IMSI

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TIA/EIA-41-D MODIFICATIONS TO SUPPORT IMSI

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Assumptions

1. **Backward Compatibility**

   Backward compatibility will be handled in several different ways, depending on the circumstances of individual transactions:

   i. Mandatory MIN will be replaced by mandatory MSID, when one of MIN or IMSI is required. This effectively changes MIN from a mandatory to an optional parameter.

      A Serving, Border or Anchor System sends IMSI towards an MS’s HLR if IMSI is received from the MS, unless the IMSI received is recognized as a MIN-based IMSI. An IMSI of the format MCC+00+D1+D2+D3+D4+D5+D6+D7+D8+D9+D10 shall be recognized as potential MIN-based IMSI. A potential MIN-based IMSI shall be recognized as a MIN-based IMSI, if the MCC is one that has been designated by the associated country’s numbering authorities for this use. In the U.S., the MCC 310 has been designated for use with MIN-based IMSI’s. In addition, an IMSI of the form 000+00+10D should also be treated as a MIN based IMSI.

      If a Serving, Border or Anchor System receives a MIN-based IMSI from an MS, it shall treat the digits D1+D2+D3+D4+D5+D6+D7+D8+D9+D10 extracted from that IMSI as the MS’s MIN and include the MobileIdentificationNumber parameter in messages sent to the MS’s Home System’s HLR or in other messages in which that parameter should be included if the MIN is known.

   ii. Optional MIN will be replaced by optional MSID when one of MIN or IMSI (or neither) is possible.

   iii. Optional IMSI will be added where both MIN and IMSI may be present (particularly in handoff messages and messages to an originating MSC).

2. **MSID**

   We recommend the introduction of the MSID concept as a documentation convenience. MSID will be a macro that is an ASN.1 CHOICE of MIN or IMSI. MSID has no physical encoding, as the X.208 specification for ASN.1 specifies that the tag [parameter identification] of a type defined using the “CHOICE” keyword takes the value of the tag of the type from which the chosen data value is taken [i.e. MIN or IMSI].

3. **Registration**

   Registration with one identifier (MIN or IMSI) will result in the alternate identifier being returned if possible. This is to support call detail record generation, roamer port terminations, redirection, intersystem paging, local roaming between locations using IMSI and locations not using IMSI (e.g. a VLR supporting multiple MSC’s), TIA/EIA/IS-136 authentication etc.

   An MSC contains a database that contains a record for each registered MS. The MSC’s record for a registered MS contains the MS identification information included by the MSC in the MSID parameter in the RegistrationNotification INVOKE sent to register the MS. If additional MS identification information was received in an MSID parameter in the RegistrationNotification RETURN RESULT, that additional MS identification information is also stored in the MSC’s record for the MS.

   The VLR’s record for a registered MS also stores this MS identification information.
4. Redirection
MIN will be used for redirection, unless only IMSI is available, as the capability of the Originating (Gateway) MSC to support IMSI will be, in general, not be known.

5. LocationRequest
The HLR will supply an originating MSC with both MIN and IMSI (if both are available) in the LocationRequest RETURN RESULT to allow redirection, call detail record generation and other operations with either identifier.

6. Authentication
The HLR may substitute MIN, if IMSI is received in an authentication message, such as AuthenticationRequest INVOKE, before forwarding that message to the AC.

7. Local Roaming
The VLR may substitute the MIN for the IMSI, or the IMSI for the MIN, in an INVOKE component received by the VLR, before forwarding the message to the MSC.

8. MIN-Only & IMSI-Only Systems
MIN-only systems will not be able to communicate with IMSI-only systems.

9. Support for Standards
This document applies only to ANSI TIA/EIA-41 Rev. D, and not to any subsequent documents.
10. Scheduling Constraints

Network elements must be upgraded to support IMSI in a specific order, illustrated by the following figure:

Upgrade AC
(if required)

Program MS with IMSI

Upgrade HLR

Note: this constraint can be avoided if a pseudo-IMSI is used AND the Serving System can recognize this situation AND substitute MIN in IS-41 messages.

Upgrade MC

Allow termination to SME using IMSI

Upgrade VLR

Allow BS to accept accesses using IMSI

Allow IMSI on E interface for handoff/inter-MSC paging

Upgrade MSC

Upgrade Neighbour MSC
TIA/EIA-41.1 Changes (Functional Overview)

2.1 Normative References

ITU-T


CDMA:


3 DEFINITIONS and DOCUMENTATION CONVENTIONS

3.1 DEFINITIONS

International Mobile Station Identity (IMSI)
A mobile station identifier composed of up to 15 digits. See ITU-T E.212.

Mobile Station Identity (MSID)
The identifier for a mobile station, a choice of either MIN or IMSI.

4. SYMBOLS AND ABBREVIATIONS

IMSI International Mobile Station Identity.
TIA/EIA-41.2 Changes (Handoff Information Flows)

Changes in this section are to add the IMSI parameter as an optional parameter to text, tables and diagrams. For diagrams, instead of replacing “MIN” by “MIN and/or IMSI”, MIN is removed from the diagram, and included only in the parameter tables. MIN is downgraded from Required to Optional, as it may not be available in all circumstances.

Note that a previous approach of replacing MIN (R) by MSID (R) was abandoned as it cannot handle all compatibility situations (i.e. handoff from a MIN/IMSI capable system, to another MIN/IMSI capable system, to a MIN-only system). To handle these cases, MIN should be transmitted in handoff messages to allow handoff to MIN-only systems. IMSI should also be included, if available, as it is the preferred identifier for generating call detail records, etc.

4.1.1. Successful FacilitiesDirective

... No changes required (as modifications are being made to FacilitiesDirective2 instead)...

4.2.1. Successful FacilitiesDirective2

This scenario describes the successful use of the FacilitiesDirective2 operation.

---

**Figure 3 Successful FacilitiesDirective2**

*a. The Serving MSC determines that a call should be handed off to a target system. It sends a FACDIR2 to the Target MSC, directing the Target MSC to initiate a Handoff-Forward task.*

Parameters are as in Section 4.1.1. Step-a, with the exception that ChannelInfo1 is not included, MIN is optional (not required) and with the following additions and modifications to the FacDir parameter group:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Usage</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>[MIN]</td>
<td>Served MS MIN. Include if available.</td>
<td>R O</td>
</tr>
<tr>
<td>[IMSI]</td>
<td>Served MS IMSI. Include if available.</td>
<td>O</td>
</tr>
<tr>
<td>...</td>
<td>remainder of parameters unchanged</td>
<td>...</td>
</tr>
</tbody>
</table>

*b. ...Remainder of section unchanged...*
4.3.1. Successful FacilitiesRelease

This scenario describes the normal use of the FacilitiesRelease operation.

Figure 5  Successful FacilitiesRelease

a. When an MSC determines that an inter-MSC trunk should be released it sends a FACREL to the receiving MSC.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Usage</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN</td>
<td>MIN associated with specified trunk. Include if required by interconnection agreement.</td>
<td>O</td>
</tr>
<tr>
<td>IMSI</td>
<td>IMSI associated with specified trunk. Include if required by interconnection agreement.</td>
<td>O</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>

4.4.1. Successful HandoffBack... No changes required (see HandoffBack2) …

4.5.1. Successful HandoffBack2

... introductory paragraph and diagram omitted …

a. The Serving MSC determines that a call should be handed off to a target system to which it is already connected, for the call in question, via an inter-MSC trunk. It sends a HANDBACK2 to the Target MSC, directing the Target MSC to initiate a Handoff-Back task.

Parameters are as in Section 4.4.1, Step-a, with the exception that ChannelInfo1 is not included, MIN is optional (not required) and with the following additions and modifications:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Usage</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>[MIN]</td>
<td>Served MS MIN. Include if available.</td>
<td>O</td>
</tr>
<tr>
<td>[IMSI]</td>
<td>Served MS IMSI. Include if available.</td>
<td>O</td>
</tr>
<tr>
<td>…</td>
<td>remainder of parameters unchanged</td>
<td>…</td>
</tr>
</tbody>
</table>

b. …remainder unchanged…

4.8.1. Successful HandoffToThird

... No changes required (see HandoffToThird2) …
4.9.1. Successful HandoffToThird2

... introductory paragraph and diagram omitted ...

a. The Serving MSC determines that a call should be handed off to a target system and that path
minimization may be possible. It sends a HANDTHIRD2 to the MSC which had previously handed
off the call to the Serving MSC (i.e., the Anchor MSC in this scenario), requesting that a handoff
with path minimization be performed.

Parameters are as in Section 4.8.1, Step-a, with the exception that ChannelInfo1 is
not included, MIN is optional (not required) and with the following additions
and modifications:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Usage</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>[MIN]</td>
<td>Served MS MIN. Include if available.</td>
<td>R O</td>
</tr>
<tr>
<td>[IMSI]</td>
<td>Served MS IMSI. Include if available.</td>
<td>O</td>
</tr>
<tr>
<td>...</td>
<td>remainder of parameters unchanged</td>
<td>...</td>
</tr>
</tbody>
</table>

b. ...remainder unchanged...

4.10.1. Successful InterSystemAnswer Following the Handoff of an Originating
MS Awaiting Answer

This scenario describes the successful use of the InterSystemAnswer operation.

a. The Anchor MSC sends an ISANSWER to the serving MSC, indicating that the call has been
answered.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Usage</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSCCID</td>
<td>Specifies a trunk in a dedicated trunk group between the two MSCs</td>
<td>R</td>
</tr>
<tr>
<td>MIN</td>
<td>Served MS MIN. Include if available.</td>
<td>R O</td>
</tr>
<tr>
<td>IMSI</td>
<td>Served MS IMSI. Include if available.</td>
<td>O</td>
</tr>
</tbody>
</table>

b. The Serving MSC acknowledges receipt of the ISANSWER by sending an empty isanswer to
the Anchor MSC.
4.10.2. Successful InterSystemAnswer Following the Handoff of a Terminating MS in the Alerting State

This scenario describes the successful use of the InterSystemAnswer operation.

**Figure 17** Successful InterSystemAnswer Following the Handoff of a Terminating MS in the Alerting State

a. The Serving MSC sends an **ISANSWER** to the Anchor MSC indicating that the call has been answered.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Usage</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSCCID</td>
<td>Specifies a trunk in a dedicated trunk group between the two MSCs</td>
<td>R</td>
</tr>
<tr>
<td>MIN</td>
<td>Served MS MIN. Include if available.</td>
<td>R O</td>
</tr>
<tr>
<td>IMSI</td>
<td>Served MS IMSI. Include if available.</td>
<td>O</td>
</tr>
</tbody>
</table>

b. The Anchor MSC acknowledges receipt of the **ISANSWER** by sending an empty **isanswer** to the Serving MSC.
TIA/EIA-41.3 Changes (Automatic Roaming Information Flows)

4.1 AuthenticationDirective 6

4.1.1 figure, step(s) a, b, c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.1.2 figure, step(s) a, b, c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.1.3 figure, step(s) a, b, c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.1.4 figure, step(s) a: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.1.5 figure, step(s) a, b, c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.1.6 figure, step(s) a, b: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.2 AuthenticationDirectiveForward 17

4.2.1 figure, step(s) a and b: add "IMSI," after "MIN,"
narrative, step(s) a: replace:

"MIN; MS MIN"

by

"MIN; MS MIN. Include if available.
IMSI, MS IMSI. Include if available."

4.3 AuthenticationFailureReport 19

4.3.1 figure: no change
narrative, step(s) a: replace "[MIN]; MS MIN" by "[MSID]; MS MSID"

4.4 AuthenticationRequest 21

4.4.1 figure: no change
narrative, step(s) a: replace "[MIN]; Served MS MIN" by "[MSID]; Served MS MSID"
narrative, step(s) d, e, f: no change

note: no need to add the parameter MIN since the SSD is not shared.

4.4.3 figure: no change
narrative, step(s) d, e, f: no change

*note*: no need to add the parameter MIN since the SSD is not shared.

4.4.5

figure.: no change

narrative, step(s) a: replace "[MIN]; MS MIN" by "[MSID]; MS MSID"
narrative, step(s) d: no change

*note*: no need to add the parameter MIN since the SSD is not shared.

4.5 **AuthenticationStatusReport** 36

4.5.1

figure, step(s) a, b, c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"
figure, steps d,e: add "MIN" before ReportParameterGroup

narrative, steps d,e: before "ReportParameterGroup", add "MIN; If the VLR is being given responsibility for authentication calculations; Optional"

4.5.2

figure, step(s) a: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.6 **BaseStationChallenge** 41

4.6.1

figure, step(s) a, b, c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.6.2

figure, step(s) a: replace "MIN" by "MSID"
narrative: no change.

4.8 **CountRequest** 46

4.8.1

figure, step(s) a, b: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.9 **FeatureRequest** 48

4.9.1

figure, step(s) a: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.9.2

figure, step(s) a: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.10 **FlashRequest** 53

4.10.1

figure, step(s) a and b: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.11 **InformationDirective** 55

4.11.1

figure, step(s) a and b: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"
4.12 InformationForward 57

4.12.1 figure, step(s) a and b: add "IMSI," after "MIN."

narrative, step(s) a: replace "MIN; Served MS MIN" by:
"MIN; Served MS MIN (include if available).

IMSI; Served MS IMSI (include if available)"

4.13 InterSystemAnswer 59

4.13.1 figure, step(s) a: add ", IMSI" after "MIN"

narrative, step(s) a: for MIN parameter, replace type "R" by "O". To usage add "Include if available."

Add parameter IMSI (Usage: "Served MS IMSI. Include if available", Type O).

4.14 InterSystemPage60

4.14.1 figure: no change

narrative, step(s) a: replace "[MIN]; Served MS MIN" by "[MIN], [IMSI]; Served MS MIN and IMSI (include all
known)"

4.15 InterSystemPage2 65

4.15.1 figure: no change

narrative, step(s) a: replace "MIN; Served MS MIN" by "MIN, IMSI; Served MS MIN and IMSI (include all
known)"

4.16 InterSystemSetup 70

4.16.1 figure, step(s) a: add "IMSI" after "MIN"

narrative, step(s) a: replace "MIN; Served MS MIN" by "MIN, IMSI; Served MS MIN and IMSI (include all
known); O"

4.16.2 figure, step(s) a: add "IMSI" after "MIN"

narrative: no change

4.17 LocationRequest 73

4.17.1 figure, step(s) b: add "IMSI," after "MIN,"

narrative, step(s) b: after "MIN; Served MS MIN", add "IMSI; Called MS IMSI (include if available); O"

4.17.2 figure, step(s) b: add "IMSI," after "MIN,"

narrative: no change

4.17.3 figure, step(s) b: add "IMSI," after "MIN,"

narrative: no change

4.17.4 figure, step(s) b: add "IMSI," after "MIN,"

narrative: no change

4.17.5 figure, step(s) b: add "IMSI," after "MIN,"
narrative: no change

4.17.6
figure, step(s) b: add "IMSI," after "MIN;"
narrative, step(s) b: after "MIN; Called MS MIN", add "IMSI; Called MS IMSI (include if available); O"

4.18 **MSInactive** 82

4.18.1
figure, step(s) a and c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.18.2
figure, step(s) a, c and e: replace "MIN" by "MSID"
narrative, step(s) a and e: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.19 **OriginationRequest** 86

4.19.1
figure, step(s) a: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.19.2
figure, step(s) a: replace "MIN" by "MSID"
narrative: no change

4.20 **QualificationDirective** 89

4.20.1
figure, step(s) a and c: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID (last identifier used for registration at Serving System)."

4.20.2
figure, step(s) a and c: replace "MIN" by "MSID"
narrative: no change

4.20.3
figure, step(s) a and c: replace "MIN" by "MSID"
narrative: no change

4.20.4
figure, step(s) a and c: replace "MIN" by "MSID"
narrative, step(s) a and c: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.21 **QualificationRequest** 97

4.21.1
figure, step(s) a and b: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.21.2
figure, step(s) a and b: replace "MIN" by "MSID"

4.21.3
figure, step(s) a and b: replace "MIN" by "MSID"

4.23 **RedirectionDirective** 106

4.23.1
figure, step(s) a: add "IMSI" after "MIN"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MIN, IMSI; Served MS MIN and IMSI (include all known)"

4.23.2 figure, step(s) a: add "IMSI" after "MIN"
narrative: no change

4.24 RedirectionRequest 109

4.24.1 figure, step(s) a: add "IMSI" after "MIN"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MIN, IMSI; Served MS MIN and IMSI (include all known)"

4.24.2 figure, step(s) a: add "IMSI" after "MIN"
narrative: no change

4.25 RegistrationCancellation 112

4.25.1 figure, step(s) a and b: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.25.2 figure, step(s) a and b: replace "MIN" by "MSID"
narrative: no change

4.25.3 figure, step(s) a: replace "MIN" by "MSID"
narrative: no change

4.26 RegistrationNotification 118

4.26.1 figure, step(s) b: add "MSID," after "MYTYP,"
narrative, step(s) a: replace "[MIN]; Served MS MIN" by "[MSID]; Served MS MSID. Include the identifier (MIN or IMSI) used by the MS to access this system."
narrative, step(s) b: after "MYTYP; VLR vendor ..", add "MSID; Served MS MSID (for MIN and IMSI capable MS, the "other" MS identifier than the one used in the Invoke)"; O"

4.26.2 figure, step(s) c and d: add "MSID," after "MYTYP,"
narrative: no change

4.26.3 no change

4.29 RoutingRequest 129

4.29.1 figure: no change
narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID (last ID received from this serving system)"

4.30 SMSDeliveryBackward 135

4.30.1 figure, step(s) a and b: replace "MIN" by "MSID"
narrative, step(s) a: replace "MIN; Used to identify the MS" by "MSID; Used to identify the MS"
4.30.2  
figure, step(s) a and b: replace "MIN" by "MSID"

narrative: no change

4.31  **SMSDeliveryForward**  139

4.31.1  
figure, step(s) a, b: add "IMSI," after "MIN,"

narrative, step(s) a: replace "MIN; Used to identify the MS." by:

"MIN,IMSI; Used to identify the MS. Include all known. At least one is required."

4.31.2  
figure, step(s) a, b: add "IMSI," after "MIN,"

narrative: no change

4.32  **SMSDeliveryPointToPoint**  143

4.32.1  
figure, step(s) a: replace "MIN" by "MSID"

narrative, step(s) a: replace "MIN; Served MS MIN. Include if known." by "MSID; Served MS MSID. Include if available."

4.32.2  
figure, step(s) a: replace "MIN" by "MSID"

narrative: no change

4.33  **SMSNotification**  147

4.33.1  
figure, step(s) a: replace "MIN" by "MSID"

narrative, step(s) a: replace "MIN; Used to identify the MS" by "MSID; Used to identify the MS"

4.33.2  
figure, step(s) a: replace "MIN" by "MSID"

narrative, step(s) a: replace "MIN; Used to identify the MS" by "MSID; Used to identify the MS"

4.34  **SMSRequest**  149

4.34.1  
figure, step(s) a, b, and c: replace "MIN" by "MSID"

figure, step(s) d, e, and f: add ", MSID" after "SMSADDR"

narrative, step(s) a: replace "MIN; Used to identify the MS" by "MSID; Used to identify the MS"

narrative, step(s) d: after "SMSADDR", add "MSID; Identifier that should be used for SMS delivery; O"

4.34.2  
figure, step(s) a, b, and c: replace "MIN" by "MSID"

figure, step(s) d, e, and f: add ", MSID" after "SMSACCDEN"

narrative, step(s) d: after "SMSACCDEN", add "MSID; Identifier that should be used for SMS delivery; O"

4.35  **TransferToNumberRequest**  153

4.35.1  
figure, step(s) a: replace "MIN" by "MSID"

narrative, step(s) a: replace "MIN; Served MS MIN" by "MSID; Served MS MSID"

4.35.2  
figure, step(s) a: replace "MIN" by "MSID"

narrative: no change
4.37 UnsolicitedResponse 158

4.37.1

figure: no change

narrative, step(s) a: replace "[MIN]; Served MS MIN" by "[MSID]; Served MS MSID"

5.4.1 Initial Registration with Authentication

Scenario, steps b, d and f: replace "MIN" by "MSID".
Scenario, step e. Add sentence "Note that the HLR may replace IMSI, if received as the MSID, by MIN, if
required by authentication algorithms.

5.4.2 Origination with Authentication

Scenario, steps b, d and f: replace "MIN" by "MSID".
Scenario, step e. Add sentence "Note that the HLR may replace IMSI, if received as the MSID, by MIN, if
required by authentication algorithms.

5.4.3 Termination with Authentication

Scenario, steps b,c,e and g: replace "MIN" by "MSID".
Scenario, step f. Add sentence "Note that the HLR may replace IMSI, if received as the MSID, by MIN, if
required by authentication algorithms.

5.4.4 Authentication on Voice Channel Only

Scenario, steps b, d and f: replace "MIN" by "MSID".
Scenario, step e. Add sentence "Note that the HLR may replace IMSI, if received as the MSID, by MIN, if
required by authentication algorithms.

5.4.5 Authentication on Flash Request

Scenario, step d and f: replace "MIN" by "MSID".
Scenario, step e. Add sentence to end of first paragraph: "Note that the HLR may replace IMSI, if received as the
MSID, by MIN, if required by authentication algorithms.

5.4.8 Authentication When SSD is Currently Shared with Another System

Scenario, step b: replace "MIN" by "MSID".
Scenario, step b. Add sentence "Note that the HLR may replace IMSI, if received as the MSID, by MIN, if
required by authentication algorithms.

6.1.2 CD Invocation to an Idle MS on Another MSC

Scenario, steps d and f: replace "MIN" by "MSID".

6.8.4 CNIP Interaction with CFU

Correct error in scenario step c: "It includes the MS's MIN directory number in the RedirectingNumberDigits
parameter."
Correct same error in parameter table (also in same step): "Redirecting number digits, set to MS's MIN directory
number."

6.9.2 CNIR Interaction with CFU

Correct error in scenario step c: "It includes the MS's MIN directory number in the RedirectingNumberDigits
parameter, with an indication that presentation is restricted."
Correct same error in parameter table (also in same step): "Redirecting number digits, incl. presentation restriction
information. Set to MS's MIN directory number."

6.8.4 CNIP Interaction with CFU

Correct error in scenario step c: "It includes the MS's MIN directory number in the RedirectingNumberDigits
parameter.
Correct same error in parameter table (also in same step): "Redirecting number digits, set to MS's MIN directory
number."

6.9.3 CNIR Interaction with CFNA or CFD on MS No Answer
Correct error in scenario step l: "It includes the MS's MIN directory number in the RedirectingNumberDigits parameter, with an indication that presentation is restricted.

Correct same error in parameter table (also in same step): "Redirecting number digits, incl. presentation restriction information. Set to MS's MIN directory number."

### 6.9.4 CNIR Interaction with CFB or CFD on MS Busy

Correct error in scenario step g: "It includes the MS's MIN directory number in the RedirectingNumberDigits parameter, with an indication that presentation is restricted.

Correct same error in parameter table (also in same step): "Redirecting number digits, incl. presentation restriction information. Set to MS's MIN directory number."

### 6.9.5 CNIR Interaction with CFB or CFD on Call Collision

Correct error in scenario step l: "It includes the MS's MIN directory number in the RedirectingNumberDigits parameter, with an indication that presentation is restricted.

Correct same error in parameter table (also in same step): "Redirecting number digits, incl. presentation restriction information. Set to MS's MIN directory number."

### 6.23.1 Normal Operation: Invocation via Feature Code

Replace in step c parameter table: "MIN/Mobile Identification Number/R" by "MSID/MS Identifier (MIN or IMSI)/R". Also, for the "VMBOX" parameter row, replace "MIN" by "MSID".

### 7.1 Successful Short Message to a Known MS-Based SME

narrative, step n: replace "MIN, Mobile Identification Number, R" by "MSID, Mobile Station Identity, R"

narrative, step o: replace "MIN" by "MSID"

### 7.24 Short Message to MS-Based SME After Handoff

narrative, step b: replace "MIN" by "MIN, if available, and IMSI, if available" in the first place that it occurs. In the parameter table, replace the row for "MIN" by a new row:

"MIN,IMSI; Used to identify the MS. Include all known. At least one is required."

narrative, step d: replace "MIN" by "MSID"

### 7.25 Short Message from MS-Based SME After Handoff

narrative, step b: replace "MIN" by "MSID" in all four places that it occurs.
TIA/EIA-41.4 Changes (OA&M Information Flows and Procedures)

No changes required.
5.1.2 Signaling Connection Control Part

For TIA/EIA-41 applications, the SCCP is defined in ANSI T1.112, with the following exceptions and limitations:

- several bullet items omitted (no changes required)
- Global Title Translation on International Mobile Station Identity can be used for communication with the an HLR. Global Title Indicator type 2 (0010) is used. A translation type value of 9 is used for “IMSI to HLR” translation. The global title address information field contains the IMSI. The encoding scheme is BCD. Each address signal is coded as described in ITU-T E.212.
- Global Title Translation on International Mobile Station Identity can be used for communication with a Message Center. Global Title Indicator type 2 (0010) is used. A translation type value of 13 is used for Short Message Service for “IMSI to MC” translation. The global title address information field contains the IMSI. The encoding scheme is BCD. Each address signal is coded as described in ITU-T E.212.
- remainder of bullet items in section omitted (no changes required).

6.3.2.3.1 Error Definitions

...no change...

MIN MSID/HLRMismatch

a. Supplied MIN MSID is not resident on the HLR.

...no change. to following error codes..

UnrecognizedIMSI

a. Supplied IMSI is not currently served by the VLR.
b. Supplied IMSI is not currently served by the HLR.
c. Supplied IMSI is not currently served by the Serving MSC.
d. Supplied IMSI does not currently have an active call on an originating MSC.
For ANSI-41 the Error Code Identifier is coded as Private TCAP. Error Codes are coded as follows:

<table>
<thead>
<tr>
<th>Error Code Name</th>
<th>Error Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H G F E D</td>
</tr>
<tr>
<td>UnrecognizedMIN</td>
<td>1 0 0 0 0</td>
</tr>
<tr>
<td>UnrecognizedESN</td>
<td>1 0 0 0 0 0</td>
</tr>
<tr>
<td>MIN/MSID/HLRMismatch</td>
<td>1 0 0 0 0 1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>UnrecognizedIMSI</td>
<td>1 0 0 0 1 0</td>
</tr>
<tr>
<td>Other Error Codes are Reserved</td>
<td>Reserved (Note a)</td>
</tr>
<tr>
<td>Reserved for Protocol Extension</td>
<td>1 1 1 0 0 0 0</td>
</tr>
<tr>
<td>(Note b)</td>
<td></td>
</tr>
</tbody>
</table>

6.4.2.1. AuthenticationDirective

The AuthenticationDirective operation is used to request modification of an MS’s authentication parameters.

The AuthenticationDirective operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>AuthenticationDirective INVOKE Parameters</th>
<th>Timer: ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>Value</td>
</tr>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
</tr>
<tr>
<td>Contents</td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td>M</td>
</tr>
<tr>
<td>MobileIdentificationNumber MSID</td>
<td>M</td>
</tr>
<tr>
<td>... remaining parameters unchanged...</td>
<td>...</td>
</tr>
</tbody>
</table>

Notes: ...no change to existing notes...

j. The HLR includes the type of MSID last received from the Serving System; this may not be the type of MSID received from the AC. The VLR includes the type of MSID last received from the Serving MSC; this may not be the type of MSID received from the HLR.
6.4.2.2 AuthenticationDirectiveForward

Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to new note 'b.

6.4.2.3 AuthenticationFailureReport

The AuthenticationFailureReport operation is used to report on the failure of an autonomously initiated authentication operation for an MS.

The AuthenticationFailureReport operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

Table 15 AuthenticationFailureReport INVOKE Parameters

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.4.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.4.1.1</td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td>M</td>
<td>6.5.2.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber MSID</td>
<td>M</td>
<td>6.5.2.81bv</td>
<td>e,f</td>
<td></td>
</tr>
</tbody>
</table>

...no further changes...

Notes:

a. Include if ReportType parameter value is COUNT mismatch.

b. Should be included on IS-41-C or later.

c. Not required for IS-41-C or later. For TSB51, two ReportType parameters are needed to report the outcome of an SSD Update and the Unique Challenge that is performed after the Base Station Challenge is completed. The first (mandatory ReportType parameter indicates the outcome of the SSD Update. The second ReportType parameter (optional) reports on the outcome of the Unique Challenge when the SSD Update was successful.

d. Include to identify message sender, the functional entity sending the message.

e. Include the identifier with which the MS last accessed the system, unless that identifier was a MIN-based IMSI, in which case the MobileIdentificationNumber (populated with the MIN derived from that IMSI) should be included.

f. The HLR may replace the IMSI parameter, if received, by the MobileIdentificationNumber parameter before forwarding this message to the AC.
The AuthenticationFailureReport operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

### Table 16 AuthenticationFailureReport RETURN RESULT Parameters

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.3.2.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.3.2.2</td>
<td></td>
</tr>
<tr>
<td>AuthenticationAlgorithmVersion</td>
<td></td>
<td>O</td>
<td>6.5.2.7</td>
<td>a</td>
</tr>
<tr>
<td>AuthenticationResponseUniqueChallenge</td>
<td></td>
<td>O</td>
<td>6.5.2.12</td>
<td>b</td>
</tr>
<tr>
<td>CallHistoryCount</td>
<td></td>
<td>O</td>
<td>6.5.2.18</td>
<td>c</td>
</tr>
<tr>
<td>DenyAccess</td>
<td></td>
<td>O</td>
<td>6.5.2.54</td>
<td>d</td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td></td>
<td>O</td>
<td>6.5.2.81</td>
<td>i</td>
</tr>
<tr>
<td>RandomVariableSSD</td>
<td></td>
<td>O</td>
<td>6.5.2.103</td>
<td>e</td>
</tr>
<tr>
<td>RandomVariableUniqueChallenge</td>
<td></td>
<td>O</td>
<td>6.5.2.104</td>
<td>b</td>
</tr>
<tr>
<td>SharedSecretData</td>
<td></td>
<td>O</td>
<td>6.5.2.119</td>
<td>c</td>
</tr>
<tr>
<td>SSDNotShared</td>
<td></td>
<td>O</td>
<td>6.5.2.141</td>
<td>f</td>
</tr>
<tr>
<td>TerminalType</td>
<td></td>
<td>O</td>
<td>6.5.2.154</td>
<td>g</td>
</tr>
<tr>
<td>UpdateCount</td>
<td></td>
<td>O</td>
<td>6.5.2.163</td>
<td>h</td>
</tr>
</tbody>
</table>

Notes:

a..h - no changes required.

i. Include if:
  - SSD or pending SSD is shared,
  - MIN is needed for authentication calculations, and
  - MIN was not present as the MSID in the corresponding INVOKE.

#### 6.4.2.4 AuthenticationRequest

Same changes as 6.4.2.3. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with references to two notes worded in the same way as the two notes added as reference for the MSID in the AuthenticationFailureReport INVOKE; add MobileIdentificationNumber to the RETURN RESULT component with reference to a note worded in the same way as the note added as reference for the MobileIdentificationNumber in the AuthenticationFailureReport RETURN RESULT.)

#### 6.4.2.5 AuthenticationStatusReport

Same changes as 6.4.2.3. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with references to two notes worded in the same way as the two notes added as reference for the MSID in the AuthenticationFailureReport INVOKE; add MobileIdentificationNumber to the RETURN RESULT component with reference to a note worded in the same way as the note added as
reference for the MobileIdentificationNumber in the AuthenticationFailureReport RETURN RESULT.)

6.4.2.6 BaseStationChallenge

The BaseStationChallenge operation is used to request a response to a Base Station Challenge Order received from an MS.

The BaseStationChallenge operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.4.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.4.1.1</td>
<td></td>
</tr>
<tr>
<td>Contents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td></td>
<td>M</td>
<td>6.5.2.63</td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td>MSID</td>
<td>M</td>
<td>6.5.2.81</td>
<td>bv, c</td>
</tr>
<tr>
<td>RandomVariableBaseStation</td>
<td></td>
<td>M</td>
<td>6.5.2.102</td>
<td></td>
</tr>
<tr>
<td>SenderIdentificationNumber</td>
<td></td>
<td>O</td>
<td>6.5.2.116</td>
<td>a</td>
</tr>
</tbody>
</table>

Notes:

a. Include to identify the functional entity sending the message.

b. Include the identifier with which the MS last accessed the system unless that identifier was a MIN-based IMSI, in which case the MobileIdentificationNumber (populated with the MIN derived from that IMSI) should be included.

c. The HLR may replace the IMSI parameter by the MobileIdentificationNumber parameter before forwarding this message the AC.

...Remainder of section unchanged...

6.4.2.9 CountRequest

The CountRequest operation is used to obtain the current value of the CallHistoryCount parameter. The CountRequest operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CountRequest INVOLVE Parameters</td>
<td>Timer: CRT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Field | Value | Type | Reference | Notes
---|---|---|---|---
Identifier | SET [NATIONAL 18] | M | 6.4.1.2 | 
Length | variable octets | M | 6.4.1.1 | 

Contents

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ElectronicSerialNumber</td>
<td></td>
<td>M</td>
<td>6.5.2.63</td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td>MSID</td>
<td>M</td>
<td>6.5.2.81</td>
<td></td>
</tr>
<tr>
<td>SenderIdentificationNumber</td>
<td></td>
<td>O</td>
<td>6.5.2.116</td>
<td>a</td>
</tr>
</tbody>
</table>

Notes:

a. Include to identify the functional entity sending the message.

b. The HLR includes the type of MSID last received from the Old Serving System; this may not be the type of MSID received from the AC.

...Remainder of section unchanged...

6.4.2.11 FacilitiesDirective2

The FacilitiesDirective2 operation is used to request that the Target MSC initiate the Handoff-Forward task. This operation differs from the FacilitiesDirective operation in its addition of support for CDMA and NAMPS MSs.

The FacilitiesDirective2 operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>FacilitiesDirective2 INVOKE Parameters</th>
<th>Timer: HOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>Value</td>
</tr>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
</tr>
</tbody>
</table>

Contents

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BillingID</td>
<td></td>
<td>M</td>
<td>6.5.2.16</td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td></td>
<td>M</td>
<td>6.5.2.63</td>
<td></td>
</tr>
<tr>
<td>InterMSCCircuitID</td>
<td></td>
<td>M</td>
<td>6.5.2.72</td>
<td></td>
</tr>
<tr>
<td>InterSwitchCount</td>
<td></td>
<td>M</td>
<td>6.5.2.73</td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td></td>
<td>M</td>
<td>6.5.2.81</td>
<td></td>
</tr>
<tr>
<td>ServingCellID</td>
<td></td>
<td>M</td>
<td>6.5.2.117</td>
<td>a</td>
</tr>
</tbody>
</table>

...optional parameters omitted...

| IMSI | | O | 6.5.2.bu | ñ |

...optional parameters omitted...

| MobileIdentificationNumber | | O | 6.5.2.81 | ñ |

...optional parameters omitted...
Notes:  

No changes

r. Include if available. At least one of these parameters should be present.

...Remainder of section unchanged...

6.4.2.12 **FacilitiesRelease**

The FacilitiesRelease operation is used to request that allocated resources for a call segment be released.

The FacilitiesRelease operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>FacilitiesRelease INVOKE Parameters</th>
<th>Timer: CTT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>Value</td>
</tr>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
</tr>
<tr>
<td>Contents</td>
<td></td>
</tr>
<tr>
<td>InterMSCCircuitID</td>
<td>M</td>
</tr>
<tr>
<td>ReleaseReason</td>
<td>M</td>
</tr>
<tr>
<td>BillingID</td>
<td>O</td>
</tr>
<tr>
<td>IMSI</td>
<td>O</td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td>O</td>
</tr>
</tbody>
</table>

Notes:  

...no change to notes required...

6.4.2.13 **FeatureRequest**

This operation was named RemoteFeatureControlRequest prior to this revision of the Interim Standard.

The FeatureRequest operation is used to request feature-related treatment on behalf of a registered MS.

The FeatureRequest operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>FeatureRequest INVOKE Parameters</th>
<th>Timer: FRRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>Value</td>
</tr>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
</tr>
<tr>
<td>Contents</td>
<td></td>
</tr>
<tr>
<td>Digits (Dialed)</td>
<td>M</td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td>M</td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td>M</td>
</tr>
</tbody>
</table>

...remaining parameters unchanged
Notes:

a.i  Notes unchanged.

j. Include the identifier with which the MS last accessed the system, unless that identifier was a
MIN-based IMSI, in which case the MobileIdentificationNumber (populated with the MIN
derived from that IMSI) should be included.

...Remainder of section unchanged...

6.4.2.14 FlashRequest

Same changes as 6.4.2.13. (Replace mandatory MobileIdentificationNumber by
mandatory MSID in the INVOKE component with reference to a note worded in the
same way as the note added as reference for the MSID in the FeatureRequest
INVOKE.)

6.4.2.16 HandoffBack2

Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional
MobileIdentificationNumber and optional IMSI, with reference to new note ‘r. Include
if available. At least one of these parameters should be present.’).

6.4.2.20 HandoffToThird2

Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional
MobileIdentificationNumber and optional IMSI, with reference to new note ‘q. Include
if available. At least one of these parameters should be present.’).

6.4.2.21 InformationDirective

The InformationDirective operation is used by the HLR to direct the serving system to provide a
specified notification to an idle MS.

The InformationDirective operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP
QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.4.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.4.1.1</td>
<td></td>
</tr>
</tbody>
</table>

... remaining parameters unchanged...

Notes:  ...no change to existing notes...

e. The HLR includes the type of MSID last received from the Serving System. The VLR includes
the type of MSID last received from the Serving MSC; this may not be the type of MSID
received from the HLR.
...Remainder of section unchanged...

### 6.4.2.22 InformationForward

*Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to new note ‘b. Include if available. At least one of these parameters should be present.’).*

### 6.4.2.23 InterSystemAnswer

*Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to new note ‘b. Include if available. At least one of these parameters should be present.’).*

### 6.4.2.24 InterSystemPage

*Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to a note worded in the same way as the note added as reference for the MobileIdentificationNumber and IMSI in the FacilitiesDirective2 INVOKE.)*

### 6.4.2.25 InterSystemPage2

*Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to a note worded in the same way as the note added as reference for the MobileIdentificationNumber and IMSI in the FacilitiesDirective2 INVOKE.)*

### 6.4.2.26 InterSystemSetup

*Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to a note worded in the same way as the note added as reference for the MobileIdentificationNumber and IMSI in the FacilitiesDirective2 INVOKE.)*

### 6.4.2.27 LocationRequest

The LocationRequest operation is used by an Originating MSC to obtain call treatment instructions from the HLR. The call is identified by the dialed MS address digits received by the Originating MSC.

*…no change required…*
The LocationRequest operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.4.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.4.1.1</td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td>M 6.5.2.63</td>
<td></td>
<td></td>
<td>a</td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td>M 6.5.2.81</td>
<td></td>
<td></td>
<td>a</td>
</tr>
<tr>
<td>MSCID (Serving MSC)</td>
<td>M 6.5.2.82</td>
<td></td>
<td></td>
<td>b</td>
</tr>
<tr>
<td>...optional parameters omitted (no changes required)…</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSI</td>
<td>O 6.5.2.bu</td>
<td></td>
<td></td>
<td>f</td>
</tr>
<tr>
<td>...optional parameters omitted, no changes required…</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: …no changes required… (note f -Include if available.)
### 6.4.2.29 MSInactive

Same changes as 6.4.2.13. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the FeatureRequest INVOKE.)

### 6.4.2.30 OriginationRequest

Same changes as 6.4.2.13. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the FeatureRequest INVOKE.)

### 6.4.2.31 QualificationDirective

Same changes as 6.4.2.21. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the InformationDirective INVOKE.)

### 6.4.2.32 QualificationRequest

Same changes to the INVOKE component as the changes made to the INVOKE component in 6.4.2.13. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the FeatureRequest INVOKE.)

### 6.4.2.34 RedirectionDirective

Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to a note worded in the same way as the note added as reference for the MobileIdentificationNumber and IMSI in the FacilitiesDirective2 INVOKE.)

### 6.4.2.35 RedirectionRequest

Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to a note worded in the same way as the note added as reference for the MobileIdentificationNumber and IMSI in the FacilitiesDirective2 INVOKE.)

### 6.4.2.36 RegistrationCancellation

Same changes as 6.4.2.21. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the InformationDirective INVOKE.)

### 6.4.2.37 RegistrationNotification
Same changes to the INVOKE component as the changes made to the INVOKE component in 6.4.2.13. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the FeatureRequest INVOKE.)

The RegistrationNotification operation success is reported with a TCAP RETURN RESULT (LAST). This is carried by a TCAP RESPONSE package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.4.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.4.1.1</td>
<td></td>
</tr>
</tbody>
</table>

Contents

| SystemMyTypeCode (VLR or HLR) | M    | 6.5.2.147 |       |
| ...existing optional parameters unchanged... |     |         |       |
| MSID                          | O    | 6.5.2.bv | k     |

Notes:

a..j unchanged...

k. Include MIN if available and IMSI was included in INVOKE. Include IMSI if available and MIN was included in INVOKE.

6.4.2.40 RoutingRequest

The RoutingRequest operation is used to inquire as to the preferred method of routing a pending call to the identified MS.

The RoutingRequest operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.4.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.4.1.1</td>
<td></td>
</tr>
</tbody>
</table>

Contents

| BillingID (Originating) | M    | 6.5.2.16 | a     |
| ElectronicSerialNumber  | M    | 6.5.2.63 |       |
| MobileIdentificationNumber | MSID | 6.5.2.bv | r     |
| ... remaining parameters unchanged... | ... | ... | ... |

Notes:

...no change to existing notes...

r. When this message is used in accessing a feature at an adjunct MSC (e.g. for voice message retrieval), the HLR includes the type of MSID appropriate to the MS and the feature being accessed; otherwise the HLR includes the type of MSID last received from the Serving
System. The VLR includes the type of MSID last received from the Serving MSC; this may not be the type of MSID received from the HLR.

...Remainder of section unchanged...

6.4.2.41 SMSDeliveryBackward

Same changes as 6.4.2.13. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the FeatureRequest INVOKE.)

6.4.2.42 SMSDeliveryForward

Same change as 6.4.2.11 (replace mandatory MobileIdentificationNumber by optional MobileIdentificationNumber and optional IMSI, with reference to existing note 'h.

6.4.2.43 SMSDeliveryPointToPoint

The SMSDeliveryPointToPoint operation is a general purpose operation that is used to convey a short message or in general any other information or encapsulated data from one point to another point and report on the success of failure of that transfer.

The SMSDeliveryPointToPoint operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

Table 94  SMSDeliveryPointToPoint INVOKE Parameters

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
<td>M</td>
<td>6.4.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.4.1.1</td>
<td></td>
</tr>
</tbody>
</table>

Contents

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS_BearerData</td>
<td></td>
<td>M</td>
<td>6.5.2.124</td>
<td></td>
</tr>
<tr>
<td>SMS_TeleserviceIdentifier</td>
<td></td>
<td>M</td>
<td>6.5.2.137</td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td></td>
<td>O</td>
<td>6.5.2.63</td>
<td>a</td>
</tr>
<tr>
<td>MobileIdentificationNumber_MSID</td>
<td></td>
<td>O</td>
<td>6.5.2.bv81</td>
<td>a,j</td>
</tr>
<tr>
<td>... remaining parameters unchanged...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:  ...no change to existing notes...

i. When this message is sent from an MC to the Anchor or Serving MSC for an MS-based SME, the MC includes the type of MSID last received in an SMSNotification INVOKE or in SMSRequest RETURN RESULT for that MS.

...Remainder of section unchanged...
6.4.2.44 SMSNotification

The SMSNotification operation is used to report a change in an MS’s ability to receive SMS messages based on the location or status of the MS. This message, at a minimum, is used to report the accessibility of an MS following a postponed SMSRequest or SMSDeliveryPointToPoint. This message may also be used to revoke delivery permission previously granted with either an SMSRequest or an SMSNotification.

The SMSNotification operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>SMSNotification INVOKE Parameters</th>
<th>Timer: SNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>Value</td>
</tr>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
</tr>
<tr>
<td>Contents</td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td>M</td>
</tr>
<tr>
<td>MobileIdentificationNumber MSID</td>
<td>M</td>
</tr>
<tr>
<td>... remaining parameters unchanged…</td>
<td>...</td>
</tr>
</tbody>
</table>

Notes: …no change to existing notes…

c. The HLR includes the type of MSID last received from the Serving System. The MSC includes the identifier with which the MS last accessed the system, unless that identifier was a MIN-based IMSI, in which case it includes the MobileIdentificationNumber (populated with the MIN derived from that IMSI).

...Remainder of section unchanged…

6.4.2.45 SMSRequest

Same changes to the INVOKE component as the changes made to the INVOKE component in 6.4.2.21. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the InformationDirective INVOKE.)

6.4.2.43 TransferToNumberRequest

The TransferToNumberRequest operation is used during feature processing to obtain an MS’s forward-to number from the HLR.

The TransferToNumberRequest operation is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. The Parameter Set is encoded as follows:

<table>
<thead>
<tr>
<th>TransferToNumberRequest INVOKE Parameters</th>
<th>Timer: TTNRT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Field</td>
<td>Value</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Identifier</td>
<td>SET [NATIONAL 18]</td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
</tr>
</tbody>
</table>

**Contents**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ElectronicSerialNumber</td>
<td>M</td>
<td>6.5.2.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber MSID</td>
<td>M</td>
<td>6.5.2.bv81</td>
<td>g</td>
<td></td>
</tr>
</tbody>
</table>

...remaining parameters unchanged...

**Notes:** …no change to existing notes…

- g. Use the MobileIdentificationNumber form of the MSID if the IMSI is known to be a MIN-based IMSI.

...Remainder of section unchanged…

**6.4.2.51 UnsolicitedResponse**

Same changes as 6.4.2.13. (Replace mandatory MobileIdentificationNumber by mandatory MSID in the INVOKE component with reference to a note worded in the same way as the note added as reference for the MSID in the FeatureRequest INVOKE.)
6.5 MAP PARAMETERS

6.5.1 General

6.5.1.1 Parameter Format

*TIA/EIA-41* MAP uses the TCAP parameter format defined in ANSI T1.114.

6.5.1.2 Parameter Identifiers

The following table lists the *TIA/EIA-41* MAP Parameter Identifiers.

<table>
<thead>
<tr>
<th>Parameter Identifier Name</th>
<th>Parameter Identifier Code</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSI</td>
<td>10011111</td>
<td>6.5.2.bu</td>
</tr>
<tr>
<td></td>
<td>100000001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>01110010</td>
<td></td>
</tr>
</tbody>
</table>

6.5.2.54 DenyAccess

The DenyAccess (DENACC) parameter is used by the AC to indicate that the visiting MS to which the DenyAccess response applies is invalid.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>DenyAccess</td>
<td>M</td>
<td>6.5.1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMPLICIT Unsigned Enumerated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>1 octet</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
<tr>
<td>Contents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>H</th>
<th>G</th>
<th>F</th>
<th>E</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
<th>octet</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DenyAccess Reason</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 137  DenyAccess Reason value

<table>
<thead>
<tr>
<th>Bits</th>
<th>H</th>
<th>G</th>
<th>F</th>
<th>E</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Not used.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Unspecified.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>SSD Update failure.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>COUNT Update failure.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>Unique Challenge failure.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>AUTHR mismatch.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>COUNT mismatch.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>7</td>
<td>Process collision.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>8</td>
<td>Missing authentication parameters.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>8</td>
<td>9</td>
<td>TerminalType mismatch.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>10</td>
<td>MIN, IMSI or ESN authorization failure.</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>11</td>
<td>Reserved. Treat the same as value 1, Unspecified.</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>12</td>
<td>Reserved for IS-41 protocol extension. If unknown, treat the same as value 1, Unspecified.</td>
</tr>
</tbody>
</table>

6.5.2.60  DMH_AlginateBillingDigits

The DMH_AlginateBillingDigits (ABDGTS) parameter specifies a non-telephony billing number, such as a calling card number, credit card account number, debit card account code, etc. The DMH_AlginateBillingDigits is supplied and screened by a subscriber’s home cellular service provider.

The account responsible for a call is based upon the presence of the following parameters in order of precedence:

a. DMH_AlginateBillingDigits.

b. DMH_BillingDigits.

c. MobileDirectoryNumber.

d. MobileIdentificationNumber or IMSI.
<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>DMH_AlternateBillingDigits</td>
<td>M</td>
<td>6.5.1.2</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>IMPLICIT DigitsType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
</tbody>
</table>

**Contents**

<table>
<thead>
<tr>
<th>H</th>
<th>G</th>
<th>F</th>
<th>E</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
<th>octet</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
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<td>Type of Digits 1 b</td>
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<td></td>
<td></td>
<td></td>
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<td>Nature of Number 2 c</td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td>Numbering Plan</td>
</tr>
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<td></td>
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<td>Number of Digits 4 f</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; BCD Digit</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4&lt;sup&gt;th&lt;/sup&gt; BCD Digit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• • • • • • • • • • • •</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>n&lt;sup&gt;th&lt;/sup&gt; BCD Digit</td>
</tr>
</tbody>
</table>

**Figure 68**  DMH_AlternateBillingDigits parameter for BCD digits

Notes:

a. Refer to the DigitsType parameter type (see 6.5.3.2) for notes and field encoding.

b. The Type of Digits field is ignored on receipt.

c. The Nature of Number field is ignored on receipt.

d. The Numbering Plan field is ignored on receipt.

e. The Encoding field is set to BCD.

f. The Number of Digits is between 0 and at least 15.
The DMH_BillingDigits (BILLDGTS) parameter specifies the telephony billing number used for calls with special billing arrangements to identify the party to be billed, such as third party billing, calling card, etc. The billing number must be a valid telephony number for billing the call.

The account responsible for a call is based upon the presence of the following parameters in order of precedence:

a. DMH_AlternateBillingDigits.

b. DMH_BillingDigits.

c. MobileDirectoryNumber.

d. MobileIdentificationNumber or IMSI.

The network charge number for a call is determined by the presence of the following parameters in order of precedence:

a. DMH_BillingDigits.

b. MobileDirectoryNumber.

c. MobileIdentificationNumber or IMSI.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>DMH_BillingDigits IMPLICIT DigitsType</td>
<td>M</td>
<td>6.5.1.2</td>
<td>a</td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 69 DMH_BillingDigits parameter for BCD digits**

Notes:

a. See the DigitsType parameter type (see 6.5.3.2) for notes and field encoding.

b. The Type of Digits field is set to Billing Number.

c. The Nature of Number field is ignored on receipt.

d. The Numbering Plan field is ignored on receipt.

e. The Encoding field is set to BCD.

f. The Number of Digits is between 0 and at least 15.
The IMSI (International Mobile Station Identity) parameter is used to identify a specific MS. It is defined in ITU-T recommendation E.212. IMSI may be up to 15 digits in length. Only the last digit may be set to the filler value (i.e. for IMSI with an odd number of digits).

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>IMSI IMPLICIT OCTET STRING</td>
<td>M</td>
<td>6.5.1.2</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable octets</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
</tbody>
</table>

### Contents

<table>
<thead>
<tr>
<th>H</th>
<th>G</th>
<th>F</th>
<th>E</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
<th>octet</th>
<th>Notes</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit 2</td>
<td>Digit 1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit 4</td>
<td>Digit 3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit 6</td>
<td>Digit 5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit 8</td>
<td>Digit 7</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit 10</td>
<td>Digit 9</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit 12</td>
<td>Digit 11</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit 14</td>
<td>Digit 13</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>filler</td>
<td>Digit 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure XX** IMSI parameter

Notes:

a. Digit 1 (bits A through D of octet 1) is the most significant digit (i.e. first digit of MCC).

### Table XX IMSI Digit values

**Digit n, where n=\{0, 1, 2, \ldots, 15\} (octets 1-8)**

<table>
<thead>
<tr>
<th>Bits or D C B A</th>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0</td>
<td>0</td>
<td>Digit = 0.</td>
</tr>
<tr>
<td>0 0 0 1</td>
<td>1</td>
<td>Digit = 1.</td>
</tr>
<tr>
<td>0 0 1 0</td>
<td>2</td>
<td>Digit = 2.</td>
</tr>
<tr>
<td>0 0 1 1</td>
<td>3</td>
<td>Digit = 3.</td>
</tr>
<tr>
<td>0 1 0 0</td>
<td>4</td>
<td>Digit = 4.</td>
</tr>
<tr>
<td>0 1 0 1</td>
<td>5</td>
<td>Digit = 5.</td>
</tr>
<tr>
<td>0 1 1 0</td>
<td>6</td>
<td>Digit = 6.</td>
</tr>
<tr>
<td>0 1 1 1</td>
<td>7</td>
<td>Digit = 7.</td>
</tr>
<tr>
<td>1 0 0 0</td>
<td>8</td>
<td>Digit = 8.</td>
</tr>
<tr>
<td>1 0 0 1</td>
<td>9</td>
<td>Digit = 9.</td>
</tr>
<tr>
<td>X X X X</td>
<td>-</td>
<td>Values 10 through 14 reserved.</td>
</tr>
<tr>
<td>1 1 1 1</td>
<td>15</td>
<td>Filler</td>
</tr>
</tbody>
</table>
### 6.5.2.74 IntersystemTermination

The IntersystemTermination (ISTERM) parameter is used to provide an MSC with routing information for calls which are to be terminated on another MSC.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>IntersystemTermination</td>
<td>M</td>
<td>6.5.1.2</td>
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</tr>
<tr>
<td></td>
<td>IMPLICIT SEQUENCE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
<tr>
<td><strong>Contents</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DestinationDigits</td>
<td>M</td>
<td>6.5.2.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSCID (serving)</td>
<td>M</td>
<td>6.5.2.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>…optional parameters omitted (no changes required)…</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSI</td>
<td>O</td>
<td>6.5.2.bu e, k</td>
<td></td>
<td></td>
</tr>
<tr>
<td>…optional parameters omitted (no changes required)…</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td>O</td>
<td>6.5.2.81 e, k</td>
<td></td>
<td></td>
</tr>
<tr>
<td>…optional parameters omitted (no changes required)…</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 82** IntersystemTermination parameter

**Notes:** no changes required to existing notes

k. Include at least one for recording purposes, if TerminationTreatment indicates that termination is to an MS. In this case, include all available when the IntersystemTermination is included in a TerminationList parameter being returned in a LocationRequest RETURN RESULT, but when the IntersystemTermination is included in a TerminationList parameter being returned in the RETURN RESULT for some other operation, the identifier to be included shall be of the same type as the type of MSID received in the INVOKE provided that an identifier of that type has been assigned to the MS.
6.5.2.76 LocalTermination

The LocalTermination (LOCTERM) parameter is used to provide an MSC with routing information for calls which are to be terminated on the same MSC.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
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<td>LocalTermination</td>
<td>M</td>
<td>6.5.1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMPLICIT SEQUENCE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
<tr>
<td>Contents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ElectronicSerialNumber</td>
<td></td>
<td>M</td>
<td>6.5.2.63</td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td>MSID</td>
<td>M</td>
<td>6.5.2.81 bn</td>
<td></td>
</tr>
<tr>
<td>TerminationTreatment</td>
<td></td>
<td>M</td>
<td>6.5.2.158</td>
<td></td>
</tr>
<tr>
<td>...optional parameters omitted (no changes required)...</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSI</td>
<td>O</td>
<td>6.5.2.64</td>
<td>l</td>
<td></td>
</tr>
<tr>
<td>...optional parameters omitted (no changes required)...</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td></td>
<td>O</td>
<td>6.5.2.81 bn</td>
<td>l</td>
</tr>
<tr>
<td>...optional parameters omitted (no changes required)...</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 84 LocalTermination parameter

Notes: ...no changes required to existing notes...

1. Include all available when the LocalTermination is included in a TerminationList parameter being returned in a LocationRequest RETURN RESULT. When the LocalTermination is included in a TerminationList parameter being returned in the RETURN RESULT for some other operation, the identifier to be included shall be of the same type as the type of MSID received in the INVOKE provided that an identifier of that type has been assigned to the MS.

6.5.2.bv MSID

The MSID (Mobile Station Identity) identifies a mobile station (MS). The MSID CHOICE is not explicitly encoded with a parameter id and length.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOICE</td>
<td></td>
<td>M</td>
<td>6.5.3.1</td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td></td>
<td>O</td>
<td>6.5.2.81</td>
<td></td>
</tr>
<tr>
<td>IMSI</td>
<td>O</td>
<td>6.5.2.64</td>
<td>l</td>
<td></td>
</tr>
</tbody>
</table>

Figure XX MSID parameter
**PSTN Termination**

The PSTN Termination (PSTNTERM) parameter is used to provide an MSC with routing information for calls which are to be terminated in the PSTN.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>PSTN Termination</td>
<td>M</td>
<td>6.5.1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMPLICIT SEQUENCE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>variable</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
<tr>
<td>Contents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DestinationDigits</td>
<td></td>
<td>M</td>
<td>6.5.2.56</td>
<td></td>
</tr>
<tr>
<td>...optional parameters omitted (no changes required)...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSI</td>
<td></td>
<td>O</td>
<td>6.5.2.81</td>
<td>c, e</td>
</tr>
<tr>
<td>...optional parameters omitted (no changes required)...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MobileIdentificationNumber</td>
<td></td>
<td>O</td>
<td>6.5.2.81</td>
<td>c, e</td>
</tr>
<tr>
<td>...optional parameters omitted (no changes required)...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Figure 106 PSTN Termination parameter](image)

**Notes:** no changes required to existing notes

---

**ReportType**

The ReportType (RPTTYP) parameter indicates the type of authentication failure being reported by the Visited System (MSC or VLR) to the AC.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Type</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>ReportType</td>
<td>M</td>
<td>6.5.1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMPLICIT Unsigned Enumerated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>1 octet</td>
<td>M</td>
<td>6.5.1.1</td>
<td></td>
</tr>
<tr>
<td>Contents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H G F E D C B A octet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ReportType</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Figure 120 ReportType parameter](image)
### Table 172  ReportType value

<table>
<thead>
<tr>
<th>Bits H G F E D C B A</th>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0 0 0 0 0 0</td>
<td>0</td>
<td>Not used.</td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 0 1</td>
<td>1</td>
<td>Unspecified security violation.</td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 1 0</td>
<td>2</td>
<td>MIN MSID/ESN mismatch.</td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 1 1</td>
<td>3</td>
<td>RANDC mismatch.</td>
</tr>
<tr>
<td>0 0 0 0 0 1 0 0 0</td>
<td>4</td>
<td>Reserved (see TSB51).</td>
</tr>
<tr>
<td>0 0 0 0 0 1 0 1 0</td>
<td>5</td>
<td>SSD Update failed.</td>
</tr>
<tr>
<td>0 0 0 0 0 1 1 0 0</td>
<td>6</td>
<td>Reserved (see TSB51).</td>
</tr>
<tr>
<td>0 0 0 0 0 1 1 1 1</td>
<td>7</td>
<td>COUNT mismatch.</td>
</tr>
<tr>
<td>0 0 0 0 1 0 0 0 0</td>
<td>8</td>
<td>Reserved (see TSB51).</td>
</tr>
<tr>
<td>0 0 0 0 1 0 0 1</td>
<td>9</td>
<td>Unique Challenge failed.</td>
</tr>
<tr>
<td>0 0 0 0 1 0 1 0</td>
<td>10</td>
<td>Unsolicited Base Station Challenge.</td>
</tr>
<tr>
<td>0 0 0 0 1 0 1 1</td>
<td>11</td>
<td>SSD Update no response.</td>
</tr>
<tr>
<td>0 0 0 0 1 1 0 0</td>
<td>12</td>
<td>COUNT Update no response.</td>
</tr>
<tr>
<td>0 0 0 0 1 1 0 1</td>
<td>13</td>
<td>Unique Challenge no response.</td>
</tr>
<tr>
<td>0 0 0 0 1 1 1 0</td>
<td>14</td>
<td>AUTHR mismatch.</td>
</tr>
<tr>
<td>0 0 0 0 1 1 1 1</td>
<td>15</td>
<td>TERMTYP mismatch.</td>
</tr>
<tr>
<td>0 0 0 1 0 0 0 0</td>
<td>16</td>
<td>Missing authentication parameters.</td>
</tr>
<tr>
<td>0 0 0 1 0 0 0 1</td>
<td>17</td>
<td>Reserved. Treat the same as value 1, Unspecified security violation.</td>
</tr>
<tr>
<td>1 1 0 1 1 1 1 1</td>
<td>223</td>
<td>Reserved. Treat the same as value 1, Unspecified security violation.</td>
</tr>
<tr>
<td>1 1 0 0 0 0 0 0</td>
<td>224</td>
<td>Reserved for IS-41 protocol extension. If unknown, treat the same as value 1, Unspecified security violation.</td>
</tr>
</tbody>
</table>

#### 6.5.2.125  SMS_CauseCode

The SMS_CauseCode parameter indicates a reason for not delivering an SMS message.

#### Field | Value | Type | Reference |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>SMS_CauseCode</td>
<td>M</td>
<td>6.5.1.2</td>
</tr>
<tr>
<td>Length</td>
<td>IMPLICIT OCTET STRING</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Contents

<table>
<thead>
<tr>
<th>H G F E D C B A octet</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS Cause Code</td>
<td>1 a</td>
</tr>
<tr>
<td>...</td>
<td>n b</td>
</tr>
</tbody>
</table>

**Figure 136  SMS_CauseCode parameter**

**Notes:**

a. Only the SMS_CauseCode SMS delivery postponed is used to indicate that an SMS message is pending delivery and that notification shall be provided.

b. Ignore extra octets, if received. Send only defined (or significant) octets.
Table 171  SMS_CauseCode value

<table>
<thead>
<tr>
<th>SMS Cause Code (octet 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Network Problems:</td>
</tr>
<tr>
<td>Bits</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

...Much of table omitted (no changes required)...

Table 177 (concluded)

<table>
<thead>
<tr>
<th>SMS Cause Code (octet 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. General Problems :</td>
</tr>
<tr>
<td>Bits</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

...remainder of table unchanged...
TIA/EIA-41.6 Changes (Signaling Procedures)

Changes in this section are to modify the TIA/EIA-41 procedures to support IMSI. This mainly involves replacing MobileIdentificationNumber by MSID, or by adding IMSI as optional, when both may be present. For every modification, one complete example is given, and subsequent changes simply refer back to that example.

1 Introduction

No changes required

2 Technology and Concepts

No changes required

3 Basic Call Processing

3.3.5 MS Termination Alerting

...note: alerting by MobileDirectoryNumber is not possible...

1-5 IF the MobileDirectoryNumber parameter is received:
  1-5-1 Include the MobileDirectoryNumber parameter as the Called Number in the MS alerting command.
  1-6 ELSE:
  1-6-1 Include the MobileIdentificationNumber parameter as the Called Number in the MS alerting command.
  1-7 ENDIF.
1-5 Include the appropriate MS identifier (MIN or IMSI) in the alerting command.
1-6 null
1-7 null

... 2-2-3 IF the MobileDirectoryNumber parameter is received:
  2-2-3-1 Include the MobileDirectoryNumber parameter as the Called Number in the MS alerting command.
  2-2-4 ELSE:
  2-2-4-1 Include the MobileIdentificationNumber parameter as the Called Number in the MS alerting command.
  2-2-5 ENDIF.
2-2-3 Include the appropriate mobile identifier (MIN or IMSI) in the MS alerting command.
2-2-4 null
2-2-5 null

... 3.3.7 MSC Record the DMH Parameters

1 IF the MobileIdentificationNumber parameter is received:
  1-1 Record the MobileIdentificationNumber parameter (see DMH).
  2 ENDIF.
2A IF the IMSI parameter is received:
   2A-1 Record the IMSI parameter (see DMH).
2B ENDIF.
3 IF the ElectronicSerialNumber parameter is received:
   3-1 Record the ElectronicSerialNumber parameter (see DMH).
   4 ENDIF.

4 INTERSYSTEM PROCEDURES

4.1.1 AC Initiation of an Authentication Directive
When an AC determines that the authentication parameters associated with an MS must be changed, it shall start the authentication directive process. For example, the authentication parameters may be changed due to AC administrative procedures, when an authentication abnormality is detected or periodically.

The AC shall perform the following:

   1 Include the ElectronicSerialNumber parameter set to identify the MS.
   2 Include the MobileIdentificationNumber MSID parameter set to identify the MS.

… no further changes …

4.1.2 HLR Receiving AuthenticationDirective INVOKE
When an HLR receives an AuthenticationDirective INVOKE, it shall perform the following:

   1 IF the received message can be processed:
      1-1 Include the SenderIdentificationNumber set to the identification number of the HLR.
      1-x Include the MSID parameter set to identify the MS to the VLR.
      1-2 Relay all other received parameters.

… no further changes before error table …

<table>
<thead>
<tr>
<th>Problem Detection and Recommended Response from HLR to AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROBLEM DEFINITION</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>RETURN ERROR Error Code</td>
</tr>
<tr>
<td>UnrecognizedMIN</td>
</tr>
<tr>
<td>UnrecognizedESN</td>
</tr>
<tr>
<td>MIN/MSID/HLR Mismatch</td>
</tr>
<tr>
<td>…no change…</td>
</tr>
<tr>
<td>UnrecognizedIMSI</td>
</tr>
<tr>
<td>RETURN RESULT</td>
</tr>
</tbody>
</table>

Problem Detection:

1.5 … no change …

6. The supplied MobileIdentificationNumber MSID parameter is not in the HLR’s range of MINs MSIDs or directory numbers (suspect routing error).

7. The supplied MobileIdentificationNumber or IMSI parameter is within the range of the HLR, but the MIN MS is not Authentication capable or authorized.
8. An optional parameter required by the HLR was expected, but not received (e.g., only MobileIdentificationNumber and ElectronicSerialNumber parameters received).

9. The supplied MobileIdentificationNumber or IMSI parameter is within the range of the HLR, but the supplied ElectronicSerialNumber parameter is not valid for the MIN’s authentication record.

10.11 ... no change ...

Notes: ...no change...

**Editing Instructions for Remaining Error Code Tables**

1. Add row to table for new error code UnrecognizedIMSI:

| UnrecognizedIMSI |     |     |     |     |     |     |     | X |     |     |     |     |

2. Insert X in this row associated with the same “Problem Definition” as associated with the UnrecognizedMIN error code (if there is one).

3. If there is a problem definition associated with UnrecognizedMIN and UnrecognizedIMSI, replace MobileIdentificationNumber by MSID and MIN (if present) by MS, e.g.;

   ?. The supplied MobileIdentificationNumber or IMSI parameter is not in the HLR’s range of MINs MSIDs or directory numbers (suspect routing error).

4. Add a similar note as associated with UnrecognizedMIN.

5. Modify the name of the MIN/HLRMismatch error code to MSID/HLRMismatch.

6. If there is a Problem Definition associated with MSID/HLRMismatch, modify it to:
   i. Replace MobileIdentificationNumber, if present, by MSID.
   ii. Replace MIN, if present, by MSID.

   An example of this modification is shown below:

   ?. The supplied MobileIdentificationNumber or IMSI parameter is not in the HLR’s range of MINs MSIDs or directory numbers (suspect routing error).

**4.2.1 Anchor MSC Initiating an Authentication Directive Forward**

When the Anchor MSC receives a request to perform a Unique Challenge for an MS that is engaged in a call and has been handed off to another MSC, the Anchor MSC shall perform the following:

1. Include the MobileIdentificationNumber parameter set to the specified MS’s MIN (if available).

   1A. Include the IMSI parameter set to the specified MS’s IMSI (if available).

2. Include the RandomVariableUniqueChallenge (RANDU) and AuthenticationResponseUnique (AUTHU) parameters specified by the calling task.

   …no further changes…

**4.3.3 HLR Receiving AuthenticationFailureReport INVOKE**

When an HLR receives an AuthenticationFailureReport INVOKE, it shall perform the following:

1. IF the received message can be processed:

   1-x. Include the MSID parameter set to identify the MS to the AC.

   1-1. Relay all other received parameters.

   1-2. Start the Authentication Failure Report Timer (AFRT).
1-3 Send an AuthenticationFailureReport INVOKE to the AC associated with the MS.
1-4 WAIT for an Authentication Failure Report response:
1-5 WHEN a RETURN RESULT is received:
1-5-1 Stop timer (AFRT).
1-5-2 IF the message can be processed:
1-5-2-x IF the SharedSecretData parameter is received:
1-5-2-x-1 IF the MIN may be needed for authentication calculations for the MS:
1-5-2-x-1-1 IF the MobileIdentificationNumber parameter was not present as the MSID parameter in the INVOKE AND IF the MIN cannot be derived from the IMSI:
1-5-2-x-1-1-1 Include the MobileIdentificationNumber parameter set to identify the MS to the VLR.
1-5-2-x-1-2 ENDIF.
1-5-2-x-2 ENDIF.
1-5-2-y ENDIF.
1-5-2-1 Relay all received parameters.
… no further changes …

4.4.2 VLR Receiving AuthenticationRequest INVOKE

When a VLR receives an AuthenticationRequest INVOKE, it shall perform the following:

1 IF the received message can be processed:
1-1 IF the indicated MS’s AuthenticationCapability status information indicates that authentication is not required:
1-1-1 Send an AuthenticationRequest RETURN RESULT to the requesting MSC.
1-1-2 Exit this task.
1-2 ENDIF.
1-3 IF the MS is not allowed to register (e.g., the MS is on a negative list or registration attempts for the MS from same MSCID and LocationAreaID have failed in the recent past or the request is within a previously received DeniedAuthorizationPeriod):
1-3-1 Include the DenyAccess parameter set to Unspecified.
1-3-2 Send a RETURN RESULT to the requesting MSC.
1-3-3 Exit this task.
1-4 ENDIF.
1-5 IF the SharedSecretData (SSD) was provided to the VLR:
1-5-1 IF the MobileIdentificationNumber MSID and ElectronicSerialNumber parameters reported by the MS cannot be validated:
1-5-1-1 Send an AuthenticationRequest RETURN RESULT to the requesting MSC.
1-5-1-2 Include the ReportType parameter set to MIN MSID/ESN Mismatch.
1-5-1-3 Execute the “VLR Initiating an Authentication Failure Report” task (see 4.3.5).
1-5-1-4 Exit this task.
1-5-2 ENDIF.
… no further changes …
4.4.3 HLR Receiving AuthenticationRequest INVOKE

When an HLR receives an AuthenticationRequest INVOKE, it shall perform the following:

1. IF the received message can be processed:
   1-x Include the MSID parameter set to identify the MS to the AC.
   1-1 Include the SenderIdentificationNumber set to the identification number of the HLR.
   1-2 Relay all other received parameters.
   1-3 Send an AuthenticationRequest INVOKE to the AC associated with the MS.
   1-4 Start the Authentication Request Timer (ART).
   1-5 WAIT for an Authentication Request response:
   1-6 WHEN a RETURN RESULT is received:
       1-6-1 Stop timer (ART).
       1-6-2 IF the message can be processed:
           1-6-2-x IF the SharedSecretData parameter is received:
               1-6-2-x-1 IF the MIN may be needed for authentication calculations for the MS:
                   1-6-2-x-1-1 IF the MobileIdentificationNumber parameter was not present as the MSID
                       parameter in the INVOKE AND IF the MIN cannot be derived from the IMSI:
                           1-6-2-x-1-1-1 Include the MobileIdentificationNumber parameter set to identify the
                                           MS to the VLR.
                   1-6-2-x-2 ENDIF.
               1-6-2-x-2 ENDIF.
               1-6-2-y ENDIF.
       1-6-2-1 IF the MS’s service profile indicates that the MS is not authorized for Voice Privacy:
           1-6-2-1-1 Discard any received VoicePrivacyMask (VPMASK) or
                       CDMAPrivateLongCodeMask (CDMA PLCM) parameters.
       1-6-2-2 ENDIF.
       1-6-2-3 Relay all other received parameters.
       … no further changes …

4.4.4 AC Receiving AuthenticationRequest INVOKE

When an AC receives an AuthenticationRequest INVOKE, it shall perform the following:

...
4.5.3 HLR Receiving AuthenticationStatusReport INVOKE

When an HLR receives an AuthenticationStatusReport INVOKE, it shall perform the following:

1 IF the received message can be processed:
   1-x Include the MSID parameter set to identify the MS to the AC.
   1-1 Include the SenderIdentificationNumber set to the identification number of the HLR.
   1-2 Relay all other received parameters.
   1-3 Start the Authentication Status Report Timer (ASRT).
   1-4 Send an AuthenticationStatusReport INVOKE to the AC associated with the MS.
   1-5 WAIT for an Authentication Status Report response:
   1-6 WHEN a RETURN RESULT is received:
      1-6-1 Stop timer (ASRT).
      1-6-2 IF the message can be processed:
         1-6-2-x IF the SharedSecretData parameter is received:
            1-6-2-x-1 IF the MIN may be needed for authentication calculations for the MS:
               1-6-2-x-1-1 IF the MobileIdentificationNumber parameter was not present as the MSID parameter in the INVOKE AND IF the MIN cannot be derived from the IMSI:
                  1-6-2-x-1-1-1 Include the MobileIdentificationNumber parameter set to identify the MS to the VLR.
               1-6-2-x-1-2 ENDIF.
            1-6-2-x-2 ENDIF.
         1-6-2-y ENDIF.
      1-6-2-1 Relay all received parameters.
   … no further changes …

4.6 BASE STATION CHALLENGE

4.6.1 MSC Initiating a Base Station Challenge

When an MSC receives a Base Station Challenge Order from an MS, it shall perform the following:

1 Include the ElectronicSerialNumber parameter set to identify the MS.
2 Include the MobileIdentificationNumber MSID parameter set to identify the MS.
… no further changes …

4.6.3 HLR Receiving BaseStationChallenge INVOKE

When an HLR receives a BaseStationChallenge INVOKE, it shall perform the following:

1 IF the received message can be processed:
   1-x Include the MSID parameter set to identify the MS to the AC.
   1-1 Include the SenderIdentificationNumber set to the identification number of the HLR.
   1-2 Relay all other received parameters.
4.10 COUNT REQUEST

4.10.1 AC Initiating a Count Request

When an AC determines that it needs to retrieve the current value of the CallHistoryCount (COUNT) parameter from the current serving system, it shall perform the following:

1. Include the ElectronicSerialNumber parameter set to identify the MS.
2. Include the MobileIdentificationNumber MSID parameter set to identify the MS.

4.10.2 HLR Receiving CountRequest INVOKE

When an HLR receives a CountRequest INVOKE, it shall perform the following:

1. IF the received message can be processed:
   1-1. IF the CallHistoryCount (COUNT) cannot be retrieved for the indicated MS:
   1-1-1. Send a CountRequest RETURN RESULT to the requesting AC (without the CallHistoryCount (COUNT) parameter).
   1-1-2. Exit this task.
   1-2. ENDIF.
   1-x. Include the MSID parameter set to identify the MS to the VLR.
1-3. Include the SenderIdentificationNumber set to the identification number of the HLR.
1-4. Relay all other received parameters.

4.11 FACILITIES DIRECTIVE (HANDOFF FORWARD)

The handoff forward using the FacilitiesDirective operation is described in this section.

4.11.1 Serving MSC Initiating a Facilities Directive

When a Serving MSC determines that it needs to handoff a call to a Target MSC, it shall do the following:

1. IF handoff is allowed (e.g., InterSwitchCount value at the Serving MSC is less than MAXHANDOFF, see 2.1):
   1-3-17. Include the ElectronicSerialNumber parameter set to identify the MS.
   1-3-18. Include the MobileIdentificationNumber parameter set to identify the MS, if available.
   1-3-18A. Include the IMSI parameter set to identify the MS, if available (and if this task is being used to initiate a FacilitiesDirective2 message, and not FacilitiesDirective).

… no further changes …
4.14.1 MSC Detecting Feature Request

When performing digit analysis of the dialed digits received from the MS, the MSC detects that the
dialed digits are a feature control access. It shall perform the following:

1. Include the BillingID parameter set to identify the current call for billing and redirection purposes.
2. Include the Digits (Dialed) parameter set to the digits received from the MS.
3. Include the ElectronicSerialNumber parameter set to identify the MS.
4. Include the MobileIdentificationNumber MSID parameter set to identify the MS.

4.15.1 Serving MSC Initiating a Flash Request

When the Serving MSC receives a flash from an MS engaged in a voice call, it shall perform the
following:

1. Include the InterMSCCircuitID parameter set to the trunk for this call.
2. Include the MobileIdentificationNumber MSID parameter set to identify the requesting MS’s MIN.

4.16.1 Serving MSC Initiating a Handoff Back

15. Include the MobileIdentificationNumber parameter, if available.
15A. Include the IMSI parameter, if available (and if this task is being used to initiate a HandoffBack2
message, and not HandoffBack).

4.20.1 Serving MSC Initiating a Handoff-To-Third

17. Include the MobileIdentificationNumber parameter, if available.
17A. Include the IMSI parameter, if available (and if this task is being used to initiate a HandoffTo-
Third2 message, and not HandoffToThird).

4.20.4 MSC Initiating a FacilitiesDirective for Path Minimization

1-10. Include the MobileIdentificationNumber parameter, if available.
1-10A. Include the IMSI parameter, if available (and if this task is being used to initiate a Facilities-

4.22.1 HLR Initiating an Information Directive

Upon request, the HLR shall do the following:

1. Include the ElectronicSerialNumber parameter set to identify the MS.
2 Include the MobileIdentificationNumber parameter set to identify the MS.

4.23.1 MSC Initiating an Information Forward

Upon request, the MSC shall do the following (parameters are included before this is invoked):

1 Include the ElectronicSerialNumber parameter.
2 Include the InterMSCCircuitID parameter identifying the trunk used in the direction toward the Serving MSC.
3 Include the MobileIdentificationNumber parameter, if available.
   x Include the IMSI parameter, if available.

4.23.2 MSC Receiving a InformationForward INVOKE

Upon receipt of an InformationForward INVOKE, an MSC shall do the following:

1 IF the received message can be processed:
   1-1 IF the MSC is the Serving MSC:
      1-1-1 Execute the “MSC MWN Status Change Invocation” task (see 5.13.9).
      1-1-2 Execute the “MSC Special MS Alerting
      1-1-3 Send a RETURN RESULT to the requesting MSC.
   1-2 ELSE (this is a Tandem MSC):
      1-2-1 Replace the received InterMSCCircuitID with the identity of the trunk used in the direction toward the Serving MSC.
      1-2-2 Relay all other received parameters (e.g., ElectronicSerialNumber, MobileIdentificationNumber, AlertCode, AnnouncementList, CallingPartyNumberString1, CallingPartyNumberString2, CallingPartySubaddress, MessageWaitingNotificationCount, MessageWaitingNotificationType, RedirectingNumberString, RedirectingSubaddress).

4.25.1 MSC Initiating an InterSystemPage

1-3 Include the MobileIdentificationNumber parameter set to identify the MS, if available.
1-3 Include the IMSI parameter set to identify the MS, if available.

4.27.1 MSC Initiating an Intersystem Setup

8 Include the MS’s ElectronicSerialNumber parameter, the IMSI parameter (if available), and the MobileIdentificationNumber parameter (if available).
4.28.1 MSC Initiating a Location Request

... 22-2-1-7-4 Execute the “Authorize MS Termination Attempt” task for the MS identified by the received MobileIdentificationNumber or IMSI parameter (see 3.3.4). ...

4.30.1 MSC Initiating an MS Inactive

When the MSC detects an inactive MS, the Serving MSC shall do the following:

1. Include the MS’s MobileIdentificationNumber MSID and ElectronicSerialNumber parameters.

4.30.3 VLR Detection of MS Inactivity

When the VLR determines that an MS is inactive by receiving an MSInactive INVOKE from an MSC or based on internal algorithms, the VLR shall do the following:

1. Include the MS’s ElectronicSerialNumber parameter.
2. Include the MS’s MobileIdentificationNumber MSID parameter.

4.30.4 HLR Receiving MSInactive INVOKE

When an HLR receives an MSInactive INVOKE, it shall perform the following:

1. IF the received message can be processed:
   1-1 IF the MobileIdentificationNumber MSID (MIN or IMSI) and the ElectronicSerialNumber of a registered MS are equal to the received MobileIdentificationNumber MSID and ElectronicSerialNumber parameters, AND IF the requesting VLR is the VLR serving the MS:

4.31.1 MSC Initiating an Origination Request

When the MSC determines that the HLR must perform digit analysis (for other than a feature code), it shall perform the following:

1. Include the BillingID (Originating) parameter set to the billing identifier for the call assigned by the current Originating MSC.
2. Include the Digits (Dialed) parameter set to the digits received from the MS.
3. Include the ElectronicSerialNumber parameter set to identify the originating MS.
4. Include the MobileIdentificationNumber MSID parameter set to identify the originating MS.
4.32.1 HLR Initiating a Qualification Directive

When an HLR detects that an MS’s profile or qualification information is changed, it shall perform the following:

1. IF the MS’s current serving VLR is known:
   1-1. Include the ElectronicSerialNumber parameter set to the MS’s ESN.
   1-2. Include the MobileIdentificationNumber MSID parameter set to identify the MS to the VLR the MS’s MIN.

4.32.3 VLR Initiating a Qualification Directive

When a VLR detects that an MS’s profile or qualification information is changed, it shall perform the following:

1. Include the ElectronicSerialNumber parameter set to the MS’s ESN.
2. Include the MobileIdentificationNumber MSID parameter set to identify the MS to the MSC the MS’s MIN.

4.33.1 MSC Initiating a Qualification Request

When an MSC determines that it needs to retrieve an MS’s qualification information, profile information, or both; it shall perform the following:

1. Include the MSCID parameter set to the identity of the requesting MSC.
2. Include the SenderIdentificationNumber parameter of the sending functional entity.
3. Include the SystemAccessType parameter set to the type of access triggering the request.
4. Include the TransactionCapability parameter set to the current capabilities of the system.
5. Include the MobileIdentificationNumber MSID parameter set to identify the requesting MS.

4.35.2 MSC Receiving RedirectionDirective INVOKE

When an MSC receives a RedirectionDirective INVOKE, it shall perform the following:

1. IF the received message can be processed:
   1-1. IF there is a call or leg in progress that is associated with the received BillingID parameter and with the received MobileIdentificationNumber parameter or IMSI parameter (or with both) parameters:

4.36.2 MSC Receiving RedirectionRequest INVOKE

When an MSC receives a RedirectionRequest INVOKE, it shall perform the following:

1. IF the received message can be processed:
1-1 IF there is a call or leg in progress that is associated with the received BillingID parameter and with the received MobileIdentificationNumber parameter or IMSI parameter (or with both) parameters:

…

4.37.1 HLR Initiating Registration Cancellation

When an HLR detects that an MS is newly registered with a VLR that is different from the previously registered one, it shall perform the following:

1 Include the CancellationType parameter set to the type of cancellation desired.

…

7 WHEN a RETURN RESULT is received:

7-1 Stop timer (RCT).

7-2 IF the message can be processed:

7-2-1 IF the CancellationDenied parameter was not present:

7-2-1-1 IF the CallHistoryCount (COUNT) parameter was received from the previously visited VLR:

7-2-1-1-1 IF SharedSecretData (SSD) is shared with the previously visited VLR:

7-2-1-1-1-1 IF the CallHistoryCount (COUNT) must be updated in the AC.

7-2-1-1-1-1-1 Include the MobileIdentificationNumber MSID parameter set to identify the MS.

…

4.38.1 MSC Initiating MS Registration

When an MSC determines that a roaming Mobile Station (MS) is now within its service area (through autonomous registration, call origination, call termination (e.g., a page response following a call to the roamer access number), or other mechanism, except for detection by a call handoff), this new Serving MSC shall start the registration notification process by doing the following:

1 Include the QualificationInformationCode parameter set according to the information needed from the VLR.

…

9 Include the MobileIdentificationNumber MSID parameter set to identify the MS.

…

4.41.1 HLR Initiating a Routing Request

When an HLR requires a temporary routing address to a termination, such as, an MS, a mail box on a voice mail system, an interaction dialog, or other voice resource, it shall perform the following (termination specific parameter should already be included):

1 Relay the received BillingID parameter to identify the call on the Originating MSC.

2 Include the called MobileIdentificationNumber MSID parameter set to identify the called (or affected) MS.

…
4.41.3 MSC Receiving RoutingRequest INVOKE

When an MSC receives a RoutingRequest INVOKE, it shall perform the following:

...  
1-6-1 CASE termination treatment OF:
1-6-2 MSTermination:
1-6-2-1 Store the MobileIdentificationNumber MSID parameter of the MS to page.
...  
1-6-3 VoiceMailDelivery:

...  
1-6-3-4 IF the VoiceMailboxNumber parameter is received:
1-6-3-4-1 Store the VoiceMailboxNumber as the voice mail box number.
1-6-3-5 ELSE:
1-6-3-5-1 Store the MS’s MobileIdentificationNumber MSID as the voice mail box number.
...  
1-6-4 VoiceMailRetrieval:
1-6-4-1 IF the Digits (Destination) parameter is received:
1-6-4-1-1 Store the received Digits (Destination) parameter as the voice mail system identifier.
1-6-4-2 ELSE:
1-6-4-2-1 Store a default voice mail system identifier.
1-6-4-3 ENDIF.
1-6-4-4 IF the VoiceMailboxNumber parameter is received:
1-6-4-4-1 Store the VoiceMailboxNumber as the voice mail box number.
1-6-4-5 ELSE:
1-6-4-5-1 Store the MS’s MobileIdentificationNumber MSID as the voice mail box number.
...  
1-6-5 DialogTermination:
1-6-5-1 IF a DestinationDigits parameter was received:
1-6-5-1-1 Store the received DestinationDigits parameter as the dialog identification.
1-6-5-1-2 Store the MobileIdentificationNumber MSID and ElectronicSerialNumber for subsequent interactions.
...  

4.44.2 MSC Receiving an SMSDeliveryBackward INVOKE

...  
1-9 ELSEIF the MobileIdentificationNumber parameter is received:
1-9-1 Set the originating address to the MobileIdentificationNumber.
1-9A ELSEIF the IMSI parameter is received:
1-9A-1 Set the originating address to the IMSI.

4.45.1 MSC Initiating SMS Delivery Forward

Upon request to send an MS terminated SMS point-to-point message down a handoff chain, the MSC shall do the following:

1. Relay included parameters.
2. Set the underlying transport destination address and the message destination to the next MSC in the handoff chain.
3. Include InterMSCCircuitID parameter set to the trunk used in the direction toward the Serving MSC.
4. IF the message destination is not the same as the destination address (i.e., the message is routed through an intervening SMS router or Tandem MSC) and the underlying transport is allowed to carry the destination address:
   4-1. IF the message destination is not the same as the MobileIdentificationNumber or IMSI parameter:
   4-1-1. Include the SMS_DestinationAddress parameter set to the destination address.

4.45.2 MSC Receiving an SMSDeliveryForward INVOKE

Upon receipt of an SMSDeliveryForward INVOKE, the MSC shall do the following:

1. IF the received message can be processed:
   1-1. IF the SMS_DestinationAddress parameter is received:
   1-1-1. Set the destination address with the address in the received SMS_DestinationAddress parameter.
   1-2. ELSEIF the MobileIdentificationNumber or IMSI parameter is received:
   1-2-1. Set the destination address to the received mobile identification parameter (MIN or IMSI).

4.46.1 SME Initiating SMS Delivery

Upon a request to deliver a short message, the originating SME shall do the following:

1. IF the request can be processed:
   1-1. IF originating supplementary services are required:
   …
   1-1-4. ENDIF.
   1-2. ELSEIF the destination is known to be an MS-based SME:
   1-2-1. IF the originating SME is HLR-based and the MS is subscribed to the HLR and the temporary SMS address for the MS is current (as determined by the HLR):
   1-2-1-1. Set the destination address to the temporary SMS address for the addressed MS.
   1-2-1-2. Include the ElectronicSerialNumber parameter for the indicated MS.
1-2-1-3 Include the MobileIdentificationNumber MSID parameter for the indicated MS.
1-2-2 ELSEIF the originating SME is MSC-based and the destination SME-based MS is currently served or anchored by the MSC:
1-2-2-1 Set the destination address to the air interface address of the MS (usually its MIN).
1-2-2-2 Include the ElectronicSerialNumber parameter for the indicated MS.
1-2-2-3 Include the MobileIdentificationNumber MSID parameter for the indicated MS.

4.46.2 Initiating SMS Delivery Point-To-Point

This task assumes that it is called by a higher function capable of acting upon returned SMS_CauseCode appropriately. The calling function should also 1) set the destination address, and it should include the ElectronicSerialNumber, MobileIdentificationNumber MSID, SMS_MessageCount and SMS_NotificationIndicator parameters, if appropriate. Upon request, a SME or MC shall do the following:

…

5 IF the message destination is not the same as the destination address (i.e., the message is routed through an intervening SMS router or Tandem MSC) and the underlying transport is allowed to carry the destination address:
5-1 IF the message destination is not the same as the MobileIdentificationNumber MSID:

…

4.46.3 SME Receiving an SMSDeliveryPointToPoint INVOKE

Upon receipt of an SMSDeliveryPointToPoint INVOKE, the SME shall do the following:
1 IF the message can be processed:
1-1 IF the SMS_DestinationAddress parameter is received:
1-1-1 Set the destination address with the address in the received SMS_DestinationAddress parameter.
1-2 ELSEIF the MobileIdentificationNumber MSID parameter is received:
1-2-1 Set the destination address to the MobileIdentificationNumber MSID.
…
1-6 IF the MobileIdentificationNumber MSID parameter is received:
1-6-1 Set the MIN mobile identity to the received MobileIdentificationNumber MSID parameter.
1-7 ENDIF.

4.46.4 MSC Receiving an SMSDeliveryPointToPoint INVOKE

Upon receipt of an SMSDeliveryPointToPoint INVOKE for an intended MS, the receiving MSC shall do the following:
1 IF the message can be processed:
1-1 IF the SMS_DestinationAddress parameter is received:
1-1-1 Set the destination address with the address in the received SMS_DestinationAddress parameter.
1-2 ELSEIF the \texttt{MobileIdentificationNumber MSID} parameter is received:
\ldots

1-16 IF a \texttt{MobileIdentificationNumber MSID} parameter is received:
1-16-1 Set the \texttt{MIN mobile identity} to the received \texttt{MobileIdentificationNumber MSID} parameter.
1-17 ELSE:
\ldots

4.46.6 MC Receiving an SMSDeliveryPointToPoint INVOKE

Upon receipt of a \texttt{SMSDeliveryPointToPoint INVOKE}, the MC shall do the following:

1 IF the message can be processed:
1-1 IF the \texttt{SMS\_DestinationAddress} parameter is received:
1-1-1 Set the destination address with the address in the received \texttt{SMS\_DestinationAddress} parameter.
1-2 ELSEIF the \texttt{MobileIdentificationNumber MSID} parameter is received:
1-2-1 Set the destination address to the \texttt{MobileIdentificationNumber MSID}.
\ldots

4.46.9 MC Initiating SMS Delivery Point-To-Point to an MS-Based SME

\ldots

9 Include the \texttt{MobileIdentificationNumber MSID} parameter set to identify the destination MS.
\ldots

4.46.10 SMS Router Receiving an SMSDeliveryPointToPoint INVOKE

Upon receipt of an \texttt{SMSDeliveryPointToPoint INVOKE} message, an SMS router shall do the following:

1 IF the \texttt{SMS\_DestinationAddress} parameter is received:
1-1 Set the destination address with the address in the received \texttt{SMS\_DestinationAddress} parameter.
2 ELSEIF the \texttt{MobileIdentificationNumber MSID} parameter is received:
2-1 Set the destination address to the \texttt{MobileIdentificationNumber MSID}.
\ldots

4.47.1 HLR Initiating SMSNotification INVOKE

Upon request to send an \texttt{SMSNotification} message, the HLR shall do the following:

1 Include the \texttt{ElectronicSerialNumber} parameter set to the ESN of the desired MS.
2 Include the \texttt{MobileIdentificationNumber MSID} parameter set to the \texttt{MIN} or \texttt{IMSI} of the desired MS.
\ldots
4.47.2 MSC Initiating SMS Notification

... When an MSC becomes aware of the availability of an MS-based SME (e.g., when an MS does a sleep mode wake-up registration), the MSC shall do the following:

1 Include the ElectronicSerialNumber parameter set to the ESN of the desired MS.
2 Include the MobileIdentificationNumber MSID parameter set to the MIN or IMSI of the desired MS.

...

4.47.3 MC Receiving an SMSNotification INVOKE

Upon receipt of a SMSNotification INVOKE, the MC shall do the following:

1 IF the received message can be processed:
   1-1 Select the MS based on the received MobileIdentificationNumber MSID and ElectronicSerialNumber parameters.

...

4.48.1 MC Initiating SMS Request

Upon request to obtain a routing address for an MS-based SME (this request may be accepted, postponed, unavailable, or denied), the MC shall do the following:

1 IF the ESN is known for the MS:
   1-1 Include the ElectronicSerialNumber parameter set to identify the MS.
2 ENDIF.
3 Include the MobileIdentificationNumber MSID parameter set to identify the MS.

...

4.49.1 MSC Initiating a Transfer-To-Number Request

When an MSC detects that it needs to request the transfer-to-number associated with an MS, it shall perform the following:

1 Relay the RedirectionReason parameter set by the calling task.
2 Include the CallingPartyNumberDigits1 parameter.
3 Include the CallingPartySubaddress parameter.
4 Include the MS’s ElectronicSerialNumber parameter.
5 Include the MS’s MobileIdentificationNumber MSID parameter.

...
5.1.3 HLR CD Incoming Call Invocation

When the HLR determines the needs for CD incoming call routing, it shall perform the following tasks:

1 IF CD is active:
1-1 IF the addressed MS is registered and active:
1-1-1 (Load the parameters for the called MS and common parameters outside the TerminationList parameter.)
1-1-2 Include the ElectronicSerialNumber to identify the called MS.
1-1-3 Include the MobileIdentificationNumber MSID to identify the called MS.

... 1-1-22-4-2 Include the MobileIdentificationNumber parameter, if available, and the IMSI parameter, if available, set to identify the called MS within a LocalTermination parameter within a TerminationList parameter.

...

5.12.3 HLR FA Incoming Call Invocation

When the HLR determines the needs for FA incoming call routing, it shall perform the following tasks:

1 Optionally, store the BillingID parameter and correlate it to the other stored information about this call.
2 Set the access denied reason to the lowest priority reason.
3 (Execute Incoming Call Feature Processes applicable to the FA Group as a whole:)
4 Include the OneTimeFeatureIndicator parameter set for the features of the FA Group.
5 Include the TerminationTriggers parameter set for the features of the FA Group.
6 IF the received TransactionCapability parameter indicates that the Originating MSC is termination capable:
   6-1 Clear the first waitable member indication.
6-2 FOR all active members of the FA Group (optionally excluding a member originating the call):
   6-2-1 IF the member is an MS on the current HLR:
      6-2-1-1 IF the MS is registered to the requesting system:
         6-2-1-1-1 IF the MS is active:
            6-2-1-1-1-1 Include the ElectronicSerialNumber parameter set to identify the called MS within the LocalTermination parameter for this MS.
            6-2-1-1-1-2 Include the MobileIdentificationNumber MSID parameter set to identify the called MS within the LocalTermination parameter for this MS.
      6-2-1-1-2 IF the query from requesting MSC is a LocationRequest INVOKE:
         6-2-1-1-2-1 Include the MobileIdentificationNumber parameter, if available, and the IMSI parameter, if available, set to identify the called MS within the LocalTermination parameter for this MS.
      6-2-1-1-3 ELSE:
         6-2-1-1-3-1 Include the MSID parameter set to identify the called MS within the LocalTermination parameter for this MS.
   6-2-1-1-C ENDIF.
5.14.4 HLR MAH Incoming Call Invocation

When the HLR determines the needs for MAH incoming call routing, it shall perform the following tasks:

... 

6-1-1-1 IF the MS is active:
6-1-1-1-1 Include the ElectronicSerialNumber parameter set to identify the called MS within a LocalTermination parameter within a TerminationList parameter.

6-1-1-1-2 Include the MobileIdentificationNumber parameter set to identify the called MS within a LocalTermination parameter within a TerminationList parameter.

6-2-1-1-2 IF the query from requesting MSC is a LocationRequest INVOKE:
6-2-1-1-A-1 Include the MobileIdentificationNumber parameter, if available, and the IMSI parameter, if available, set to identify the called MS within the LocalTermination parameter for this MS.

6-2-1-1-B ELSE:
6-2-1-1-B-1 Include the MSID parameter set to identify the called MS within the LocalTermination parameter for this MS.

6-2-1-1-C ENDIF.

5.23.2 HLR VMR Invocation

... 

1-1 IF the voice mailbox is implied by an entered Mobile Directory Number:
1-1-1 IF the Digits (Dialed) parameter was received:
1-1-1-1 IF the Digits (Dialed) parameter contains a legitimate Mobile Directory Number with voice mail for the subscriber’s MobileIdentificationNumber MSID parameter:
1-1-1-1-1 IF the selected mailbox is different than the MIN MSID:
1-1-1-1-1-1 Include the VoiceMailboxNumber parameter set to the selected mailbox.
1-1-1-1-2 ENDIF.

... 

1-2 ELSEIF the voice mailbox is implied by the MobileIdentificationNumber MSID parameter:
1-2-1 IF the selected mailbox is different than the MIN MSID:
1-2-1-1 Include the VoiceMailboxNumber parameter set to the selected mailbox.
1-2-2 ENDIF.

... 

1-8-2 Include the MobileIdentificationNumber MSID parameter set to identify the called MS.

... 

1-8-4-3 Include the MobileIdentificationNumber MSID parameter set to identify the called MS within a LocalTermination parameter within a TerminationList parameter.

... 

1-9-5 ELSE (access is allowed):
1-9-5-1 Include the ElectronicSerialNumber parameter set to identify the called MS.

1-9-5-2 Include the MobileIdentificationNumber MSID parameter set to identify the called MS.

1-9-5-2 IF the query from requesting MSC is a LocationRequest INVOKE:

1-9-5-A-1 Include the MobileIdentificationNumber parameter, if available, and the IMSI parameter, if available.

1-9-5-B ENDIF

…

1-9-5-3 Include the DMH_RedirectionIndicator parameter set to Voice Mail Retrieval.

1-9-5-4 IF the requesting MSC is capable of at least one MultipleTerminations according to the TransactionCapability received with the FeatureRequest INVOKE or OriginationRequest INVOKE:

1-9-5-4-1 Include the MSCID parameter set to the identity of the Originating MSC.

1-9-5-4-2 Include the DestinationDigits parameter within an IntersystemTermination parameter within a TerminationList parameter set to the contents of the Digits (Destination) parameter received from the RoutingRequest RETURN RESULT.

1-9-5-4-3 Include the MSCID parameter set to the identity of the Serving MSC within an IntersystemTermination parameter within a TerminationList parameter.

1-9-5-4-4 Include the ElectronicSerialNumber parameter set to identify the called MS within an IntersystemTermination parameter within a TerminationList parameter.

1-9-5-4-5 Include the MobileIdentificationNumber MSID parameter set to identify the called MS within an IntersystemTermination parameter within a TerminationList parameter.

…

D ANNEX D: SMS AIR INTERFACE DELIVERY POINT-TO-POINT

This annex is informative and is not considered part of this Interim Standard.

The following tables describe the parameters used in the illustrative SMD-REQUEST, SMD-ACK, and SMD-NAK messages. These messages must be converted into the appropriate actual air interface messages. It is further assumed that a given message transaction can be correlated across the air interface, so the address parameters are not necessary in the responses.
Table 64  SMD-REQUEST Parameters

<table>
<thead>
<tr>
<th>Contents</th>
<th>Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ElectronicSerialNumber</td>
<td>M</td>
<td>a</td>
</tr>
<tr>
<td>MobileIdentificationNumber MSID</td>
<td>M</td>
<td>a</td>
</tr>
<tr>
<td>BearerData</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>TeleserviceIdentifier</td>
<td>O</td>
<td>b</td>
</tr>
<tr>
<td>DestinationAddress</td>
<td>O</td>
<td>c, d</td>
</tr>
<tr>
<td>OriginalDestinationAddress</td>
<td>O</td>
<td>d</td>
</tr>
<tr>
<td>OriginalDestinationSubaddress</td>
<td>O</td>
<td>e</td>
</tr>
<tr>
<td>OriginalOriginatingAddress</td>
<td>O</td>
<td>f, g</td>
</tr>
<tr>
<td>OriginalOriginatingSubaddress</td>
<td>O</td>
<td>e</td>
</tr>
</tbody>
</table>

Notes:

a. Include to identify the MS on the air interface.
b. Include on air interfaces that support more than one teleservice.
c. Include if not carried by the underlying data transport. May require an interconnection agreement to facilitate interworking between network types.
d. Include if different than the destination address (MobileIdentificationNumber MSID, SMS_DestinationAddress or underlying data transport destination address).
e. Include if applicable.
f. Include if different than the originating address (SMS_OriginatingAddress or underlying data transport originating address).
g. The Originating Address is assumed to be the MS or the Anchor MSC initiating the message.

D.1 MSC INITIATING SMD-REQUEST TOWARD AN MS-BASED SME

Upon request to send an SMS point-to-point message across the air interface, the MSC shall do the following:

1. Set the underlying transport destination address to the message destination (the MIN or IMSI of the addressed MS).
2. IF the message destination is not the same as the MobileIdentificationNumber MSID parameter:
   2-1 Include the DestinationAddress parameter set to the destination address.
3. ENDIF.

...
Table 67  Mapping of Air Interface Parameters to SMD-REQUEST, SMS-ACK, and SMD-NAK Parameters

<table>
<thead>
<tr>
<th>Parameter Mapping</th>
<th>AMPS Equivalent</th>
<th>CDMA Equivalent</th>
<th>TDMA Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMD-REQUEST, SMD-ACK or SMD-NAK</td>
<td>carried in lower protocol layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic-SerialNumber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile-Identification Number</td>
<td>carried in lower protocol layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSI</td>
<td>Not applicable</td>
<td>carried in lower protocol layers</td>
<td></td>
</tr>
<tr>
<td>BearerData</td>
<td>SMS Point-to-Point / Bearer Data</td>
<td>R-Data / R-Data Unit</td>
<td></td>
</tr>
<tr>
<td>Teleservice-Identifier</td>
<td>Not applicable</td>
<td>SMS Point-to-Point / Teleservice ID</td>
<td>R-Data / Higher Layer Protocol ID</td>
</tr>
<tr>
<td>Destination-Address</td>
<td>Not applicable</td>
<td>SMS Point-to-Point / Destination Address</td>
<td>R-Data / User Destination Address</td>
</tr>
<tr>
<td>Destination-Subaddress</td>
<td>Not applicable</td>
<td>SMS Point-to-Point / Destination Subaddress</td>
<td>R-Data / User Destination Subaddress</td>
</tr>
<tr>
<td>Originating-Address</td>
<td>Not applicable</td>
<td>SMS Point-to-Point / Originating Address</td>
<td>R-Data / User Originating Address</td>
</tr>
<tr>
<td>Originating-Subaddress</td>
<td>Not applicable</td>
<td>SMS Point-to-Point / Originating Subaddress</td>
<td>R-Data / User Originating Subaddress</td>
</tr>
<tr>
<td>CauseCode</td>
<td>Not applicable</td>
<td>SMS Point-to-Point / Cause Code</td>
<td>R-DataReject / R-Cause</td>
</tr>
</tbody>
</table>

D.2  MS-BASED SME RECEIVING AN SMD-REQUEST

Upon receipt of an air interface SMD-REQUEST, the MS-based SME shall do the following:

1  IF the Destination Address (the MobileIdentificationNumber MSID or the ElectronicSerialNumber parameters) addresses this MS:

1-1  IF the SMS_DestinationAddress parameter is received:

1-1-1  Set the destination address with the address in the received SMS_DestinationAddress parameter.

1-2  ELSE:

1-2-1  Set the destination address to the MobileIdentificationNumber MSID.

1-3  ENDIF.

1-4  IF the SMS_OriginalDestinationAddress parameter is received:

1-4-1  Set the original destination address with the address in the received SMS_OriginalDestinationAddress parameter.
1-5 ELSE:
1-5-1 Set the original destination address with the MIN or IMSI.

D.4 MS-BASED SME INITIATING SMD-REQUEST TOWARD AN MSC

Upon request to send an SMS point-to-point message across the air interface, the MS-based SME shall do the following:

1 IF the message destination is not the same as the Anchor MSC (i.e., the message is routed through an intervening SMS router or Tandem MSC):
1-1 Include the SMS_DestinationAddress parameter set to the destination address.
2 ENDIF.
3 IF the original message destination is not the same as the destination address:
3-1 Include the SMS_OriginalDestinationAddress parameter set to the original destination address.
4 ENDIF.
5 Set the underlying transport originating address to the MIN or IMSI of this MS.
6 IF the original originating address is different than the MIN or IMSI of this MS (i.e., more than one address is supported by the MS):
6-1 Include the SMS_OriginalOriginatingAddress parameter set to the original originating address.
7 ENDIF.
...

D.5 SERVING MSC RECEIVING AN SMD-REQUEST

Upon receipt of an air interface SMD-REQUEST from an MS-based SME, the Serving MSC shall do the following:

1 IF the DestinationAddress parameter is received:
1-1 Set the destination address with the address in the received DestinationAddress parameter.
2 ELSE:
2-1 Set the destination address to the address of the Anchor MSC.
3 ENDIF.
4 IF the OriginalDestinationAddress parameter is received:
4-1 Set the original destination address with the address in the received OriginalDestinationAddress parameter.
5 ELSE:
5-1 Set the original destination address with the destination address.
6 ENDIF.
7 Set the originating address to the originating MIN or IMSI.
...

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