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TECHNICAL SPECIFICATION

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Follow-Me (FM);
Stage 2
(3GPP TS 23.094 version 13.0.0 Release 13)**

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GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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1 Scope

The present document specifies the stage 2 description for the Follow Me feature.

The Follow Me feature enables a mobile subscriber A to manipulate the Follow Me data of a remote party B in such a way that subsequent calls directed to remote party B will be forwarded to subscriber A.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

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[1] 3GPP TR 21.905: "3G Vocabulary".

[2] 3GPP TS 22.004: "General on Supplementary Services".

[3] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the Mobile Station (MS)".

[4] 3GPP TS 22.082: "Call Forwarding (CF) supplementary services - Stage 1".

[5] 3GPP TS 22.094: "Follow Me (FM) feature - Stage 1".

[6] 3GPP TS 23.011: "Technical realisation of Supplementary Services - General Aspects".

[7] 3GPP TS 23.015: "Technical realisation of Operator Determined Barring (ODB)".

[8] 3GPP TS 23.090: "Unstructured Supplementary Services Data (USSD)- Stage 2".

[9] 3GPP TS 23.082: "Call Forwarding (CF) supplementary services - Stage 2".

[10] 3GPP TS 22.090: "Unstructured Supplementary Services Data (USSD)- Stage 1".

[11] 3GPP TS 24.090: "Unstructured Supplementary Services Data (USSD)- Stage 3".

[12] 3GPP TS 29.002: "Mobile Application Part (MAP)".

3 Definitions and abbreviations

3.1 Definitions

initiating subscriber: mobile subscriber who modifies the Follow Me data of the remote party.

initiating number: number (the MSISDN of the initiating subscriber) to which incoming calls, originally destined for the remote party, shall be forwarded. It is subsequently also referred to as $\mathbf{MSISDN_A}$.

remote party: is characterised by the remote number which is defined in the numbering plan of a PLMN operator. The Follow Me feature enables the initiating subscriber to modify the Follow Me data of the remote party. In particular cases the remote party is a GSM subscriber of the PLMN and the remote number denotes her basic MSISDN.

Previously registered subscriber: Is the initiating service subscriber who has registered Follow Me with respect to a remote party. Her Registration can be erased by herself or by an FM service supervisor via forced erasure procedure.

FM service supervisor: is an initiating subscriber who is allowed to modify the Follow Me data of a remote party who has been registered to a previously registered subscriber for the Follow Me application. The FM service supervisor shall be authorised by her network operator.

remote number: is a number in E.164 format which identifies a remote party. In general this number is not assigned to a subscriber and can be regarded as a "dummy MSISDN". In particular cases the remote party is a GSM subscriber of the PLMN and the remote number denotes her basic MSISDN. The remote number is entered by the initiating subscriber for registration, interrogation, forced erasure and erasure of the Follow Me feature with respect to the remote party.

Follow Me function node: is a network node in the PLMN operator of the remote party. The FM data of the remote party are stored in this node. This node can be implemented in:

- an HLR;
- any other operator specific network node e.g.:
  - a gsmSCF;
  - an SCP.

3.2 Abbreviations

FFN	Follow Me function node
FM	Follow Me
SCP	Service Control Part

Other abbreviations used in this ETS are listed in 3GPP TR 21.905.

4 Handling of Follow Me

4.1 General

Follow Me enables an initiating mobile subscriber A to have control over the Follow Me data of a remote party B. The remote party B is characterised by the remote number which is defined in the numbering plan of a PLMN operator. Initiating Subscriber A shall be able to manipulate the Follow Me data of remote party B such that subsequent calls destined for remote party B are forwarded to initiating subscriber A. In the case of Forced Erasure by an FM service supervisor, the initiating subscriber is allowed to erase the Follow Me data of a remote party who has been registered to a different initiating subscriber for the Follow Me application.

Follow Me is a PLMN specific feature and the control operations of FM are based on USSD. All messages between the MS and the mobile network and internal to the mobile network are USSD messages.

The present document deals with the control operations of FM in HLRa and FFN. If the FFN is an HLR, the control of the requests for both FM and CFU services is specified (see subclause 4.3.2).

The functionality of forwarding calls for remote party B to initiating subscriber A (after successful registration of FM) is out of the scope of the present document. This functionality is the same as the functionality of the Call Forwarding Unconditional Supplementary Service applied to all telecommunication services of remote party B for which CFU is applicable.

NOTE 1: the "served mobile subscriber" in 3GPP TS 22.094 [5] corresponds to the "remote party" in the present document and the "forwarded-to subscriber" in 3GPP TS 22.094 [5] corresponds to the "initiating subscriber" in the present document.

NOTE 2: The forwarding of calls for remote party B to initiating subscriber A can be achieved by invoking the Call Forwarding Unconditional Supplementary Service or by making use of an equivalent operator specific service (e.g. via CAMEL).

The functionality of the control of Follow Me (registration, erasure, forced erasure and interrogation) is split between the HLR of the initiating subscriber A (HLRa) and the FFN of the remote party B (FFNb).

4.1.1 Provision

FM can be registered / erased / interrogated by an initiating subscriber A with respect to a remote party B if both parties are provisioned with FM.

To enable forced erasure by an FM service supervisor, the FM service shall be provisioned to the FM service supervisor. Additionally, she needs the subscription entitlement to perform the forced erasure.

NOTE: In general remote party B does not correspond to a GSM subscriber. In this case provisioning of FM for remote party B is operator specific.

If remote party B is a GSM subscriber and if the forwarding of calls for remote party B to initiating subscriber A is achieved by invoking the Call Forwarding Unconditional Supplementary Service, provision of CFU for remote party B is required.

4.1.2 Registration

The initiating subscriber registers the FM feature with respect to a particular remote party.

If an initiating subscriber A successfully registers FM with respect to a remote party B then FM becomes registered, active and operative for remote party B.

As a result of the registration subsequent calls directed to remote party B are forwarded to initiating subscriber A.

NOTE: The remote party cannot register FM with respect to herself.

4.1.3 Erasure

If an initiating subscriber A or the FM service supervisor successfully erases FM with respect to a remote party B then FM becomes not registered and not active for remote party B.

For forced erasure by the FM service supervisor the previously registered subscriber shall be informed of the successful forced erasure via a network initiated USSD Notify message with appropriate contents. This message is sent by the FFN.

If remote party B is a GSM subscriber and successfully erases FM then FM becomes not registered and not active for remote party B.

4.1.4 Interrogation

If an initiating subscriber A or the FM service supervisor successfully interrogates FM with respect to a remote party B then this procedure interrogates the FM data of subscriber B.

If remote party B is a GSM subscriber and successfully interrogates FM then this procedure interrogates her own FM data.

4.2 Information Flows

4.2.1 Information Flow for the handling of FM by the initiating subscriber

Figure 4.1 shows the Information Flow for the control of FM (registration, erasure, forced erasure and interrogation) by the initiating subscriber.

For any control operation on FM, the initiating subscriber (MSa) enters a Follow Me Request (FM-Request). This is a USSD string containing the requested FM operation and the remote number. The Follow Me Request is routed via the MSC/VLR to the HLR of the initiating subscriber (HLRa).

The HLRa performs a series of checks as described in the SDLs (subclause 4.3). If these checks fail, the MSa receives a response (FM-Response) indicating the error.

If the checks pass, the HLRa forwards the operation request (HLR-FM-Request) to the FFN of the remote party (FFNb).

FFNb carries out the appropriate control operation and checks as described in the SDLs (subclause 4.3) for the remote party.

The result of this operation (success or error) is reported back in a USSD Response to the initiating subscriber.

For successful forced erasure by a service supervisor, the FFN shall send a Network Initiated USSD notify message with the corresponding USSD string to the HLR of the previously registered subscriber who had registered the Follow Me data. The HLR shall forward the USSD notify to VLR which will relay the USSD Notify towards the MS.

Upon receipt of the USSD Notify, the MS shall respond by sending a FACILITY message with empty return result component.
An error response with corresponding reason can be returned from any entity, when error happens at the entity 3GPP TS 23.090 [8].

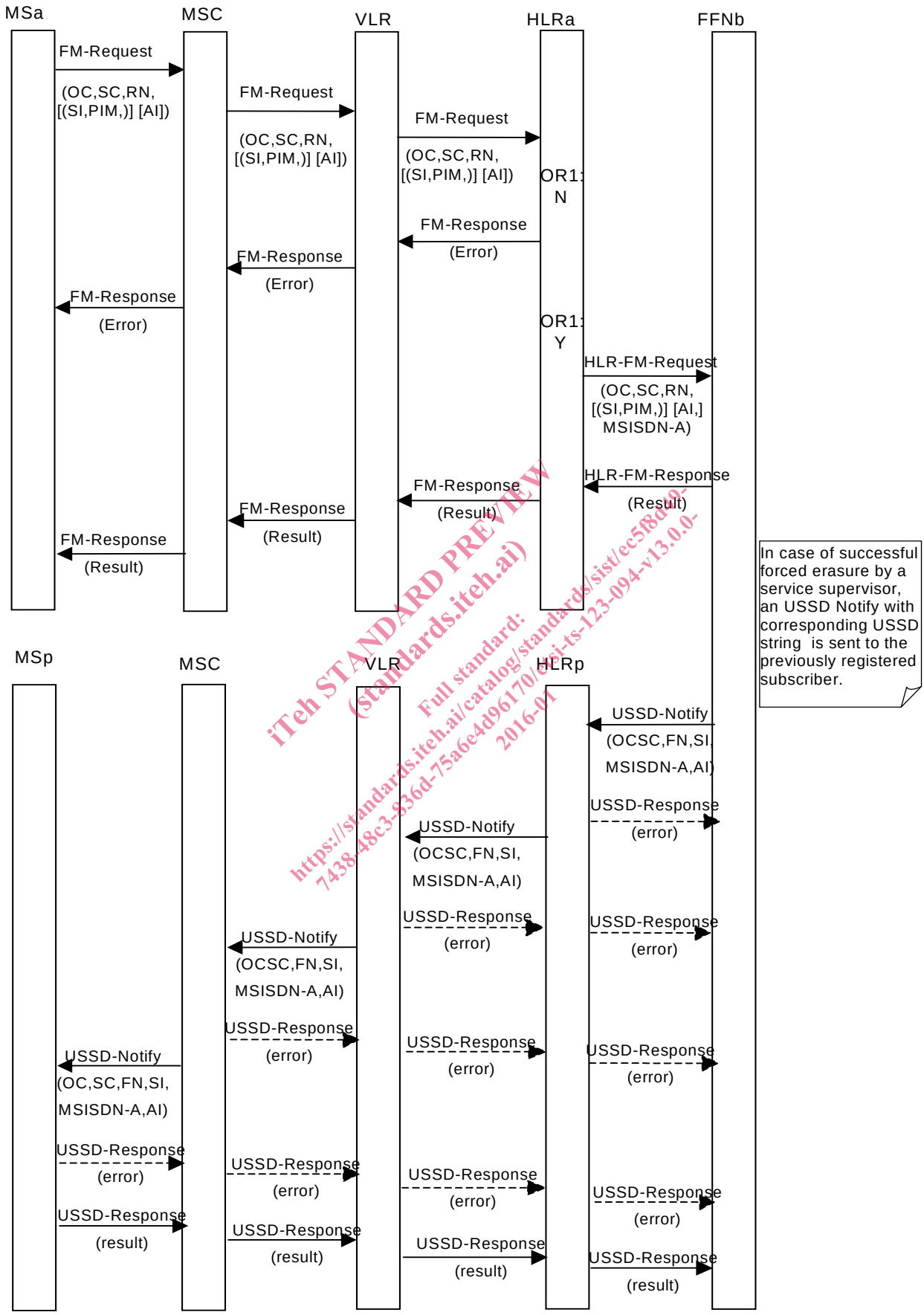

Figure 4.1: Information flow for the control of FM by the initiating subscriber or service supervisor

NOTE 1:	OR1:N:	The case where the checks in the HLR result in a negative outcome, e.g. FM is not provisioned for the initiating subscriber or the initiating subscriber is not allowed to operate FM for the remote party.
	OR1:Y:	The case where all the checks in the HLR are successful, e.g. FM is provisioned for the initiating subscriber and the initiating subscriber is allowed to operate FM for the remote party.
NOTE 2:	[...]	Optional parameter.
	(...)]	Conditional parameter.
	OC	Operation Code (Register, Erase or Interrogate).
	SC	Service Code for FM.
	RN	Remote Number.
	SI	Supervisor Indicator. This parameter is conditional and only used for forced erasure by a FM service supervisor.
	PIM	MSISDN of previously registered subscriber who has registered the FM to remote number. This parameter is conditional and only used for forced erasure by a FM service supervisor..
	AI	Supplementary Information containing additional information.
	MSISDN-A	initiating number in international format. It is not a part of the USSD string, but is sent from HLRa to the FFNb together with the HLR-FM-Request within the MAP operation. For forced erasure, the MSISDN-A corresponds to the supervisor"s MSISDN and will be part of the USSD-notify.
	MSp	MS of previously registered service subscriber.
	HLRp	HLR of the previously registered service subscriber.

4.2.2 Information Flow for the handling of FM by the remote party

Control of FM by the remote party is possible if the remote party is a GSM subscriber.

The information flow for control of FM by the remote party (erasure and interrogation of her own FM data) is the same as the information flow for control of FM by the initiating subscriber.

If a remote party tries to register FM to herself the registration is rejected and an error is reported.

4.3 Handling of FM control in HLRa and FFNb

HLRa and FFNb can both receive FM control messages, based on USSD. The USSD handler in each entity analyses the Service Code contained in the USSD string and, recognising the Service Code for FM, invokes the FM USSD application.

The FM control messages and their contents are given in Annex B (normative).

4.3.1 Handling of FM control in HLRa

The FM USSD application in HLRa is the process **FM_initiating_subscriber_handling_in_HLR** (figure 4.2). It receives the FM-Request from the initiating subscriber. This FM-Request is an USSD-string containing:

- the operation code (register, erase, interrogate);
- the remote number;
- an additional operator specific information field.