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Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT) supplementary service; Stage 3 (GSM 04.91 version 7.0.1 Release 1998)

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Foreword

This European Standard (Telecommunications series) has been produced by the Special Mobile Group (SMG).

The present document specifies the procedures used at the radio interface for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of call transfer supplementary services within the digital cellular telecommunications system.

The specification from which the present document has been derived was originally based on CEPT documentation, hence the presentation of the present document may not be entirely in accordance with the ETSI/PNE rules.

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

Version 7.x.y

where:

7   indicates Release 1998 of GSM Phase 2+.

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

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

National transposition dates	
Date of adoption of this EN:	31 December 1999
Date of latest announcement of this EN (doa):	31 March 2000
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 September 2000
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1 Scope

The present document gives the stage 3 description of the call transfer supplementary services.

The present document specifies the procedures used at the radio interface (Reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of call transfer supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3 radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04, GSM 02.8x and GSM 02.9x-series. GSM 02.91 is related specifically to call transfer supplementary services.

The technical realization of supplementary services is described in GSM 03.11, GSM 03.8x and GSM 03.9x-series. GSM 03.91 is related specifically to call transfer supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3 radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the call transfer supplementary services and are described in the present document:

- Explicit Call Transfer (ECT) (see clause 4).

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.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1]   GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2]   GSM 02.04: "Digital cellular telecommunications system (Phase 2+); General on supplementary services".

[3]   GSM 02.30: "Digital cellular telecommunications system (Phase 2+); Man-Machine Interface (MMI) of the Mobile Station (MS)".

[4]   GSM 02.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 1".

[5]   GSM 02.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 1".

[6]   GSM 02.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1".

[7]   GSM 02.84: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 1".

[8]   GSM 02.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 1".

[9]   GSM 02.86: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) Supplementary Services - Stage 1".

[10]   GSM 02.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 1".

[11]   GSM 02.90: "Digital cellular telecommunications system (Phase 2+); Unstructured Supplementary Service Data (USSD)- Stage 1".

[12]   GSM 02.91: "Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT)".

[13]   GSM 03.11: "Digital cellular telecommunications system (Phase 2+); Technical realization of supplementary services".

[14]   GSM 03.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 2".

[15]   GSM 03.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 2".

[16]   GSM 03.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".

[17]   GSM 03.84: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 2".

[18]   GSM 03.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 2".

[19]   GSM 03.86: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 2".

[20]   GSM 03.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 2".

[21]   GSM 03.90: "Digital cellular telecommunications system (Phase 2+); Unstructured supplementary services operation - Stage 2".

[22]   GSM 03.91: "Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT) supplementary service - Stage 2".

[23]   GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[24]   GSM 04.07: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3; General aspects".

[25]   GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[26]   GSM 04.10: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3; Supplementary services specification; General aspects".

[27]   GSM 04.80: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification; Formats and coding".

3 Abbreviations

The abbreviations used in the present document are listed in GSM 01.04.

4 Explicit Call Transfer (ECT)

4.1 Normal operation

The Explicit Call Transfer (ECT) function should be invoked in association with two existing calls which one is answered and in the held state and the other is answered and active or alerting.
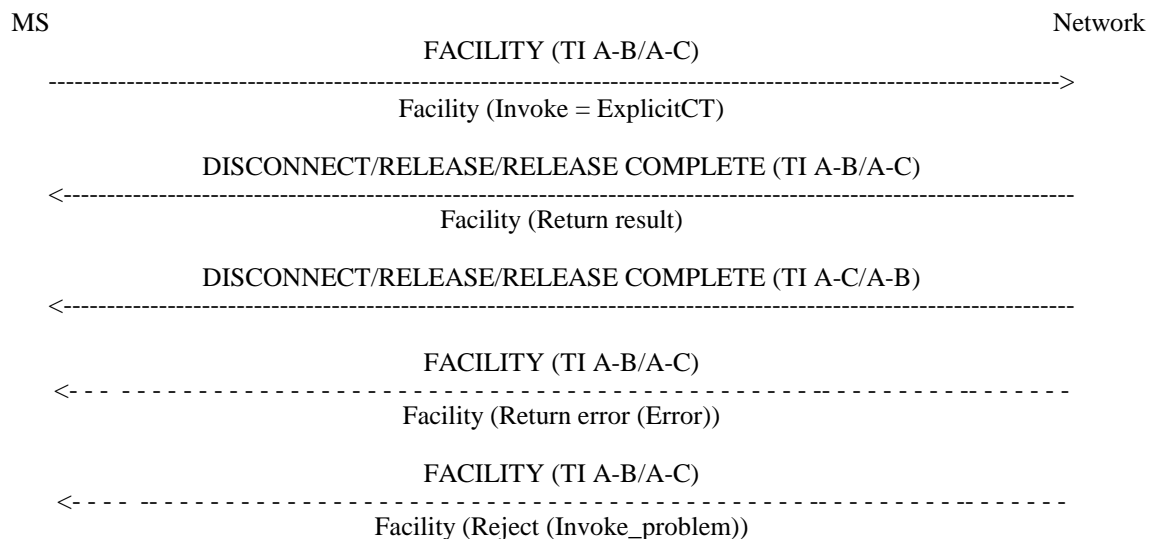
The Mobile Station (MS) invokes the service by sending a FACILITY message to the network containing the ECT request (ECT request). This ECT request indicates to the network that the mobile subscriber wishes the two calls to be connected together. The MS shall not change the basic call state or the auxiliary state of either call when sending ECT request.

The network will normally accept the ECT request and connect the two calls, indicates the success of the ECT request to the served subscriber and disconnect afterwards the served mobile subscriber from both calls (see figure 1).

If the ECT request is not accepted, the network will indicate the error to the served subscriber (see figure 1) and leaves the two calls to the condition it was in prior to the ECT request. The network confirms with the same transaction identifier. The detailed coding of the different error values are specified in GSM 04.80. Which error value is used in which error case is described below.

During the ECT operation the MS shall run a timer T_{ECT}. This timer is started when the operation is sent, and stopped when a response is received from the network. If this timer expires the MS shall assume that the operation has failed, locally release the invokeID, and may re-attempt the operation or inform the user of the failure.

4.2 Explicit Call Transfer invocation

MS   Network

FACILITY (TI A-B/A-C)

-->

Facility (Invoke = ExplicitCT)

DISCONNECT/RELEASE/RELEASE COMPLETE (TI A-B/A-C)

<--

Facility (Return result)

DISCONNECT/RELEASE/RELEASE COMPLETE (TI A-C/A-B)

<--

FACILITY (TI A-B/A-C)

<- - - - -- -- -- - - - - - -

Facility (Return error (Error))

FACILITY (TI A-B/A-C)

<- - - - -- -- -- -- - - -- -- - - - - - -

Facility (Reject (Invoke_problem))

NOTE: A-B/A-C indicates a choice. The Transaction Identifier (TI) used for the invocation of ECT shall be that of the active/answered call or of the held call.
A-C/A-B indicates the TI of the other call.

Figure 1: Invocation of Explicit Call Transfer

In the following table, the use of the different error values is described:

Table 1: Error values

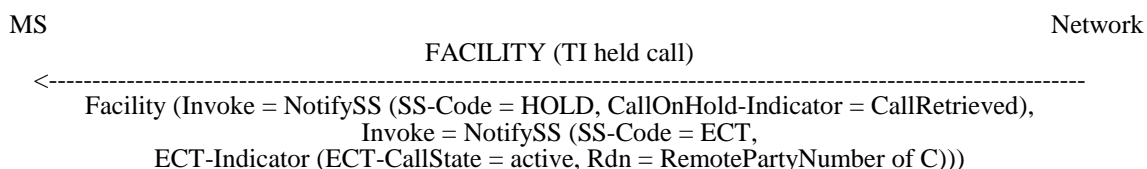| Error	Error case
IllegalSS-Operation	- operation violates the general rules applicable to the service - different calls and either off them or two are not TS 11 (telephony) - one or both of the calls are in the wrong call states - having only one call or one call is clearing - creation of a traffic channel loop
SS-ErrorStatus	- the served subscriber has not subscribed to ECT
SS-NotAvailable	- SS is not available in current location area
SS-Incompatibility	- SS-Interaction violation
FacilityNotSupported	- Facility not supported in VPLMN
SystemFailure	- problems in an entity or network resources
ResourcesNotAvailable	- problems to allocate resources
CallBarred	- contravention with the active barring program

4.3 Notification to the remote parties

If the network received a non-zero SS Screening indicator from the remote party's MS the network shall send a notification to the remote party indicating that the call has been transferred and towards the previously-held party to indicate that he is now retrieved.

If the network did not receive a non-zero SS Screening indicator from the remote party's MS it shall not send a notification.

The content of the Notification Indicator and the Redirection Number in detail is given in GSM 03.91 and the coding in GSM 04.80. For the following it is assumed that the Line Identities of the remote parties are available and allowed to be presented to the remote parties.

4.3.1 Notification to the held remote party

If ECT was invoked in the active state the previous-held remote party will be notified at the invocation of ECT (see figure 2).

```
MS                                                                                    Network
                                   FACILITY (TI held call)
   <-------------------------------------------------------------------------------------------
          Facility (Invoke = NotifySS (SS-Code = HOLD, CallOnHold-Indicator = CallRetrieved),
                              Invoke = NotifySS (SS-Code = ECT,
          ECT-Indicator (ECT-CallState = active, Rdn = RemotePartyNumber of C)))
```

Figure 2: Notification of invocation (at active state) to held remote party

If ECT was invoked in the alerting state the previous-held remote party will be notified at the invocation of ECT (figure 3) and again at the receipt of the ANSWER message from the previous-alerting remote party (figure 4).

```
MS                                                                                    Network
                                   FACILITY (TI held call)
   <-------------------------------------------------------------------------------------------
          Facility (Invoke = NotifySS (SS-Code = HOLD, CallOnHold-Indicator = CallRetrieved),
               Invoke = NotifySS (SS-Code = ECT, ECT-Indicator (ECT-CallState = alerting)))
```
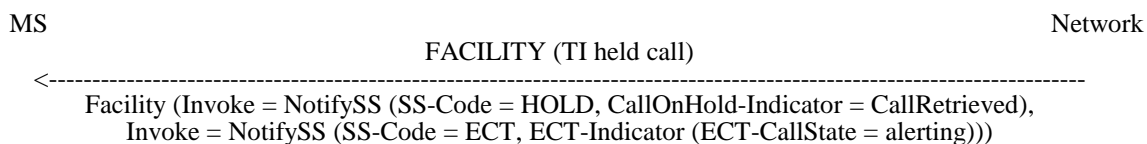
Figure 3: Notification of invocation (at alerting state) to held remote party

MS   Network

FACILITY (TI previous held call)

<--

Facility (Invoke = NotifySS (SS-Code = ECT, ECT-Indicator (ECT-CallState = active,

Rdn = RemotePartyNumber of C)))

**Figure 4: Notification to the previous-held remote party at receipt of the ANSWER message
by the previous-alerting remote party**

4.3.2   Notification to the active or alerting remote party

MS   Network

FACILITY (TI active or alerting call)

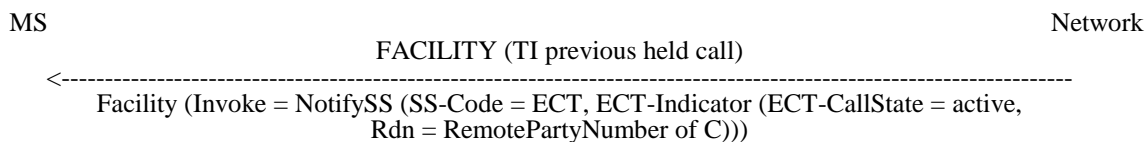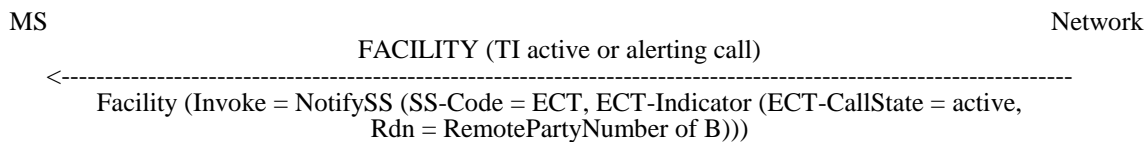<--

Facility (Invoke = NotifySS (SS-Code = ECT, ECT-Indicator (ECT-CallState = active,

Rdn = RemotePartyNumber of B)))

Figure 5: Notification of invocation to previous-active or previous-alerting remote party

4.4   Activation and deactivation

Activation and deactivation of ECT cause no signalling on the radio path.

4.5   Registration, erasure and interrogation

Registration, erasure and interrogation of ECT are not applicable.

5   Support by "old" MSs

MSs which do not explicitly support ECT are not precluded from attempting to invoke ECT. It is however, an operator option to support the invocation of ECT by these mobile stations. Where operators support this option, the mechanism employed to offer the ECT service to these MSs shall be USSD. However, it should be noted that it may not be possible using this mechanism to offer the same degree of service to the served subscriber as described in clause 4.

5.1 Explicit Call Transfer invocation

MS A invokes the service by sending a REGISTER message to the network using a call independent supplementary service (SS) transaction, with the facility information element, indicating ProcessUnstructuredSS-Request (the MMI is specified in GSM 02.30).

If the invocation of ECT is successful, then after the SS transaction has been cleared, the network shall release the CC transactions.

If the invocation of ECT is not successful, then the CC transactions shall not be released.

```
       MS                                                                          Network
                                  REGISTER (PD=SS)
      ------------------------------------------------------------------------------------>
              Facility (Invoke = ProcessUnstructuredSS-Request (ussd-DataCodingScheme,
                          ussd-String = <ECT Invocation String>))

                              RELEASE COMPLETE (PD=SS)
      <------------------------------------------------------------------------------------
            Facility (Return Result = ProcessUnstructuredSS-Request (ussd-DataCodingScheme,
                          ussd-String = <Successful Text String>))

                  DISCONNECT/RELEASE/RELEASE COMPLETE (TI=A-B, PD=CC)
      <------------------------------------------------------------------------------------

                  DISCONNECT/RELEASE/RELEASE COMPLETE (TI=A-C, PD=CC)
      <------------------------------------------------------------------------------------

                              RELEASE COMPLETE (PD=SS)
      <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -- - - - - - - -- - - - - -
            Facility (Return Result = ProcessUnstructuredSS-Request (ussd-DataCodingScheme,
                          ussd-String = <Error Text string>))

                              RELEASE COMPLETE (PD=SS)
      <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -- - - - - - - -- - - - - -
                              Facility (Return error (Error))

                              RELEASE COMPLETE (PD=SS)
       <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -- - - - - - - -- - - - - -
                              Facility (Reject (Invoke_problem))
```

NOTE: The text strings "<Successful Text String>" and "<Error Text String>" shall be defined by the network operator. Each network shall define only one "<Successful Text String>" and only one "<Error Text string>" for each error identified in table 1.
For Phase 1 USSD the operation ProcessUnstructuredSS-Request is replaced by ProcessUnstructuredSS-Data.

Figure 6: Invocation of Explicit Call Transfer for non supporting MSs

5.2 Notification to the remote parties

No alternative procedures are defined for sending notifications to remote parties indicating that the call has been transferred.

Annex A (informative):
Change Request History

Status of Technical Specification GSM 04.91		
Date	**Version**	**Remarks**
		No Phase 1 version
June 1994	version 1.0.0	To SMG#11 for information
April 1995	version 4.0.0	TS approved by SMG#14
July 1995	version 4.1.0	CR 04.91-001 (category F) approved by SMG#15

October 1995	version 5.0.0	SS removed from Phase 2
		  CR 04.91-002r2 (category B) approved by SMG#16
		  CR 04.91-003 (category B)

February 1996	version 5.1.0	CR 04.91-A004 rev 1 (category C) approved by SMG#17
December 1996	version 5.1.1	GTS converted to draft prETS 300 958 for Release 96
May 1997	version 5.1.2	ETS 300 958 first edition
January 1999	version 6.0.0	Release 1997 version
July 1999	version 7.0.0	Release 1998 version
January 2000	version 7.0.1	Version update to 7.0.1 for Publication
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V7.0.1	January 2000	Publication	