(4) gsm-sms4(13) usefulDefinitions(0) }

--      upper bound settings

        ub-operator-name-length INTEGER    ::=     20

        ub-agreem-name-length INTEGER      ::=     20

        ub-X121Address-length INTEGER      ::=     15

        ub-password-length INTEGER         ::=     20
```

```
--      Objects

--      The CBC and the BSC are modelled as atomic objects, cBC--Object and bSC-Object. Each
--      object has one port for the interconnection. ([S] and [C] indicate supply and consumption of
--      services, respectively).

        cBC-Object  OBJECT
                                PORTS { cBR-port [S] }
                                ::= id-cb-ot-CBC

        bSC-Object  OBJECT
                                PORTS { cBR-port [C] }
                                ::= id-cb-ot-BSC

--      Port

        cBR-port      PORT
                        CONSUMER INVOKES {CBR-Restart
                                CBR-Failure
                                }
                        SUPPLIER INVOKES  { CBR-Write-Replace
                                            CBR-Kill-Message
                                            CBR-Status-CBCH-Query
                                            CBR-Status-Message-Query
                                            CBR-Reset
                                            CBR-Set-DRX
                                 }
                ::= id-cb-port

--      The CBR-Bind operation

--      Both, BIND and UNBIND operations, are exclusively within the responsibility of the CBC. The
--      BIND operation is therefore always requested by the CBC

        CBR-Bind ::=
                        ABSTRACT-BIND
                        TO { cBR-port }
                        BIND
                        ARGUMENT    CBR-Bind-Parameters
                        RESULT      CBR-Bind-confirm
                        BIND-ERROR  CBR-Bind-failure

--      The CBR-Unbind operation

--      The UNBIND is a harsh release of the association and all outstanding operations are aborted.
--      UNBIND is always requested by the CBC. The CBC and the BSC should negotiate (during
--      CBR-BIND) the use of services on the association (the operations parameter - list of operation
--      types for the association) in such a way that no harmful losses of operations occur.

        CBR-Unbind ::=
                        ABSTRACT-UNBIND
                        FROM { cBR-port }
                        UNBIND
                        ARGUMENT     Time-when-connected
                        RESULT       Time-when-disconnected
```

- Association control parameters

```
CBR-Bind-Parameters ::=     SEQUENCE {
                            initiatorID     [0] Name,
                            password        [1] Password OPTIONAL,
                            pswNeeded       [2] BOOLEAN,
                            iniType         [3] Telecom-System-Type,
                            operations      [4] List-of-Operations,
                            transient       [5] BOOLEAN
}

--      Above and in SMR-Bind-confirm
--      initiatorID/respID: identify the initiating/responding telecommunication subsystem
--      password: may assist in authentication
--      pswNeeded (BIND only):requests password into SMR-Bind, SMR-Bind-Confirm
--      iniType/respType: identify the system entity
--      operations: lists the SM relay operations requested and supported on the association:
--      operations listed in both the BIND and the CONFIRM may be used (i.e. this is a negotiation
--      between CBC and BSC)
--      transient: forces the association (and the underlying connections), transient: it must be
--      UNBouND as soon as there are no operations to be performed

Name ::= SEQUENCE {
                    operator            [0] Operator        OPTIONAL,
                    bilateralAgreem     [1] BilateralAgreemOPTIONAL,
                    dataNetworkAddress      [2] X121Address     OPTIONAL,
                    iSDNAddress             [3] CBS-Address     OPTIONAL
                      }

--      operator is a text string containing the name of the CBC/PLMN operator. bilateralAgreem is a
--      text string identifying the bilateral agreement between the CBC and the PLMN operators
--      which allows for this association to be established.
--      dataNetworkAddress is the PSPDN X.121 address of the CBC/BSC issuing the BIND or
--      CONFIRM, occurring only if a PSPDN is used.
--      iSDNAddress is the PLMN address of the CBC as seen by the MSs (same datum in both BIND
        and CONFIRM).

--      Any pair of subsets of these parameters may be used to identify the CBC and the BSC to one
--      another.

Operator ::= PrintableString (SIZE(0..ub-operator-name-length))

BilateralAgreem ::=             PrintableString  (SIZE(0..ub-agreem-name-length))

X121Address     ::=     NumericString  (SIZE(0..ub-X121Address-length))

--      CBS-Address is specified later in this module.

        Password ::=    PrintableString  (SIZE(0..ub-password-length))

Telecom-System-Type     ::= INTEGER {
                            cell-Broadcast-Service-Centre   (0),
                            public-Land-Mobile-Network      (1)
                            --      Extensions are possible: additional telecommunication subsystems
                            --      might adopt this service element for their interconnection.
}
```

```
List-of-Operations  ::= BIT STRING {
                                cBR-From-CBC-Write-Replace  (0),
                                cBR-From-CBC-Kill-Message    (1),
                                cBR-From-CBC-Status-CBCH-Query  (2),
                                cBR-From-CBC-Status-Message-Query (3),
                                cBR-From-BSC-Restart (4),
                                cBR-From-CBC-Reset (5),
                                cBR-From-BSC-Failure (6)
                                cBR-From- CBC-Set-DRX (7)
                                --      Extensions are possible: additional operations may be defined
                                --      within this service element. Existing systems should tolerate
                                --      unknown values, but negotiate not to perform unknown
                                --      operations.}

CBR-Bind-confirm  ::= SEQUENCE {
                                respId[0] Name,
                                password     [1] Password OPTIONAL,
                                respType     [3] Telecom-System-Type,
                                operations   [4] List-of-Operations,
                                transient    [5] BOOLEAN,
                                connectTime        [6] Time-when-connected
                                }

CBR-Bind-failure  ::= SEQUENCE {
                                connect-failure-reason
                                [0] Connect-failure
                                  }

--      connect-failure-reason contains one of the error indications given in the following table.
```

Table 2

Error indications	Reason
not-entitled	The responder is not entitled to accept a request for an association between itself and the initiator.
temporary-overload	The responder is not capable of establishing an association due to temporary overload.
temporary-failure	The responder is not capable of establishing an association due to a temporary failure (having impact on an entity at SM-RL or at layers above).
incorrect-ID-or-password	The responder will not accept the request to establish an association between itself and the initiator due to incorrect identity or password.
not-supported	The responder does not recognize the telecommunication subsystem type of the initiator, or cannot support any of the operations suggested on the association.

```
--

Connect-failure     ::= INTEGER {
                                not-entitled (0),
                                temporary-overload (1),
                                temporary-failure (2),
                                incorrect-ID-or-password (3),
                                not-supported (4)
                                  }

        Time-when-disconnected ::= UTCTime
        Time-when-connected            ::= UTCTime

--      The CBR-Write-Replace operation
```

```
CBR-Write-Replace ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Write-Replace
                    RESULT      Report-Success
                    ERRORS      {Parameter-not-recognized,
                                Parameter-value-invalid,
                                Valid-CBS-message-not-identified,
                                Cell-identity-not-valid,
                                Unrecognized-message,
                                Missing-mandatory-element,
                                BSS-capacity-exceeded,
                                Cell-memory-exceeded,
                                BSS-memory-exceeded,
                                Unspecified-error
                                }

--      The CBR-Kill-Message operation

CBR-Kill-Message ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Kill-Message
                    RESULT      Report-Success
                    ERRORS      {Parameter-not-recognized,
                                Parameter-value-invalid,
                                Unrecognized-message,
                                Missing-mandatory-element,
                                Unspecified-error
                                }

--      The CBR-Status-CBCH-Query operation

CBR-Status-CBCH-Query ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Status-CBCH-Request
                    RESULT      Status-CBCH-Response
                    ERRORS      {Parameter-not-recognized,
                                Parameter-value-invalid,
                                Cell-identity-not-valid,
                                Unrecognized-message,
                                Missing-mandatory-element,
                                Unspecified-error
                                }

--      The CBR-Status-Message-Query operation

CBR-Status-Message-Query ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Status-Message-Request
                    RESULT      Status-Message-Response
                    ERRORS      {Parameter-not-recognized,
                                Parameter-value-invalid,
                                Cell-identity-not-valid,
                                Unrecognized-message,
                                Missing-mandatory-element,
                                Unspecified-error
                                }
```

```
--      The CBR-BSC-Restart operation
CBR-Restart ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Restart-Indication
                    RESULT
                    ERRORS    {Parameter-not-recognized,
                              Parameter-value-invalid,
                              Cell-identity-not-valid,
                              Unrecognized-message,
                              Missing-mandatory-element,
                              Unspecified-error
                                   }

--      The CBR-Reset operation

CBR-Reset ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Reset-Request
                    RESULT    Result-Request
                    ERRORS    {Parameter-not-recognized,
                              Parameter-value-invalid,
                              Cell-identity-not-valid,
                              Unrecognized-message,
                              Missing-mandatory-element
                              Unspecified-error
                              }

--      The CBR-Failure operation

CBR-Failure ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Failure-Indication
                    RESULT
                    ERRORS    {Parameter-not-recognized,
                              Parameter-value-invalid,
                              Cell-identity-not-valid,
                              Unrecognized-message,
                              Missing-mandatory-element,
                              Unspecified-error
                              }

--      The CBR-Set-DRX operation

CBR-Set-DRX ::=
                    ABSTRACT-OPERATION
                    ARGUMENT        Set-DRX
                    RESULT          Set-DRX-Resp
                    ERRORS          {Parameter-not-recognized,
                                    Parameter-value-invalid,
                                    Valid-CBS-message-not-identified,
                                    Cell-identity-not-valid,
                                    Unrecognized-message,
                                    Missing-mandatory-element,
                                    BSS-capacity-exceeded,
                                    Cell-memory-exceeded,
                                    BSS-memory-exceeded,
                                    Unspecified-error,
                                    Incompatible-DRX-parameter
                                    }

--      CBR operation ARGUMENT lists
```

```
Write-Replace ::= SEQUENCE {
        message-identifier          INTEGER (0 .. 65535),
        new-serial-number           Serial-Number,
        no-of-pages                 INTEGER (1 .. 15),
        data-coding-scheme          INTEGER (0 .. 255),
        cell-list                   Cell-List,
        repetition-rate             INTEGER (1 .. 7),
        no-of-broadcast-req         INTEGER (0 .. 2880),
        cBS-page-info               SEQUENCE OF    Page-Inf,
        old-serial-number           [1] Serial-Number       OPTIONAL,
        category                    INTEGER (0..2)          OPTIONAL,
        channel-indicator           [2] Channel             OPTIONAL
        }

Kill-Message ::= SEQUENCE {
        message-identifier INTEGER (0 .. 65535),
        old-serial-number  Serial-Number,
        cell-List                  Cell-List,
        channel-indicator          [2] Channel          OPTIONAL
        }

Status-CBCH-Request ::= SEQUENCE {
        cell-List                  Cell-List,
        channel-indicator           [2] Channel         OPTIONAL
        }

Status-Message-Request ::= SEQUENCE {
        message-Identifier INTEGER (0 .. 65535),
        old-serial-no      Serial-Number,
        channel-indicator  [2] Channel          OPTIONAL
}

Restart-Indication ::= SEQUENCE {
    cell-list                      Cell-List,
    recovery-Indication        BOOLEAN          OPTIONAL
        }

Failure-Indication ::= Cell-List

Reset-Indication ::= Cell-List

Set-DRX ::= SEQUENCE {
    cell-list                      Cell-List               OPTIONAL,
    schedule-Period                INTEGER (0 .. 48)       OPTIONAL,
    reserved-Slots                 INTEGER (0 .. 48)       OPTIONAL,
    channel-indicator              [2] Channel             OPTIONAL
}

--      CBR operation RESULT list
```

```
Report-Success ::= SEQUENCE {
        message-identifier INTEGER (0 .. 65535),
        serial-number              Serial-Number,
        SEQUENCE OF SEQUENCE{
                cell-id                    Cell,
                no-of-broadcasts-compl     INTEGER
        }OPTIONAL
        SEQUENCE OF SEQUENCE{
                cell-id                    Cell,
                cause                      Failure-Reason,
                diagnostic                 Diagnostic-Info     OPTIONAL
        }OPTIONAL,
        channel-indicator          [2] Channel         OPTIONAL

}

Status-CBCH-Response ::= SEQUENCE
        SEQUENCE OF SEQUENCE {
                cell-id                    Cell,
                cbch-loading               INTEGER (0..1019)
                -- indicates the total number of messages broadcast
                -- across the air interface within last 32
                -- minutes (min: 0, max: 1019)
        }
        SEQUENCE OF SEQUENCE{
                cell-id                    Cell,
                cause                      Failure-Reason,
                diagnostic                 Diagnostic-Info     OPTIONAL
        }OPTIONAL,
        channel-indicator          [2] Channel         OPTIONAL
}
```

```
Status-Message-Response ::= SEQUENCE {
        message-identifier INTEGER (0 .. 65535),
        old-serial-number  Serial-Number,
        SEQUENCE OF SEQUENCE {
                cell-id                 Cell,
                no-of-broadcasts-compl  INTEGER
        }
        SEQUENCE OF SEQUENCE{
                cell-id                 Cell,
                cause                   Failure-Reason,
                diagnostic              Diagnostic-Info     OPTIONAL
        }OPTIONAL,
        channel-indicator               [2] Channel         OPTIONAL
}

Set-DRX-Response ::= SEQUENCE {
        cell-list                       Cell-List                   OPTIONAL,
        SEQUENCE OF SEQUENCE{
                cell-id                 Cell,
                cause                   Failure-Reason}             OPTIONAL,
                channel-indicator       [2] Channel                 OPTIONAL
        }

--      CBR operation errors listed below

Parameter-not-recognized ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

Parameter-value-invalid ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

Valid-CBS-message-not-identified ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

Cell-Identity-not-valid ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

Unrecognized-message ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

Missing-mandatory-element ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

BSS-capacity-exceeded ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

Cell-memory-exceeded ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL

BSS-memory-exceeded ::=
                        ABSTRACT-ERROR
                        PARAMETER Diagnostic-Info OPTIONAL
```

```
Unspecified-error ::=
                ABSTRACT-ERROR
                PARAMETER Diagnostic-Info OPTIONAL

incompatible-DRX-parameter ::=
                ABSTRACT-ERROR
                PARAMETER Diagnostic-Info OPTIONAL

Serial-Number ::= INTEGER (0 .. 65535)

Page-Inf    ::=    SEQUENCE{
        message-info-useful-octets      INTEGER (0..82),
        message-info-page               Message-Info-Page
        }

Message-Info-Page       ::=     OCTET STRING (SIZE(82))

Cell-Id-Disc ::= OCTET-STRING (SIZE(1))
        -- values from the following table

                lacAndCi    ::=    '00000001'   --2 Octet lac followed by 2 Octet Cell Id
                ciOnly      ::=    '00000010'   --Cell Id only

Cell-Id ::= OCTET-STRING (SIZE(4))

        --Note: If Cell-Id-Disc equals ciOnly then only the last 2 octets of Cell-ID are to be considered --and
        the first 2 octets are filler octets

Cell ::= SEQUENCE OF {
        disc            Cell-Id-Disc,
        id              Cell-Id
        }

Cell-List ::= SEQUENCE {
        length          INTEGER,
        disc            Cell-Id-Disc,
        list            SEQUENCE OF Cell-Id
        }

Diagnostic-Info ::= OCTET STRING (SIZE (1 .. 20))

--      Definition of Cell Broadcast Relay Service address

CBS-Address ::= [APPLICATION 0] SEQUENCE {
        address-type        INTEGER  { unknown-type             (0),
                                       international-number     (1),
                                       national-number          (2),
                                       network-specific-number  (3),
                                       short-number             (4) },
        numbering-plan      INTEGER { unknown-numbering        (0),
                                       iSDN-numbering           (1),
                                       data-network-numbering   (3),
                                       telex-numbering          (4),
                                       national-numbering       (8),
                                       private-numbering        (9)}
        address-value       CHOICE { octet-format
                                       SemiOctetString
                                       --other formats are for further study}
}

SemiOctetString ::= OCTET STRING (SIZE(1..10))
-- each octet contains two binary coded decimal digits

END
```

3rd module of 3

RelayProtocol

```
RelayProtocol {
        ccitt identified-organization (4) etsi (0) mobile-domain(0)
        gsm-messaging (4) gsm-sms4 (13) relayProtocol(1) }

DEFINITIONS

IMPLICIT TAGS
::=
BEGIN

IMPORTS
--      application service elements and application contexts

        aCSE, APPLICATION-SERVICE-ELEMENT, APPLICATION-CONTEXT
FROM Remote-Operations-Notation-extension {
        joint-iso-ccitt  remote-operations(4) notation-extension(2) }

rOSE
FROM Remote-Operations-APDUs {
        joint-iso-ccitt  remote-operations(4) apdus(1) }

--      object identifiers

        id-cb-ac-so, id-cb-CBRSE, id-cb-as-CBRSE,
FROM CBS-UsefulDefinitions{
        ccitt identified-organization (4) etsi (0) mobile-domain(0)
        gsm-messaging(4) gsm-sms4 (13)  usefulDefinitions(0) } ;

        aS-ACSE OBJECT IDENTIFIER ::=
                { joint-iso-ccitt association-control (2) abstractSyntax(1) apdus(0) version(1) }

--      abstract service parameters

        CBR-Bind, CBR-Unbind, CBR-Write-Replace, CBR-Kill-Message,
        CBR-Kill-Message, CBR-Status-CBCH-Query,
        CBR-Status-Message-Query, CBR-Reset, CBR-Restart,
        CBR-Failure, CBR-Set-DRX,
        Parameter-not-recognized, Parameter-value-invalid,
        Valid-CBS-message-not-identified, Cell-identity-not-valid,
        Unrecognized-message,
        Missing-mandatory-element, BSS-capacity-exceeded,
        Cell-memory-exceeded, BSS-memory-exceeded, Unspecified-error, incompatible-DRX-parameter
FROM RelayAbstractService{
        ccitt identified-organization (4) etsi (0) mobile-domain(0)
        gsm-messaging(4) gsm-sms4(13) relayAbstractService(2) } ;

--      Application contexts

--      Only one application contexts is specified: the CBC is exclusively responsible for the BIND and
--      UNBIND operations.
```

```
cBC-BINDs-and-UNBINDs
        APPLICATION-CONTEXT
        APPLICATION-SERVICE-ELEMENTS { aCSE }
        BIND    CBR-Bind
        UNBIND  CBR-Unbind
        REMOTE OPERATIONS { rOSE }
        INITIATOR CONSUMER OF { cBRSE }
        ABSTRACT SYNTAXES { id-cb-as-CBRSE, aS-ACSE }
        ::= id-cb-ac-so

--      Application service elements

        cBRSE       APPLICATION-SERVICE-ELEMENT
                    CONSUMER INVOKES { CBR-Restart
                                       CBR-Failure
                                       }
                    SUPPLIER INVOKES { CBR-Write-Replace
                                       CBR-Kill-Message
                                       CBR-Status-CBCH-Query
                                       CBR-Status-Message-Query
                                       CBR-Reset
                                       CBR-Set-DRX
                                       }
                    ::= id-cb-SMRSE

--      Remote operations

cbr-write-replace           CBR-Write-Replace
                                ::= 1
        -- Note:    localValue - words are omitted, since they are
        --      typically not used, and likely to be removed from
        --      the OPERATION and ERROR macros in ROSE.

cbr-kill-message            CBR-Kill-Message
                                ::= 2

cbr-status-CBCH-query           CBR-Status-CBCH-Query
                                ::= 3

cbr-status-message-query        CBR-Status-Message-Query
                                ::= 4

cbr-restart                 CBR-Restart
                                ::= 5

cbr-reset                   CBR-Reset
                                ::= 6

cbr-failure                 CBR-Failure
                                ::= 7

cbr-set-DRX                 CBR-Set-DRX
                                ::= 8

--      Remote errors, the localValues are provisional

parameter-not-recognized        Parameter-not-recognized
                                ::= 1

parameter-value-invalid         Parameter-value-invalid
                                ::= 3
```

```
valid-CBS-message-not-identified    Valid-CBS-message-not-identified
                                    ::= 4

cell-identity-not-valid             Cell-identity-not-valid
                                    ::= 5

unrecognized-message                Unrecognized-message
                                    ::= 6

missing-mandatory-element           Missing-mandatory-element
                                    ::= 7

bss-capacity-exceeded               BSS-capacity-exceeded
                                    ::= 8
cell-memory-exceeded                Cell-memory-exceeded
                                    ::= 9
bss-memory-exceeded                 BSS-memory-exceeded
                                    ::= 10
unspecified-error                   Unspecified-error
                                    ::= 11
incompatible-DRX-parameter          Incompatible-DRX-Parameter
                                    ::= 12

END
```

3.3 Application rules

The following application rules specify the invocation of different operations on the association. Two alternative sets of application rules are given in 3.3.1 (for semi-permanent connections) and in 3.3.2 (for transient connections); additional sets are possible.

3.3.1 Application rule set 1 Semi-permanent symmetric connection

This set of application rules is to be used in situations where the connection (on all the protocol layers) between the CBC and the BSC is maintained for ever.

Within the CBR-BIND service, all operations are allowed on the association; semi-permanent connection is accepted (by not forcing the connection transient). This is negotiated within the CBR-BIND service as follows:

name of parametervalue in request and report

operations {cBR-From-CBC-Write-Replace,
cBR-From-CBC-Kill-Message,
cBR-From-CBC-Status-CBCH-Query,
cBR-From-CBC-Status-Message-Query,
cBR-From-BSC-Restart,
cBR-From-BSC-Reset,
cBR-From-BSC-Failure
cBR-From-CBC-Set-DRX
}

transient FALSE

The CBC invokes cBR-From-CBC-Write-Replace, cBR-From-CBC-Kill-Message, cBR-From-CBC-Status-CBCH-Query, cBR-From-CBC-Status-Message-Query, cBR-From-CBC-Set-DRX operations as needed. The BSC invokes CBR-BSC-RESTART.

The CBR-UNBIND operation is not normally invoked on the association.

3.3.2 Application rule set 2 Transient asymmetric connection

This set of application rules is to be used e.g. in situations where a CBC has connections with many BSCs, and there is a switched data network connecting them. A data network connection (and the higher layer connections on top of it) is maintained for the duration of the relay or alert operations only.

Within the CBR-BIND service, only one type of operation is negotiated for use on the association. The operation of that type must be invoked by the CBC or by the BSC in exceptional circumstances (e.g. in order to invoke CBR-BSC-RESTART). The BSC or CBC accepts the one type of operation and forces the association transient.

The following is an example of a negotiation procedure within the CBR-BIND service, where the CBR-Write-Replace operation is initiated by the CBC.

name of parametervalue

iniType cell-Broadcast-Service-Centre
respType public-Land-Mobile-Network
operations { cBR-From-CBC-Write-Replace }
transient TRUE

The association for cBR-From-CBC-Kill-Message, cBR-From-CBC-Status-CBCH-Query or cBR-From-CBC-Status-Message-Query, cBR-From-CBC-Set-DRX are negotiated according to the same principle, the CBC always being the initiator of the CBR-BIND.

The association may be used for invoking operations of the negotiated type(s) as long as there are such operations to be invoked (in other words, until all commands have been relayed).

4 An SS7 Protocol Stack For Interconnecting CBC And BSC

Concepts described in Q.1400 (see CCITT Study Group XI - Report R219) are used. These concepts enable, with minor modifications, the protocol specified in Section 3 of GSM 03.49 to be supported via an SS7 protocol stack.

Q.1400 specifies the use of OSI concepts via SS7 for the development of signalling and operations & management protocols. The protocol specified in Section 3 of this report can be carried via an SS7 protocol stack consisting of TCAP, SCCP and MTP (see Q.700 series) with minor adaptations:

- ROSE operation classes 2 and 5 are replaced by TCAP operation classes 1 and 4 respectively.

- TCAP provides a connectionless service. The services provided by CBRSE-BIND, CBR-UNBIND, CBR-Bind-confirm and CBR-Bind-failure are therefore not required and Sections 3.3 is not applicable.

PLMN networks may provide interworking between either of the protocols specified by Sections 2 or 3 and the SS7 protocol stack for the purpose of fulfilling the service requirements of the primitives specified for the CBC - BSC interface in GSM 03.41.

History

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