3GPP TSG CN Plenary Meeting #21 **NP-030392**
17th – 19th September 2003 Frankfurt, GERMANY.

Source: TSG CN WG4

Title: Corrections on mobile number portability

Agenda item: 8.9

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.002	615	3	N4-031068	Rel-5	Incorrect Charging with MNP	F	5.6.2
29.002	616	3	N4-031069	Rel-6	Incorrect Charging with MNP	A	6.2.0
23.066	026	1	N4-030984	Rel-5	Incorrect CAMEL pre-paid charging in MNP networks	F	5.1.0

CR-Form-v7

CHANGE REQUEST

⌘ 23.066 CR 026 ⌘rev 1 ⌘ Current version: 5.1.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Incorrect CAMEL pre-paid charging in MNP networks
Source:	⌘	Nortel Networks, LM Ericsson
Work item code:	⌘	MNP
Date:	⌘	29/08/2003
Category:	⌘	F
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	To provide the functionality needed to enable a SCP to obtain MNP Information in order to correctly tariff CAMEL pre-paid calls and SMS in networks employing Mobile Number Portability.
Summary of change:	⌘	Addition of a MNP_Info_Request interface and procedure for MNP-SRF based PLMNs
Consequences if not approved:	⌘	CAMEL pre-paid services may be charged incorrectly when CAMEL is deployed in a network that supports mobile number portability.

Clauses affected:	⌘	1, 2, 3, 4.1, 4.3, 5, Annex D(new)

	Y	N			
Other specs affected:	X		Other core specifications	⌘	29.002, 23.078
		X	Test specifications		
		X	O&M Specifications		

Other comments:	⌘	

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1 Scope

The present document describes several alternatives for the realisation of Mobile Number Portability.

The present document includes information applicable to network operators, service providers, switch and database manufacturers and national regulators.

It is left to operator and implementation decisions which option, or combination of options, is used, taking into account the regulatory and architectural constraints that may prevail. The possible implications of these options on internal node functions and on signalling performance are not covered in the present document.

Normative Annex A of the present document describes the technical realisation of the handling of calls to ported UMTS or GSM mobile subscribers using IN technology.

Normative Annex C of the present document describes the technical realisation of the handling of calls to ported UMTS or GSM mobile subscribers using Signalling Relay technology.

Normative Annex A and Normative Annex C describe alternative solutions. The network operator may choose the solution to be used in his network.

Normative Annex B of the present document describes the technical realisation of the handling of non-call related SCCP signalling for ported UMTS or GSM mobile subscribers using Signalling Relay technology.

Normative Annex D of the present document describes the technical realisation of the handling of the MNP information request for ported or non-ported UMTS or GSM mobile subscribers. Two solutions are described, one using IN technology the other using Signalling Relay technology. The network operator may choose~~chose~~ the solution to be used in his network.

The present document does not specify the porting process.

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. 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 TS 21.905: "3G Vocabulary".

[2] 3GPP TS 22.066: "Support of Mobile Number Portability (MNP); Service description. Stage 1".

[3] 3GPP TS 23.018: "Basic call handling; Technical realisation".

[4] ETSI ETS 300 009 (1991): "Integrated Services Digital Network (ISDN); CCITT Signalling System No. 7 – Signalling Connection Control Part (SCCP) [connectionless services] to support international interconnection".

[5] ETSI ETS 300 374-1: "Intelligent Network (IN); Intelligent Network Capability Set 1 (CS1); Core Intelligent Network Application Protocol (INAP); Part 1: protocol specification".

[6] ITU-T Recommendation Q.769.1; ISDN User Part (ISUP); Enhancements for the support of Number Portability".

[7] ETSI EN 300 356-2 V4.1: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 4 for the international interface; Part 2: ISDN supplementary services [ITU-T Recommendation Q.730 modified]".

[8} CTIA report on Wireless Number Portability, Version 2.0.0.

[9] ANSI T1.660 – 1998, American National Standards for Telecommunications – Signaling System Number 7 – NumberPortability Call Completion to a Portable Number.

[10] ANSI T1.111-1996, American National Standards for Telecommunication – Signalling System No. 7 (SS7) Message Transfer Part (MTP).

[11] ANSI T1.112-1996, American National Standards for Telecommunication – Signalling System No. 7 (SS7) Signalling Connection Control Part (SCCP).

Note: Translation Types 10 and 14 will be published in the next revision of ANSI T1.112.

[12] American National Standard for Telecommunications – Signalling System Number 7 (SS7) - ISDN User Part (ISUP) - ANSI T1.113-1995.

[13] American National Standard for Telecommunications - Signalling System Number 7 (SS7) – Transaction Capabilities Application Part (TCAP) - ANSI T1.114-1996.

[14] ETSI EN 302 097 V1.2: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP); Enhancements for support of Number Portability (NP)".

[15] TI - Technical Requirements No. 3, April 1999, Number Portability Database and Global Title Translation.

[16] 3GPP TS 23.096: "Mobile Name Identification Supplementary Service – Stage 2".

[17] North American Numbering Council (NANC) Functional Requirement Specification, Number Portability Administration Center- Service Management System (NPAC-SMS), Version 1.0, May 25, 1995; Version 2.0, June 2, 1997.

[18] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 4 – Stage 2".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

donor network: subscription network from which a number is ported in the porting process. This may or may not be the number range holder network

interrogating network entity: entity that submits a non-call related signalling message to interrogate the HLR

interrogating network: network in which the interrogating network entity resides

mobile number portability: ability for a mobile subscriber to change mobile network subscription within the same country whilst retaining his/her original MSISDN(s). Additional regulatory constraints apply in North America.

mobile number portability information: an information set relevant to Mobile Number Portability for a mobile subscriber. It contains Routeing Number, generic IMSI, MSISDN, Number Portability Status. ~~etc~~

network operator: GSM PLMN operator

non-call related signalling message: all signalling messages where the MSISDN is used to route the message on SCCP level except MAP SRI without OR parameter set (i.e. SRI_SMS, SRI for SOR, Send_IMSI, CCBS_Request etc)

North American GSM Number portability: the ability for a subscriber to change subscription between North American GSM networks and other subscription networks within a regulated geographical area within North America.

number portability database: operational database (used in real time at call set-up) which provides portability information

number portability location register: internal MAP application terminating function (MATF) in the MNP-SRF network entity with an (unspecified) interface with a NPDB

number portability status: information indicating the status of number portability for a mobile subscriber. It may be one of: own number ported out, own number not ported out, foreign number ported in, foreign number ported to a foreign network, foreign number not known to be ported

number range holder network: network to which the number range containing the ported number has been allocated

originating network: network where the calling party is located

portability domain: set of GSM PLMNs in a country between which MSISDNs may be ported or a set of North American GSM Mobile networks and other subscription networks within a regulated geographical area within North America

portability network: a PLMN or ,in North America, a PSTN or an ISDN network

portable number: E.164 number that can be ported between networks in one nation

ported number: portable number that has undergone the porting process

ported subscriber: subscriber of a ported number

porting process: description of the transfer of a number between network operators

recipient network: network that receives the number in the porting process. This network becomes the subscription network when the porting process is complete

routeing number: routeing number is the data stored against the ported number or the non-ported number in the Number Portability Database. The routeing number points to Subscription Network or Recipient Network

service key: service Key can identify to the entity holding the Number Portability Database that the service logic for Mobile Number Portability should apply. The Service Key value for Mobile Number Portability is administered in the MSC, and is passed transparently to the entity holding the Number Portability Database

service provider: entity that offers service subscriptions to individual subscribers and contracts with a network operator to implement services for a specific MSISDN. A service provider may contract with more than one network operator

service provider portability: transfer of numbers between two unique Service Providers

subscription network: network with which the customer's Service Provider has a contract to implement the customer's services for a specific MSISDN

NOTE: The term "recipient network" is used during the porting process. The recipient network becomes the "subscription network" after the completion of the porting process.

4 General

4.1 Overview

Mobile Number Portability (MNP) is the ability for a UMTS or GSM mobile subscriber to change the subscription network within a portability domain whilst retaining her original MSISDN or MSISDNs.

North American GSM Number Portability (NAGNP) is the ability for a subscriber to change subscription between North American GSM networks and other subscription networks within a regulated geographical area within North America.

As part of the porting process administrative actions have to be performed by the network operators of the number range holder network, donor network, recipient network and, as an option, by operators of other national UMTS or GSM networks as follows:

a) if the number range holder network is identical with the donor network:

Recipient network:	add an entry in the HLR; add an entry in the Number Portability Database.
Donor network:	add an entry in the Number Portability Database; delete the entry related to the ported MSISDNs in the HLR.
Other networks in the portability domain:	add an entry in the Number Portability Database (if direct routeing is used).

b) if the number range holder network is identical with the recipient network:

Recipient network:	add an entry in the HLR; delete any entry related to the ported MSISDN in the Number Portability Database.
Donor network:	delete any entry related to the ported MSISDN in the Number Portability Database; delete the entry related to the ported MSISDNs in the HLR.
Other networks in the portability domain:	delete any entry related to the ported MSISDN in the Number Portability Database.

c) if the number range holder network is different from both the recipient and the donor network:

Recipient network:	add an entry in the HLR; add an entry in the Number Portability Database.
Number range holder network:	update the Number Portability Database
Donor network:	delete (or update) the entry in the Number Portability Database; delete the entry related to the ported MSISDNs in the HLR.
Other networks in the portability domain:	update the Number Portability Database (if an entry for the ported MSISDN exists).

Note that the order of sequence for the administrative actions to be performed both within a network and by different network operators is significant with respect to prevention of disruption in service to the mobile subscriber and prevention of looping calls between networks during the porting process.

Termination of a subscription for a ported number results in the deletion of any entry in an HLR and NPDB of that number.

If a call fails because databases are not correctly synchronised, the network entity that detects the inconsistency will raise an MNP specific alarm to the operation and maintenance subsystem.

The present document does not specify the porting process. It specifies the functionality needed to set-up calls to both ported and non ported subscribers (Normative Annex A and Normative Annex C), ~~and~~ the functionality needed to relay non-call related signalling messages to the HLR in the subscription network (Normative Annex B) and the functionality needed to query a NPDB for MNP information (in order to be able to correctly charge CAMEL pre-paid calls and SMS) (Normative Annex D).

4.2 Compatibility

The IAM sent to the subscription network may contain additional routeing information. Within a portability domain the method how to convey the Routeing Number in the IAM between two portability networks shall be agreed upon by the two network operators involved (for an ITU-T ISUP solution see [6] and for an ANSI ISUP solution see [8] and [9]).

In general, IN-based and MNP-SRF (call-related) solutions are compatible and may coexist in the same portability domain. The only restriction refers to the case where the number range holder network relays call-related MAP messages (i.e. SRI for national calls) to the subscription network. If this solution is selected by at least one network operator within a portability domain, all the portability networks and transit networks affected must fulfil the following requirements:

1. The SCCP interfaces between networks in a portability domain must be agreed. This refers to the SCCP addressing mechanism being used (e.g. number lengths, natures of address and translation types for call-related MAP messages).
   For messages that do not cross network boundaries the SCCP addressing mechanism is a choice of the network operator.

2. The subscription network must be able to generate the SRI ack to allow the onward routeing of the call from the number range holder network to the subscription network.

In the rest of the possible architectures for MNP, no interworking problems have been identified. In these cases, network architectures used within one portability network (e.g. IN, MNP-SRF) are regarded as operator dependent.

In order to avoid loops and incompatibility situations, all the networks within a portability domain shall use the same routeing convention either direct routeing, indirect routeing or indirect routeing with reference to the Subscription network. As an alternative, indirect routeing can interwork successfully with direct routeing if the routeing number is transferred in the IAM or if dedicated traffic connections are used.

4.3 Common Functionality of the MNP-SRF

In a PLMN that supports mobile number portability, SCCP messages sent to an HLR may be relayed by an MNP-SRF. Depending on the implemented solution (IN-based or MNP-SRF-based), on the type of message (call-related, ~~or~~ non-call-related or MNP information request) and on the porting status of the called subscriber, the MNP-SRF may modify the SCCP called party address and route the message to a different HLR or to the subscription network, or terminate the dialogue and response to the INE.

Figure 1 shows the general steering functionality for SCCP message routeing. It shows the SCCP routeing principle for mobile number portability within a network.

Note that call related messages in the IN-based solution are not routed to the MNP-SRF. Therefore Normative Annex A of the present document does not mention the MNP-SRF.
However, the usage of the IN-based solution for the call-related messages should allow operators to have the routeing of the non call-related messages determined in the same database. See [7] for the description of the access of the MNP-SRF (node with relay capability) to the NPDB (external database).

In order to guard against the possibility that the porting data for an MSISDN is inconsistent between PLMNs in a porting domain, the SCCP hop counter may be used to prevent indefinite looping of messages between PLMNs. The MNP-SRF would then decrement the SCCP hop counter for every message that is relayed. It should be noted that the use of the SCCP hop counter requires the use of non segmented SCCP XUDT messages as defined in ITU-T 1996 SCCP recommendations or in the ANSI T1.112-1996 SCCP recommendations for North America, reference [11].

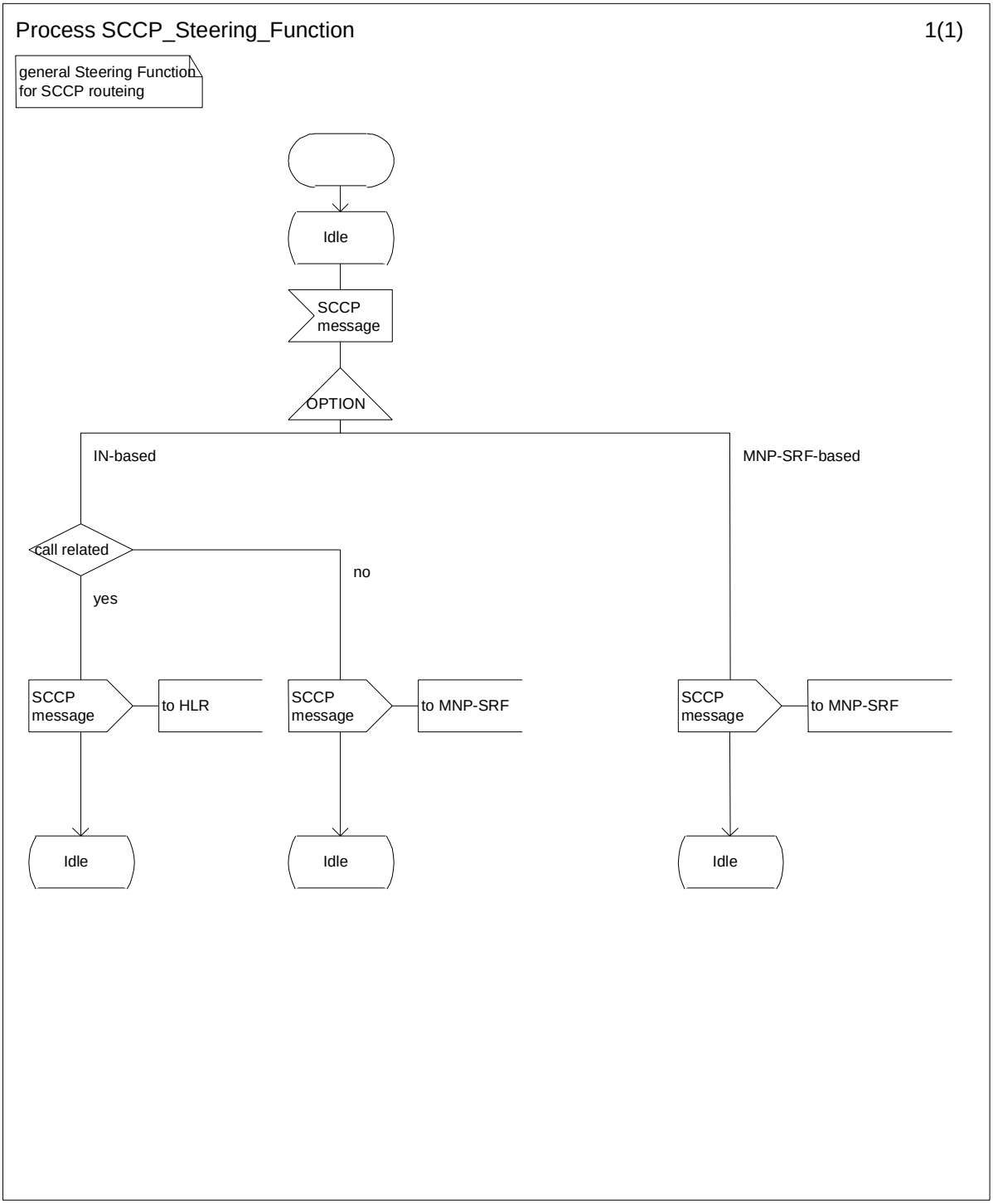


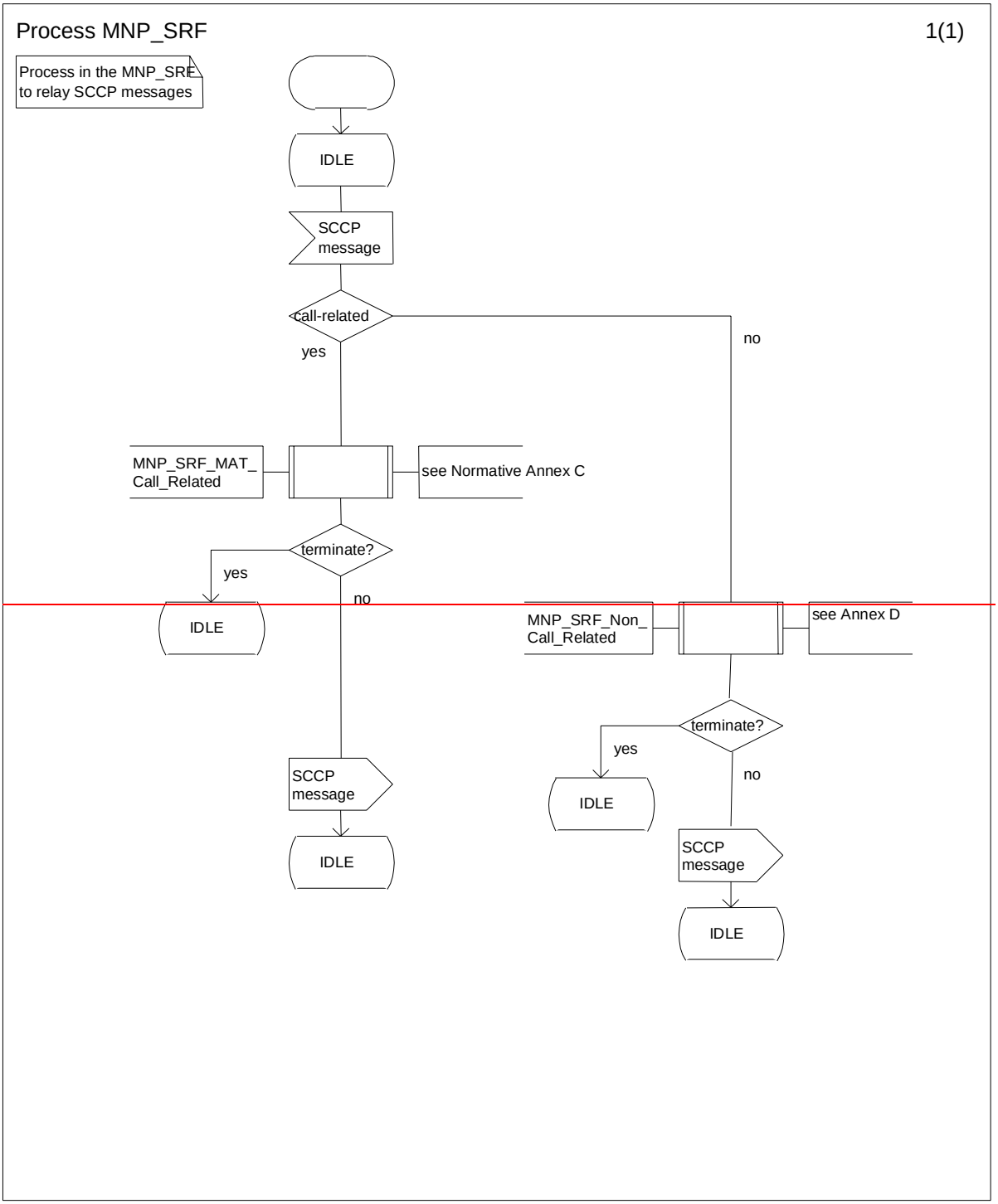
Figure 1: Steering Function for SCCP Message routeing

Figure 2 shows the process MNP_SRF in the MNP-SRF. The procedures MNP_SRF_MATF_Call_Related, ~~and~~ MNP_SRF_Non_Call_Related and MNP_SRF_MATF_Info_Request are described in Normative Annex C, ~~and~~ Normative Annex B and Normative Annex D of the present document. Note that in networks which support the IN-based solution for call related signalling, a distinction on SCCP level for call related and non-call related messages is needed and that the MNP-SRF does not require to include ~~a~~ MATF's since call related messages and MNP information request messages are not ~~routed to~~terminated at the MNP-SRF.

The test "info-request" is a test on the SCCP Translation Type if a dedicated Translation Type value for MNP information request messages is used in the network. The handling of SCCP messages in the MNP-SRF in networks

which do not make use of a dedicated Translation Type value for MNP information request messages is for further study.

The test "call-related" is a test on the SCCP Translation Type if a dedicated Translation Type value for call related messages is used in the network. The handling of SCCP messages in the MNP-SRF in networks which do not make use of a dedicated Translation Type value for call related messages is for further study.



~~Figure 2: Process MNP_SRF~~

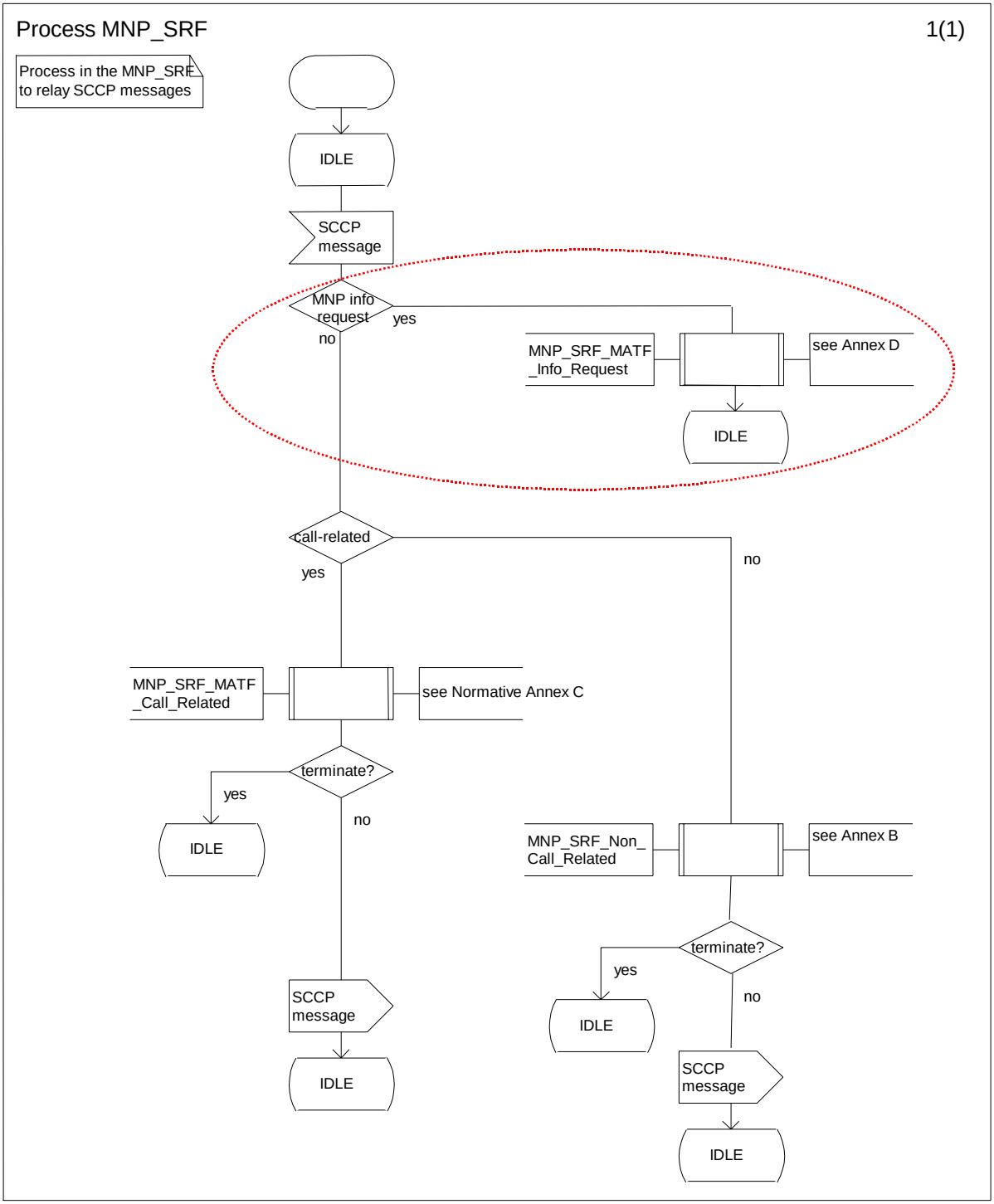


Figure 2: Process MNP_SRF

5 Common Architecture for call setup

Figure 3 shows the general architecture of a portability domain for routeing of calls. The more detailed architecture within the networks depends on the chosen solution (IN-based or MNP/SRF-based) and options and is described in Normative Annex A and Normative Annex C of the present document.

The architecture for non-call related signalling is described in Normative Annex B of the present document.

The architecture for MNP information request is described in Normative Annex D of the present document.

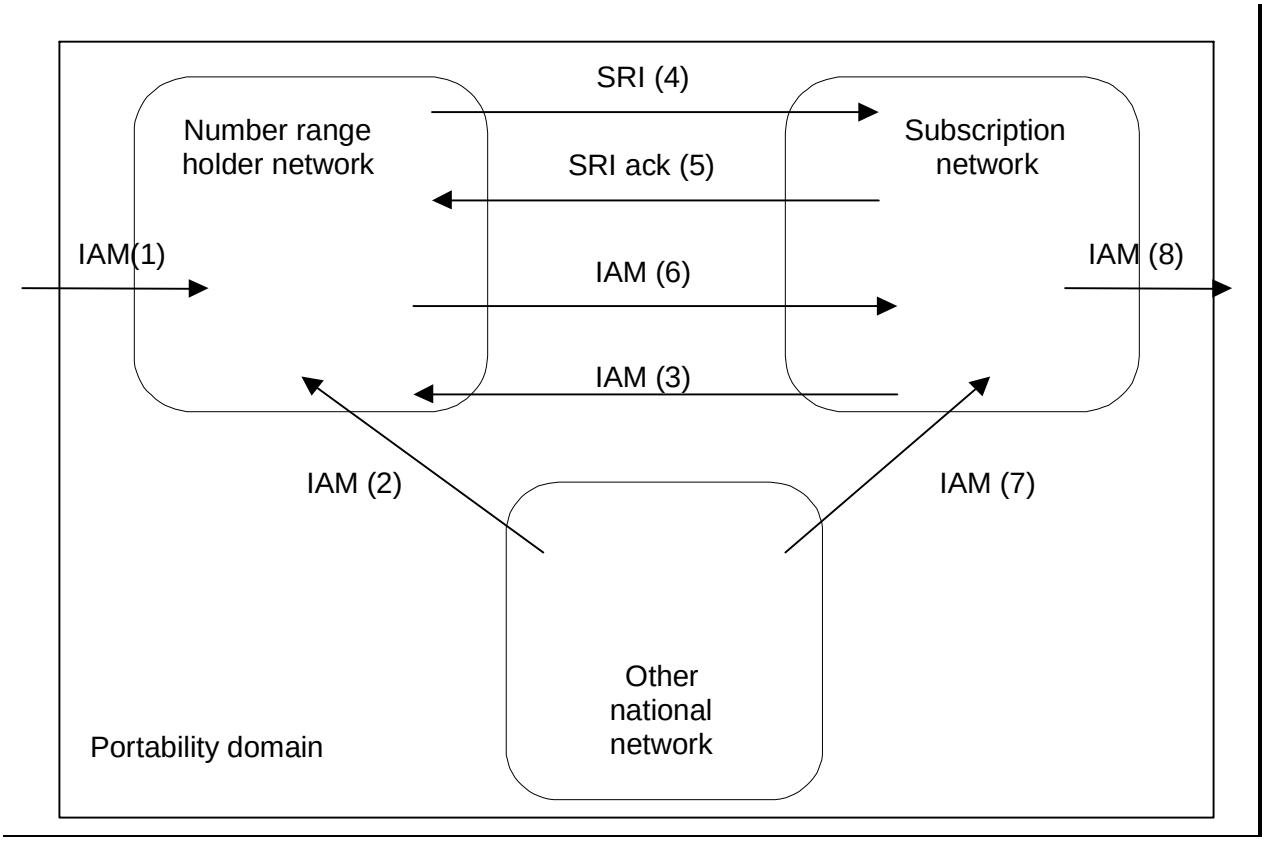


Figure 3: General architecture of a portability domain for routeing of calls

The following routeing conventions are identified:

1. Direct Routeing of calls is a PLMN option that allows to route calls directly from the PLMN supporting this option to the ported subscriber's subscription network.

2. Indirect Routeing of calls is a PLMN option which allows to route calls from the PLMN supporting this option via the number range holder network to the ported subscriber's subscription network.

3. Indirect Routeing of calls with reference to the subscription network is a PLMN option for PLMN operators having chosen the MNP-SRF solution for call related signalling described in Normative Annex C. If all PLMNs within a portability domain support this option, calls are routed from the originating network to the number range holder network. The number range holder network obtains onward routeing information from the subscription network and routes the call onward to the ported subscriber's subscription network.

The following action in the different networks can be identified:

1. If the call is originated outside the portability domain, the IAM (1) is received by the number range holder network.

2a. If the call is originated in another national network and the other national network does not support originating call query (i.e. Indirect Routeing of calls is applicable), the IAM (2) is received by the number range holder network.

2b. If the call is originated in another national network and the other national network supports originating call query (i.e. Direct Routeing of calls is applicable), the IAM (7) containing the routeing number is sent to the subscription network. If the routeing number is not used in the IAM sent from the national originating network to the subscription network, all transit networks involved are required to look up an NPDB in order to retrieve routeing information to route the call to the subscription network without looping.

3a. If the call is originated in the subscription network and the subscription network does not support originating call query (i.e. Indirect Routeing of calls is applicable), the IAM (3) is received by the number range holder network.

3b. If the call is originated in the subscription network and the subscription network supports originating call query (i.e. Direct Routeing of calls is applicable), it sends an IAM (8) containing the MSRN to the visited network of the called subscriber.

3c. If the subscription network receives IAM (6 or 7) containing the routeing number, it sends an IAM (8) containing the MSRN to the visited network of the called subscriber.

4a. If the call is routed via the number range holder network, and the number range holder network supports the MNP-SRF/MATF solution with the option 'MATF in subscription network' described in Normative Annex C of the present document (i.e. Indirect Routeing of calls with reference to the subscription network is applicable), the number range holder network sends SRI (4) to the subscription network. The subscription network returns SRI ack (5) containing the routeing number. The number range holder network then sends IAM (6) containing the routeing number to the subscription network. If the routeing number is not used in the IAM sent from the number range holder network to the subscription network, all transit networks involved are required to look up an NPDB in order to retrieve routeing information to route the call to the subscription network without looping.

4b. If the call is routed via the number range holder network, and the number range holder network supports the IN solution described in Normative Annex A of the present document or the MNP-SRF/MATF solution with the option 'MATF inside number range holder network' described in Normative Annex C of the present document, the number range holder network sends IAM (6) containing the routeing number to the subscription network.

Annex D (normative): Mobile Number Portability Information Request

MNP information can be requested by the gsmSCF to help determine the appropriate tariff to apply to a CAMEL pre-paid call or SM.

There are two solutions for MNP Information Request:

1. IN-based
2. MNP-SRF based

D.1 IN-based MNP Information Request

(See section A.1.4.3)

D.2 MNP-SRF-based MNP Information Request

D.2.1 Architecture

In a PLMN supporting MNP with direct routeing, where the called party number or the calling party number is within the ranges owned by any network in the portability domain, the INE sends a~~n~~ MNP Information request ~~ATI~~ such that it will be handled by the MNP-SRF in the network.

In a PLMN supporting MNP with indirect routeing, where the called party number or the calling party number is within the ranges owned by ~~the~~any network in the portability domain, the INE sends a MNP Information Request~~n ATI~~ such that it will be handled by the MNP-SRF in the Number Range Holder Network.

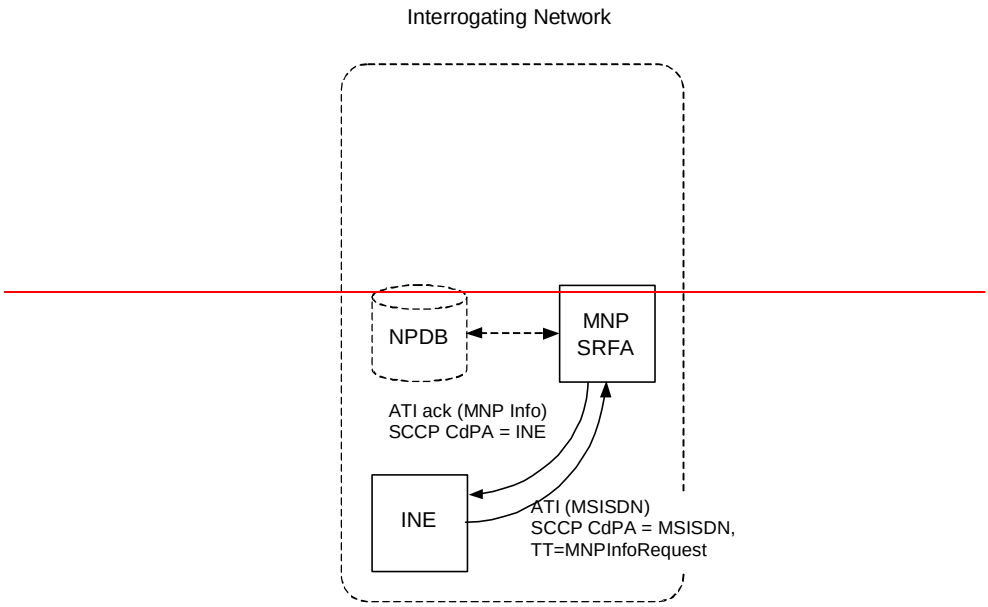
The MNP-SRF obtains the MNP information for a subscriber from the MNP database.

From the perspective of the PLMN in which the MNP-SRF resides, the CdPA represents one of:

1. An own number ported out.
2. An own number not ported out.
3. A foreign number ported in.
4. A foreign number ported to a foreign network.
5. A ~~foreign~~ number not known to be ported.

In all cases the MNP information request is sent to the MNP_SRF_MATF_Info_Request procedure/ MAP Application Termination Function (MATF) for handling. A response is sent to the INE containing MNP information or an error is returned.

D.2.1.1 Direct Routeing



~~Figure D.2.1.1: MNP-SRF operation for providing MNP Information where direct routeing applies~~

In a PLMN using a MNP-SRF based MNP solution supporting direct routeing, the INE always sends the MNP information request, containing the CdPA, to the MNP-SRF in that network.

The INE may query the MNP information for the called party number or the calling party number.

The INE requesting MNP information may be gsmSCF for prepaid services (see 3GPP TS 23.078 [18]).

Note: In order to provide enough information for a CAMEL SCP to correctly charge CAMEL Pre-Paid Calls and SMS to national MSISDNs originated in the HPLMN, operators should ensure that the NPDB contains, at least, MNP information for 'own numbers ported out' and 'foreign numbers ported in'.

D.2.1.2 Indirect Routeing

~~Figure D.2.1.2 shows the scenario for providing MNP information where indirect routeing is used (i.e., via the number range holder network).~~

The Interrogating Network Entity (INE) submits a~~n~~ MNP Information request ~~Any Time Interrogation (ATI)~~ message to the MNP-SRFB, which triggers MNP-SRF operation. The MNP-SRF functionality analyses the MSISDN in the application level and queries an MNP database to get the MNP information. The INE may query the MNP information for the called party number or the calling party number.

The INE requesting MNP information may be gsmSCF for prepaid services (see 3GPP TS 23.078 [18]).

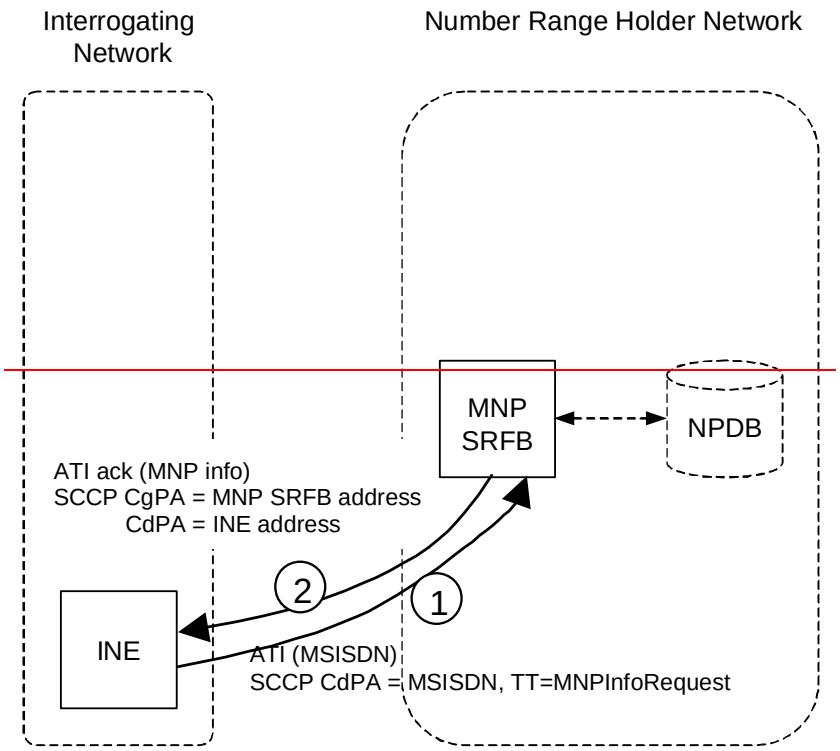


Figure D.2.1.2: MNP-SRF operation for Providing MNP information where indirect routeing isapplies

D.2.2 Signalling Scenarios (informative)

D2.2.1 CAMEL Pre-paid Originating Calls

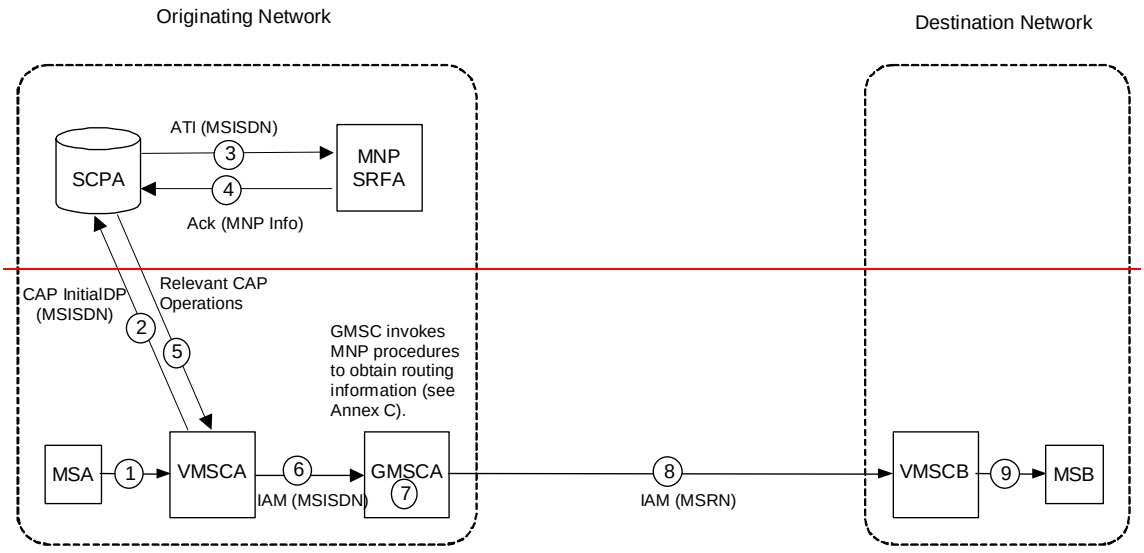


Figure D.2.2.1: SCF MNP Information Request for CAMEL Pre-Paid MO Call

MSA originates a call to a mobile subscriber.

VMSCA recognises MSA as a CAMEL subscriber, suspends call processing and contacts the SCP.

The SCP recognises MSA as a CAMEL pre-paid subscriber roaming in the HPLMN and the called party as a mobile subscriber in the same Portability Domain as the calling party. The SCP requests MNP Information for the called party (MSISDN) by submitting a MAP ATI to the MNP_SRFA. The TT on SCCP is set to 'info-request'.

When MNP_SRFA receives the message it analyses the MSISDN in the ATI as defined in the ATI_NPLR process. The MNP_SRFA responds to the SCP either with an ATI ack, containing MNP information parameters, or with a relevant error.

The SCP uses the response to ATI (ack or negative response) to determine charging parameters for the pre-paid call. CAMEL processing continues until the SCP instructs the VMSC to continue with call processing.

VMSCA continues call processing and routes the call to GMSCA.

GMSCA uses the called party's MSISDN to determine a routing number (see Annex C: Call-related Signalling)

GMSCA uses the MSRN to route the call to VMSCB.

VMSCB establishes a traffic channel to MSB.

Similar scenario's exist for CAMEL follow-on calls (e.g. after unsuccessful call establishment and call disconnection) and for CAMEL CSE-initiated calls.

D2.2.2 CAMEL Pre-paid MO-SMS

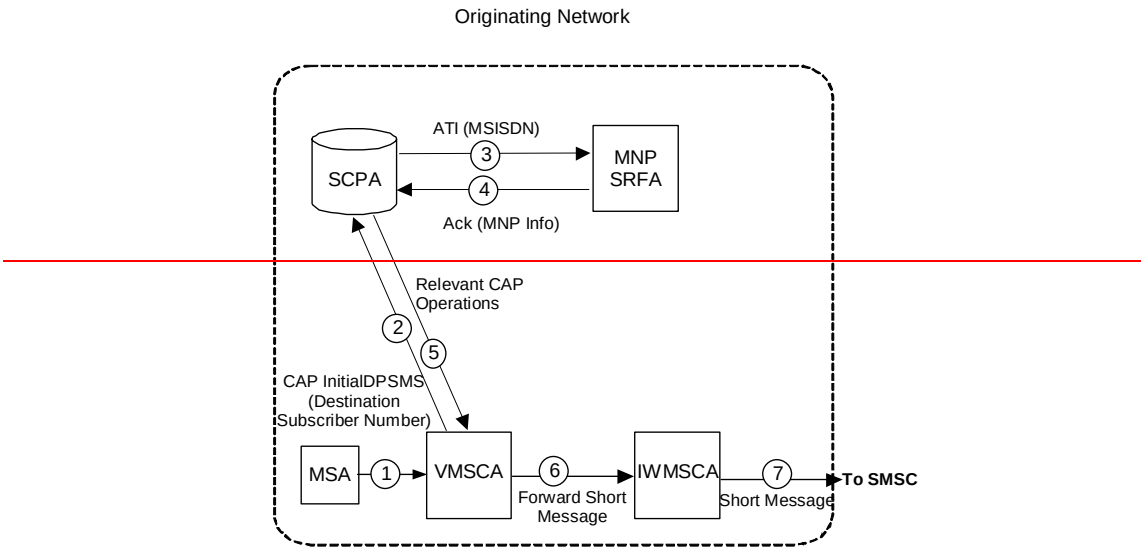


Figure D.2.2.1: SCF MNP Information Request for CAMEL Pre-Paid MO-SM

MSA originates a Short Message to a mobile subscriber.

VMSCA recognises MSA as a CAMEL subscriber, suspends call processing and contacts the SCP.

The SCP recognises MSA as a CAMEL pre-paid subscriber roaming in the HPLMN and the recipient for the SM as a mobile subscriber in the same Portability Domain as MSA. The SCP requests MNP Information for the recipient of the SM by submitting a MAP ATI to the MNP_SRFA. The TT on SCCP is set to 'info-request'.

When MNP_SRFA receives the message it analyses the MSISDN in the ATI as defined in the ATI_NPLR process. The MNP_SRFA responds to the SCP either with an ATI ack, containing MNP information parameters, or with a relevant error.

The SCP uses the response to ATI (ack or negative response) to determine charging parameters for the pre-paid Short Message. CAMEL processing continues until the SCP instructs the VMSC to continue with SM processing.

~~VMSCA forwards the short message to the IWMSCA.~~

~~IWMSCA sends the short message to the SMSC.~~

D.2.3 Functional Requirements of Network Entities

D.2.3.1 Procedure MNP_SRF_MATF_Info_Request

Figure D.2.3.1 shows the procedure MNP_SRF_MATF_Info_Request. This procedure handles an information request signalling message to provide MNP information for a subscriber. It is called from the process MNP_SRF (see clause 4.3).

D.2.3.2 Process ATI_NPLR

Figure D.2.3.2 shows the process ATI_NPLR.

The database query uses the MSISDN received at the application level in the ATI, rather then the CdPA of the SCCP level.

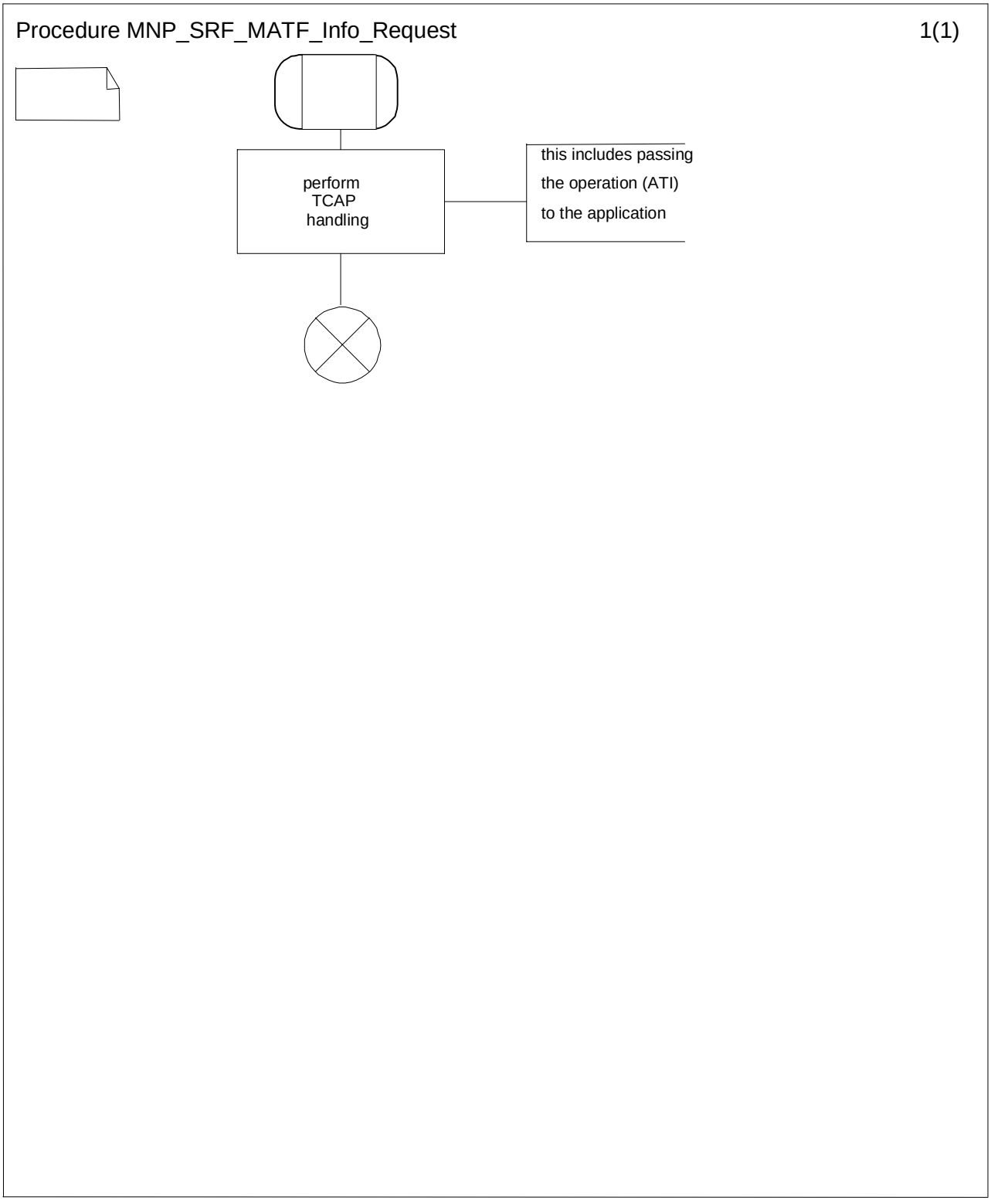


Figure D.2.3.1: Procedure MATF_Info_Request

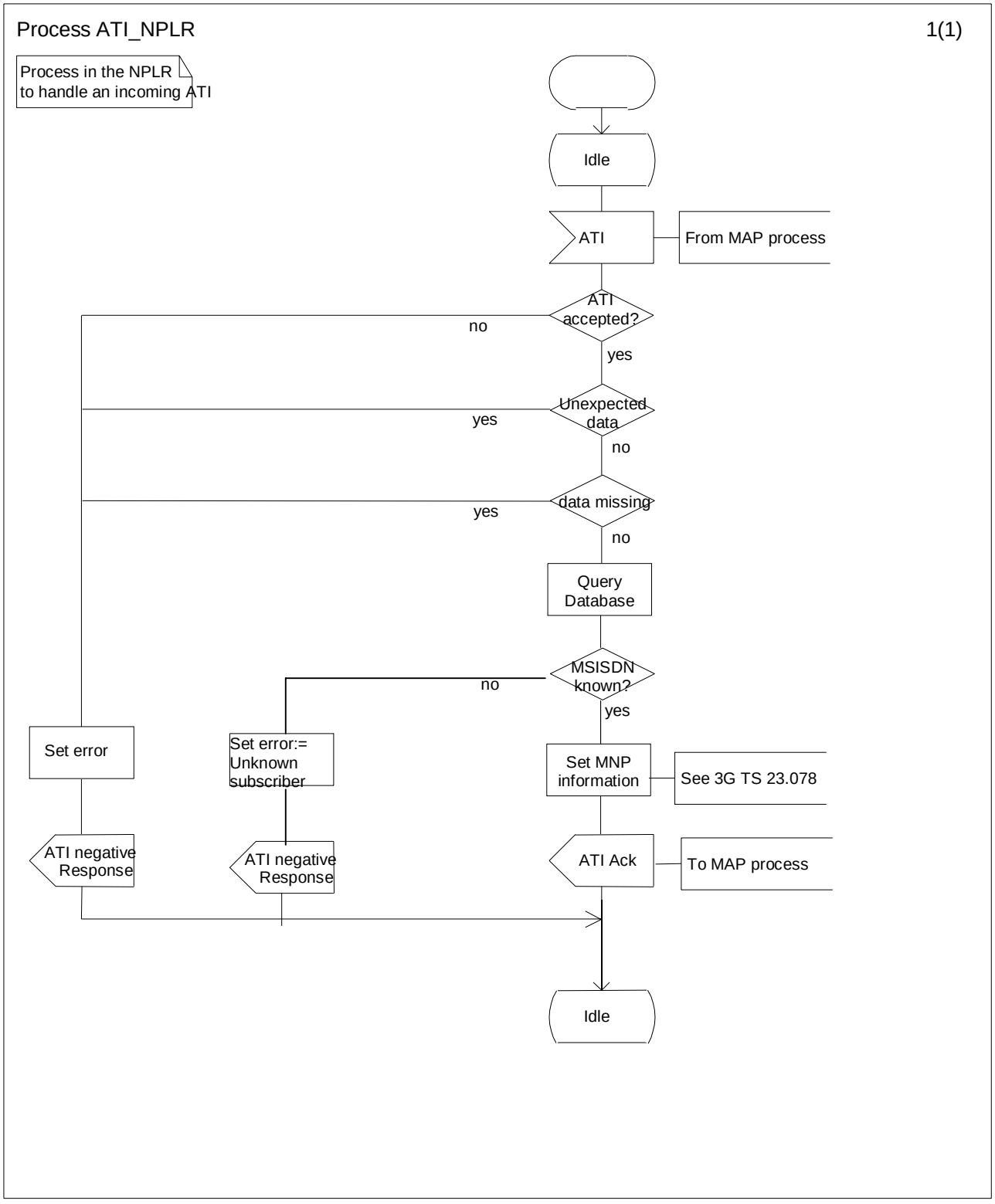


Figure D.2.3.2: Process ATI_NPLR

D.2.4 Contents of Messages

The~~is~~ contents of the messages ~~clause specifies the content of the following messages on~~ used on the SCF – MNP-SRF interface are specified in 3G TS 23.078 [19].~~:~~

Any Time Interrogation

Any Time Interrogation Ack

D.2.4.1 Any Time Interrogation

This message is specified in 3G TS 23.078 [18]. In the case that the message is sent from the gsmSCF to the MNP SRF the following information element is required:

Information element name	Required	Description
MNP Requested Info	M	The gsmSCF explicitly requests MNP information from the MNP SRF.

D.2.4.2 Any Time Interrogation Ack

This message is specified in 3G TS 23.078 [18]. In the case that the message is sent from the MNP SRF to the INE , the following information elements are defined:

Information element name	Required	Description
Routeing Number	C	The Routeing Number points to Subscription Network of Subscriber.
Imsi	C	The IMSI returned by MNP SRF is a generic IMSI, i.e. it is not tied necessarily to the Subscriber. MCC and MNC values in this IMSI shall point to the Subscription Network of the Subscriber.
Msisdn	C	MSISDN of the subscriber.
Number Portability Status	C	Indicates the number portability status of the subscriber. It shall be one of the following: NotKnownToBePorted; OwnNumberPortedOut; ForeignNumberPortedToForeignNetwork; OwnNumberNotPortedOut; ForeignNumberPortedIn.

Annex ~~D~~ E (informative): Change history

TSG CN#	Spec	Version	CR	<Phase>	New Version	Subject/Comment
#03	GSM 03.66	7.1.0				Transferred to 3GPP CN2
Aug 1999	23.066				3.0.0	
#05 Oct 1999	23.066	3.0.0	001		3.1.0	Harmonisation of terminology **interrogating**
#05 Oct 1999	23.066	3.0.0	002		3.1.0	Proposed changes to B.4.2 Delivery of SMS to a Non-ported Number - Direct Routeing – MNP-SRF acts as Higher-level Relay
#05 Oct 1999	23.066	3.0.0	003		3.1.0	Clarification of NPLR functionality in not known to be ported case
#07 Mar 2000	23.066	3.1.0	007r1	R99	3.2.0	Editorial cleanup
#07 Mar 2000	23.066	3.1.0	008r4	R99	3.2.0	Alignment of IN interface with Fixed Networks
#07 Mar 2000	23.066	3.1.0	009r3	R99	3.2.0	Detection of database synchronisation errors in SRF
#07 Mar 2000	23.066	3.1.0	012r2	R99	3.2.0	Result of Public Enquiry 9953
#07 Mar 2000	23.066	3.1.0	015r1	R99	3.2.0	Clarification of NPDB error detection and MNP specific call handling
#08 Jun 2000	23.066	3.2.0	019r2	R99	3.3.0	North American Service Provider Number Portability impacts for Mobile Number Portability
#11 Mar 2001	23.066	3.3.0		Rel-4	4.0.0	Release 4 after CN#11
#16 Mar 2002	23.066	4.0.0		Rel-4	4.0.1	References updated
#16 Jun 2002	23.066	4.0.1		Rel-5	5.0.0	Release 5 after CN#16
#20 Jun 2002	23.066	5.0.0	023r1	Rel-5	5.1.0	IN-based solution for correct charging of calls to ported or non-ported subscribers originated by pre-paid subscribers

3GPP TSG CN WG4 Meeting #20 **N4-031068**
Sophia Antipolis, France, 25th – 29th Aug 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **615** ⌘**rev** **3** ⌘ Current version: **5.6.2** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Incorrect Charging with MNP
Source:	⌘	CN4
Work item code:	⌘	NMP
Date:	⌘	29/08/2003
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change:	⌘	**Essential Correction** Operators normally apply different tariffs to calls established to their own subscribers and calls established towards subscribers belonging to another networks. In scenarios without MNP, the B number (called party) or the A number (calling party) indicates the network to which the subscriber belongs. In scenarios with MNP, the B number (called party) or the A number (calling party) doesn't indicate anymore the network to which the subscriber belongs. With the introduction of MNP, it is impossible for operators to calculate the proper rating based on the MSISDN identity for prepaid services as any subscriber number can be ported to another operator domain. This function is missing in the existing standards. It is highly needed to introduce a solution for prepaid services.
Summary of change:	⌘	Any Time Interrogation is modified in order to support providing MNP information.
Consequences if not approved:	⌘	Prepaid services can be charged incorrectly when MNP is introduced in the portability domain because the charge of A number or B number may vary depending on whether the B number or A number is ported or not.

Clauses affected:	⌘	7.6, 7.6.2.59, 7.6.3.92, 7.6.3.93, 8.11.1.1, 8.11.1.2, 17.2.2.31, 17.3.2.29, 17.7.1 and 17.7.3

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.078 23.066
			X	Test specifications		

	X	O&M Specifications
Other comments:	⌘	Refer to discussion paper N4-021466, presented and noted on CN4 #17 meeting, for background information on this issue.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

***** *First Modification* *****

7.6 Definition of parameters

Following is an alphabetic list of parameters used in the common MAP-services in clause 7.3:

Application context name	7.3.1	Refuse reason	7.3.1
Destination address	7.3.1	Release method	7.3.2
Destination reference	7.3.1	Responding address	7.3.1
Diagnostic information	7.3.4	Result	7.3.1
Originating address	7.3.1	Source	7.3.5
Originating reference	7.3.1	Specific information	7.3.1/7.3.2/7.3.4
Problem diagnostic	7.3.6	User reason	7.3.4
Provider reason	7.3.5		

Following is an alphabetic list of parameters contained in this clause:

Absent Subscriber Diagnostic SM	7.6.8.9	Location Information	7.6.2.30
Access connection status	7.6.9.3	Location Information for GPRS	7.6.2.30a
Access signalling information	7.6.9.5	Location update type	7.6.9.6
Additional Absent Subscriber Diagnostic SM	7.6.8.12	Long Forwarded-to Number	7.6.2.22A
Additional Location Estimate	7.6.11.21	Long FTN Supported	7.6.2.22B
Additional number	7.6.2.46	Lower Layer Compatibility	7.6.3.42
Additional signal info	7.6.9.10	LSA Information	7.6.3.56
Additional SM Delivery Outcome	7.6.8.11	LSA Information Withdraw	7.6.3.58
Age Indicator	7.6.3.72	MC Information	7.6.4.48
Alert Reason	7.6.8.8	MC Subscription Data	7.6.4.47
		MNP Info Result	7.6.3.94
		MNP Requested Info	7.6.3.93
Alert Reason Indicator	7.6.8.10	Mobile Not Reachable Reason	7.6.3.51
Alerting Pattern	7.6.3.44	Modification request for CSI	7.6.3.81
All GPRS Data	7.6.3.53	Modification request for SS Information	7.6.3.82
All Information Sent	7.6.1.5	More Messages To Send	7.6.8.7
AN-apdu	7.6.9.1	MS ISDN	7.6.2.17
APN	7.6.2.42	MSC number	7.6.2.11
Authentication set list	7.6.7.1	MSIsdn-Alert	7.6.2.29
B-subscriber Address	7.6.2.36	Multicall Bearer Information	7.6.2.52
B subscriber Number	7.6.2.48	Multiple Bearer Requested	7.6.2.53
B subscriber subaddress	7.6.2.49	Multiple Bearer Not Supported	7.6.2.54
Basic Service Group	7.6.4.40	MWD status	7.6.8.3
Bearer service	7.6.4.38	NbrUser	7.6.4.45
BSSMAP Service Handover	7.6.6.5	Network Access Mode	7.6.3.50
BSSMAP Service Handover List	7.6.6.5A	Network node number	7.6.2.43
Call Barring Data	7.6.3.83	Network resources	7.6.10.1
Call barring feature	7.6.4.19	Network signal information	7.6.9.8
Call barring information	7.6.4.18	New password	7.6.4.20
Call Direction	7.6.5.8	No reply condition timer	7.6.4.7
Call Forwarding Data	7.6.3.84	North American Equal Access preferred Carrier Id	7.6.2.34
Call Info	7.6.9.9	Number Portability Status	7.6.5.14
Call reference	7.6.5.1	ODB Data	7.6.3.85
Call Termination Indicator	7.6.3.67	ODB General Data	7.6.3.9
Called number	7.6.2.24	ODB HPLMN Specific Data	7.6.3.10
Calling number	7.6.2.25	OMC Id	7.6.2.18
CAMEL Subscription Info	7.6.3.78	Originally dialled number	7.6.2.26
CAMEL Subscription Info Withdraw	7.6.3.38	Originating entity number	7.6.2.10
Cancellation Type	7.6.3.52	Override Category	7.6.4.4
Category	7.6.3.1	P-TMSI	7.6.2.47
CCBS Feature	7.6.5.8	PDP-Address	7.6.2.45
CCBS Request State	7.6.4.49	PDP-Context identifier	7.6.3.55

Channel Type	7.6.5.9
Chosen Channel	7.6.5.10
Chosen Radio Resource Information	7.6.6.10B
Ciphering mode	7.6.7.7
Cksn	7.6.7.5
CLI Restriction	7.6.4.5
CM service type	7.6.9.2
Complete Data List Included	7.6.3.54
CS Allocation Retention priority	7.6.3.87
CS LCS Not Supported by UE	7.6.11.9
CUG feature	7.6.3.26
CUG index	7.6.3.25
CUG info	7.6.3.22
CUG interlock	7.6.3.24
CUG Outgoing Access indicator	7.6.3.8
CUG subscription	7.6.3.23
CUG Subscription Flag	7.6.3.37
Current location area Id	7.6.2.6
Current password	7.6.4.21
Deferred MT-LR Data	7.6.11.3
Deferred MT-LR Response Indicator	7.6.11.2
eMLPP Information	7.6.4.41
Encryption Information	7.6.6.9
Equipment status	7.6.3.2
Extensible Basic Service Group	7.6.3.5
Extensible Bearer service	7.6.3.3
Extensible Call barring feature	7.6.3.21
Extensible Call barring information	7.6.3.20
Extensible Call barring information for CSE	7.6.3.79
Extensible Forwarding feature	7.6.3.16
Extensible Forwarding info	7.6.3.15
Extensible Forwarding information for CSE	7.6.3.80
Extensible Forwarding Options	7.6.3.18
Extensible No reply condition timer	7.6.3.19
Extensible QoS-Subscribed	7.6.3.74
Extensible SS-Data	7.6.3.29
Extensible SS-Info	7.6.3.14
Extensible SS-Status	7.6.3.17
Extensible Teleservice	7.6.3.4
External Signal Information	7.6.9.4
Failure Cause	7.6.7.9
Forwarded-to number	7.6.2.22
Forwarded-to subaddress	7.6.2.23
Forwarding feature	7.6.4.16
Forwarding information	7.6.4.15
Forwarding Options	7.6.4.6
GERAN Classmark	7.6.6.4
GGSN address	7.6.2.40
GGSN number	7.6.2.41
GMSC CAMEL Subscription Info	7.6.3.34
GPRS enhancements support indicator	7.6.3.73
GPRS Node Indicator	7.6.8.14
GPRS Subscription Data	7.6.3.46
GPRS Subscription Data Withdraw	7.6.3.45
GPRS Support Indicator	7.6.8.15
Group Id	7.6.2.33
GSM bearer capability	7.6.3.6
gsmSCF Address	7.6.2.58
gsmSCF Initiated Call	7.6.3.c
PDP-Type	7.6.2.44
Positioning Data	7.6.11.11A
Pre-paging supported	7.6.5.15
Previous location area Id	7.6.2.4
Protocol Id	7.6.9.7
Provider error	7.6.1.3
PS LCS Not Supported by UE	7.6.11.10
QoS-Subscribed	7.6.3.47
Radio Resource Information	7.6.6.10
Radio Resource List	7.6.6.10A
RANAP Service Handover	7.6.6.6
Rand	7.6.7.2
LCS-Reference Number	7.6.11.23
Regional Subscription Data	7.6.3.11
Regional Subscription Response	7.6.3.12
Relocation Number List	7.6.2.19A
Requested Info	7.6.3.31
Requested Subscription Info	7.6.3.86
Roaming number	7.6.2.19
Roaming Restricted In SGSN Due To Unsupported Feature	7.6.3.49
Roaming Restriction Due To Unsupported Feature	7.6.3.13
Routeing Number	7.6.2.63
Current Security Context	7.6.7.8
Selected RAB ID	7.6.2.56
Service centre address	7.6.2.27
Serving Cell Id	7.6.2.37
SGSN address	7.6.2.39
SGSN CAMEL Subscription Info	7.6.3.75
SGSN number	7.6.2.38
SIWF Number	7.6.2.35
SoLSA Support Indicator	7.6.3.57
SM Delivery Outcome	7.6.8.6
SM-RP-DA	7.6.8.1
SM-RP-MTI	7.6.8.16
SM-RP-OA	7.6.8.2
SM-RP-PRI	7.6.8.5
SM-RP-SMEA	7.6.8.17
SM-RP-UI	7.6.8.4
Sres	7.6.7.3
SS-Code	7.6.4.1
SS-Data	7.6.4.3
SS-Event	7.6.4.42
SS-Event-Data	7.6.4.43
SS-Info	7.6.4.24
SS-Status	7.6.4.2
Stored location area Id	7.6.2.5
Subscriber State	7.6.3.30
Subscriber Status	7.6.3.7
Super-Charger Supported in HLR	7.6.3.70
Super-Charger Supported in Serving Network Entity	7.6.3.71
Offered Camel4 CSIs	7.6.3.36D
Offered Camel4 CSIs in interrogating node	7.6.3.36E
Offered Camel4 CSIs in VMSC	7.6.3.36F
Offered Camel4 CSIs in VLR	7.6.3.36B
Offered Camel4 CSIs in SGSN	7.6.3.36C
Offered Camel4 Functionalities	7.6.3.36G
Supported CAMEL Phases	7.6.3.36H
Supported CAMEL Phases in VLR	7.6.3.36
Supported CAMEL Phases in SGSN	7.6.3.36A
Supported CAMEL Phases in interrogating node	7.6.3.36I
Supported GAD Shapes	7.6.11.20
Supported LCS Capability Sets	7.6.11.17

Guidance information	7.6.4.22	Suppress Incoming Call Barring	7.6.3.b
Handover number	7.6.2.21	Suppress T-CSI	7.6.3.33
High Layer Compatibility	7.6.3.43	Suppress VT-CSI	7.6.3.a
HLR Id	7.6.2.15	Suppression of Announcement	7.6.3.32
HLR number	7.6.2.13	Target cell Id	7.6.2.8
HO-Number Not Required	7.6.6.7	Target location area Id	7.6.2.7
IMEI	7.6.2.3	Target RNC Id	7.6.2.8A
IMSI	7.6.2.1	Target MSC number	7.6.2.12
Integrity Protection Information	7.6.6.8	Teleservice	7.6.4.39
Inter CUG options	7.6.3.27	TMSI	7.6.2.2
Intra CUG restrictions	7.6.3.28	Trace reference	7.6.10.2
Invoke Id	7.6.1.1	Trace type	7.6.10.3
		UESBI	7.6.6.20
ISDN Bearer Capability	7.6.3.41	User error	7.6.1.4
IST Alert Timer	7.6.3.66	USSD Data Coding Scheme	7.6.4.36
IST Information Withdrawn	7.6.3.68	USSD String	7.6.4.37
IST Support Indicator	7.6.3.69	UU Data	7.6.5.12
LCS Codeword	7.6.11.18	UUS CF Interaction	7.6.5.13
LCS Information	7.6.3.60	VBS Data	7.6.3.40
LCS Service Type Id	7.6.11.15	VGCS Data	7.6.3.39
Kc	7.6.7.4	VLR CAMEL Subscription Info	7.6.3.35
Linked Id	7.6.1.2	VLR number	7.6.2.14
LMSI	7.6.2.16	VPLMN address allowed	7.6.3.48
		Zone Code	7.6.2.28

***** *Next Modification* *****

7.6.2.57 RAB ID

This parameter indicates the radio access bearer identifier as defined in 3GPP TS 25.413. This parameter is used to relate the radio resources with the radio access bearers.

7.6.2.58 gsmSCF Address

This parameter refers to the ISDN number assigned to the gsmSCF address. In an IP Multimedia Core Network, the gsmSCF-address shall contain the IM-SSF address when the IM-SSF takes the role of the gsmSCF.

7.6.2.59 V-GMLC Address

This parameter refers to the IP address of a V-GMLC.

7.6.2.60 V-GMLC Address

This parameter refers to the IP address of a V-GMLC.

7.6.2.61 H-GMLC Address

This parameter refers to the IP address of a H-GMLC.

7.6.2.62 PPR Address

This parameter refers to the IP address of a Privacy Profile Register.

7.6.2.63 Routeing Number

This parameter refers to a number used for routeing purpose and identifying a network operator. See 3GPP TS 23.066 [108].

***** *Next Modification* *****

7.6.3.90 Suppress Incoming Call Barring

This parameter is used to suppress the invocation of Incoming Call Barrings.

7.6.3.91 gsmSCF Initiated Call

This parameter is used to indicate that the call was initiated by the gsmSCF.

7.6.3.92 MNP Requested Info

This parameter indicates that Mobile Number Portability (MNP) information are requested for the subscriber, as defined in 3GPP TS 23.078 [98].

7.6.3.93 MNP Info Result

This parameter refers to the Mobile Number Portability (MNP) information result (see 3GPP TS 23.078 [98] and 3GPP TS 23.066 [108]). This parameter contains the following information:

- Routeing Number (see clause 7.6.2.59).
- IMSI (see 3GPP TS 23.078[98], see also clause 7.6.2.1).
- MSISDN (see clause 7.6.2.17).
- Number Portability Status (see clause 7.6.5.14).

***** *Next Modification* *****

8.11 Subscriber Information services

8.11.1 MAP-ANY-TIME-INTERROGATION service

8.11.1.1 Definition

This service is used by the gsmSCF, to request information (e.g. subscriber state and location) from the HLR or the GMLC at any time. This service is used by the gsmSCF to request the Mobile Number Portability (MNP) information from MNP Signalling Relay Function (MNP SRF) at any time whenever the Mobile Number Portability applies in the country.

When this service is used to the HLR, the subscriber state or location may be requested.

When this service is used to the GMLC, only the location may be requested.

When this service is used to the MNP SRF, only the MNP information may be requested.

The MAP-ANY-TIME-INTERROGATION service is a confirmed service using the service primitives defined in table 8.11/1.

8.11.1.2 Service primitives

Table 8.11/1: Any_Time_Interrogation

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
Requested Info	M	M(=)		
Requested domain	C	C(=)		
MNP Requested Info	C	C(=)		
gsmSCF-Address	M	M(=)		
IMSI	C	C(=)	C	C(=)
MSISDN	C	C(=)	C	C(=)
Location Information			C	C(=)
Location Information for GPRS			C	C(=)
Subscriber State			C	C(=)
PS Subscriber State			C	C(=)
IMEI			C	C(=)
MS Classmark 2			C	C(=)
GPRS MS Class			C	C(=)
MNP info Result			C	C(=)
User error			C	C(=)
Provider error				O

8.11.1.3 Parameter definition and use

All parameters are described in clause 7.6. The use of these parameters and the requirements for their presence are specified in 3GPP TS 23.018 [97] and 3GPP TS 23.078 [98].

The HLR or GMLC may be able to use the value of the parameter gsmSCF-address to screen a MAP_Any_Time_Interrogation indication.

The use of the parameters and the requirements for their presence are specified in 3GPP TS 23.078.

User error

This parameter is sent by the responder when an error is detected and if present, takes one of the following values:

- System Failure;
- Any Time Interrogation Not Allowed;
- Data Missing;
- Unexpected Data Value;
- Unknown Subscriber.

Provider error

These are defined in clause 7.6.1.

*** Next Modification ***

17.2.2.31 Any time information enquiry

This operation package includes the operations required for any time information enquiry procedures between gsmSCF and HLR or between gsmSCF and GMLC or between gsmSCF and MNP SRF.

```
anyTimeInformationEnquiryPackage-v3  OPERATION-PACKAGE ::= {
    -- Supplier is HLR or GMLC or MNP SRF if Consumer is gsmSCF
    CONSUMER INVOKES {
        anyTimeInterrogation} }
```

This package is v3 only.

*** Next Modification ***

17.3.2.29 Any time information enquiry

This application context is used between gsmSCF and HLR or between gsmSCF and GMLC or between gsmSCF and MNP SRF for any time information enquiry procedures.

```
anyTimeInfoEnquiryContext-v3 APPLICATION-CONTEXT ::= {
     -- Responder is HLR or GMLC or MNP SRF if Initiator is gsmSCF
     INITIATOR CONSUMER OF {
          anyTimeInformationEnquiryPackage-v3}
     ID   {map-ac anyTimeInfoEnquiry(29) version3(3)} }
```

This application-context is v3 only.

****** Next Modification ******

17.7 MAP constants and data types

17.7.1 Mobile Service data types

```
*** previous text unchanged ****
*******************************

-- provide subscriber info types
   GeographicalInformation,
   MS-Classmark2,
   GPRSMSClass,

   -- subscriber information enquiry types
   ProvideSubscriberInfoArg,
   ProvideSubscriberInfoRes,
   SubscriberInfo,
   LocationInformation,
   LocationInformationGPRS,
   RAIdentity,
   SubscriberState,
   GPRSChargingID,
   MNPRequestedInfo,
   MNPInfoRes,
   RouteingNumber,
```

****** Next Modification ******

```
SubscriberInfo ::= SEQUENCE {
     locationInformation                [0] LocationInformation          OPTIONAL,
     subscriberState                    [1] SubscriberState              OPTIONAL,
     extensionContainer                 [2] ExtensionContainer           OPTIONAL,
     ... ,
     locationInformationGPRS            [3] LocationInformationGPRS      OPTIONAL,
     ps-SubscriberState                 [4] PS-SubscriberState           OPTIONAL,
     imei                               [5] IMEI                         OPTIONAL,
     ms-Classmark2                      [6] MS-Classmark2                OPTIONAL,
     gprs-MS-Class                      [7] GPRSMSClass                  OPTIONAL,
     mnpInfoRes                         [8] MNPInfoRes                   OPTIONAL,
     }

--   If the HLR receives locationInformation, subscriberState or ms-Classmark2 from an SGSN
--   it shall discard them.
--   If the HLR receives locationInformationGPRS, ps-SubscriberState or gprs-MS-Class from
--   a VLR it shall discard them.
--   If the HLR receives parameters which it has not requested, it shall discard them.
```

```
MNPInfoRes ::= SEQUENCE {
     routeingNumber                     [0] RouteingNumber               OPTIONAL,
     imsi                               [1] IMSI                         OPTIONAL,
     msisdn                             [2] MSISDN                       OPTIONAL,
     numberPortabilityStatus            [3] NumberPortabilityStatus      OPTIONAL,
     extensionContainer                 [4] ExtensionContainer           OPTIONAL,
     ... }

--   The IMSI parameter contains a generic IMSI, i.e. it is not tied necessarily to the
--   Subscriber. MCC and MNC values in this IMSI shall point to the Subscription Network of
--   the B or A Subscriber. See 3GPP TS 23.066 [108].
```

```
RouteingNumber ::= TBCD-STRING (SIZE (1..5))
```

```
MS-Classmark2 ::= OCTET STRING (SIZE (3))
     -- This parameter carries the value part of the MS Classmark 2 IE defined in
     -- 3GPP TS 24.008 [35].
```

```
GPRSMSClass ::= SEQUENCE {
     mSNetworkCapability                [0] MSNetworkCapability,
     mSRadioAccessCapability            [1] MSRadioAccessCapability      OPTIONAL
     }
```

```
MSNetworkCapability ::= OCTET STRING (SIZE (1..8))
     -- This parameter carries the value part of the MS Network Capability IE defined in
     -- 3GPP TS 24.008 [35].
```

```
MSRadioAccessCapability ::= OCTET STRING (SIZE (1..50))
     -- This parameter carries the value part of the MS Radio Access Capability IE defined in
     -- 3GPP TS 24.008 [35].
```

```
RequestedInfo ::= SEQUENCE {
     locationInformation                [0] NULL                         OPTIONAL,
     subscriberState                    [1] NULL                         OPTIONAL,
     extensionContainer                 [2] ExtensionContainer           OPTIONAL,
     ...,
     currentLocation                    [3] NULL                         OPTIONAL,
     requestedDomain                    [4] DomainType                   OPTIONAL,
     imei                               [6] NULL                         OPTIONAL,
     ms-classmark                       [5] NULL                         OPTIONAL,
     mnpRequestedInfo                   [7] NULL                         OPTIONAL }

--   currentLocation shall be absent if locationInformation is absent
```

17.7.3 Call handling data type

***** *Next Modification* *****

```
NumberPortabilityStatus ::= ENUMERATED {
     notKnownToBePorted                  (0),
     ownNumberPortedOut                  (1),
     foreignNumberPortedToForeignNetwork (2),
     ...,
     ownNumberNotPortedOut               (4),
     foreignNumberPortedIn               (5)
     }
     --   exception handling:
     --  reception of other values than the ones listed the receiver shall ignore the
     --  whole NumberPortabilityStatus;
     --  ownNumberNotPortedOut or foreignNumberPortedIn may only be included in Any Time
         Interrogation message.
```

***** *End of Document* *****

3GPP TSG CN WG4 Meeting #20 **N4-031069**
Sophia Antipolis, France, 25th – 29th Aug 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **616** ⌘ **rev** **3** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Incorrect Charging with MNP
Source:	⌘	CN4
Work item code:	⌘	CAMEL4
Date:	⌘	29/08/2003
Category:	⌘	**A**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change:	⌘	Essential Correction Operators normally apply different tariffs to calls established to their own subscribers and calls established towards subscribers belonging to another networks. In scenarios without MNP, the B number (called party) or the A number (calling party) indicates the network to which the subscriber belongs. In scenarios with MNP, the B number (called party) or the A number (calling party) doesn't indicate anymore the network to which the subscriber belongs. With the introduction of MNP, it is impossible for operators to calculate the proper rating based on the MSISDN identity for prepaid services as any subscriber number can be ported to another operator domain. This function is missing in the existing standards. It is highly needed to introduce a solution for prepaid services.
Summary of change:	⌘	Any Time Interrogation is modified in order to support providing MNP information.
Consequences if not approved:	⌘	Prepaid services can be charged incorrectly when MNP is introduced in the portability domain because the charge of A number or B number may vary depending on whether the B number or A number is ported or not.

Clauses affected:	⌘	7.6, 7.6.2.59, 7.6.3.92, 7.6.3.93, 8.11.1.1, 8.11.1.2, 17.2.2.31, 17.3.2.29, 17.7.1 and 17.7.3

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.078 23.066
			X	Test specifications		

	X	O&M Specifications
Other comments:	⌘	Refer to discussion paper N4-021466, presented and noted on CN4 #17 meeting, for background information on this issue.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

***** *First Modification* *****

7.6 Definition of parameters

Following is an alphabetic list of parameters used in the common MAP-services in clause 7.3:

Application context name	7.3.1	Refuse reason	7.3.1
Destination address	7.3.1	Release method	7.3.2
Destination reference	7.3.1	Responding address	7.3.1
Diagnostic information	7.3.4	Result	7.3.1
Originating address	7.3.1	Source	7.3.5
Originating reference	7.3.1	Specific information	7.3.1/7.3.2/7.3.4
Problem diagnostic	7.3.6	User reason	7.3.4
Provider reason	7.3.5		

Following is an alphabetic list of parameters contained in this clause:

Absent Subscriber Diagnostic SM	7.6.8.9	Location Information	7.6.2.30
Access connection status	7.6.9.3	Location Information for GPRS	7.6.2.30a
Access signalling information	7.6.9.5	Location update type	7.6.9.6
Additional Absent Subscriber Diagnostic SM	7.6.8.12	Long Forwarded-to Number	7.6.2.22A
Additional Location Estimate	7.6.11.21	Long FTN Supported	7.6.2.22B
Additional number	7.6.2.46	Lower Layer Compatibility	7.6.3.42
Additional signal info	7.6.9.10	LSA Information	7.6.3.56
Additional SM Delivery Outcome	7.6.8.11	LSA Information Withdraw	7.6.3.58
Age Indicator	7.6.3.72	MC Information	7.6.4.48
Alert Reason	7.6.8.8	MC Subscription Data	7.6.4.47
		MNP Info Result	7.6.3.94
		MNP Requested Info	7.6.3.93
Alert Reason Indicator	7.6.8.10	Mobile Not Reachable Reason	7.6.3.51
Alerting Pattern	7.6.3.44	Modification request for CSI	7.6.3.81
All GPRS Data	7.6.3.53	Modification request for SS Information	7.6.3.82
All Information Sent	7.6.1.5	More Messages To Send	7.6.8.7
AN-apdu	7.6.9.1	MS ISDN	7.6.2.17
APN	7.6.2.42	MSC number	7.6.2.11
Authentication set list	7.6.7.1	MSIsdn-Alert	7.6.2.29
B-subscriber Address	7.6.2.36	Multicall Bearer Information	7.6.2.52
B subscriber Number	7.6.2.48	Multiple Bearer Requested	7.6.2.53
B subscriber subaddress	7.6.2.49	Multiple Bearer Not Supported	7.6.2.54
Basic Service Group	7.6.4.40	MWD status	7.6.8.3
Bearer service	7.6.4.38	NbrUser	7.6.4.45
BSSMAP Service Handover	7.6.6.5	Network Access Mode	7.6.3.50
BSSMAP Service Handover List	7.6.6.5A	Network node number	7.6.2.43
Call Barring Data	7.6.3.83	Network resources	7.6.10.1
Call barring feature	7.6.4.19	Network signal information	7.6.9.8
Call barring information	7.6.4.18	New password	7.6.4.20
Call Direction	7.6.5.8	No reply condition timer	7.6.4.7
Call Forwarding Data	7.6.3.84	North American Equal Access preferred Carrier Id	7.6.2.34
Call Info	7.6.9.9	Number Portability Status	7.6.5.14
Call reference	7.6.5.1	ODB Data	7.6.3.85
Call Termination Indicator	7.6.3.67	ODB General Data	7.6.3.9
Called number	7.6.2.24	ODB HPLMN Specific Data	7.6.3.10
Calling number	7.6.2.25	OMC Id	7.6.2.18
CAMEL Subscription Info	7.6.3.78	Originally dialled number	7.6.2.26
CAMEL Subscription Info Withdraw	7.6.3.38	Originating entity number	7.6.2.10
Cancellation Type	7.6.3.52	Override Category	7.6.4.4
Category	7.6.3.1	P-TMSI	7.6.2.47
CCBS Feature	7.6.5.8	PDP-Address	7.6.2.45
CCBS Request State	7.6.4.49	PDP-Context identifier	7.6.3.55

Channel Type	7.6.5.9
Chosen Channel	7.6.5.10
Chosen Radio Resource Information	7.6.6.10B
Ciphering mode	7.6.7.7
Cksn	7.6.7.5
CLI Restriction	7.6.4.5
CM service type	7.6.9.2
Complete Data List Included	7.6.3.54
CS Allocation Retention priority	7.6.3.87
CS LCS Not Supported by UE	7.6.11.9
CUG feature	7.6.3.26
CUG index	7.6.3.25
CUG info	7.6.3.22
CUG interlock	7.6.3.24
CUG Outgoing Access indicator	7.6.3.8
CUG subscription	7.6.3.23
CUG Subscription Flag	7.6.3.37
Current location area Id	7.6.2.6
Current password	7.6.4.21
Deferred MT-LR Data	7.6.11.3
Deferred MT-LR Response Indicator	7.6.11.2
eMLPP Information	7.6.4.41
Encryption Information	7.6.6.9
Equipment status	7.6.3.2
Extensible Basic Service Group	7.6.3.5
Extensible Bearer service	7.6.3.3
Extensible Call barring feature	7.6.3.21
Extensible Call barring information	7.6.3.20
Extensible Call barring information for CSE	7.6.3.79
Extensible Forwarding feature	7.6.3.16
Extensible Forwarding info	7.6.3.15
Extensible Forwarding information for CSE	7.6.3.80
Extensible Forwarding Options	7.6.3.18
Extensible No reply condition timer	7.6.3.19
Extensible QoS-Subscribed	7.6.3.74
Extensible SS-Data	7.6.3.29
Extensible SS-Info	7.6.3.14
Extensible SS-Status	7.6.3.17
Extensible Teleservice	7.6.3.4
External Signal Information	7.6.9.4
Failure Cause	7.6.7.9
Forwarded-to number	7.6.2.22
Forwarded-to subaddress	7.6.2.23
Forwarding feature	7.6.4.16
Forwarding information	7.6.4.15
Forwarding Options	7.6.4.6
GERAN Classmark	7.6.6.4
GGSN address	7.6.2.40
GGSN number	7.6.2.41
GMSC CAMEL Subscription Info	7.6.3.34
GPRS enhancements support indicator	7.6.3.73
GPRS Node Indicator	7.6.8.14
GPRS Subscription Data	7.6.3.46
GPRS Subscription Data Withdraw	7.6.3.45
GPRS Support Indicator	7.6.8.15
Group Id	7.6.2.33
GSM bearer capability	7.6.3.6
gsmSCF Address	7.6.2.58
gsmSCF Initiated Call	7.6.3.c
PDP-Type	7.6.2.44
Positioning Data	7.6.11.11A
Pre-paging supported	7.6.5.15
Previous location area Id	7.6.2.4
Protocol Id	7.6.9.7
Provider error	7.6.1.3
PS LCS Not Supported by UE	7.6.11.10
QoS-Subscribed	7.6.3.47
Radio Resource Information	7.6.6.10
Radio Resource List	7.6.6.10A
RANAP Service Handover	7.6.6.6
Rand	7.6.7.2
LCS-Reference Number	7.6.11.23
Regional Subscription Data	7.6.3.11
Regional Subscription Response	7.6.3.12
Relocation Number List	7.6.2.19A
Requested Info	7.6.3.31
Requested Subscription Info	7.6.3.86
Roaming number	7.6.2.19
Roaming Restricted In SGSN Due To Unsupported Feature	7.6.3.49
Roaming Restriction Due To Unsupported Feature	7.6.3.13
Routeing Number	7.6.2.63
Current Security Context	7.6.7.8
Selected RAB ID	7.6.2.56
Service centre address	7.6.2.27
Serving Cell Id	7.6.2.37
SGSN address	7.6.2.39
SGSN CAMEL Subscription Info	7.6.3.75
SGSN number	7.6.2.38
SIWF Number	7.6.2.35
SoLSA Support Indicator	7.6.3.57
SM Delivery Outcome	7.6.8.6
SM-RP-DA	7.6.8.1
SM-RP-MTI	7.6.8.16
SM-RP-OA	7.6.8.2
SM-RP-PRI	7.6.8.5
SM-RP-SMEA	7.6.8.17
SM-RP-UI	7.6.8.4
Sres	7.6.7.3
SS-Code	7.6.4.1
SS-Data	7.6.4.3
SS-Event	7.6.4.42
SS-Event-Data	7.6.4.43
SS-Info	7.6.4.24
SS-Status	7.6.4.2
Stored location area Id	7.6.2.5
Subscriber State	7.6.3.30
Subscriber Status	7.6.3.7
Super-Charger Supported in HLR	7.6.3.70
Super-Charger Supported in Serving Network Entity	7.6.3.71
Offered Camel4 CSIs	7.6.3.36D
Offered Camel4 CSIs in interrogating node	7.6.3.36E
Offered Camel4 CSIs in VMSC	7.6.3.36F
Offered Camel4 CSIs in VLR	7.6.3.36B
Offered Camel4 CSIs in SGSN	7.6.3.36C
Offered Camel4 Functionalities	7.6.3.36G
Supported CAMEL Phases	7.6.3.36H
Supported CAMEL Phases in VLR	7.6.3.36
Supported CAMEL Phases in SGSN	7.6.3.36A
Supported CAMEL Phases in interrogating node	7.6.3.36I
Supported GAD Shapes	7.6.11.20
Supported LCS Capability Sets	7.6.11.17

Guidance information	7.6.4.22	Suppress Incoming Call Barring	7.6.3.b
Handover number	7.6.2.21	Suppress T-CSI	7.6.3.33
High Layer Compatibility	7.6.3.43	Suppress VT-CSI	7.6.3.a
HLR Id	7.6.2.15	Suppression of Announcement	7.6.3.32
HLR number	7.6.2.13	Target cell Id	7.6.2.8
HO-Number Not Required	7.6.6.7	Target location area Id	7.6.2.7
IMEI	7.6.2.3	Target RNC Id	7.6.2.8A
IMSI	7.6.2.1	Target MSC number	7.6.2.12
Integrity Protection Information	7.6.6.8	Teleservice	7.6.4.39
Inter CUG options	7.6.3.27	TMSI	7.6.2.2
Intra CUG restrictions	7.6.3.28	Trace reference	7.6.10.2
Invoke Id	7.6.1.1	Trace type	7.6.10.3
		UESBI	7.6.6.20
ISDN Bearer Capability	7.6.3.41	User error	7.6.1.4
IST Alert Timer	7.6.3.66	USSD Data Coding Scheme	7.6.4.36
IST Information Withdrawn	7.6.3.68	USSD String	7.6.4.37
IST Support Indicator	7.6.3.69	UU Data	7.6.5.12
LCS Codeword	7.6.11.18	UUS CF Interaction	7.6.5.13
LCS Information	7.6.3.60	VBS Data	7.6.3.40
LCS Service Type Id	7.6.11.15	VGCS Data	7.6.3.39
Kc	7.6.7.4	VLR CAMEL Subscription Info	7.6.3.35
Linked Id	7.6.1.2	VLR number	7.6.2.14
LMSI	7.6.2.16	VPLMN address allowed	7.6.3.48
		Zone Code	7.6.2.28

***** *Next Modification* *****

7.6.2.57 RAB ID

This parameter indicates the radio access bearer identifier as defined in 3GPP TS 25.413. This parameter is used to relate the radio resources with the radio access bearers.

7.6.2.58 gsmSCF Address

This parameter refers to the ISDN number assigned to the gsmSCF address. In an IP Multimedia Core Network, the gsmSCF-address shall contain the IM-SSF address when the IM-SSF takes the role of the gsmSCF.

7.6.2.59 V-GMLC Address

This parameter refers to the IP address of a V-GMLC.

7.6.2.60 V-GMLC Address

This parameter refers to the IP address of a V-GMLC.

7.6.2.61 H-GMLC Address

This parameter refers to the IP address of a H-GMLC.

7.6.2.62 PPR Address

This parameter refers to the IP address of a Privacy Profile Register.

7.6.2.63 Routeing Number

This parameter refers to a number used for routeing purpose and identifying a network operator. See 3GPP TS 23.066 [108].

***** *Next Modification* *****

7.6.3.90 Suppress Incoming Call Barring

This parameter is used to suppress the invocation of Incoming Call Barrings.

7.6.3.91 gsmSCF Initiated Call

This parameter is used to indicate that the call was initiated by the gsmSCF.

7.6.3.92 MNP Requested Info

This parameter indicates that Mobile Number Portability (MNP) information are requested for the subscriber, as defined in 3GPP TS 23.078 [98].

7.6.3.93 MNP Info Result

This parameter refers to the Mobile Number Portability (MNP) information result (see 3GPP TS 23.078 [98] and 3GPP TS 23.066 [108]). This parameter contains the following information:

- Routeing Number (see clause 7.6.2.59).
- IMSI (see 3GPP TS 23.078[98], see also clause 7.6.2.1).
- MSISDN (see clause 7.6.2.17).
- Number Portability Status (see clause 7.6.5.14).

***** *Next Modification* *****

8.11 Subscriber Information services

8.11.1 MAP-ANY-TIME-INTERROGATION service

8.11.1.1 Definition

This service is used by the gsmSCF, to request information (e.g. subscriber state and location) from the HLR or the GMLC at any time. This service is used by the gsmSCF to request the Mobile Number Portability (MNP) information from MNP Signalling Relay Function (MNP SRF) at any time whenever the Mobile Number Portability applies in the country.

When this service is used to the HLR, the subscriber state or location may be requested.

When this service is used to the GMLC, only the location may be requested.

When this service is used to the MNP SRF, only the MNP information may be requested.

The MAP-ANY-TIME-INTERROGATION service is a confirmed service using the service primitives defined in table 8.11/1.

8.11.1.2 Service primitives

Table 8.11/1: Any_Time_Interrogation

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
Requested Info	M	M(=)		
Requested domain	C	C(=)		
MNP Requested Info	C	C(=)		
gsmSCF-Address	M	M(=)		
IMSI	C	C(=)	C	C(=)
MSISDN	C	C(=)	C	C(=)
Location Information			C	C(=)
Location Information for GPRS			C	C(=)
Subscriber State			C	C(=)
PS Subscriber State			C	C(=)
IMEI			C	C(=)
MS Classmark 2			C	C(=)
GPRS MS Class			C	C(=)
MNP info Result			C	C(=)
User error			C	C(=)
Provider error				O

8.11.1.3 Parameter definition and use

All parameters are described in clause 7.6. The use of these parameters and the requirements for their presence are specified in 3GPP TS 23.018 [97] and 3GPP TS 23.078 [98].

The HLR or GMLC may be able to use the value of the parameter gsmSCF-address to screen a MAP_Any_Time_Interrogation indication.

The use of the parameters and the requirements for their presence are specified in 3GPP TS 23.078.

User error

This parameter is sent by the responder when an error is detected and if present, takes one of the following values:

- System Failure;
- Any Time Interrogation Not Allowed;
- Data Missing;
- Unexpected Data Value;
- Unknown Subscriber.

Provider error

These are defined in clause 7.6.1.

*** Next Modification ***

17.2.2.31 Any time information enquiry

This operation package includes the operations required for any time information enquiry procedures between gsmSCF and HLR or between gsmSCF and GMLC or between gsmSCF and MNP SRF.

```
anyTimeInformationEnquiryPackage-v3  OPERATION-PACKAGE ::= {
    -- Supplier is HLR or GMLC or MNP SRF if Consumer is gsmSCF
    CONSUMER INVOKES {
        anyTimeInterrogation} }
```

This package is v3 only.

*** Next Modification ***

17.3.2.29 Any time information enquiry

This application context is used between gsmSCF and HLR or between gsmSCF and GMLC or between gsmSCF and MNP SRF for any time information enquiry procedures.

```
anyTimeInfoEnquiryContext-v3 APPLICATION-CONTEXT ::= {
     -- Responder is HLR or GMLC or MNP SRF if Initiator is gsmSCF
     INITIATOR CONSUMER OF {
          anyTimeInformationEnquiryPackage-v3}
     ID   {map-ac anyTimeInfoEnquiry(29) version3(3)} }
```

This application-context is v3 only.

****** Next Modification ******

17.7 MAP constants and data types

17.7.1 Mobile Service data types

```
*** previous text unchanged ****
*******************************

-- provide subscriber info types
   GeographicalInformation,
   MS-Classmark2,
   GPRSMSClass,

   -- subscriber information enquiry types
   ProvideSubscriberInfoArg,
   ProvideSubscriberInfoRes,
   SubscriberInfo,
   LocationInformation,
   LocationInformationGPRS,
   RAIdentity,
   SubscriberState,
   GPRSChargingID,
   MNPRequestedInfo,
   MNPInfoRes,
   RouteingNumber,
```

****** Next Modification ******

```
SubscriberInfo ::= SEQUENCE {
     locationInformation                [0] LocationInformation          OPTIONAL,
     subscriberState                    [1] SubscriberState              OPTIONAL,
     extensionContainer                 [2] ExtensionContainer           OPTIONAL,
     ... ,
     locationInformationGPRS            [3] LocationInformationGPRS      OPTIONAL,
     ps-SubscriberState                 [4] PS-SubscriberState           OPTIONAL,
     imei                               [5] IMEI                         OPTIONAL,
     ms-Classmark2                      [6] MS-Classmark2                OPTIONAL,
     gprs-MS-Class                      [7] GPRSMSClass                  OPTIONAL,
     mnpInfoRes                         [8] MNPInfoRes                   OPTIONAL,
     }

--   If the HLR receives locationInformation, subscriberState or ms-Classmark2 from an SGSN
--   it shall discard them.
--   If the HLR receives locationInformationGPRS, ps-SubscriberState or gprs-MS-Class from
--   a VLR it shall discard them.
--   If the HLR receives parameters which it has not requested, it shall discard them.
```

```
MNPInfoRes ::= SEQUENCE {
     routeingNumber                     [0] RouteingNumber               OPTIONAL,
     imsi                               [1] IMSI                         OPTIONAL,
     msisdn                             [2] MSISDN                       OPTIONAL,
     numberPortabilityStatus            [3] NumberPortabilityStatus      OPTIONAL,
     extensionContainer                 [4] ExtensionContainer           OPTIONAL,
     ... }

--   The IMSI parameter contains a generic IMSI, i.e. it is not tied necessarily to the
--   Subscriber. MCC and MNC values in this IMSI shall point to the Subscription Network of
--   the B or A Subscriber. See 3GPP TS 23.066 [108].
```

```
RouteingNumber ::= TBCD-STRING (SIZE (1..5))
```

```
MS-Classmark2 ::= OCTET STRING (SIZE (3))
     -- This parameter carries the value part of the MS Classmark 2 IE defined in
     -- 3GPP TS 24.008 [35].
```

```
GPRSMSClass ::= SEQUENCE {
     mSNetworkCapability                [0] MSNetworkCapability,
     mSRadioAccessCapability            [1] MSRadioAccessCapability      OPTIONAL
     }
```

```
MSNetworkCapability ::= OCTET STRING (SIZE (1..8))
     -- This parameter carries the value part of the MS Network Capability IE defined in
     -- 3GPP TS 24.008 [35].
```

```
MSRadioAccessCapability ::= OCTET STRING (SIZE (1..50))
     -- This parameter carries the value part of the MS Radio Access Capability IE defined in
     -- 3GPP TS 24.008 [35].
```

```
RequestedInfo ::= SEQUENCE {
     locationInformation                [0] NULL                         OPTIONAL,
     subscriberState                    [1] NULL                         OPTIONAL,
     extensionContainer                 [2] ExtensionContainer           OPTIONAL,
     ...,
     currentLocation                    [3] NULL                         OPTIONAL,
     requestedDomain                    [4] DomainType                   OPTIONAL,
     imei                               [6] NULL                         OPTIONAL,
     ms-classmark                       [5] NULL                         OPTIONAL,
     mnpRequestedInfo                   [7] NULL                         OPTIONAL }

--   currentLocation shall be absent if locationInformation is absent
```

17.7.3 Call handling data type

***** *Next Modification* *****

```
NumberPortabilityStatus ::= ENUMERATED {
     notKnownToBePorted                  (0),
     ownNumberPortedOut                  (1),
     foreignNumberPortedToForeignNetwork (2),
     ...,
     ownNumberNotPortedOut               (4),
     foreignNumberPortedIn               (5)
     }
     --   exception handling:
     --  reception of other values than the ones listed the receiver shall ignore the
     --  whole NumberPortabilityStatus;
     --  ownNumberNotPortedOut or foreignNumberPortedIn may only be included in Any Time
         Interrogation message.
```

***** *End of Document* *****