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**Integrated Services Digital Network (ISDN);
Completion of Calls to Busy Subscriber (CCBS)
supplementary service;
Service description**



Reference

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN), and is now submitted for the ETSI standards One-step Approval Procedure.

In accordance with ITU-T Recommendation I.130 [1], the following three level structure is used to describe the supplementary telecommunications services as provided by European public telecommunications operators under the pan-European Integrated Services Digital Network (ISDN):

- Stage 1: is an overall service description, from the user's standpoint;
- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and
- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

The present document details the stage 1 aspects (overall service description) for the Completion of Calls to Busy Subscriber (CCBS) supplementary service. The stage 2 aspects are detailed in ETS 300 358 (see bibliography) and the stage 3 aspects are detailed in EN 300 359-1 [7] and EN 300 356-18 [8].

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

The present document defines the stage one of the Completion of Calls to Busy Subscriber (CCBS) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators. Stage one is an overall service description from the user's point of view (see ITU-T Recommendation I.130 [1]), but does not deal with the details of the human interface itself.

The present document defines the interworking requirements of private ISDNs with the public ISDN.

In addition, the present document specifies the base functionality where the service is provided to the user via a private ISDN.

The present document does not specify the additional requirements where the service is provided to the user via a telecommunications network that is not an ISDN but does include interworking requirements of other networks with the public ISDN.

Interactions with supplementary services not listed in clause 7 are outside the scope of the present document.

Charging principles are outside the scope of the present document.

The CCBS supplementary service enables user A, encountering a busy destination B, to have the call completed without having to make a new call attempt when the destination B becomes not busy.

The CCBS supplementary service is applicable to all circuit-switched telecommunications services with the following exceptions:

- a) call 2, of the videotelephony teleservice (see ETS 300 264 in bibliography);
- b) all other circuit-switched telecommunications services requiring the use of more than one B-channel.

The present document is applicable to the stage two and stage three documents for the ISDN CCBS supplementary service. The terms "stage two" and "stage three" are also defined in ITU-T Recommendation I.130 [1]. Where the text indicates the status of a requirement (i.e. as strict command or prohibition, as authorization leaving freedom, or as a capability or possibility), this shall be reflected in the text of the relevant stage two and stage three documents.

Furthermore, conformance to the present document is met by conforming to the stage three document with the field of application appropriate to the equipment being implemented. Therefore, no method of testing is provided for 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, subsequent revisions do apply.

- [1] ITU-T Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [2] ITU-T Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".
- [3] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [4] ITU-T Recommendation E.164 (1997): "The international public telecommunication numbering plan".

- [5] ITU-T Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".
- [6] ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".
- [7] ETSI EN 300 359-1 (V1.3.2): "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol Specification".
- [8] ETSI EN 300 356-18 (V3.1.3): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 for the international interface; Part 18: Completion of Calls to Busy Subscriber (CCBS) supplementary service [ITU-T Recommendation Q.733, clause 3 (1997), modified]".

3 Definitions and abbreviations

3.1 Definitions

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

basic access: see ITU-T Recommendation Q.9 [5], clause 1, definition 1551

basic call procedures: procedures by which a call (as an instance of a telecommunications service) is established and terminated

busy: see ITU-T Recommendation I.221 [6], clause 3.

CCBS busy: any one of the following conditions will cause user A to be considered as CCBS busy:

- maximum number of calls reached at user A;
- no B-channels available at user A;
- CCBS recall pending on user A.

CCBS call: call generated by the network from user A to destination B resulting from user A's acceptance of a CCBS recall

CCBS recall: indication informing user A that the network is ready to initiate a CCBS call to destination B and that the network is awaiting a response to this indication

CCBS recall timer: maximum time the network will wait for user A to respond to a CCBS recall. The value of this timer shall be a minimum of 10 seconds and a maximum of 20 seconds

CCBS request: instance of an activation of the CCBS supplementary service which is held in a queue pending the correct conditions for the CCBS supplementary service to be completed

CCBS service duration timer: maximum time the CCBS supplementary service will remain activated for user A within the network. The value of this timer shall be a minimum of 15 minutes and a maximum of 45 minutes

compatible terminal: terminal which can support the bearer service or teleservice requested for the original call to destination B and which can accept calls to the ISDN number and subaddress identifying the called user in the original call to destination B

destination B: entity addressed in the original call

destination B idle guard timer: time the network will wait after destination B has become not busy before informing user A. The value of this timer shall be a maximum of 15 seconds

Integrated Services Digital Network (ISDN): see ITU-T Recommendation I.112 [2], clause 2.3, definition 308

ISDN number: number conforming to the numbering plan and structure specified in ITU-T Recommendation E.164 [4]

primary rate access: see ITU-T Recommendation Q.9 [5], clause 1, definition 1552

retention timer: this timer specifies the amount of time that the network retains all of the information supplied by the calling user when the call encounters busy. This timer is part of the basic call procedures. Although this timer is optional for the basic call procedures, it is needed for the operation of the CCBS supplementary service. The value shall be greater than 15 seconds

service; telecommunications service: see ITU-T Recommendation I.112 [2], clause 2.2, definition 201

subaddress: see ITU-T Recommendation E.164 [4], clause 11.2

supplementary service: see ITU-T Recommendation I.210 [3], clause 2.4

suspended CCBS request: CCBS request which cannot be served even if destination B is not busy, because user A is busy or CCBS busy

user A: user who originated the call and to whom the CCBS supplementary service is provided

3.2 Abbreviations

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

CCBS	Completion of Calls to Busy Subscriber
ISDN	Integrated Services Digital Network

4 Description

The CCBS supplementary service enables user A, encountering a busy destination B, to have the call completed without having to make a new call attempt when the destination B becomes not busy.

When user A requests the CCBS supplementary service, the network will monitor for destination B becoming not busy.

When destination B becomes not busy (i.e. access resources, e.g. at least one B-channel, are not busy) then the network will wait a short time in order to allow the resources to be re-used for originating a call. If the resources are not re-used by destination B within this time, then the network will automatically recall user A.

When user A accepts the CCBS recall, then the network will automatically generate a CCBS call to destination B.

The CCBS supplementary service shall be available to users who are connected to the network via a basic access or a primary rate access.

NOTE: A supplementary service provided to destination B which prevents the registration of CCBS requests is outside the scope of the present document.

5 Procedures

5.1 Provision and withdrawal

The CCBS supplementary service shall be provided to user A after prior arrangement with the service provider or shall be generally available.

The CCBS supplementary service shall be withdrawn by the service provider upon request of the subscriber or for service provider reasons.

As a service provider option, the CCBS supplementary service can be offered with a subscription option, which shall apply to the whole access of user A. The subscription option is detailed in table 1.

Table 1

Subscription option	Values
Recall mode	<ul style="list-style-type: none"> - Global, i.e. CCBS recall offered to all terminals. - Specific, i.e. CCBS recall offered to the terminal, which activated the CCBS supplementary service.

If the subscription option is not offered, one of the two values shall be chosen by the service provider.

5.2 Normal procedures

5.2.1 Registration and erasure

Not applicable.

5.2.2 Activation and deactivation

5.2.2.1 Activation

When the network encounters a busy destination B, it shall retain the call information for the CCBS supplementary service for the period defined by the retention timer. During this time user A can activate the CCBS supplementary service. The value of the retention timer shall be a minimum of 15 seconds.

Upon receipt of a request for the activation of the CCBS supplementary service the network shall check that a compatible terminal exists at destination B (see annex A).

When it has been established that a compatible terminal exists at destination B, the network shall register the CCBS request based on the retained call information and user A shall be informed that the activation was successful. Multiple requests against destination B shall be queued.

When the activation of the CCBS supplementary service is accepted the CCBS service duration timer shall be started. The value of this timer shall be a minimum of 15 minutes and a maximum of 45 minutes. The network shall monitor for destination B becoming not busy.

User A can have a limited number of CCBS requests outstanding. This limit shall apply in general for all users and its value shall be a network provider option with a maximum value of 5. The requests can be to different destinations, or can be to the same destination B with different service requirements (e.g. bearer service and teleservice requirements), or as a network option, the same service requirements.

Destination B can have a limited number of incoming CCBS requests outstanding. This limit shall apply in general for all users and its value shall be a destination network option with a maximum value of 5.

As a further destination network option, the size of the destination B CCBS queue can be reduced for individual users. The reduced size can have zero length.

NOTE 1: Reducing the queue length allows a network operator to balance the interaction between the CCBS supplementary service and other supplementary services (e.g. the call waiting supplementary service and the freephone supplementary service).

NOTE 2: As a consequence of the queue having zero length, the CCBS supplementary service will be unavailable to users calling destination B.

Having activated the CCBS supplementary service, user A can originate calls and receive calls as normal.

5.2.2.2 Deactivation

User A can send any of the following deactivation requests:

- a) deactivate all outstanding CCBS requests; or
- b) deactivate a specific CCBS request. This request shall contain enough information to correlate with the initial activation.

Upon successful deactivation, the corresponding CCBS request shall be discarded.

User A shall be informed that the deactivation is successful. If a specific CCBS request is deactivated, the network shall indicate which specific CCBS request has been deactivated.

If the value of the subscription option "recall mode" is "specific" then the user can deactivate only those outstanding CCBS requests made from that terminal.

If the value of the subscription option "recall mode" is "global", then from any of user A's terminals, user A can deactivate any outstanding CCBS request stored for that user.

5.2.3 Invocation and operation

When destination B becomes not busy (e.g. a call is terminated) or destination B is not busy when either of the following occurs:

- a CCBS request is received; or
- a CCBS request becomes not suspended,

then the destination B CCBS queue shall be processed, provided that an entry in the destination B CCBS queue is not currently being processed. Entries shall not be processed in parallel.

The first request, which is not suspended, shall be selected and the network shall reserve on destination B's interface the resources (e.g. a B-channel) which are necessary to complete the CCBS call. Destination B can use the reserved access resources or other free resources, in order to originate a call. An incoming call shall not use these reserved resources.

A check for a compatible terminal, which is not busy at destination B, shall be performed (see annex A). If such a terminal does not exist, further requests, which are not suspended, shall be examined. When a terminal is found, the network shall start the destination B idle guard timer. The value of this timer shall be a maximum of 15 seconds.

NOTE: This timer enables destination B to initiate a call before any CCBS request is processed.

When the destination B idle guard timer expires, then provided that interface resources are still available at destination B, and a compatible terminal at destination B is still not busy, user A shall be informed.

If user A is neither busy nor CCBS busy, user 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 shall be started. The value of this timer shall be a minimum of 10 seconds and a maximum of 20 seconds.

If user A accepts the recall before the CCBS recall timer expires, then the network shall initiate the CCBS call to destination B. 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 idle guard timer is running, and also whilst awaiting the CCBS call to destination B, a new incoming call shall not be offered to destination B if it has service requirements and destination selection information identical to the (not suspended) request which is currently being processed in the destination B CCBS queue.

For such incoming calls, the called user shall be considered as being busy 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 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.

If, for any reason, no CCBS call results from the processing of a CCBS request, then provided that access resources are still available at destination B, the next 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, for any reason, no CCBS call results from the processing of a CCBS request and the access resources are no longer available at destination B, then the resources reserved for the CCBS supplementary service shall be released and the network shall monitor for destination B becoming not busy.

If all of the destination B CCBS queue has been processed and no CCBS call results, then processing is complete and the resources reserved for the CCBS supplementary service shall be released. If requests which are not suspended exist in the destination B CCBS queue, then:

- if destination B is busy, the network shall monitor for destination B becoming not busy; or
- if destination B is not busy, then the destination B CCBS queue shall be processed when another call is terminated, or a CCBS request is received, or a CCBS request becomes not suspended.

5.2.4 Interrogation

User A can request the status of the CCBS supplementary service. In response to the request the following information shall be provided:

- a) in response to a general request user A shall be given a list of the addresses against which CCBS requests are outstanding;
- b) in response to a specific request concerning one particular address, user A shall be informed whether or not user A has a CCBS request outstanding against that address.

NOTE: In both cases, the network provides information relating to CCBS requests and it is a matter for terminal implementation whether or not the user is given information about CCBS requests which are not compatible with the terminal.

5.3 Exceptional procedures

5.3.1 Registration and erasure

Not applicable.

5.3.2 Activation and deactivation

5.3.2.1 Activation

The activation of the CCBS supplementary service shall be rejected if the CCBS supplementary service is not provided to the user.

The activation of the CCBS supplementary service shall be rejected if there is no compatible terminal at destination B.

If the network cannot accept user A's request to activate the CCBS supplementary service, the network shall inform user A and give one of the following reasons:

- a) **short term denial:** the network temporarily cannot accept user A's request to activate the CCBS supplementary service. A later attempt to activate the CCBS supplementary service for the same destination B may succeed. This reason will be given e.g.:
 - if user A has reached the limit of CCBS requests outstanding;
 - if there are already the maximum number of requests queued against destination B;
 - if there is an interaction with a supplementary service which temporarily prevents the activation of the CCBS supplementary service;
 - if no compatible terminal is found at destination B.

- b) **long term denial:** the network cannot accept user A's request to activate the CCBS supplementary service and a later attempt to activate the CCBS supplementary service for the same destination B will also be rejected. An example of long term denial is where destination B's network does not support the CCBS supplementary service.

If destination B is no longer busy when the CCBS request arrives, then the CCBS request shall be handled at destination B as described in clause 5.2.2.1.

5.3.2.2 Deactivation

A CCBS request shall be automatically deactivated by the network and user A informed if:

- a) the CCBS service duration timer expires;
- b) user A does not accept the CCBS recall before the recall timer expires;
- c) destination B invokes a service that conflicts with the existing CCBS request and deactivation becomes necessary.

The user shall only be given information about deactivation of a CCBS request if that user would have been given the CCBS recall associated with that CCBS request.

5.3.3 Invocation and operation

5.3.3.1 Exceptional situation at destination B's side

The following situations can occur at the destination B's side:

- a) resources or compatible terminal at destination B no longer available when the destination B idle guard timer expires.
 - if, when the destination B idle guard timer expires, no access resources are available at destination B, then processing of the destination B CCBS queue shall cease. The network shall monitor for destination B becoming not busy and the procedures of clause 5.2.3 shall apply;
 - if, when the destination B idle guard timer expires, all compatible terminals (see annex A) at destination B are busy then the next request in the destination B CCBS queue shall be selected for processing;
- b) destination B is busy upon arrival of the CCBS call.
 - if destination B is again busy when the network attempts to make the CCBS call, then, as a network provider option, either:
 - the corresponding CCBS request shall be deactivated. If user A activates the CCBS supplementary service again, this activation shall be considered as a new CCBS request, which will be put at the end of the destination B queue; or
 - the original CCBS request shall retain its position in the queue, and the CCBS service duration timer shall not be restarted. If user A attempts to activate the CCBS supplementary service again, this shall be treated as described in clause 5.3.3.2 c).

NOTE: It is the responsibility of networks supporting the option to retain the original CCBS request to provide interworking with those networks that do not.

5.3.3.2 Exceptional situation at user A's side

The following situations can occur at user A's side:

- a) non-acceptance or rejection of CCBS recall:
 - If user A rejects the CCBS recall or the CCBS recall timer expires, then the CCBS request shall be deactivated;
- b) user A is found to be busy or CCBS busy:
 - If user A is found to be busy or CCBS busy at the time of a recall then user A shall be notified and the CCBS request shall be suspended until user A becomes neither busy nor CCBS busy. The network shall expect no response from user A to this notification;
 - when user A becomes neither busy nor CCBS busy, then user A's CCBS requests associated with the bearer services and/or teleservices for which user A is considered not busy shall become not suspended and the procedures of clause 5.2.3 shall apply;
- c) user A reinitiates the CCBS supplementary service:
 - If user A does not wait for the CCBS recall to a particular destination B, but makes another call to that (busy) destination B and requests the CCBS supplementary service again then, as a network option, one of the following shall occur:
 - the network shall check if an identical CCBS request already exists:
 - if so, then the original request shall be retained with the current request being discarded and user A shall be informed that the request has not been accepted because a CCBS request had already been stored against the requested destination B;
 - if not, then the network shall treat this as a new CCBS request.
 - in order to determine that two CCBS requests are identical, the network shall only compare the basic call information, i.e. the bearer service and teleservice requirements, the destination selection information and calling user identity (if any); or
 - the network shall not check if an identical CCBS request already exists and the procedures of clause 5.2.2.1 shall apply for this new request;
- d) no resources available at user A when user A accepts the CCBS recall:
 - If user A accepts the CCBS recall but there are insufficient resources for the CCBS call available at user A's access, then user A shall be informed and the CCBS request shall be suspended until user A becomes not busy again.

5.3.3.3 Network congestion

If the CCBS call encounters network congestion, then user A shall be informed as for the basic call procedures. In addition, the CCBS request shall be deactivated and user A shall be informed accordingly.

NOTE: Some networks may take action to reduce the probability of network congestion on the CCBS call.

5.3.4 Interrogation

If there are no CCBS requests outstanding when user A requests a general interrogation, user A shall be explicitly informed.

6 Intercommunication considerations

When user A and destination B belong to different networks, then the CCBS supplementary service can operate successfully only if all networks involved support the CCBS supplementary service along the communication path between the two users.

6.1 Interworking with non-ISDNs

If user A or destination B resides within a non-ISDN which supports CCBS service functionality, then the CCBS supplementary service may be supported.

6.2 Interworking with private ISDNs

The CCBS supplementary service shall not apply in the case of congestion at the interface between a public ISDN and a private ISDN. Therefore the CCBS supplementary service cannot be activated in this situation.

Where the CCBS supplementary service involves users attached to the public ISDN and private ISDN then, for the CCBS supplementary service to be successful, these networks need to interwork on a cooperative basis. This interworking needs to take account of the fact that one network cannot directly monitor a user attached to the other network.

Where a private ISDN supports the CCBS supplementary service, then this information shall be registered with the public network in order to support destination Bs who are attached to the private ISDN.

In order to request the activation of the CCBS supplementary service in the public ISDN, subscription will be necessary as normal.

NOTE: The subscription option "recall mode" does not apply at the interface between the public ISDN and the private ISDN.

7 Interaction with other supplementary services

Unless stated otherwise below, the supplementary services requested for the original call shall be used in association with the CCBS call.

7.1 Advice of charge services

Charging information can be given for the original call, and for the resulting CCBS call.

7.1.1 Charging information at call set-up time

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

7.1.2 Charging information during the call

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

7.1.3 Charging information at the end of a call

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

7.2 Call waiting

NOTE 1: For a waiting call, destination B is not considered as busy.

If the call waiting indication cannot be given at the destination B, user A will receive busy indication and can invoke the CCBS supplementary service to destination B.

CCBS requests in the destination B CCBS queue shall only be processed if there are no calls waiting.

NOTE 2: Means to influence the balance between the CCBS supplementary service and the call waiting supplementary service are described in clause 5.2.3.

7.3 Call hold

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

NOTE 1: When receiving a CCBS recall indication, user A may invoke the call hold supplementary service in order to make interface resources available for the establishment of the CCBS call.

NOTE 2: When user A is busy or CCBS busy and is notified that destination B is not busy, invocation of the call hold supplementary service will not result in the CCBS call being established.

7.4 Explicit call transfer

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

7.5 Number identification services

7.5.1 Calling line identification presentation

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

7.5.2 Calling line identification restriction

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

7.5.3 Connected line identification presentation

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

7.5.4 Connected line identification restriction

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

7.6 Closed user group

Closed user group information from the original call shall also be included in the CCBS call.

NOTE: Closed user group information will not be included in the check for a compatible terminal.

If a terminal performs an internal closed user group check and uses the closed user group information provided on a call to determine whether, or not, to inform the user of the incoming call, then such a terminal may react positively to the check for a compatible terminal due to the absence of closed user group information, but due to the internal closed user group check such a terminal may then not inform the user of the arrival of the resulting CCBS call.

7.7 Completion of calls to busy subscriber

A user can be both a "user A" and a "destination B" simultaneously, i.e. that user can have activated the CCBS supplementary service and have CCBS requests outstanding whilst at the same time that user can be the destination of CCBS requests from other users.

If a user receives a CCBS recall while that user's destination B CCBS queue is being processed, then the CCBS recall shall take priority over the handling of the destination B CCBS queue. The handling of CCBS requests activated by this user shall have priority over the handling of CCBS requests activated by other users on this user.

If one of the user's CCBS requests matures as a result, then the user shall be given a CCBS recall or notification as in clause 5. The served user's destination B idle guard timer, if running, shall be cancelled.

7.8 Conference services

7.8.1 Conference call, add-on

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

NOTE: For the determination of user busy, the conference appears the same as a two party call.

7.8.2 Meet-me conference

An attempt to activate the CCBS supplementary service on a call to a busy conference shall be rejected.

7.9 Direct dialling in

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

7.10 Diversion services

CCBS recalls shall never be diverted. They shall be given to user A at user A's original location.

7.10.1 Call forwarding unconditional

Assume user A calls user B and user B activates the call forwarding unconditional supplementary service or has activated the call forwarding unconditional supplementary service to user C.

NOTE: A recall resulting from the CCBS supplementary service will not be forwarded.

The call forwarding unconditional supplementary service was activated by user B before user A requests the CCBS supplementary service on user B:

If the call to user B is forwarded to user C by the call forwarding unconditional supplementary service and user C is busy, then a request by user A to activate the CCBS supplementary service shall be rejected. User A shall be informed that the request has been rejected with "short term denial" as the reason.

The call forwarding unconditional supplementary service is activated by user B after user A has activated the CCBS supplementary service on user B:

If user B activates the call forwarding unconditional supplementary service after user A has activated the CCBS supplementary service, then outstanding queued requests shall remain in the user B queue until expiry of the duration timer for the CCBS supplementary service. If user B deactivates the call forwarding unconditional supplementary service before the expiry of the duration timer for the CCBS supplementary service and subsequently becomes not busy, the outstanding queued requests shall again be processed.

If user B activates the call forwarding unconditional supplementary service between the expiry of the user B idle guard timer and the arrival of the call resulting from the CCBS supplementary service, the call resulting from the CCBS supplementary service shall be forwarded as a normal call.

7.10.2 Call forwarding busy

Assume user A calls user B, and user B activates the call forwarding busy supplementary service or has activated the call forwarding busy supplementary service to user C.

NOTE: A recall resulting from the CCBS supplementary service will not be forwarded.

The call forwarding busy supplementary service was activated by user B before user A requests the CCBS supplementary service on user B:

If user B has activated the call forwarding busy supplementary service and is busy, and the forwarded-to user C is also busy, then a request by user A to activate the CCBS supplementary service shall be applied to user B.

The call forwarding busy supplementary service is activated by user B after user A has activated the CCBS supplementary service on user B:

If user B activates the call forwarding busy supplementary service after user A has activated the CCBS supplementary service on user B, the call resulting from the CCBS supplementary service shall be treated as described in the paragraph below.

Arrival of the CCBS call after the call forwarding busy supplementary service has been activated:

If user B has activated the call forwarding busy supplementary service and is busy upon the arrival of a call resulting from the CCBS supplementary service, then according to a network option, the call shall be treated as follows:

- user B shall be considered as being busy and the procedures of the CCBS supplementary service shall apply; or
- the call shall be forwarded as a normal call.

7.10.3 Call forwarding no reply

Assume that user A calls user B and that user B activates the call forwarding no reply supplementary service or has activated the call forwarding no reply supplementary service to user C.

NOTE 1: A recall resulting from the CCBS supplementary service will not be forwarded.

NOTE 2: If user B has activated the call forwarding no reply supplementary service and user B is busy, user A may activate the CCBS supplementary service on user B.

The call forwarding no reply supplementary service was activated by user B before user A requests the CCBS supplementary service on user B:

If user A calls user B and the call is forwarded on no reply to user C and user C is then busy and the call is not retained at user B, then any request by user A for the CCBS supplementary service shall be rejected with user A being given a short term denial as reason.

NOTE 3: If the call is retained at user B then the CCBS supplementary service does not apply.

The call forwarding no reply supplementary service is activated by user B after user A has activated the CCBS supplementary service on user B:

If user B activates the call forwarding no reply supplementary service after user A has activated the CCBS supplementary service on user B, then the call resulting from the CCBS supplementary service shall be given to user B. After the no reply timer has expired at user B, the call shall be forwarded as a normal call.

7.10.4 Call deflection

NOTE: A recall resulting from the CCBS supplementary service will not be deflected.

Calling user (user A):

If a call to the called user (destination B) is deflected to another user by the call deflection supplementary service and this other user is busy, then a request by user A to activate the CCBS supplementary service shall be applied to destination B.

Called user (destination B):

If the called user (destination B) requests invocation of the call deflection supplementary service on a call resulting from the CCBS supplementary service, then the following actions shall result:

- if the request was made prior to the network receiving an indication that the user is being informed of the call, then the request shall be rejected; or
- if the request was made after the network has received an indication that the user is being informed of the call, then the request shall be accepted. The call shall be deflected as a normal call.

7.11 Freephone

A request for the CCBS supplementary service on a call to a freephone number shall be rejected. Freephone calls shall take precedence over requests for the CCBS supplementary service.

7.12 Malicious call identification

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

7.13 Multiple subscriber number

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

- NOTE: The limit of entries in the destination B CCBS queue applies per multiple subscriber number. Entries are processed in the order that they are received for the whole access. The network operator may limit the maximum number of entries in the combined destination B CCBS queue for the access.

7.14 Subaddressing

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

- NOTE: The calling user's subaddress (if any), which was supplied in the original call request, can be included when notifying or recalling the calling user.

7.15 Terminal portability

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

- NOTE: In the case of disconnected terminals a CCBS recall will be treated as not accepted upon expiry of the CCBS recall timer.

7.16 Three party

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

7.17 User-to-user signalling

The network shall not store any information related to the user-to-user signalling supplementary service provided by user A in the original call.

User A can request the activation of the user-to-user signalling supplementary service and provide the user-to-user information, as required, when accepting the CCBS recall. If the resulting CCBS call contains information related to the user-to-user signalling supplementary service, this shall be handled as for the normal operation of the user-to-user signalling supplementary service.

Annex A (normative): Determination of the existence of compatible terminals

Some terminals supporting the bearer capabilities 3,1 kHz audio, speech, or 64 kbit/s unrestricted, may not be able to cooperate in the process of determining that there is a compatible terminal present at destination B. Networks can take measures to identify situations where such terminals are involved.

If the network cannot unambiguously determine that a compatible terminal does exist at destination B, then it shall be assumed that a compatible terminal does exist.

Annex B (informative): Bibliography

- ETSI ETS 300 264 (1994): "Integrated Services Digital Network (ISDN); Videotelephony teleservice; Service description".
- ETSI ETS 300 358 (1995): "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Functional capabilities and information flows".

History

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