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Foreword

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The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

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Foreword

This Technical Specification has been produced by the 3GPP.

This TS specifies the procedures used at the radio interface for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of charging supplementary services within the 3GPP system.

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

Version 3.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 Indicates TSG approved document under change control.

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

z the third digit is incremented when editorial only changes have been incorporated in the specification;

0 Scope

The present document specifies the procedures used at the radio interface (reference point Um as defined in 3GPP TS 24.002) 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 3GPP TS 24.010 the general aspects of the specification of supplementary services at the layer 3 radio interface are given.

3GPP TS 24.080 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in 3GPP TS 22.004 and 3GPP TS 22.08x and 3GPP TS 22.09x-series. 3GPP TS 22.024 and 02.86 are related to the charging supplementary services.

Technical realization of supplementary services is described in 3GPP TS 23.011 and 3GPP TS 23.08x and 3GPP TS 23.09x-series. 3GPP TS 23.086 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 3GPP TS 24.007 and 3GPP TS 24.008.

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

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

0.1 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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.004: "General on supplementary services".

[3] 3GPP TS 22.024: "Description of Charge Advice Information (CAI)".

[4] 3GPP TS 22.081: "Line identification supplementary services - Stage 1".

[5] 3GPP TS 22.082: "Call Forwarding (CF) supplementary services - Stage 1".

[6] 3GPP TS 22.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1".

[7] 3GPP TS 22.084: "MultiParty (MPTY) supplementary services - Stage 1".

[8] 3GPP TS 22.085: "Closed User Group (CUG) supplementary services - Stage 1".

[9] 3GPP TS 22.086: "Advice of Charge (AoC) supplementary services - Stage 1".

[10] 3GPP TS 22.088: "Call Barring (CB) supplementary services - Stage 1".

[11] 3GPP TS 22.090: "Unstructured Supplementary Services Data (USSD) - Stage 1".

[12] 3GPP TS 23.002: "Network architecture".

[13] 3GPP TS 23.011: "Technical realization of supplementary services".

[14] 3GPP TS 23.081: "Line identification supplementary services - Stage 2".

[15] 3GPP TS 23.082: "Call Forwarding (CF) supplementary services - Stage 2".

[16] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".

[17] 3GPP TS 23.084: "MultiParty (MPTY) supplementary services - Stage 2".

[18] 3GPP TS 23.085: "Closed User Group (CUG) supplementary services - Stage 2".

[19] 3GPP TS 23.086: "Advice of Charge (AoC) supplementary services - Stage 2".

[20] 3GPP TS 23.088: "Call Barring (CB) supplementary services - Stage 2".

[21] 3GPP TS 23.090: "Unstructured supplementary services operation - Stage 2".

[22] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) Access Reference Configuration".

[23] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[24] 3GPP TS 24.008: "Mobile radio interface layer 3 specification".

[25] 3GPP TS 24.010: "Mobile radio interface layer 3; Supplementary services specification; General aspects".

[26] 3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification; Formats and coding".

0.2 Abbreviations

Abbreviations used in the present document are listed in 3GPP TR 21.905.

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 3GPP TS 22.024, 3GPP TS 22.086 and 3GPP TS 23.086. 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 3GPP TS 22.024 and 3GPP TS 22.086. AoCI refers to the Advice of Charge (Information) service.

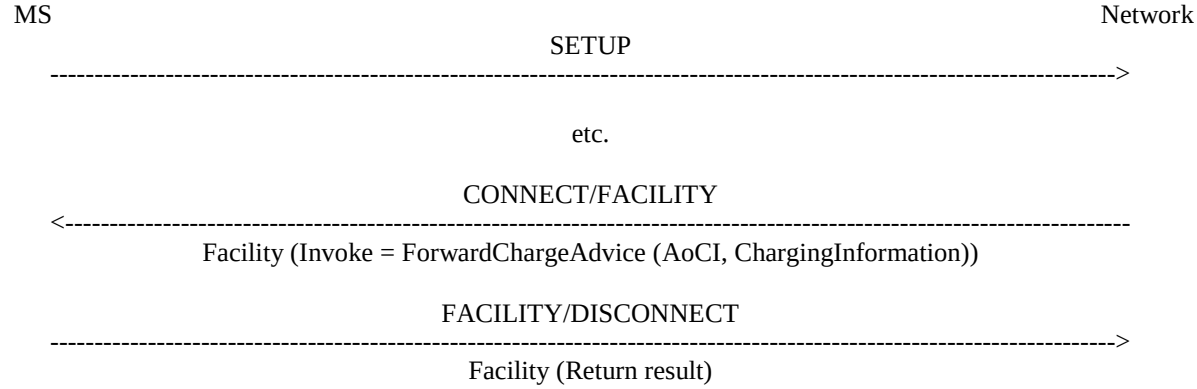

Figure 1.1: Notification to the served mobile subscriber of the charging information in case of an originated call set up

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 3GPP TS 22.024 and 3GPP TS 22.086.

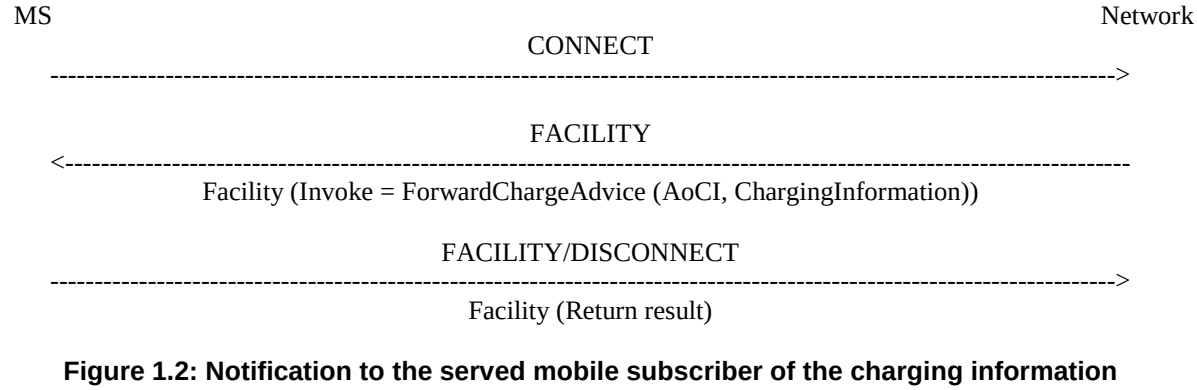

Figure 1.2: Notification to the served mobile subscriber of the charging information in case of a terminated call set-up

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 3GPP TS 22.024 and 3GPP TS 22.086.

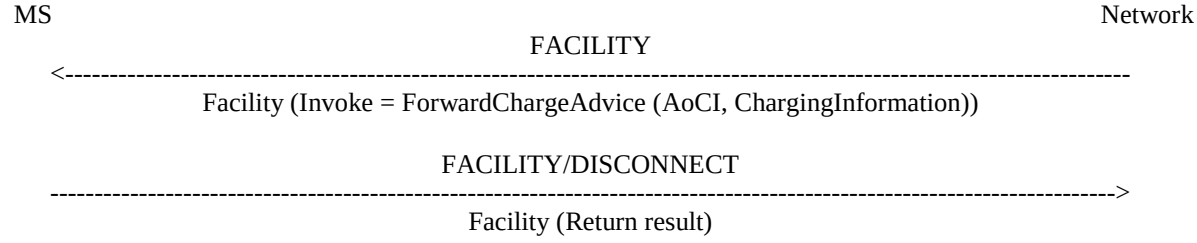

Figure 1.3: Notification to the served mobile subscriber of a change in the charging information

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 3GPP TS 22.024, 3GPP TS 22.086 and 3GPP TS 23.086. 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 3GPP TS 22.024 and 3GPP TS 22.086. AoCC refers to the Advice of Charge (Charging) service.

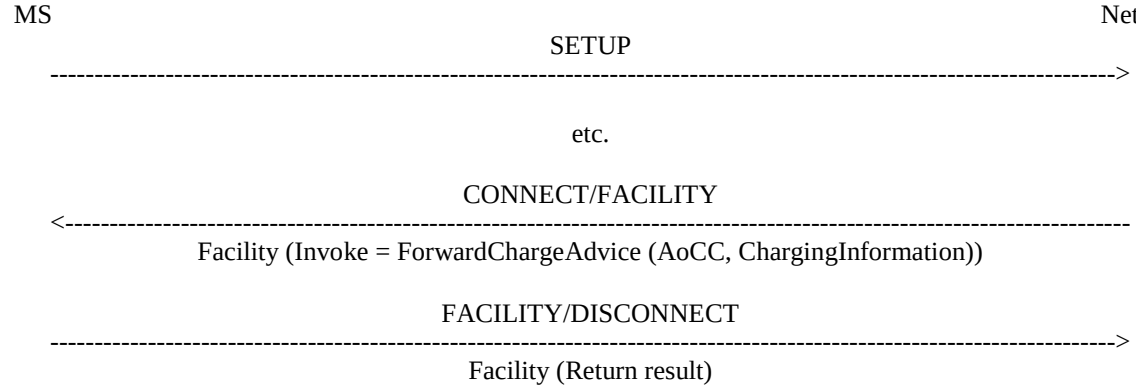

Figure 2.1: Notification to the served mobile subscriber of the charging information in case of an originated call set up

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 3GPP TS 22.024 and 3GPP TS 22.086.

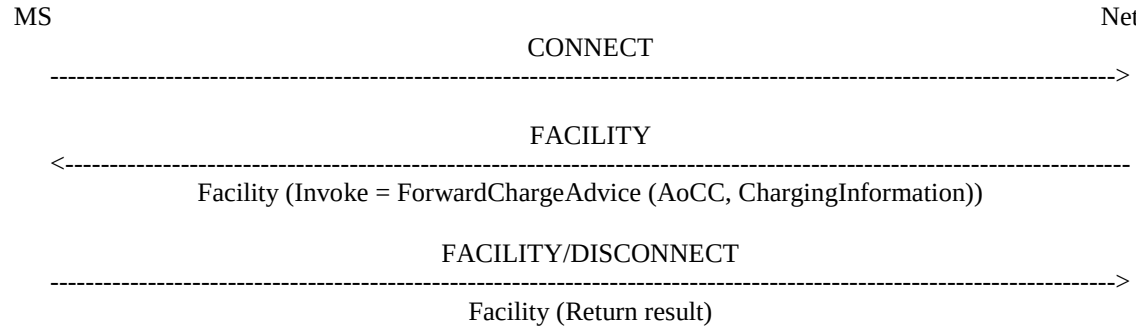

Figure 2.2: Notification to the served mobile subscriber of the charging information in case of a terminated call set up

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 3GPP TS 22.024 and 3GPP TS 22.086.

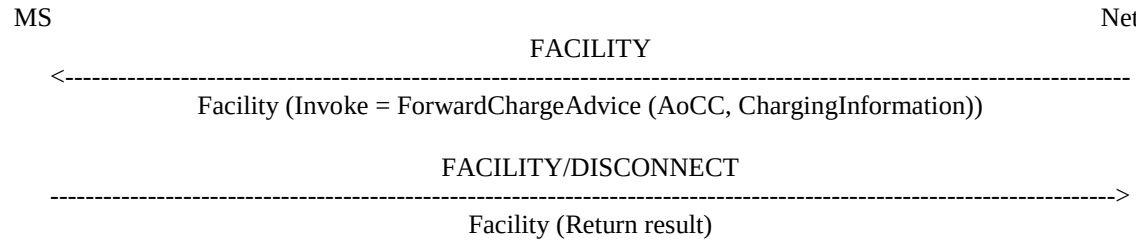

Figure 2.3: Notification to the served mobile subscriber of a change in the charging information

2.2 Normal operation with unsuccessful outcome

If timer T(AoC) (see 3GPP TS 23.086) expires before the Charge Advice Information is acknowledged, the network shall release the call. The MS and network shall act in accordance with 3GPP TS 24.008 network initiated call clearing procedures (see figure 2.4).

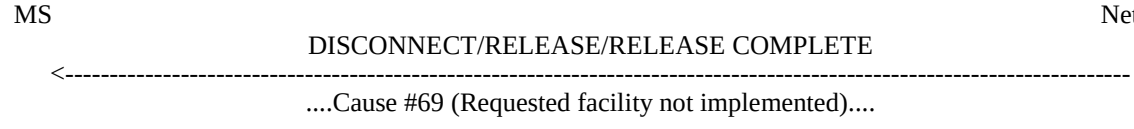

Figure 2.4: Network release due to unsuccessful operation of Advice of Charge (Charging) service

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.

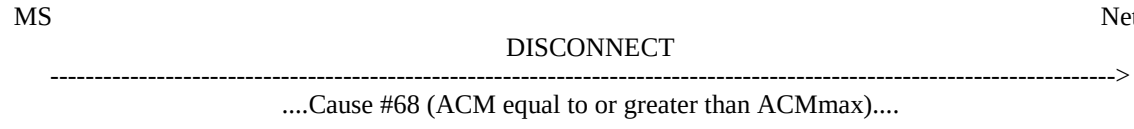

Figure 2.5: Mobile station releases the call due to ACM being equal to or greater than ACMmax

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): Change history

Change history						
TSG CN#	**Spec**	**Version**	**CR**	**<Phase>**	**New Version**	**Subject/Comment**
Apr 1999	GSM 04.86	6.0.0				Transferred to 3GPP CN1
CN#03	24.086			R99	3.0.0	Approved at CN#03
CN#11	24.086	3.0.0		Rel-4	4.0.0	Release 4 after CN#11
CN#16	24.086	4.0.0		Rel-4	4.0.1	References updated
CN#16	24.086	4.0.1		Rel-5	5.0.0	Release 5 created after CN#16
CN#26	24.086	5.0.0		Rel-6	6.0.0	Release 6 created after CN#26
CT#36	24.086	6.0.0		Rel-7	7.0.0	Upgraded unchanged from Rel-6
CT#42	24.086	7.0.0		Rel-8	8.0.0	Upgraded unchanged from Rel-7

History

Document history		
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