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**Integrated Services Digital Network (ISDN);
Call Waiting (CW) supplementary service
Service description**

ETSI

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

In accordance with CCITT 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.

This ETS details the stage 1 aspects (overall service description) for the Call Waiting (CW) supplementary service. The stage 2 and stage 3 aspects are detailed in ETS 300 057 (1991) and ETS 300 058 (1991), respectively.

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1 Scope

This standard defines the stage one of the Call Waiting (CW) 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, but does not deal with the details of the human interface itself (see CCITT Recommendation I.130 [1]).

This standard defines the interworking requirements of private ISDNs with the public ISDN.

In addition this standard specifies the base functionality where the service is provided to the user via a private ISDN.

This standard 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 8 are outside the scope of this standard.

Charging principles are outside the scope of this standard.

The Call Waiting (CW) supplementary service permits a user to be informed of an incoming call (as per basic call procedures) with an indication that no interface information channel is available. The user then has the choice of accepting, rejecting or ignoring the waiting call (as per basic call procedures).

The CW supplementary service is considered meaningful when applied to the telephony teleservice and the speech and 3,1 kHz audio bearer services. Furthermore, it can be applied to other circuit-switched services.

This standard is applicable to the stage two and stage three standards for the ISDN CW supplementary service. The terms "stage two" and "stage three" are also defined in CCITT Recommendation I.130 [1]. Where the text indicates the status of a requirement, (i.e. as strict command or prohibition, as authorisation leaving freedom, as a capability or possibility) this shall be reflected in the text of the relevant stage two and stage three standards.

Furthermore, conformance to this standard is met by conforming to the stage three standards with the field of application appropriate to the equipment being implemented. Therefore no method of testing is provided for this standard.

2 Normative references

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

- [1] CCITT Recommendation I.130 (1988): "Method for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [2] CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".
- [3] CCITT Recommendation I.221 (1988): "Common specific characteristics of services".
- [4] CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".
- [5] CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [6] CCITT Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".

3 Definitions

For the purposes of this standard, the following definitions apply:

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

User Determined User Busy (UDUB): See CCITT Recommendation I.221 [3], § 3.1.4.

interface resources: See CCITT Recommendation I.221 [3], § 3.1.2.

subscriber resources: See CCITT Recommendation I.221 [3], § 3.1.2.

resources busy: See CCITT Recommendation I.221 [3], § 3.1.2 and § 3.1.3.

channels busy: See CCITT Recommendation I.221 [3], § 3.1.3.

Network Determined User Busy (NDUB): See CCITT Recommendation I.221 [3], § 3.1.4.

service; telecommunications service: See CCITT Recommendation I.112 [2], § 2.2, definition 201.

supplementary service: See CCITT Recommendation I.210 [5], § 2.4.

bearer service: See CCITT Recommendation I.112 [2], § 2.2, definition 202.

teleservice: See CCITT Recommendation I.112 [2], § 2.2, definition 203.

ISDN number: A number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [4].

Integrated Services Digital Network (ISDN): See CCITT Recommendation I.112 [2], § 2.3, definition 308.

subscriber B: Subscriber B is the subscriber who is provided by the network with the CW supplementary service on a particular interface.

user B: User B is the one user who reacts to the call waiting at subscriber B.

user C: User C is the user who has originated a call to subscriber B which causes the CW supplementary service to be invoked.

user A: User A is a user who is engaged in a call with user B (this call can be in any state).

T1; user response time-out: The duration of this time out is the time the network will wait for a positive response from a terminal at B, to the offered call. It is part of the basic call and has a value of a few seconds.

T2; No Answer Time-Out (SERVICE Provider Option): The duration of this time-out is the time the network will wait for an acceptance (answer) of the offered call from user C, by user B. The value of this timer is between 30 seconds and two minutes. If T2 is not provided, the basic call time-out on awaiting answer will be used.

basic access: See CCITT Recommendation Q.9 [6], § 1, definition 1551.

primary rate access: See CCITT Recommendation Q.9 [6], § 1, definition 1552.

4 Symbols and abbreviations

ISDN	Integrated Services Digital Network
CW	Call Waiting
NDUB	Network Determined User Busy
UDUB	User Determined User Busy

5 Description

The CW supplementary service shall apply to the basic access and primary rate access.

The CW supplementary service permits a user to be informed of an incoming call (as per basic call procedures) with an indication that no interface information channel is available. The user has then the choice of accepting, rejecting or ignoring the waiting call (as per basic call procedures).

The CW supplementary service shall operate when all appropriate B channels of the access to the terminal(s) of subscriber B are busy.

Moreover, when at least one B-channel is free, any compatible busy terminal of subscriber B can react positively to an incoming call.

When a third party (calling user C) attempts to connect to that termination, subscriber B shall be given an appropriate indication of the waiting call.

The maximum number of calls that can be handled (e.g. active, held, alerting, waiting) for each ISDN number on a given interface shall be a network option.

NOTE: It is recognised that a small call-connect system or an active bus may be present at customers' premises and that an internal call may be in progress when the call waiting indication is applied. It is assumed that it is the responsibility of the customer's equipment to determine what action should take place in these circumstances.

6 Procedures

6.1 Provision and withdrawal

The CW supplementary service shall either be provided on a subscription basis or, as a network option, be generally available to all users without subscription. The CW supplementary service can be withdrawn at the request of the customer or for administrative reasons.

NOTE: The maximum number of information channels which can be used (occupied) on the interface for each ISDN number, all ISDN numbers or subsets of ISDN numbers can be described in each applicable bearer service and teleservice. Call waiting for bearer services or teleservices occurs only when an attempt is made to exceed these limits.

As a network option, call waiting may be offered with the following subscription option (see table 1). The option shall apply separately to each ISDN number and service combination.

Table 1

Subscription option	Value
Calling user receives notification that their call is waiting	No Yes

The network option in table 2 can be specified for each ISDN number, all ISDN numbers, or subsets of ISDN numbers on each interface.

Table 2

Network option	Value
Maximum number of calls which can be waiting	One N, where N is more than one

The use of T2 is a service provider option. When used, the value of T2 shall be set by the service provider as a default value subject to change only by the service provider.

6.2 Normal procedures

6.2.1 Activation, deactivation and registration

The CW supplementary service shall be activated by the service provider at provision.

The CW supplementary service shall be deactivated by the service provider at withdrawal.

Registration shall not apply.

6.2.2 Erasure

Not applicable.

6.2.3 Invocation and operation

6.2.3.1 Interface resources in use

When an incoming call from user C arrives at the access of subscriber B and encounters the channels busy condition and a NDUB condition does not result, then the CW supplementary service shall be invoked and the call shall be offered to subscriber B with an indication that the channels busy condition exists.

If a response is received from at least one terminal at the access of subscriber B within T1 indicating that the user is being informed about the incoming call, then user C shall be given the normal indication that the call is being offered to the called user. In some networks this indication can also indicate that call waiting is in operation, depending on the value of the subscription option of user B.

If either user A or user B requests that the active call is terminated, then this call shall be terminated as for basic call. User B shall then be able to accept the waiting call from user C before the expiry of T2.

User B can also free resources by using the call hold supplementary service. User B shall then be able to accept the waiting call from user C before the expiry of T2.

6.2.3.2 Subscriber resources in use

When an incoming call from user C arrives at the access of subscriber B and there is a B-channel available, the call shall be indicated to subscriber B. If a terminal at the access of subscriber B is busy because of another call but that terminal is able to accept the incoming call from user C, it shall indicate to the network that the called user is being informed about the incoming call, then the network shall indicate this to user C by using basic call procedures.

6.2.4 Interrogation

Not applicable.

NOTE: If activation and deactivation are provided within a user's equipment, then that equipment should provide the necessary interrogation procedure.

6.3 Exceptional procedures

6.3.1 Activation, deactivation and registration

Not applicable.

6.3.2 Erasure

Not applicable.

6.3.3 Invocation and operation

6.3.3.1 Maximum number of waiting calls reached

Subscriber B shall be considered as busy when the limit on the maximum number of calls which can be waiting has been reached. Any incoming call during this period shall be handled accordingly.

6.3.3.2 No positive response from terminals at the access of subscriber B

If a positive response is not received from a terminal at the access of subscriber B within T1 that one or more users are being informed about the incoming call, then the call attempt from user C shall be ceased by the network with user C being given the reason for the failure.

6.3.3.3 Incoming call from user C rejected by user B

Rejection of the waiting call by one of the terminals at the access of subscriber B will not stop T2 as another terminal may subsequently accept the waiting call within the remainder of the specified period. Such rejection may cancel any related indication provided to that terminal.

Where rejections have been received from all those terminals that responded with an alerting indication before the expiry of T2, the call attempt from user C shall be ceased as for basic call with an indication to user C specifying remote user rejection. Subscriber B shall be notified that the call is no longer waiting.

6.3.3.4 No resources available

If user B accepts a call and network resources do not exist to complete the call (i.e. no B-channels are available), the network shall indicate an error to user B with cause "No B Channels Available". The network will not clear the call, but will wait for another user B indication for acceptance, until user C clears the call or T2 expires.

6.3.3.5 Incoming call from user C ignored by subscriber B

If T2 expires without any acceptance of the incoming call by subscriber B, then the network shall inform subscriber B that the call is no longer waiting and also shall inform user C that the call cannot be connected. The call attempt from user C shall be ceased as for basic call with an appropriate indication given to user C (the call is cleared indicating no acceptance by the user).

6.3.3.6 Release by user C within the specified period

If calling user C terminates the call attempt to subscriber B before the expiry of T2, then the network shall inform subscriber B of this situation and shall cease call attempt from user C, as for basic call.

6.3.4 Interrogation

Not applicable.

7 Intercommunication considerations

7.1 Interworking with non-ISDNs

Calls originating from outside the ISDN can undergo call waiting at the access of subscriber B with no impact on subscriber B's CW supplementary service.

A special in-band indication may be provided to the calling user instead of the normal alerting indication.

7.2 Interworking with private ISDNs

When user C is on a different network from subscriber B (e.g., one user on a private ISDN and the other user on a public ISDN), then indications to user C, if applicable, shall be sent to the network to which user C is attached for forwarding to user C.

8 Interaction with other supplementary services

8.1 Advice of charge

8.1.1 Charging information at call set up time

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

8.1.2 Charging information during the call

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

8.1.3 Charging information at the end of the call

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

8.2 Call waiting

Not applicable.

8.3 Call hold

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

NOTE: A user may use the call hold supplementary service to hold an active call in order to be able to subsequently answer the waiting call from user C.

8.4 Call transfer services

8.4.1 Explicit call transfer

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

8.4.2 Single step call transfer

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

NOTE: Call waiting can be invoked on the transferred leg of the call at the transferred-to-user.

8.5 Number identification services

8.5.1 Calling line identification presentation

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

8.5.2 Calling line identification restriction

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

8.5.3 Connected line identification presentation

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

8.5.4 Connected line identification restriction

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

8.6 Closed user group

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

8.7 Completion of calls to busy subscriber

If a subscriber to the completion of calls to busy subscriber supplementary service places a call to a user B who has subscribed to the CW supplementary service, and user B is given the call waiting indication, then invocation of completion of calls to busy subscriber supplementary service cannot occur.

8.8 Conference services

8.8.1 Conference call, add-on

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

8.8.2 Meet me conference

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

8.9 Direct dialling in

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

8.10 Diversion services

8.10.1 Call forwarding unconditional

If subscriber B has activated the call forwarding unconditional supplementary service, then the execution of the call forwarding unconditional supplementary service shall take precedence over the CW supplementary service. The call forwarding unconditional supplementary service can be activated while a call is waiting without changing the state of the waiting call.

A forwarded call can invoke the CW supplementary service.

8.10.2 Call forwarding busy

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

NOTE: The following text clarifies this situation. If user B is NDUB, call forwarding busy shall take place, and the call is not offered. If user B is not NDUB, the call shall be offered, and if the UDUB condition results, then call forwarding busy shall take place.

A forwarded call can invoke the CW supplementary service.

8.10.3 Call forwarding no reply

If subscriber B has the call forwarding no reply supplementary service activated, then a waiting call shall still be offered as described in this standard. If the call forwarding no reply timer expires before an answer is received then the call forwarding no reply supplementary service becomes invoked and the call is forwarded and call waiting ceases.

A forwarded call can invoke the CW supplementary service.

8.10.4 Call deflection

When receiving the call waiting indication, user B can invoke the call deflection supplementary service.

A deflected call can invoke the CW supplementary service.

8.11 Freephone

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

8.12 Malicious call identification

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

8.13 Multiple subscriber number

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

8.14 Subaddressing

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

8.15 Terminal portability

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

NOTE: A waiting call is not an active call and therefore cannot be suspended.

8.16 Three party

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

8.17 User-user signalling

User-user information (for the operation of service 1) included in the call request shall be delivered to subscriber B with the call waiting indication.

User-user information (for the operation of service 2) sent from the calling user to the called user during the alerting phase can be sent when a point-to-point configuration exists at the called side.

There is no interaction with service 3 of the user-user signalling supplementary.

History

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