



# **GSM** **T**ECHNICAL **S**PECIFICATION

**GSM 02.91**

July 1996

Version 5.1.0

---

Source: ETSI TC-SMG

Reference: TS/SMG-010291QR1

ICS: 33.060.50

**Key words:** Digital cellular telecommunications system, Global System for Mobile communications (GSM)



## **Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT) (GSM 02.91)**

**ETSI**

European Telecommunications Standards Institute

**ETSI Secretariat**

**Postal address:** F-06921 Sophia Antipolis CEDEX - FRANCE

**Office address:** 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

**X.400:** c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

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

---

**Copyright Notification:** No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1996. All rights reserved.



## Contents

Foreword .....	5
1 Scope .....	7
2 Normative references .....	7
3 Definitions and abbreviations .....	7
3.1 Definitions .....	7
3.2 Abbreviations .....	8
4 Description .....	8
4.1 Applicability to telecommunication services .....	8
5 Normal operation with successful outcome .....	8
5.1 Provision .....	8
5.2 Withdrawal .....	8
5.3 Registration .....	8
5.4 Erasure .....	8
5.5 Activation .....	9
5.6 Deactivation .....	9
5.7 Invocation .....	9
5.8 Normal operation .....	9
5.9 Interrogation .....	10
5.10 Charging requirements .....	10
6 Exception procedures or unsuccessful outcome .....	10
7 Alternate procedures .....	10
8 Interaction with other supplementary services .....	11
8.1 Calling Line Identification Presentation (CLIP) .....	11
8.2 Calling Line Identification Restriction (CLIR) .....	11
8.3 Connected Line Identification Presentation (COLP) .....	11
8.4 Connected Line Identification Restriction (COLR) .....	11
8.5 Call Forwarding Unconditional (CFU) .....	11
8.6 Call Forwarding on mobile subscriber Busy (CFB) .....	11
8.7 Call Forwarding on No Reply (CFNRy) .....	12
8.8 Call Forwarding on mobile subscriber Not Reachable (CFNRc) .....	12
8.9 Call Waiting (CW) .....	12
8.10 Call Hold (CH) .....	12
8.11 Multi-party (MPTY) service .....	12
8.12 Closed User Group (CUG) .....	12
8.13 Advice of Charge (AoC) .....	13
8.14 Barring of All Outgoing Calls (BAOC) .....	13
8.15 Barring of all Outgoing International Calls (BOIC) .....	13
8.16 Barring of all Outgoing International Calls except those direct to the Home PLMN Country (BOIC-exHC) .....	13
8.17 Barring of All Incoming Calls (BAIC) .....	13
8.18 Barring of Incoming Calls when roaming outside the home PLMN country (BIC-Roam) ..	13
8.19 Call Transfer (CT) .....	14
9 Interworking considerations .....	14
Annex A (informative): Deviations of GSM ECT to the ISDN specifications of ECT .....	15
A.1 Subclause: 4.1. Applicability to telecommunication services .....	15

A.2	Subclause: 5.8. Normal operation .....	15
A.3	Subclause 6. Exception procedures or unsuccessful outcome .....	15
A.4	Subclauses 8.6 and 8.7 .....	15
A.5	Annexes.....	15
Annex B (normative):	Cross Phase compatibility.....	16
History .....		17

## Foreword

This Global System for Mobile communications Technical Specification (GTS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This GTS specifies the stage 1 description of Explicit Call Transfer (ECT) from the service subscriber's and user's points of view within the digital cellular telecommunications system (Phase 2/Phase 2+).

GTS are produced by TC-SMG to enable the GSM Phase 2+ specifications to become publicly available, prior to submission for the formal ETSI standards approval procedure to become European Telecommunications Standards (ETS). This ensures the earliest possible access to GSM Phase 2+ specifications for all Manufacturers, Network operators and implementors of the Global System for Mobile communications.

The contents of this GTS are subject to continuing work within TC-SMG and may change following formal TC-SMG approval. Should TC-SMG modify the contents of this GTS it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

- y     the third digit is incremented when editorial only changes have been incorporated in the specification;
  
- x     the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

Reference is made within this GTS to GSM-TSs (note).

NOTE:     TC-SMG has produced documents which give the technical specifications for the implementation of the digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These TSs may have subsequently become I-ETSs (Phase 1), or ETSS/ETSI Technical Reports (ETRs) (Phase 2). TC-SMG has also produced ETSI GSM TSs which give the technical specifications for the implementation of Phase 2+ enhancements of the digital cellular telecommunications system. These version 5.x.x GSM Technical Specifications may be referred to as GTSS.

Blank page

## 1 Scope

This European Telecommunications Standard (ETS) specifies the stage 1 description of Explicit Call Transfer (ECT) from the service 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 Global System for Mobile communications (GSM) supplementary services.

This ETS does not deal with the Man-Machine Interface (MMI) requirements, but makes reference to the appropriate GSM Technical Specification and ETS.

The charging principles applied to ECT are established in this standard in terms of the charging information required to be collected. Any subsequent charging implications are outside of the scope of this ETS.

This ETS is applicable to the digital cellular telecommunication system GSM. Any interactions with other networks not dealt with in Clause 9 are outside the scope of this ETS.

## 2 Normative references

This ETS 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 ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] GSM 01.04 (ETR 100): "European digital cellular telecommunication system (Phase 2); Abbreviations and acronyms".
- [2] GSM 02.30 (ETS 300 511): "European digital cellular telecommunication system (Phase 2); Man-Machine Interface (MMI) of the Mobile Station (MS)".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of this ETS the following definitions apply:

**Alerting state:** the remote subscriber is being informed of the call (i.e. the connection has not yet been established for that call).

**Answered state:** the connection has been established on the call to the remote subscriber.

**Subscriber A:** is the served mobile subscriber, the one who has subscribed to, and invokes the Explicit Call Transfer supplementary service.

**Subscriber B:** is the other party in one of subscribers A's calls. By convention, in this standard it is considered that the connection has been established on this call.

**Subscriber C:** is the other party in another of subscribers A's calls.

**Subscriber D:** is the forwarded-to subscriber of call forwarded by subscriber C.

NOTE: Each of subscriber B, C and D can be a mobile or a fixed subscriber, and each of them is referred to as "remote party".

**Successful invocation:** The ECT supplementary service is successfully invoked if the outcome of all checks (e.g. subscription, states of calls, resources) performed by the network on the received ECT request from the served subscriber are successful.

### 3.2 Abbreviations

All abbreviations used within this ETS are given in ETR 100 (GSM 01.04) [1].

## 4 Description

The ECT supplementary service enables the served mobile subscriber (subscriber A) who has two calls, each of which can be an incoming or outgoing call, to connect the other parties in the two calls and release the served mobile subscribers own connection.

Prior to transfer, the connection shall have been established on the call between subscriber A and subscriber B. On the call between subscriber A and subscriber C, either the connection shall have been established prior to transfer, or, as a network option, transfer can occur while subscriber C is being informed of the call (i.e. the connection has not yet been established.)

### 4.1 Applicability to telecommunication services

This service is applicable to telephony (TS:11) only.

## 5 Normal operation with successful outcome

### 5.1 Provision

The supplementary service shall be provided after pre-arrangement with the service provider.

The provision of the Call Hold (CH) supplementary service is also required.

The HPLMN operator may limit the possible number of parallel invocations of ECT per serving network entity. The maximum number shall be either set to any value between 1 and 7 or no restriction at all. The value can be different for each subscriber.

As a subscription option, the following limitations shall be offered:

- 1 The served mobile subscriber A can not invoke ECT to connect subscriber B and subscriber C in case these two calls are both outgoing calls from served subscriber A.
- 2 The served mobile subscriber A can only invoke ECT in case the outgoing leg(s) is (are) either national or to predefined countries or PLMNs [the maximum number in terms of a white or black list has to be defined]. These limitations may apply commonly to all subscribers having subscribed to this option.
- 3 ECT will become deactivated when the subscriber roams outside the HPLMN.

These subscription options may be chosen by the subscriber if offered by the HPLMN operator or service provider.

### 5.2 Withdrawal

The supplementary service shall be withdrawn at the subscriber request or for service provider reasons.

### 5.3 Registration

Not applicable.

### 5.4 Erasure

Not applicable.



### 5.5      **Activation**

The supplementary service shall be activated by the service provider as a result of provision.

### 5.6      **Deactivation**

The supplementary service shall be deactivated by the service provider as a result of withdrawal.

### 5.7      **Invocation**

ECT shall be invoked by the served mobile subscriber by use of a control procedure as described in GSM 02.30 [2].

### 5.8      **Normal operation**

The served mobile subscriber (subscriber A) who has two calls (one with subscriber B and one with subscriber C), each of which can be an incoming call or an outgoing call, can request the invocation of the ECT supplementary service with respect to the two calls.

The connection shall have been established on one of the calls (referred to as the call between subscriber A and subscriber B).

The ECT supplementary service can be invoked after the connection has been established on the call between subscriber A and subscriber C, and in addition, as a network option, after subscriber C has been informed of the call (i.e. an outgoing call from subscriber A to subscriber C, where the connection has not yet been established).

On successful invocation of the ECT supplementary service, the two calls between subscriber A and subscriber B and between subscriber A and subscriber C respectively shall be removed from subscriber A's access (i.e. the traffic channel and the signalling channel towards subscriber A will be released) and shall be transformed into a normal call between subscriber B and subscriber C where the state of the previously held party is changed to active without a subscriber action.

The previously held party will be informed in the normal way of the retrieve procedure.

If the network option above is supported, then if subscriber C is being informed of the call from subscriber A at the time of transfer, the call shall remain in this state at subscriber C (as a network option the ringing tone will be given to subscriber B), and when the connection is established by subscriber C, subscriber C shall be connected to subscriber B.

Subscriber A will no longer have any control of the on-going call between B and C.

The network shall inform (if possible) subscriber B and subscriber C of the occasion that call transfer has happened including the state (connection established, or user being informed of the call) of the call to the other subscriber.

If the network option above is supported, then after connection is established on a call which was transferred whilst subscriber C was being informed of that call, subscriber B shall be informed that the connection has been established on the call to subscriber C.

The line identity of subscriber B shall be indicated to subscriber C as specified in clauses 8.1 through 8.4.

The line identity of subscriber C shall be indicated to subscriber B as specified in clauses 8.1 through 8.4, either:

- at the time of transfer, if the connection had been established between subscriber A and subscriber C; or
- when subscriber B is informed that the connection has been established to subscriber C, if this occurs after transfer.

## 5.9 Interrogation

Not applicable.

## 5.10 Charging requirements

The charging principles applicable prior to the served mobile subscribers invocation of ECT, shall also apply after the ECT supplementary service is successfully invoked, i.e. the same charging information will continue to be collected after invocation as before. The charging information for both calls shall contain an indication of successful invocation of ECT.

NOTE: There is no additional charging requirement on the interchange signalling capabilities.

## 6 Exception procedures or unsuccessful outcome

If a mobile subscriber tries to invoke the call transfer service while not subscribed to or the network cannot provide ECT supplementary service for some other reason, an indication shall be provided to the mobile subscriber to notify the mobile subscriber with the reason of failure.

The call state is not affected and the established connection shall remain in the state prior to the request.

In the case where:

- the two calls are incompatible with the ECT request, i.e. either one of them or both are not belonging to the service TS:11 (telephony);
- if the network option is not supported and the call state is not compatible with the request, e.g. one call is not answered;
- the invocation of ECT is not permitted due to one of the subscription options being active;
- at the serving network entity the maximum number of parallel ECT invocations, defined by the HPLMN operator for that subscriber, has been reached.

the request shall be rejected by the network and the subscriber shall be notified with the reason.

The call state is not affected and the established connection shall remain in the state prior to the request.

The request for the ECT supplementary service shall be rejected if, as a network option, the network can determine that the resulting connection would contain no subscriber who is able to terminate the call.

NOTE: It may not be possible to decide if the resulting connection would have such a subscriber, e.g. when interworking between different versions of signalling systems occurs. In such cases, as a network option, the request for the ECT supplementary service may be accepted, or rejected. If the request for the ECT supplementary service is accepted in this case, the network may employ other means to control this situation (e.g. time supervision). The procedures for this are outside the scope of this standard.

## 7 Alternate procedures

For further study.

## **8 Interaction with other supplementary services**

### **8.1 Calling Line Identification Presentation (CLIP)**

If subscriber A originated the call between subscribers A and B, and subscriber B subscribes to CLIP, subscriber C's identity shall be presented to subscriber B, subject to subscriber C's line identification restrictions (see subclauses 8.2 and 8.4). If the connection has been established on the call between subscribers A and C before ECT is invoked, subscriber C's identity shall be presented when ECT is invoked. If the connection is established on the call between subscribers A and C after ECT is invoked, subscriber C's identity shall be presented when the connection on that call is established.

If subscriber A originated the call between subscribers A and C, and subscriber C subscribes to CLIP, subscriber B's identity shall be presented to subscriber C, subject to subscriber B's line identification restrictions (see subclauses 8.2 and 8.4) when ECT is invoked.

### **8.2 Calling Line Identification Restriction (CLIR)**

If subscriber B originated the call between subscribers A and B, and subscriber B subscribes to CLIR, presentation of subscriber B's identity to subscriber C shall be controlled by that subscription.

If subscriber C originated the call between subscribers A and C, and subscriber C subscribes to CLIR, presentation of subscriber C's identity to subscriber B shall be controlled by that subscription.

### **8.3 Connected Line Identification Presentation (COLP)**

If subscriber B originated the call between subscribers A and B, and subscriber B subscribes to COLP, subscriber C's identity shall be presented to subscriber B, subject to subscriber C's line identification restrictions (see subclauses 8.2 and 8.4). If the connection has been established on the call between subscribers A and C before ECT is invoked, subscriber C's identity shall be presented when ECT is invoked. If the connection is established on the call between subscribers A and C after ECT is invoked, subscriber C's identity shall be presented when the connection on that call is established.

If subscriber C originated the call between subscribers A and C, and subscriber C subscribes to COLP, subscriber B's identity shall be presented to subscriber C, subject to subscriber B's line identification restrictions (see subclauses 8.2 and 8.4) when ECT is invoked.

### **8.4 Connected Line Identification Restriction (COLR)**

If subscriber A originated the call between subscribers A and B, and subscriber B subscribes to COLR, presentation of subscriber B's identity to subscriber C shall be controlled by that subscription.

If subscriber A originated the call between subscribers A and C, and subscriber C subscribes to COLR, presentation of subscriber C's identity to subscriber B shall be controlled by that subscription.

### **8.5 Call Forwarding Unconditional (CFU)**

No impact.

### **8.6 Call Forwarding on mobile subscriber Busy (CFB)**

Where a network supports the option to transfer a call for which the connection has been established to a subscriber C to which the connection has not yet been established, the transferred call will be forwarded to a forwarded-to subscriber D if the CFB condition at subscriber C (i.e. UDUB) applies.

For a call that is forwarded due to CFB after ECT is invoked, the sending of line identities to subscriber B and forwarded-to subscriber D respectively shall correspond to what is specified for the B and C subscribers in clauses 8.1 through 8.4, i.e. replacing "subscriber C" with "the forwarded-to subscriber D" in the text.

### **8.7 Call Forwarding on No Reply (CFNRy)**

The CFNRy timer at C is not restarted after the transfer has taken place.

Where a network supports the option to transfer a call for which the connection has been established to a subscriber C to which the connection has not yet been established, the transferred call will be forwarded to a forwarded-to subscriber D if the call forwarding no reply timer expires.

For a call that is forwarded due to CFNRy after ECT is invoked, the sending of line identities to subscriber B and forwarded-to subscriber D respectively shall correspond to what is specified for the B and C subscribers in clauses 8.1 through 8.4, i.e. replacing "subscriber C" with "the forwarded-to subscriber D" in the text.

### **8.8 Call Forwarding on mobile subscriber Not Reachable (CFNRc)**

No impact.

### **8.9 Call Waiting (CW)**

No impact, any party may receive a CW indication before, during or after the calls are transferred.

NOTE: After execution of ECT the served subscribers access is free for receiving calls without a CW indication.

If subscriber A has one active, one held and one waiting call, then once ECT of the held and active calls has been successfully completed, subscriber A shall be offered the normal notification that there is a new call, as for a normal terminating call.

If the call to subscriber C meets the waiting state at C, the subscriber B shall be informed after successful transfer about the waiting status at subscriber C.

### **8.10 Call Hold (CH)**

No impact, if either subscriber B or C have put their call to the served subscriber A on hold prior to the transfer, the resulting transferred call shall remain on hold by that subscriber. In this case the remote parties shall not be informed of the held state on the call.

### **8.11 Multi-party (MPTY) service**

A served mobile subscriber who has invoked MPTY supplementary service is not allowed to invoke the ECT supplementary service.

This is due to the fact that the MPTY functionality can not be subject to call transfer at all.

Any of the remote parties is allowed to invoke ECT.

### **8.12 Closed User Group (CUG)**

The two calls shall use the same closed user group for the transfer to be successful.

NOTE: Closed user group restrictions between subscribers will have been checked when the first call is established. Similarly, closed user group restrictions between subscribers will have been checked when established the second call.

### 8.13 Advice of Charge (AoC)

Served mobile subscriber:

- if call transfer is successfully accepted by the network, subscriber A will be disconnected, and therefore AoC processing at subscribers A Mobile Station will be stopped;
- for the combination AoC charging level and ECT, it is strongly recommended not to subscribe to both supplementary services at the same time.

Remote mobile subscriber:

- any AoC service at the remote sides will continue to calculate the charging information according to the original call.

### 8.14 Barring of All Outgoing Calls (BAOC)

No impact.

### 8.15 Barring of all Outgoing International Calls (BOIC)

No impact.

NOTE: If transfer occurs successfully at subscriber A, the barring programs at the remote subscribers cannot be checked again.

EXAMPLE: User B has BOIC and calls subscriber A which is located in the same country. Subscriber A calls user C in a different country. If subscriber A transfers the call between user B and user C, the barring program of user B cannot stop the connection.

### 8.16 Barring of all Outgoing International Calls except those direct to the Home PLMN Country (BOIC-exHC)

No impact.

NOTE: If transfer occurs successfully at subscriber A, the barring programs at the remote subscribers cannot be checked again.

EXAMPLE: User B has BOIC and calls subscriber A which is located in the same country. Subscriber A calls user C in a different country. If subscriber A transfers the call between user B and user C, the barring program of user B cannot stop the connection.

### 8.17 Barring of All Incoming Calls (BAIC)

No impact.

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

No impact.

## 8.19 Call Transfer (CT)

No impact.

The ECT supplementary service can be invoked simultaneously by the users on a call for which the connection has been established, but this is not regarded as a normal situation. The network will not be required to prevent this occurring, but likewise cannot guarantee that the indications supplied to the users involved will be sensible to those users. There can be more than one indication generated due to multiple invocations of the ECT supplementary service and the arrival of such indications is dependent on the timing of their invocation by the users involved in the call. The network shall transfer these indications when they are generated.

Therefore, both mobile subscribers (subscriber A and subscriber B) in a normal call, who have each subscribed to the ECT supplementary service, can simultaneous transfer the call. That is, if subscriber A and subscriber B are involved in a call on which the connection has been established, subscriber A can transfer the call to user C and subscriber B can transfer the call to user D.

NOTE: Mechanisms which prevent the ECT supplementary service from resulting in a connection which contains no subscriber able to terminate the call may result in rejection of simultaneous requests to invoke the ECT supplementary service by the subscribers involved in the call.

## 9 Interworking considerations

The operation of this supplementary service is not affected by the nature (i.e. GSM or non-GSM) of the far end of the connections.

NOTE: In some networks the indication to the remote parties about the invocation of ECT may not be supported.

## **Annex A (informative): Deviations of GSM ECT to the ISDN specifications of ECT**

References are given to the version 1.5.0 of TS GSM 02.91.

### **A.1 Subclause: 4.1. Applicability to telecommunication services**

This service is applicable to Telephony (TS:11) only.

**NA1 states:** applicable to all circuit switched basic telecommunication services.

### **A.2 Subclause: 5.8. Normal operation**

The NOTE describing the Call Hold scenario is not included in the GSM stage 1.

In GSM there an explicit explanation that the previously held party shall be informed of the retrieve procedure.

**NA1:** there is no explicit description of this procedure.

In GSM there is no explicit exchange of the subaddress of the remote parties after the successful transfer defined.

**NA1 states:** After the successful transfer of the call, the subscriber B and subscriber C can deliver if supplied their subaddress to the other subscriber.

### **A.3 Subclause 6. Exception procedures or unsuccessful outcome**

In the case where:

- the two calls are incompatible with ECT (either one of them or both are not Telephony service);
- the call state is not compatible with the request, e.g. one call is not answered;
- etc. (for further study).

the request will be rejected by the network and the subscriber will be notified of the cause.

**NA1 states:** It is the responsibility of the served user to ensure that the two calls are compatible.

### **A.4 Subclauses 8.6 and 8.7**

**NA1:** There is no special definition of the impact of the interaction between CFB and CFNRy and ECT on the line identification supplementary services.

### **A.5 Annexes**

Annex A is missing in the ISDN specification.

## **Annex B (normative): Cross Phase compatibility**

As a operator option it is possible to support also the invocation of ECT done by an old mobile (Phase 1 or Phase 2) by using Unstructured Supplementary Service Data (USSD).

The USSD string used should be the same as the standardized MMI code (4 SEND) for ECT.

The network shall send an indication towards the user if ECT was invoked successfully or unsuccessfully, though the mechanism for this indication is not specified.

If a remote party uses a non-ECT mobile they may not receive the ECT notification.



## History

Date	Old Version	New version	Section Affected	SMG1 Doc	Subject
11/02/94	0.3.0	0.4.0	Various	55/94	Normal elaboration
15/04/94	0.4.0	1.0.0	Various	55/94r1	Presentation to SMG#10
07/07/94	ESA	1.1.0	Various		ETSI drafting rules applied
14/09/94	1.2.0	1.3.0	Various		Alignment with ISDN
14/09/94	1.3.0	1.4.0	Various		
11/10/94	1.4.0	1.5.0	Various	314/94	Interaction between ECT and CF
14/12/94	1.5.0	1.5.1	Various	11/95	editorial changes, inclusion of Annex, B
08/03/95	1.5.1	2.0.0	Various	97/95	Version for approval
07/04/95	2.0.0	4.0.0	None		Version approved at SMG#14
20/10/95	4.0.0	5.0.0	None		New policy at SMG#16
<b>Rapporteur:</b> Mr Erwin POSTMANN					
<b>Text and Figures:</b> Word for Windows 6.0 <b>Stylesheet/Template:</b> ETSIW_60.DOT					

Change history					
SMG No.	TDoc. No.	CR. No.	Section affected	New version	Subject/Comments
SMG#17	048/96	A002r1	Ann B	5.0.1	Cross phase compatibility
SMG#19	361/96	A003	5.1, 6.0	5.1.0	Incorporation of features for fraud prevention

Document history	
October 1995	Creation of Version 5.0.0 (A001 A004)
January 1996	Publication of Version 5.0.0
February 1996	Creation of Version 5.0.1 (A002r1)
March 1996	Publication of Version 5.0.1
June 1996	Creation of Version 5.0.1 (A003)
July 1996	Publication of Version 5.0.1