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**Digital cellular telecommunications system;
Advice of Charge (AoC) supplementary services - Stage 3
(GSM 04.86 version 5.0.1)**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This ETS specifies the procedures used at the radio interface for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of charging supplementary services within the digital cellular telecommunications system.

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

Transposition dates	
Date of adoption:	18 April 1997
Date of latest announcement of this ETS (doa):	31 August 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	28 February 1998
Date of withdrawal of any conflicting National Standard (dow):	28 February 1998

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0 Scope

This European Telecommunication Standard (ETS) 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 charging supplementary services. The provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and causes 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 and GSM 02.8x and GSM 02.9x-series. GSM 02.24 and 02.86 are related to the charging supplementary services.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and GSM 03.9x-series. GSM 03.86 is related to the charging 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 charging supplementary services and are described in this ETS:

- Advice of Charge (Information) (AoCI) (clause 1);
- Advice of Charge (Charging) (AoCC) (clause 2).

0.1 Normative references

This ETS incorporates by dated and 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 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 02.04 (ETS 300 918): "Digital cellular telecommunications system (Phase 2+); General on supplementary services".
- [3] GSM 02.24 (ETS 300 923): "Digital cellular telecommunications system; Description of Charge Advice Information (CAI)".
- [4] GSM 02.81: "Digital cellular telecommunications system; 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; Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 1".
- [7] GSM 02.84: "Digital cellular telecommunications system; Multi Party (MPTY) Supplementary Services - Stage 1".
- [8] GSM 02.85: "Digital cellular telecommunications system; Closed User Group (CUG) Supplementary Services - Stage 1".
- [9] GSM 02.86: "Digital cellular telecommunications system; Advice of Charge (AoC) Supplementary Services - Stage 1".

- [10] GSM 02.88: "Digital cellular telecommunications system; Call Barring (CB) Supplementary Services - Stage 1".
- [11] GSM 02.90: "Digital cellular telecommunications system; Unstructured Supplementary Service Data (USSD) - Stage 1".
- [12] GSM 03.02: "Digital cellular telecommunications system (Phase 2+); Network architecture".
- [13] GSM 03.11 (ETS 300 928): "Digital cellular telecommunications system; Technical realization of supplementary services".
- [14] GSM 03.81: "Digital cellular telecommunications system; Line identification supplementary services - Stage 2".
- [15] GSM 03.82: "Digital cellular telecommunications system; Call Forwarding (CF) supplementary services - Stage 2".
- [16] GSM 03.83: "Digital cellular telecommunications system; Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".
- [17] GSM 03.84: "Digital cellular telecommunications system; Multi Party (MPTY) supplementary services - Stage 2".
- [18] GSM 03.85: "Digital cellular telecommunications system; Closed User Group (CUG) supplementary services - Stage 2".
- [19] GSM 03.86 (ETS 300 935): "Digital cellular telecommunications system; Advice of Charge (AoC) supplementary services - Stage 2".
- [20] GSM 03.88: "Digital cellular telecommunications system; Call Barring (CB) supplementary services - Stage 2".
- [21] GSM 03.90: "Digital cellular telecommunications system; Unstructured Supplementary Service Data (USSD) - Stage 2".
- [22] GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".
- [23] GSM 04.07 (ETS 300 939): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3; General aspects".
- [24] GSM 04.08 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".
- [25] GSM 04.10 (ETS 300 941): "Digital cellular telecommunications system; Mobile radio interface layer 3 Supplementary services specification; General aspects".
- [26] GSM 04.80 (ETS 300 950): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification; Formats and coding".

0.2 Abbreviations

Abbreviations used in this ETS are listed in GSM 01.04.

1 Advice of Charge (Information) (AoCI)

1.1 Normal operation with successful outcome

On every successful request for an applicable telecommunications service, the served Mobile Station (MS) will be provided with charging information.

The network sends the Charge Advice Information (CAI) to the MS according to GSM 02.24, GSM 02.86 and GSM 03.86. With this information the MS is able to calculate the units associated with the requested service in real time. In the case where the served mobile is to be charged for multi party calls, separate processes within the MS are used to calculate units appropriate to each call. For unit calculation, each call is treated in the same way as a normal "two-party" call. Any change in the charging rate during a call may be indicated to the MS.

1.1.1 Call re-establishment

When the MS detects a radio link failure, the Chargeable Duration (CDUR) shall be suspended.

If a call re-establishment procedure is attempted, the MS shall resume the CDUR when:

- an MM connection has been successfully completed; and
- a TCH has been successfully seized in the appropriate mode.

1.1.2 MS originated call

For an MS originated call, charging information is transferred to the MS as shown in figure 1.1. The charging information is acknowledged in a FACILITY message only if the MS supports the AoCI functionality specified in GSM 02.24 and GSM 02.86. AoCI refers to the Advice of Charge (Information) service.

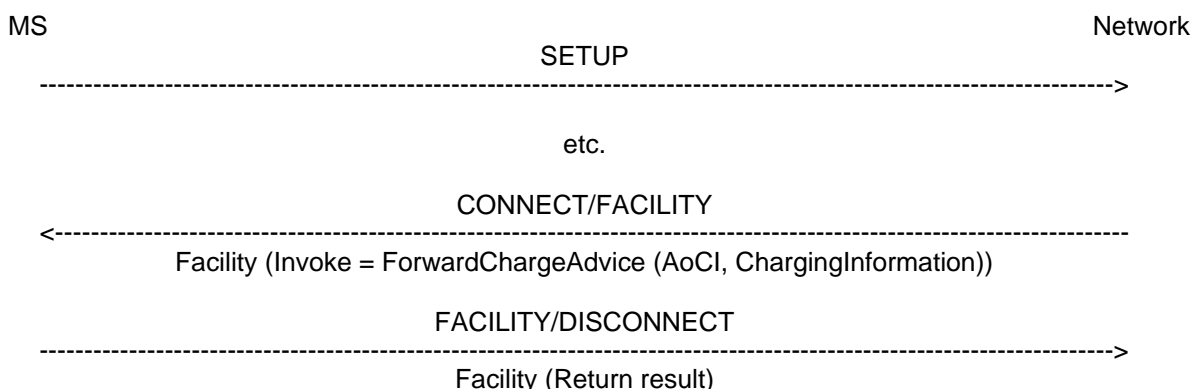


Figure 1.1: Notification to the served mobile subscriber of the charging information in case of an originated call set up

1.1.3 MS terminated call

For an MS terminated call, where required, charging information is transferred to the MS as shown in figure 1.2. The charging information is acknowledged only if the MS supports the AoCI functionality specified in GSM 02.24 and GSM 02.86.

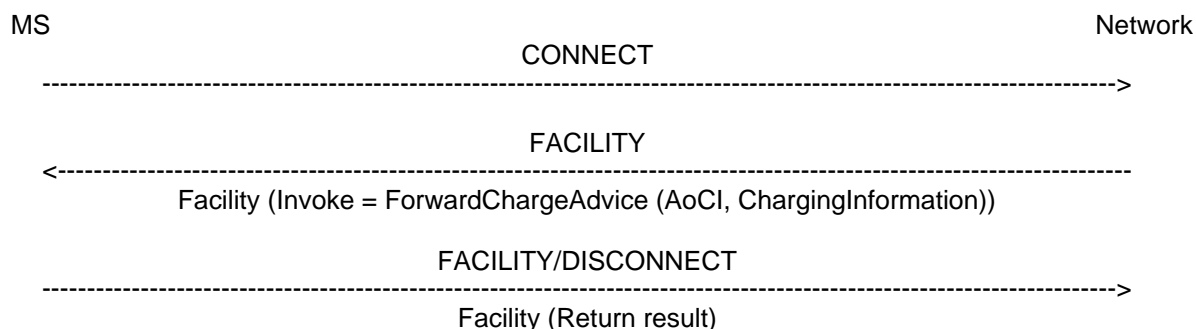


Figure 1.2: Notification to the served mobile subscriber of the charging information in case of a terminated call set-up

1.1.4 Change of charging information

To inform the MS of a change in charging information the procedure of figure 1.3 is performed. The charging information is acknowledged only if the MS supports the AoCI functionality specified in GSM 02.24 and GSM 02.86.

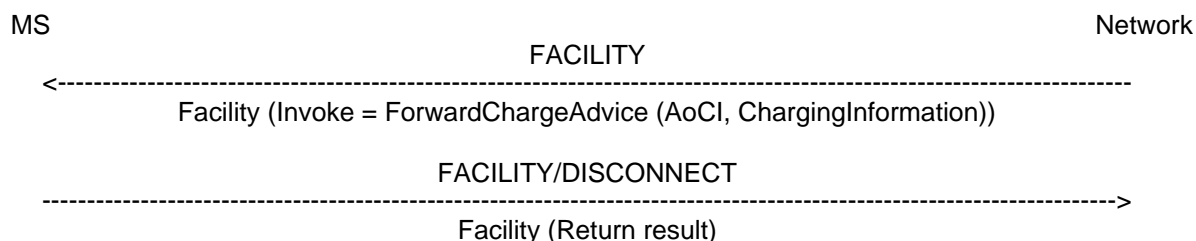


Figure 1.3: Notification to the served mobile subscriber of a change in the charging information

1.2 Normal operation with unsuccessful outcome

No signalling is performed by the network if a MS fails to acknowledge receipt of charging Information.

1.3 Activation, deactivation and invocation

Activation, deactivation and invocation of the Advice of Charge (Information) supplementary service are not applicable.

1.4 Interrogation, registration and erasure

Interrogation, registration and erasure of the Advice of Charge (Information) supplementary service are not applicable.

2 Advice of Charge (Charging) (AoCC)

2.1 Normal operation with successful outcome

On every successful request for an applicable telecommunications service, the served MS will be provided with charging information.

The network sends the Charge Advice Information (CAI) to the MS according to GSM 02.24, GSM 02.86 and GSM 03.86. With this information the MS is able to calculate the units associated with the requested service in real time. In the case where the served mobile is to be charged for multi party calls, separate processes within the MS are used to calculate units appropriate to each call. For unit calculation, each call is treated in the same way as a normal "two-party" call. Any change in the charging rate during a call may be indicated to the MS.

2.1.1 Call re-establishment

When the MS detects a radio link failure, the Chargeable Duration (CDUR) shall be suspended.

If a call re-establishment procedure is attempted, the MS shall resume the CDUR when:

- an MM connection has been successfully completed; and
- a TCH has been successfully seized in the appropriate mode.

2.1.2 MS originated call

For an MS originated call, charging information is transferred to the MS as shown in figure 2.1. The charging information is acknowledged in a FACILITY message only if the MS supports the AoCC functionality specified in GSM 02.24 and GSM 02.86. AoCC refers to the Advice of Charge (Charging) service.

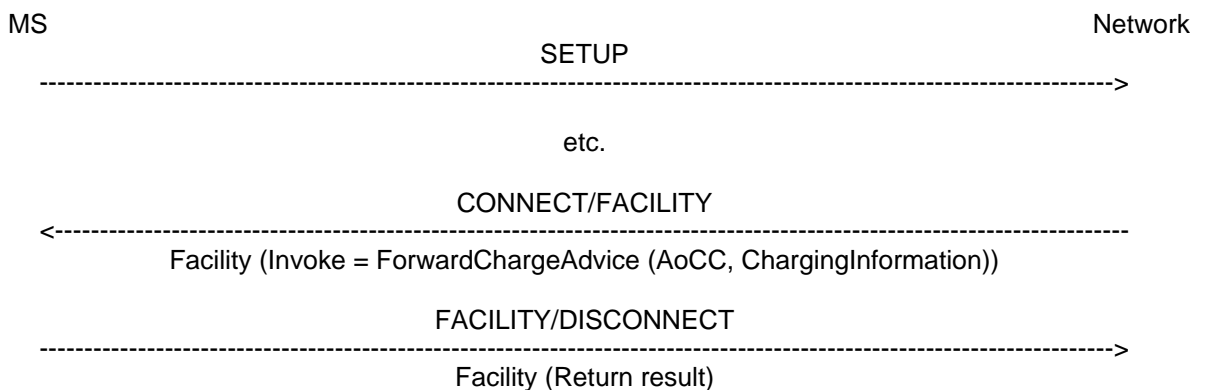


Figure 2.1: Notification to the served mobile subscriber of the charging information in case of an originated call set up

2.1.3 MS terminated call

For an MS terminated call, where required, charging information is transferred to the MS as shown in figure 2.2. The charging information is acknowledged only if the MS supports the AoCC functionality specified in GSM 02.24 and GSM 02.86.

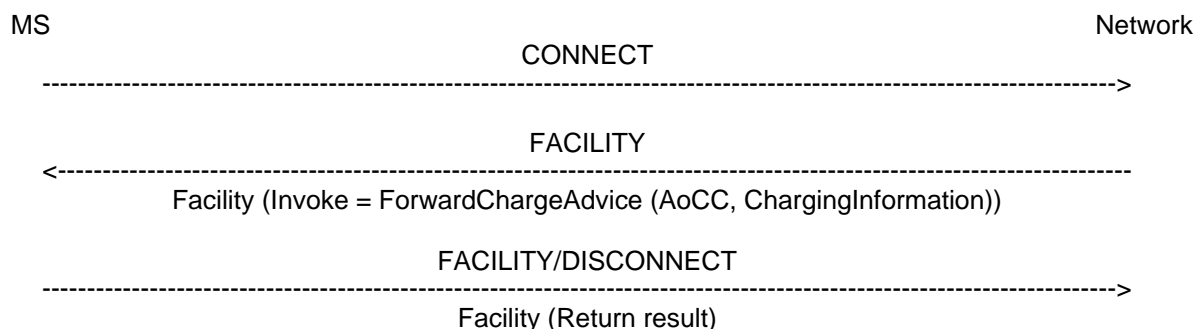


Figure 2.2: Notification to the served mobile subscriber of the charging information in case of a terminated call set up

2.1.4 Change of charging information

To inform the MS of a change in charging information the procedure of figure 2.3 is performed. The charging information is acknowledged only if the MS supports the AoCC functionality specified in GSM 02.24 and GSM 02.86.

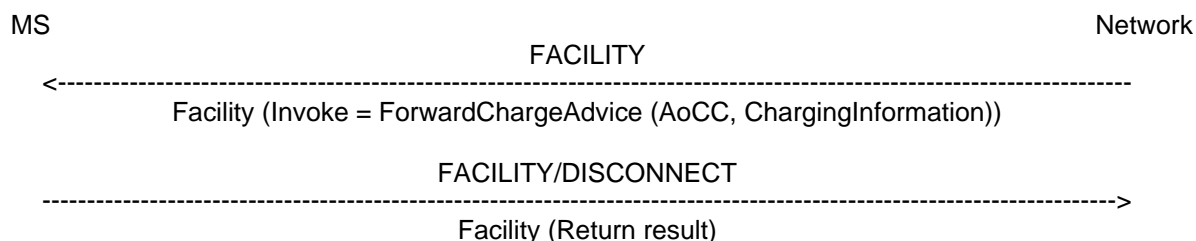


Figure 2.3: Notification to the served mobile subscriber of a change in the charging information

2.2 Normal operation with unsuccessful outcome

If timer T(AoC) (see GSM 03.86) expires before the Charge Advice Information is acknowledged, the network shall release the call. The MS and network shall act in accordance with GSM 04.08 network initiated call clearing procedures (see figure 2.4).

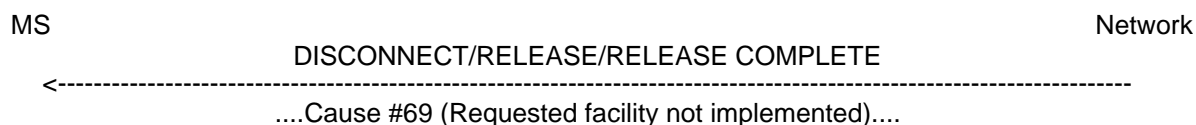


Figure 2.4: Network release due to unsuccessful operation of Advice of Charge (Charging) service

2.3 Accumulated Call Meter is equal to or greater than ACMmax

If the change stored in the Accumulated Call Meter (ACM) is equal to or greater than the maximum value specified by ACMmax, then the MS shall initiate call clearing giving a specific cause value for this situation as indicated in figure 2.5.

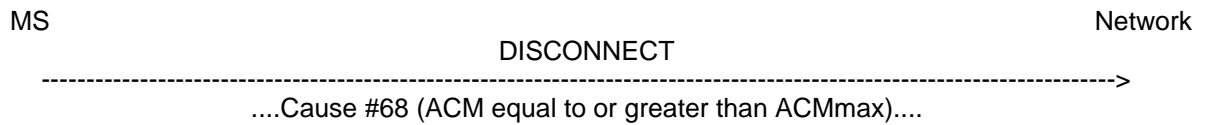


Figure 2.5: Mobile station releases the call due to ACM being equal to or greater than ACMmax

2.4 Activation, deactivation and invocation

Activation, deactivation and invocation of the Advice of Charge (Charging) supplementary service are not applicable.

2.5 Interrogation, registration and erasure

Interrogation, registration and erasure of the Advice of Charge (Charging) supplementary service are not applicable.

Annex A (informative): Status of GSM 04.8

Status of Technical Specification GSM 04.86		
Date	Version	Remarks
		No phase 1 version
March 1991	version 4.0.0	TS approved by SMG#30 TS frozen for phase 2 by SMG#05
April 1993	version 4.1.0	CR 04.86-01 rev 1 (category F) approved by SMG#06
June 1993	version 4.2.0	CR 04.86-02 (category F) approved by SMG#07
October 1993	version 4.3.0	CR 04.86-03 (category F) approved by SMG#08 Changed to draft prETS 300 570
April 1994	version 4.4.0	CR 04.86-04 (category F) approved by SMG#10
July 1994	version 4.5.0	CR 04.86-06 (category F) approved by SMG#11
October 1994	version 4.5.1	TS changed to final draft prETS 300 570
January 1995	version 4.5.2	TS changed to ETS 300 570 First edition July 1996 file converted from word5 to word6
December 1996	version 5.0.0	GTS converted to draft prETS 300 955 for Release 96
May 1997	version 5.0.1	ETS 300 955 first edition
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History

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