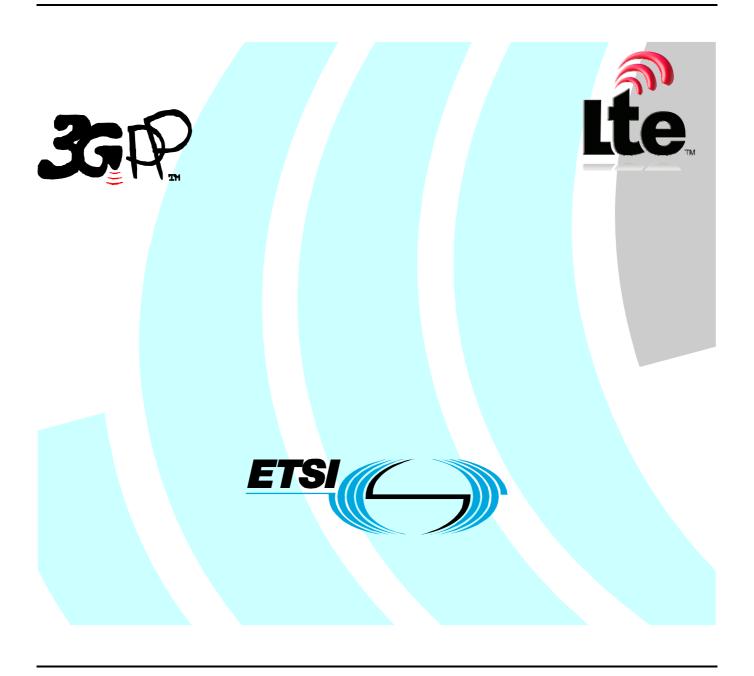# ETSI TS 122 093 V9.0.0 (2010-01)

Technical Specification

Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Completion of Calls to Busy Subscriber (CCBS); Service description, Stage 1 (3GPP TS 22.093 version 9.0.0 Release 9)

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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3GPP.

This TS specifies the stage 1 description of Completion of Calls to Busy Subscriber (CCBS) from the subscriber's and user's points of view; in particular:

- the procedures for normal operation with successful outcome;

- the action to be taken in exceptional circumstances;

- the interaction with other 3GPP supplementary services.

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1 presented to TSG for information;

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y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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1 Scope

The present document specifies the stage 1 description of Completion of Calls to Busy Subscriber (CCBS) from the subscriber's and user's points of view; in particular:

- the procedures for normal operation with successful outcome;

- the action to be taken in exceptional circumstances;

- the interaction with other supplementary services;

The present document does not deal with the Man-Machine Interface (MMI) requirements, but makes reference to the appropriate specifications.

The charging principles applied to CCBS are outside of the scope of this specifcation.

Any interactions with other networks not dealt with in the present document are outside the scope of the present document.

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]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2]   3GPP TS 22.004: "General on supplementary services'.

[3]   3GPP TS 22.030: "Man-Machine Interface (MMI) of the Mobile Station (MS)".

[4]   3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[5]   3GPP TS 22.085: "Closed User Group (CUG) Supplementary Services - Stage 1".

3 Definitions and abbreviations

3.1 Definitions

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

CCBS supplementary service: is a service which enables a calling subscriber A, encountering a NDUB destination B, to have the call completed when the busy destination B becomes idle, without having to make a new call attempt**.**

CCBS busy on the A side: is caused by the following condition:

- while the CCBS recall timer T4 or the CCBS notification timer T10 is running or until the CCBS call is completed or the CCBS call fails.

CCBS busy on the B side: is caused by the following conditions:

- while the idle guard timer (T8) is running;

- while there is CCBS recall pending (i.e. while the CCBS recall timer T9 is running).

Subscriber A and Destination B is indicated as **idle** if there are no active calls, no calls on hold and no call waiting for the subscribers.

Subscriber A and Destination B is indicated as **not reachable** if one of the conditions defined in TS 29.002 [4] apply (e.g. IMSI detach, no paging response, no location information in HLR).

CCBS recall: an indication informing subscriber A that destination B is idle.

CCBS call: a call set-up from subscriber A to destination B resulting from subscriber A's acceptance of a CCBS recall.

CCBS request: A request by subscriber A against an NDUB destination B requesting that subscriber A be automatically informed when destination B becomes idle. The CCBS request shall be held in a CCBS queue pending the correct conditions for the CCBS request to be completed.

Destination B: the entity addressed in the original call set up.

Subscriber A: the subscriber that originated the call, activated a CCBS request and is uniquely identifiable for CCBS recall.

Suspended CCBS request: a CCBS request which cannot be served even if destination B is idle, because subscriber A is CCBS busy, not reachable or is not idle and ignores the CCBS recall.

Resumed CCBS request: a CCBS request which was suspended before and has become not suspended as a result of subscriber A becoming idle, not CCBS busy or reachable again.

Automatic deactivation: an action by the network resulting in removal of all reference to a CCBS request without informing the subscriber. Automatic deactivation is performed after a successful CCBS procedure or for exceptional situations.

Timers at the originating side (A):

CCBS retention timer (T1): this timer specifies the amount of time that the network retains the call information when the call encounters busy. The value shall be greater than 15 seconds. The upper limit of the CCBS retention timer is a network option.

CCBS service duration timer (T3): the maximum time the CCBS request will be active within the network. The value of this period is a network option, in the range of 15 to 45 minutes.

CCBS recall timer (T4): the maximum time the network will wait for a subscriber A response to a CCBS recall when subscriber A is idle. The value of this timer is a network option and shall be in the range 20 to 30 seconds**.**

CCBS notification timer (T10): the maximum time the network will wait for a subscriber A response to a CCBS recall when subscriber A is not idle and not CCBS busy. The value of the timer is a network option and shall be in the range 20 to 30 seconds.

CCBS resume timer (T11): the timer started as soon as a suspended CCBS request is resumed, making sure only one CCBS request is becoming resumed at a time. Duration of the timer shall allow a CCBS recall resulting from the destination side CCBS queue being processed. The value of the timer is a network option and shall be in the range 20 to 25 seconds.

Timers at the terminating side (B):

CCBS service duration timer (T7): is the timer which specifies the maximum length of time the CCBS request will be held within the network. The value of this period is a network option shall be greater than 45 minutes.

Destination B idle guard timer (T8): the time the network will wait after destination B has become idle before initiating a "CCBS recall" to subscriber A. The value of this timer is a network option and shall be in the range 0 to 15 seconds.

NOTE 1: This timer enables destination B to initiate a call before any notification is given to subscriber A that destination B has become idle and prevents destination B to receive incoming calls.

CCBS recall B timer (T9): is the timer, which supervises the CCBS recall establishment on the B-side. The value is a network option and shall be shall be in the range of 40 to 55 seconds.

NOTE 2: This timer prevents destination B from receiving other incoming calls than from subscriber A.

NOTE 3: The timer values may vary from one PLMN to another and thus give the subscriber a slightly different perception of the service as she roams between PLMN"s.

3.2 Abbreviations

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

CCBS Completion of Calls to Busy Subscriber

NDUB Network Determined User Busy

Additional abbreviations may be found in GSM 01.04 [1] and TR 21.905 [6].

4 Description

When subscriber A encounters a Network Determined User Busy (NDUB) destination B, subscriber A can request the CCBS supplementary service (i.e. activate a CCBS Request against destination B). The network will then monitor the wanted destination B for becoming idle.

When the wanted destination B becomes idle, then the network will wait a short time in order to allow destination B to make an outgoing call. If destination B does not make any outgoing call within this time, then the network shall automatically recall subscriber A.

When subscriber A accepts the CCBS recall, within a defined time, then the network will automatically generate a CCBS call to destination B.

CCBS has to be supported by the originating, as well as by the terminating network.

4.1 Applicability to telecommunications services

The applicability of the CCBS supplementary service is defined in TS 22.004 [2].

5 Normal procedures with successful outcome

5.1 Provision

5.1.1 Subscriber A

The CCBS supplementary service shall be provided to subscriber A after prior arrangement with the service provider.

This supplementary service is provisioned for all Basic Services (BS) subscribed to and to which it is applicable, i.e. not provisioned to any subset of these BSs.

5.1.2 Subscriber B

Subscriber B is the user of destination B and is not provided with the CCBS supplementary service. However, if provided by the network operator/service provider as an option, subscriber B may elect not to be a target of CCBS requests. In this case, the size of her destination B CCBS queue shall be reduced to zero length by the service provider. Only the service provider may subsequently change the destination B CCBS queue length on demand of subscriber B.

5.2 Withdrawal

The CCBS supplementary service shall be withdrawn at the customer's request or for administrative reasons. At the same time, all outstanding CCBS requests shall be automatically deactivated.

5.3 Registration

Not applicable.

5.4 Erasure

Not applicable.

5.5 Activation

The CCBS service shall be activated as a result of provisioning.

A CCBS request shall be activated by the mobile subscriber on a per-call basis by a control procedure as described in TS 22.030 [3].

When subscriber A encounters a NDUB destination B, the network shall retain the call information for a period defined by the CCBS retention timer (T1), and inform subscriber A that CCBS is possible when the following set of conditions apply:

- subscriber A has the CCBS supplementary service provisioned;

- the call failure reason is either "user busy or "no circuit/channel available";

- CCBS is available (as determined by network B as described below).

   During this time subscriber A can activate the CCBS request.

CCBS is available at network B, when the following set of conditions apply:

- network B supports the CCBS supplementary service;

- destination B is found to be NDUB; and

- the maximum length of destination B's CCBS queue is greater than zero.

If the network accepts the activation of a CCBS request the network shall register the call information in the original call request, and subscriber A shall be informed that the activation was successful.

When the activation of a CCBS request is accepted the CCBS service duration timers (T3 and T7) are started. The network shall monitor destination B for destination B becoming idle.

Subscriber A can have a limited number of CCBS requests outstanding. This limit is a network option (with a maximum value of 5). The CCBS requests can be to different destination Bs, or can be to the same destination B with different basic service requirements.

Destination B can have a limited number of incoming CCBS requests outstanding. This limit is a network option (with a maximum value of 5). The requests can be from different subscriber As, or can be from the same subscriber A with different basic service requirements.

Having activated a CCBS, subscriber A can originate calls and receive calls as normal.

5.6 Deactivation

The CCBS supplementary service shall be deactivated as a result of withdrawal.

A previous CCBS request activation shall be deactivated by the mobile subscriber by a control procedure as described in TS 22.030 [3] or shall be automatically deactivated after a successful CCBS procedure or for exceptional situations as described in subclause 6.4.

Deactivation of a CCBS request shall result in all reference to this CCBS request (entries in A and B queue and timers) being removed from the network.

Subscriber A can send the following deactivation request:

   a) deactivate all outstanding CCBS requests;

   b) deactivate one specific CCBS request.

Subscriber A shall be informed that the deactivation is successful.

5.7   Invocation and operation

The CCBS supplementary service shall be automatically invoked by the network after destination B has become idle.

When destination B is or becomes idle or reachable and there are non-suspended CCBS requests in destination B's CCBS queue, then the network shall start the destination B idle guard timer (T8).

When the destination B idle guard timer (T8) expires and destination B is still idle, the first non-suspended CCBS request shall be processed, provided that an entry in the destination B's CCBS queue is not currently being processed. Entries shall not be processed in parallel. This means that the CCBS recall procedure shall be started towards subscriber A, informing subscriber A that destination B is now idle and the CCBS recall B timer (T9) shall be started.

If subscriber A is idle or not CCBS busy, subscriber A shall be recalled with an indication that it is a CCBS recall and with an indication of which CCBS request it applies to, and the CCBS recall timer (T4) shall be started. Optionally, the ME may use a specific alert (e.g. a tone, different from the one used for normal MT call) for the indication of a CCBS recall.

If subscriber A accepts the recall before the CCBS recall timer (T4) expires, then the network shall initiate the CCBS call to destination B using the call information of the original call set-up (retained in the network). When the network receives an indication that the destination B is being informed of the CCBS call, the corresponding CCBS request shall be considered as completed.

Whilst the destination B idle guard timer (T8) is running, and also whilst awaiting the CCBS call to destination B (whilst CCBS recall B timer (T9) is running), a new incoming call shall not be offered to destination B. For such incoming calls, the called user shall be considered as being NDUB and the calling user shall be informed as for basic call procedures.

The CCBS requests in the destination B CCBS queue shall be processed in the order they are received, although the actual mechanism for processing the CCBS queue is outside the scope of the present document. During the processing of the destination B CCBS queue, CCBS requests which are currently suspended shall be ignored and the next entry in the CCBS queue shall be processed.

If, for any reason, no CCBS call results from the processing of a CCBS request, then provided destination B is still idle, the next CCBS request in the destination B CCBS queue shall be selected for processing. This procedure shall be repeated until the processing of the destination B CCBS queue is complete.

If all of the destination B CCBS queue has been processed and no CCBS call results, then processing is complete.

5.8   Interrogation

Subscriber A can request the list of the CCBS requests by a control procedure as described in TS 22.030 [3]. In response to the request subscriber A shall be given a list of the addresses and basic services against which CCBS requests are outstanding.

6 Exceptional procedures or unsuccessful outcome

6.1 Registration

Not applicable.

6.2 Erasure

Not applicable.

6.3 Activation

If the Mobile Station (MS) does not receive information from the network that CCBS is possible, the activation of a CCBS request shall be rejected.

If the network cannot accept subscriber A's request to activate a CCBS request, the network shall inform subscriber A and give the appropriate reason.

If the request to activate a CCBS request can not be accepted due to special situation regarding CCBS the following indications shall be given to subscriber A:

a) **short term denial:** The network temporarily cannot accept subscriber A's request to activate a CCBS request. A later attempt to activate a CCBS request for the same destination B may succeed.

   - The maximum number of CCBS requests permitted against destination B has been reached;

   - Subscriber A tried to activate a CCBS request against destination B after the CCBS retention timer T1 has expired;

   - Subscriber A has reached the maximum number of CCBS requests permitted;

   - if there is an interaction with a supplementary service which temporarily prevents the activation of a CCBS request;

b) **long term denial:** The network cannot accept subscriber A's request to activate a CCBS request and a later attempt to activate a CCBS request against the same destination B will also be rejected.

   - A CCBS request is not allowed against destination B i.e. because the destination B CCBS queue is set to zero;

If subscriber A does not wait for the CCBS recall to a particular destination B, but makes another call to that (busy) destination B and activates another CCBS request then, the following procedures can apply:

   - if the two calls are identical, the original CCBS request shall be automatically deactivated and the current CCBS request shall be accepted. The current CCBS request shall be treated as new CCBS request (see subclause 5.5);

   NOTE: There will be no restriction how often subscriber A is allowed to activate identical requests like this. If destination B's CCBS queue is limited to a size of one, i.e. only one CCBS request is allowed to be planted against destination B, then if subscriber A re-activates CCBS request before T3 expires then no other subscriber can activate CCBS against destination B.

   - if the two calls are not identical, then the network shall treat this as a new CCBS request. (see subclause 5.5).

   In order to decide that the two calls are identical, the originating network shall only compare the basic call information, i.e. the basic service requirements, and called subscriber identity.

   The originating network shall check for identical CCBS requests.

6.4 Deactivation

If there are no CCBS requests outstanding which meet the criteria specified in the deactivation request, the network shall inform subscriber A.

6.5 Invocation and operation

If, as a result of processing the entries in the queue, all entries become either suspended or automatically deactivated, no further processing shall take place. If, while destination B is idle, a previously suspended entry is resumed, or a new entry is added to the queue, the network shall process that entry. If destination B becomes idle , the network shall process that entry.

If, while destination B is still idle and no other CCBS call is awaited (CCBS Recall B timer (T9) is not running), a previously suspended entry is resumed or a new entry is added to the destination B CCBS queue, the network shall process that entry as described in subclause 5.7.

6.5.1 Exceptional situation at destination B's side:

a) Destination B makes an outgoing call during the idle guard timer is running.

   If destination B makes an outgoing call while the destination B idle guard timer (T8) is running, then invocation of CCBS shall be deferred until destination B becomes idle again.

b) destination B is NDUB upon arrival of the CCBS call.

   If destination B is is NDUB upon arrival of the CCBS call, then two network options exist:

   - the corresponding CCBS request shall be automatically deactivated. If subscriber A activates a CCBS request again, this activation shall be considered as a new CCBS request; or

   - the original CCBS request shall retain its position in the CCBS queue, and the CCBS service duration timers (T3 and T7) shall not be restarted. If subscriber A attempts to activate a CCBS request again, this shall be treated as an identical request (see subclause 6.3).

   NOTE: The option to retain the information of the original CCBS request can only be invoked if both the originating and the destination network support this option. It is the responsibility of networks supporting the option to retain the original CCBS request to provide interworking with those networks that do not.

c) destination B is not reachable.

   The network may determine that destination B is not reachable:

   - when the network monitors destination B for destination B becoming idle;

   - while running the destination B idle guard timer (T8).

   In each of the above cases, the CCBS request shall remain in the CCBS queue until. When destination B becomes reachable, the network shall process any CCBS requests in the CCBS queue (see subclause 5.7).

   If subscriber A accepts the CCBS recall and destination B is not reachable, then the corresponding CCBS request shall be automatically deactivated.

d) destination B rejects the CCBS call with UDUB.

   If destination B rejects the CCBS call using UDUB, the CCBS request shall be automatically deactivated. The network shall not offer subscriber A the opportunity to activate a CCBS request for this call again.

e) supplementary service interaction on destination B's side:

   If a supplementary service is active and operative on destination B side which prohibits the invocation of the CCBS supplementary service (for details see also Clause 7), then the processing of the B CCBS queue shall be stopped. The outstanding CCBS requests shall remain in destination B CCBS request CCBS queue. If the supplementary service interaction ends the outstanding CCBS requests shall be processed (see subclause 5.7).

f) CCBS request becomes suspended while awaiting the CCBS call:

If a CCBS request becomes suspended while being processed, the network shall stop the CCBS recall timer (T9) and process the next non-suspended CCBS request.

g) CCBS service duration timer (T7) expires:

If the CCBS service duration timer (T7) expires and the subscriber A has not been informed that destination B is idle for that CCBS request, i.e. the CCBS recall timer (T9) is not running, then the network shall automatically deactivate the CCBS request.

If the CCBS service duration timer (T7) expires after the subscriber A has been informed that destination B is idle for that CCBS request, i.e. the CCBS recall B timer (T9) is running, then the CCBS request shall not be automatically deactivated until the processing of the CCBS request is completed.

h) CCBS recall B timer (T9) expires:

If the CCBS recall B timer (T9) expires then the network shall automatically deactivate the CCBS request.

6.5.2 Exceptional situation at subscriber A's side:

a) non-acceptance or rejection of CCBS recall when subscriber A is found to be idle.

If subscriber A rejects the CCBS recall or the CCBS recall timer (T4) expires, then the CCBS request shall be automatically deactivated.

If subscriber A tries to suspend the CCBS recall then the CCBS request shall be automatically deactivated.

b) subscriber A is found to be not idle.

When the destination B's idle guard timer (T8) expires and subscriber A is found to be not idle, the network shall notify subscriber A and start the CCBS notification timer (T10). While the CCBS notification timer (T10) is running, subscriber A may:

- Accept the CCBS recall: The subscriber A has to free up the required resources to set-up the CCBS call, e.g. by releasing the existing calls or put the existing call on hold. The CCBS recall shall then be handled in the same way as when subscriber A is idle (subclause 5.7).

- Reject the CCBS notification. The network shall automatically deactivate the CCBS request.

- Ignore the CCBS notification. When the CCBS notification timer (T10) expires, the network shall suspend the CCBS request if T3 is still running. If T10 expires while T3 has already expired, then the CCBS request shall be automatically deactivated.

- Suspend the CCBS request . The request may later be resumed according to subclause 6.5.2.e.

c) subscriber A is found to be CCBS busy.

If subscriber A is CCBS busy when destination B's idle guard timer (T8) expires, the network shall suspend the CCBS request without notifying subscriber A.

d) Subscriber A is not reachable.

If it is identified that subscriber A is not reachable when the destination B idle guard timer expires, then the CCBS request shall be suspended until subscriber A becomes reachable again.

e) If subscriber A becomes idle after being not idle or CCBS busy, or subscriber A becomes reachable again and there are one or more suspended CCBS requests in subscriber A's CCBS queue, this queue shall be processed in the following way:

The first suspended CCBS request shall be resumed. The CCBS resume timer (T11) is started, provided that subscriber A"s CCBS queue holds more than one CCBS request;

- If no CCBS recall results from the resume procedure before the CCBS resume timer (T11) expires, processing of subscriber A's CCBS queue shall be continued as described above until no more suspended CCBS requests are left in that queue;

- If a CCBS recall results from the resume procedure, the CCBS resume timer (T11) is stopped, and the CCBS recall is treated in the normal way as described in subclause 5.7.

f) CCBS service duration timer (T3) expires:

- If the CCBS service duration timer (T3) expires and the subscriber A has not been informed that destination B is idle for that CCBS request, i.e. the CCBS recall timer (T4) or the CCBS notification timer (T10) are not running then the network shall automatically deactivate the CCBS request.

- If the CCBS service duration timer (T3) expires and the subscriber A has been informed that destination B is idle, i.e. the CCBS recall timer (T4) or the CCBS notification timer (T10) are running, then the CCBS request shall not be automatically deactivated until the processing of the CCBS request is completed.

g) CCBS recall timer (T4) expires:

If the CCBS recall timer (T4) expires then the network shall automatically deactivate the CCBS request.

6.5.3 Exceptional situations in the network

If the CCBS call fails for any other reason than described in subclauses 6.5.1 and 6.5.2, then subscriber A shall be informed as for the basic call procedures, and the CCBS request shall be automatically deactivated.

7 Interaction with other supplementary services

7.1 Calling line identification presentation

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

7.2 Calling line identification restriction

CLIR information from the original call, stored in the network, shall also be automatically included in the CCBS call.

7.3 Connected line identification presentation

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

7.4 Connected line identification restriction

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

7.5 Call Forwarding Unconditional (CFU)

CCBS recalls shall never be forwarded.

If subscriber A places a call to destination B and the call is forwarded to user C by the CFU supplementary service and user C is busy, then subscriber A shall not receive any CCBS possible indication.

If destination B activates the CFU supplementary service after subscriber A has activated a CCBS request, then all the CCBS requests related to the relevant Basic Service Group shall be excluded from the destination B network"s queue processing until the CFU supplementary service becomes deactive or quiescent or until the CCBS duration timers (T3 or T7) expire.

If destination B activates the CFU supplementary service for the relevant Basic Service Group between the expiry of the destination B idle guard timer and the arrival of the CCBS call, the CCBS call shall be forwarded as a normal call.

If the destination network B receives a CCBS request from the originating A network while the CFU supplementary is active and operative for the relevant Basic Service Group, then the CCBS request shall be rejected with an indication of short term denial.

7.6 Call Forwarding on mobile subscriber Busy (CFB)

CCBS recalls shall never be forwarded.

If subscriber A places a call to destination B and the call is forwarded to user C by the CFB supplementary service and user C is busy, then any subsequent attempt to activate a CCBS request by subscriber A against destination B will be accepted.

If destination B activates the CFB supplementary service after subscriber A has activated a CCBS request, then the processing of destination B's CCBS queue shall be continued.

If destination B which has activated the CFB supplementary service is busy upon arrival of a CCBS call two network provider options exist with regard to the treatment of that CCBS call, i.e.:

- the CCBS call shall be treated according to the exceptional procedures (destination B again busy); or

- the CCBS call shall be forwarded as a normal call.

7.7 Call Forwarding on No Reply (CFNRy)

CCBS recalls shall never be forwarded.

If subscriber A places a call to destination B and the call is forwarded to user C by the CFNRy supplementary service and user C is busy, then subscriber A shall not receive any CCBS possible indication.

If destination B activates the CFNRy supplementary service after subscriber A has activated a CCBS request, then the processing of destination B's CCBS queue shall be continued.

If destination B activates the call forwarding no reply supplementary service after subscriber A has activated a CCBS requestagainst destination B, then the CCBS call shall be given to destination B at the user's original location. After the no reply timer has expired at destination B the CCBS call shall be forwarded as a normal call.

7.8 Call Forwarding on mobile subscriber Not Reachable (CFNRc)

CCBS recalls shall never be forwarded.

If subscriber A places a call to destination B and the call is forwarded to user C by the CFNRc supplementary service and user C is busy, then subscriber A shall not receive any CCBS possible indication.

If destination B activates the CFNRc supplementary service after subscriber A has activated a CCBS request, then the processing of destination B's queue shall be continued.

If destination B activates the CFNRc supplementary service after subscriber A has activated a CCBS request against destination B and destination B is not reachable upon the arrival of CCBS call then the CCBS call shall be forwarded as a normal call.

7.9 Call waiting

If subscriber A has subscribed to the CCBS supplementary service and places a normal call to a destination B that has subscribed to the call waiting supplementary service, and the call waiting indication is given to destination B (i.e. the call is waiting), a subsequent CCBS request activation by subscriber A shall not be allowed.

If the call waiting indication cannot be given at the destination B, subscriber A will receive busy indication and can activate a CCBS request against destination B.

CCBS requests in the destination B CCBS queue shall only be processed if destination B is idle.

A CCBS call shall be treated as a normal call with respect to call waiting, at subscriber B.

7.10 Call hold

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

7.11 Multiparty services

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

7.12 Closed user group

Closed user group information from the original call, stored in the network, shall also be automatically included in the CCBS call.

If subscriber A or destination B roam to a network not supporting CUG the call restriction procedures as described in TS 22.085 [4] shall apply after a CCBS request has been activated.

7.13 Advice of charge services

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

If subscriber A has subscribed to Advice of Charge Charging (AoCC) and if ACMmax is reached, or exceeded, and subscriber A is awaiting a CCBS recall notification, then the ME shall be informed of the CCBS recall. Subscriber A shall not be informed of the CCBS recall. The ME shall reject the CCBS recall which shall stop T4 or T10 and the corresponding CCBS request shall be deactivated. Any outstanding CCBS request shall remain in subscriber A's CCBS queue until the CCBS service duration timer (T3 or T7) expires.

7.14 Barring of All Outgoing Calls (BAOC)

If the BAOC supplementary service becomes active and operative for subscriber A after subscriber A has activated a CCBS request, and subscriber A accepts the CCBS Recall, the CCBS call will be barred and the CCBS Request shall be automatically deactivated.

7.15 Barring of Outgoing International Calls (BOIC)

If the BOIC supplementary service becomes active and operative for subscriber A after subscriber A has activated a CCBS request, and subscriber A accepts the CCBS Recall, the CCBS call will be barred if it is an international call and the CCBS Request shall be automatically deactivated.

7.16 Barring of Outgoing International Calls except those directed to the Home PLMN Country (BOIC-exHC)

If the BOIC-exHC supplementary service becomes active and operative for subscriber A after subscriber A has activated a CCBS request, and subscriber A accepts the CCBS Recall, the CCBS call will be barred if it is an international call except to the HPLMN country and the CCBS Request shall be automatically deactivated.

7.17 Barring of All Incoming Calls (BAIC)

If destination B activates the BAIC supplementary service after subscriber A has activated a CCBS request, then all the CCBS requests related to the relevant Basic Service Group shall be excluded from the destination B network"s queue

processing until the BAIC supplementary service becomes deactive or until the CCBS duration timers (T3 or T7) expire.

If the BAIC supplementary service is active and operative for the relevant Basic Service Group when the HPLMN B receives an interrogation to route the CCBS call, then the specific CCBS request relating to that CCBS call shall be automatically deactivated.

If the destination network B receives a CCBS request from the originating A network while the BAIC supplementary service is active and operative for the relevant Basic Service Group, then the CCBS request shall be rejected with an indication of short term denial.

7.18 Barring of Incoming Calls when roaming outside the home PLMN country (BIC-Roam)

If destination B activates the BIC-Roam supplementary service after subscriber A has activated a CCBS request, then all the CCBS requests related to the relevant Basic Service Group shall be excluded from the destination B network"s queue processing until the BAIC supplementary service becomes deactive or quiescent or until the CCBS duration timers (T3 or T7) expire.

If the BIC-Roam supplementary service becomes active and operative for the relevant Basic Service Group when the HPLMN B receives an interrogation to route the CCBS call, then the specific CCBS request relating to that CCBS call shall be automatically deactivated.

If the destination network B receives a CCBS request from the originating A network while the BIC-Roam supplementary service is active and operative for the relevant Basic Service Group, then the CCBS request shall be rejected with an indication of short term denial.

7.19 Explicit call transfer

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

7.20 Completion of calls to busy subscriber

No impact.

A subscriber can be both a "subscriber A" and a "destination B" simultaneously, i.e. the same subscriber can be both the originator and the target of one or more CCBS requests.

If the subscriber receives a CCBS call while that subscriber is being alerted or is awaiting completion of the CCBS call for which the subscribers is the originator, then the received CCBS call shall be treated as if the subscriber was busy again.

7.21 Customised Applications for Mobile network Enhanced Logic (CAMEL)

The CCBS call shall be treated as normal originating call for the purpose of CAMEL based originating services.

If a mobile originating CAMEL based service determines for a CCBS call different called party address than for the initial call, the CCBS call shall be released by the network and the corresponding CCBS request shall be automatically deactivated.

There will be no interaction in case of the called party address is not changed by any CAMEL based terminating service.

In case of a terminating CAMEL based service changing the called party address, then a CCBS request activation shall not be allowed.

At Interrogation the network shall return the same B subscriber address as subscriber A has entered at the time of CCBS request activation.

If the CSE (CAMEL Service Environment) requests a call set-up to an alternative destination after the original call set-up to destination B has encountered a busy condition and this call meets a busy destination, then any subsequent attempt to activate a CCBS request by subscriber A against destination B (the original called party) will be accepted.

If the CSE (CAMEL Service Environment) requests a call set-up to an alternative destination after the original call set-up has failed for other reasons than the busy condition of destination B or was disconnected and this call meets a busy destination, then subscriber A shall not receive any CCBS possible indication..

7.22 Support of Private Numbering Plan (SPNP)

A CCBS call shall always be directed to the party originally addressed, regardless of any changes in the B party number after activation of a CCBS request.

At Interrogation, the network shall return the same B subscriber address as subscriber A has entered at the time of the original call.

8 Mobility aspects

The processing of CCBS requests shall not be affected by the mobility of subscriber A or destination B if either or both of the subscribers is a mobile subscriber.

Annex A (informative):
Cross Phase compatibility

Users of existing MSs (Phase 2 and possibly Phase 1) are not prevented from using the CCBS supplementary service.

Existing Phase 1/Phase 2 functional signalling mechanisms and USSD shall be used to offer the service to these MSs. Networks wishing to offer this service to existing MSs are therefore required to support both functional (Phase 1/Phase 2) and stimulus signalling (USSD).

A.1   Activation of a CCBS request

Activation of CCBS requests by existing MSs shall be performed using USSD. The standardised MMI is defined in TS22.030 [3]. The network shall interpret the USSD string as an activation of a CCBS request.

Consequently, networks which do not support USSD will not be able to offer the service to existing MSs which do not support USSD will not be able to activate a CCBS request.

A.2   CCBS Recall

A CCBS Recall to an existing MS shall be handled as a normal mobile terminated call using Phase 1/Phase 2 functional signalling.

A.3   Interrogation

Existing MSs shall use USSD to interrogate the service. The MMI is defined in TS 22.030[3].

A.4   Deactivation

Existing MSs shall use USSD to deactivate the service. The MMI is defined in TS22.030 [3].

Annex B (normative):
Roaming to non-supporting networks

B.1 Roaming into networks or registering in network entities not supporting CCBS

This clause looks at the times when either parties involved in CCBS may roam from a supporting network entity into a non-supporting network or network entity.

Consider the times when neither Subscriber A or Destination B can register in another location area.

Subscriber A cannot register in another location area:

a) Having received a CCBS Possible indication and while the network is awaiting the initial CCBS Request;
b) Having received a CCBS Recall and while the network is awaiting acceptance of the CCBS Recall;
c) During the duration of the CCBS Call.

Destination B cannot register in another location area:

a) During the duration of the CCBS Call;

B.1.1 Subscriber A may register in a non-supporting network or network entity

Whilst waiting for the CCBS Recall from Destination B

If Subscriber A registers in a non-supporting entity whilst waiting for the CCBS Recall from destination B. The network shall be aware that the CCBS supplementary service is not supported and shall suspend the CCBS Request. The CCBS Request shall remain suspended until either Subscriber A registers in a supporting entity or until the service duration timer T3 expires.

B.1.2 Destination B may register in a non-supporting network entity

a) If destination B becomes idle after "CCBS Possible" has been sent and before a "CCBS Request" is received. If destination B is idle and has registered in a non-supporting entity when the CCBS Request arrives then the CCBS Request shall be accepted, but the handling of the destination B CCBS queue shall be frozen until the destination B registers in a supporting entity or until a service duration timer expires.

b) While T8 is running. If destination B registers in a non-supporting network entity during T8, then the processing of the destination B CCBS queue shall be stopped until either destination B registers in a supporting network entity or the service duration time expires.

c) After T8 expires. If Destination B registers in a non-supporting entity after having sent the CCBS Recall, then error handling will ensure that the entity informs the network that it doesn't support CCBS. However, the CCBS Call shall be allowed to continue. When the non-supporting entity receives the CCBS Call, it will not be able to inform the network that the CCBS has been completed. The only safeguard is that T9 in the network will expire, which will result in automatic deactivation of the CCBS Request from the queue.

d) When a CCBS Request is suspended and before it is resumed. If destination B has registered in a non-supporting entity when the CCBS Resume arrives, then the CCBS Resume shall be treated as a CCBS Request and shall be accepted, but the handling of the destination B CCBS queue shall be frozen until destination B registers in a supporting entity or until a service duration timer expires.

Annex C (informative):
Change history

								Change history			
TSG SA#	**SA Doc.**	**SA1 Doc**	**Spec**	**CR**	**Rev**	**Rel**	**Cat**	**Subject/Comment**	**Old**	**New**	**WI**
Jun 1999			GSM 02.93					Transferred to 3GPP SA1	7.0.0		
SA#04			22.093			R99		Transferred to 3GPP SA1		3.0.0	
SP-05	SP-99479	S1-99638	22.093	001		R99	D	Editorial changes for alignment	3.0.0	3.0.1	Editorial changes
SP-11	SP-010065	S1-010258	22.093			Rel-4		Transferred to 3GPP Release 4	3.0.1	4.0.0	
SP-16	SP-020267	S1-021043	22.093			Rel-5		Updated from Rel-4 to Rel5	4.0.0	5.0.0	
SP-26	SP-040744	S1-040997	22.093			Rel-6		Updated from Rel-5 to Rel-6	5.0.0	6.0.0	
SP-36			22.093			Rel-7		Updated from Rel-6 to Rel-7	6.0.0	7.0.0	
SP-42	-	-				Rel-8		Updated from Rel-7 to Rel-8	7.0.0	8.0.0	
SP-46	-	-	-	-	-	-	-	Updated to Rel-9 by MCC	8.0.0	9.0.0	

History

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