ETSI TS 144 069 V16.0.0 (2020-08)

Digital cellular telecommunications system (Phase 2+) (GSM);
Broadcast Call Control (BCC) protocol
(3GPP TS 44.069 version 16.0.0 Release 16)

3GPP™ A GLOBAL INITIATIVE
GSM® GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

Reference
RTS/TSGC-0144069vg00

Keywords
GSM

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the Broadcast Call Control (BCC) protocol used by the Voice Broadcast Call Service (VBCS) on the radio interface.

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.
- For a specific reference, subsequent revisions do not apply.
- 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] Void.

[1a] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 42.069: "Voice Broadcast Service (VBS); Stage 1".

[3] 3GPP TS 23.003: "Numbering, addressing and identification".

[4] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 2".

[5] 3GPP TS 43.069: "Voice Broadcast Call Service (VBCS); Stage 2".

[6] 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".

[7] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[8] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[9] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[10] 3GPP TS 44.068: "Group Call Control (GCC) protocol".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in 3GPP TS 42.069 and the following apply:

Attachment of the user connection: See 3GPP TS 24.008, subclause 5.2.

Broadcast call channel: downlink channel to be allocated in each cell of the group call area for a particular broadcast call. All MSs of the listening service subscribers in one cell shall listen to the common downlink.

Broadcast call: is used in the same sense as "voice broadcast call".

Calling user: BCC entity in the Mobile Station (MS) initiating or having initiated a broadcast call.

Clearing the context related to the broadcast call establishment: all running BCC timers in the relevant BCC entity are stopped, all attributes in the relevant BCC entity are deleted.

Downlink: network to MS direction.

Group receive mode: See 3GPP TS 44.018.

Originating mobile station: MS initiating or having initiated the broadcast call.

Uplink: Mobile station to network direction.

3.2 Abbreviations

For the purposes of the present document, the abbreviation defined in 3GPP TR 21.905 [1a] and the following applies:

BCC Broadcast Call Control

4 Applicability

Support of the broadcast call protocol is optional in the MS and in the network.

5 Main concepts

The present document describes the broadcast call control (BCC) protocol, which is one of the protocols of the Connection Management (CM) sublayer (see 3GPP TS 24.007).

There is in general more than one MS engaged in a broadcast call. Consequently, there is in general more than one MS with a BCC entity engaged in the same broadcast call, and there is one BCC entity in the network engaged in that broadcast call.

Under which conditions a BCC message is passed from lower (sub-)layers to the BCC entity is defined in the specifications of the sub-layers.

The MS shall ignore BCC messages that it receives which were sent in unacknowledged mode and which explicitly specify as destination a mobile identity which is not a mobile identity of the MS.

Higher layers and the MM sub-layer decide when to accept parallel BCC transactions and when/whether to accept BCC transactions in parallel to other CM transactions.

The broadcast call may be initiated by a mobile user or by a dispatcher. Specification of a protocol for dispatchers is out of the scope of the present document. Hence, in the scope of the present document, there are:

- one BCC entity in the network; and
- one or more than one BCC entities in different MSs;

engaged in a broadcast call, and one ore none of the MSs is the originator of the broadcast call (called the originating MS in the present document).

NOTE: Whereas for the Group Call Control (GCC) protocol (see 3GPP TS 44.068), in certain situations, the GCC entity in a MS assumes to be the originator of a broadcast call without being the originator, this is not the case for the BCC protocol.

The originator of the BCC transaction chooses the Transaction Identifier (TI). A MS not assuming to be the originator of the transaction will chose the transaction identifier received from the network, setting the TI flag to 1+x mod 2 where x is the received TI flag.

The present document describes the broadcast call control protocol only with regard to two peer entities, one in a MS, the other one in the network. The call control entities are described as communicating finite state machines which exchange messages across the radio interface and communicate internally with other protocol (sub)layers. In particular, the BCC protocol uses the MM and RR sublayer specified in 3GPP TS 24.008 and 3GPP TS 44.018. The BCC entity in a MS that is not the originator of the broadcast call shall not send messages to its peer entity. This description in only normative as far as the consequential externally observable behaviour is concerned. For simplicity, instead of using the terms "BCC entity in the MS" and "BCC entity in the network", the present document often uses the terms "MS" and "network" if no confusion may arise.

Certain sequences of actions of the two peer entities compose "elementary procedures" which are used as a basis for the description in the present document. These elementary procedures are defined in clause 6.

The network should apply supervisory functions to verify that the BCC procedures are progressing and if not, take appropriate means to resolve the problems. This, however, is out of the scope of the present document.

6 Elementary procedures for Broadcast Call Control

6.1 Overview

6.1.1 General

The elementary procedures may be broadcasted into the following classes:

- broadcast call establishment procedures;
- broadcast call termination procedures;
- broadcast call information phase procedures;
- miscellaneous procedures.

6.1.2 Broadcast call control states

6.1.2.1 Broadcast call control states at the MS side of the interface

The BCC entity of the MS is described as an extended finite state machine. It performs transitions between states. It has certain parameters and attributes, e.g. configuration parameters and behaviour parameters, which it sets and changes based on interaction with higher and lower (sub-)layers and on message exchange with its peer entity. If a configuration parameter is set to a certain value, the MS shall also adapt the configuration accordingly. Behaviour parameters decide on (part of) the behaviour of the BCC entity. When the BCC entity in the MS receives a message, it shall first analyse whether it shall ignore the message, see clauses 5 and 7.

6.1.2.1.1 Attributes and Parameters of BCC in the MS

For the following behaviour parameters, the description is informative.

Parameter	Description
ORIG	Depending on the context, the MS assumes to be the originator of the call (ORIG=T) or not to be the originator of the call (ORIG=F).
COMM	Depending on the context, the MS assumes that communication with its peer entity is enabled in both directions (COMM = T) or not (COMM = F).

For the following configuration parameters the MS shall adapt its configuration according to the parameter value and parameter definition.

Parameter	Definition
D-ATT	D-ATT = T means that the MS attaches the user connection for the broadcast call in the downlink. D-ATT = F means that the MS does not attach the user connection for the broadcast call in the downlink.
U-ATT	U-ATT = T means that the MS attaches the user connection for the broadcast call in the uplink. U-ATT = F means that the MS does not attach the user connection for the broadcast call in the uplink.

6.1.2.1.2 NULL (U0)

No broadcast call exists for the BCC entity. When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = F, COMM = F, D-ATT = F, U-ATT = F.

6.1.2.1.3 MM CONNECTION PENDING (U0.p)

The BCC entity has requested the explicit establishment of an MM connection. When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = T, COMM = F, D-ATT = F, U-ATT = F.

6.1.2.1.4 BROADCAST CALL INITIATED (U1)

The BCC entity has requested the peer entity in the network to establish a broadcast call. When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = T, COMM = T, D-ATT = F, U-ATT = F.

6.1.2.1.5 BROADCAST CALL ACTIVE (U2)

The broadcast call is established at least in one cell. When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = T, COMM = T, D-ATT = T, U-ATT = T.

6.1.2.1.6 BROADCAST CALL PRESENT (U3)

The MS has received a notification about an ongoing broadcast call. Higher layers are requested to accept or reject the call. When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = F, COMM = F, D-ATT = F, U-ATT = F.

6.1.2.1.7 BROADCAST CALL CONNECTION REQUESTED (U4)

The MS has received a notification about an ongoing broadcast call. Higher layers have decided to accept the call. When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = F, COMM = F, D-ATT = F, U-ATT = F.

6.1.2.1.8 TERMINATION REQUESTED (U5)

The MS which is the originator of the broadcast call has been in state U1 or U2 and has sent a TERMINATION REQUEST message to the network. When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = T, COMM = T, D-ATT = T, U-ATT = T.

6.1.2.1.9 RECEIVE MODE ACTIVE (U6)

The BCC entity in the MS in state U4, BROADCAST CALL CONNECTION REQUESTED, has got an indication from lower (sub-)layers that RR has entered group receive mode (see 3GPP TS 44.018). When entering the state, parameters shall be set to the following values, and configuration shall be adapted to the new values of configuration parameters: ORIG = F, COMM = F, D-ATT = T, U-ATT = F.

6.1.2.1.10 BCC TIMERS IN THE MS

Table 6.1 specifies the timers used in BCC. The denotation of columns is defined as follows:

timer ::= name of the timer;

set ::= under which conditions the timer is set (i.e., started);

stopped ::= under which conditions the timer is stopped;

running in state(s) ::= in which state(s) the timer may be running;

action at expiry ::= which actions the BCC entity shall perform at expiry;

value ::= the duration between setting the timer and expiry of the timer ("s" denotes "second(s)" "xx - yy" means that any value between xx and yy is permitted).

Table 6.1: Specification of timers used in BCC

timer	set	stopped	running in state(s)	action at expiry	value
$T_{no\ channel}$	in state U6 on receipt of an indication from lower (sub-)layers that no channel is currently available	when leaving U6 or when receiving in U6 an indication from lower (sub-)layers that a channel is available	in U6, depending on further conditions	see subclause 6.3.1	3 s
$T_{MM\text{-}est}$	when entering U0.p using the set-up procedure when entering U1 using the immediate set-up procedure	when leaving U0.p or U1	U0.p, U1	see subclause 6.2.1	7 s
T_{term}	when sending a TERMINATION REQUEST	when receiving a TERMINATION or TERMINATION REJECT	U5	abort broadcast call	10 s
$T_{conn\ req}$	when entering state U4	when leaving state U4	U4	abort broadcast call	10-30 s

6.1.2.1.11 CONSISTENCY OF PARAMETERS AND STATES

The MS shall consider the following parameter values as inconsistent with the state or sub-state:

ORIG = T is inconsistent with states U3, U4, and U6.

COMM = T is inconsistent with states U0, U3, U4, and U6.

All other values of parameters ORIG, COMM, D-ATT, and U-ATT shall not be considered by the MS as inconsistent with a state.

6.1.2.2 BROADCAST CALL CONTROL STATES AT THE NETWORK SIDE OF THE INTERFACE

6.1.2.2.1 NULL (State N0)

No broadcast call exists for the BCC entity.

6.1.2.2.2 BROADCAST CALL INITIATED (N1)

The BCC entity has received the indication that a peer entity in a MS wants to establish a broadcast call for a certain broadcast identity.

6.1.2.2.3 BROADCAST CALL ACTIVE (N2)

The broadcast call is established in at least one cell; there may be a MS which has seized the uplink or not; there may be talking dispatchers or not.

6.1.2.2.4 BROADCAST CALL ESTABLISHMENT PROCEEDING (N3)

The BCC entity wants to accept the broadcast call, has initiated establishment of corresponding broadcast call channels, and, if there is a calling user. has sent a CONNECT message to the calling user.

6.1.2.2.5 TERMINATION REQUESTED (N4)

The BCC entity has asked lower sub-layers to terminate the broadcast call in all cells and waits for a confirmation that the broadcast call has been terminated in all cells.

6.2 Procedures for establishment of a broadcast call

6.2.1 Activation of a broadcast call by the network

The BCC entity in the network may initiate the activation of a broadcast call with a certain broadcast call reference and priority in a list of cells by asking lower layers to establish the broadcast call with that broadcast call reference and priority in those cells. It then waits until it is informed by lower (sub-)layers that resource activation was sufficiently successful, and enters state N2, BC ACTIVE.

6.2.2 Mobile originated establishment

Higher layers in the MS may ask the BCC entity in state U0, NULL, to establish a broadcast call, either using the immediate set-up procedure or using the set-up procedure. The request contains a group-id and may contain a priority indication.

On request of higher layers to establish a broadcast call using the set-up procedure, the BCC entity of the MS builds an appropriate SETUP message and asks lower (sub-)layers to establish an MM connection explicitly (i.e. by use of a CM SERVICE REQUEST message) and to transmit the SETUP message. It then enters state U0.p, MM CONNECTION PENDING. In state U0.p, when informed by lower sub-layers that an MM connection has been established, the BCC entity in the MS shall stop timer $T_{MM\text{-}est}$ and enter state U1, BC INITIATED.

On request of higher layers to establish a broadcast call using the immediate set-up procedure, the BCC entity of the MS builds an appropriate IMMEDIATE SETUP message and asks lower (sub-)layers to establish an MM connection implicitly (see 3GPP TS 24.008) and to transmit the IMMEDIATE SETUP message. It sets timer $T_{MM\text{-}est}$ and then enters state U1, BC INITIATED.

The network BCC entity in state NULL may receive a set-up message from its peer entity in the originating MS. This set-up message is either a SETUP message or an IMMEDIATE SETUP message. The network enters state N1, BC INITIATED.

In state N1, the network decides whether:

a) the establishment is accepted; or

b) the establishment rejected.

In case a), the BCC entity in the network considers the peer entity in the MS having sent the set-up message to be the calling user and asks lower layers to activate the appropriate resources. It then:

1) waits until it is informed by lower (sub-)layers that resource activation was sufficiently successful, then sends a CONNECT message to the calling user, and enters state N2, BC ACTIVE; or

2) sends a CONNECT message to the calling user and enters N3, BC ESTABLISHMENT PROCEEDING. In state N3, the BCC entity is informed by lower layers whenever the status of resources for the broadcast call is changed. When informed that activation of resources was sufficiently successful, the BCC entity in the network enters state N2, ACTIVE.

The CONNECT message specifies the broadcast call reference of the broadcast call and indicates that the MS is the originator of the broadcast call.

In case b), the further proceeding is as defined in subclause 6.2.2.1.

In state U0.p or U1, the BCC entity in the MS shall, on receipt of a CONNECT message, establish the conditions defined for state U2, ACTIVE and the suitable sub-state (see subclause 6.1.2.1), stop timer $T_{MM\text{-}est}$ (if running) and enter state U2, ACTIVE. If the immediate set-up procedure has been used, the BCC entity in the MS shall inform lower sub-layers that the MM connection has been implicitly established.

6.2.2.1 Termination during mobile originated establishment

At any time during the mobile originated establishment of a broadcast call, the network may decide to terminate the connection between the two peer entities in the network and MS. In this case the network sends a TERMINATION message to the MS specifying the appropriate cause; it may ask lower (sub-)layers to release associated resources. The further actions are specified in subclause 6.4.

During mobile originated establishment of a broadcast call, the MS may abort the broadcast call, see subclause 6.4.

6.2.2.2 Abnormal cases

At expiry of $T_{MM\text{-}est}$, or radio link failure (see 3GPP TS 44.018), the BCC entity in the MS requests lower sub-layers to abort the MM connection establishment and returns to state U0, NULL(this includes clearing of the context related to the broadcast call establishment).

On receipt of an indication of lower sub-layers that the MM connection establishment was unsuccessful, the BCC entity in the MS returns to state U0, NULL (this includes clearing of the context related to the broadcast call establishment).

6.2.3 Mobile terminating broadcast call establishment in the MS

The BCC entity in the MS, being in state U0, NULL, may receive an indication of lower layers that a broadcast call exists. This indication specifies the broadcast-id and a priority. It shall then inform higher layers and enter state U3, BC present. This state may be supervised by a timer at expiry of which the BCC entity clears the context and returns to state U0, NULL.

In state U3, on request of higher layers to join the broadcast call, the BCC entity in the MS stops any running timer, asks lower sub-layers to join the broadcast call, starts timer $T_{conn\ req}$, and enters state U4, BC CONNECTION REQUESTED.

In state U4, on indication of lower sub-layers that the broadcast call has been joint (this indication specifies the mode of the RR connection), the BCC entity in the MS stops any running timer, enters state U6, RECEIVE MODE ACTIVE, establishes the appropriate configurations (see subclause 6.1) and informs higher layers (this includes information about the sub-state).

6.3 Procedures during the active state and receive mode active state of a broadcast call

6.3.1 Mobile station procedures in the active state

In the active state, the BCC entity in the MS performs, on receipt of messages from its peer entity, on request of higher layers, and on indication of lower sub-layers, actions as defined below.

On request of higher layers, the MS initiates abort or termination of the broadcast call, see subclause 6.4.

If the network initiates broadcast call abortion or termination, the MS reacts as specified in subclause 6.4.

On radio link failure, the MS aborts the broadcast call, see subclause 6.4.

6.3.2 Network procedures in the active state

In the active state the BCC entity in the network performs supervisory functions, maintenance functions and resource modifications which are not further specified. (This includes through-connection of the application data stream(s), which is defined in 3GPP TS 43.069).

The network may initiate abort or termination of the broadcast call, see subclause 6.4.

If the MS initiates broadcast call abortion or termination, the network reacts as specified in subclause 6.4.

The network may send a SET PARAMETER message to the MS in order to ask the MS to set parameters to certain values and to take consequential actions.

6.3.3 Mobile station procedures in the RECEIVE MODE ACTIVE state

In state U6, RECEIVE MODE ACTIVE, the BCC entity in the MS performs, on receipt of messages from its peer entity, on request of higher layers, and on indication of lower sub-layers, actions as defined below.

On request of higher layers, the MS initiates abort of the broadcast call, see subclause 6.4.

If the network initiates broadcast call abortion or termination, the MS reacts as specified in subclause 6.4.

Upon indication from lower layers that no channel is available, the BCC entity in the MS informs higher layers and starts timer $T_{no\ channel}$. Then:

- if $T_{no\ channel}$ expires, the BCC entity in the MS informs higher layers, asks lower sub-layers to abort resources and enters the idle state;
- upon indication from lower layers that a channel is available, the BCC entity in the MS informs higher layers and stops timer $T_{no\ channel}$.

6.4 Procedures for release, abortion, and termination of a broadcast call

6.4.1 Termination procedure

The MS being the originator of the broadcast call (ORIG = T) shall, on request of higher layers, initiate the termination procedure by sending a TERMINATION REQUEST message to its peer entity in the network and setting timer T_{term}.

The network either accepts the termination by sending a TERMINATION or rejects termination by sending a TERMINATION REJECT. These messages indicate an appropriate cause.

In state U5, on receipt of a TERMINATION REJECT message, the BCC entity in the MS informs higher layers and stops T_{term}.

In state U5, on T_{term} expiry, the BCC entity in the MS informs higher layers, asks lower sub-layers to abort the broadcast call, clears the context related to the broadcast call, and returns to state U0, NULL.

In any state, on receipt of a TERMINATION message, the BCC entity in the MS informs higher layers, asks lower sub-layers to release the broadcast call, clears the context related to the broadcast call, and returns to state U0, NULL.

At any time during a broadcast call, the network may decide to terminate the connection between the two peer entities in the network and MS. In this case the network sends a TERMINATION message to the MS specifying the appropriate cause; it may ask lower (sub-)layers to release associated resources. The further actions are specified above in this subclause 6.4.

6.4.2 Abort and release procedures

The network may ask lower sub-layers to abort or release the broadcast call. The MS will detect abort of the broadcast call by detecting the abort of RR resources, and a broadcast call release by detecting the release of RR resources. The BCC entity in the MS shall then inform higher layers, ask lower sub-layers to abort the broadcast call, clear the context related to the broadcast call, and return to state U0, NULL.

The MS shall, on request of higher layers, initiate the release procedure by asking lower sub-layers to release the broadcast call, clearing the context related to the broadcast call, and returning to state U0, NULL.

The BCC entity in the MS shall when required by the BCC protocol, abort the broadcast call by requesting lower layers to abort the broadcast call, informing higher layers, clearing the context related to the broadcast call, and returning to state U0, NULL.

6.5 Miscellaneous procedures

6.5.1 Status procedures

6.5.1.1 Get status procedure

Upon receipt of a GET STATUS message, the MS shall:

- if COMM = T, respond with a STATUS message, reporting the current call state, the current values of configuration and behaviour parameters and cause value # 30 "Response to GET STATUS";
- if COMM = F, ignore the message.

6.5.1.2 Set parameter procedure

Upon receipt of a SET PARAMETER message the MS shall set the parameters to the indicated values and the configuration shall be adapted to the new values of configuration parameters, if they are consistent with the current BCC state and sub-state (see subclause 6.1.2). If they are not:

- if COMM, before the message was received, is equal to T, it shall send a STATUS message specifying error cause "message incompatible with protocol state", the state and, if applicable, sub-state, and the *state attributes* IE;
- if COMM, before the message was received, is equal to F, it shall ignore the message.

7 Handling of unknown, unforeseen, and erroneous protocol data

7.1 General

This subclause specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving BCC protocol entity in the MS. These procedures are called "error handling procedures", but in addition to providing recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocols. Error handling procedures in the network are for further study.

Subclauses 7.1 to 7.8 shall be applied in order of precedence.

Most error handling procedures are mandatory for the MS.

In this clause the following terminology is used:

- an IE is defined to be syntactically incorrect in a message if it contains at least one value defined as "reserved" in clause 9, or if its value part violates rules of clause 9. However it is not a syntactical error that a TLV encoded IE specifies in its length indicator a greater length than defined in clause 9;

- a message is defined to have semantically incorrect contents if it contains information which, possibly dependant on the state of the receiver, is in contradiction to the resources of the receiver and/or to the procedural part (i.e. clauses 6 and 7) of the present document.

7.2 Message too short

When a message is received that is too short to contain a complete message type information element, that message shall be ignored, cf. 3GPP TS 24.007.

7.3 Unknown or unforeseen transaction identifier

If COMM = T, the MS shall answer to a message received with TI value "111" by sending a STATUS message with same TI value, cause "invalid transaction identifier value", and including, if possible, as diagnostics the complete message received (this may not be possible, e.g., due to length restrictions). If COMM = F, the MS shall ignore a message received with TI value "111".

For a broadcast call control message received with TI different from "111", the following procedures shall apply.

Whenever a message is received specifying a transaction identifier which is not recognized as relating to an active transaction, if COMM = F, the MS shall ignore the message; if COMM = T, the MS shall send a STATUS message with cause #81 "invalid transaction identifier value" using the received transaction identifier value and including, if possible, as diagnostics the complete message received (this may not be possible, e.g., due to length restrictions).

7.4 Unknown or unforeseen message type

If the protocol entity in the MS receives a message with message type not defined for the PD or not implemented by the receiver, it shall ignore the message except for the fact that, if COMM = T, it shall return a STATUS message with cause "message type non-existent or not implemented" and including as diagnostics the message type of the message received.

NOTE: A message type not defined for the PD in the given direction is regarded by the receiver as a message type not defined for the PD, see 3GPP TS 24.007.

If the protocol entity in the MS receives a message not compatible with the protocol state, the MS shall ignore the message except for the fact that, if COMM = T, it returns a STATUS message with cause "message type not compatible with protocol state" and including as diagnostics the message type of the message received.

7.5 Non-semantical mandatory information element errors

When on receipt of a message:

- an "imperative message part" error; or
- a "missing mandatory IE" error,

is diagnosed or when a message containing

- a syntactically incorrect mandatory IE; or
- an IE unknown in the message, but encoded as "comprehension required" (see 3GPP TS 24.008, subclause 10.5); or
- an out of sequence IE encoded as "comprehension required" (see 3GPP TS 24.008, subclause 10.5),

is received,

- the MS shall, if COMM = F, ignore the message. Otherwise it shall proceed as follows:

  The MS shall ignore the message except for the fact that it shall return a STATUS message with cause "invalid mandatory information" and including, if possible, as diagnostics the complete message received (this may not be possible, e.g., due to length restrictions).

7.6 Unknown and unforeseen information elements in the non-imperative message part

7.6.1 Information elements unknown in the message

The protocol entity in the MS shall ignore all information elements unknown in a message which are not encoded as "comprehension required".

7.6.2 Out of sequence information elements

The MS shall ignore all out of sequence Information elements in a message which are not encoded as "comprehension required".

7.6.3 Repeated Information elements

If an information element with format T, TV, or TLV is repeated in a message in which repetition of the information element is not specified in clause 8, only the contents of the information element appearing first shall be handled and all subsequent repetitions of the information element shall be ignored. When repetition of information elements is specified, only the contents of specified repeated information elements shall be handled. If the limit on repetition of information elements is exceeded, the contents of information elements appearing first up to the limit of repetitions shall be handled and all subsequent repetitions of the information element shall be ignored.

7.7 Non-imperative message part errors

This category includes:

- syntactically incorrect optional Information elements;
- conditional IE errors.

7.7.1 Syntactically incorrect optional Information elements

The protocol entity shall treat all optional Information elements that are syntactically incorrect in a message as not present in the message.

7.8 Messages with semantically incorrect contents

When a message with semantically incorrect contents is received, the foreseen reactions of the procedural part (i.e. of clauses 5 and 6) of the present document are performed. If however no such reactions are specified, the MS shall ignore the message except for the fact that, if COMM = T, it returns a STATUS message with cause value "semantically incorrect message" and including, if possible, as diagnostics the complete message received (this may not be possible, e.g.: due to length restrictions).

8 Message functional definitions and contents

This clause defines the structure of the messages of those layer 3 protocols defined in the present document, that is the BCC protocol.

All messages are standard L3 messages as defined in 3GPP TS 24.007.

Each definition given in the present clause includes:

- a brief description of the message direction and use;
- a definition in which direction the message is defined;
- a table listing the information elements permitted to be in that message and their order of their appearance in the message. All information elements that may be repeated are explicitly indicated. Neither the network nor the MS is allowed to include information elements in a message which are not specified for the message or to include the information elements in the message in an order different from the specified order. (V and LV formatted IEs, which compose the imperative part of the message, occur before T, TV, and TLV formatted IEs which compose the non-imperative part of the message, cf. 3GPP TS 24.007.) In a (maximal) sequence of consecutive information elements with half octet length, the first information element with half octet length occupies bits 1 to 4 of octet N, the second bits 5 to 8 of octet N, the third bits 1 to 4 of octet N+1 etc. Such a sequence always has an even number of elements.

  For each information element the table indicates:

  1) if the IE has format T, TV, or TLV, the IEI used by the IE at the indicated position in the message, in hexadecimal notation. If the IEI has half octet length, this is specified by a notation representing the IEI as a hexadecimal digit followed by a "-" (example: B-);
  2) the name of the information element (which may give an idea of the semantics of the element). The name of the information element (usually written in italics) followed by "IE" or "information element" is used in 3GPP TS 24.008 as reference to the information element within a message;
  3) the name of the type of the information element (which indicates the coding of the value part of the IE), and generally, the referenced subclause of clause 9 describing the value part of the information element;
  4) the presence requirement indication (M or O) for the IE as defined in 3GPP TS 24.007 (Presence requirement indication C is not used in the present document.);
  5) the format of the information element (T, V, TV, LV, TLV) as defined in 3GPP TS 24.007;
  6) the length of the information element (or permissible range of lengths), in octets, in the message. This indication is normative. However, further restrictions to the length of an IE may be specified elsewhere.

c) subclauses specifying, where appropriate:

  - the meaning of and
  - conditions for

  absence, repeated occurrence, and/or presence for IEs with presence requirement O in the relevant message which together with other conditions specified in the present document define when the information elements shall be included or not, what presence, repeated occurrence, and absence of such IEs means.

TABLE 8.1

8.1 CONNECT

This message is sent by the network to the calling MS in order to indicate establishment of the requested broadcast call.

See table 8.1.

Message type: CONNECT

Significance: dual

Direction: network to MS

Table 8.1: CONNECT message content

IEI	Information element	Type/Reference	Presence	Format	Length
	Broadcast Call control protocol discriminator	Protocol discriminator 9.1	M	V	1/2
	Transaction identifier	Transaction identifier 9.2	M	V	1/2
	Connect message type	Message type 9.3	M	V	1
	Broadcast call reference	Call reference 9.4.1	M	V	4
	Originator indication	Originator indication 9.4.4	M	V	1/2
	Spare half octet	Spare half octet 9.4.5	M	V	1/2

8.2 GET STATUS

This message is sent by the network at any time to solicit a STATUS message from the MS in acknowledged or unacknowledged mode.

See table 8.2.

Message type: GET STATUS

Significance: local

Direction: network to MS

Table 8.2: GET STATUS message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	mobile identity	mobile identity 3GPP TS 24.008, 10.5.1.4	O	TLV	3-10

8.2.1 mobile identity

This IE is included if the network wishes so. If the message is received by the MS in acknowledged mode, it shall be ignored by the MS. If received in unacknowledged mode, it specifies the destination MS, see clause 5.

8.3 IMMEDIATE SETUP

This message is sent by the MS to the network in order to set-up a broadcast call immediately, i.e. without previous establishment of an MM connection. See table 8.3.

Message type: IMMEDIATE SETUP

Significance: dual

Direction: MS to network

Table 8.3: IMMEDIATE SETUP message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	Spare half octet	Spare half octet 9.4.5	M	V	1/2
	Ciphering key sequence number	Ciphering key sequence number 3GPP TS 24.008, 10.5.1.2	M	V	1/2
	Mobile station classmark	Mobile station classmark 2 3GPP TS 24.008, 10.5.1.6	M	LV	4
	Mobile identity	Mobile identity 3GPP TS 24.008, 10.5.1.4	M	LV	2-9
	Broadcast identity	Call reference	M	V	4

8.3.1 Mobile identity

This IE shall specify the TMSI, if available, and the IMSI else.

8.3a IMMEDIATE SETUP 2

This message is sent by the MS to the network in order to set-up a group call immediately, i.e. without previous establishment of an MM connection, and to include compressed originator-to dispatcher information. The message shall only be used if the MS has a valid TMSI. See table 8.3a.

Message type: IMMEDIATE SETUP 2;

Significance: dual

Direction: MS to network.

Table 8.3a: IMMEDIATE SETUP 2 message content

IEI	Information element	Type/Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 9.1	M	V	1/2
	Transaction identifier	Transaction identifier 9.2	M	V	1/2
	Message type	Message type 9.3	M	V	1
	Spare half octet	Spare half octet 9.4.6	M	V	½
	Ciphering key sequence number	Ciphering key sequence number 3GPP TS 24.008, 10.5.1.2	M	V	½
	Mobile station classmark	Mobile station classmark 2 3GPP TS 24.008, 10.5.1.6	M	LV	4
	TMSI	TMSI/P-TMSI 3GPP TS 44.018, 10.5.2.42	M	V	4
	Group identity	Call reference 9.4.1	M	V	4
	Compressed otdi	Compressed otdi 9.4.7	M	V	5

8.3a.1 TMSI

The *TMSI* information element indicates the Temporary Mobile Subscriber Identity of the MS.

8.3a.2 Compressed otdi

This information element contains compressed originator-to-dispatcher information.

8.4 SET PARAMETER

This message is sent by the network at any time to ask the MS for setting of parameters and consequential actions.

See table 8.4.

Message type: SET PARAMETER

Significance: local

Direction: network to MS

Table 8.4: SET PARAMETER message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	state attributes	state attributes 9.4.6	M	V	1/2
	spare half octet	spare half octet 9.4.6	M	V	1/2

8.5 SETUP

This message is sent by the MS to the network in order to set-up a broadcast call after establishment of an MM connection.

See table 8.5.

Message type: SETUP

Significance: dual

Direction: MS to network

Table 8.5: SETUP message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	Broadcast identity	Call reference 9.4.1	M	V	4
7E	Originator-to-dispatcher information	User-user 3GPP TS 24.008 subclause10.5.4.25	O	TLV	3-35

8.5.1 Originator-to-dispatcher information

The *Originator-to-dispatcher* IE specifies originator-to-dispatcher information. The coding of the IE is equal to the coding of User-user information defined in 3GPP TS 24.008 subclause 10.5.4.25.

8.6 STATUS

This message is sent by the MS to the network at any time during a call to report certain error conditions listed in subclause 8. It shall also be sent in response to a GET STATUS message.

See table 8.6.

Message type: STATUS

Significance: local

Direction: MS to network

Table 8.6: STATUS message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	cause	cause 9.4.3	M	LV	2-248
A-	call state	call state 9.4.2	O	TV	1
B-	state attributes	state attributes 9.4.6	O	TV	1

8.6.1 Call state

This IE may always be included in the message. In certain cases identified in the present document, the IE shall be included in the message, e.g., when used in the get status procedure.

8.6.2 State attributes

This IE may always be included in the message. In certain cases identified in the present document, the IE shall be included in the message, e.g., when used in the get status procedure.

8.7 TERMINATION

This message is sent by the network to the MS in order to terminate the connection between the two peer entities in the network and MS and/or to indicate that the broadcast call has been or will be terminated, e.g. as a response to a termination request.

See table 8.7.

Message type: TERMINATION

Significance: dual

Direction: network to MS

Table 8.7: TERMINATION message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	cause	cause 9.4.3	M	LV	2-248

8.8 TERMINATION REJECT

This message is sent by the network to the MS in order to reject a termination request.

See table 8.8.

Message type: TERMINATION REJECT

Significance: dual

Direction: network to MS

Table 8.8: TERMINATION REJECT message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	Reject cause	Cause 9.4.3	M	LV	2-248

8.9 TERMINATION REQUEST

This message is sent by the MS to the network in order to request termination of a broadcast call which it had originated.

See table 8.9.

Message type: TERMINATION REQUEST

Significance: dual

Direction: MS to network

Table 8.9: TERMINATION REQUEST message content

IEI	Information element	Type/Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	Broadcast call reference	Call reference 9.4.1	M	V	4

9 Contents of information elements value parts

The figures and text in this clause describe the contents of Information Elements (IE) value parts. The structure of an IE as composed of Information Element Identifier (IEI), length, and value part is defined in 3GPP TS 24.007.

9.1 Protocol Discriminator

The Protocol Discriminator (PD) and its use are defined in 3GPP TS 24.007.

9.2 Transaction identifier

Bits 5 to 8 of the first octet of every message belonging to the BCC protocol contain the transaction identifier (TI). The transaction identifier and its use are defined in 3GPP TS 24.007.

9.3 Message Type

The message type IE and its use are defined in 3GPP TS 24.007. Table 9.1 define the value part of the message type IE used in the BCC protocol.

Table 9.1: Message types for BCC

8	7	6	5	4	3	2	1	
0	x	1	1	0	0	0	1	IMMEDIATE SETUP
0	x	1	1	0	0	1	0	SETUP
0	x	1	1	0	0	1	1	CONNECT
0	x	1	1	0	1	0	0	TERMINATION
0	x	1	1	0	1	0	1	TERMINATION REQUEST
0	x	1	1	0	1	1	0	TERMINATION REJECT
0	x	1	1	1	0	0	0	STATUS
0	x	1	1	1	0	0	1	GET STATUS
0	x	1	1	1	0	1	0	SET PARAMETER
0	x	1	1	1	0	1	1	IMMEDIATE SETUP 2

Bit 8 is reserved for possible future use as an extension bit, see 3GPP TS 24.007.

Bit 7 is reserved for the send sequence number in BCC messages sent from the MS. In BCC messages sent from the network an, bit 7 is coded with a "0". See 3GPP TS 24.007.

9.4 Other information elements

For coding of other IEs, the rules defined in 3GPP TS 24.007 annex B apply.

9.4.1 Call Reference

The *Call Reference* information element identifies the broadcast call reference or broadcast Id of a broadcast call. It is coded as shown below. It is a type 3 information element.

<*call reference*> ::= **reference** *{* **0 spare_4** | { **1 priority** spare_1 } *}*

Attributes

The information element defines a reference which, depending on the situation, is to be interpreted as a broadcast call reference or as a broadcast id. If the **priority** field is present in <*call reference*>, the information element also specifies a priority.

If the *Call Reference* IE is included in the SETUP message and if the **priority** field is present in <*call reference*>, then the MS shall set the priority value to be the same as the priority value in the CM_SERVICE_REQUEST message.

Field contents

The field of the *call reference* information element are coded as shown in table 9.2.

Table 9.2: *call reference* information element

reference (27 bits)

This field contains the 27 bit binary encoding (with leading zeroes) of the number the decimal encoding of which (with leading zeroes) is the broadcast call reference or the broadcast id (see 3GPP TS 23.003).

priority (3 bits)

3	2	1	
0	0	0	reserved
0	0	1	call priority level 4
0	1	0	call priority level 3
0	1	1	call priority level 2
1	0	0	call priority level 1
1	0	1	call priority level 0
1	1	0	call priority level B
1	1	1	call priority level A

spare_4 (4 bits)

This field shall be ignored

spare_1 (1 bit)

This field shall be ignored

9.4.2 Call state

The *call state* information element identifies a state, and, if applicable, a sub-state of the broadcast call protocol at the MS side. It is coded as defined below. It is a type 1 information element.

<call state> *::=* **state**

Attributes

The **state** field defines an integer N in the range 0..15. The *call state* information element defines a call state or a sub-state of state U2, ACTIVE, of the BCC protocol.

Field contents

See table 9.3.

Static conditions

The values 12 to 15 of integer N are reserved.

Table 9.3: *call state* information element

state (4 bits)			
	This field contains the 4 bit encoding (with leading zeroes) of an integer N = 0, ..., 15. The state or substate associated to integer N is defined below:		
	N		state
	0		U0
	1		U1
	2		U2
	3		U3
	4		U4
	5		U5
	6		U0.p
	7		U6
	All other values are reserved.		

9.4.3 Cause

The purpose of the *cause* information element is to describe the reason for generating certain messages and to provide diagnostic information in the event of procedural errors.

The *cause* information element is a type 4 information element. Its value part has a minimal length of 1 octet. The maximum length is given by the maximum number of octets in a L3 message (see 3GPP TS 44.006).

The value part is coded as shown below:

<*cause* > ::= **1 cause_part** [**diagnostics** *]*

| **0 cause_part** <*cause*>

Attributes

The **cause_part** field defines a non-negative integer N. If more than one **cause_part** fields are present in <*cause*>, the information element indicates an unspecific cause; otherwise, it indicates a cause as defined by N.

Field contents

The fields of the information element are coded as shown in table 9.4.

Table 9.4: *cause* information element

cause_part **(7 bits)**		
	This field contains the 7 bit encoding (with leading zeroes) of a non-negative integer which	
	specifies a cause as defined below:	
	N	cause
	3	Illegal MS
	5	IMEI not accepted
	6	Illegal ME
	8	Service not authorized
	9	Application not supported on the protocol
	10	RR connection aborted
	16	Normal call clearing
	17	Network failure
	20	Busy
	22	Congestion
	23	User not originator of call
	24	Network wants to maintain call
	30	Response to GET STATUS
	32	Service option not supported
	33	Requested service option not subscribed
	34	Service option temporarily out of order
	38	Call cannot be identified
	48 - 63	retry upon entry into a new cell
	81	Invalid transaction identifier value
	95	Semantically incorrect message
	96	Invalid mandatory information
	97	Message type non-existent or not implemented
	98	Message type not compatible with the protocol state
	99	Information element non-existent or not implemented
	100	Message type not compatible with the protocol state
	112	Protocol error, unspecified
	Any other value received shall be treated as an unspecific cause.	
Diagnostics		
	This field contains a message or information element.	

9.4.4 Originator indication

The *originator indication* information element informs the broadcast call control entity in the MS whether it is the calling user. It is a type 1 information element.

The value part is coded as shown below:

<*originator indication*> ::= **spare_3 OI**

Attributes

The IE defines whether the MS is the originator of the broadcast call.

Field contents

The fields of the information element are coded as shown in table 9.5.

Table 9.5: *originator indication* information element fields

spare_3 (3 bits)	
This field shall be ignored.	
OI (1 bit)	
0	The MS is not the originator of the call
1	The MS is the originator of the call

9.4.5 Spare Half Octet

This element is used in the description of messages in clause 8 when an odd number of half octet type 1 information elements are used. This element consists of 4 bits set to zero and is placed in bits 5 to 8 of the octet unless otherwise specified. It is a type 1 information element.

9.4.6 State attributes

The *state attributes* information element contains information about parameter values of the MS. It is a type 1 information element.

The value part is coded as shown below:

<state attributes> ::= **DA UA COMM OI**

Attributes

The IE defines values of parameters D-ATT, U-ATT, ORIG, and COMM.

Field contents

The fields of the information element are coded as shown in table 9.7.

Table 9.7: *state attributes* information element fields

DA (1 bit)	
0	User connection in the downlink not attached (D-ATT = F)
1	User connection in the downlink attached (D-ATT = T)
UA (1 bit)	
0	User connection in the uplink not attached (U-ATT = F)
1	User connection in the uplink attached (U-ATT = T)
COMM (1 bit)	
0	COMM = F
1	COMM = T
OI (1 bit)	
0	The MS is not the originator of the call (ORIG = F)
1	The MS is the originator of the call (ORIG = T)

9.4.7 Compressed otdi

The *Compressed otdi* information element specifies an integer N in 40 bit binary representation; bit 8 of octet 1 is the most significant bit and bit 1 of octet 5 is the least significant bit. The integer denotes compressed originator-to-dispatcher information. The corresponding decompressed originator-to-dispatcher information is given by the following attributes:

- User-user protocol discriminator: IA5 characters.
- User-user information: The user-user information is a string of 12 digits which are the decimal representation of the integer N with leading zeros. Each digit after decompression is coded in one octet. The bits 1 to 7 are used for the coding of the IA5 character, and bit 8 is coded as "0". A coding example is given in Annex A.

Annex A (informative): Example of the coding of the user-user information after decompression of the originator-to-dispatcher information

If the originator-to-dispatcher information after the decompression in decimal representation with leading zeros is "000000009123", then the user-user information is coded in IA5 characters as follows:

Table A.1: Example of user-user information in IA5 characters after decompression

8	7	6	5	4	3	2	1	content	IA5 Code
0	0	1	1	0	0	0	0	1. digit: 0	0x30
0	0	1	1	0	0	0	0	2. digit: 0	0x30
0	0	1	1	0	0	0	0	3. digit: 0	0x30
0	0	1	1	0	0	0	0	4. digit: 0	0x30
0	0	1	1	0	0	0	0	5. digit: 0	0x30
0	0	1	1	0	0	0	0	6. digit: 0	0x30
0	0	1	1	0	0	0	0	7. digit: 0	0x30
0	0	1	1	0	0	0	0	8. digit: 0	0x30
0	0	1	1	1	0	0	1	9. digit: 9	0x39
0	0	1	1	0	0	0	1	10. digit: 1	0x31
0	0	1	1	0	0	1	0	11. digit: 2	0x32
0	0	1	1	0	0	1	1	12. digit: 3	0x33

Annex B (informative): Change History

TSG#	TSG doc	WG doc	Spec	CR	Rev	Ph	Cat	Old vers	New vers	Title	WI
S#31		Feb 2000	04.69					7.1.0	8.0.0	Specification version upgrade to Release 1999 version 8.0.0	
CN#7		N1-000472	04.69	A021		R99		8.0.0	8.1.0	Addition of cause values, Approved at TSGN#7 and SMG email approved before SMG#32	
S#32, CN#8		N1-000679	04.69	A022		R00		8.1.0	9.0.0	Introduction of Originator-to-dispatcher information into VBS	
			04.69 / 44.069					04.69 v9.0.0	44.069 v4.0.0	Conversion to 3GPP TS format	-
CN#7	NP-000449	N1-001007	44.069	001	1	R00	C	4.0.0	4.1.0	The repetition of the priority in the Call Reference IE in the SETUP message	ASCI
								4.1.0	4.1.1	Oct 2000: Correction of references.	
NP-12	NP-010269	N1-010855	44.069	002	1	Rel-4	F	4.1.1	4.2.0	Clarification of the coding of otdi information in IA5 format	ASCI
NP-16	NP-020224	N1-021369	44.069	003	1	Rel-4	F	4.2.0	4.3.0	Various clean-up of wrong references, eg towards 44.018	TEI4
NP-16			44.069			Rel-5		4.3.0	5.0.0	CN plenary decision to make this TS also for Release 5.	June 2002
NP-26			44.069			Rel-6		5.0.0	6.0.0	CN plenary decision to make this TS also for Release 6.	Dec 2004
CP-33	CP-060506	C1-061469	44.069	005		Rel-7		6.0.0	7.0.0	TC RT Increase VBS setup timeout (MS timer TMM-est)	Sept 2006
CP-42						Rel-8		7.0.0	8.0.0	Upgrade to Rel-8.	Dec 2008
CP-46						Rel-9		8.0.0	9.0.0	Upgrade to Rel-9	Dec 2009
CP-51						Rel-10		9.0.0	10.0.0	Upgrade to Rel-10	March 2011
CP-57						Rel-11		10.0.0	11.0.0	Upgrade to Rel-11	Sept 2012
CP-65						Rel-12		11.0.0	12.0.0	Úpgrade to Rel-12	Sept 2014
CP-70						Rel-13		12.0.0	13.0.0	Upgrade to Rel-13	Dec 2015

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-03	SA#75					Upgrade to Rel-14	14.0.0
2018-06	SA#80	-	-	-	-	Update to Rel-15 version (MCC)	15.0.0
2020-06	SA#88e					Update to Rel-16 version (MCC)	16.0.0

History

Document history		
V16.0.0	August 2020	Publication