**3GPP TSG_CN#7** **NP-000093**
**ETSI SMG3 Plenary Meeting #7,**
**Madrid, Spain**
**13th – 15th March 2000**

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**Agenda item:** **5.1.3**

**Source:** **TSG_N WG1**

**Title:** **CRs to 3G Work Item GSM/UMTS Interworking-Part2**

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**Introduction:**

This document contains **"14"** CRs on **Work Item GSM/UMTS Interworking,** that have been agreed by **TSG_N WG1,** and are forwarded to **TSG_N Plenary** meeting #7 for approval.

| Tdoc | Spec | CR | Rev | CAT | Rel. | Old Ver | New Ver | Subject |
|---|---|---|---|---|---|---|---|---|
| N1-000336 | 24.008 | CR144 | | C | R99 | 3.2.1 | 3.3.0 | NAS System Information with T3312 included in the CS domain specific part |
| N1-000171 | 24.008 | CR116 | 1 | F | R99 | 3.2.1 | 3.3.0 | Paging response in 4.7.9 |
| N1-000505 | 24.008 | CR146 | 1 | C | R99 | 3.2.1 | 3.3.0 | Paging response in UMTS |
| N1-000191 | 24.007 | CR008 | | C | R99 | 3.2.0 | 3.3.0 | PMMSMS-REL-Req deletion in MS side |
| N1-000509 | 24.008 | CR159 | 1 | C | R99 | 3.2.1 | 3.3.0 | Presence of TFT IE in *Activate Secondary PDP Context Request* |
| N1-000434 | 23.009 | CR005 | | C | R99 | 3.1.0 | 3.2.0 | Procedures for 3G_MSC-A_HO |
| N1-000423 | 23.009 | CR004 | | C | R99 | 3.1.0 | 3.2.0 | Procedures for 3G_MSC-B_HO |
| N1-000084 | 24.007 | CR007 | | C | R99 | 3.2.0 | 3.3.0 | Removal of Anonymous Access |
| N1-000085 | 24.008 | CR111 | | C | R99 | 3.2.1 | 3.3.0 | Removal of Anonymous Access |
| N1-000080 | 24.008 | CR109 | | B | R99 | 3.2.1 | 3.3.0 | Service Request procedure in the chapter 4.1.1. |
| N1-000330 | 24.008 | CR141 | | F | R99 | 3.2.1 | 3.3.0 | SM IEI value |
| N1-000167 | 24.011 | CR003 | 1 | C | R99 | 3.1.0 | 3.2.0 | SMC-GP SDL modification to transfer SMS messages via GMM |
| N1-000500 | 23.034 | CR004 | 1 | C | R99 | 3.1.1 | 3.2.0 | Support of high speed data in UMTS/UTRAN |
| N1-000390 | 24.007 | CR006 | 1 | C | R99 | 3.2.0 | 3.3.0 | Updating Session Management (SM) for R99 |

**3GPP/SMG TSG-CN WG1 Meeting #11**
**Umeå, Sweden, 27 Feb – 3 Mar 2000**

***Document* *N1-000336***

# CHANGE REQUEST

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| **24.008** | **CR** | **144** | Current Version: | 3.2.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | TSG CN #7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

| **Proposed change affects:** *(at least one should be marked with an X)* | (U)SIM | | ME | X | UTRAN / Radio | X | Core Network | X |
|---|---|---|---|---|---|---|---|---|

| **Source:** | CN1 | **Date:** | 2000-02-19 |
|---|---|---|---|

| **Subject:** | NAS System Information with T3312 included in the CS domain specific part |
|---|---|

| **Work item:** | GSM-UMTS Interworking |
|---|---|

**Category:** *(only one category shall be marked with an X)*

| | | |
|---|---|---|
| F | Correction | |
| A | Corresponds to a correction in an earlier release | |
| B | Addition of feature | |
| C | Functional modification of feature | X |
| D | Editorial modification | |

**Release:**

| | |
|---|---|
| Phase 2 | |
| Release 96 | |
| Release 97 | |
| Release 98 | |
| Release 99 | X |
| Release 00 | |

**Reason for change:**

Introduction of Core Network (CN) System Information.
In UMTS, the system information will be sent to the MS in RRC messages and the structure of this information is specified in TS 25.331. For the CN system information, the IE type "GSM-MAP NAS system information" is defined in TS 25.331 v3.1.0. This IE type may contain either information specific to one CN domain (CS or PS) or information common for both CN domains. The contents of the CN common system information, the CS domain specific system information and the PS domain specific system information are to be specified in TS 24.008.

**Clauses affected:** 4.4.x (new), 4.7.x (new), 10.5.1.xx (new)

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | | → List of CRs: |
| Other GSM core specifications | | → List of CRs: |
| MS test specifications | | → List of CRs: |
| BSS test specifications | | → List of CRs: |
| O&M specifications | | → List of CRs: |

**Other comments:**

The CN System information parameters are not used on the RRC level. Parameters that are relevant for both RRC and upper layers are specified in TS 25.331. Such parameters are e.g.: PLMN identity (MCC and MNC), information about the absence/presence of a CN domain, the CN CS respective PS domain specific DRX cycle length.
The Access Control Class information should to be specified in TS 25.331 since the setting and use of this parameter is considered to be part of RRC functionality. Emergency call is a CS domain feature, but since the "Emergency call allowed" parameter is close related to the Access Control Class of the MS it is proposed to specify this parameter also in TS 25.331.

The relation between T3212 and T3302 is assumed removed. I.e. the timer T3302 in GMM is assumed loaded with default value or the signalled value at Attach accepts and RA update accept.

Therefore the timer T3212 is included in the CS domain specific system information.

Attached, as an Annex, to this CR is a copy of the chapters 8.5.7.1.2, 10.1.47.5.3 – 10.1.47.5.5 and 10.2.1.9 of the TS 25.331.

***** MM Next Modification *****

## 4.4.x Core Network System Information (UMTS only)

In the network broadcast system information some of the system information is used by MM.

At reception of new system information, the RRC layer in the MS delivers the contents of the CN common system information and the CS domain specific system information to the MM layer in the MS.

The Core Network system information is included in specific information elements within some RRC messages sent to MS, see TS 25.331. In the Core Network system information the Common system information part and the CS domain specific system information part contains settings of parameters controlling MM functionality. No MM messages contain the Core Network System Information.

***** GMM Next Modification *****

## 4.7.x Core Network System Information (UMTS only)

In the network broadcast system information some of the system information is used by GMM.

At reception of new system information, the RRC layer in the MS delivers the contents of the CN common system information and the PS domain specific system information to the GMM layer in the MS.

The Core Network system information is included in specific information elements within some RRC messages sent to MS, see TS 25.331. In the Core Network system information the Common system information part and the PS domain specific system information part contains settings of parameters controlling GMM functionality. No GMM messages contain the Core Network System Information.

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

## 10.5.1.xx Core Network System Information (UMTS only)

The purpose of the *Core Network System I*nformation is to provide the MS with actual parameter settings of system information parameters controlling MM and GMM functionality. The Core Network system information is included in specific information elements within some RRC messages sent to MS, see TS 25.331.

NOTE: These IEs do not have an IEI or a length indicator, because these IEs are never present in any layer 3 messages, Hence these IEs do not conform to the general IE rules defined in 24.007.

### 10.5.1.xx.1 CN Common GSM-MAP NAS system information

The purpose of the *CN Common GSM-MAP NAS system information* element is to provide the MS with actual parameter settings of parameters relevant for both MM and GMM functionality. The coding of the information element identifier and length information is defined in the TS 25.331. Only the coding of the content is in the scope of this specification.

The content of the *CN common GSM-MAP NAS system information* element is coded as shown in figure 10.5.1.xx.1/TS 24.008 and table 10.5.1.xx.1/TS 24.008.
The length of this element content is two octets. The MS shall ignore any additional octets received.

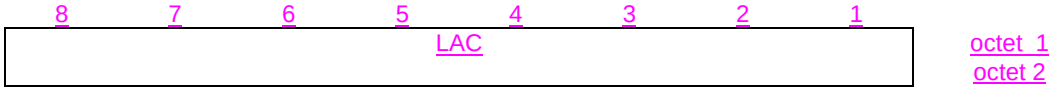


**Figure 10.5.1.xx.1/TS 24.008 Common system information element**

**Table 10.5.1.xx.1/TS 24.008: *Common system information* element**

**LAC, Location Area Code** (2 octet field)
This field is the binary representation of the Location Area Code, see TS 23.003. The LAC field consists of 16 bits. Bit 8 in octet 1 is the most significant bit and bit 1 in octet 2 is the least significant bit.

## 10.5.1..xx.2 CS domain specific system information

The purpose of the *CN domain specific GSM-MAP NAS system information* element, when used for the CS domain, is to provide the MS with actual parameter settings of parameters relevant only for MM functionality. The coding of the information element identifier and length information is defined in the TS 25.331. Only the coding of the content is in the scope of this specification.

For CS domain, the content of the *CN domain specific GSM-MAP NAS system information* element is coded as shown in figure 10.5.1.xx.2/TS 24.008 and table 10.5.1.xx.2/TS 24.008. The length of this element content is two octets. The MS shall ignore any additional octets received.

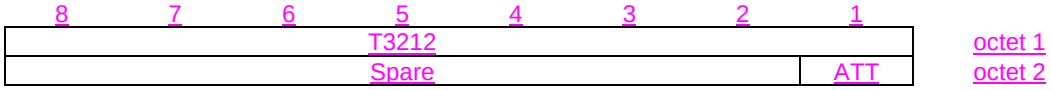


**Figure 10.5.1.xx.2/TS 24.008 *CS domain specific system information* element**

**Table 10.5.1.xx.2/TS 24.008: *CS domain specific system information* element**

**T3212 timeout value** (1 octet field)
The T3212 timeout field is coded as the binary representation of the timeout value for periodic updating in decihours. Bit 8 in octet 3 is the most significant bit and bit 1 in octet 3 is the least significant bit.
Range: 1 to 255
The value 0 is used for infinite timeout value i.e. periodic updating shall not be used

**ATT, Attach-detach allowed** (1 bit field):
Bit 1
0 MSs shall not apply IMSI attach and detach procedure.
1 MSs shall apply IMSI attach and detach procedure

The bits 2 – 8 of octet 1 are spare and shall be coded all zeros.

## 10.5.1.xx.3 PS domain specific system information

The purpose of the *CN domain specific GSM-MAP NAS system information* element, when used for the PS domain, is to provide the MS with actual parameter settings of parameters relevant only for GMM

functionality. The coding of the information element identifier and length information is defined in the TS 25.331. Only the coding of the content is in the scope of this specification.

For PS domain, the content of the *CN domain specific GSM-MAP NAS system information* element is coded as shown in figure 10.5.1.xx.3/TS 24.008 and table 10.5.1.xx.3/TS 24.008. The length of this element content is two octets. The MS shall ignore any additional octets received.

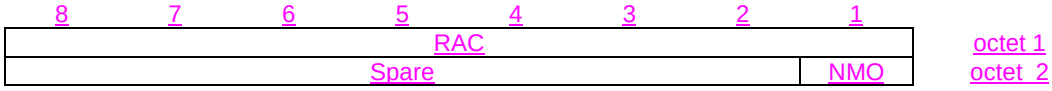


**Figure 10.5.1.xx.3/TS 24.008 *PS domain specific system information* element**

**Table 10.5.1.xx.3/TS 24.008: *PS domain specific system information* element**

**RAC, Routing Area Code** (8 bit field)
This field is the binary representation of the Routing Area Code, see TS 23.003. Bit 8 in octet 1 is the most significant bit and bit 1 in octet 1 is the least significant bit.

**NMO, Network Mode of Operation** (1 bit field)
This field is the binary representation of the Network Mode of Operation, see TS 23.060

| Bit 1 | |
|---|---|
| 0 | Network Mode of Operation I |
| 1 | Network Mode of Operation II |

The bits 2 – 8 of octet 2 are spare and shall be coded all zeros.

**ANNEX**
**Text from 3G TS 25.331 V3.1.0 (2000-01)**

### 8.5.7.1.2 NAS system information

If the IE "CN related information"."CN domain identity" and the IE "CN related information"."NAS system information" are present in a message, the UE shall forward the content of the IE "NAS system information" to the non-access stratum entity of the UE indicated by the IE "CN domain identity".

## 10.2.1.9 NAS system information (GSM-MAP)

This information element contains system information that belongs to the non-access stratum for a GSM-MAP type of core network. This information is transparent to RRC. It may contain either information specific to one CN domain (CS or PS) or information common for both CN domains.

| Information Element/Group name | Presence | Range | IE type and reference | Semantics description |
|---|---|---|---|---|
| GSM-MAP NAS system information | M | | Bit string(0..maxNASsystemiinfoLength) | |

### 10.1.47.5.3 System Information Block type 1

The system information block type 1 contains NAS system information as well as UE timers and counters to be used in idle mode.

| Information Element | Presence | Multi | IE type and reference | Semantics description |
|---|---|---|---|---|
| **CN information elements** | | | | |
| CN common GSM-MAP NAS system information | O | | GSM-MAP NAS system information | |
| CN domain related information | | 1 to <maxCNdomains> | | Send CN information for each CN domain. |
| >CN domain identity | M | | | |
| >CN domain specific GSM-MAP NAS system information | M | | GSM-MAP NAS system information | |
| >CN domain specific DRX cycle length coefficient | M | | DRX cycle length coefficient | |
| **UE information** | | | | |
| UE Timers and counters in idle mode | M | | | |

| Multi Bound | Explanation |
|---|---|
| *MaxCNdomains* | Maximum number of CN domains |

**ANNEX**
**Text from 3G TS 25.331 V3.1.0 (2000-01)**

### 10.1.47.5.4 System Information Block type 2

The system information block type 2 contains the URA identity and information for periodic cell and URA update. It also includes the UE timers and counters to be used in connected mode.

| Information Element | Presence | Multi | IE type and reference | Semantics description |
|---|---|---|---|---|
| **UTRAN mobility information elements** | | | | |
| URA identity | | 1 ..<maxURAcount> | | |
| Information for periodic cell and URA update | M | | | |
| **UE information** | | | | |
| UE Timers and counters in connected mode | M | | | |
| UTRAN DRX cycle length | M | | | |
| CHOICE *mode* | | | | |
| >FDD | | | | |
| >>TX Diversity Timing Mode | O | | Enumerated( Normal Cell Mode,Macro Cell Mode) | *Note: The presence of this IE is mandatory if closed loop TX Diversity is used.* |

| Multi Bound | Explanation |
|---|---|
| *MaxURAcount* | Maximum number of URAs in a cell |

### 10.1.47.5.5 System Information Block type 3

The system information block type 3 contains parameters for cell selection and re-selection. The block may also contain scheduling information for other system information blocks.

| Information Element | Presence | Multi | IE type and reference | Semantics description |
|---|---|---|---|---|
| References to other system information blocks | | 0 .. <maxSysInfoBlockcount> | | |
| >Scheduling information | M | | | |
| **UTRAN mobility information elements** | | | | |
| Cell identity | M | | | The necessity and usage of cell identity is FFS. |
| Cell selection and re-selection info | M | | | |
| Cell Access Restriction | M | | | |

| Multi Bound | Explanation |
|---|---|
| *MaxSysInfoBlockcount* | Maximum number of references to other system information blocks. |

**3GPP/SMG Meeting #10**
**Abiko, Japan, 11 - 14 January.2000**

***Document* N1-000171**
Rev of N1-000090 *e.g. for 3GPP use the format TP-99xxx or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

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| 24.008 | CR | 116 r1 | Current Version: | 3.2.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: TSGN#7 *list expected approval meeting # here ↑* | for approval | X | strategic | | *(for SMG use only)* |
|---|---|---|---|---|---|
| | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

| **Proposed change affects:** *(at least one should be marked with an X)* | (U)SIM | | ME | X | UTRAN / Radio | X | Core Network | X |
|---|---|---|---|---|---|---|---|---|

**Source:** CN1 **Date:** 14.01.00

**Subject:** Paging response in 4.7.9

**Work item:** GSM/UMTS interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | X | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:** To separate and clarify actions and references between GSM and UMTS.
Also clarifying RAU as paging response according to the selective RAU procedure.

**Clauses affected:** 4.7.9

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | | → List of CRs: |
| Other GSM core specifications | | → List of CRs: |
| MS test specifications | | → List of CRs: |
| BSS test specifications | | → List of CRs: |
| O&M specifications | | → List of CRs: |

**Other comments:**

<--------- double-click here for help and instructions on how to create a CR.

## 4.7.9 Paging procedure

### 4.7.9.1 Paging for GPRS services

In GSM, paging is used by the network to identify the cell the MS has currently selected, or to prompt the mobile to re-attach if necessary as a result of network failure. If the MS is not GPRS attached when it receives a paging for GPRS services, the MS shall ignore the paging.

In UMTS, paging is used by the network to request the establishment of PS signalling connection or to prompt the mobile to re-attach if necessary as a result of network failure. If the MS is not GPRS attached when it receives a paging for GPRS services, the MS shall ignore the paging.

#### 4.7.9.1.1 Paging for GPRS services using P-TMSI

The network shall initiate the paging procedure for GPRS services using P-TMSI when GMM signalling messages or user data is pending to be sent to the MS while the Mobile Reachable timer is running. The network may page only GPRS MSs which are GMM-REGISTERED and identified by a local P-TMSI.

In UMTS, to initiate the procedure the GMM entity in the network requests the lower layer to start paging (see TS 25.331 and TS 25.413) and starts timer T3313. Upon reception of a paging indication, the MS shall respond to the paging with a SERVICE REQUEST message with service type "paging response" (see TS 24.007 [20], TS 23.060 [74], TS 25.331 and TS 25.413).

In GSM, ~~T~~to initiate the procedure the GMM entity requests the RR sublayer to start paging (see GSM 04.18, GSM 04.60 [75]~~, TS 25.331 and TS 25.413~~) and starts timer T3313. Upon reception of a paging indication, the MS shall respond to the paging with any LLC frame (see TS 24.007 [20], TS 23.060 [74]~~, TS 25.331 and TS 25.413~~).

At intersystem change, an MS not having the READY timer running in GSM or an MS in PMM-IDLE mode in UMTS, being paged in a different access network as when it last sent user data or signalling message, uses ROUTING AREA UPDATE REQUEST message as paging response, i.e. the RA update procedure shall be performed instead according to the selective routing area update procedure.

The network shall stop timer T3313 when a response is received from the MS. When the timer T3313 expires the network may reinitiate paging.

In UMTS, when a response is received from the MS, the network shall change from PMM-IDLE mode to PMM-CONNECTED mode.

In GSM, ~~the network shall stop timer T3313~~ when a response is received from the MS, the network ~~and~~ shall start the READY timer. ~~When the timer T3313 expires the network may reinitiate paging.~~

#### 4.7.9.1.2 Paging for GPRS services using IMSI

Paging for GPRS services using IMSI is an abnormal procedure used for error recovery in the network.

The network may initiate paging using IMSI if the P-TMSI is not available due to a network failure.

In UMTS, to initiate the procedure the GMM entity in the network requests the lower layer to start paging (see TS 25.331 and TS 25.413).

In GSM, ~~T~~to initiate the procedure the GMM entity in the network requests the RR sublayer to start paging (see GSM 04.18, GSM 04.60 [75]~~, TS 25.331 and TS 25.413~~).

Upon reception of a paging indication for GPRS services using IMSI, the MS shall locally deactivate any active PDP contexts and locally detach from GPRS. The local detach includes deleting any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number stored, setting the GPRS update status to GU2 NOT UPDATED and changing state to GMM-DEREGISTERED.

After performing the local detach, the MS shall then perform a GPRS attach or combined GPRS attach procedure. After performing the attach, a MS should activate PDP context(s) to replace any previously active PDP context(s).

NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

NOTE: The MS does not respond to the paging except with the Attach Request. Hence timer T3313 in the network is not used when paging with IMSI.

NOTE: Paging without DRX parameters may require a considerable extension of the paging duration.

#### 4.7.9.2 Paging for non-GPRS services

The network may initiate the paging procedure for non-GPRS services when the MS is IMSI attached for non-GPRS services.

In UMTS, to initiate the procedure the GMM entity requests the lower layer to start paging (see TS 25.331 and TS 25.413) for non-GPRS services.

In GSM, ~~T~~to initiate the procedure the GMM entity requests the RR sublayer to start~~initiate~~ paging (see GSM 04.18 GSM 04.60 [75]~~, TS 25.331 and TS 25.413~~) for non-GPRS services.

The MS identity used for paging shall be the allocated TMSI if acknowledged by the MS, otherwise the IMSI.

**3GPP/SMG Meeting #11**
**Umeå, Sweden, 28 Feb - 03 Mar 2000**

***Document N1-000505***
*Revision of N1-000338*

# CHANGE REQUEST

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| **24.008** | **CR** | **146r1** | Current Version: | 3.2.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | TSGN#7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

**Source:** CN1 **Date:** 2000-02-20

**Subject:** Paging response in UMTS

**Work item:** GSM-UMTS Inter-working

**Category:** *(only one category shall be marked with an X)*

| | | |
|---|---|---|
| F | Correction | |
| A | Corresponds to a correction in an earlier release | |
| B | Addition of feature | |
| C | Functional modification of feature | X |
| D | Editorial modification | |

**Release:**

| | |
|---|---|
| Phase 2 | |
| Release 96 | |
| Release 97 | |
| Release 98 | |
| Release 99 | X |
| Release 00 | |

**Reason for change:** This CR proposes to add a new chapter in 24.008 to clarify that the MS in UMTS shall use the Paging Response message defined in chapter 9.1.25 in 04.18, in order to respond to a CS Paging request initiated by the CS domain in the network.

**Clauses affected:** 4.4.x (new section)

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:** Annex A – chapter 8.1.2 and 8.1.11 from TS 25.331, version 3.1.0; and
Annex B – chapter 3.3.2.2 and 9.1.25 from GSM 04.18, version 8.2.0;
are attached to this CR.

## 4.4.x Paging response in UMTS

The network may initiate the paging procedure for CS services when the MS is IMSI attached for CS services. To initiate the procedure, the MM entity requests the RR sublayer to initiate paging (see TS 25.331 and TS 25.413) for CS services.

At reception of a paging message, the RR sublayer in the MS shall deliver a paging indication to the MM sublayer if the paging was initiated by the MM entity in the network (see TS 25.331). The MS shall respond with the PAGING RESPONSE message defined in GSM 04.18, chapter 9.1.25. For reasons of backward compatibility the paging response shall use the RR protocol discriminator.

***** ANNEX from GSM 04.18 version 8.2.0 *****

## 9.1.25 Paging response

This message is sent on the main DCCH by the mobile station to the network in connection with establishment of the main signalling link as a response to the paging request message. See table 9.25/GSM 04.18.

Message type: PAGING RESPONSE

Significance: dual

Direction: mobile station to network

**Table 9.25/GSM 04.18: PAGING RESPONSE message content**

| IEI | Information element | Type / Reference | Presence | Format | length |
|---|---|---|---|---|---|
| | RR management Protocol Discriminator | Protocol Discriminator 10.2 | M | V | 1/2 |
| | Skip Indicator | Skip Indicator 10.3.1 | M | V | 1/2 |
| | Paging Response Message Type | Message Type 10.4 | M | V | 1 |
| | Ciphering Key Sequence Number | Ciphering Key Sequence Number 10.5.1.2 | M | V | 1/2 |
| | Spare Half Octet | Spare Half Octet 10.5.1.8 | M | V | 1/2 |
| | Mobile Station Classmark | Mobile Station Classmark 2 10.5.1.6 | M | LV | 4 |
| | Mobile Identity | Mobile Identity 10.5.1.4 | M | LV | 2-9 |

### 9.1.25.1 Mobile Station Classmark

This IE shall include for multiband mobile station the Classmark 2 corresponding to the frequency band in use.

**3GPP/SMG Meeting #10**
**Abiko, Japan, 11 – 13 Jan. 2000**

***Document N1-000191***
*Related to N1-000167*
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| 24.007 | CR | 008 | Current Version: | 3.2.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: CN#7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]

**Source:** CN1 **Date:** 14.1.00

**Subject:** PMMSMS-REL-Req deletion in MS side

**Work item:** GSM/UMTS Interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | X | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:** Since an MS can't release the PS signalling connection by itself, a GMM in MS side has to do nothing when it received a PMMSMS-REL-Req primitive from an SMC-GP. Even though without this primitive, PS signalling connection may release by the NW if it is needed. So PMMSMS-REL-Req primitive in MS side should be deleted.

And in this CR, there also exists a terminology alignment.

**Clauses affected:** 9.5.4

**Other specs affected:**

| | | | |
|---|---|---|---|
| Other 3G core specifications | X | → List of CRs: | 24.011 CR003r1 |
| Other GSM core specifications | | → List of CRs: | |
| MS test specifications | | → List of CRs: | |
| BSS test specifications | | → List of CRs: | |
| O&M specifications | | → List of CRs: | |

**Other comments:**


help.doc

<--------- double-click here for help and instructions on how to create a CR.

## 9.5.4 Service primitives for PMMSMS-SAP

**Table 9.5.4: Primitives and Parameters at PMMSMS-SAP - ~~UE~~ MS side**

| PRIMITIVES | PARAMETERS (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| PMMSMS_EST_REQ | Mobile-ID | 9.5.4.1 |
| PMMSMS_EST_CNF | - | 9.5.4.2 |
| ~~PMMSMS_REL_REQ~~ | ~~-~~ | ~~9.5.4.3~~ |
| PMMSMS_ERROR_IND | cause | 9.5.4.~~4~~3 |
| PMMSMS_UNITDATA_REQ | SMS-PDU | 9.5.4.~~5~~4 |
| PMMSMS_UNITDATA_IND | SMS-PDU | 9.5.4.~~6~~5 |

### 9.5.4.1 PMMSMS_EST _REQ

The GMM is requested to establish a PS signalling conection.

### 9.5.4.2 PMMSMS_EST _CNF

The GMM indicates a PS signalling connection is established.

### ~~9.5.4.3 PMMSMS_REL_REQ~~

~~The GMM is requested to release of a PS signalling connection.~~

### 9.5.4.~~4~~3 PMMSMS_ERROR_IND

The GMM indicates that a PS signalling connection has been released.

### 9.5.4.~~5~~4 PMMSMS_UNITDATA_REQ

The GMM is requested to forward a SMS PDU in order to send it to the peer entity.

### 9.5.4.~~6~~5 PMMSMS_UNITDATA_IND

Indication used by GMM to transfer the received data to the GSMS entities.

**3GPP/SMG Meeting #11**
**Umea, Sweden, 28 February - 03 March.2000**

***Document N1-000509***
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| 24.008 | **CR** | **159r1** | Current Version: | 3.2.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | CN#7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

| **Proposed change affects:** *(at least one should be marked with an X)* | (U)SIM | | ME | X | UTRAN / Radio | | Core Network | X |
|---|---|---|---|---|---|---|---|---|

**Source:** CN1 **Date:** 16 February, 2000

**Subject:** Presence of TFT IE in *Activate Secondary PDP Context Request*

**Work item:** GSM/UMTS Interwork

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | X | | Release 97 | |
| C | Functional modification of feature | | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:** According to 23.060, the presence of TFT IE in *ACTIVATE SCONDARY PDP CONTEXT REQUEST* should be option, not mandatory. This CR is to align stage 3 with stage 2.

**Clauses affected:** 9.5.4, 6.1.3.2.1, 10.5.6.6, ANNEX I.1

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | | → List of CRs: |
| Other GSM core specifications | | → List of CRs: |
| MS test specifications | | → List of CRs: |
| BSS test specifications | | → List of CRs: |
| O&M specifications | | → List of CRs: |

**Other comments:**

Quotation from 23.060 v3.2.1;

9.2.2.1.1 Secondary PDP Context Activation Procedure

[1 paragraph is skipped]

The Secondary PDP Context Activation procedure may be executed without providing a Traffic Flow Template (TFT) to the newly activated PDP context if all other active PDP contexts for this PDP address and APN already have an associated TFT, otherwise a TFT shall be provided. The TFT contains attributes that specify an IP header filter that is used to direct data packets received from the interconnected external packet data network to the newly activated PDP context.


help.doc

<--------- double-click here for help and instructions on how to create a CR.

## 9.5.4 Activate Secondary PDP Context Request

This message is sent by the MS to the network to request activation of a secondary PDP context. See Table 9.5.4/TS 24.008.

Message type: ACTIVATE SECONDARY PDP CONTEXT REQUEST

Significance: global

Direction: MS to network

**Table 9.5.4/TS 24.008: Activate SECONDARY PDP context request message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Protocol discriminator | Protocol discriminator 10.2 | M | V | ½ |
| | Transaction identifier | Transaction identifier 10.3.2 | M | V | ½ |
| | Activate secondary PDP context request message identity | Message type 10.4 | M | V | 1 |
| | Requested NSAPI | Network service access point identifier 10.5.6.2 | M | V | 1 |
| | Requested LLC SAPI | LLC service access point identifier 10.5.6.9 | M | V | 1 |
| | Requested QoS | Quality of service 10.5.6.5 | M | LV | FFS |
| | ~~TFT~~ | ~~Traffic Flow Template~~ | ~~M~~ | ~~LV~~ | ~~FFS~~ |
| | Linked TI | Linked TI 10.5.6.7 | M | LV | 2-3 |
| 36 | TFT | Traffic Flow Template | O | TLV | FFS |

### 9.5.4.1 TFT

This IE shall be included if a PDP context without TFT has already been activated.

### 6.1.3.2.1 Successful Secondary PDP Context Activation Initiated by the MS

In order to request a secondary PDP context activation, the MS shall send an ACTIVATE SECONDARY PDP CONTEXT REQUEST message to the network, enter the state PDP-ACTIVE-PENDING and start timer T3380. The message shall contain the selected NSAPI. The MS shall ensure that the selected NSAPI is not currently being used by another Session Management entity in the MS. The message shall also include a QoS profile, ~~a TFT, a~~ a requested LLC SAPI and the Linked TI. The QoS profile is the requested QoS. If present, t~~T~~he TFT shall be sent transparently through the SGSN to the GGSN to enable packet classification and policing for downlink data transfer.

Upon receipt of an ACTIVATE SECONDARY PDP CONTEXT REQUEST, the network shall validate the message by verifying the TI given in the Linked TI IE. The same GGSN address shall be used by the SGSN as for the already established PDP context(s) for that PDP address. The network shall select a radio priority level based on the QoS negotiated and shall reply with an ACTIVATE SECONDARY PDP CONTEXT ACCEPT message, if the request can be accepted.

Upon receipt of the message ACTIVATE SECONDARY PDP CONTEXT ACCEPT, the MS shall stop timer T3380 and enter the state PDP-ACTIVE. If the offered QoS parameters received from the network differ from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure.

In GSM the MS shall initiate establishment of the logical link for the LLC SAPI indicated by the network with the offered QoS and selected radio priority level if no logical link has been already established for that SAPI.

If the LLC SAPI indicated by the network can not be supported by the MS, the MS shall initiate the PDP context deactivation procedure.

In UMTS, both SGSN and MS shall store the LLC SAPI and the radio priority in the PDP context. If a UMTS to GSM Routing Area Update is performed, the new SGSN shall initiate establishment of the logical link using the negotiated LLC SAPI, the negotiated QoS profile and selected radio priority level stored in the PDP context as in a GSM to GSM Routing Area Update.

An MS, which is capable of operating in both GSM and UMTS, shall use a valid LLC SAPI, while an MS which is capable of operating only in UMTS shall indicate the LLC SAPI value as "LLC SAPI not assigned" in order to avoid unnecessary value range checking and any other possible confusion in the network.

NOTE: The radio priority level and the LLC SAPI parameters, though not used in UMTS, shall be included in the messages, in order to support handover between UMTS and GSM networks.6.1.3.2.2 Unsuccessful Secondary PDP Context Activation initiated by the MS

Upon receipt of an ACTIVATE SECONDARY PDP CONTEXT REQUEST message, the network may reject the MS initiated secondary PDP context activation by sending an ACTIVATE SECONDARY PDP CONTEXT REJECT message to the MS. The message shall contain a cause code that typically indicates one of the following:

# 26: insufficient resources;
# 30: activation rejected by GGSN;
# 31: activation rejected, unspecified;
# 32: service option not supported;
# 33: requested service option not subscribed;
# 34: service option temporarily out of order;
# 35: NSAPI already used;
# 41: TFT already used;
# 42: invalid TFT;
# 43: unknown PDP context;
# 46: PDP context without TFT already activated;
# 95 - 111: protocol errors.

Upon receipt of an ACTIVATE SECONDARY PDP CONTEXT REJECT message, the MS shall stop timer T3380 and enter the state PDP-INACTIVE.

## 10.5.6.6 SM cause

The purpose of the *SM cause* information element is to indicate the reason why a session management request is rejected.

The *SM cause* is a type 3 information element with 2 octets length.

The *SM cause* information element is coded as shown in figure 10.5.139/TS 24.008 and table 10.5.157/TS 24.008.

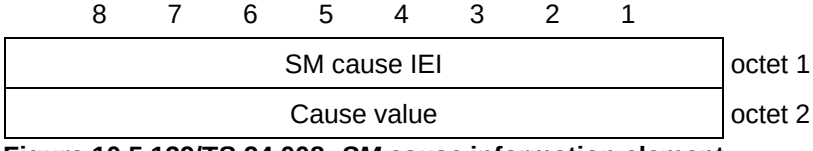



**Figure 10.5.139/TS 24.008: *SM cause* information element**

**Table 10.5.157/TS 24.008: *SM cause* information element**

| Cause value (octet 2) Bits 8 7 6 5 4 3 2 1 | |
|---|---|
| 0 0 0 1 1 0 0 1 | LLC or SNDCP failure(GSM only) |
| 0 0 0 1 1 0 1 0 | Insufficient resources |
| 0 0 0 1 1 0 1 1 | Missing or unknown APN |
| 0 0 0 1 1 1 0 0 | Unknown PDP address or PDP type |
| 0 0 0 1 1 1 0 1 | User Aauthentication failed |
| 0 0 0 1 1 1 1 0 | Activation rejected by GGSN |
| 0 0 0 1 1 1 1 1 | Activation rejected, unspecified |
| 0 0 1 0 0 0 0 0 | Service option not supported |
| 0 0 1 0 0 0 0 1 | Requested service option not subscribed |
| 0 0 1 0 0 0 1 0 | Service option temporarily out of order |
| 0 0 1 0 0 0 1 1 | NSAPI already used |
| 0 0 1 0 0 1 0 0 | Regular deactivation |
| 0 0 1 0 0 1 0 1 | QoS not accepted |
| 0 0 1 0 0 1 1 0 | Network failure |
| 0 0 1 0 0 1 1 1 | Reactivation required |
| 0 0 1 0 1 0 0 1 | TFT already used |
| 0 0 1 0 1 0 1 1 | Invalid TFT |
| 0 0 1 0 1 1 0 0 | Unknown PDP context |
| 0 0 1 0 1 1 1 0 | PDP context without TFT already activated |
| 0 1 0 1 0 0 0 1 | Invalid transaction identifier value |
| 0 1 0 1 1 1 1 1 | Semantically incorrect message |
| 0 1 1 0 0 0 0 0 | Invalid mandatory information |
| 0 1 1 0 0 0 0 1 | Message type non-existent or not implemented |
| 0 1 1 0 0 0 1 0 | Message type not compatible with the protocol state |
| 0 1 1 0 0 0 1 1 | Information element non-existent or not implemented |
| 0 1 1 0 0 1 0 0 | Conditional IE error |
| 0 1 1 0 0 1 0 1 | Message not compatible with the protocol state |
| 0 1 1 0 1 1 1 1 | Protocol error, unspecified |

Any other value received by the mobile station shall be treated as 0010 0010, 'Service option temporarily out of order'. Any other value received by the network shall be treated as 0110 1111, 'Protocol error, unspecified'.

NOTE: The listed cause values are defined in Annex I

# I.1 Causes related to nature of request

Cause value = 25 LLC or SNDCP failure (GSM only)

This cause code is used by the MS indicate that a PDP context is deactivated because of a LLC or SNDCP failure ( e.g. if the SM receives a *SNSM-STATUS.request* message with cause "*DM received* " or " *invalid XID response* ", see GSM 04.65 [78])

Cause value = 26 Insufficient resources

This cause code is used by the MS or by the network to indicate that a PDP context activation request Secondary PDP context activation request or PDP context modification request cannot be accepted due to insufficient resources.

Cause value = 27 Unknown or missing access point name

This cause code is used by the network to indicate that the requested service was rejected by the external packet data network because the access point name was not included although required or if the access point name could not be resolved.

Cause value = 28 Unknown PDP address or PDP type

This cause code is used by the network to indicate that the requested service was rejected by the external packet data network because the PDP address or type could not be recognised.

Cause value = 29 User authentication failed

This cause code is used by the network to indicate that the requested service was rejected by the external packet data network due to a failed user authentication.

Cause value = 30 Activation rejected by GGSN

This cause code is used by the network to indicate that the requested service was rejected by the GGSN.

Cause value = 31 Activation rejected, unspecified

This cause code is used by the network to indicate that the requested service was rejected due to unspecified reasons.

Cause value = 32 Service option not supported

This cause code is used by the network when the MS requests a service which is not supported by the PLMN.

Cause value = 33 Requested service option not subscribed

See Annex G, section 4.

Cause value = 34 Service option temporarily out of order

See Annex G, section 4.

Cause value = 35 NSAPI already used

This cause code is used by the network to indicate that the NSAPI requested by the MS in the PDP context activation or Secondary PDP context activation request is already used by another active PDP context of this MS.

Cause value = 36 Regular PDP context deactivation

This cause code is used to indicate a regular MS or network initiated PDP context deactivation.

Cause value = 37 QoS not accepted

This cause code is used by the MS if the new QoS cannot be accepted that were indicated by the network in the PDP Context Modification procedure.

Cause value = 38 Network failure

This cause code is used by the network to indicate that the PDP context deactivation is caused by an error situation in the network.

Cause value = 39 Reactivation requested

This cause code is used by the network to request a PDP context reactivation after a GGSN restart.

Cause value = 40 Feature not supported

This cause code is used by the MS to indicate that the PDP context activation initiated by the network is not supported by the MS.

Cause value = 41 TFT already used

This cause code is used by the network to indicate that the TFT indicated in the secondary PDP context activation request is already used.

Cause value = 42 invalid TFT

This cause code is used by the network to indicate that the TFT indicated in the secondary PDP context activation request is invalid.

Cause value = 43 unknown PDP context

This cause code is used by the network to indicate that the primary PDP context specified in the secondary PDP context activation request is not active.

Cause value = 46 PDP context without TFT already activated

This cause code is used by the network to indicate that the network has already activated a PDP context without TFT.

**3GPP TSG-CN 1 meeting #11**
**Umeå, Sweden, 28 Feb - 3 Mar 2000**

***Document* N1-000434**
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| 23.009 | CR | 005 | Current Version: | 3.1.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | TSG-N #7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

**Source:** CN1 **Date:** 2000-02-25

**Subject:** Procedures for 3G_MSC-A

**Work item:** GSM UMTS Interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | X | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:**
The requested changes include the introduction of RANAP for intra-UMTS inter-MSC relocation. Some minor editorial corrections have also been added.
Editorial changes:
Sheet 4: Timer T502 instead of T302; Sheet 12: UE instead of UE/MS; Sheet 16: A text (GSM to UMTS handover) has been added; Sheet 33: Text (GSM to UMTS handover) added; Sheet 57: Text (SRNS Reloction) added; Sheet 61: Text (UTRAN) added; Sheet 62: Text (UTRAN) added
Functional changes:
Sheet 57: A-HO functions within MAP messages replaced by IU-RLC functions; Sheet 59: A-CLEAR-REQUEST replaced by IU-REL-REQUEST; Sheet 60, 62, 63, 65-71, 73-78; IU- functions instead of A- functions

**Clauses affected:**

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | | → List of CRs: |
| Other GSM core specifications | | → List of CRs: |
| MS test specifications | | → List of CRs: |
| BSS test specifications | | → List of CRs: |
| O&M specifications | | → List of CRs: |

**Other comments:**


help.doc

<--------- double-click here for help and instructions on how to create a CR.

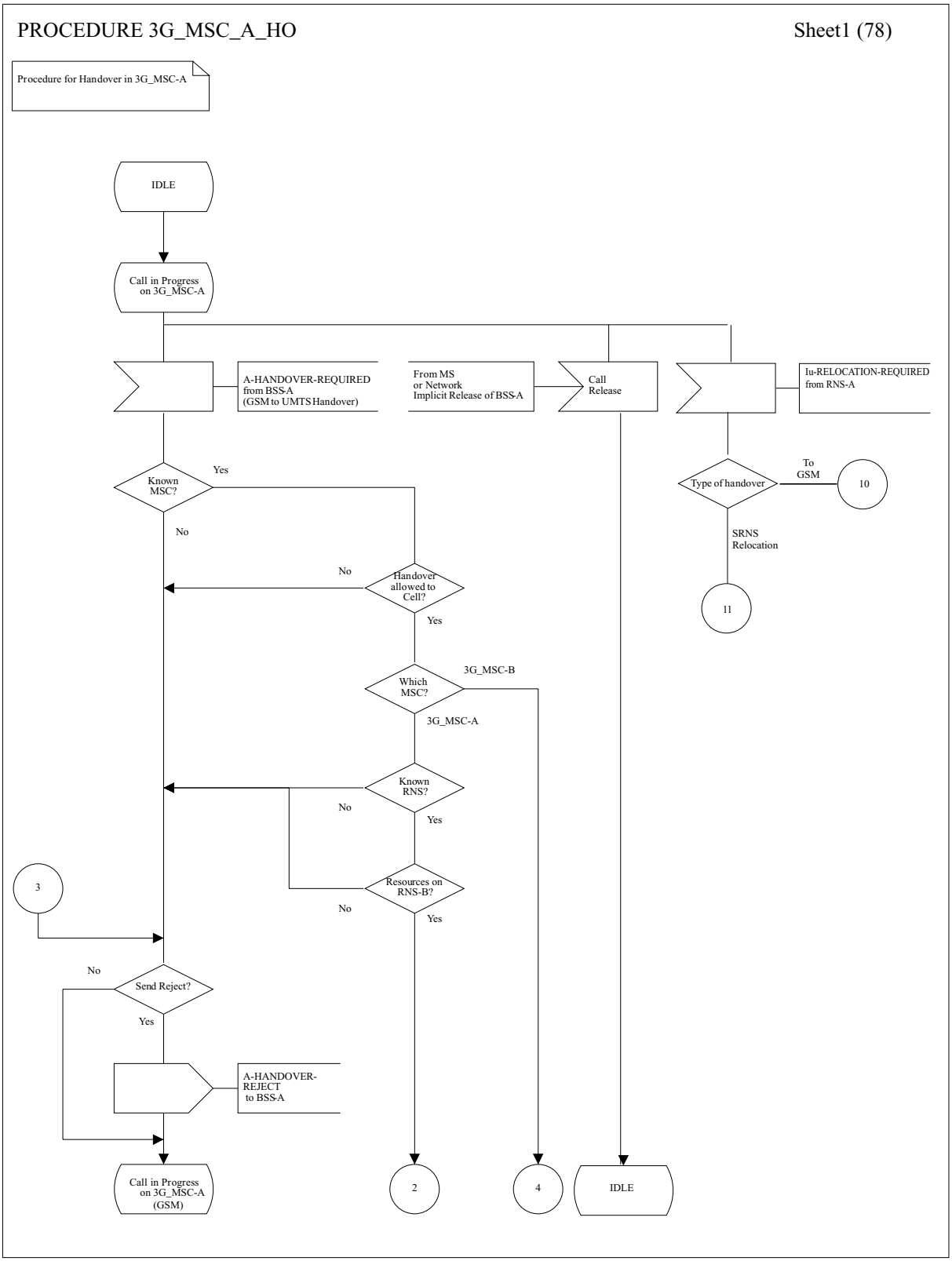



Figure 43 (Sheet 1 of 78): Handover control procedure in 3G_MSC-A

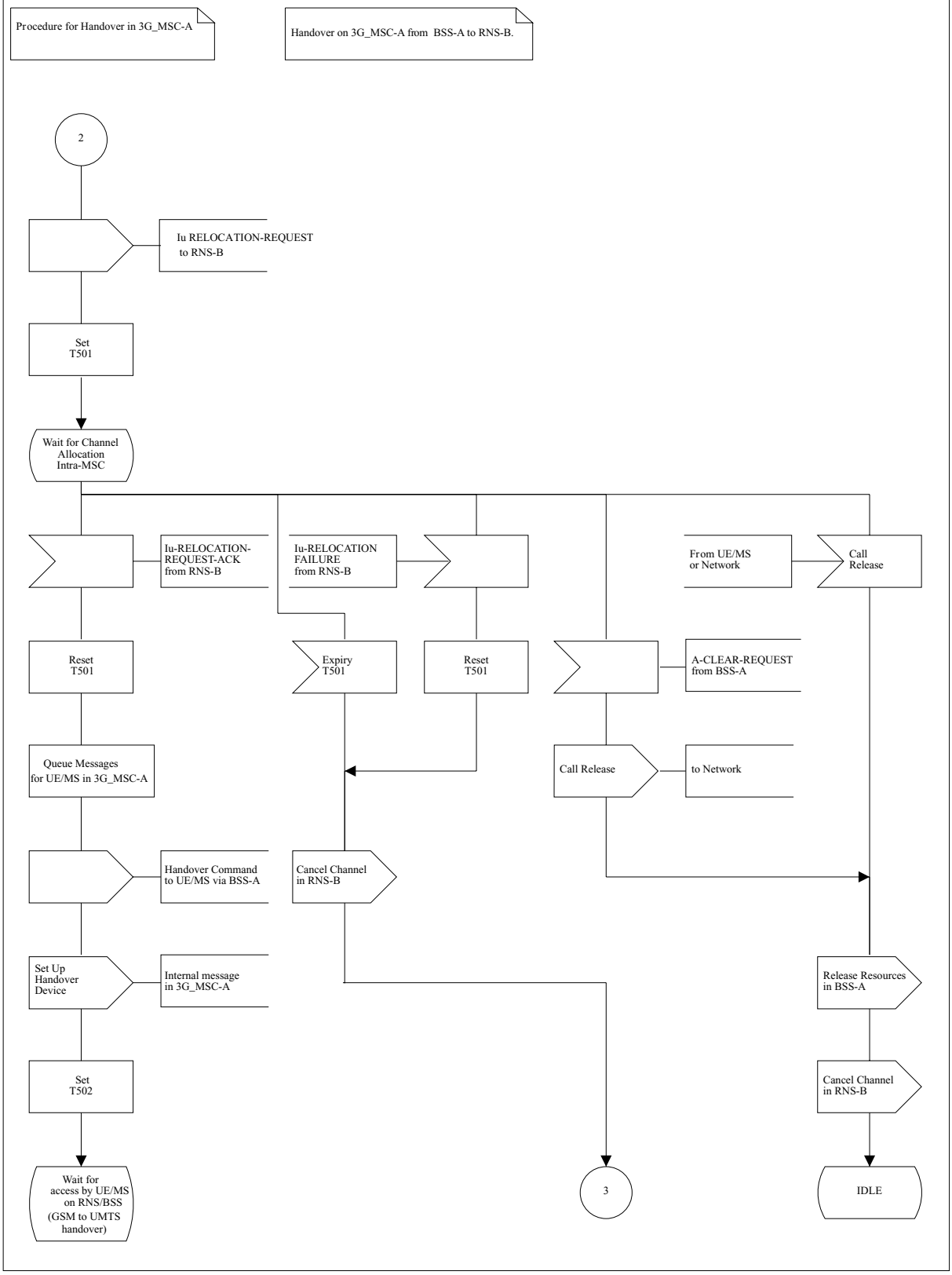



Figure 43 (Sheet 2 of 78): Handover control procedure in 3G_MSC-A

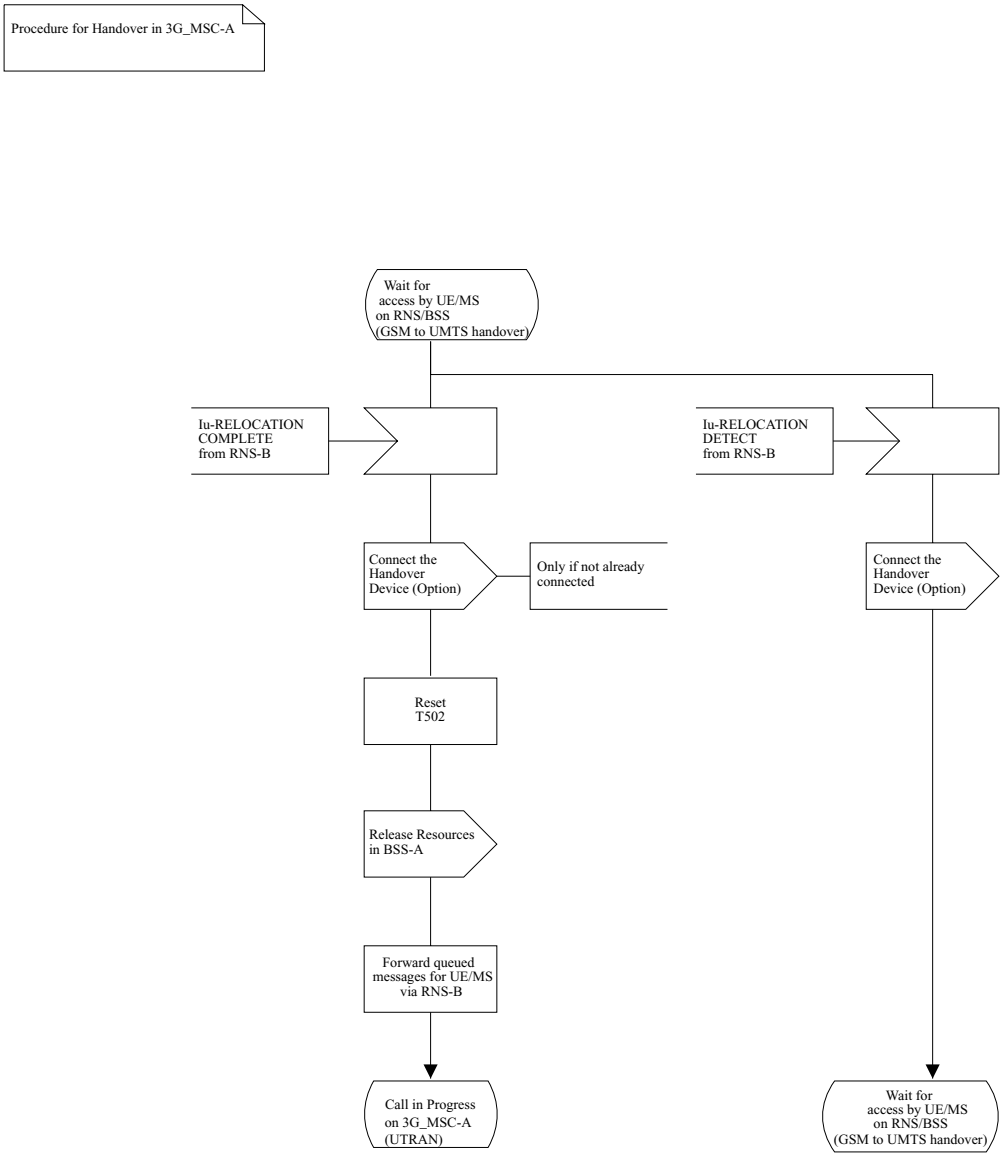



Figure 43 (Sheet 3 of 78): Handover control procedure in 3G_MSC-A

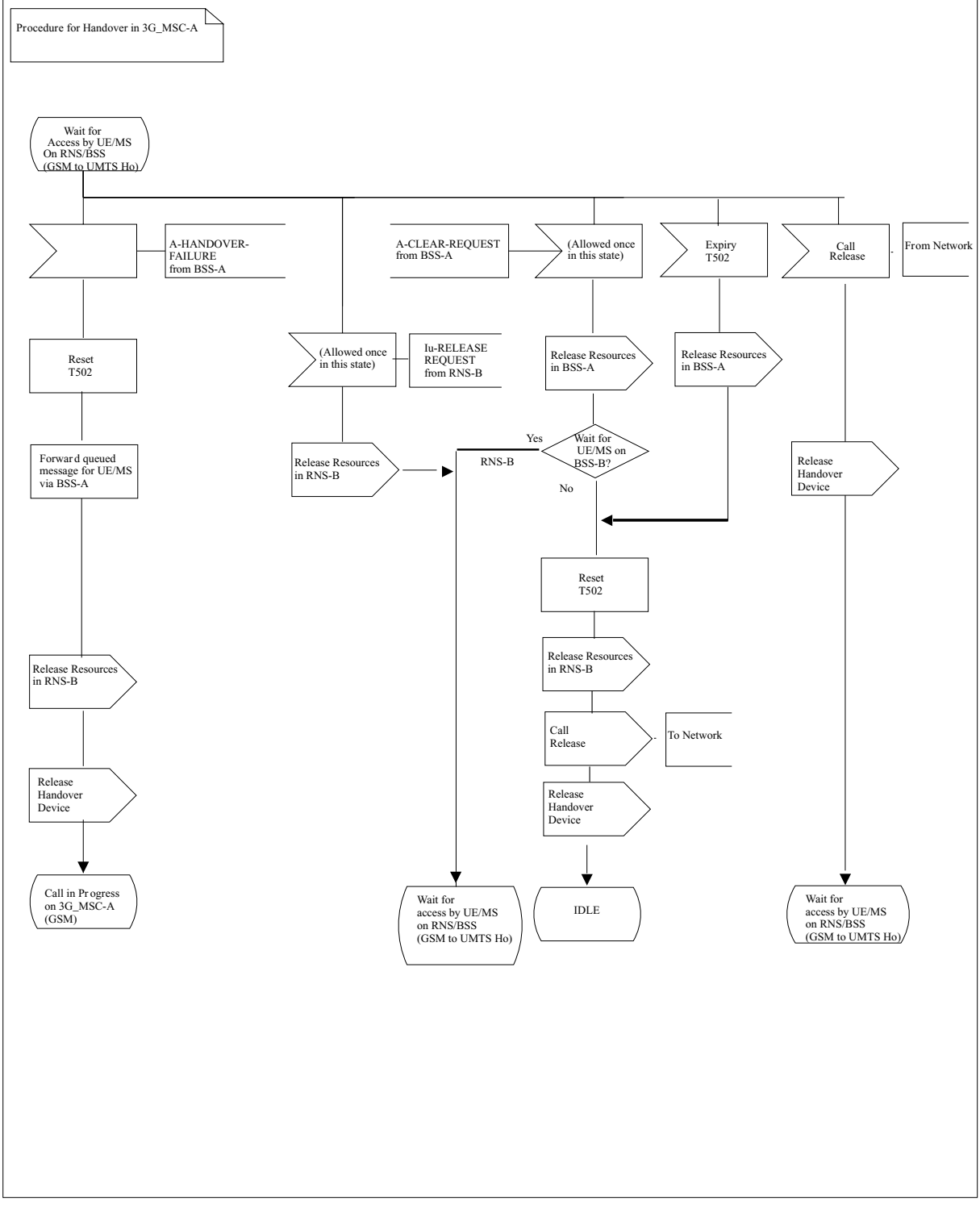



Figure 43 (Sheet 4 of 78): Handover control procedure in 3G_MSC-A

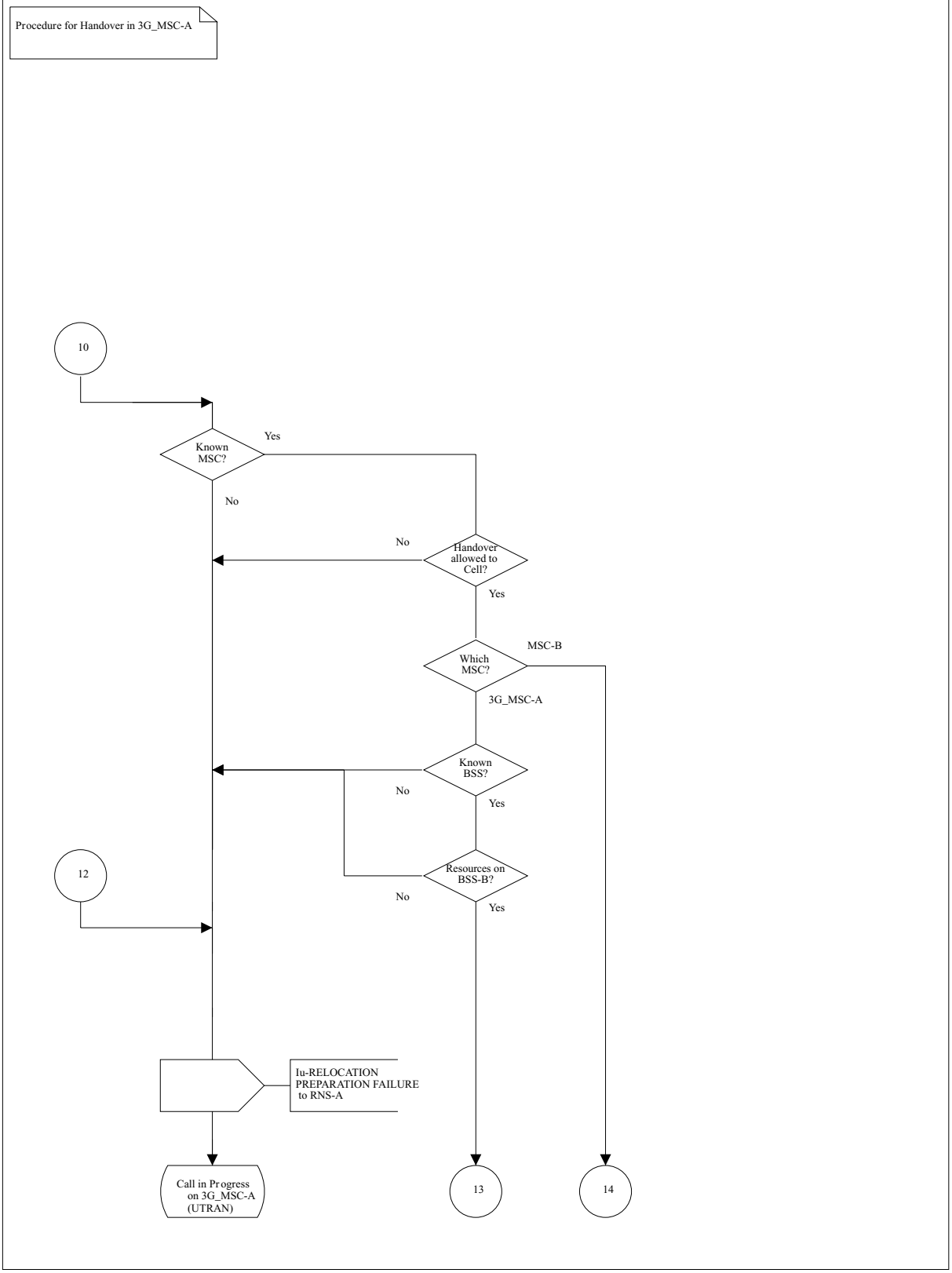



Figure 43 (Sheet 5 of 78): Handover control procedure in 3G_MSC-A

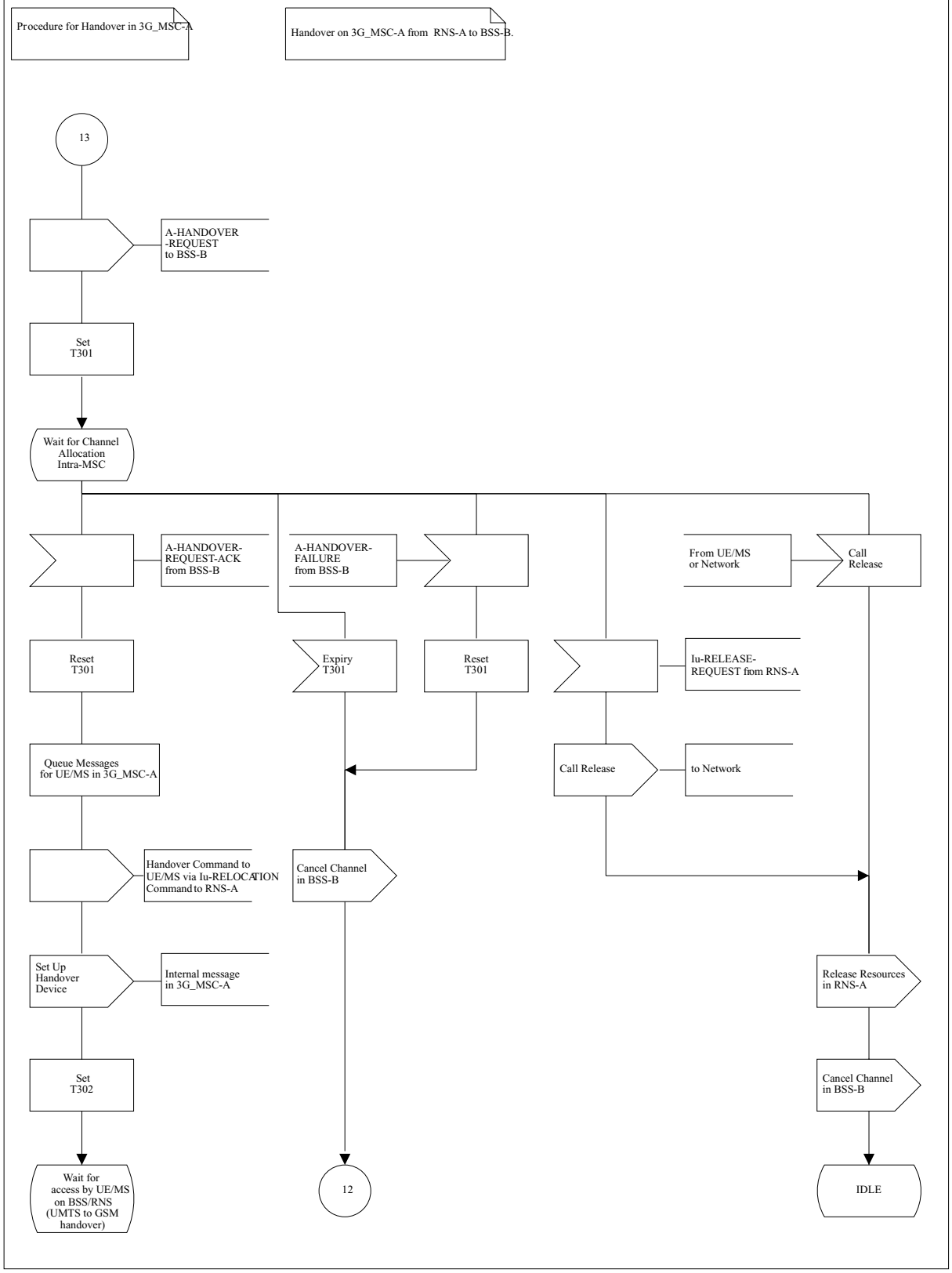



Figure 43 (Sheet 6 of 78): Handover control procedure in 3G_MSC-A

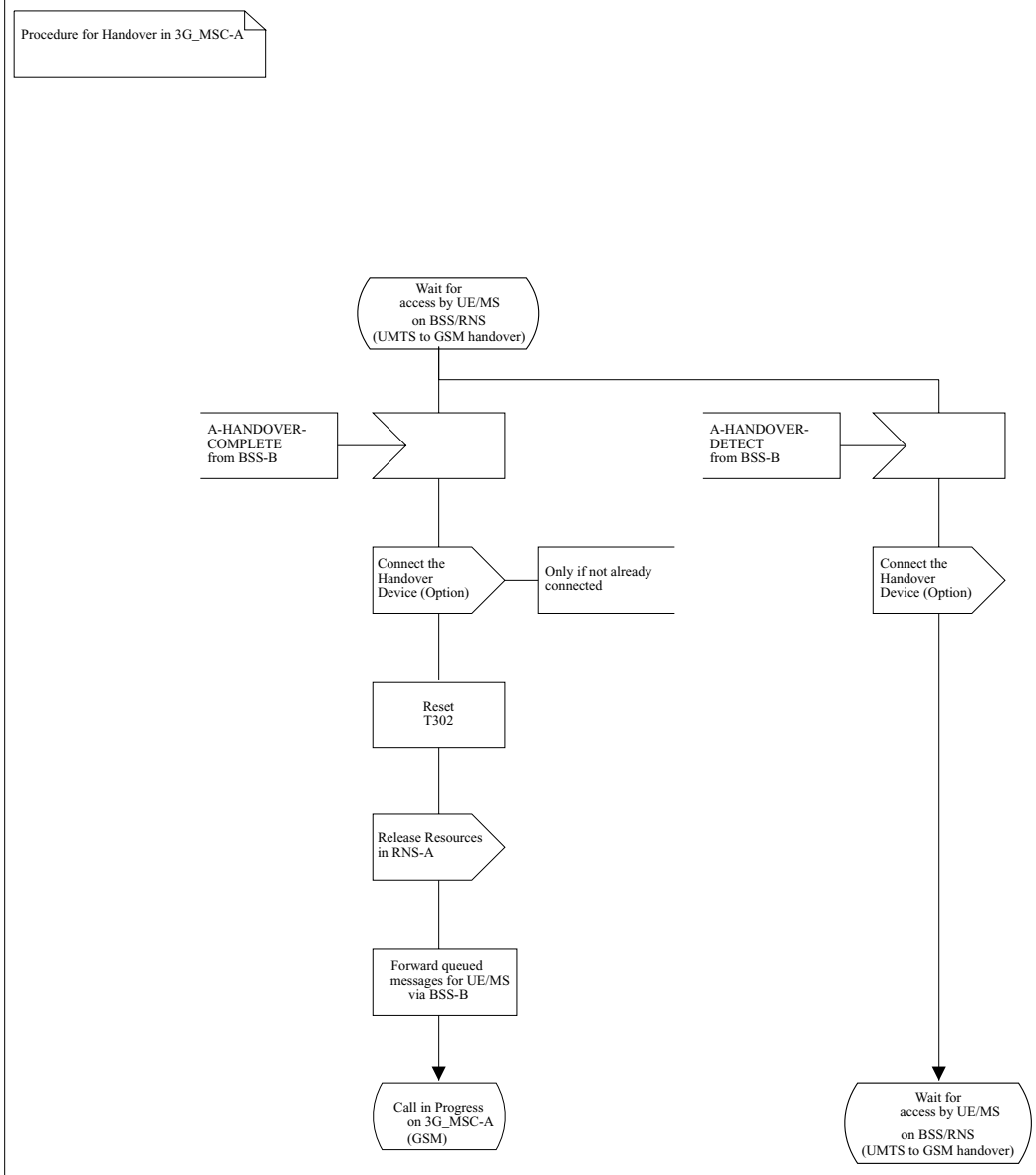



Figure 43 (Sheet 7 of 78): Handover control procedure in 3G_MSC-A

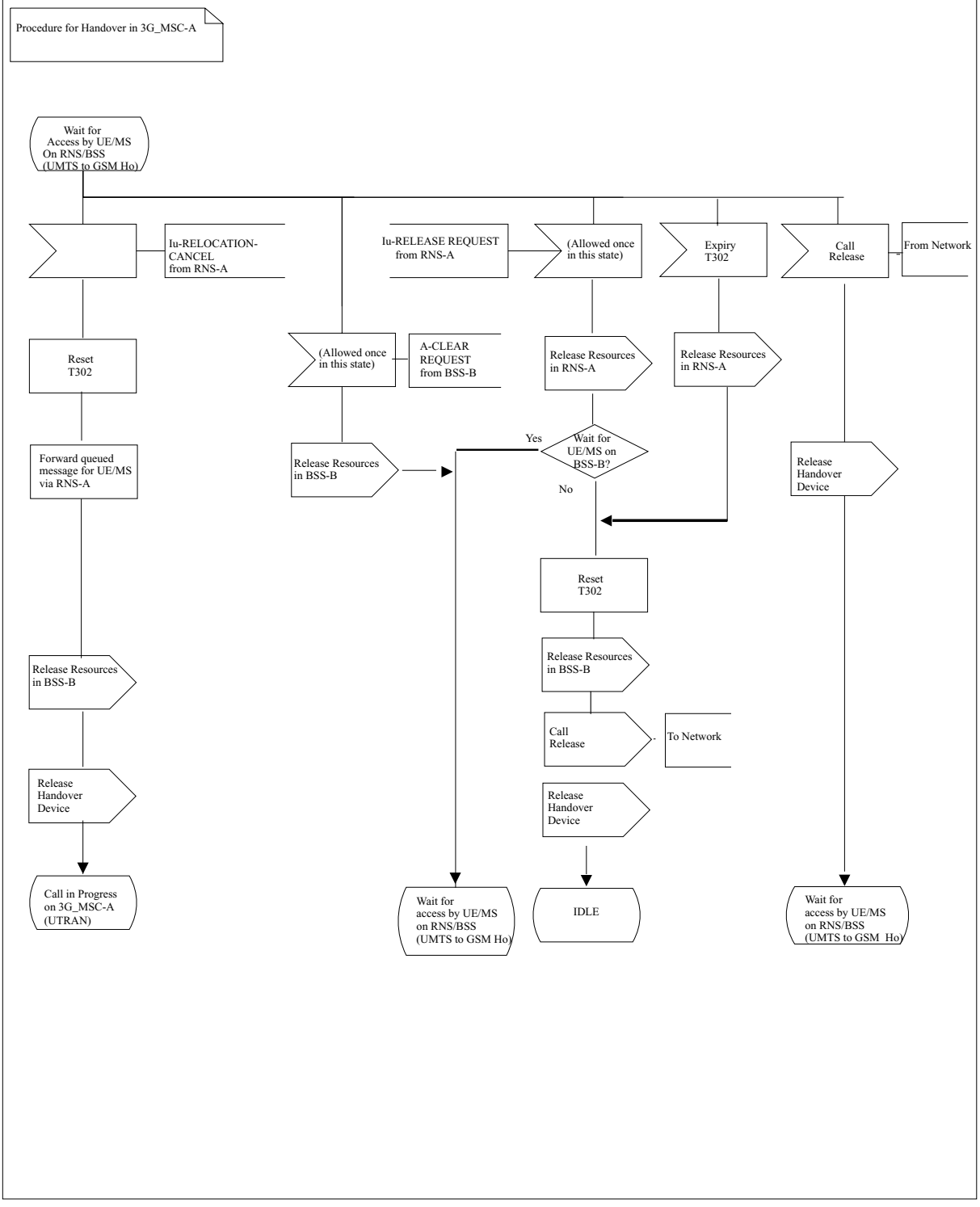



Figure 43 (Sheet 8 of 78): Handover control procedure in 3G_MSC-A

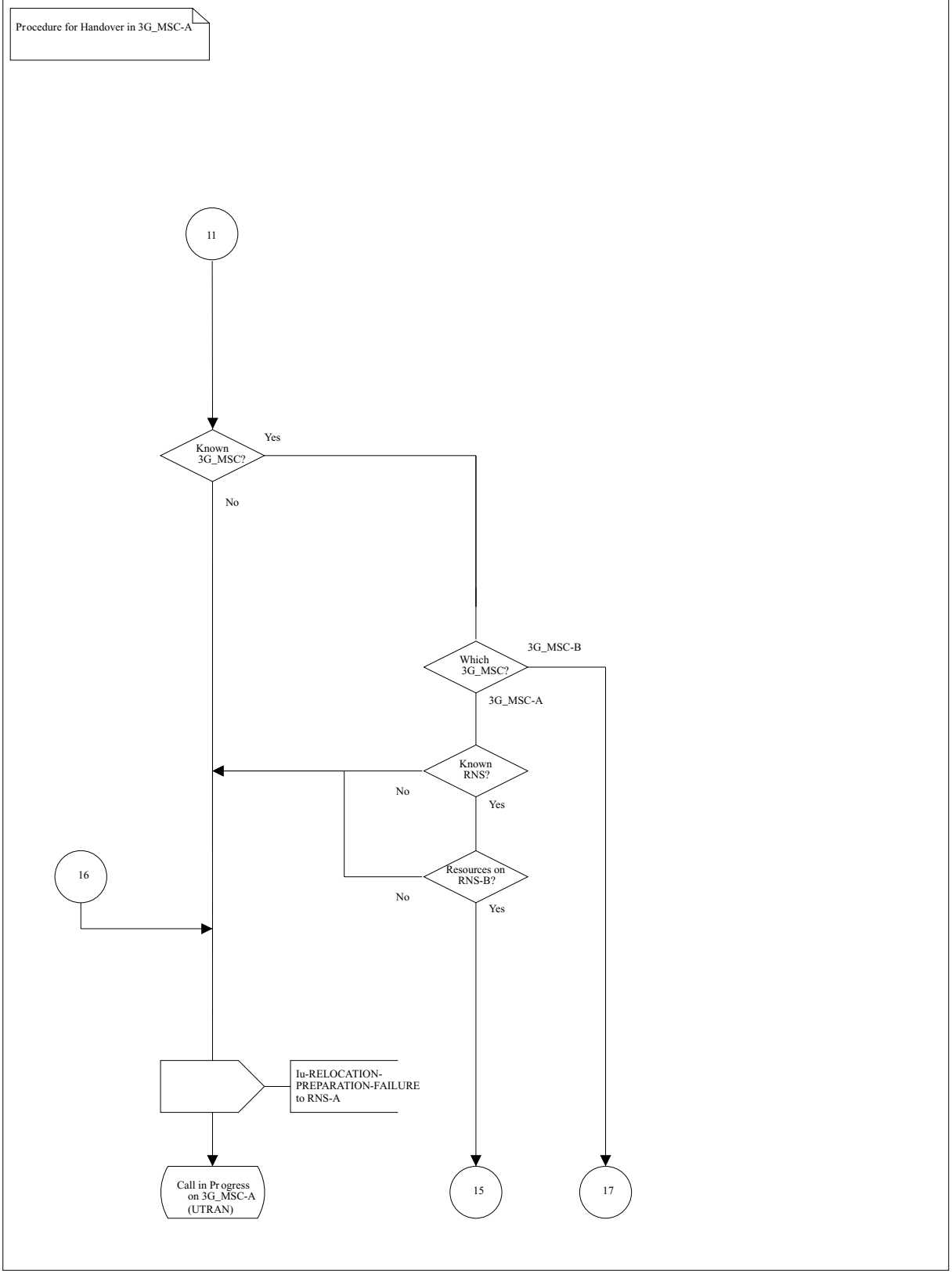



Figure 43 (Sheet 9 of 78): Handover control procedure in 3G_MSC-A

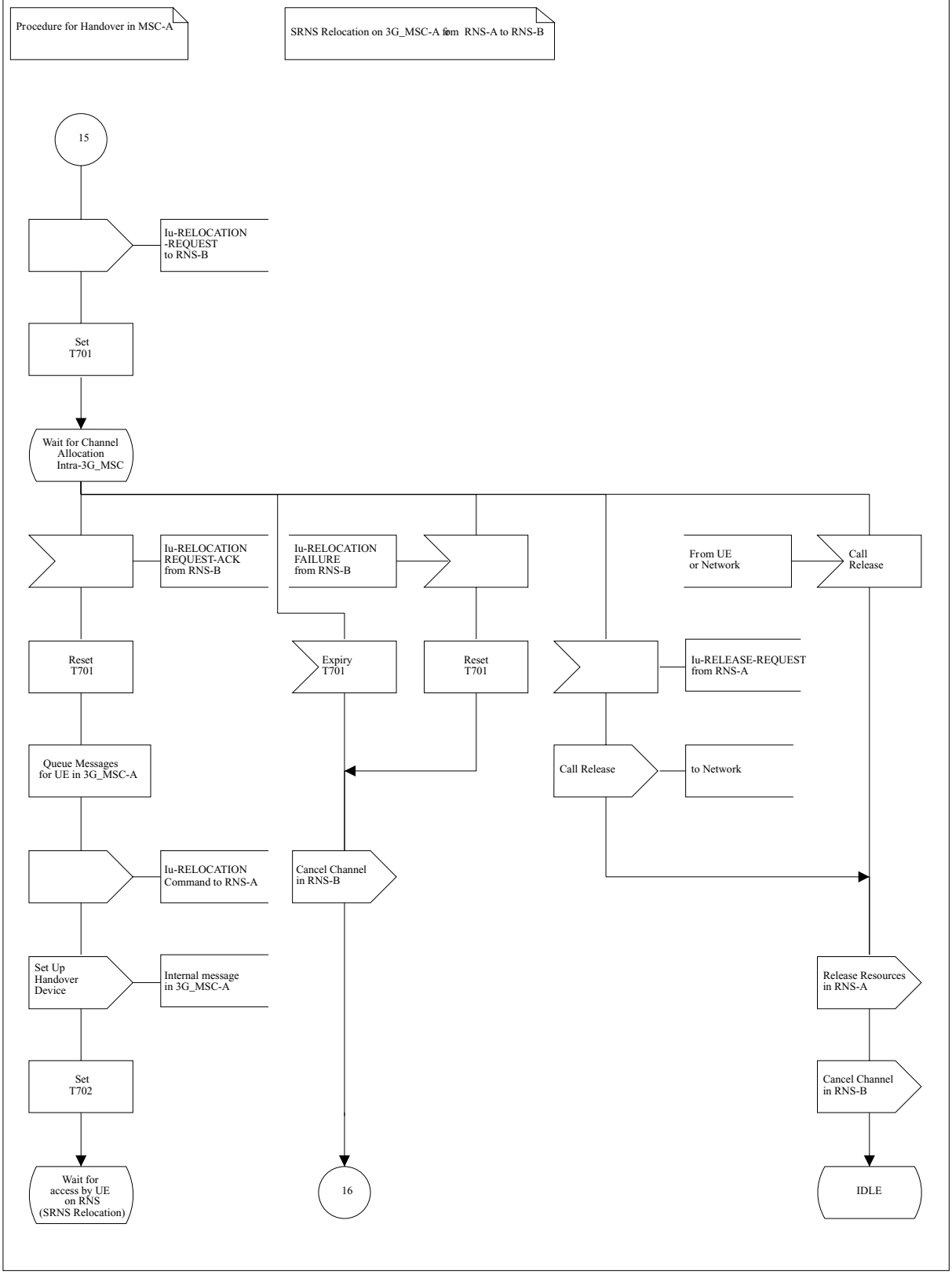



Figure 43 (Sheet 10 of 78): Handover control procedure in 3G_MSC-A

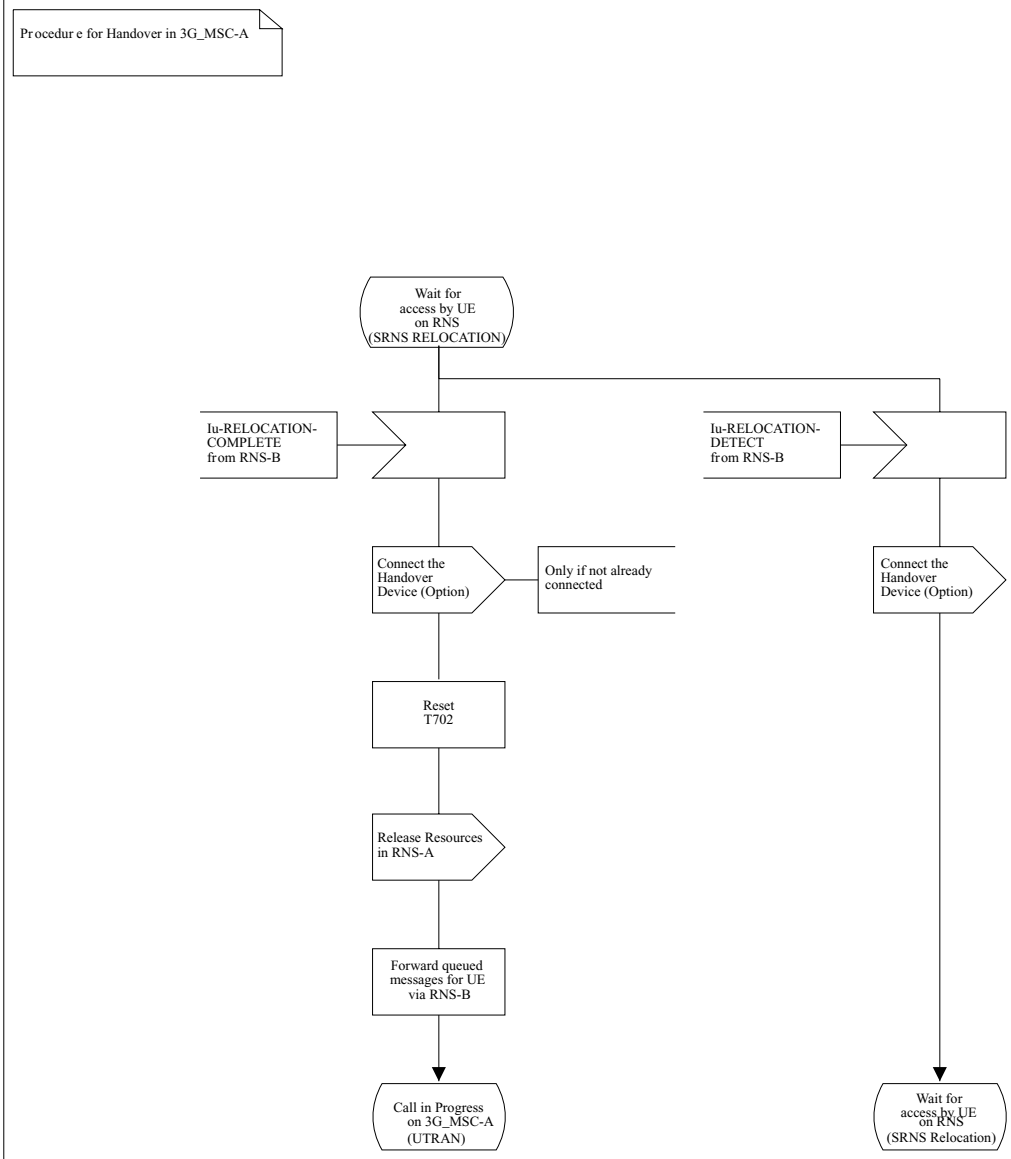



Figure 43 (Sheet 11 of 78): Handover control procedure in 3G_MSC-A

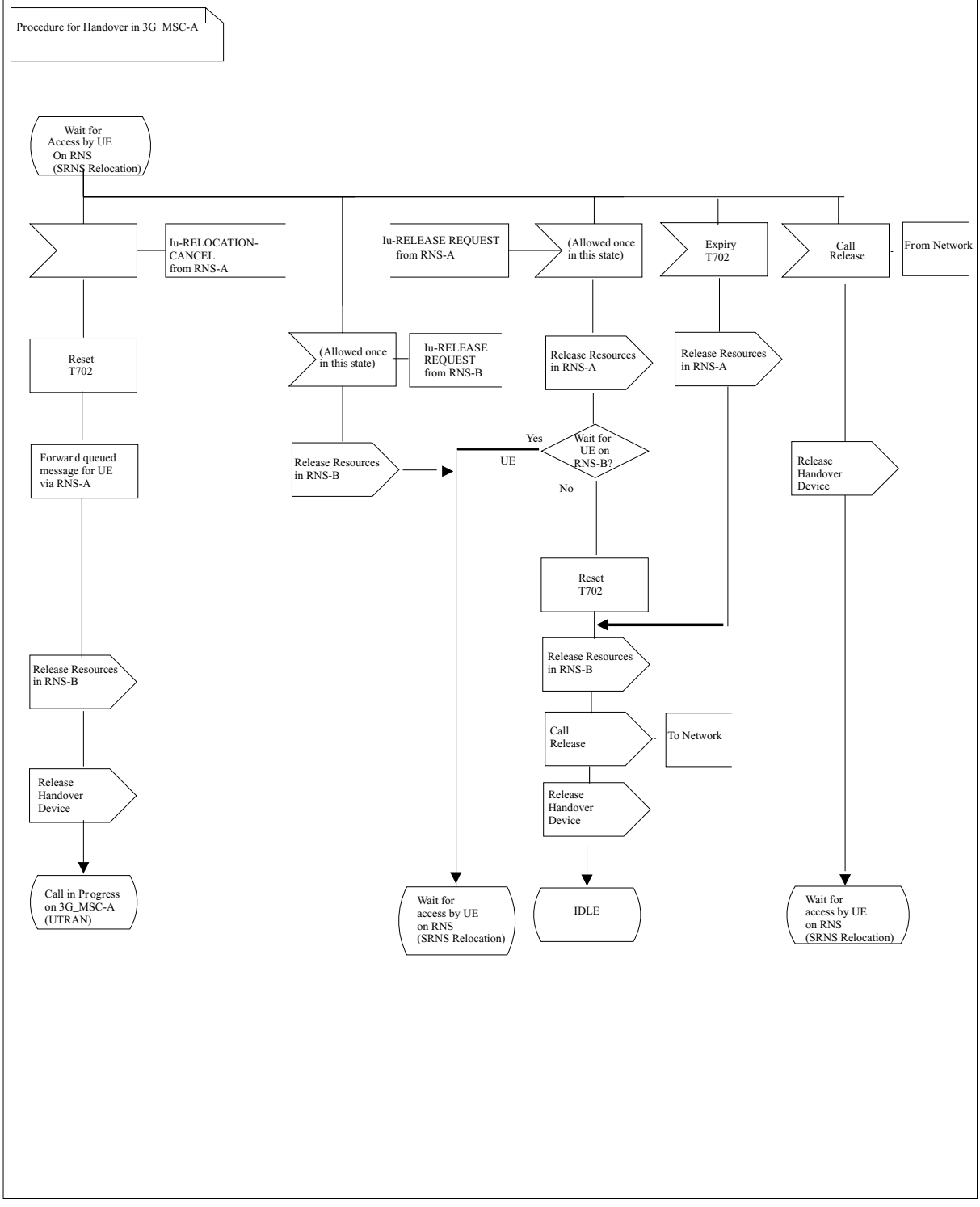



Figure 43 (Sheet 12 of 78): Handover control procedure in 3G_MSC-A

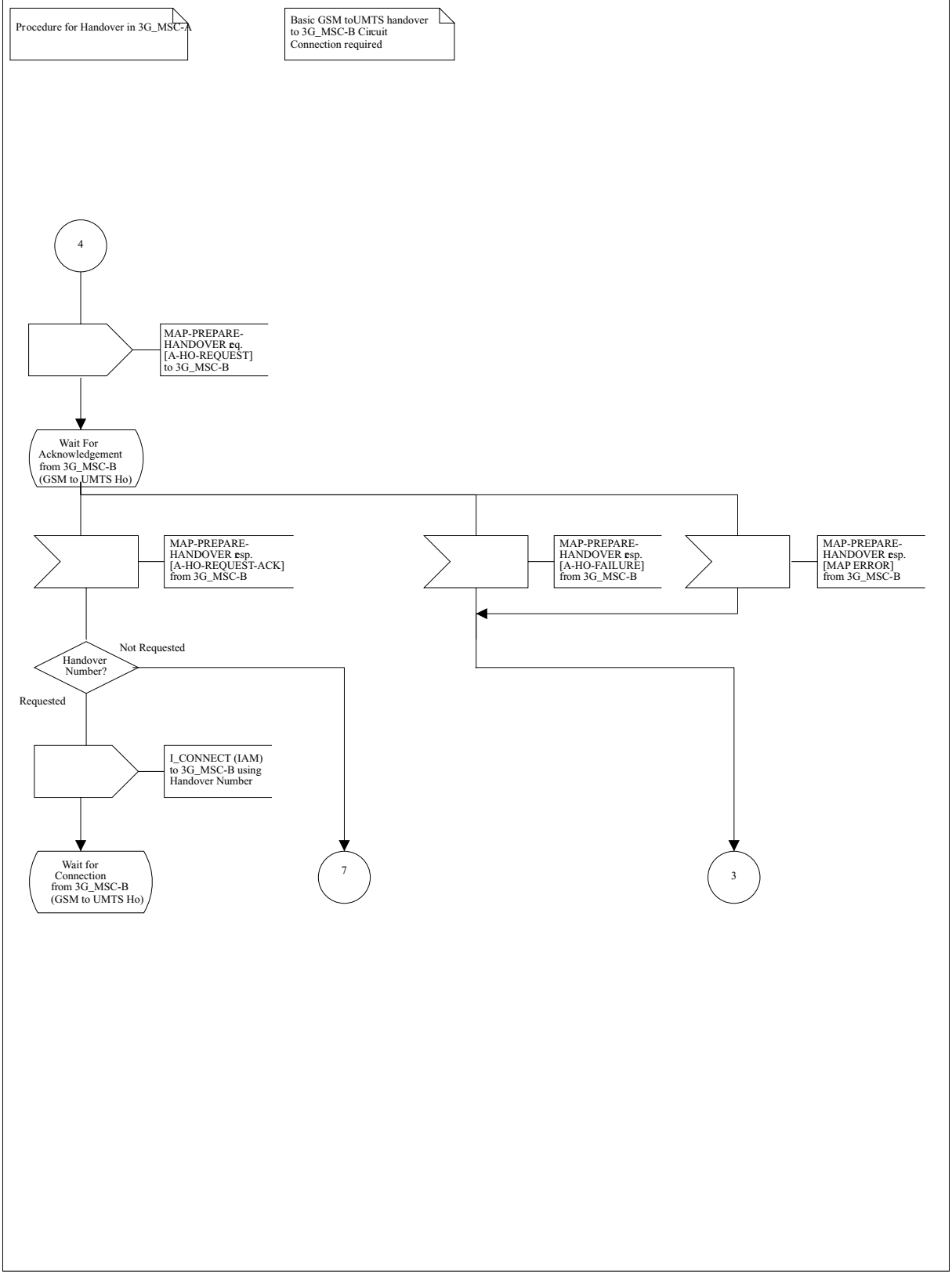



Figure 43 (Sheet 13 of 78): Handover control procedure in 3G_MSC-A

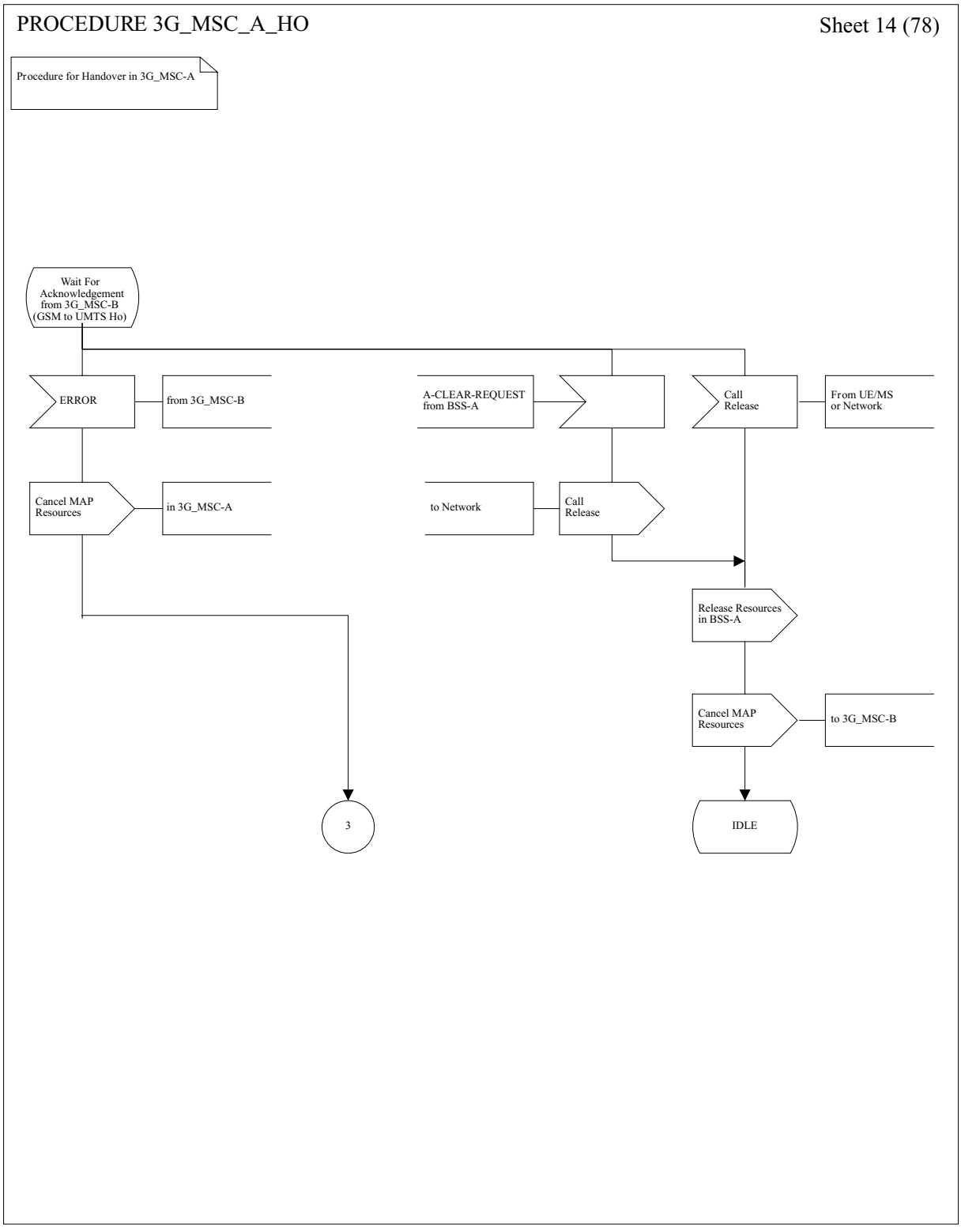



Figure 43 (Sheet 14 of 78): Handover control procedure in 3G_MSC-A

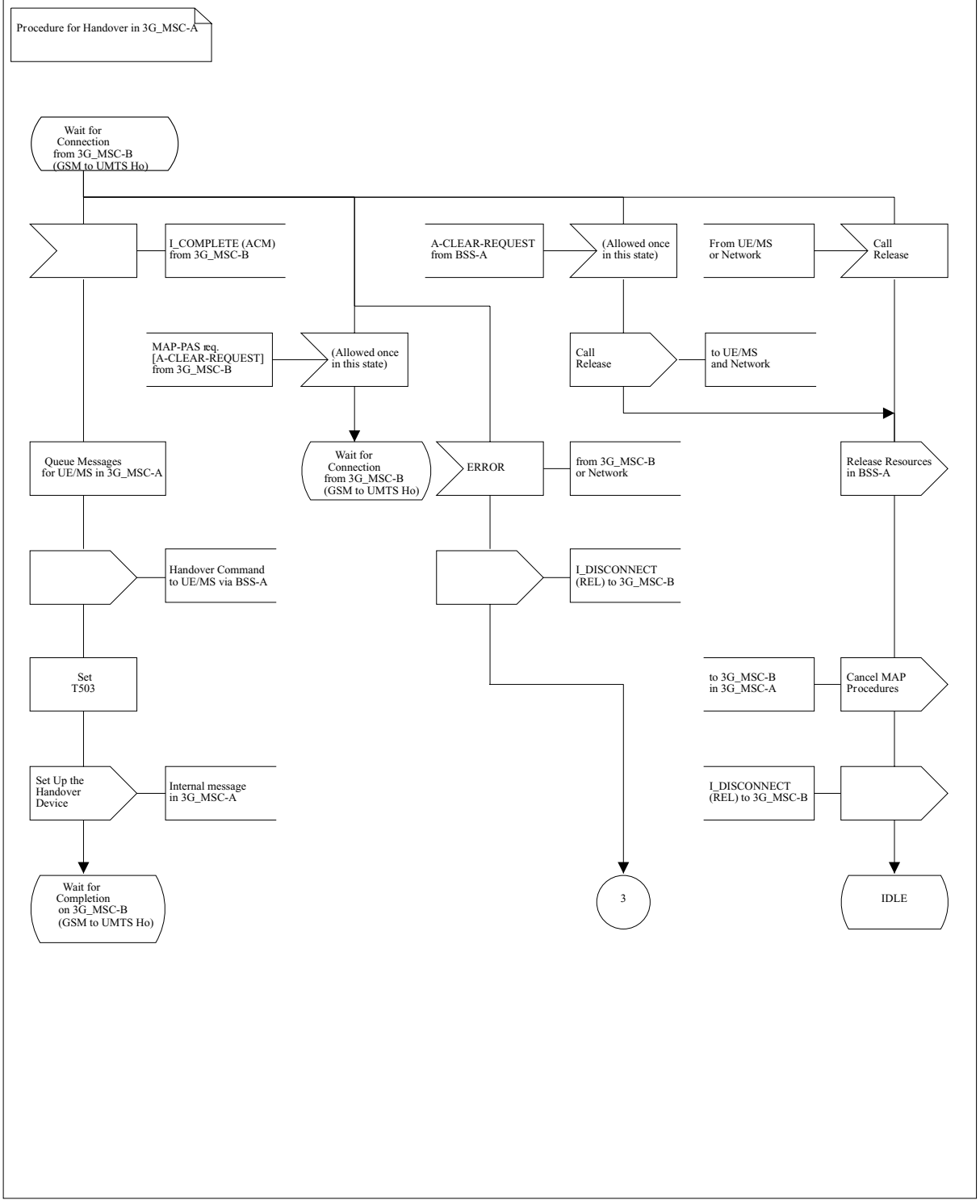



Figure 43 (Sheet 15 of 78): Handover control procedure in 3G_MSC-A

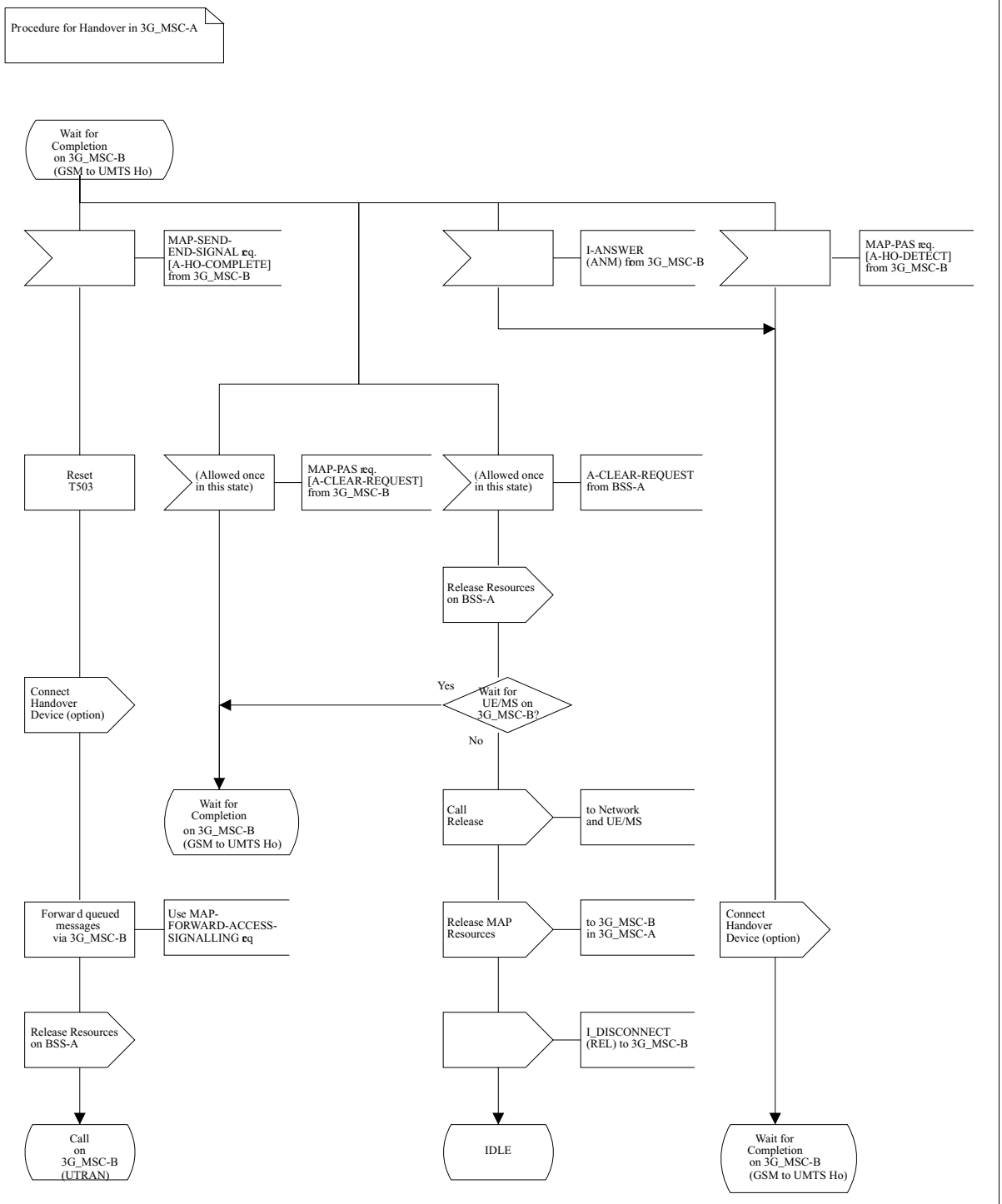



Figure 43 (Sheet 16 of 78): Handover control procedure in 3G_MSC-A

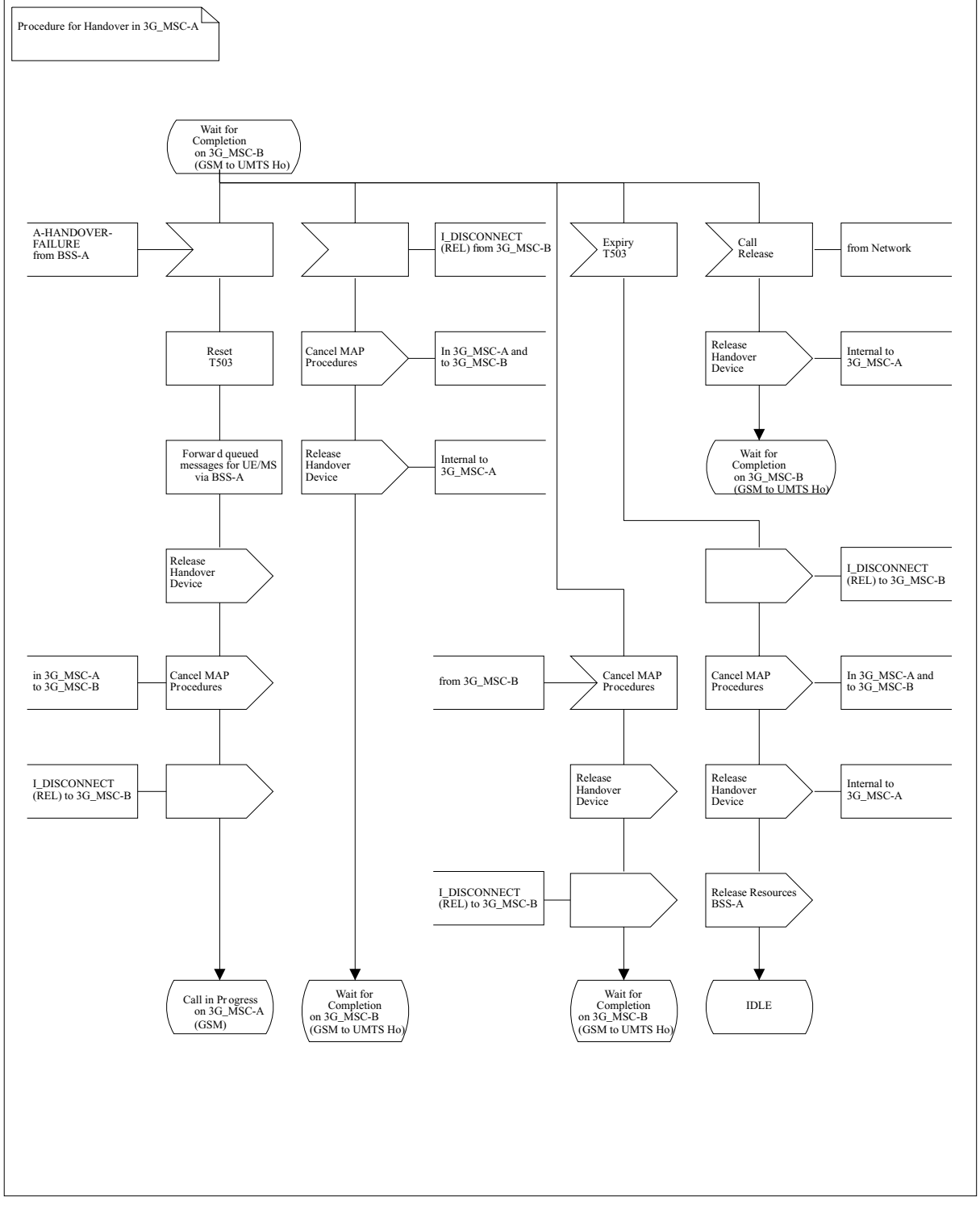



Figure 43 (Sheet 17 of 78): Handover control procedure in 3G_MSC-A

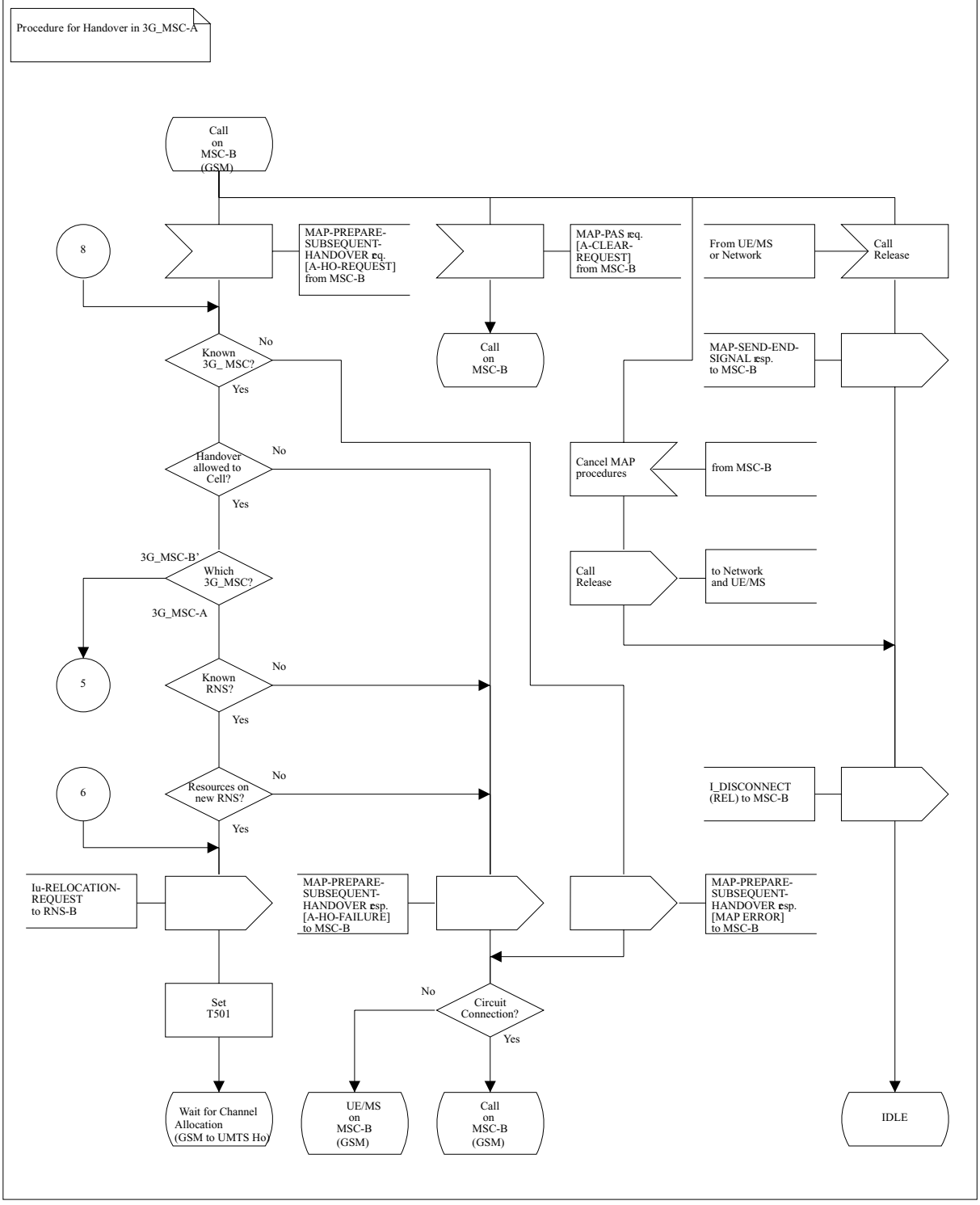



Figure 43 (Sheet 18 of 78): Handover control procedure in 3G_MSC-A

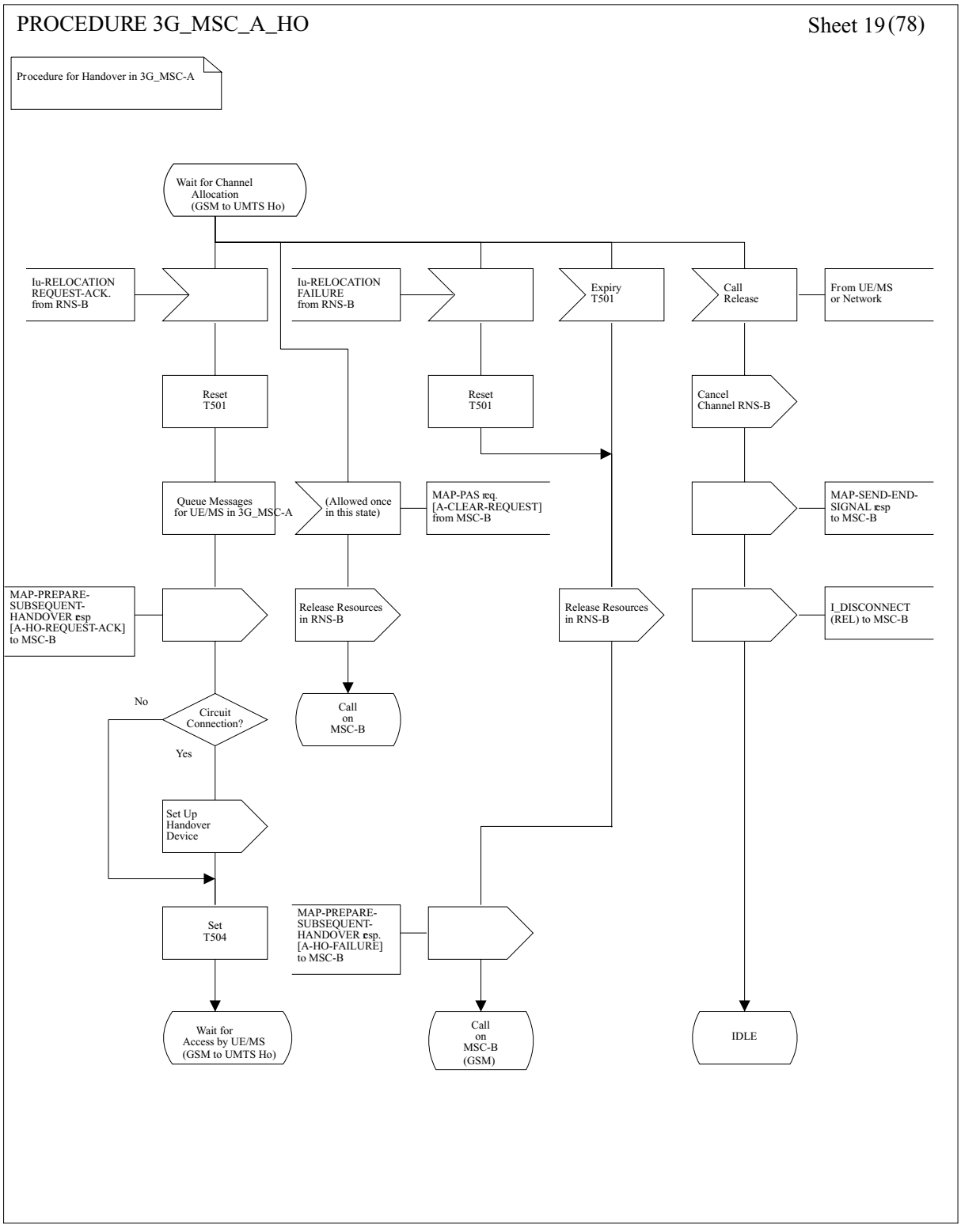



Figure 43 (Sheet 19 of 78): Handover control procedure in 3G_MSC-A

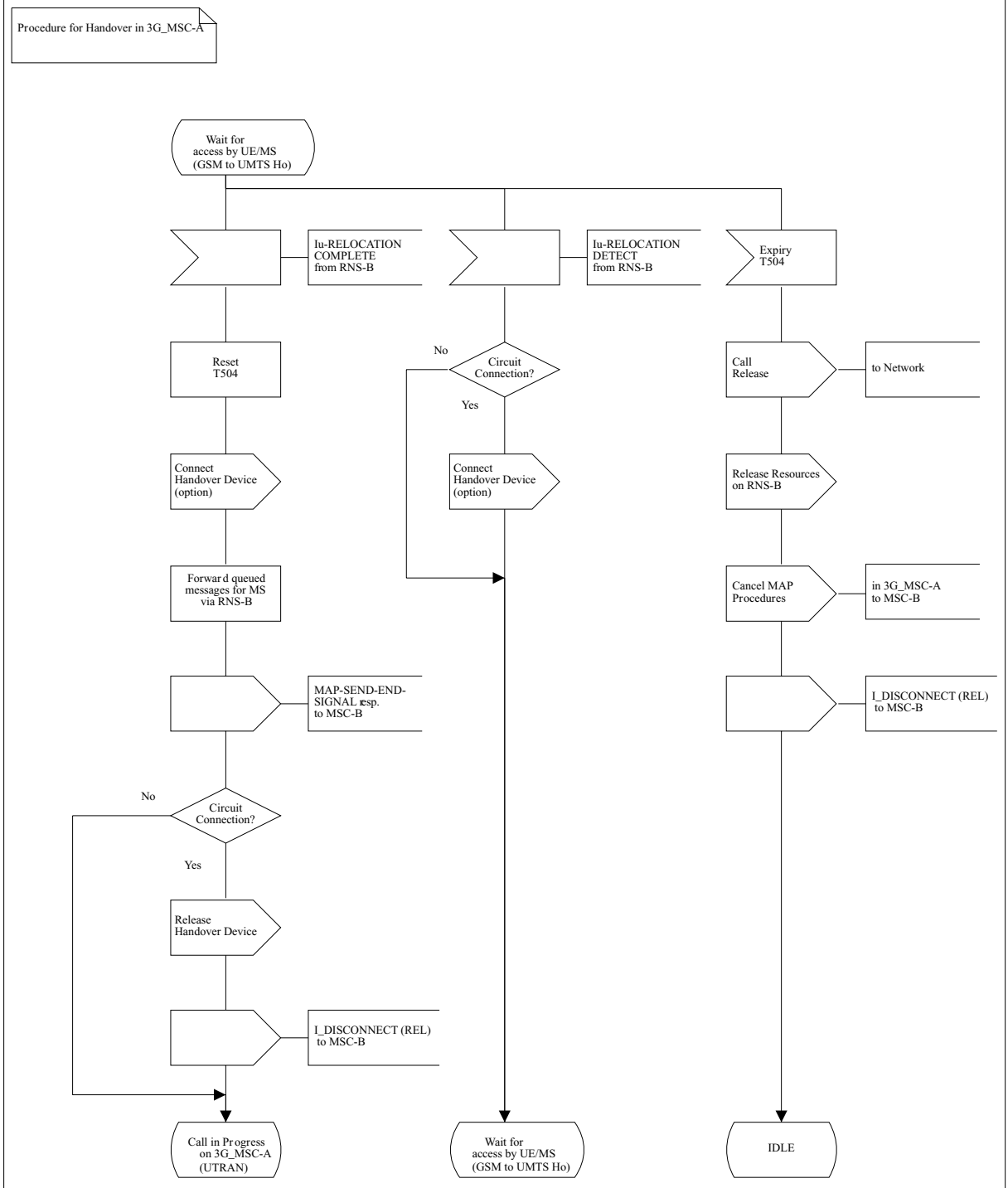



Figure 43 (Sheet 20 of 78): Handover control procedure in 3G_MSC-A

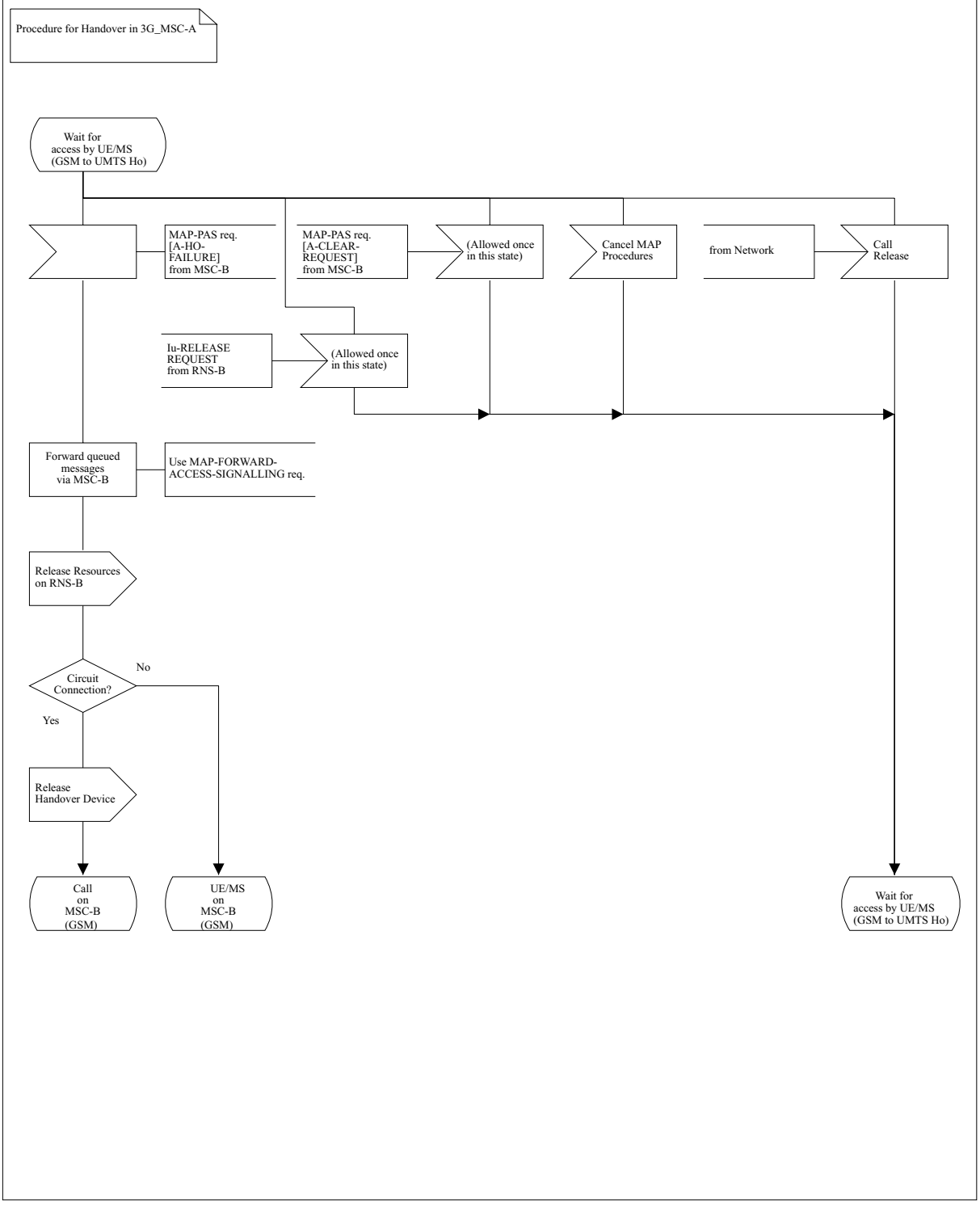



Figure 43 (Sheet 21 of 78): Handover control procedure in 3G_MSC-A

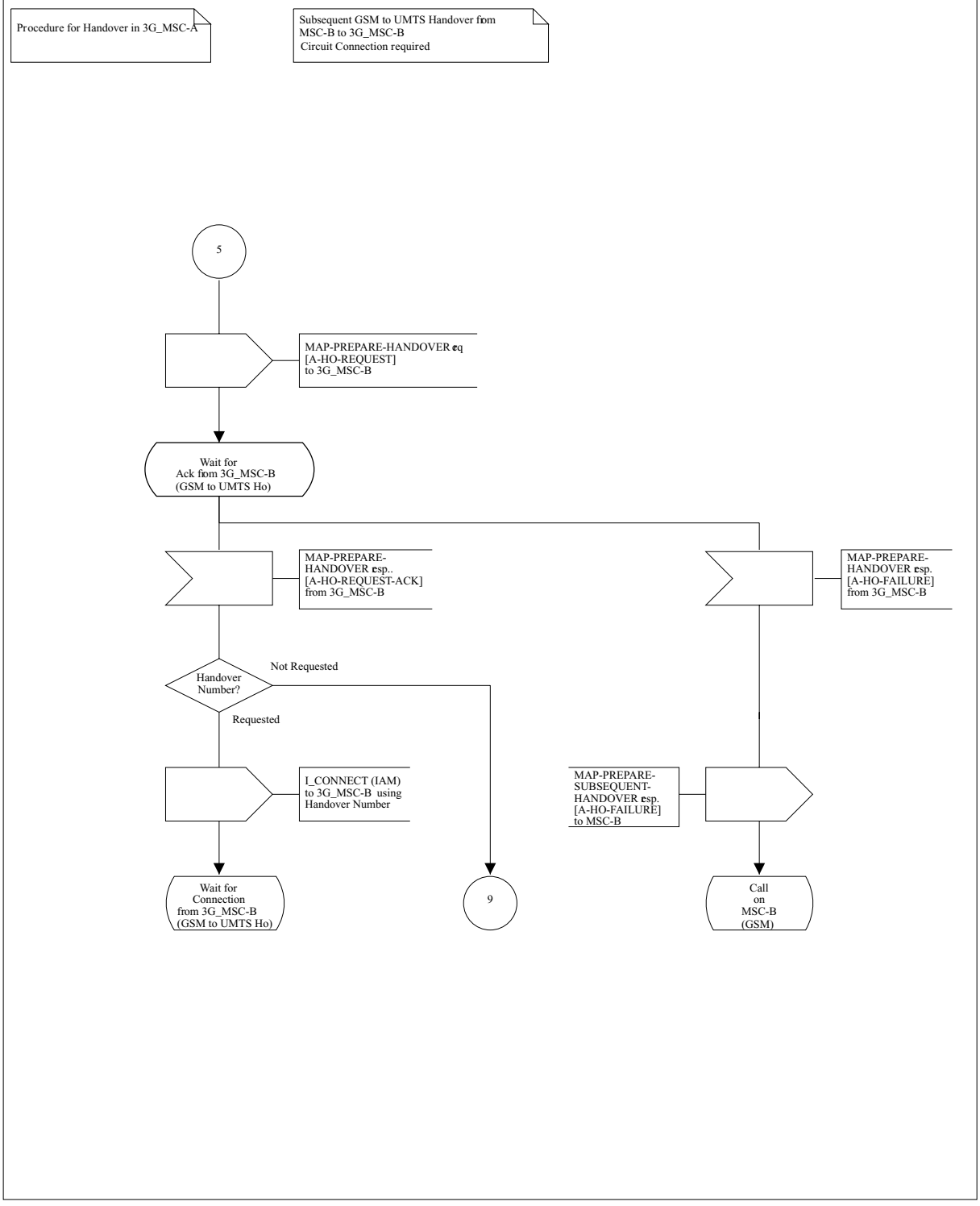



Figure 43 (Sheet 22 of 78): Handover control procedure in 3G_MSC-A

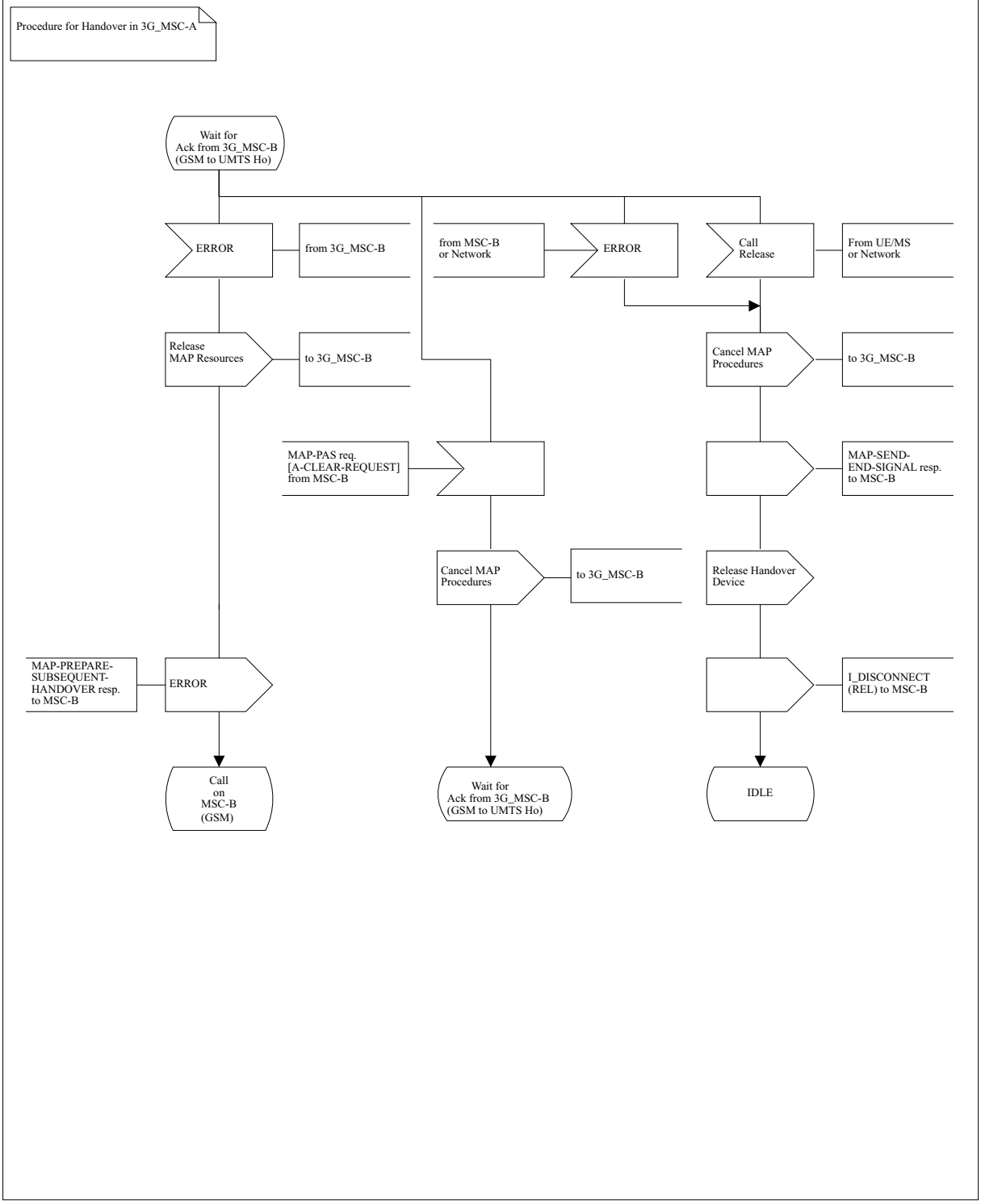



Figure 43 (Sheet 23 of 78): Handover control procedure in 3G_MSC-A

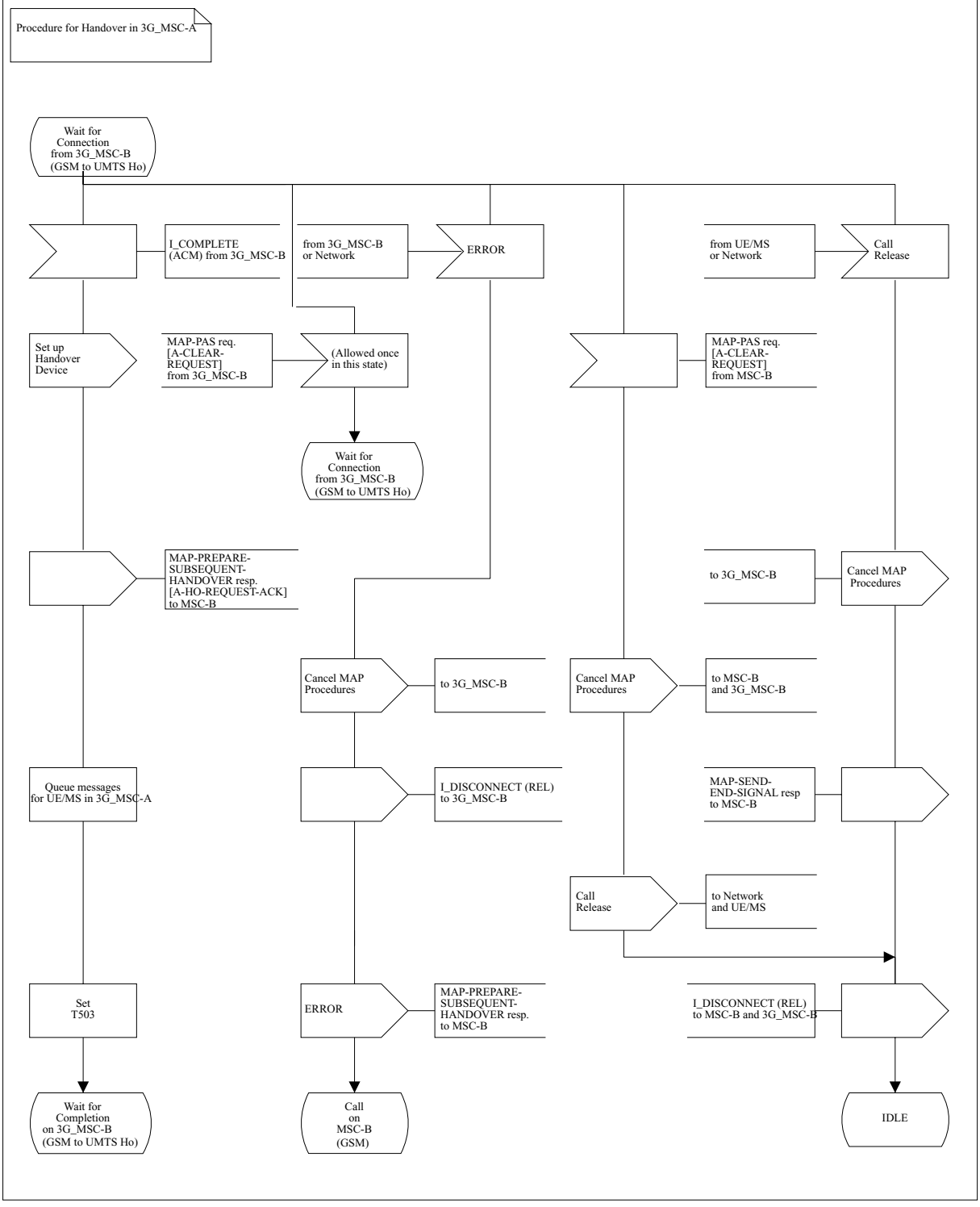



Figure 43 (Sheet 24 of 78): Handover control procedure in 3G_MSC-A

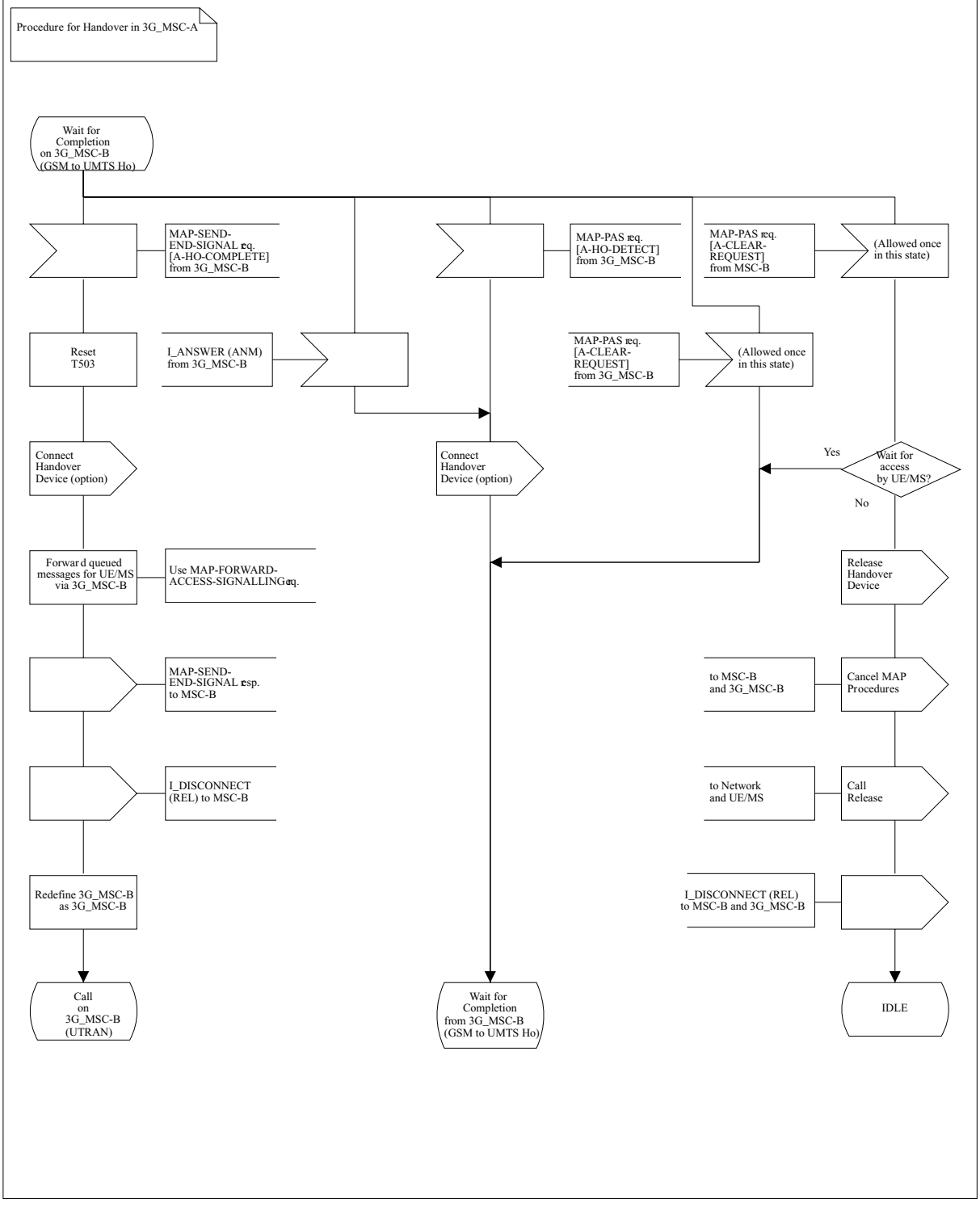



Figure 43 (Sheet 25 of 78): Handover control procedure in 3G_MSC-A

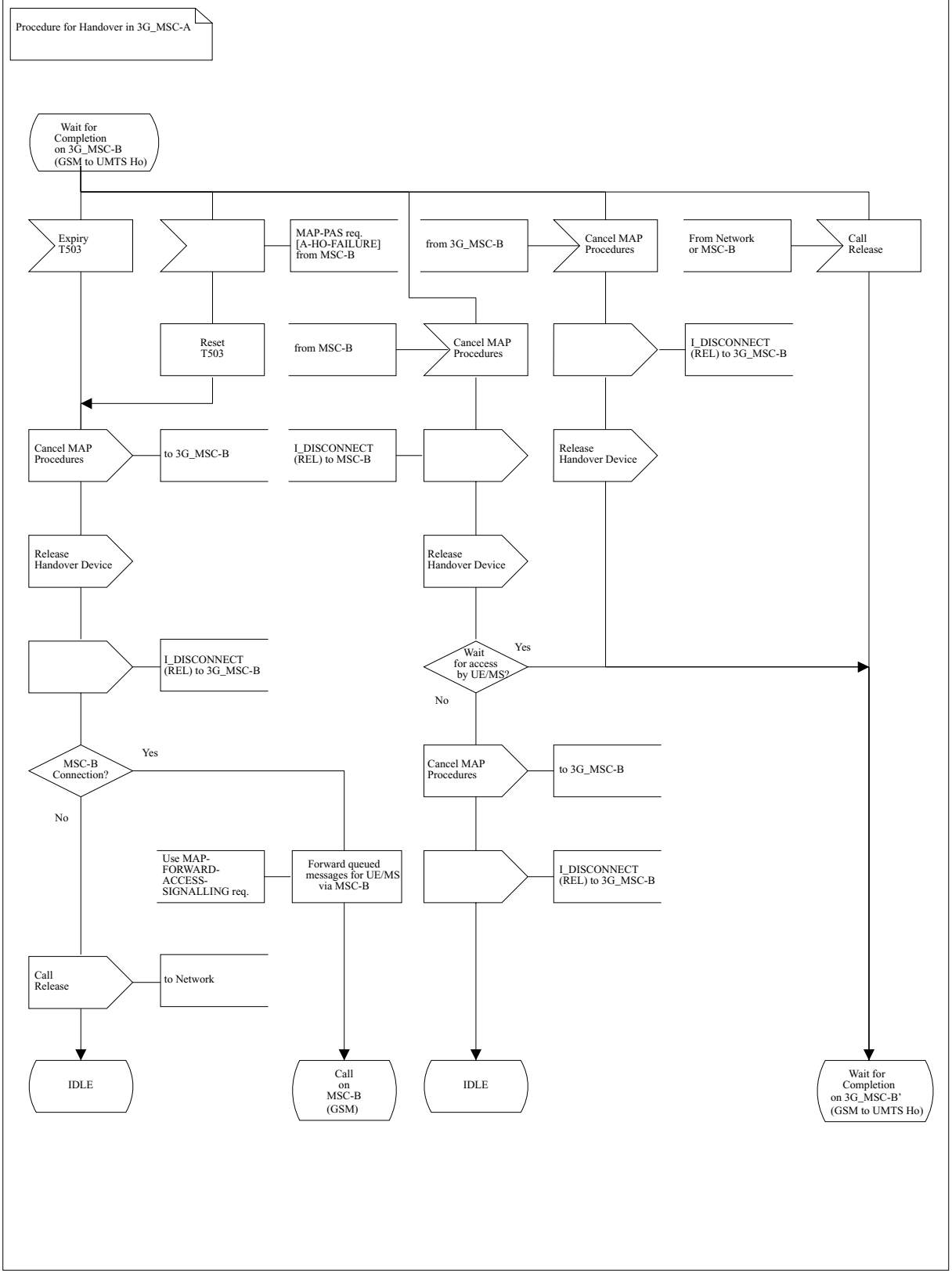



Figure 43 (Sheet 26 of 78): Handover control procedure in 3G_MSC-A

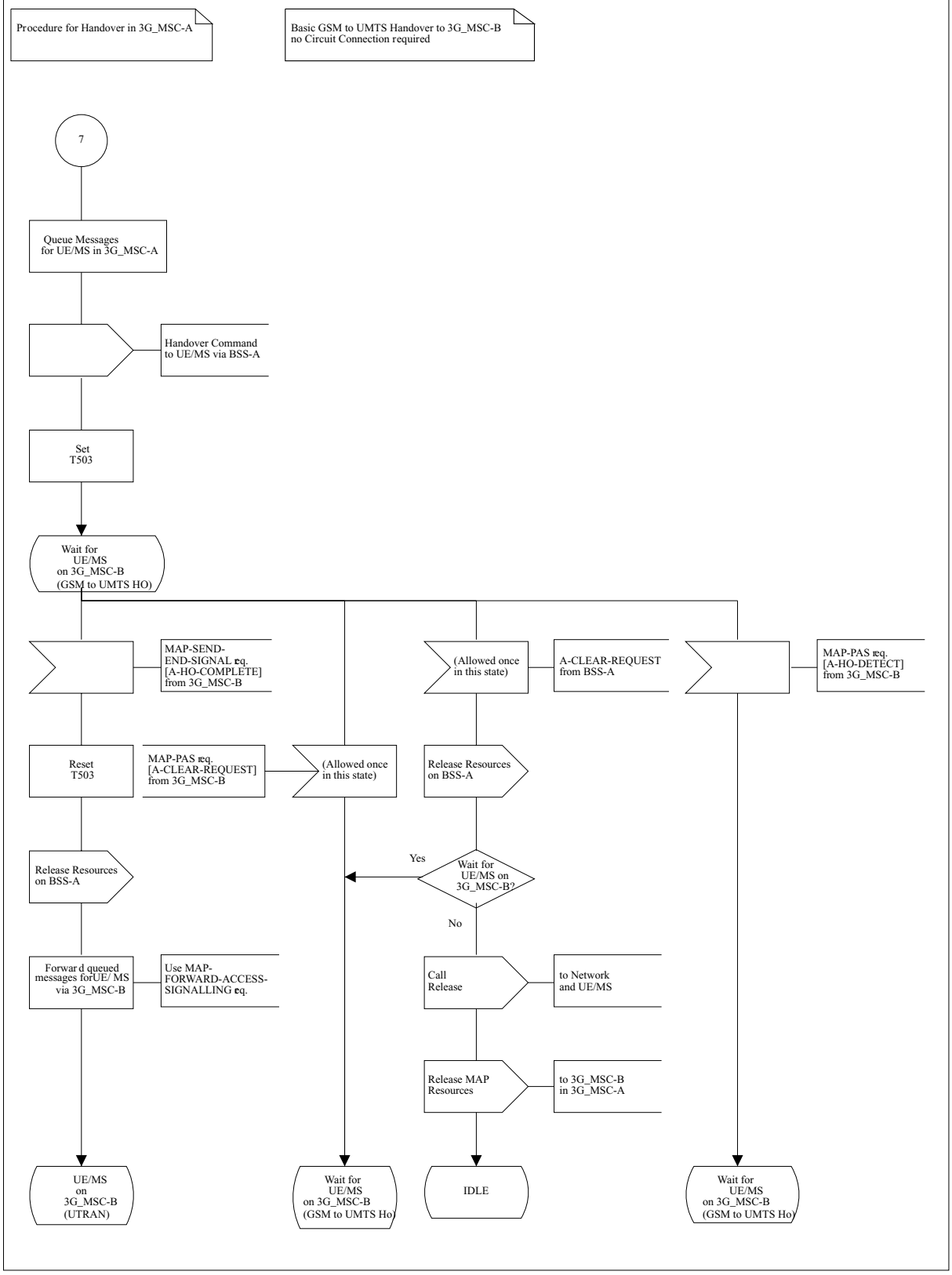



Figure 43 (Sheet 27 of 78): Handover control procedure in 3G_MSC-A

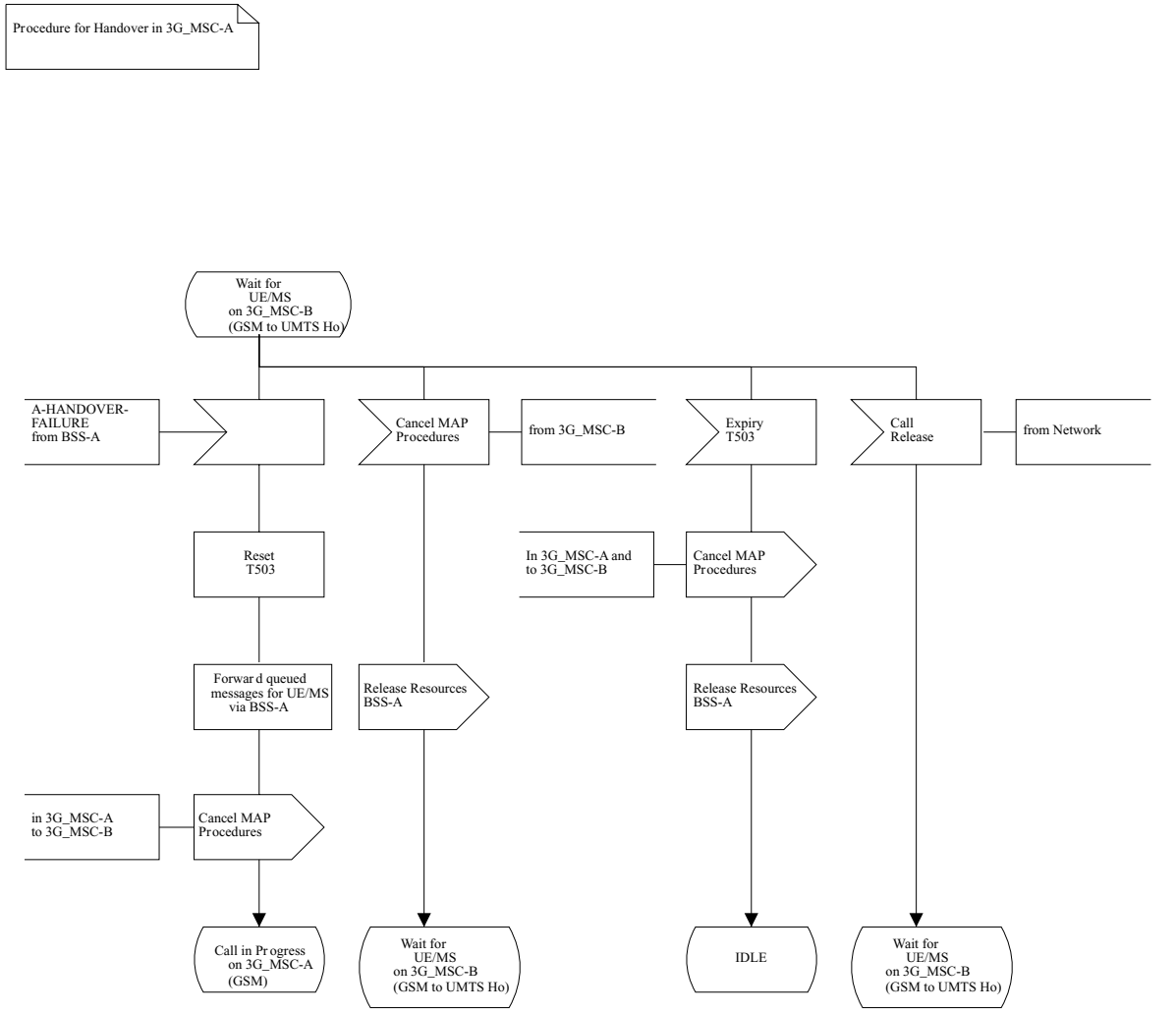



Figure 43 (Sheet 28 of 78): Handover control procedure in 3G_MSC-A

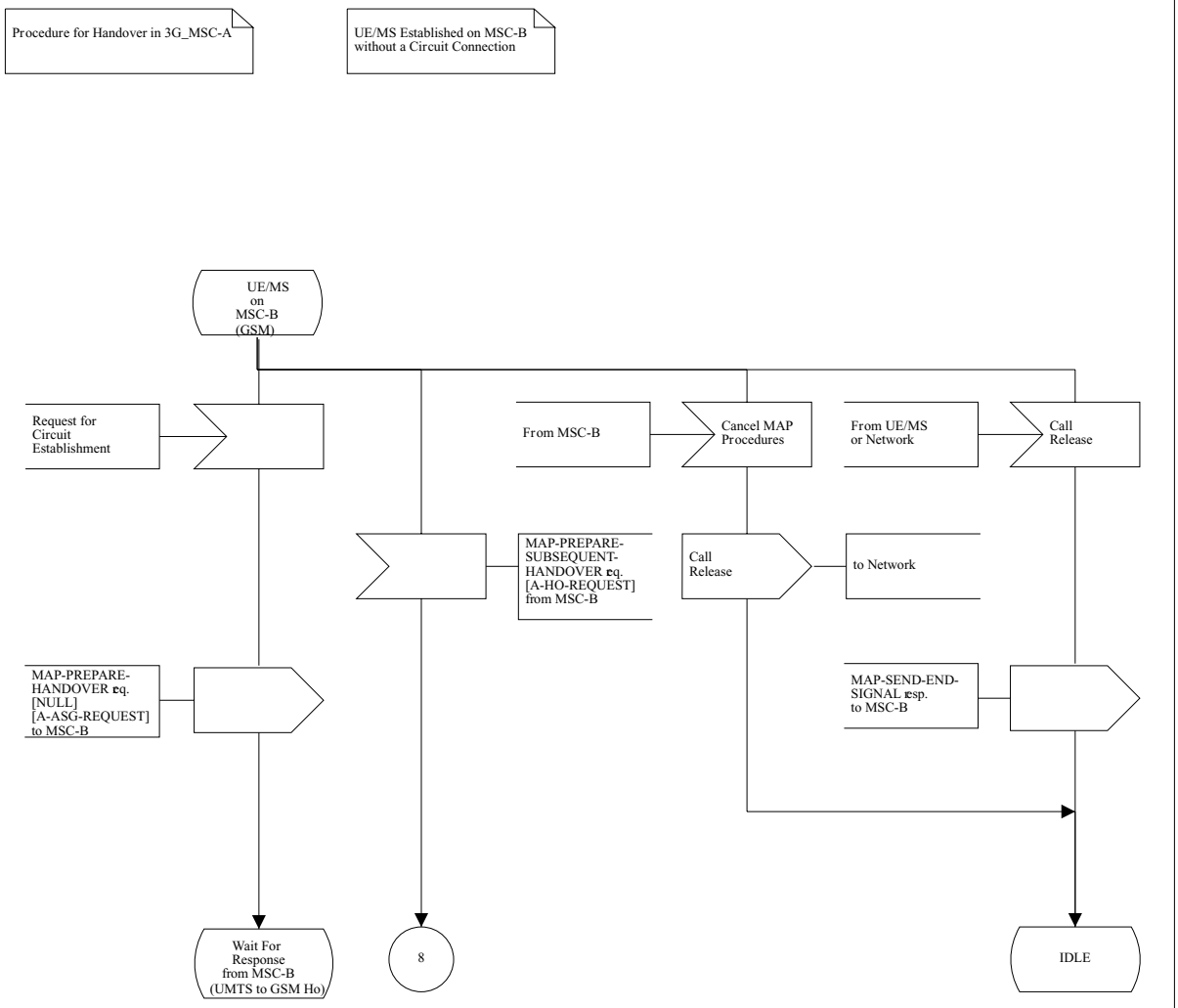



Figure 43 (Sheet 29 of 78): Handover control procedure in 3G_MSC-A

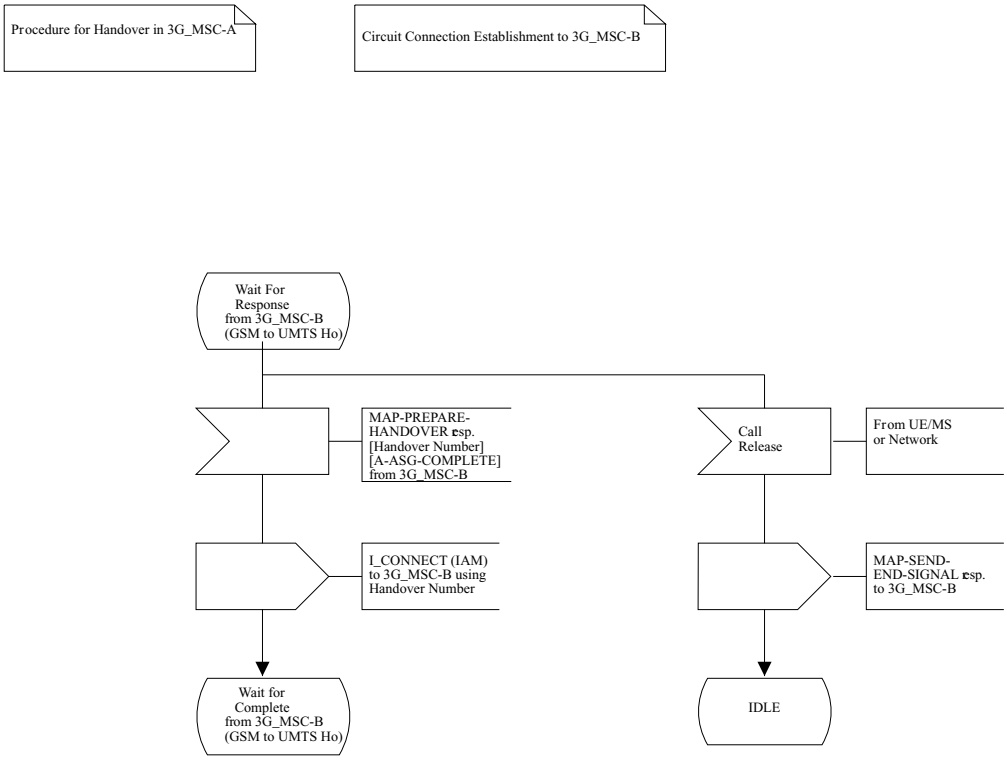



Figure 43 (Sheet 30 of 78): Handover control procedure in 3G_MSC-A

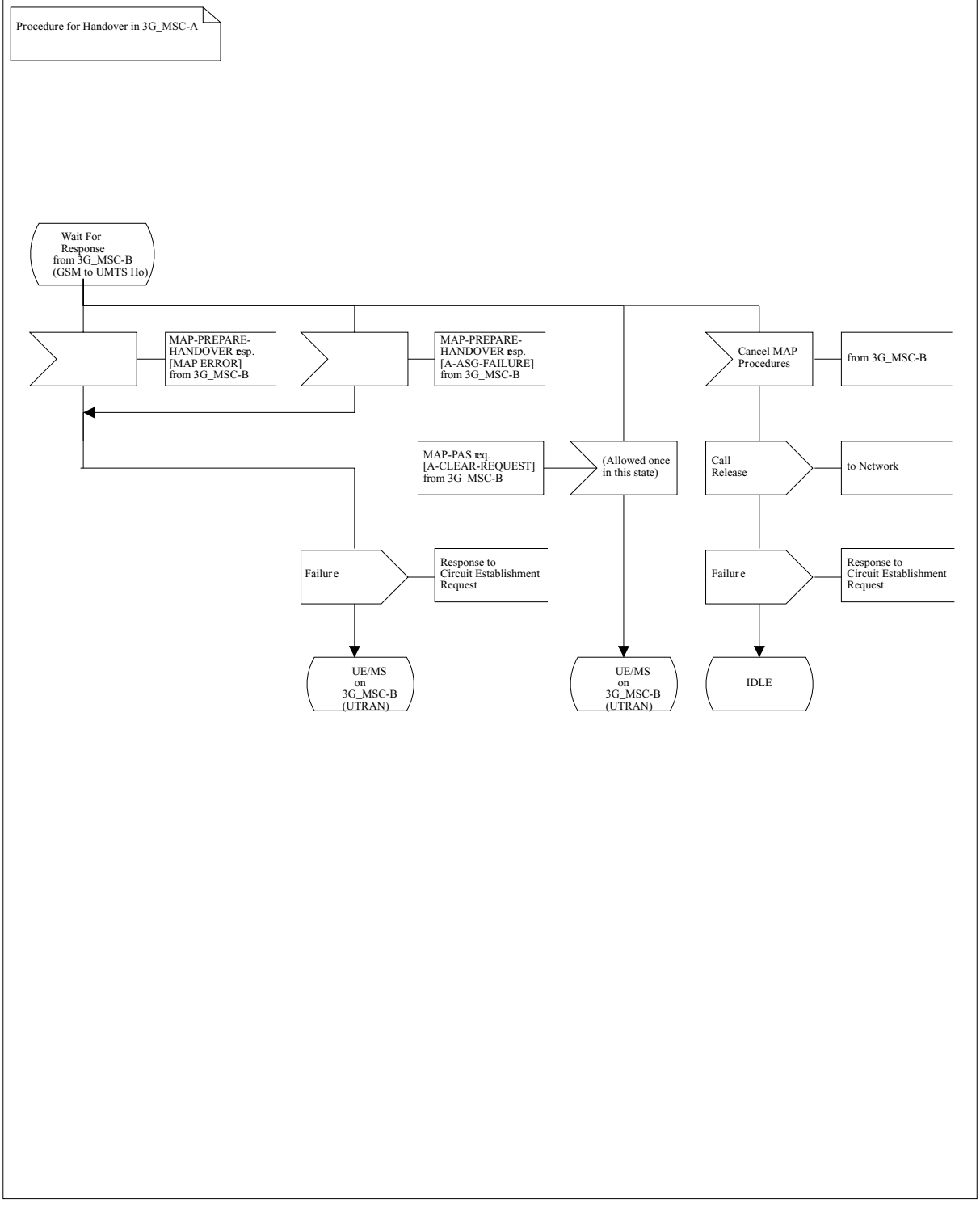



Figure 43 (Sheet 31 of 78): Handover control procedure in 3G_MSC-A

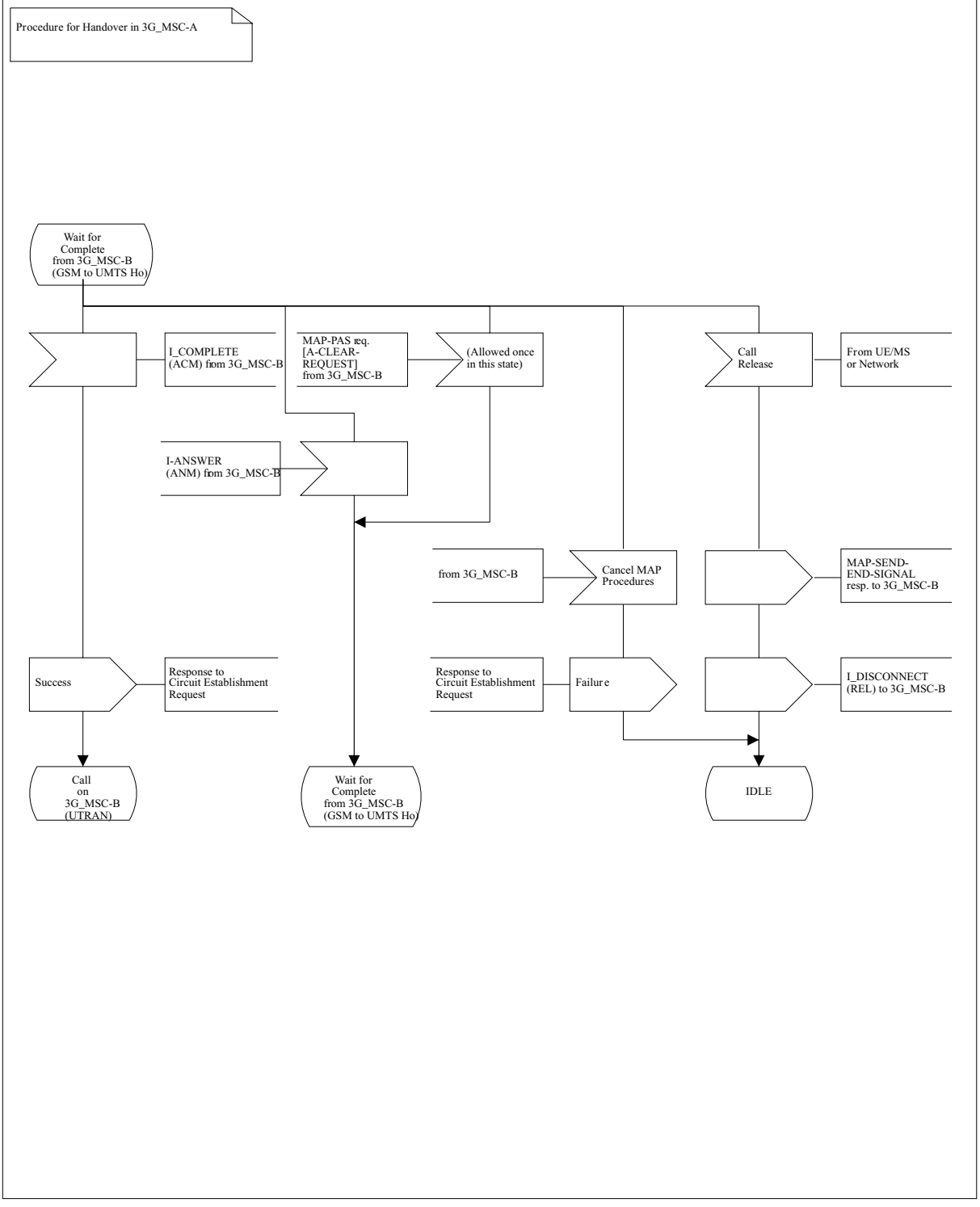



Figure 43 (Sheet 32 of 78): Handover control procedure in 3G_MSC-A

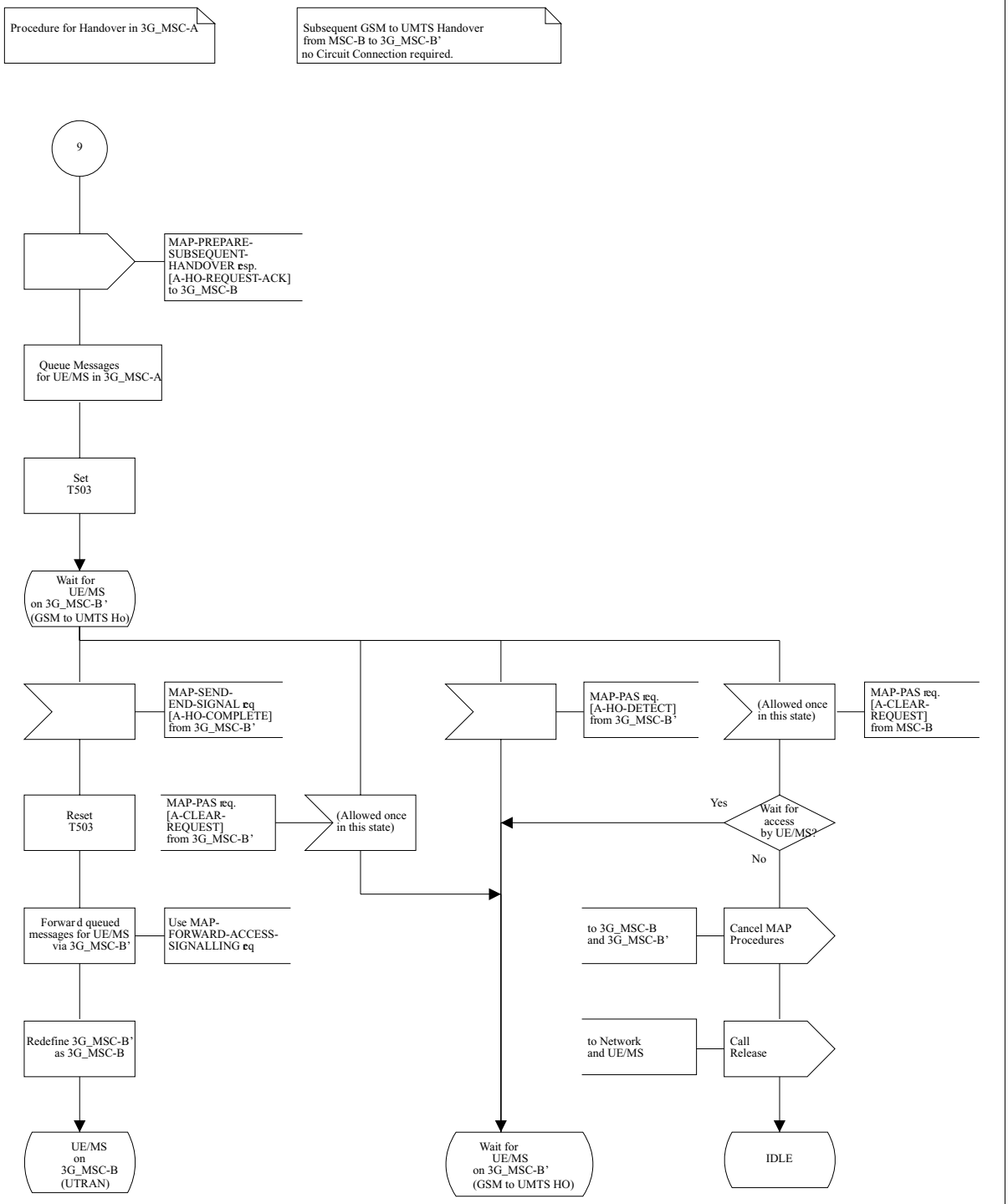



Figure 43 (Sheet 33 of 78): Handover control procedure in 3G_MSC-A

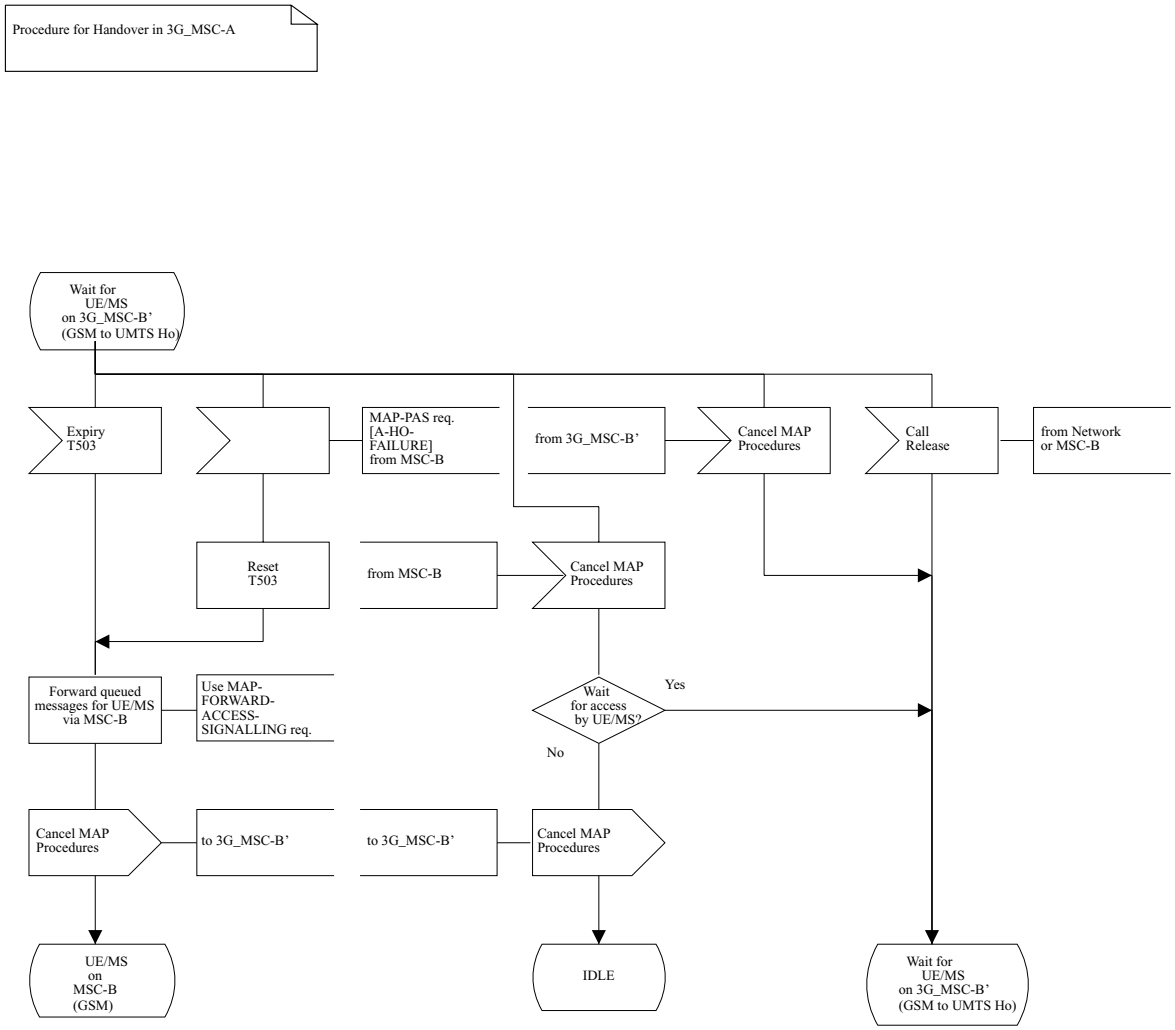



Figure 43 (Sheet 34 of 78): Handover control procedure in 3G_MSC-A

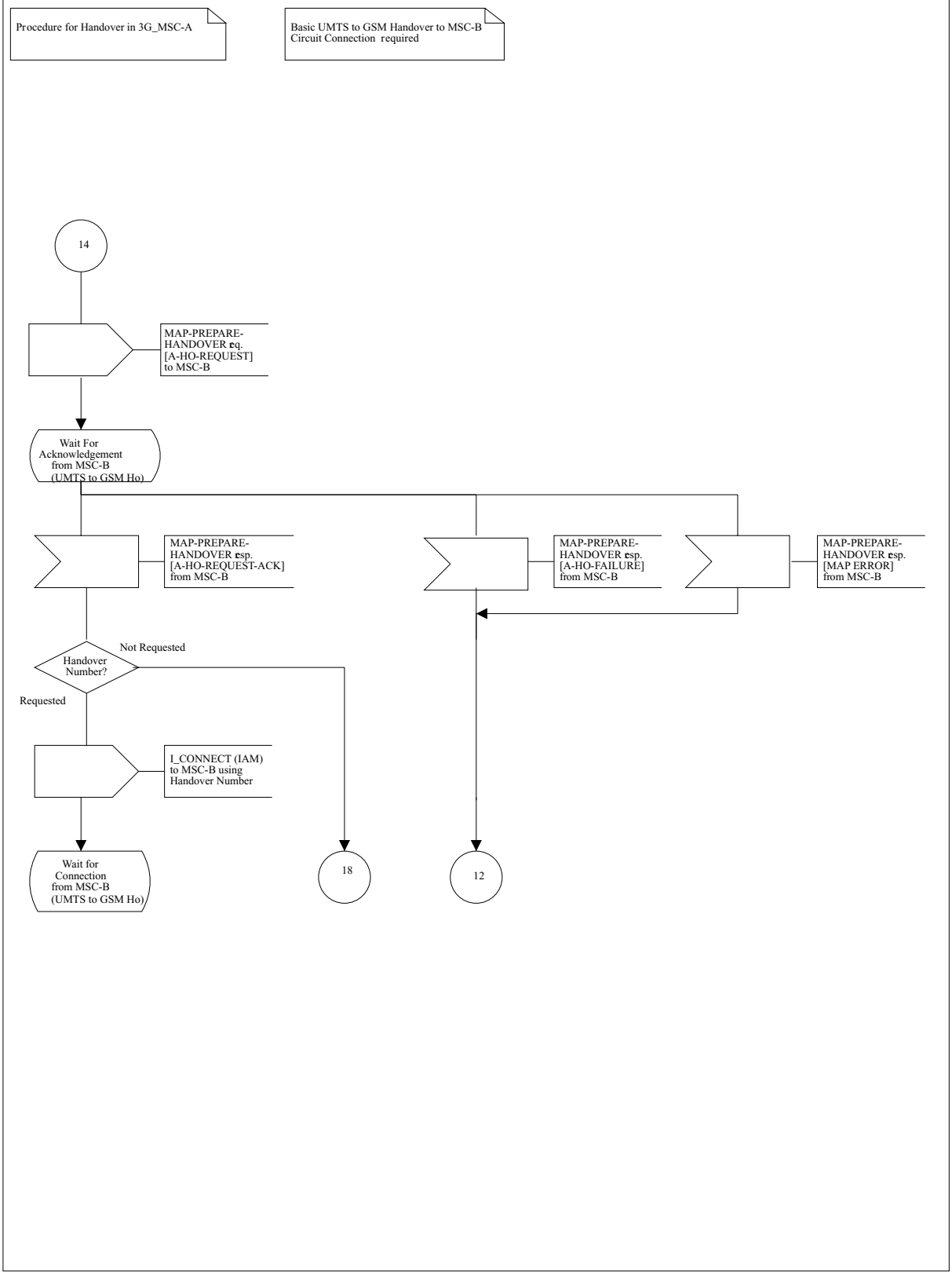



Figure 43 (Sheet 35 of 78): Handover control procedure in 3G_MSC-A

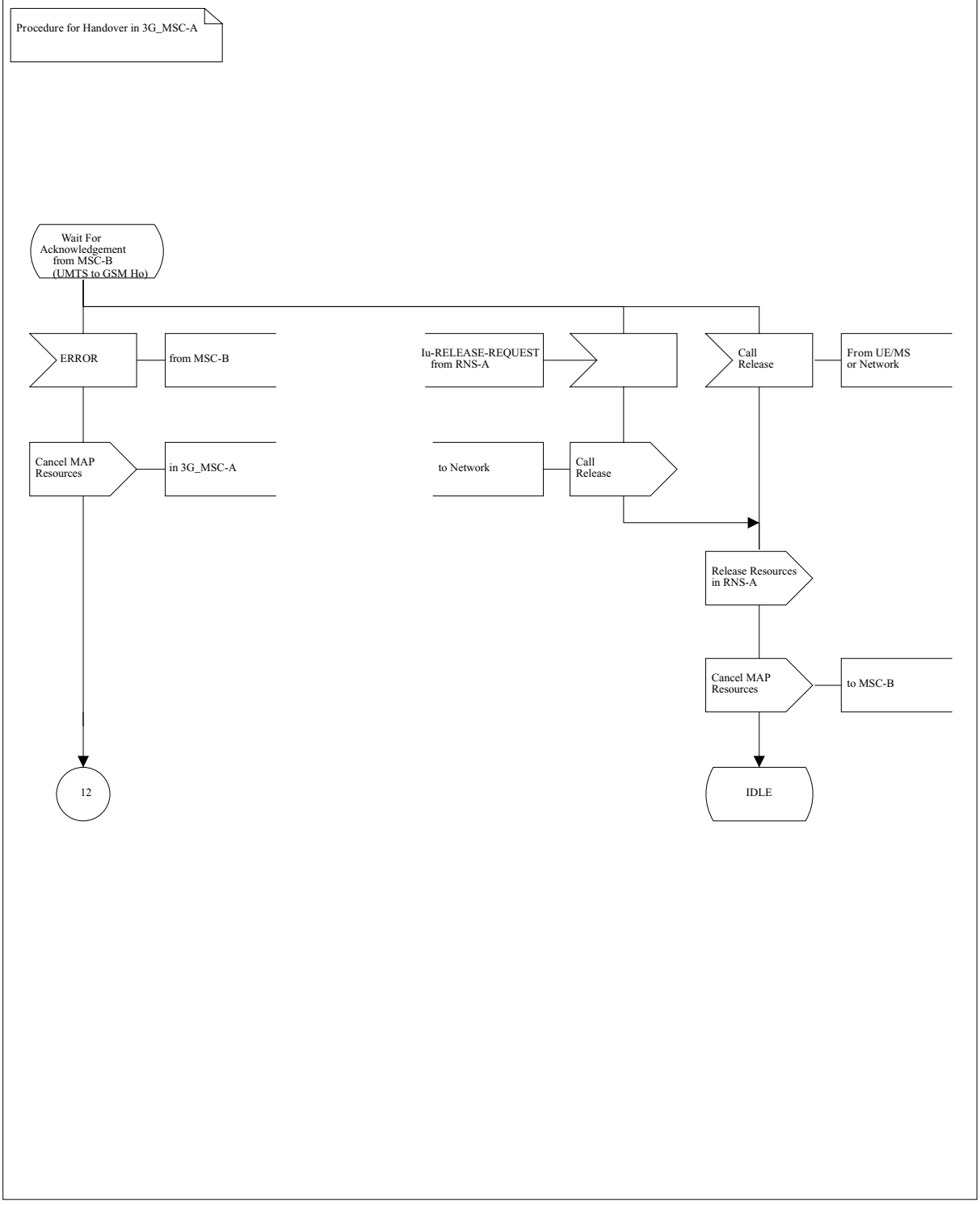



Figure 43 (Sheet 36 of 78): Handover control procedure in 3G_MSC-A

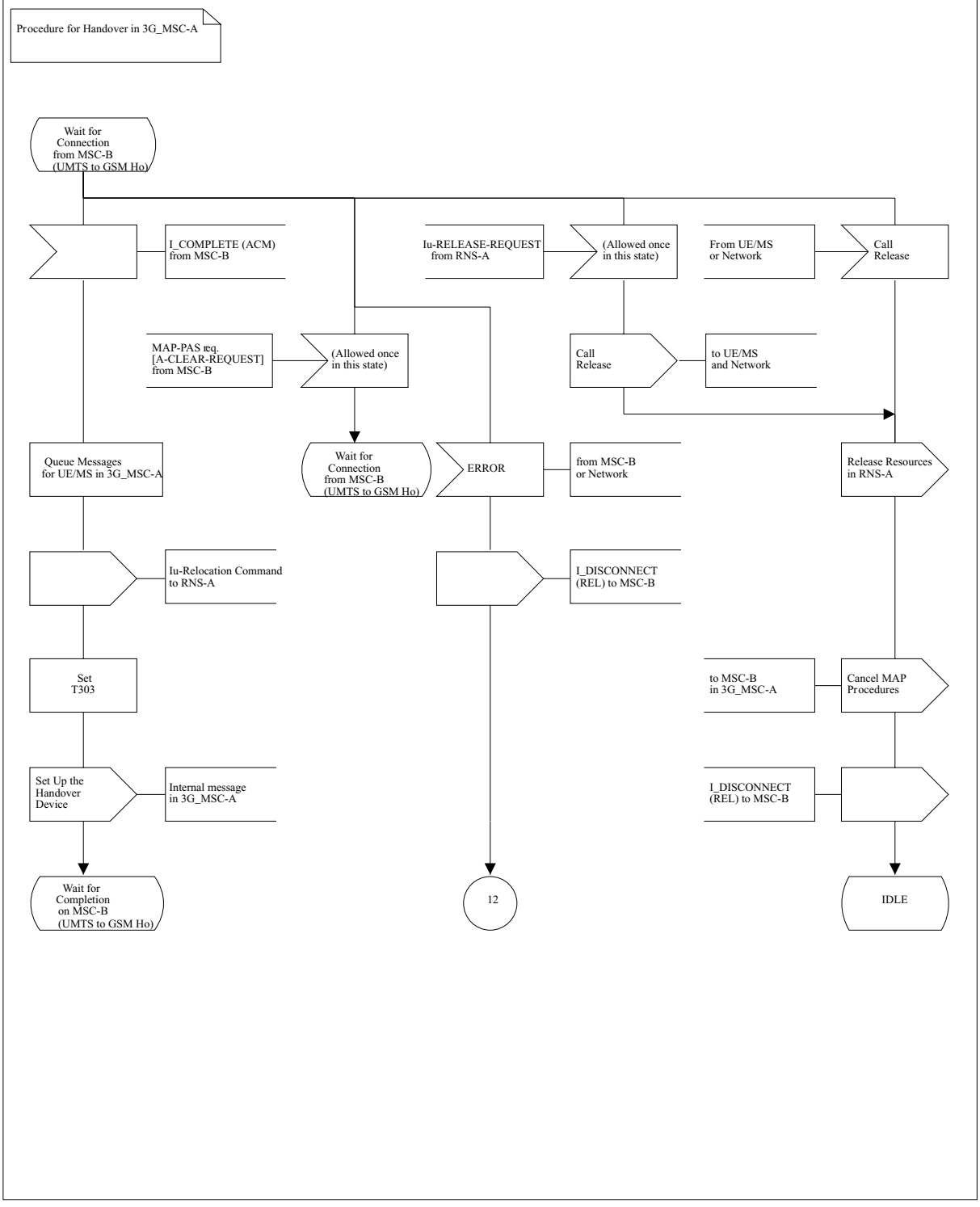



Figure 43 (Sheet 37 of 78): Handover control procedure in 3G_MSC-A

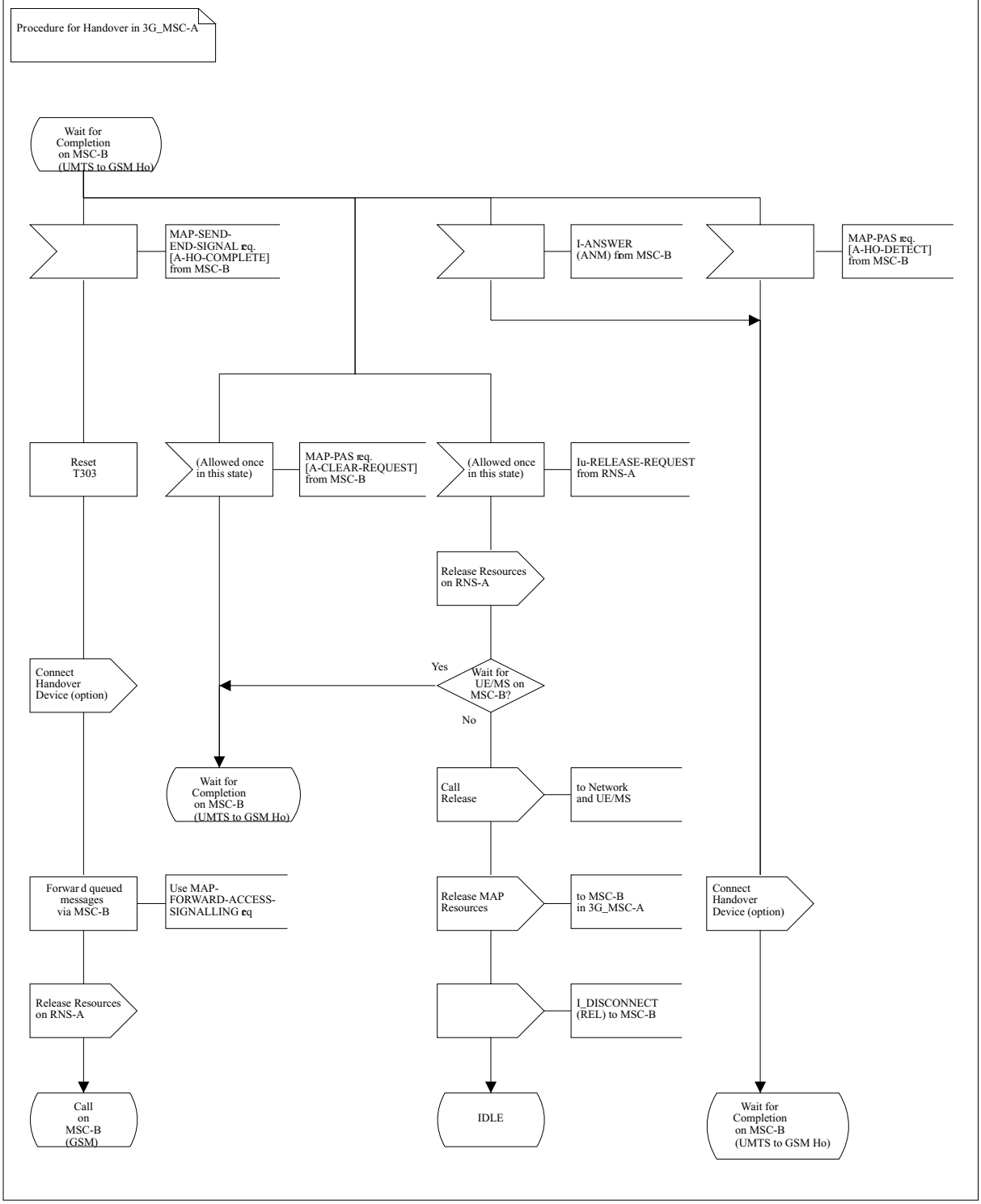



Figure 43 (Sheet 38 of 78): Handover control procedure in 3G_MSC-A

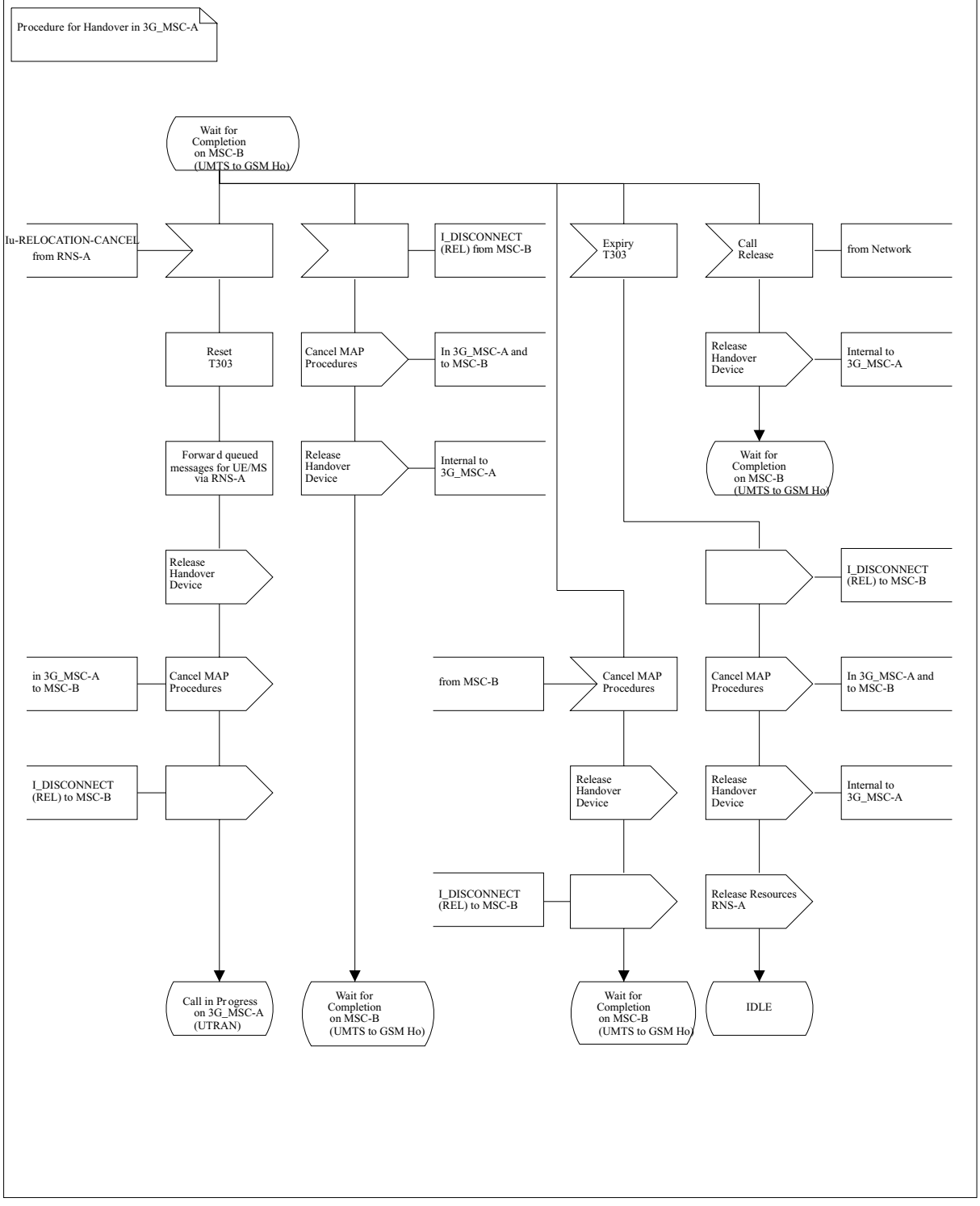



Figure 43 (Sheet 39 of 78): Handover control procedure in 3G_MSC-A

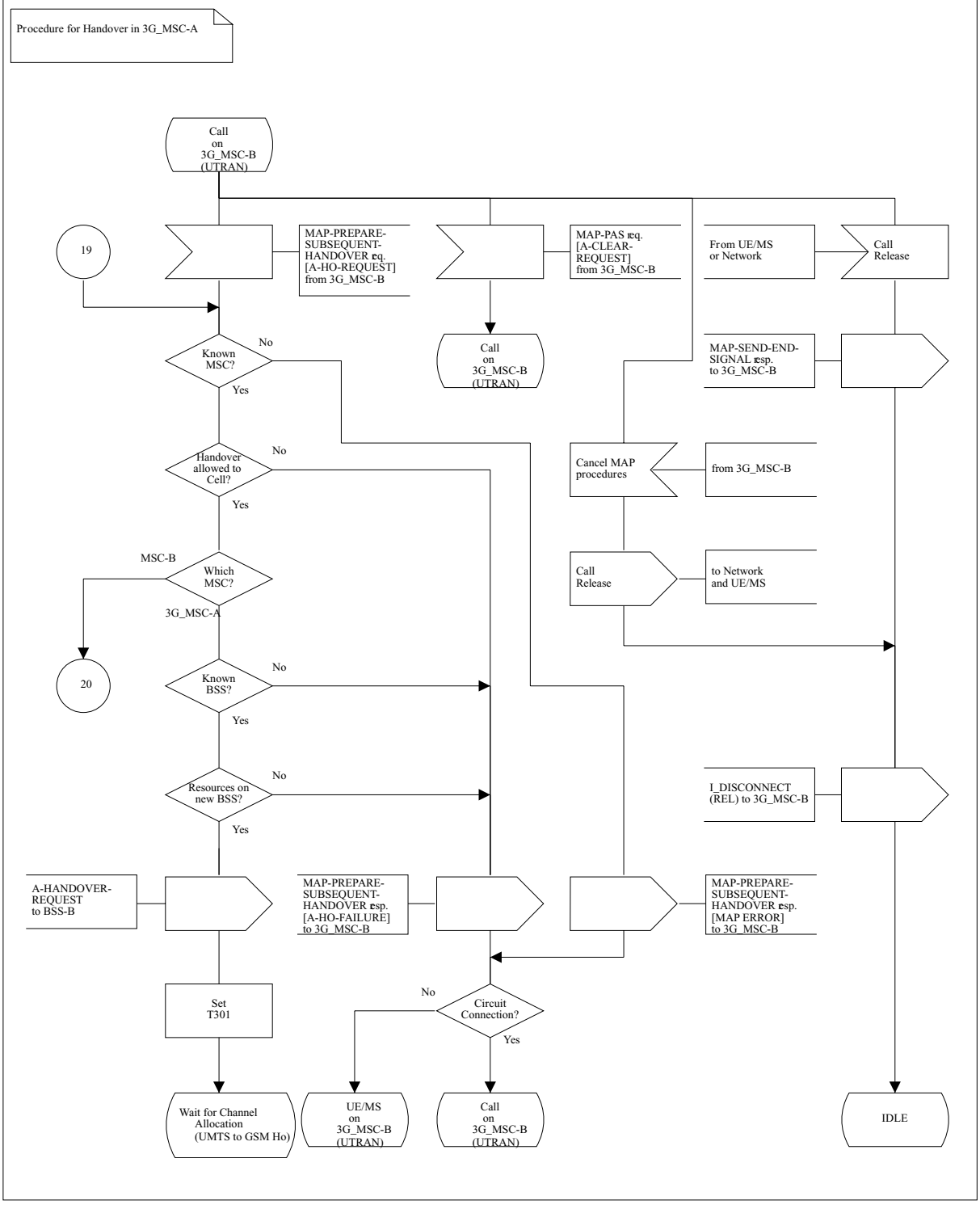



Figure 43 (Sheet 40 of 78): Handover control procedure in 3G_MSC-A

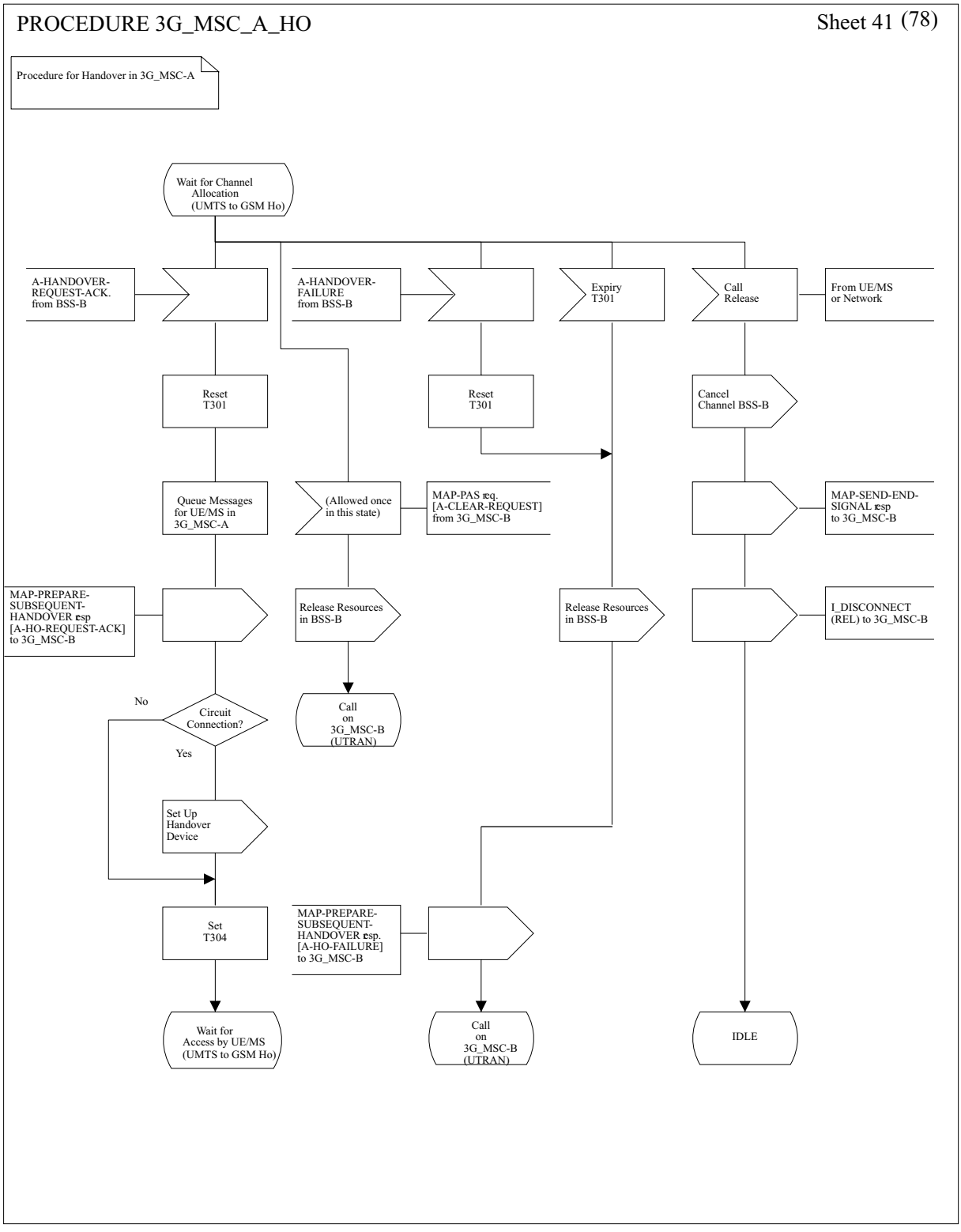



Figure 43 (Sheet 41 of 78): Handover control procedure in 3G_MSC-A

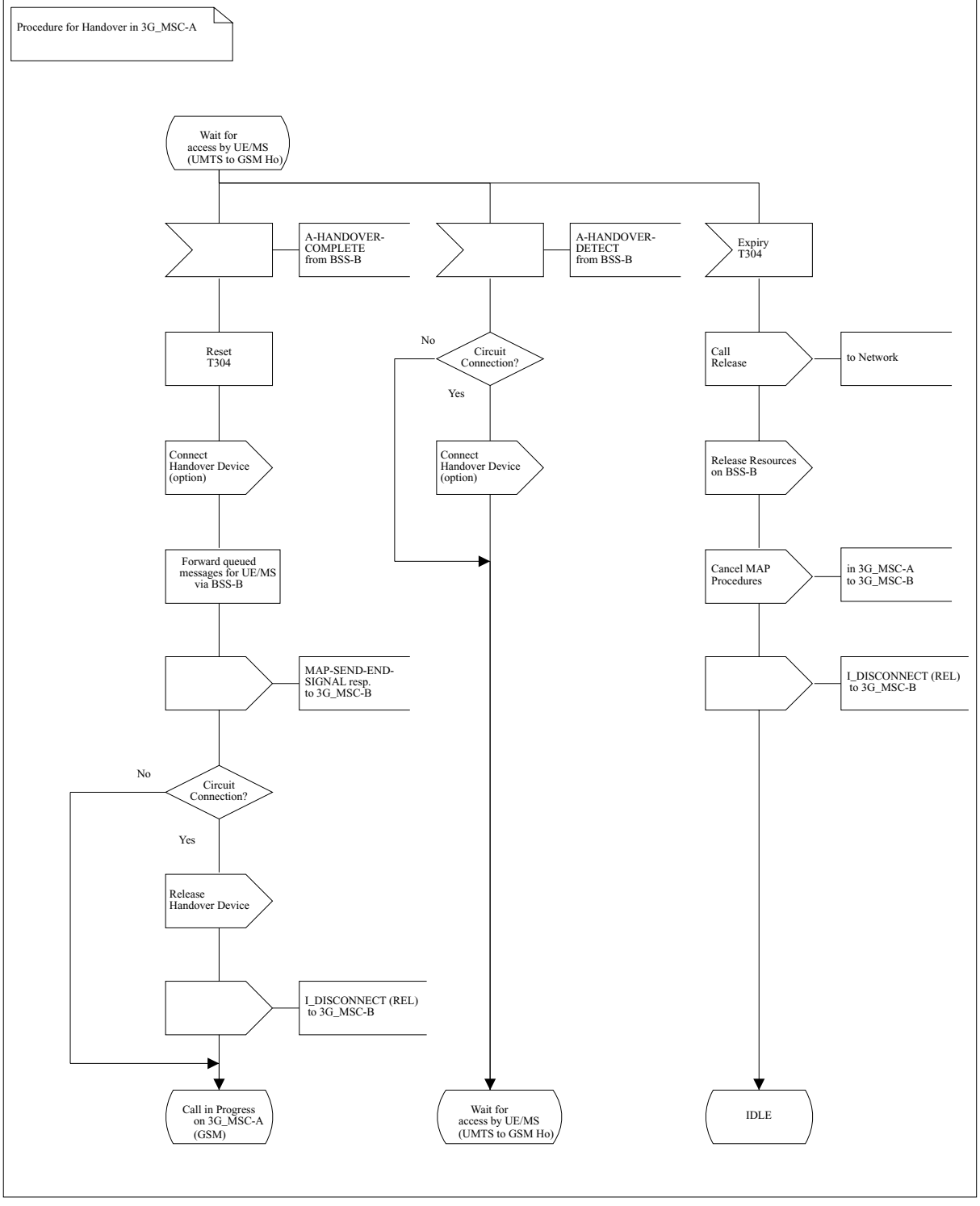



Figure 43 (Sheet 42 of 78): Handover control procedure in 3G_MSC-A

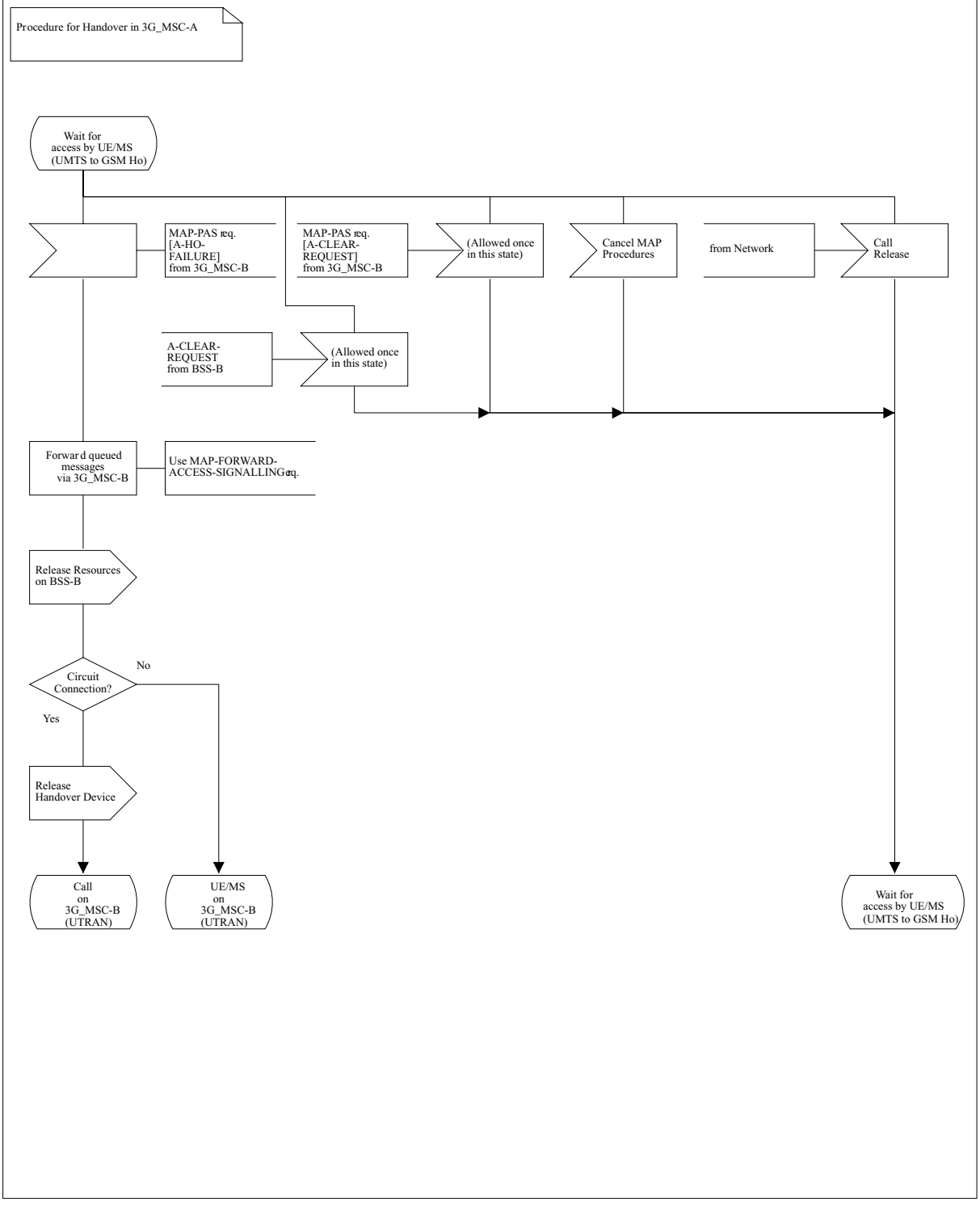



Figure 43 (Sheet 43 of 78): Handover control procedure in 3G_MSC-A

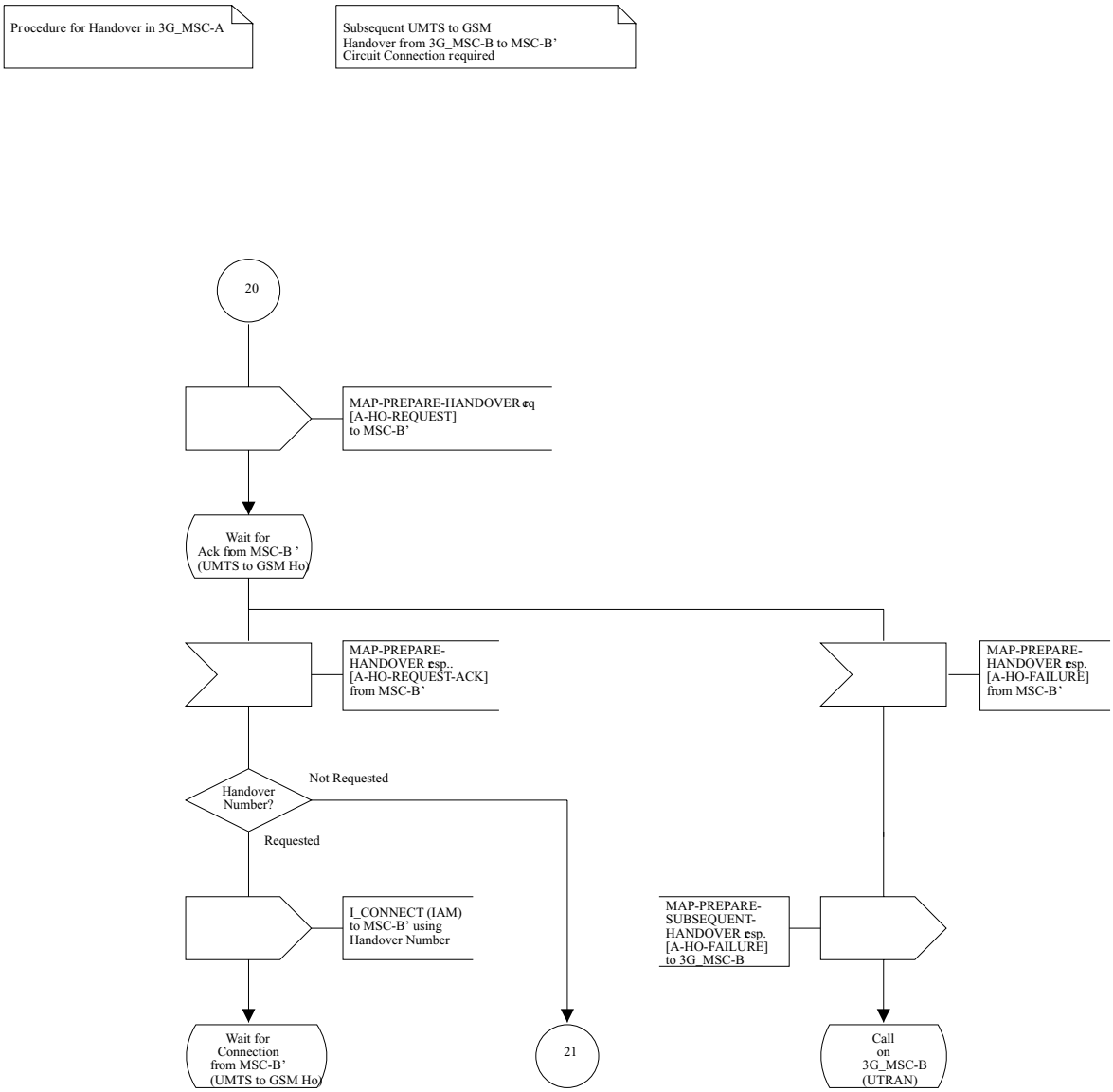



Figure 43 (Sheet 44 of 78): Handover control procedure in 3G_MSC-A

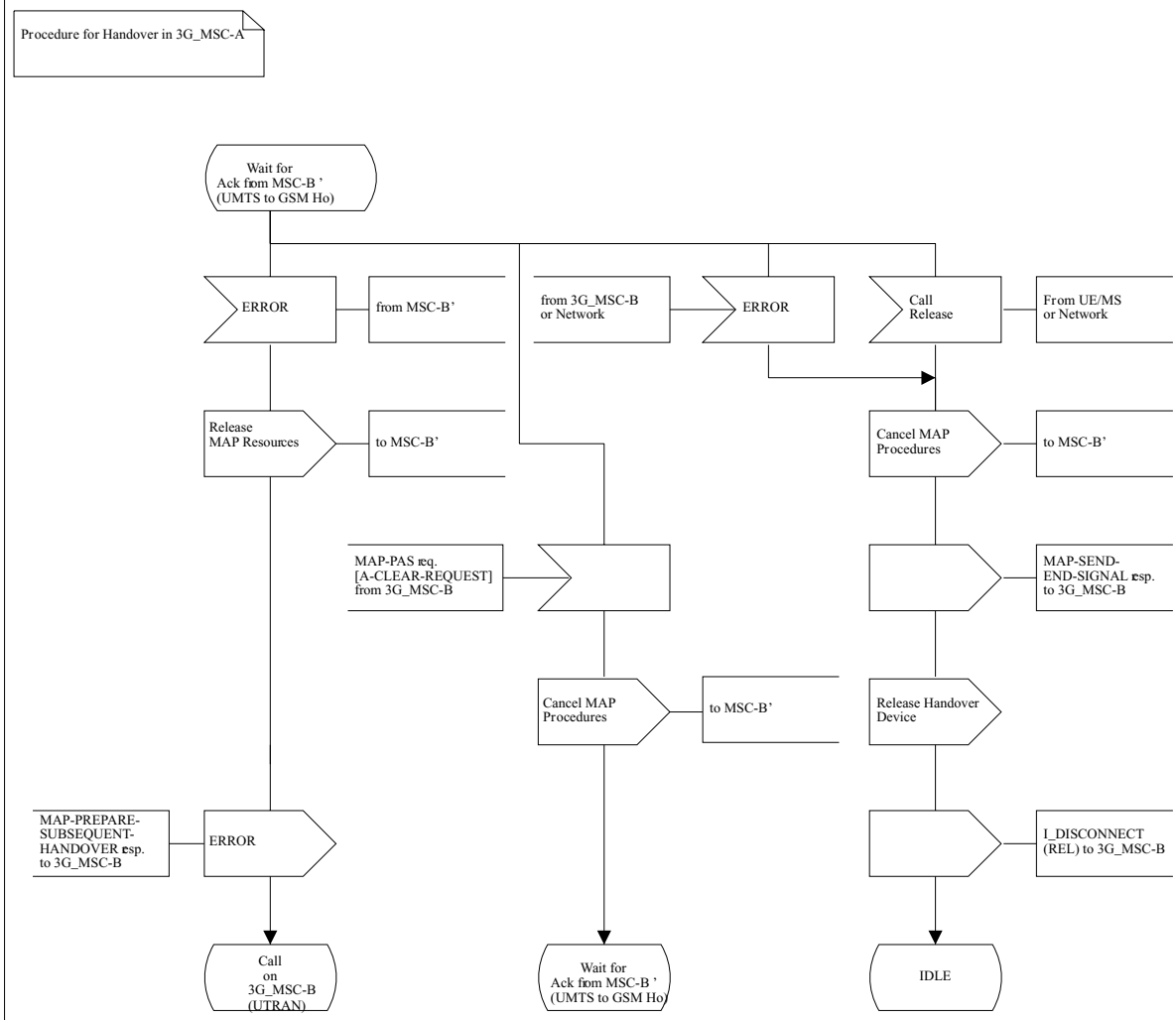



Figure 43 (Sheet 45 of 78): Handover control procedure in 3G_MSC-A

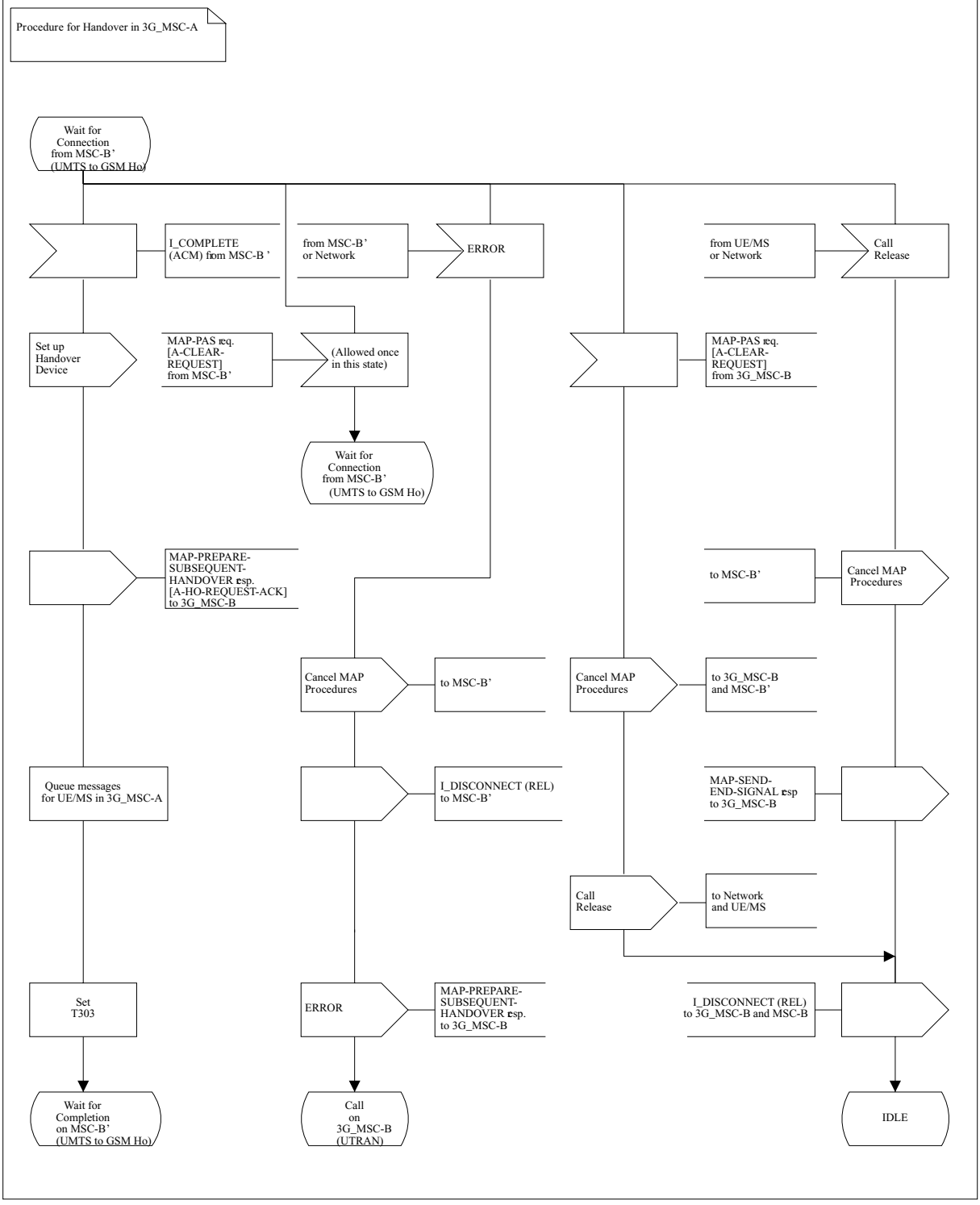



Figure 43 (Sheet 46 of 78): Handover control procedure in 3G_MSC-A

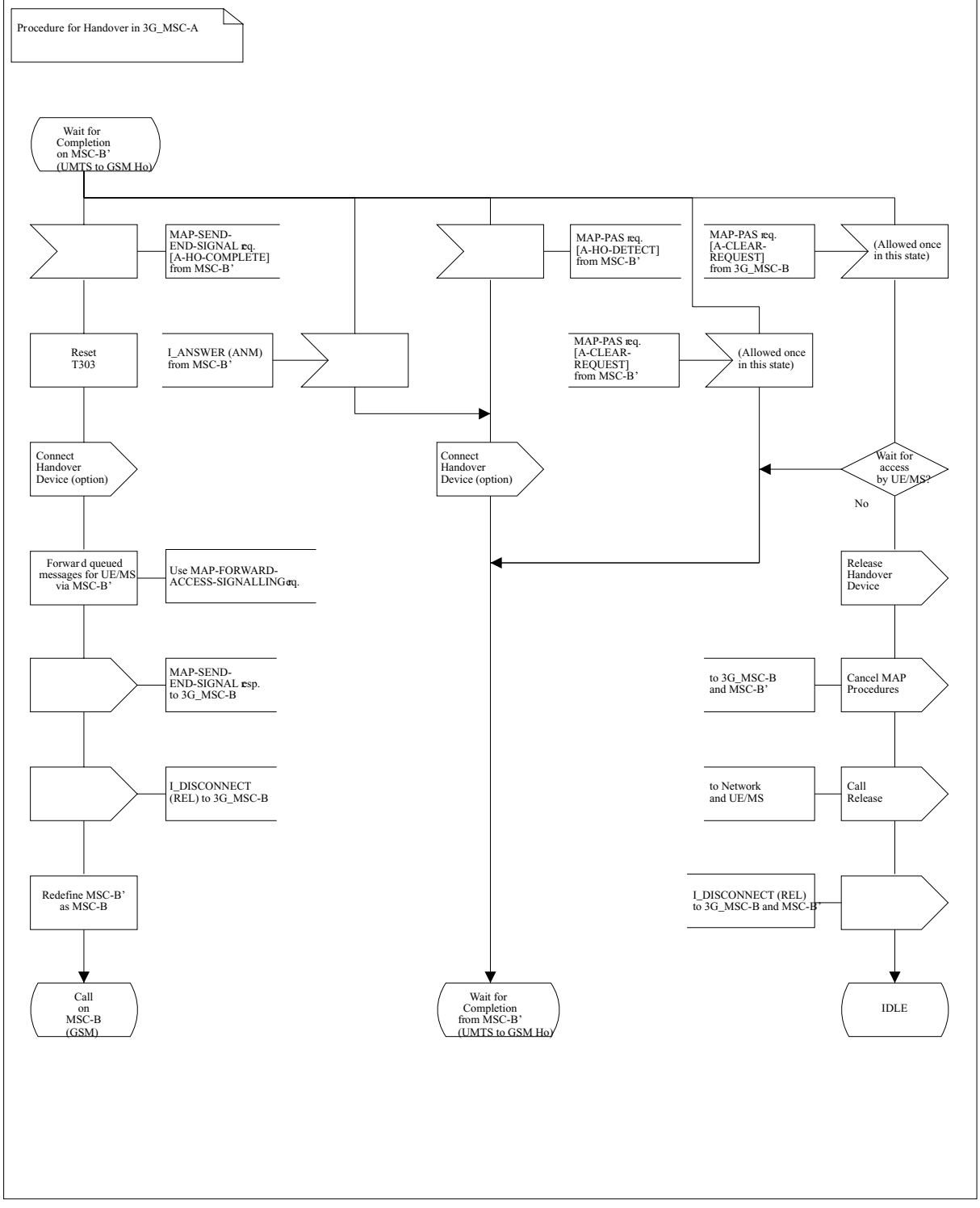



Figure 43 (Sheet 47 of 78): Handover control procedure in 3G_MSC-A

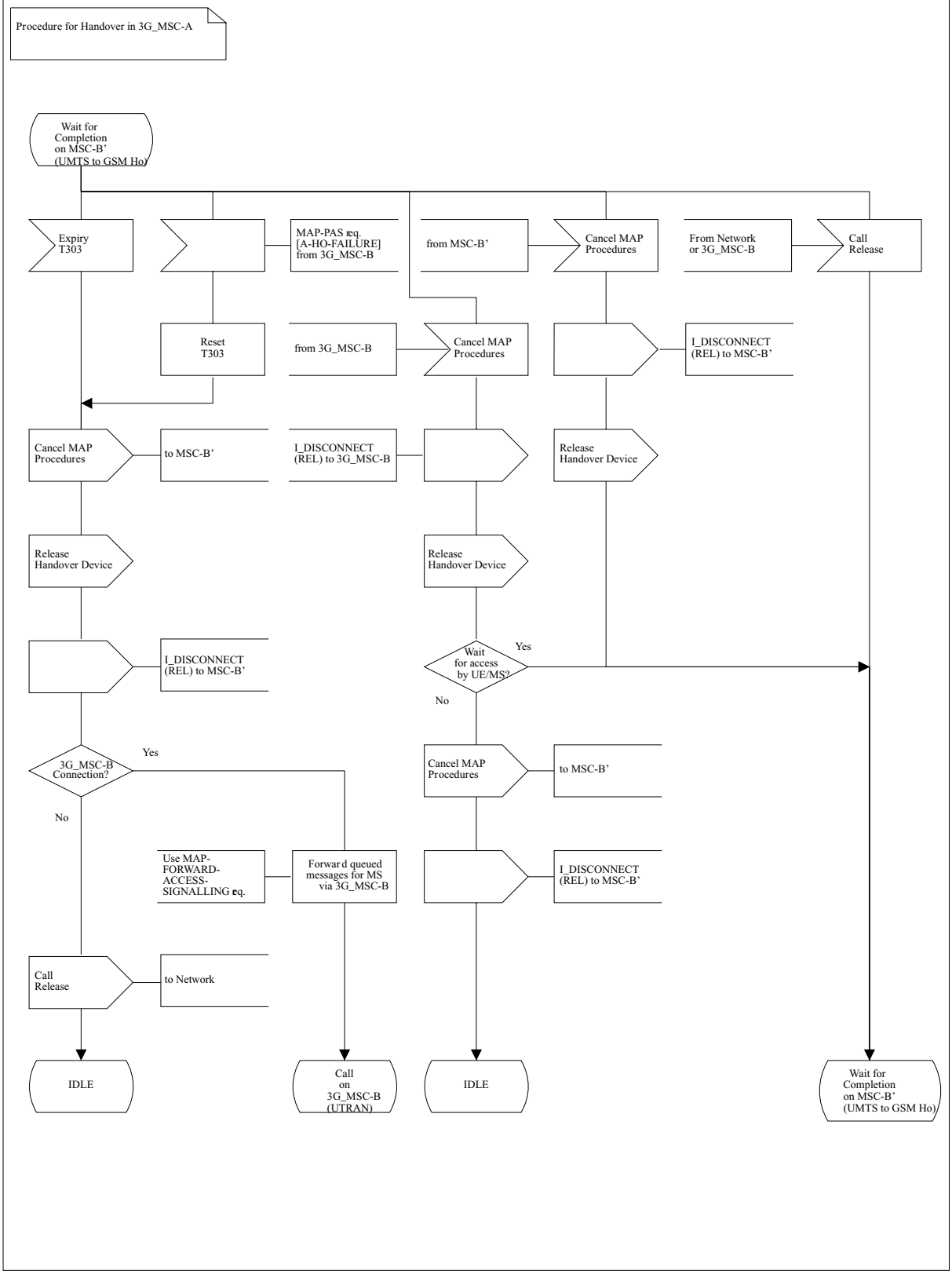



Figure 43 (Sheet 48 of 78): Handover control procedure in 3G_MSC-A

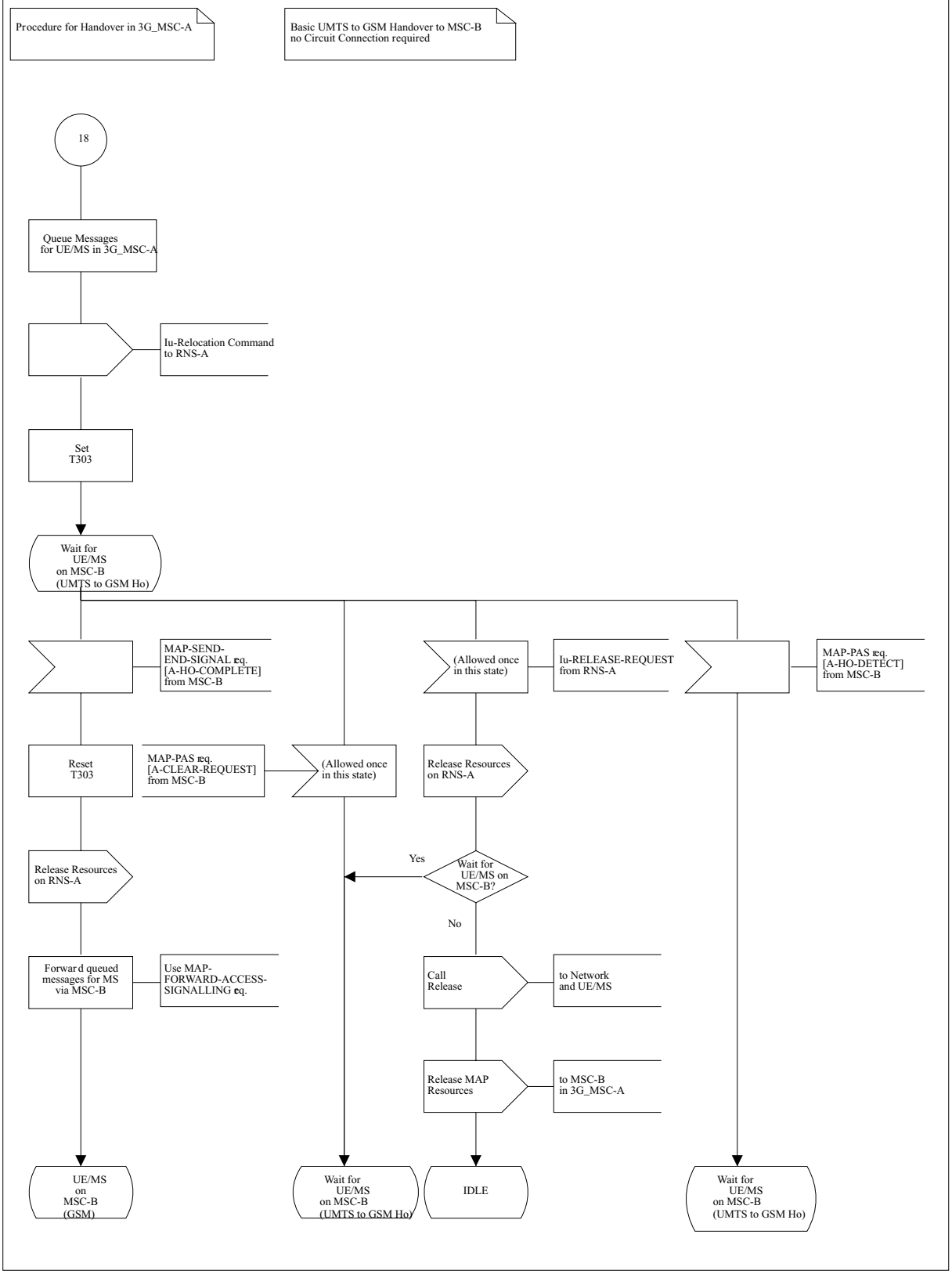



Figure 43 (Sheet 49 of 78): Handover control procedure in 3G_MSC-A

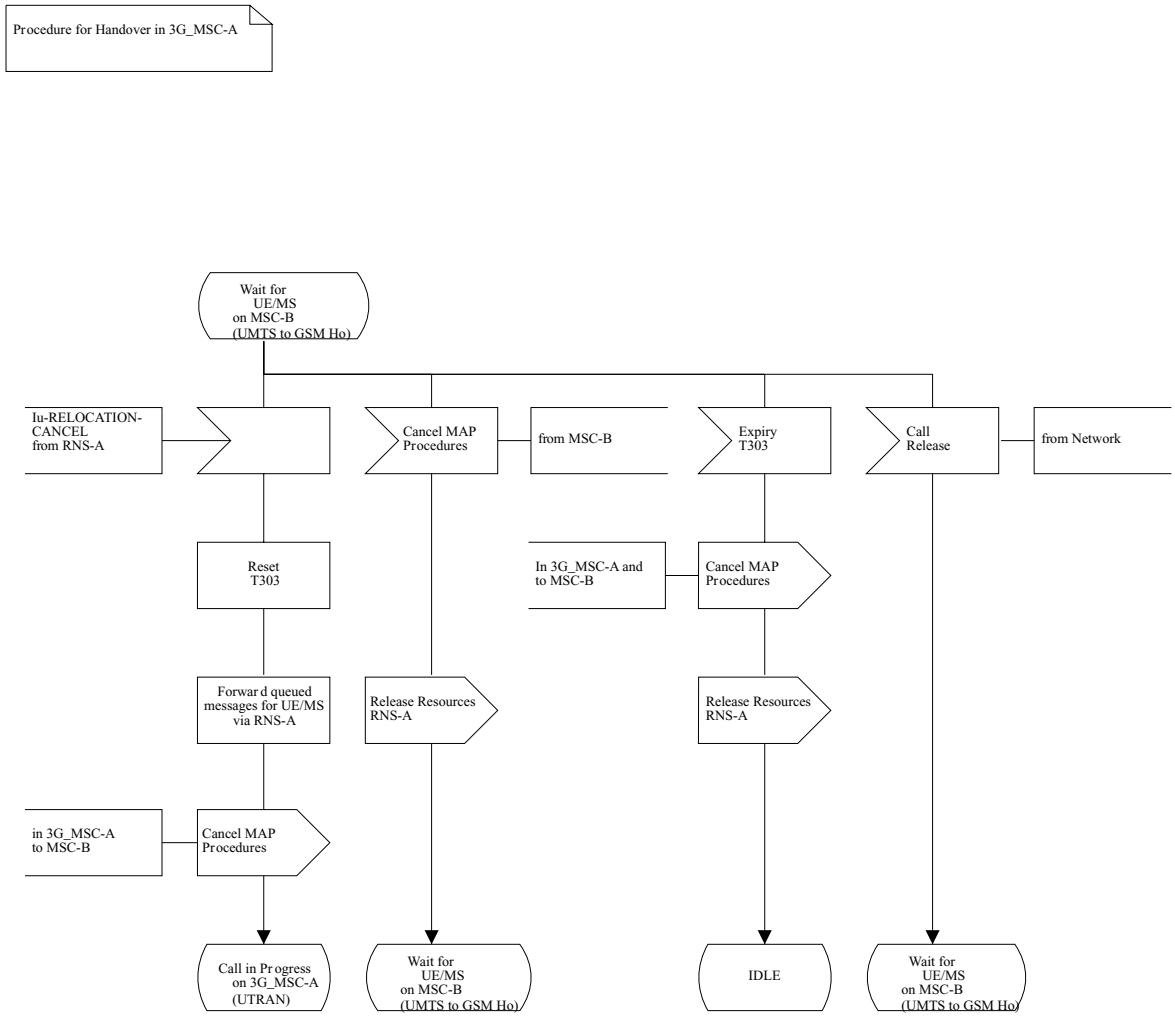



Figure 43 (Sheet 50 of 78): Ha ndover control procedure in 3G_MSC-A

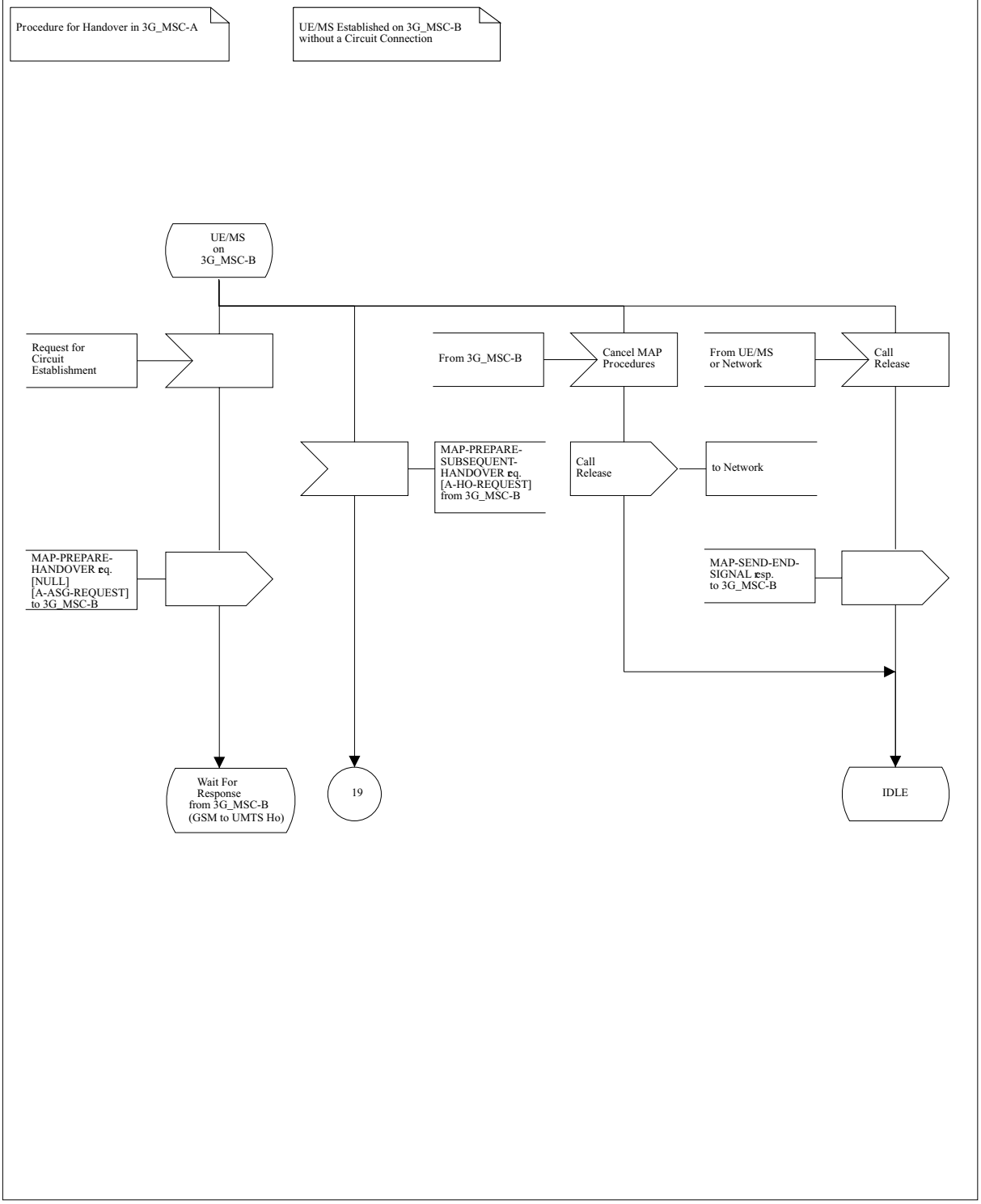



Figure 43 (Sheet 51 of 78): Handover control procedure in 3G_MSC-A

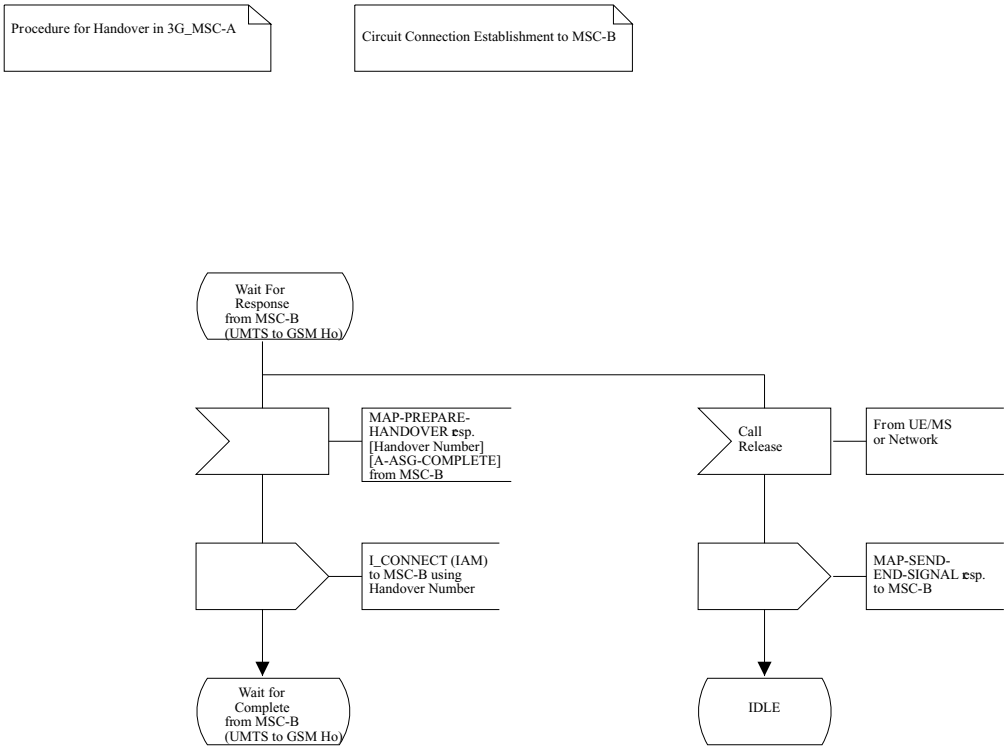



Figure 43 (Sheet 52 of 78): Handover control procedure in 3G_MSC-A

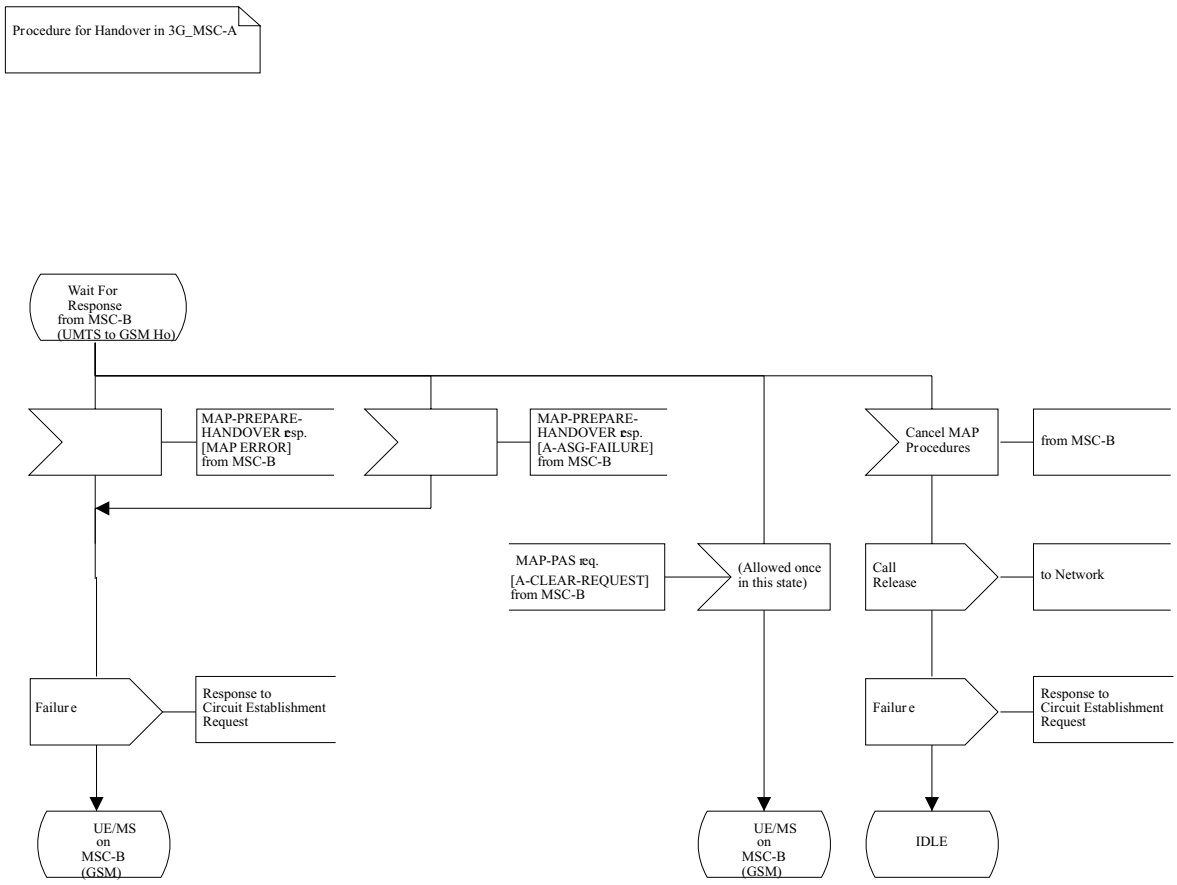



Figure 43 (Sheet 53 of 78): Handover control procedure in 3G_MSC-A

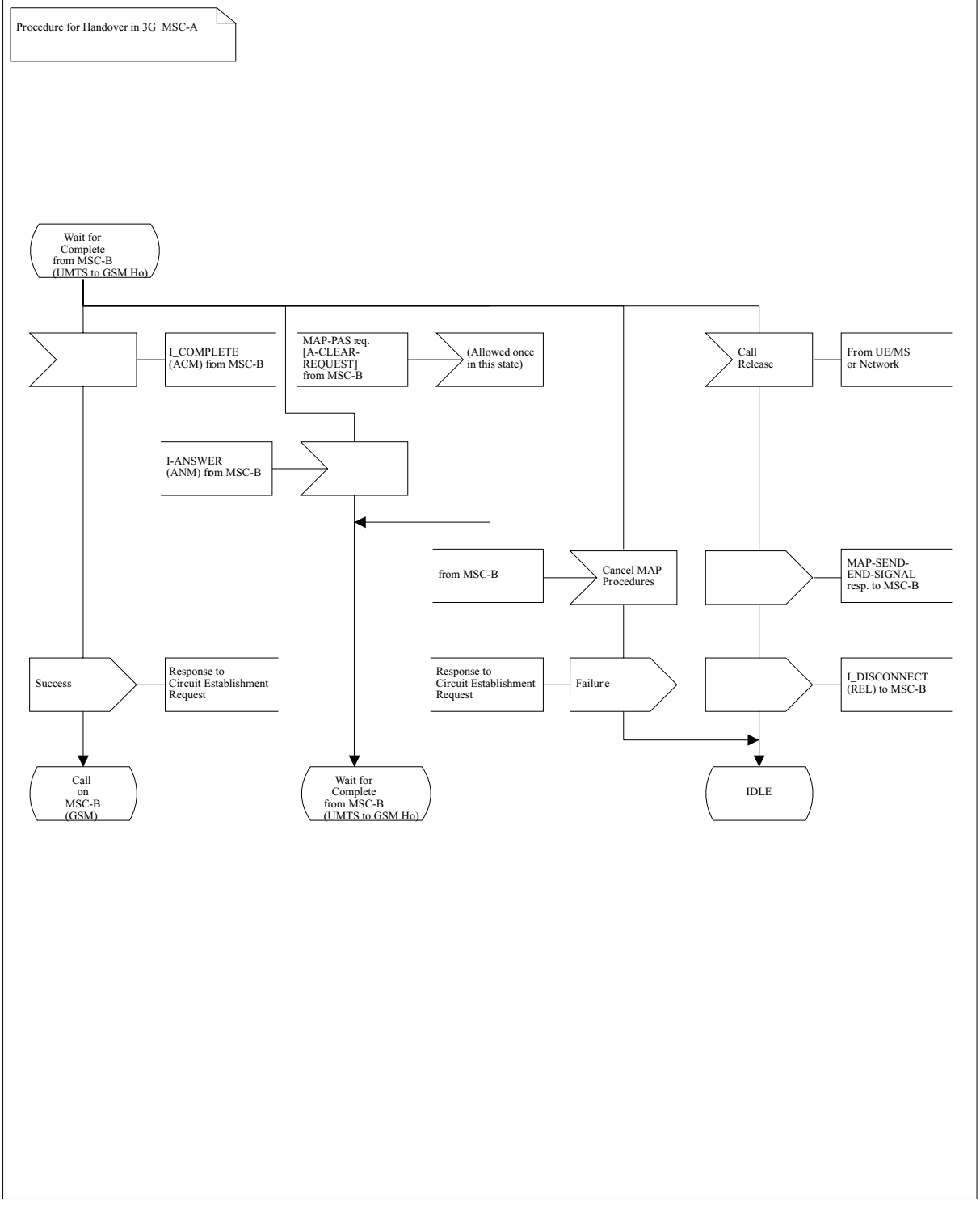



Figure 43 (Sheet 54 of 78): Handover control procedure in 3G_MSC-A

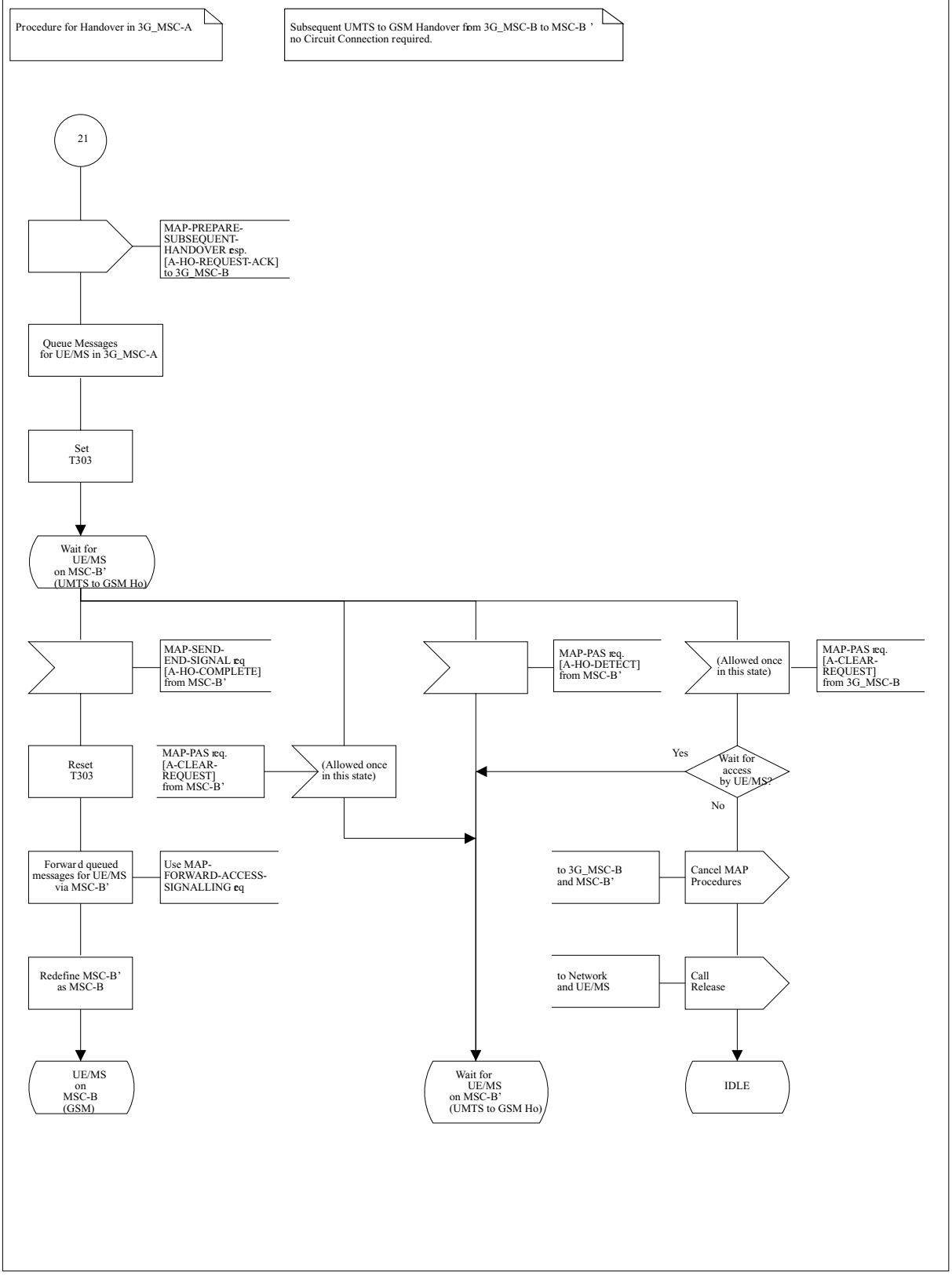



Figure 43 (Sheet 55 of 78): Handover control procedure in 3G_MSC-A

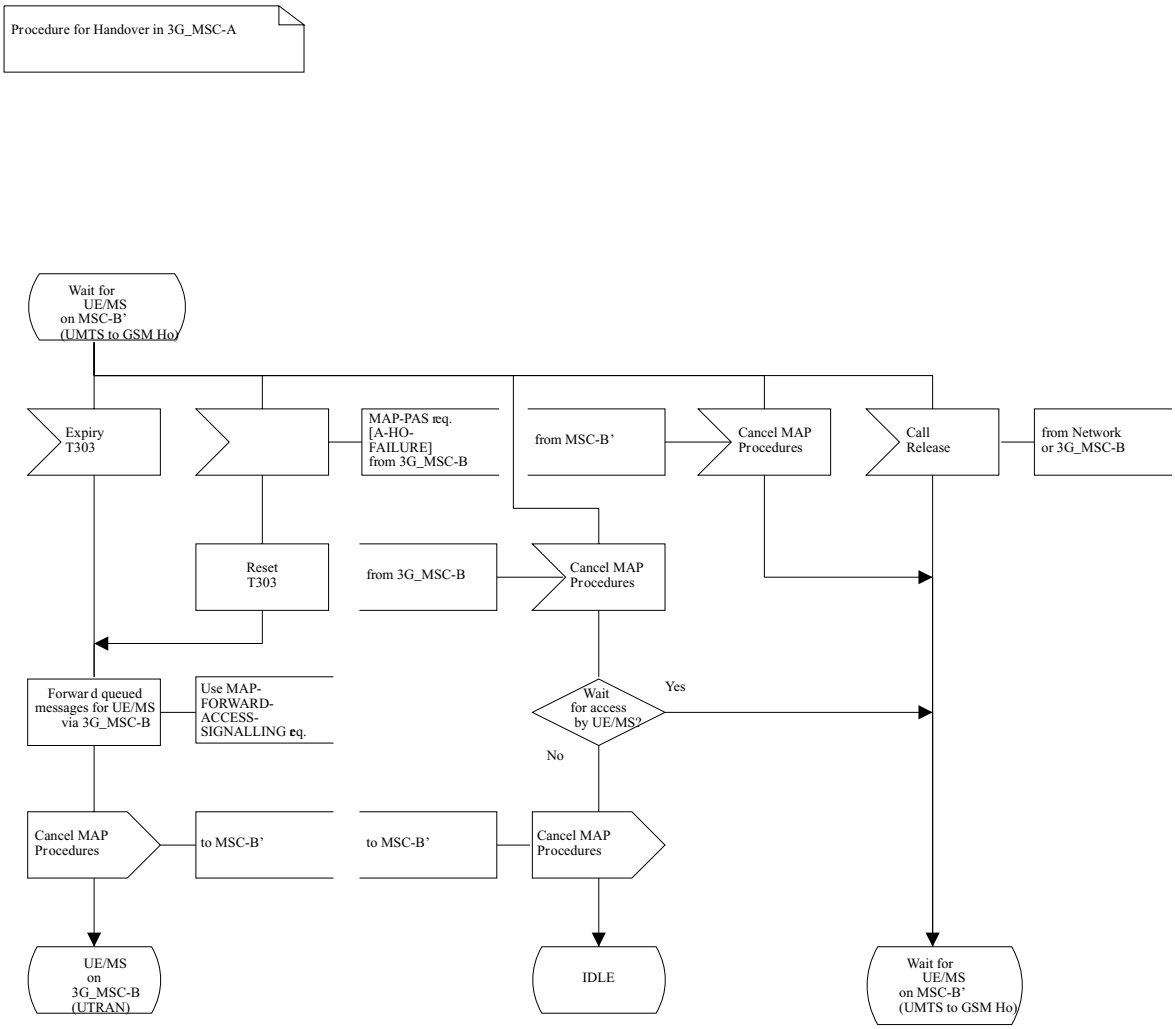



Figure 43 (Sheet 56 of 78): Handover control procedure in 3G_MSC-A

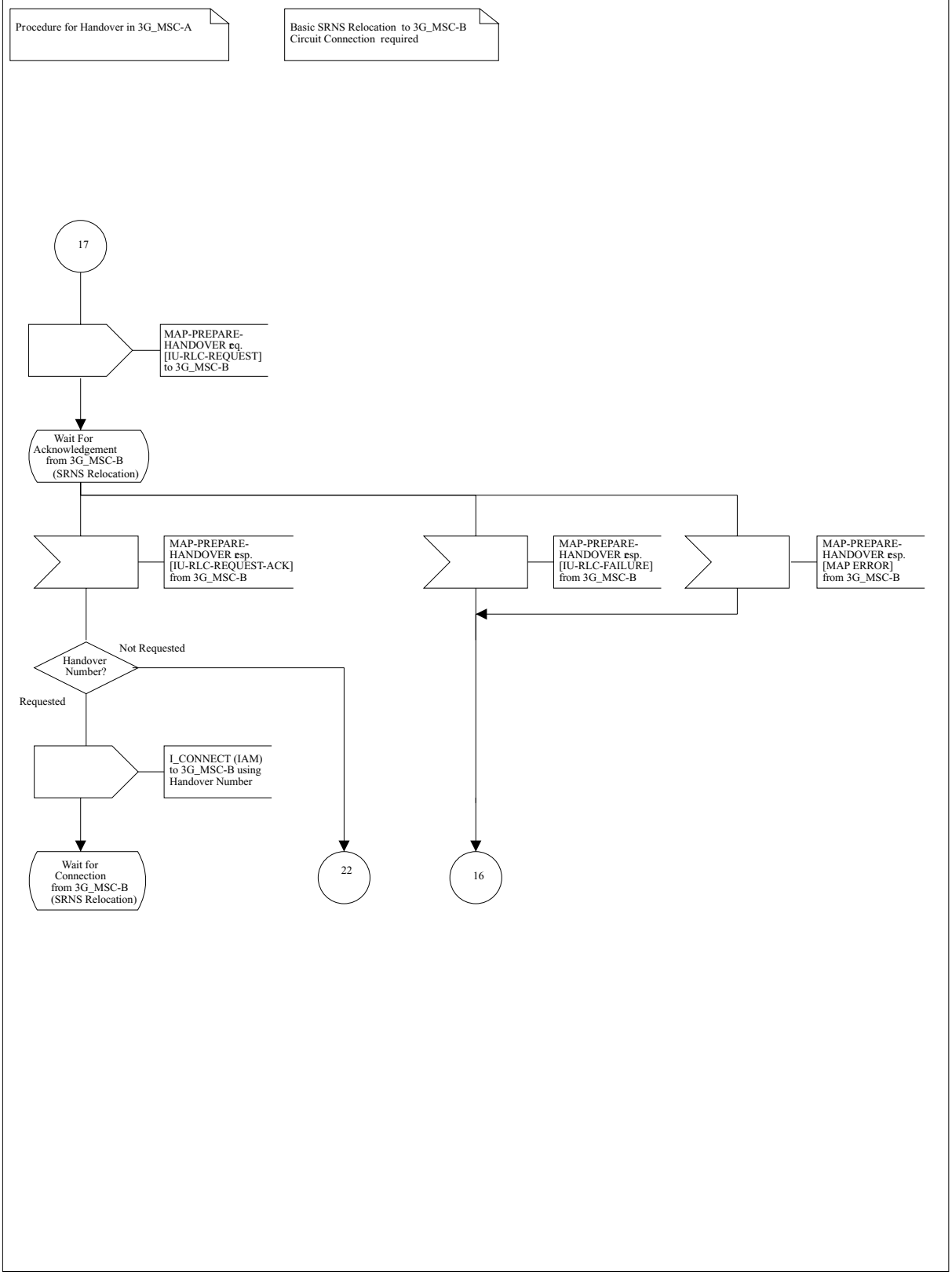



Figure 43 (Sheet 57 of 78): Handover control procedure in 3G_MSC-A

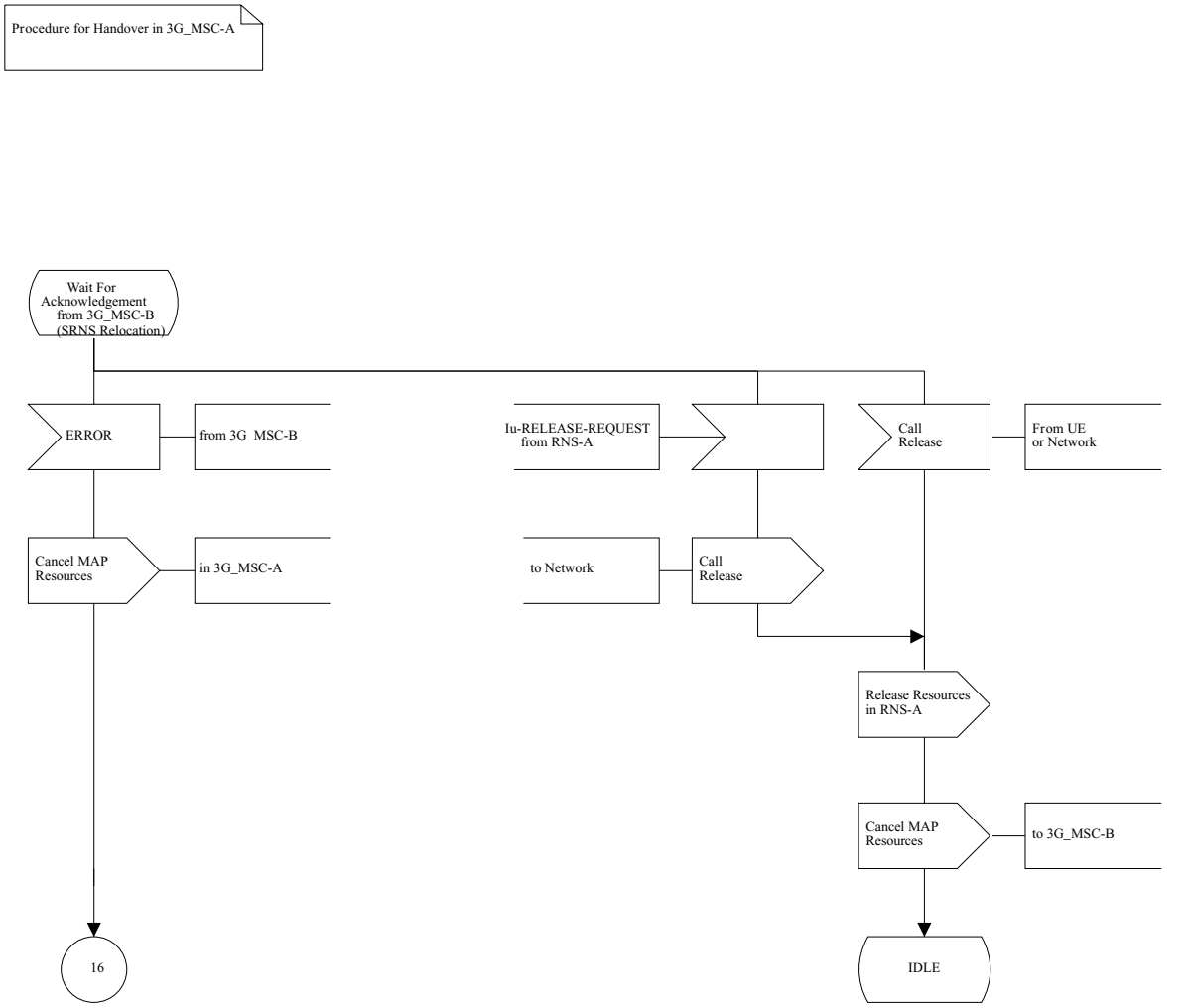



Figure 43 (Sheet 58 of 78): Handover control procedure in 3G_MSC-A

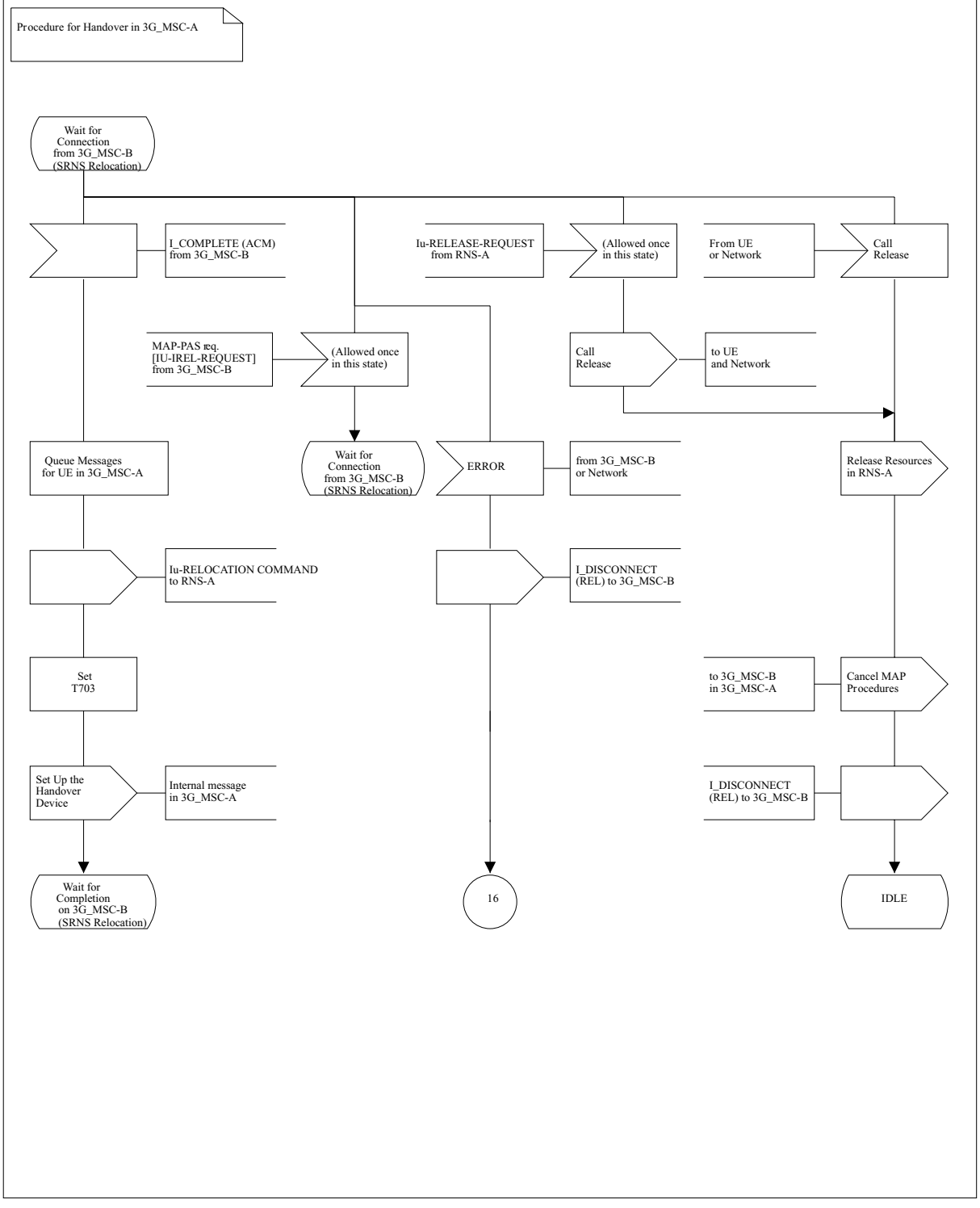



Figure 43 (Sheet 59 of 78): Handover control procedure in 3G_MSC-A

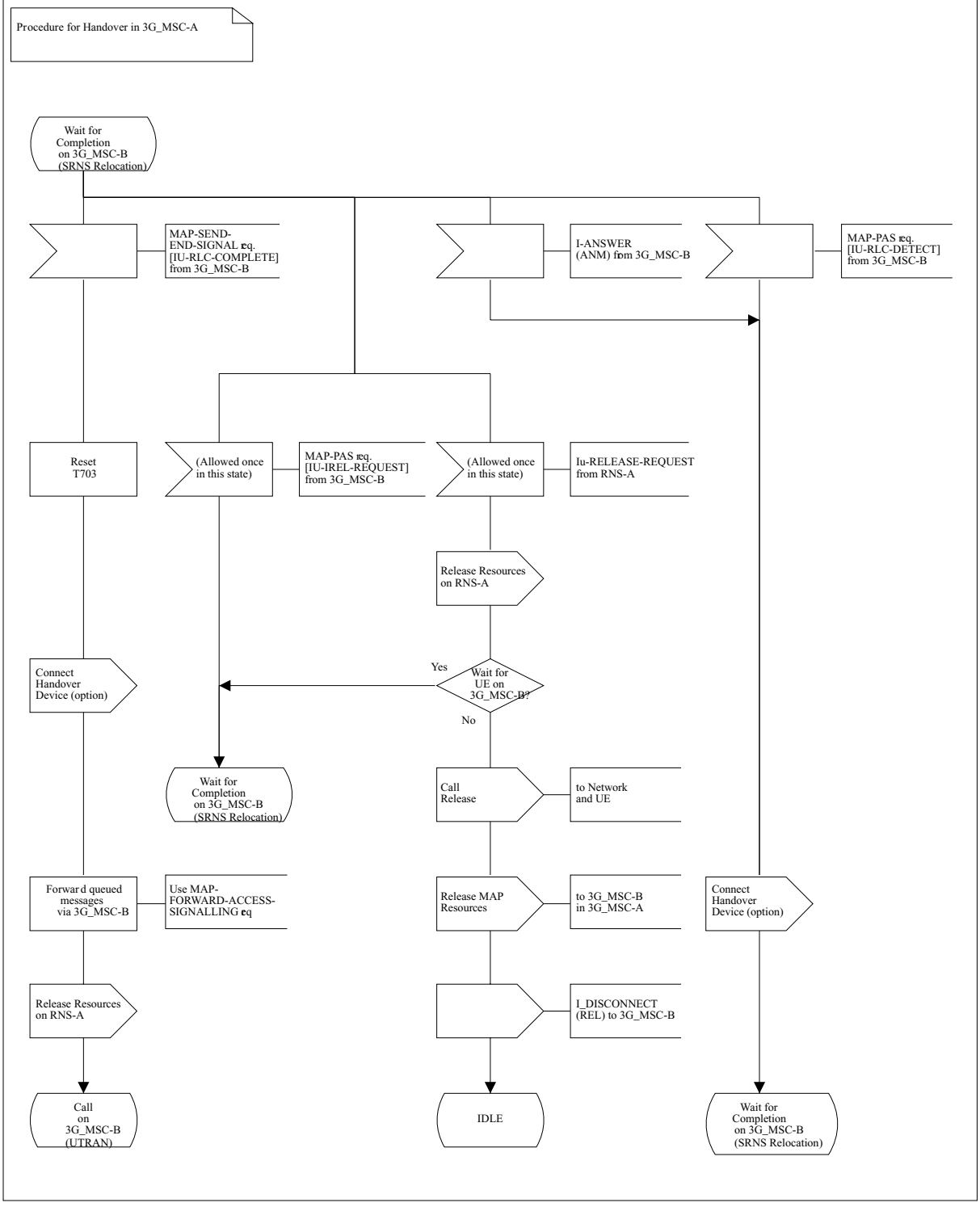



Figure 43 (Sheet 60 of 78): Handover control procedure in 3G_MSC-A

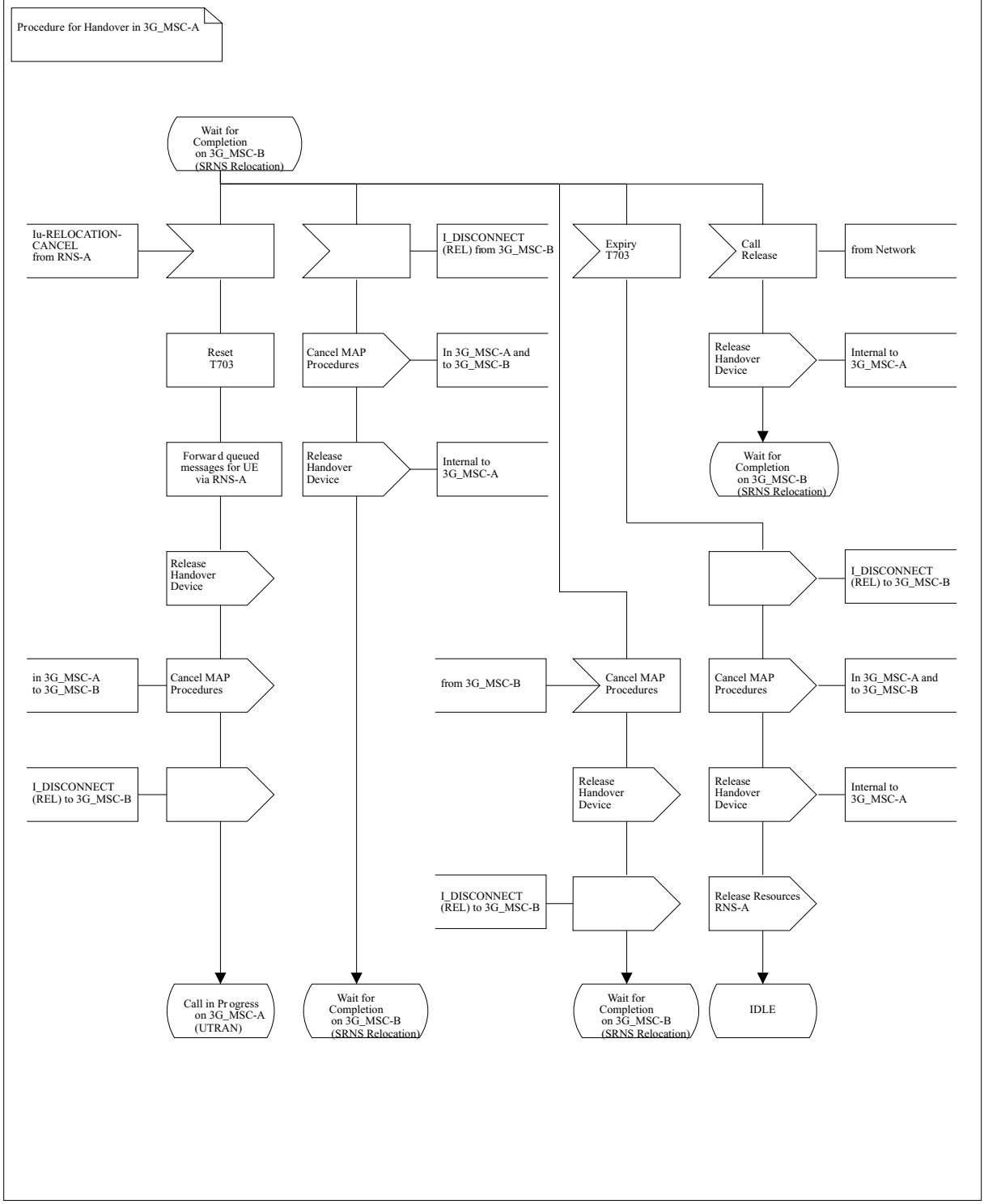



Figure 43 (Sheet 61 of 78): Handover control procedure in 3G_MSC-A

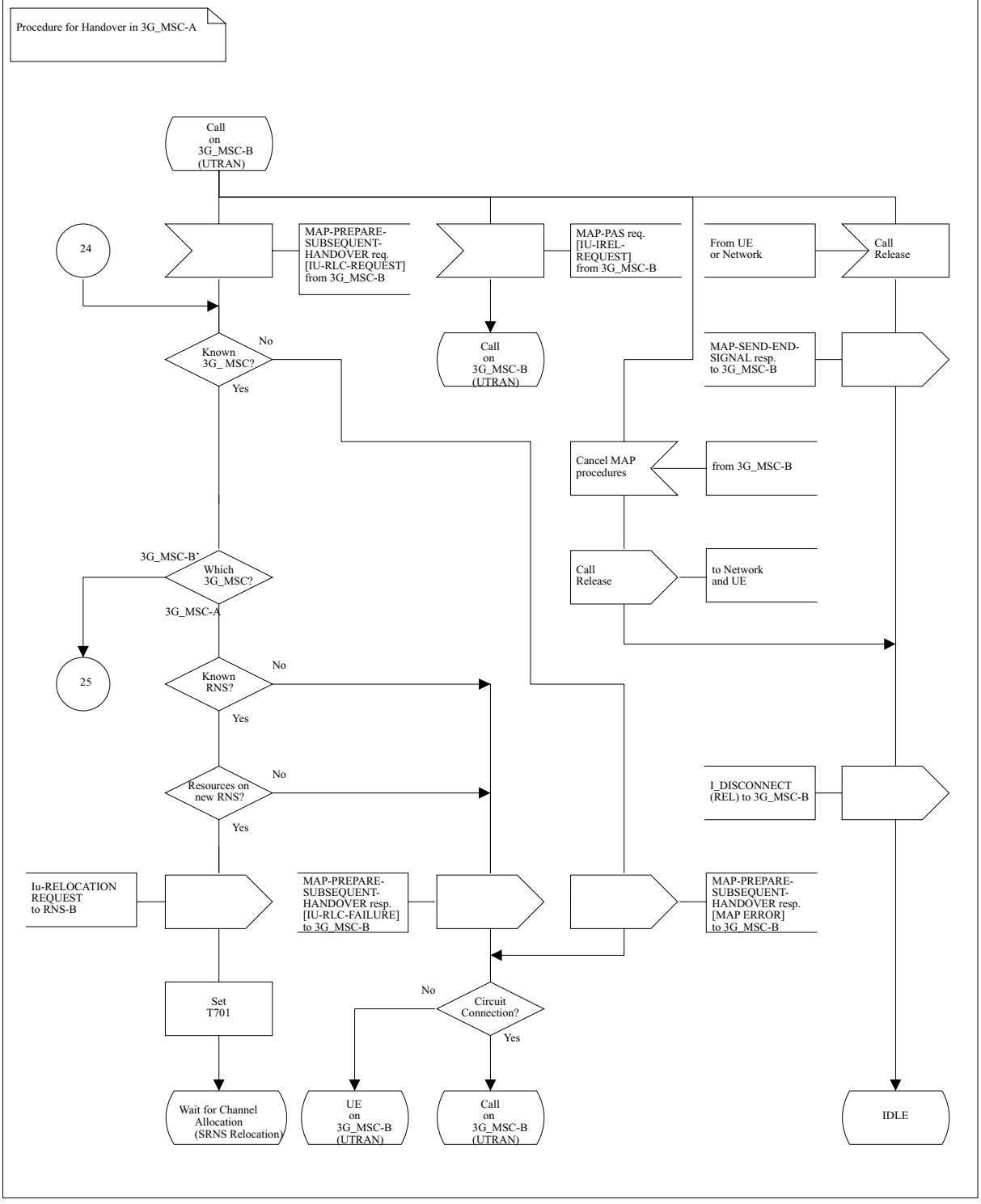



Figure 43 (Sheet 62 of 78): Handover control procedure in 3G_MSC-A

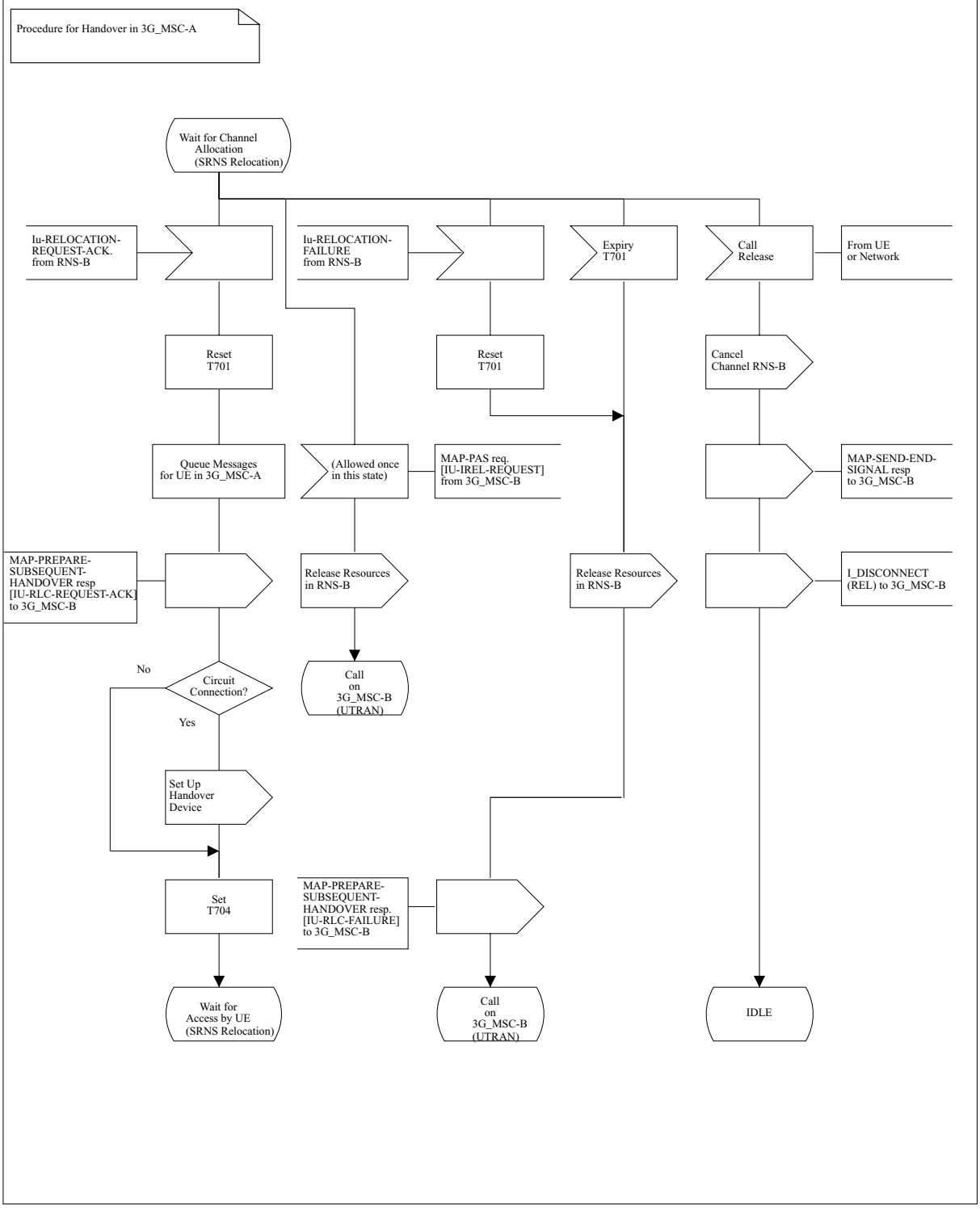



Figure 43 (Sheet 63 of 78): Handover control procedure in 3G_MSC-A

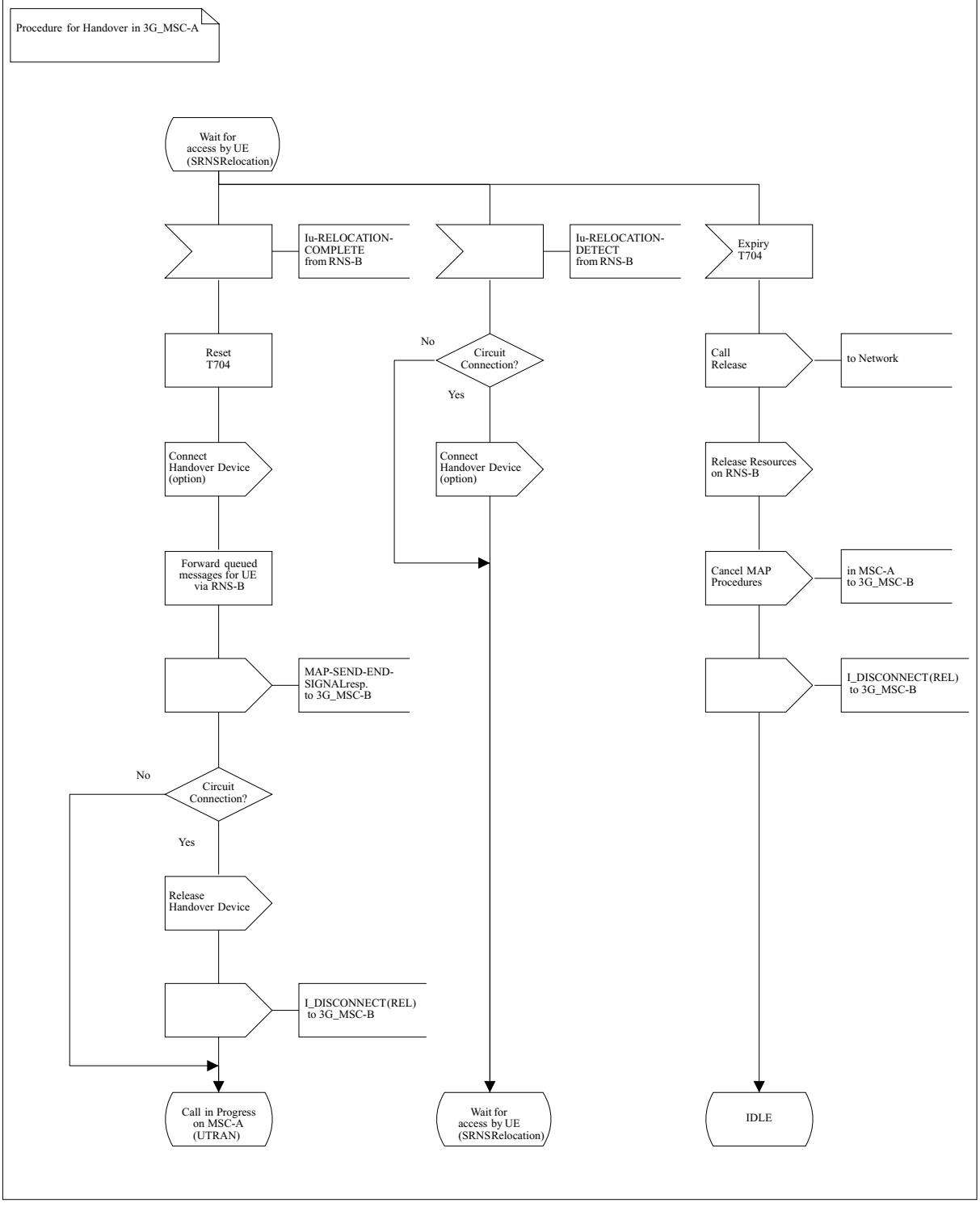



Figure 43 (Sheet 64 of 78): Handover control procedure in 3G_MSC-A

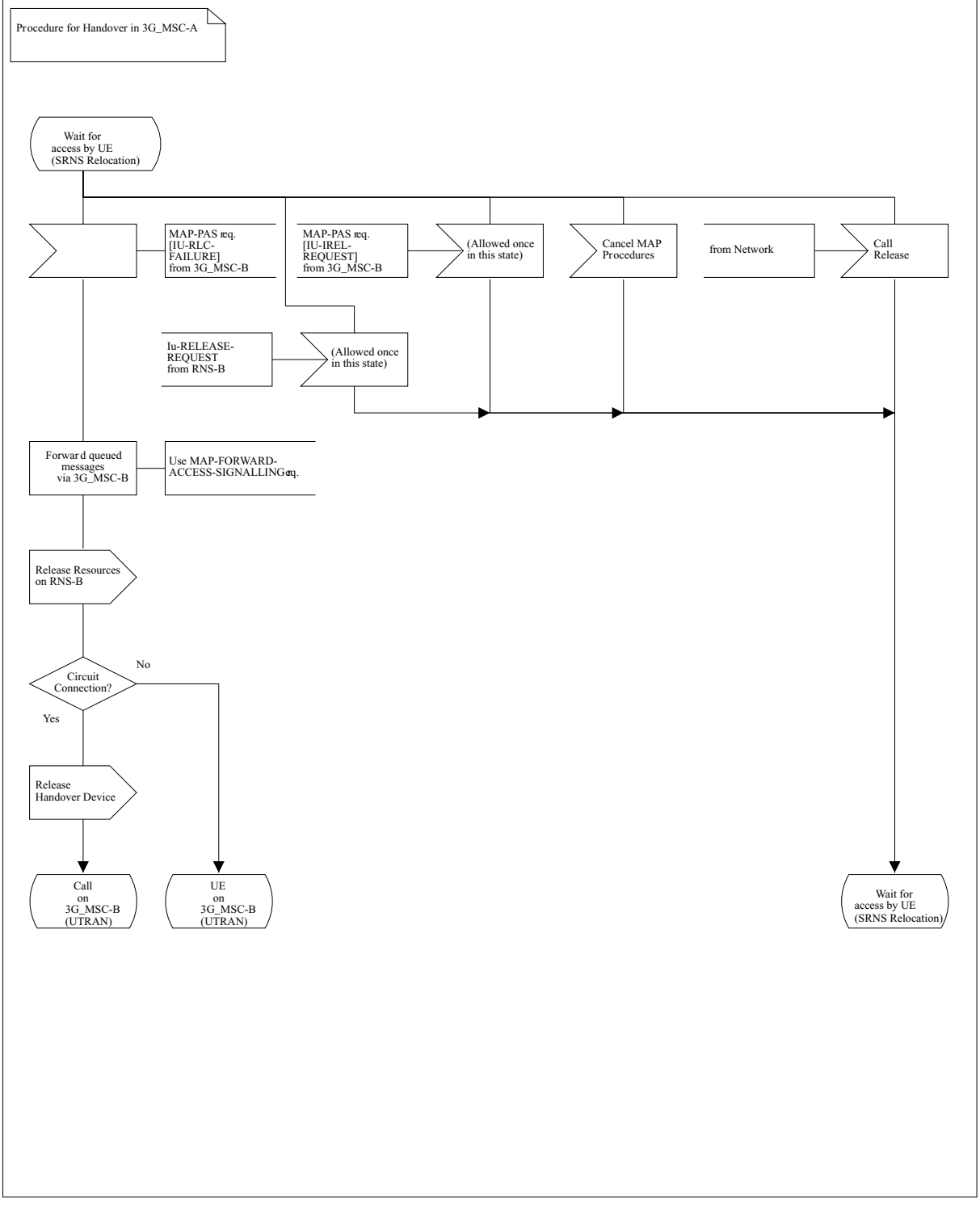



Figure 43 (Sheet 65 of 78): Handover control procedure in 3G_MSC-A

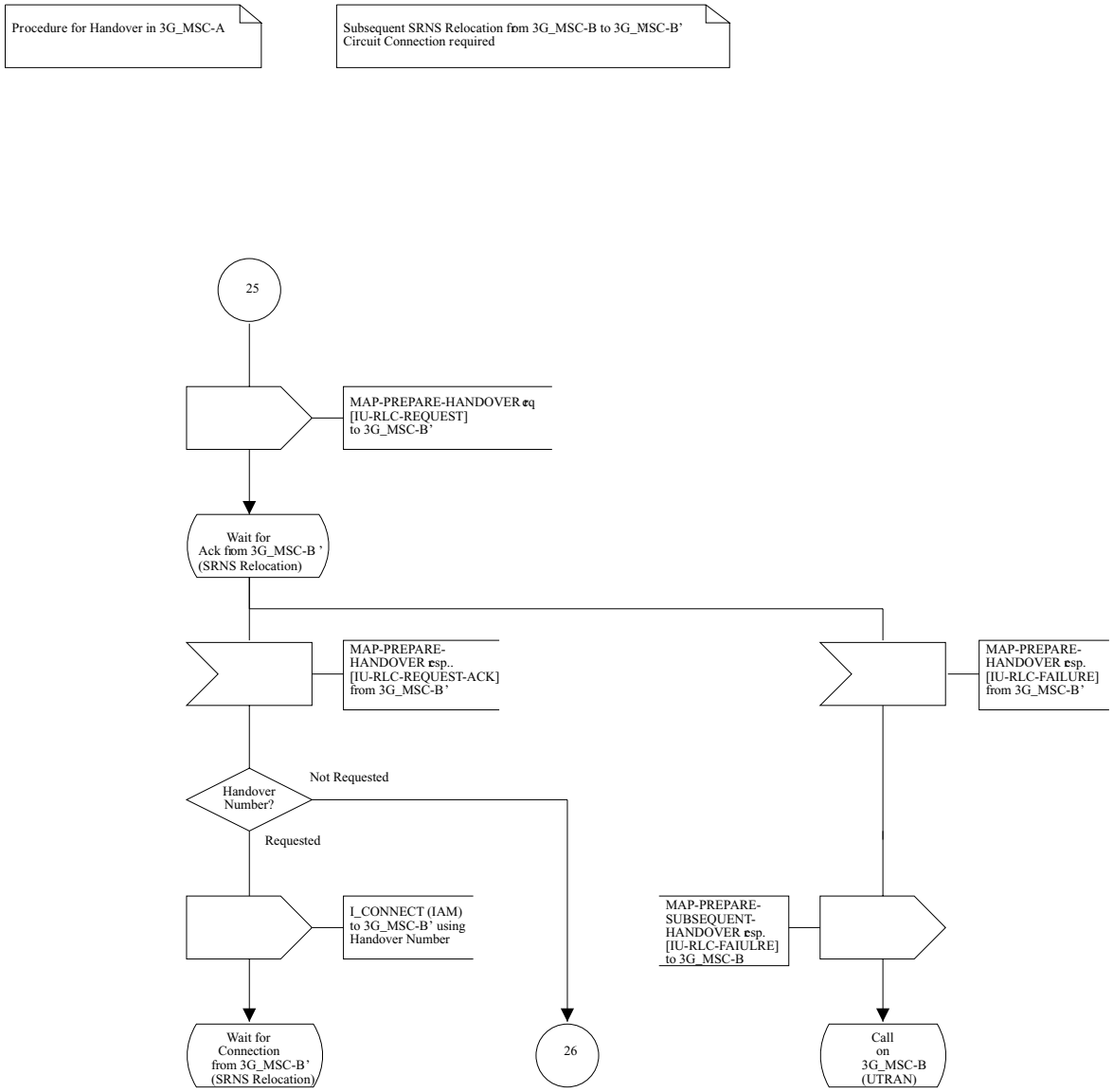



Figure 43 (Sheet 66 of 78): Handover control procedure in 3G_MSC-A

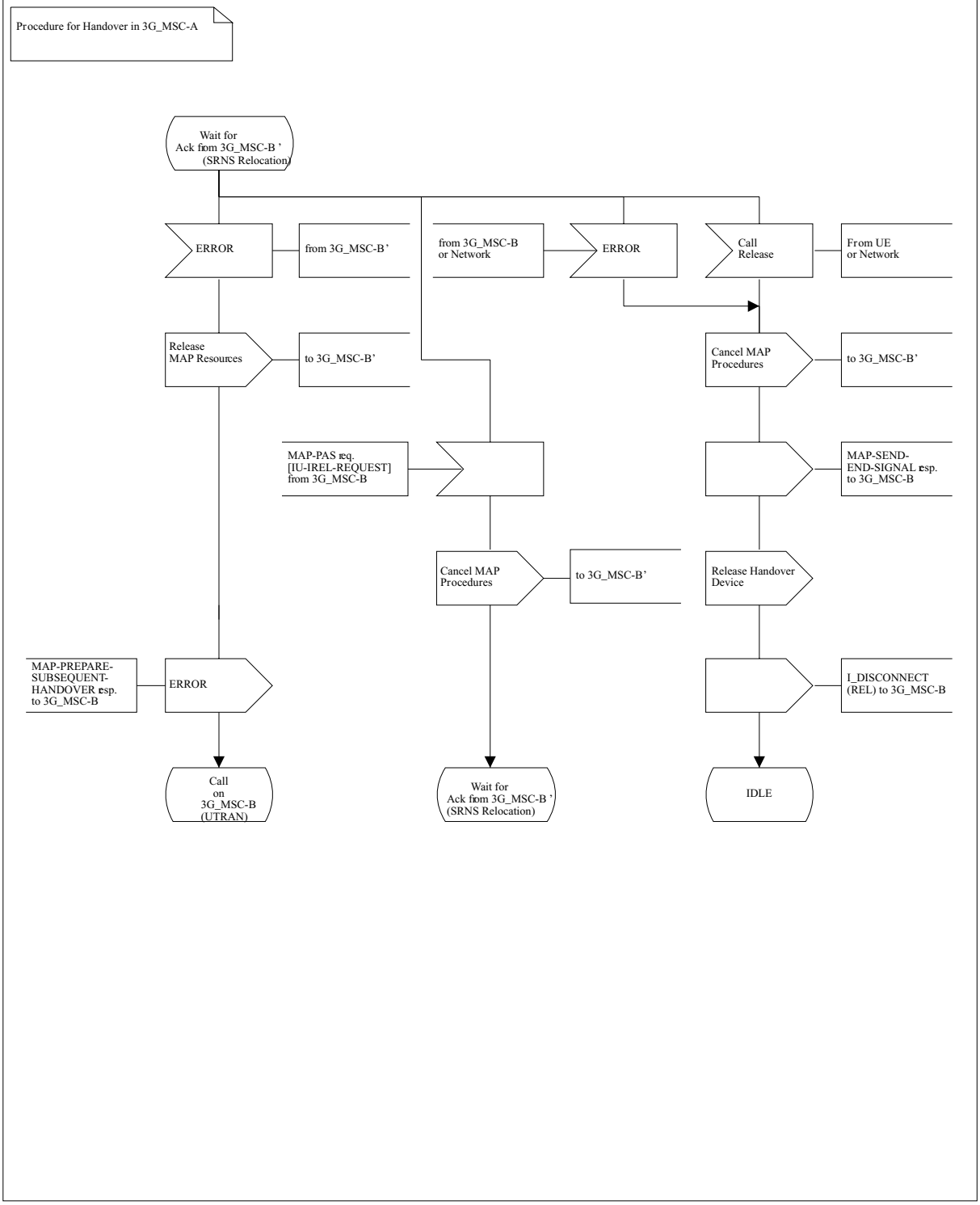



Figure 43 (Sheet 67 of 78): Handover control procedure in 3G_MSC-A

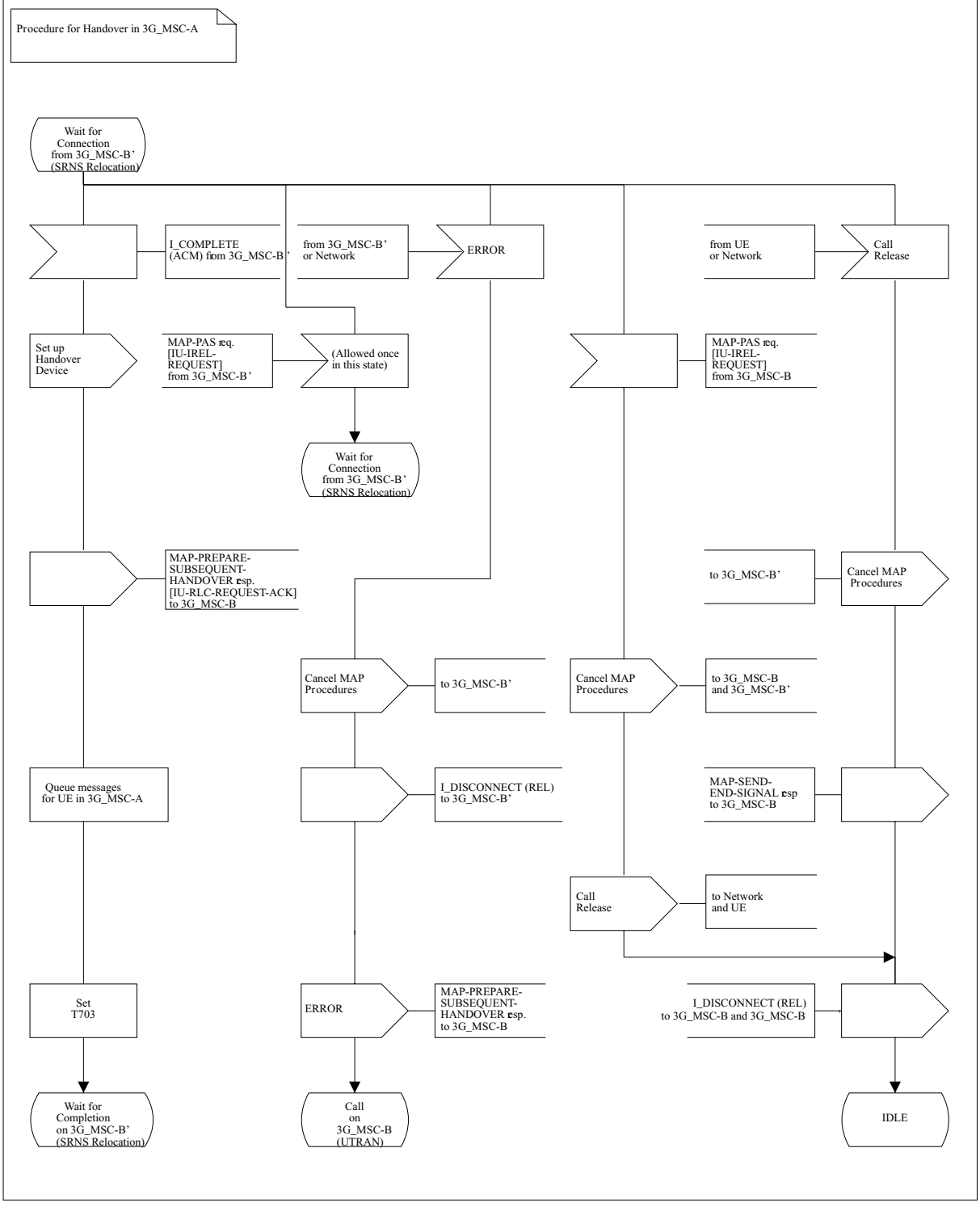



Figure 43 (Sheet 68 of 78): Handover control procedure in 3G_MSC-A

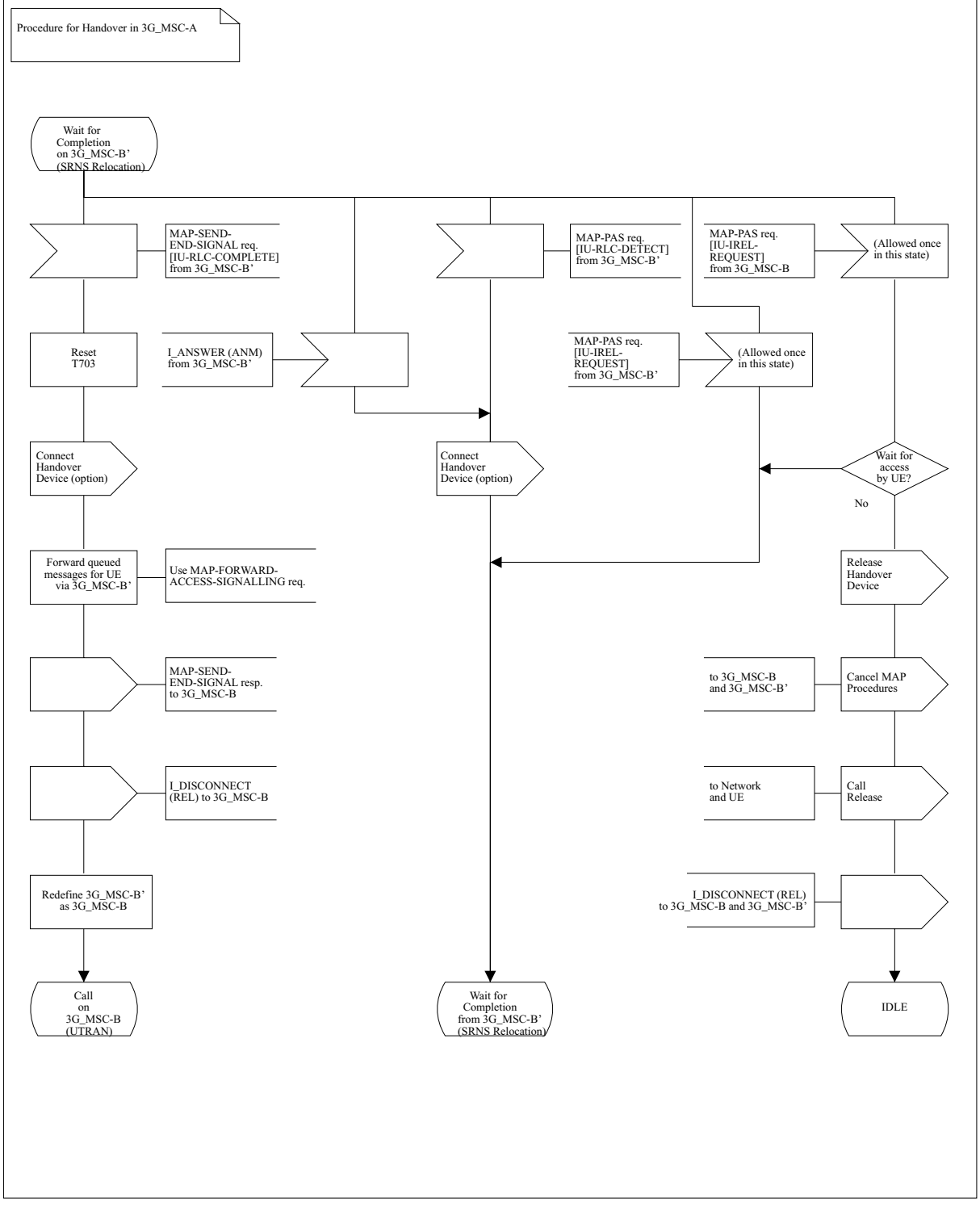



Figure 43 (Sheet 69 of 78): Handover control procedure in 3G_MSC-A

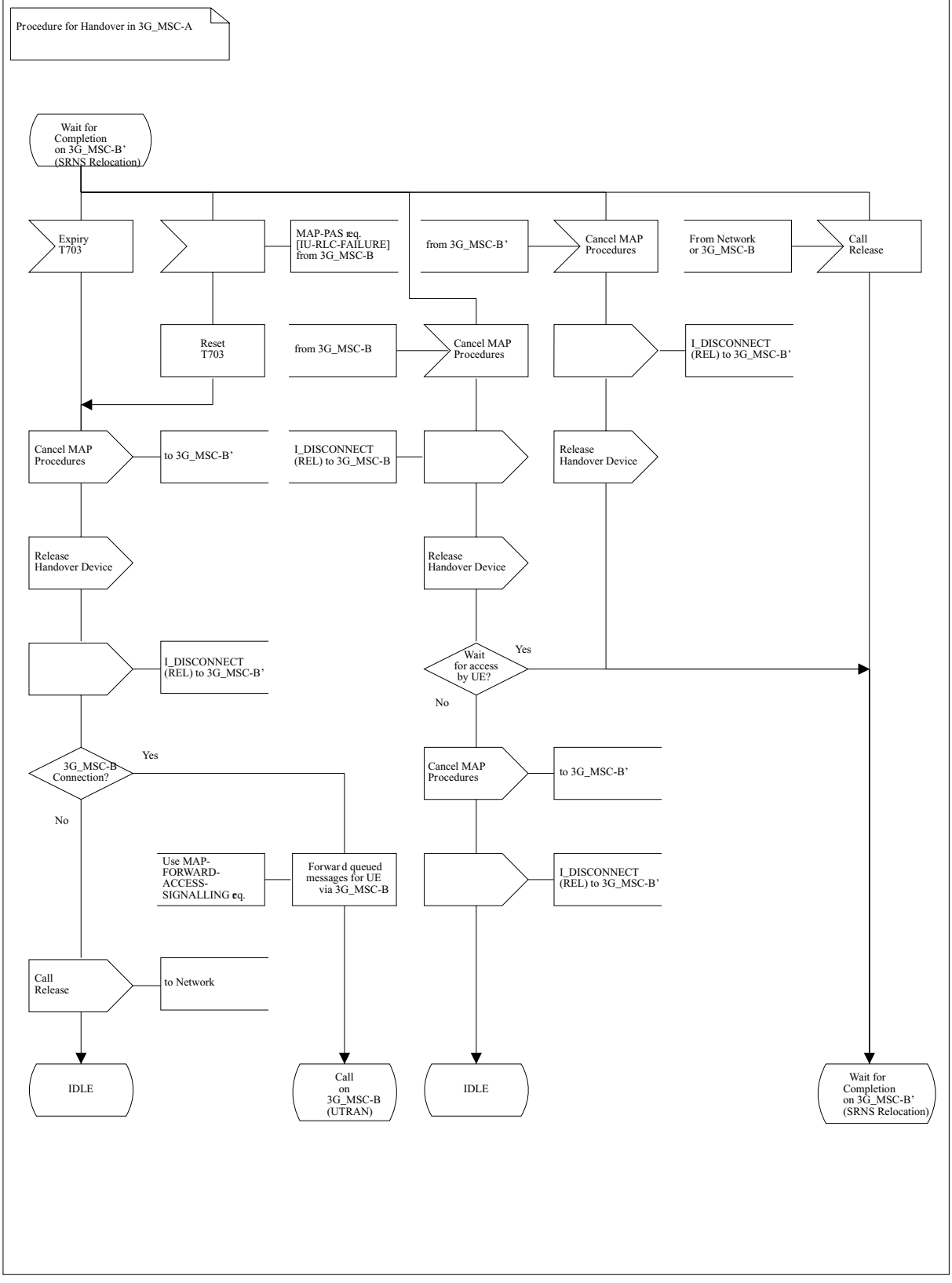



Figure 43 (Sheet 70 of 78): Handover control procedure in 3G_MSC-A

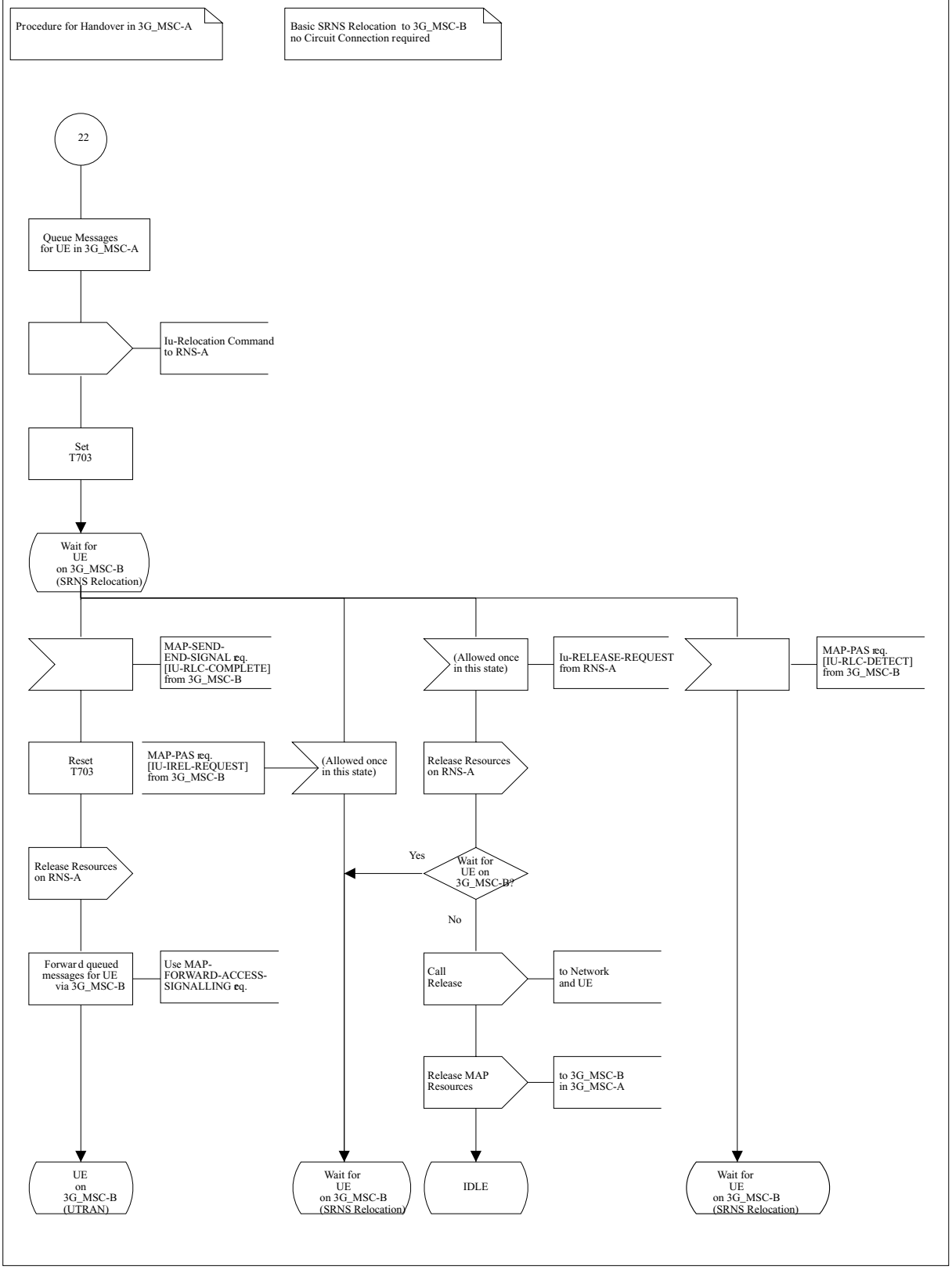



Figure 43 (Sheet 71 of 78): Handover control procedure in 3G_MSC-A

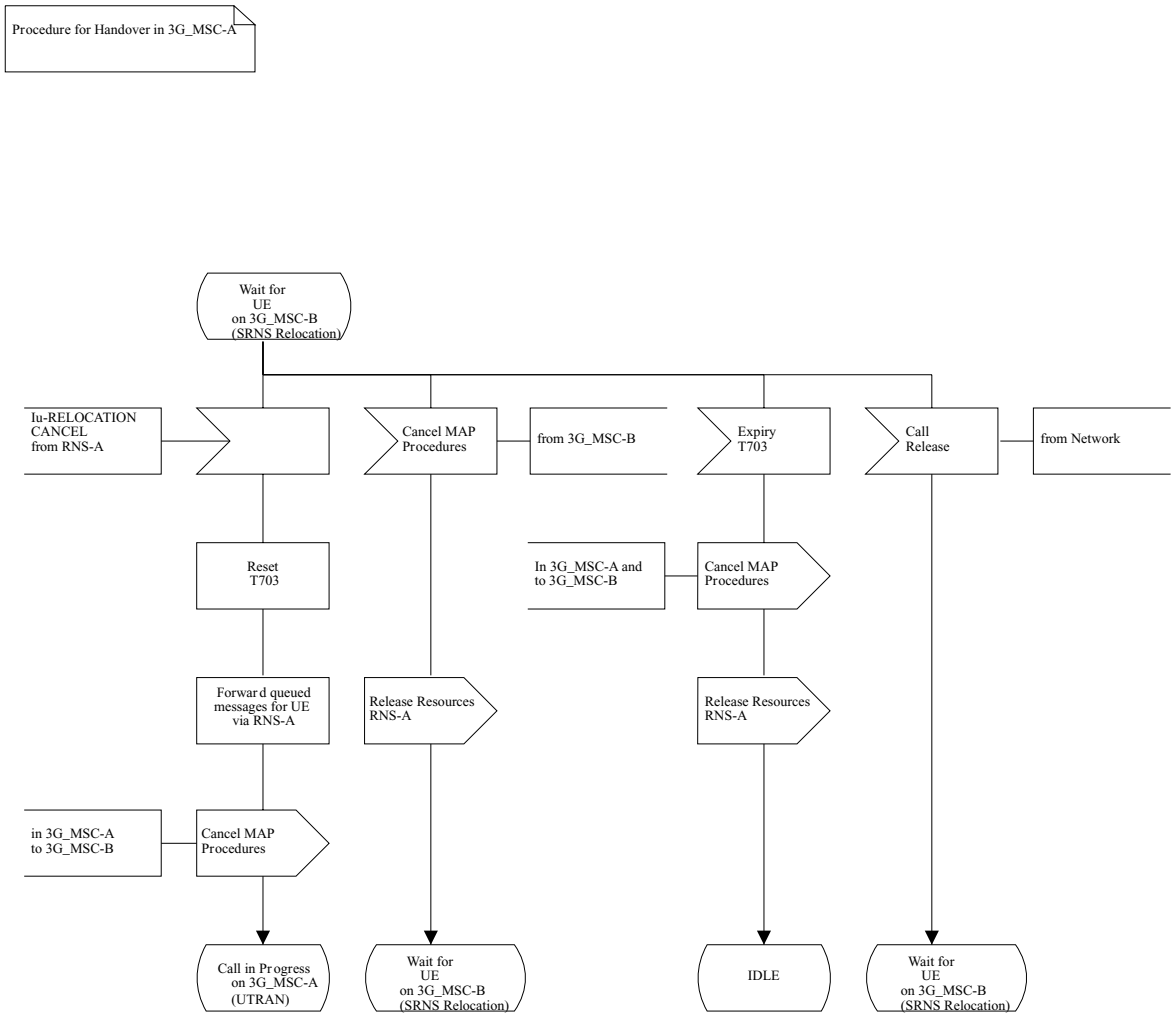



Figure 43 (Sheet 72 of 78): Handover control procedure in 3G_MSC-A

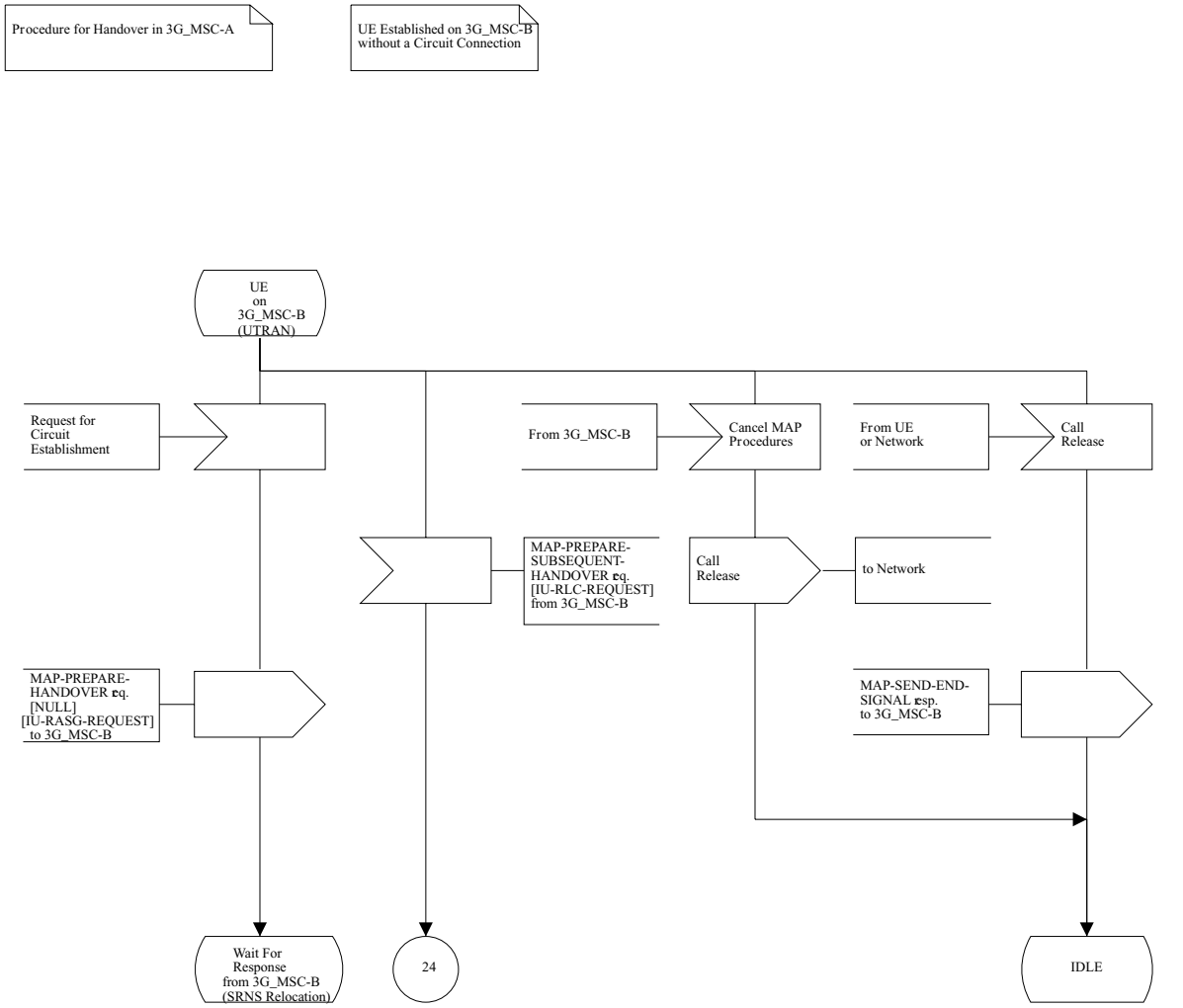



Figure 43 (Sheet 73 of 78): Handover control procedure in 3G_MSC-A

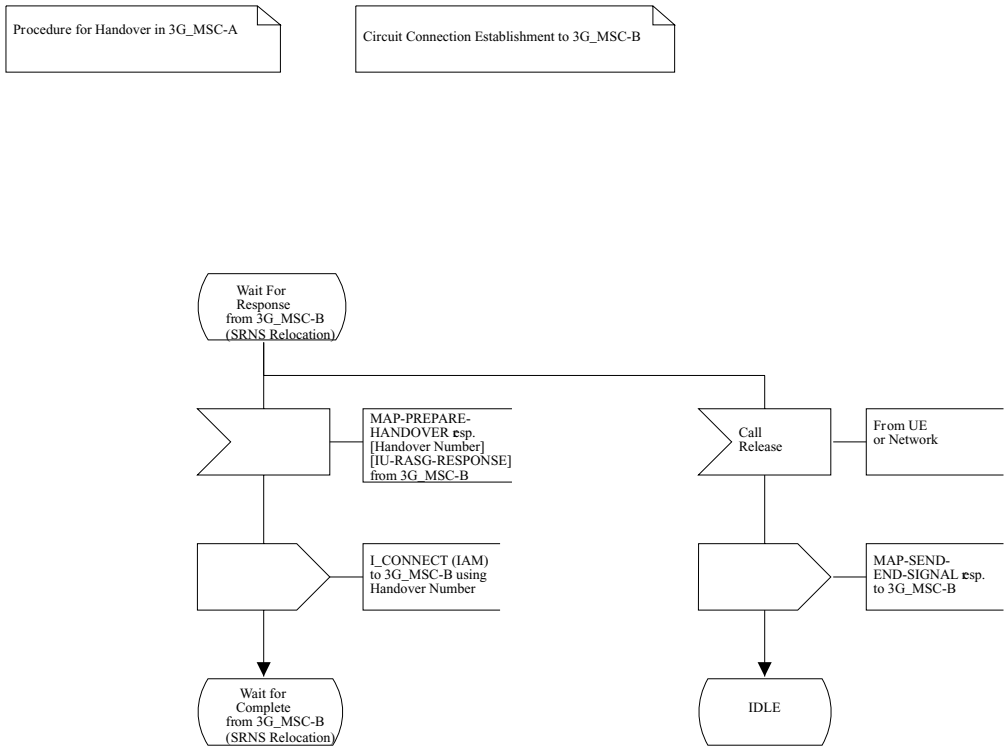



Figure 43 (Sheet 74 of 78): Handover control procedure in 3G_MSC-A

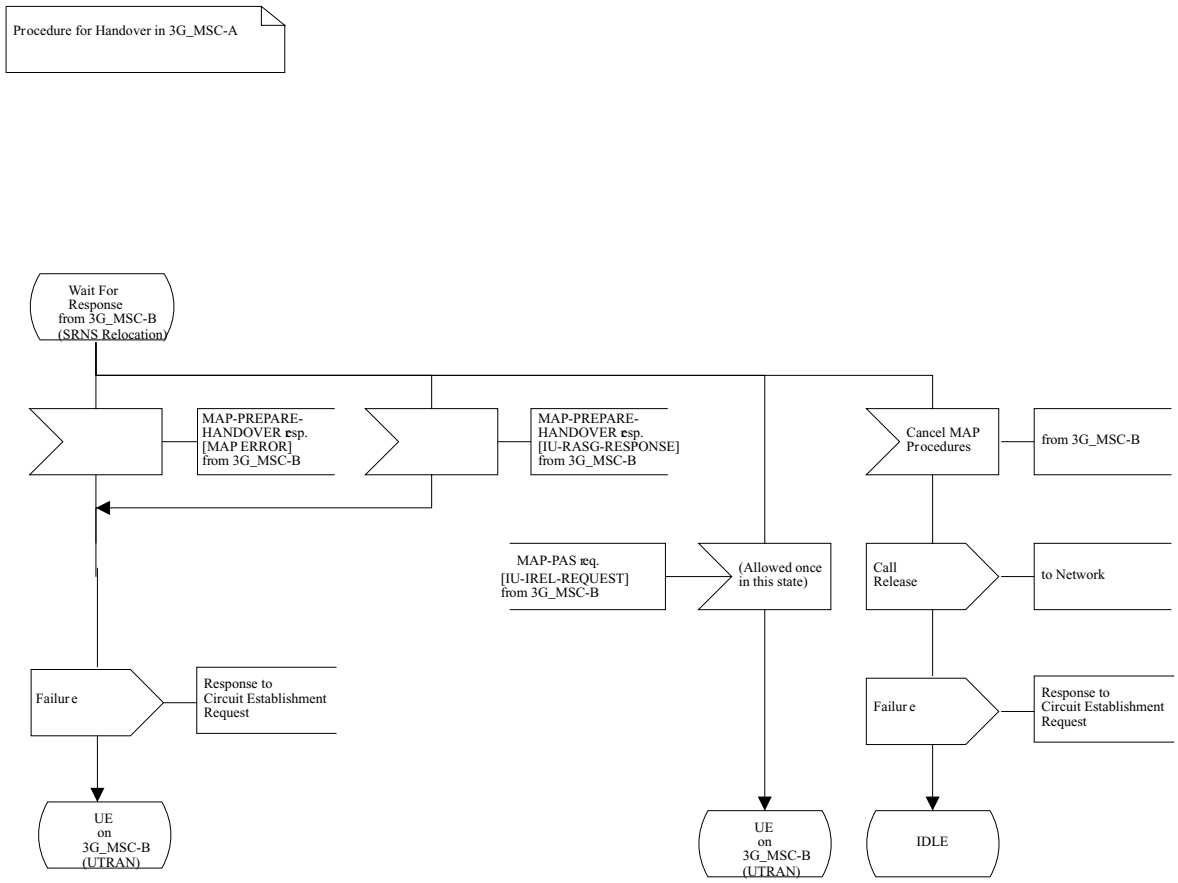



Figure 43 (Sheet 75 of 78): Handover control procedure in 3G_MSC-A

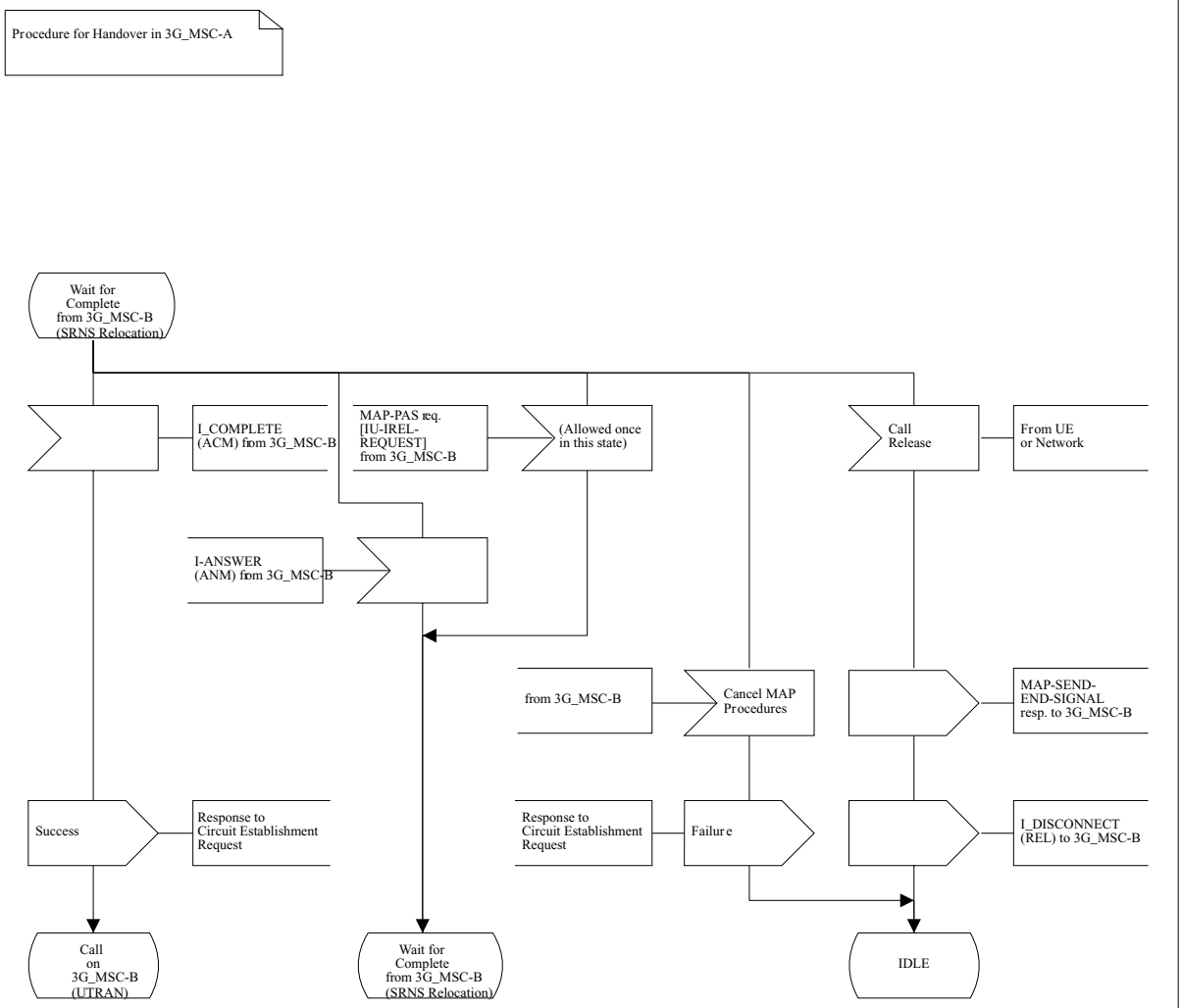



Figure 43 (Sheet 76 of 78): Handover control procedure in 3G_MSC-A

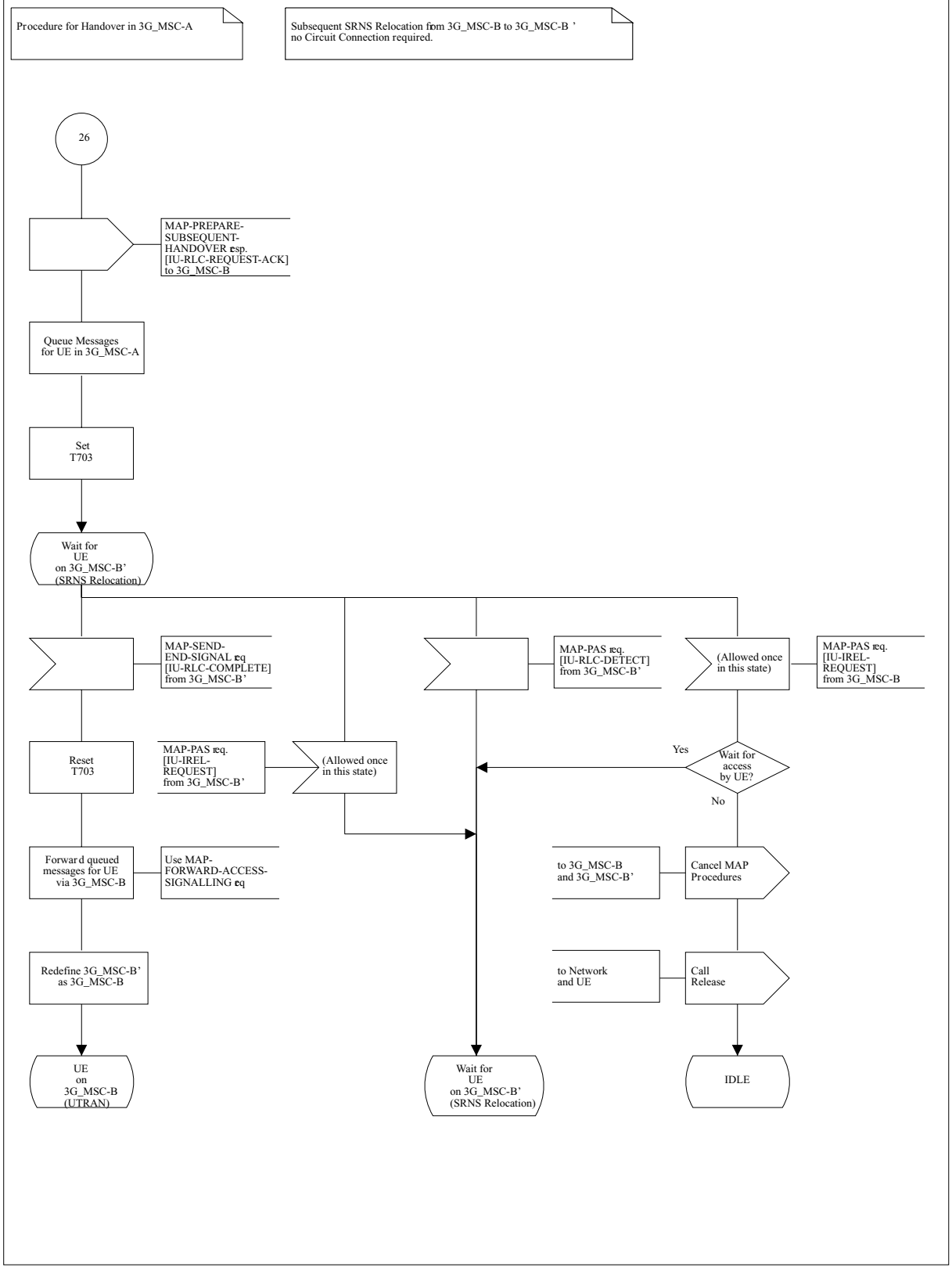



Figure 43 (Sheet 77 of 78): Handover control procedure in 3G_MSC-A

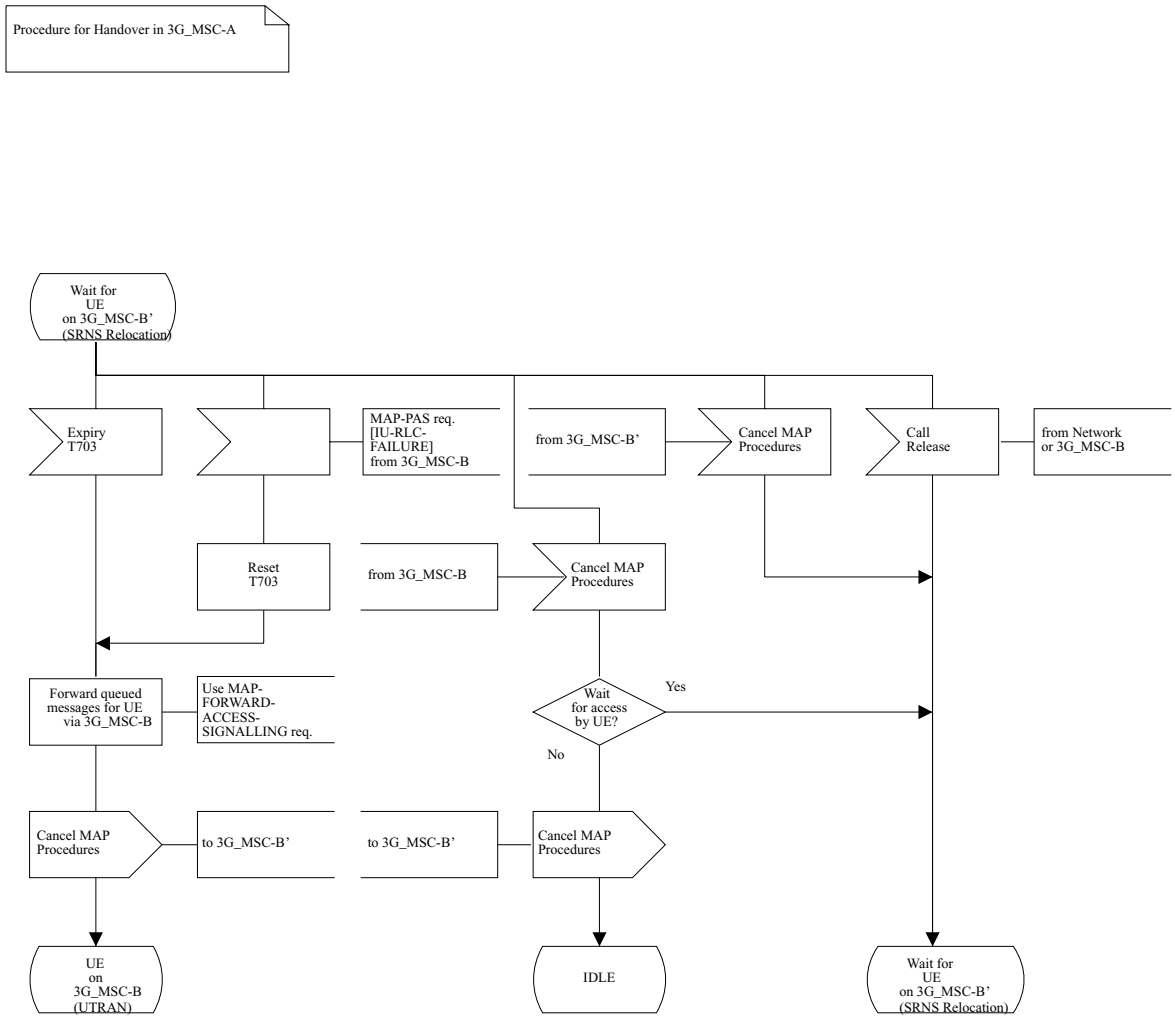



Figure 43 (Sheet 78 of 78): Handover control procedure in 3G_MSC-A

**3GPP TSG-CN 1 meeting #11**
**Umeå, Sweden, 28 Feb - 3 Mar 2000**

***Document* N1-000423**
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| 23.009 | CR | 004 | Current Version: | 3.1.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | TSG-N #7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

**Source:** CN1 **Date:** 2000-02-25

**Subject:** Procedures for 3G_MSC-B

**Work item:** GSM UMTS Interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | X | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:**
The requested changes include the introduction of RANAP for intra-UMTS inter-MSC relocation. Some minor editorial corrections have also been added.
Editorial changes:
Sheet 7: Entry 4 deleted; Sheet 19: Entry point is 5; Sheet 24: Exit point is 8; Sheet 25: A number of entry and exit points have been renumbered and the entry 10 deleted; Sheet 26: A number of entry and exit points have been renumbered and the text in some boxes have been changed; Sheet 29: Exit point changed to 7; Sheet 32: Exit point changed to 8; Sheet 37: Entry point changed to 6; Sheet 42: Exit point changed to 12 and no italics; Sheet 43: A number of entry and exit points have been renumbered and entry 14 deleted; Sheet 44: Entry point changed to 13, exit point changed to 11 and text changed to "Iu-RELOCATION-FAILURE from RNS-B"; Sheet 47: Exit point changed to 11; Sheet 50: Exit point changed to 12
Functional changes:
Sheet 1: A new branch added with MAP including IU-RLC-REQUEST; Sheet 37-44, 46-53: A- functions within square brackets replaced by Iu- functions; Sheet 45: Box with MAP-PAS with A-HANDOVER-PERFORMED deleted;

**Clauses affected:**

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**

help.doc

<--------- double-click here for help and instructions on how to create a CR.

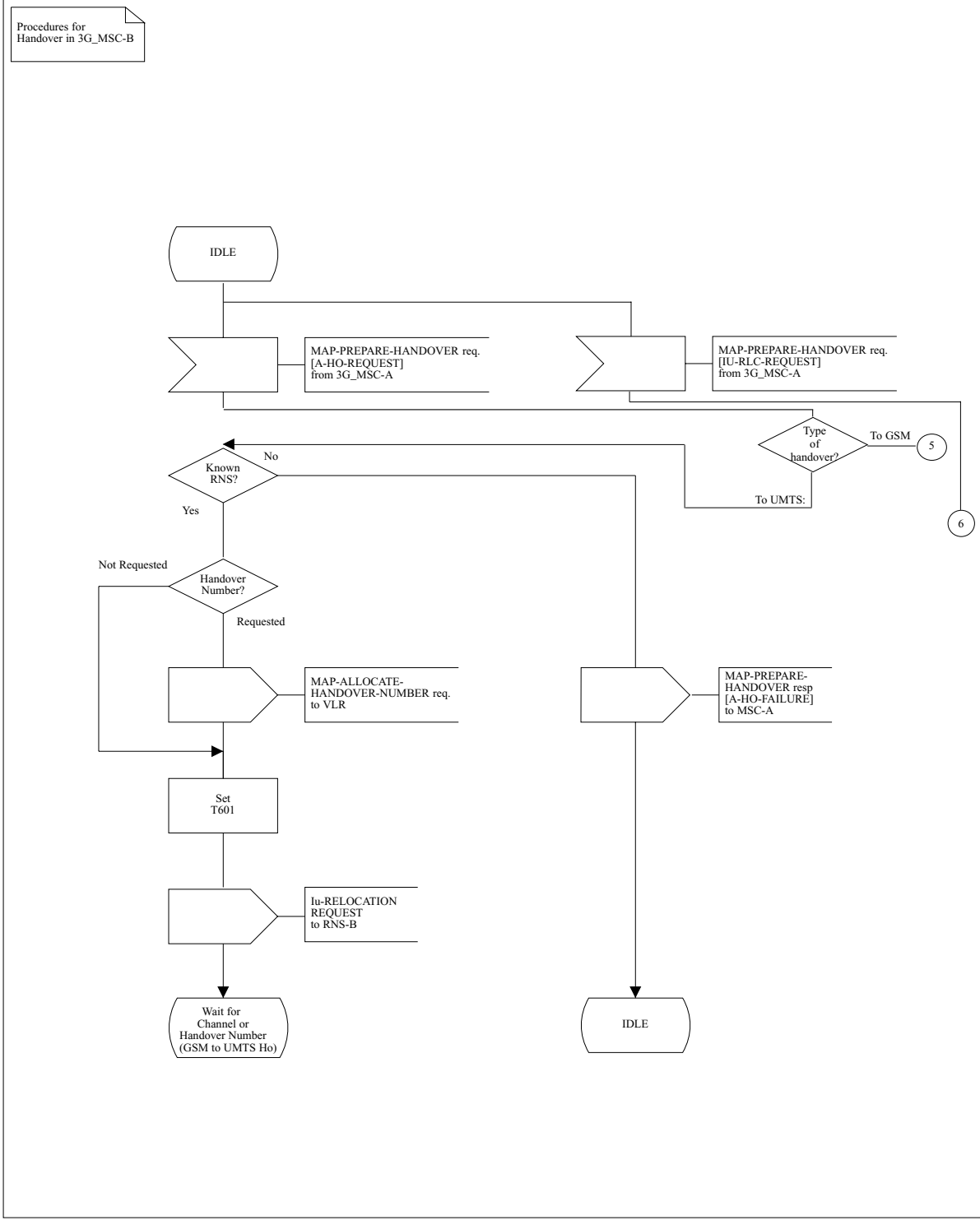



Figure 44 (Sheet 1of 54): Handover control procedure in 3G_MSC-B

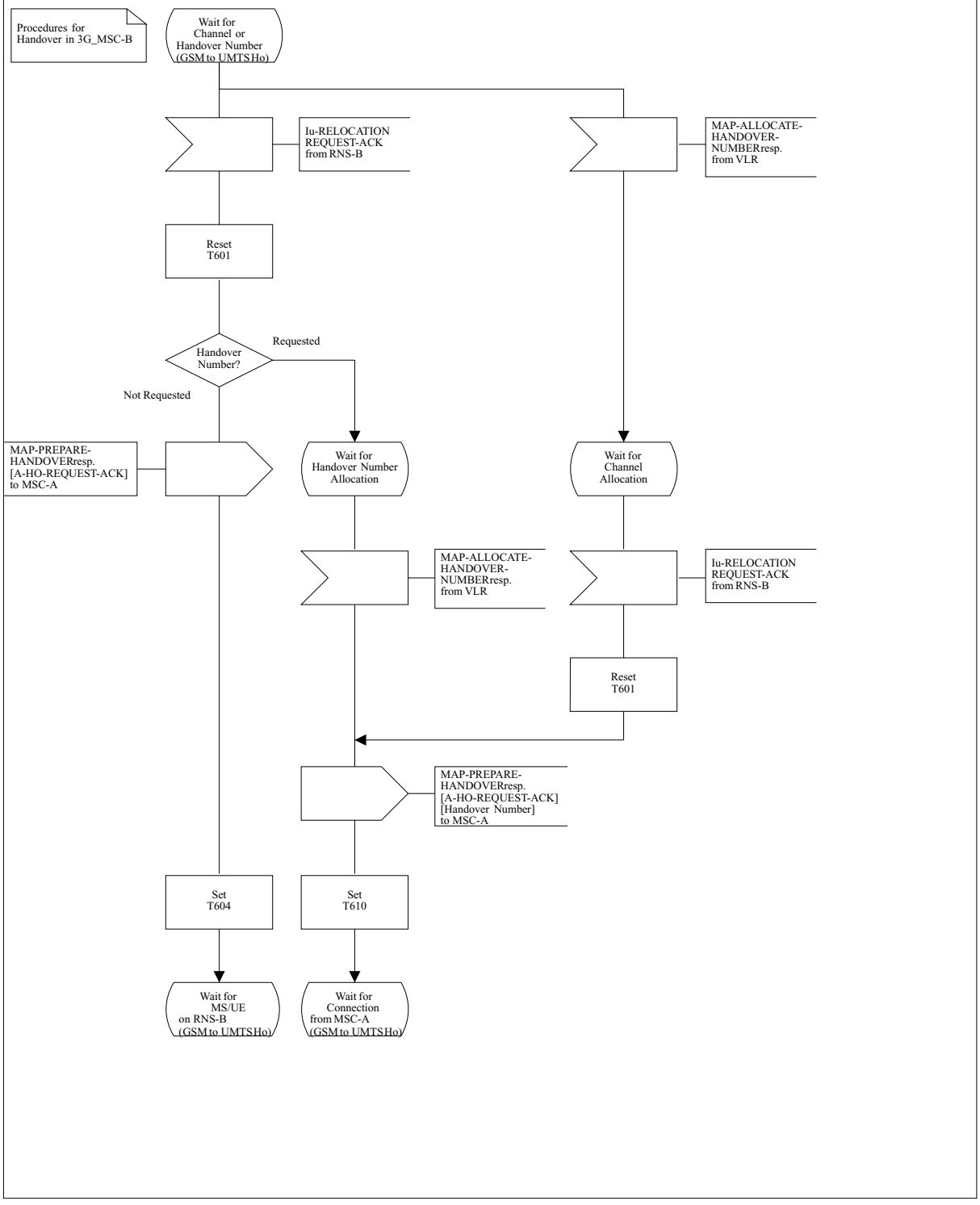



Figure 44 (Sheet 2 of 54): Handover control procedure in 3G_MSC-B

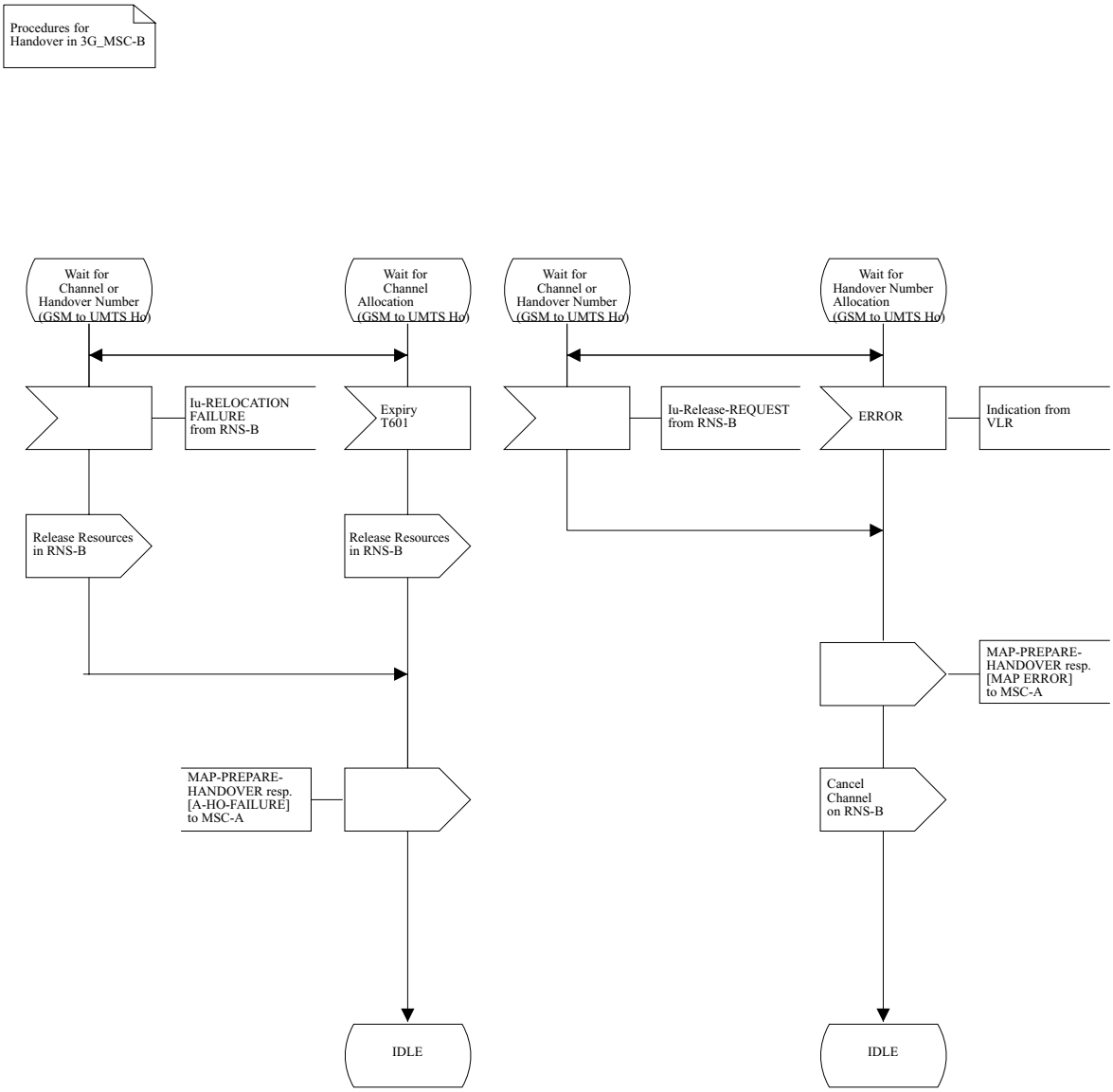



Figure 44 (Sheet 3 of 54): Handover control procedure in 3G_MSC-B

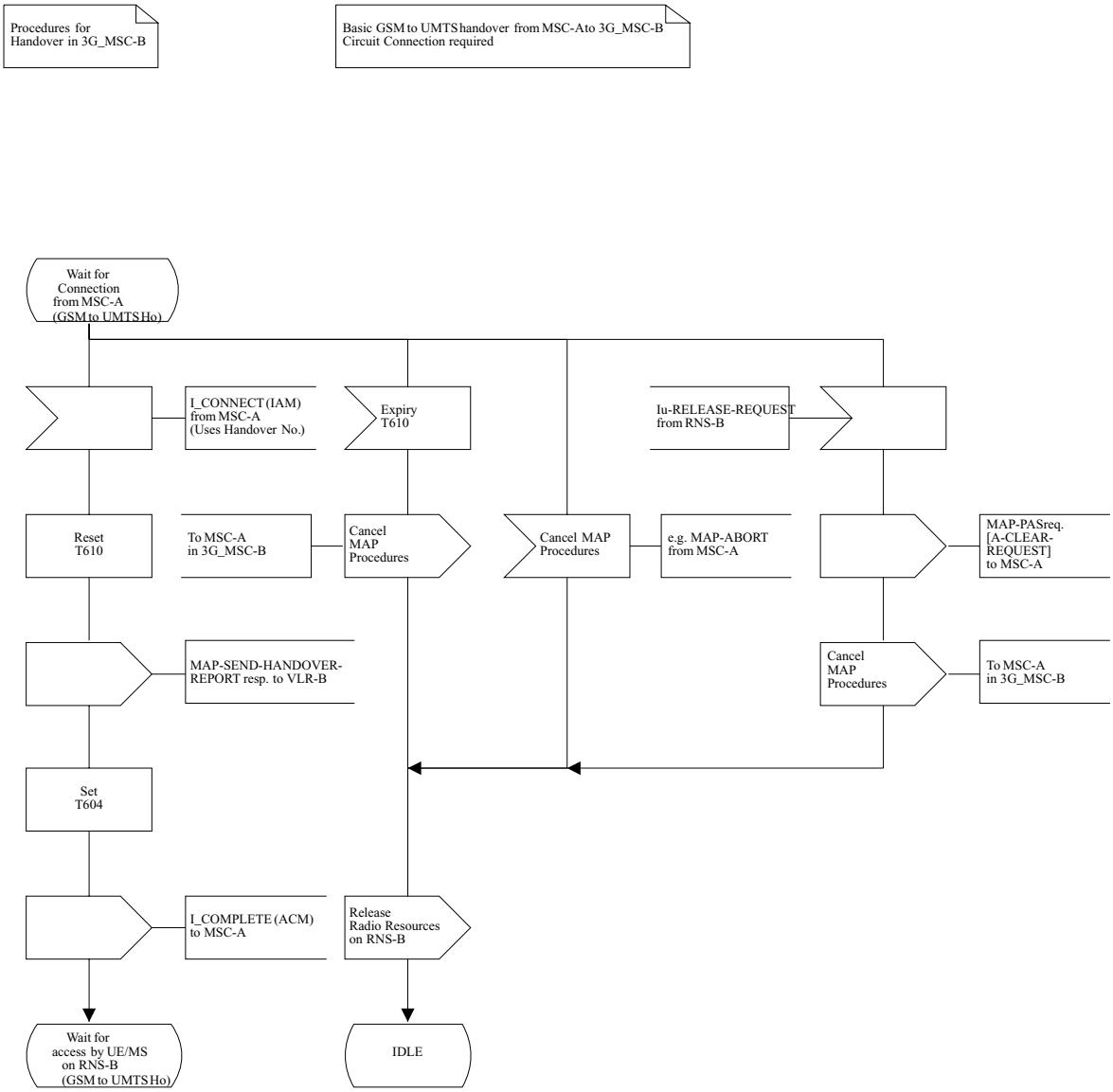



Figure 44 (Sheet 4 of 54): Handover control procedure in 3G_MSC-B

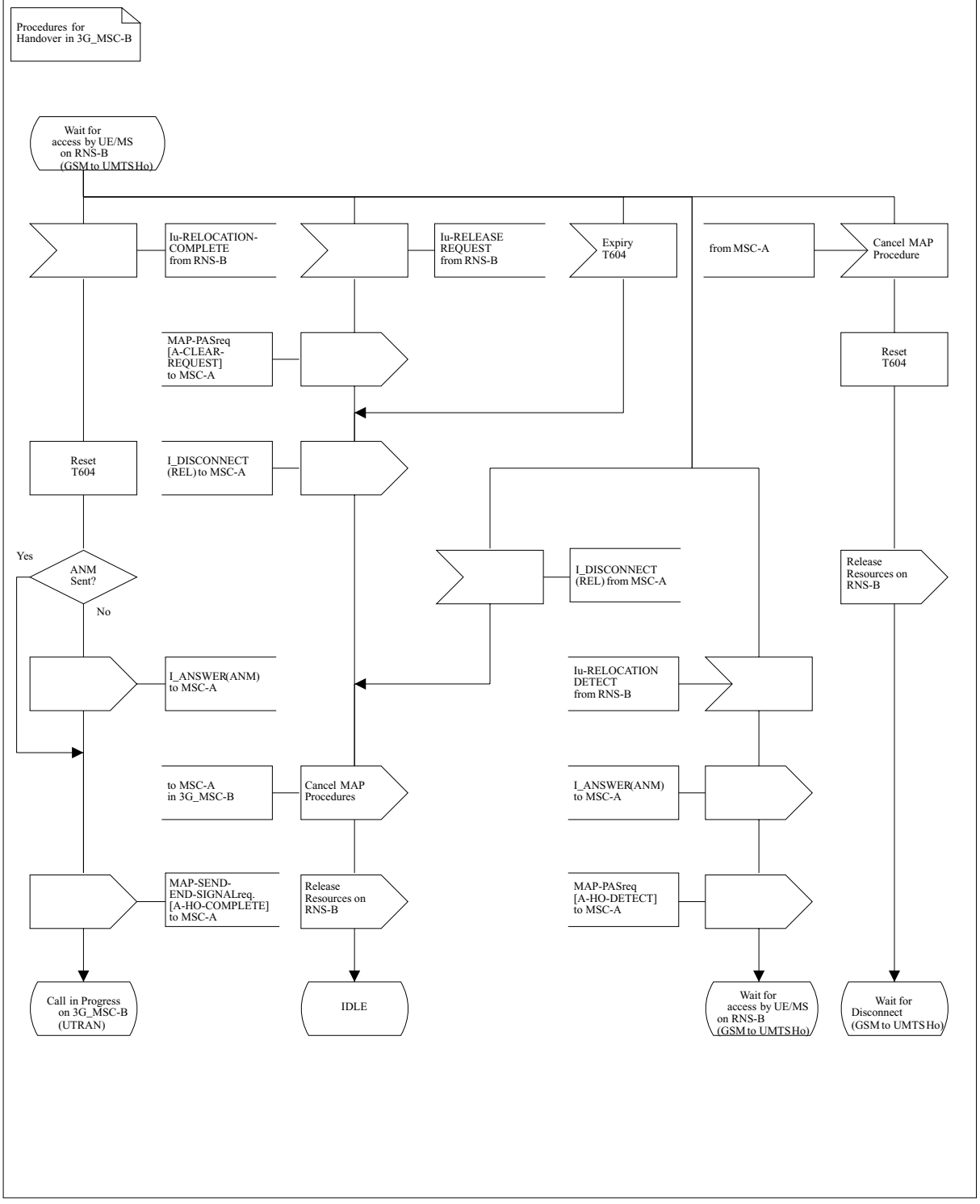



Figure 44 (Sheet 5 of 54): Handover control procedure in 3G_MSC-B

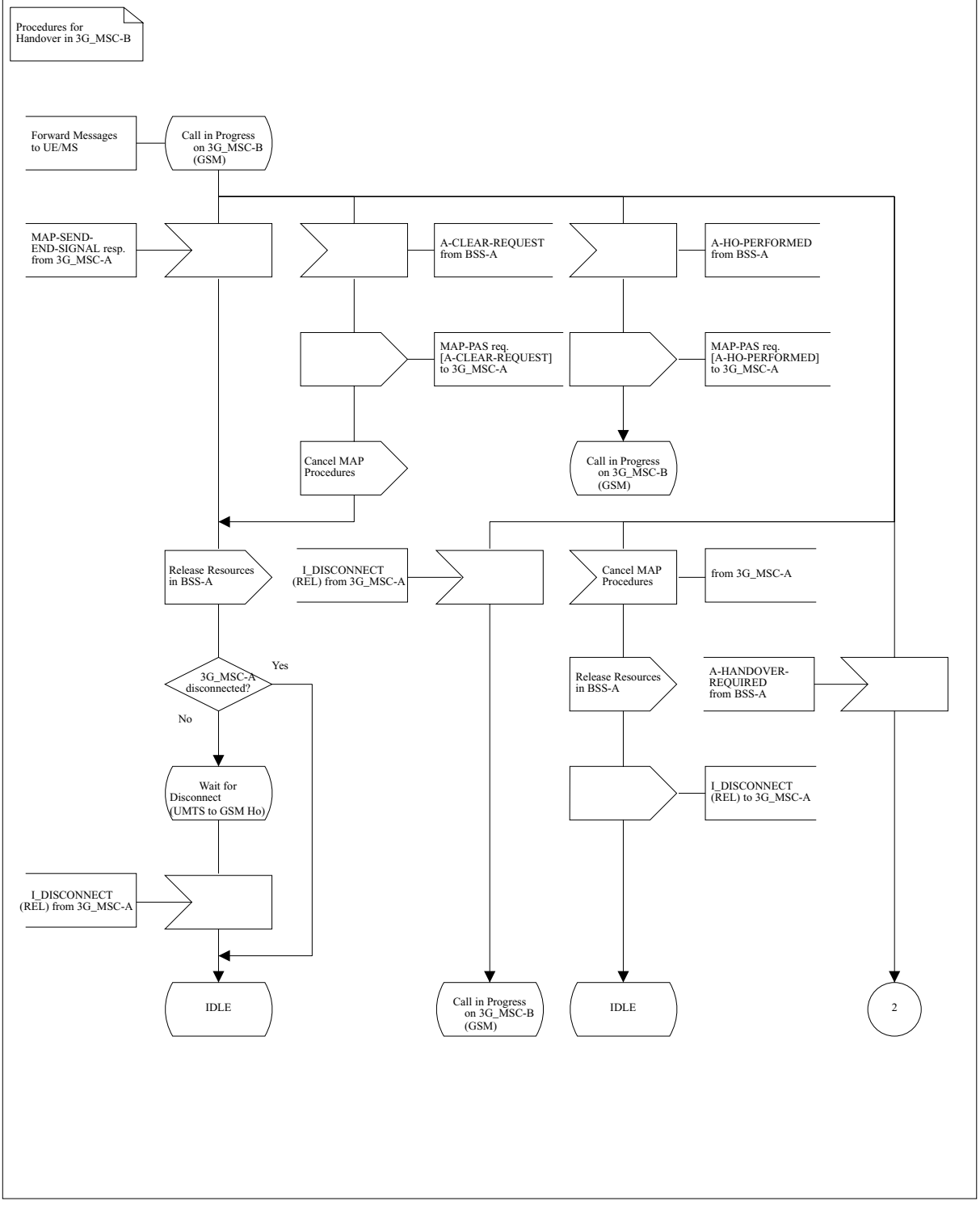



Figure 44 (Sheet 6 of 54): Handover control procedure in 3G_MSC-B

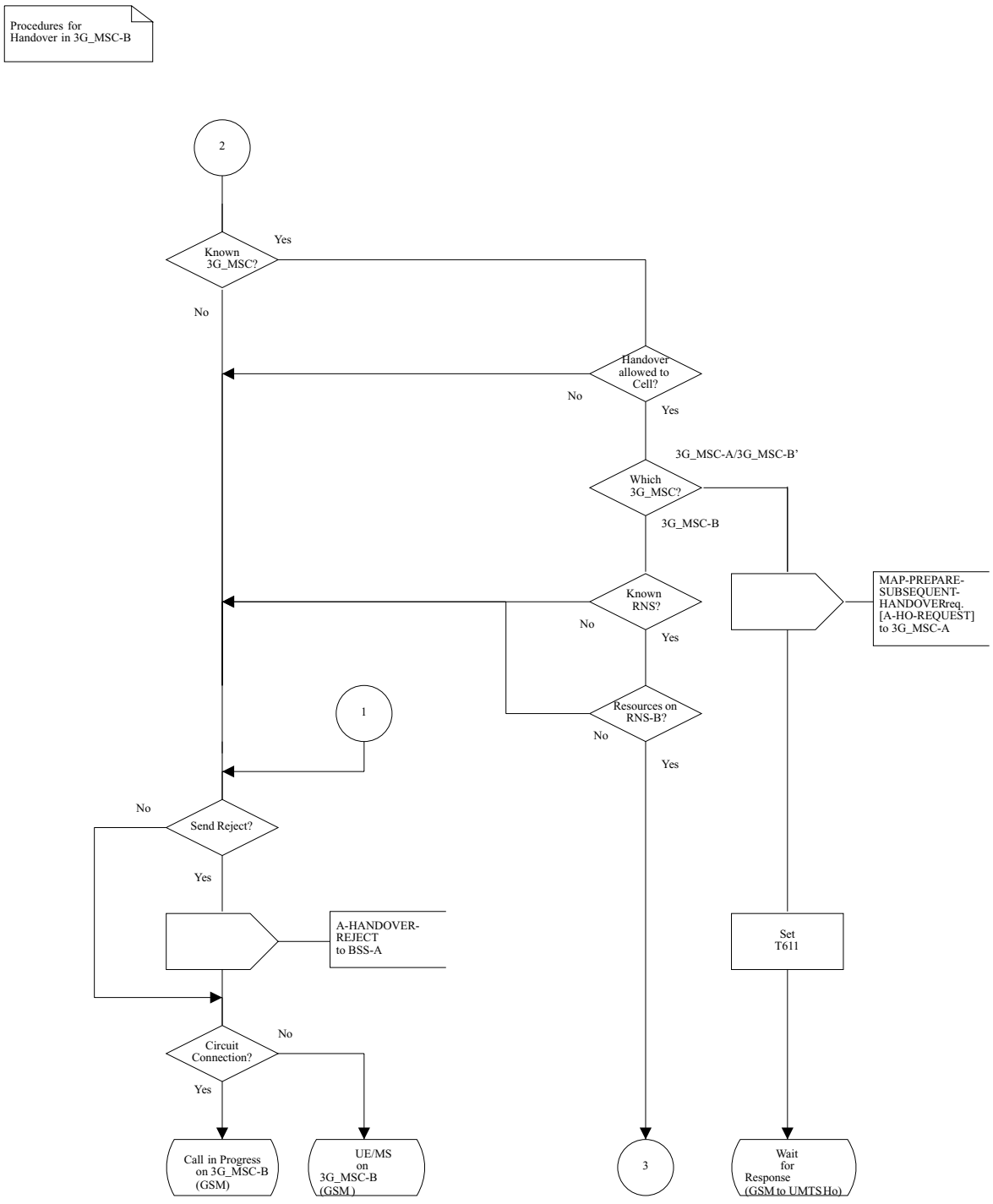



Figure 44 (Sheet 7 of 54): Handover control procedure in 3G_MSC-B

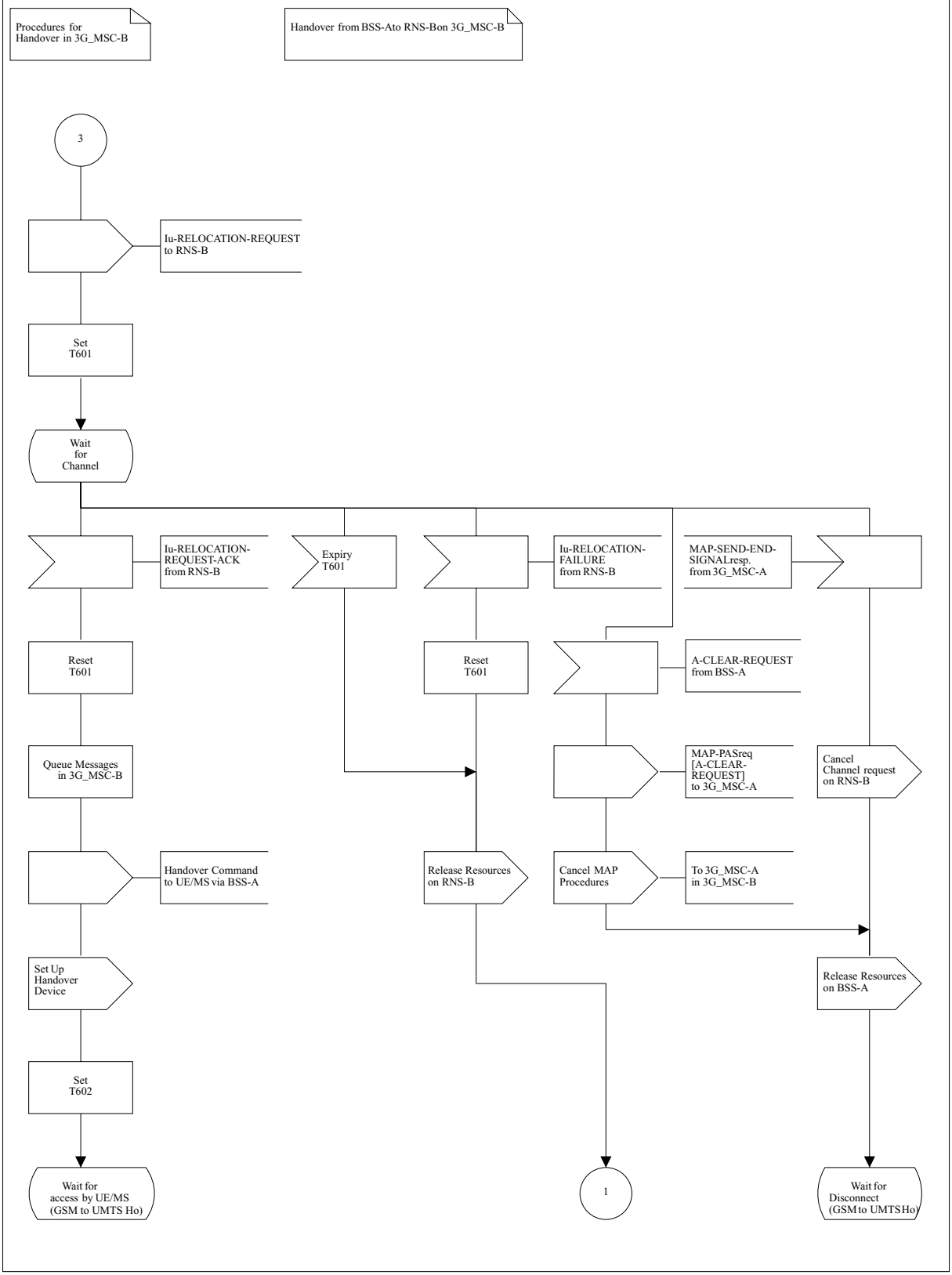



Figure 44 (Sheet 8 of 54): Handover control procedure in 3G_MSC-B

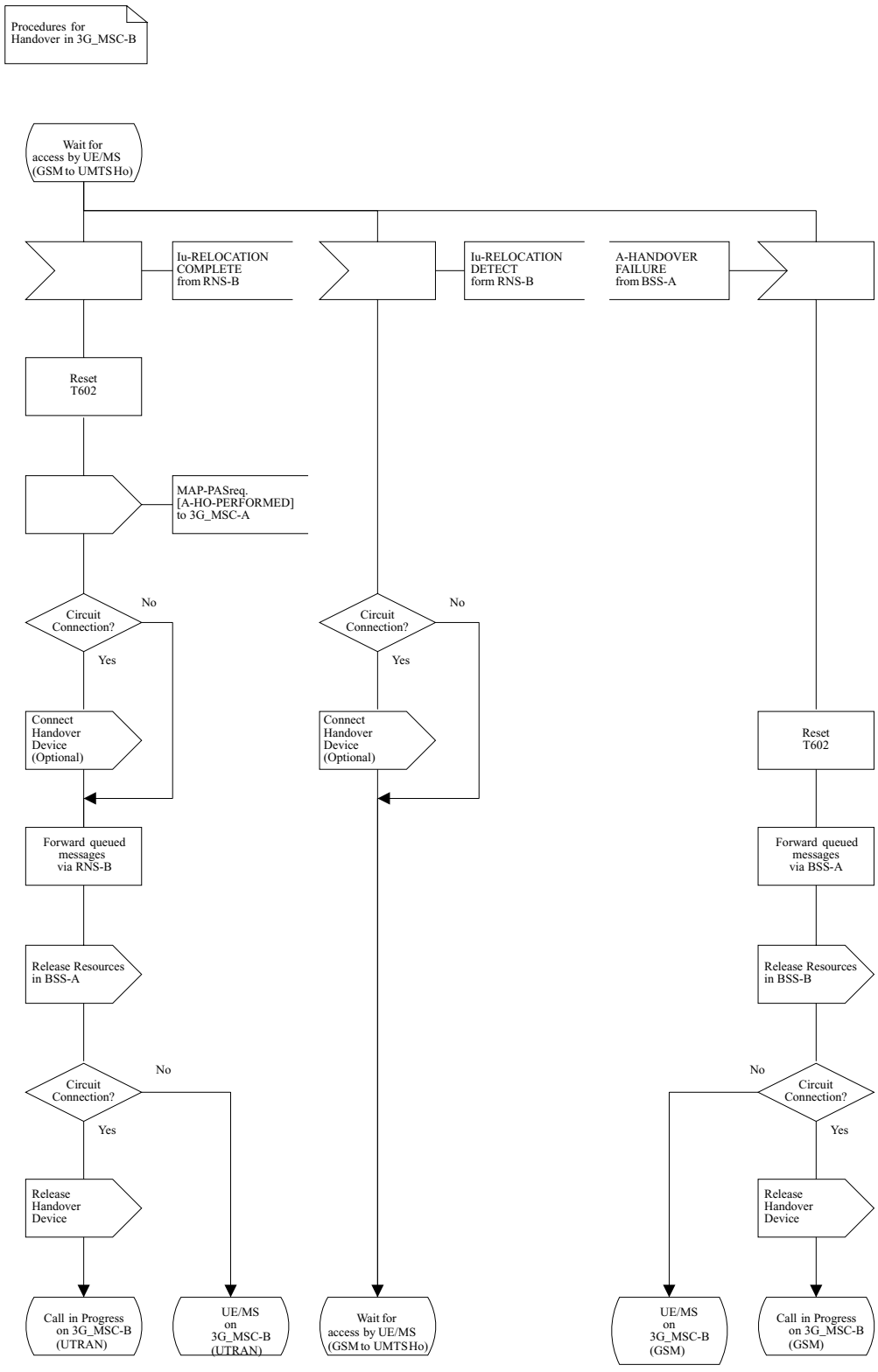



Figure 44 (Sheet 9 of 54): Handover control procedure in 3G_MSC-B

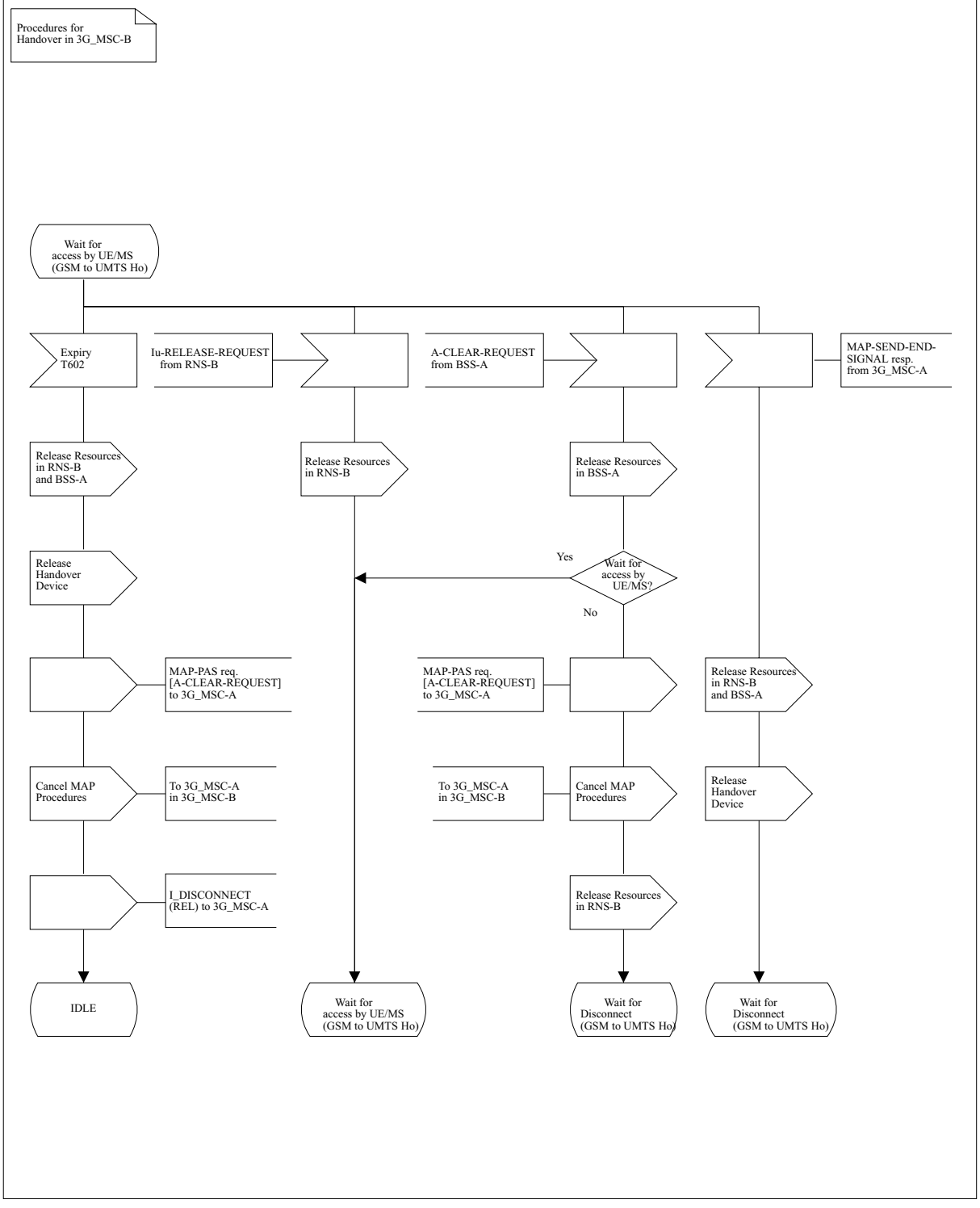



Figure 44 (Sheet 10 of 54): Handover control procedure in 3G_MSC-B

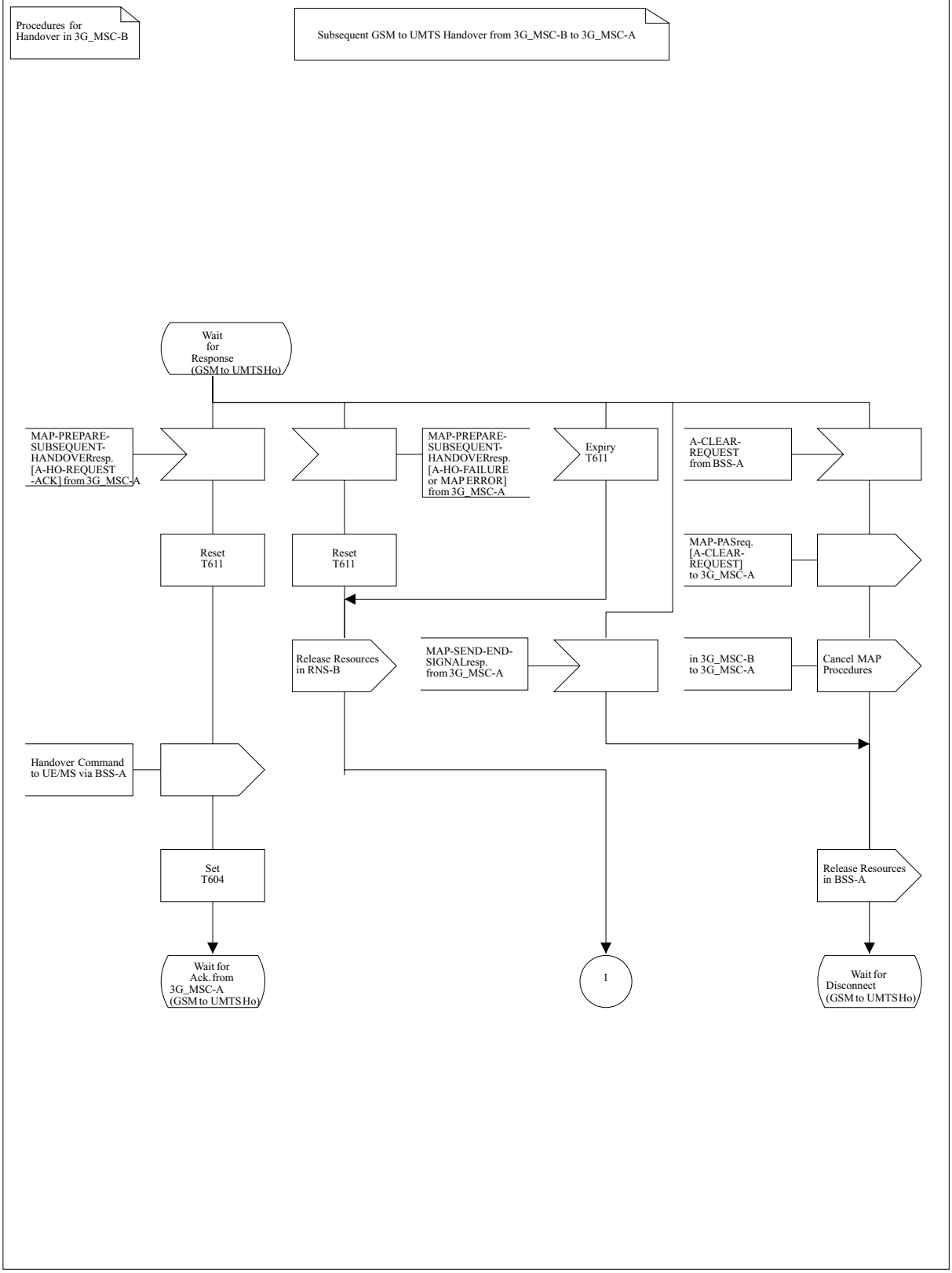



Figure 44 (Sheet 11 of 54): Handover control procedure in 3G_MSC-B

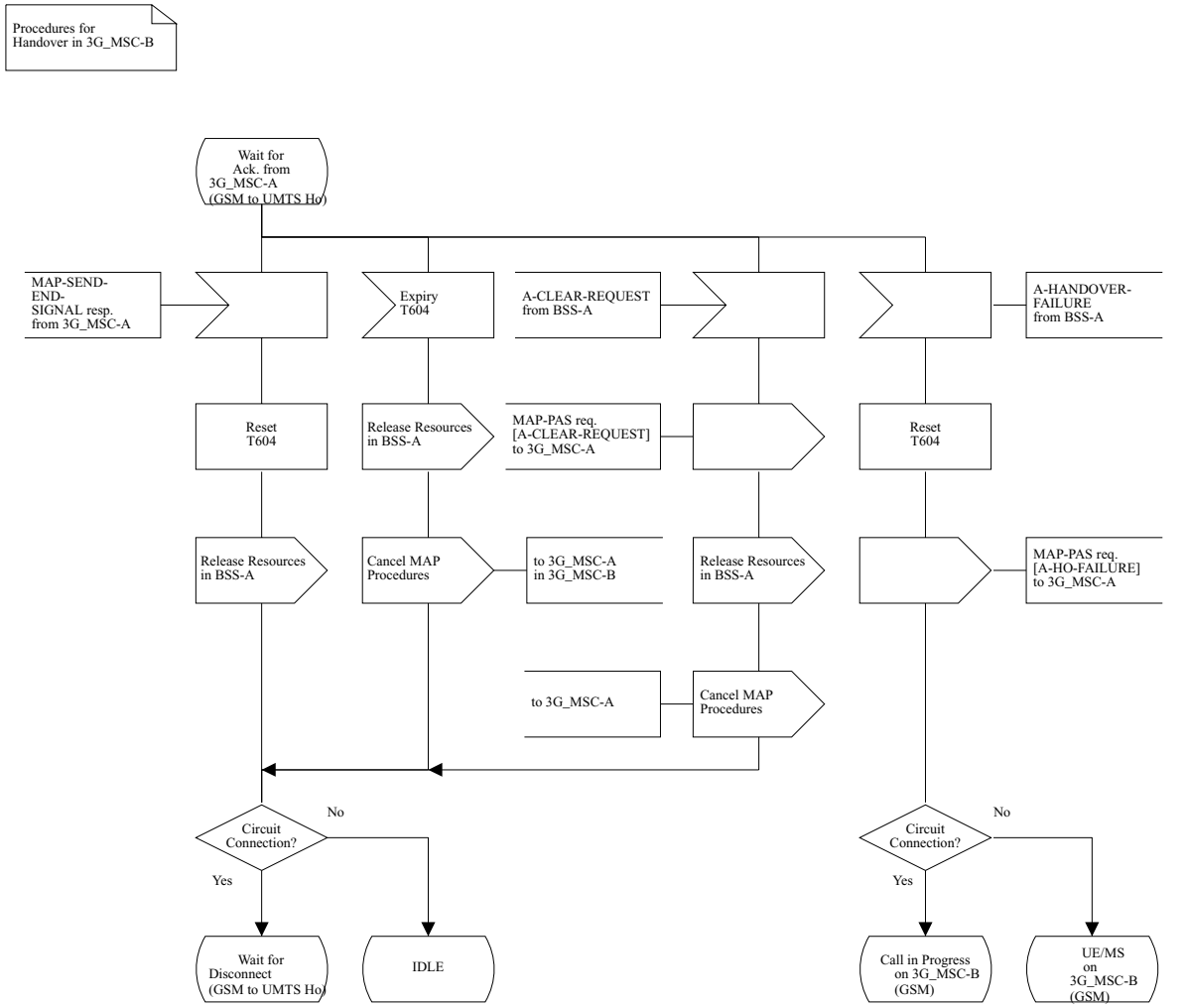



Figure 44 (Sheet 12 of 54): Handover control procedure in 3G_MSC-B

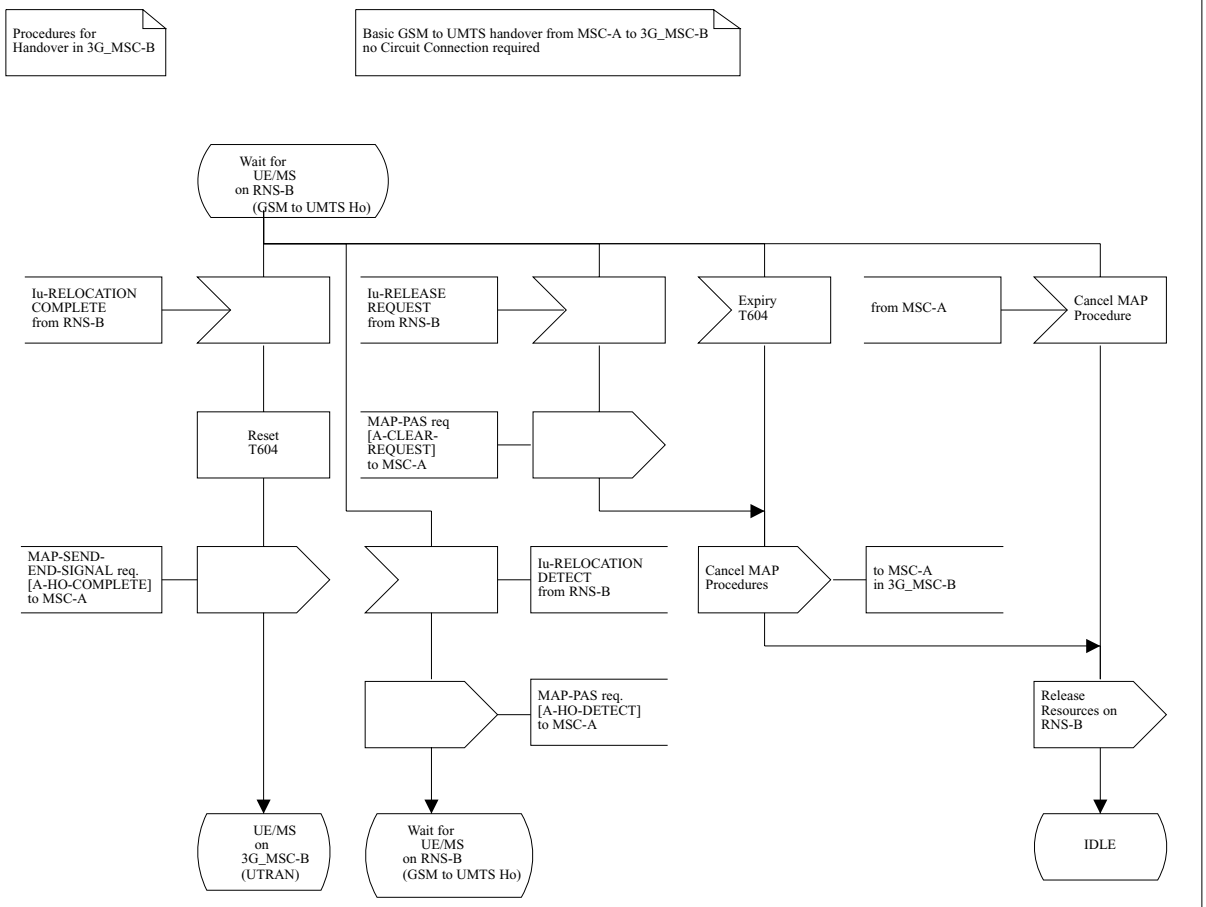



Figure 44 (Sheet 13 of 54): Handover control procedure in 3G_MSC-B

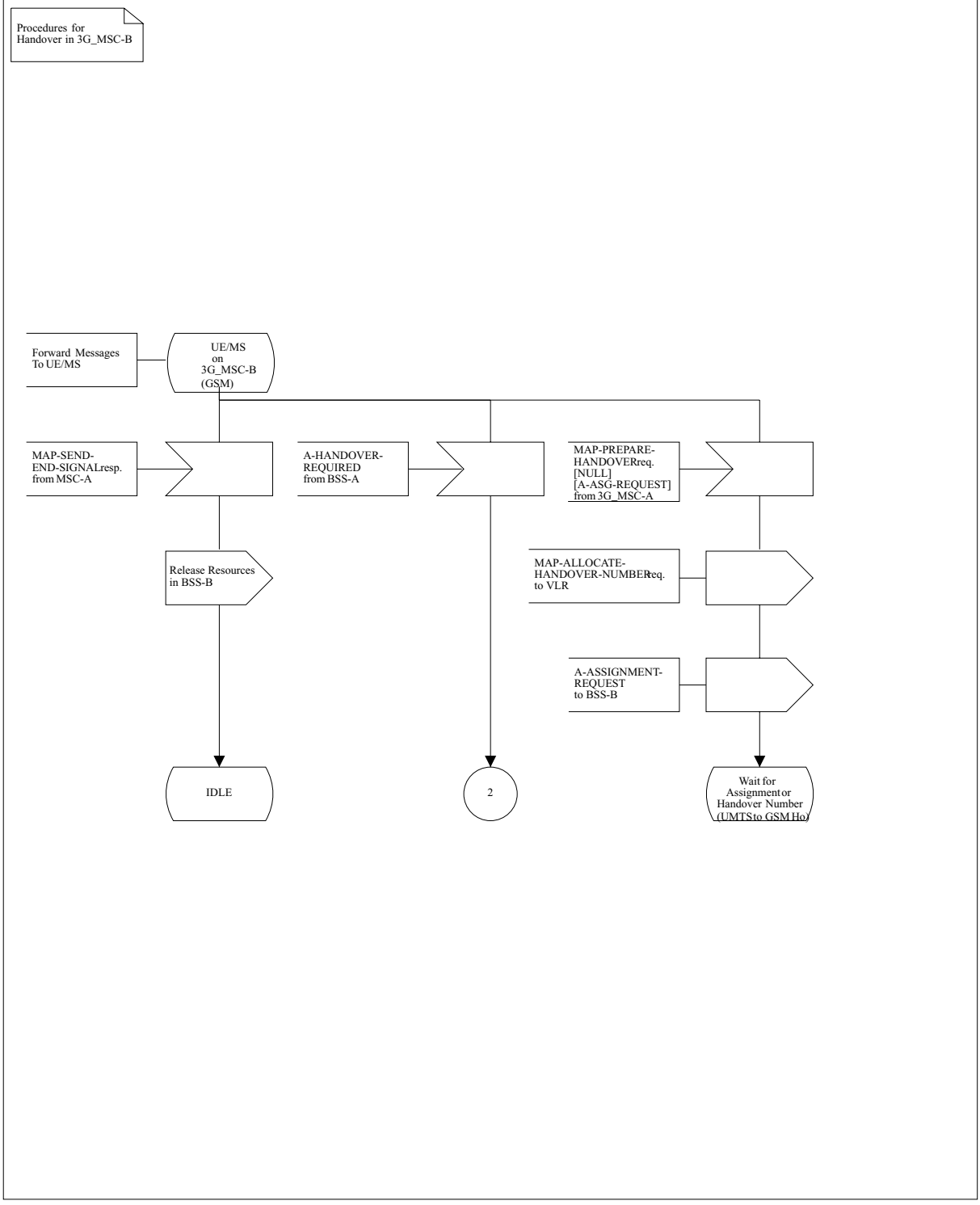



Figure 44 (Sheet 14 of 54): Handover control procedure in 3G_MSC-B

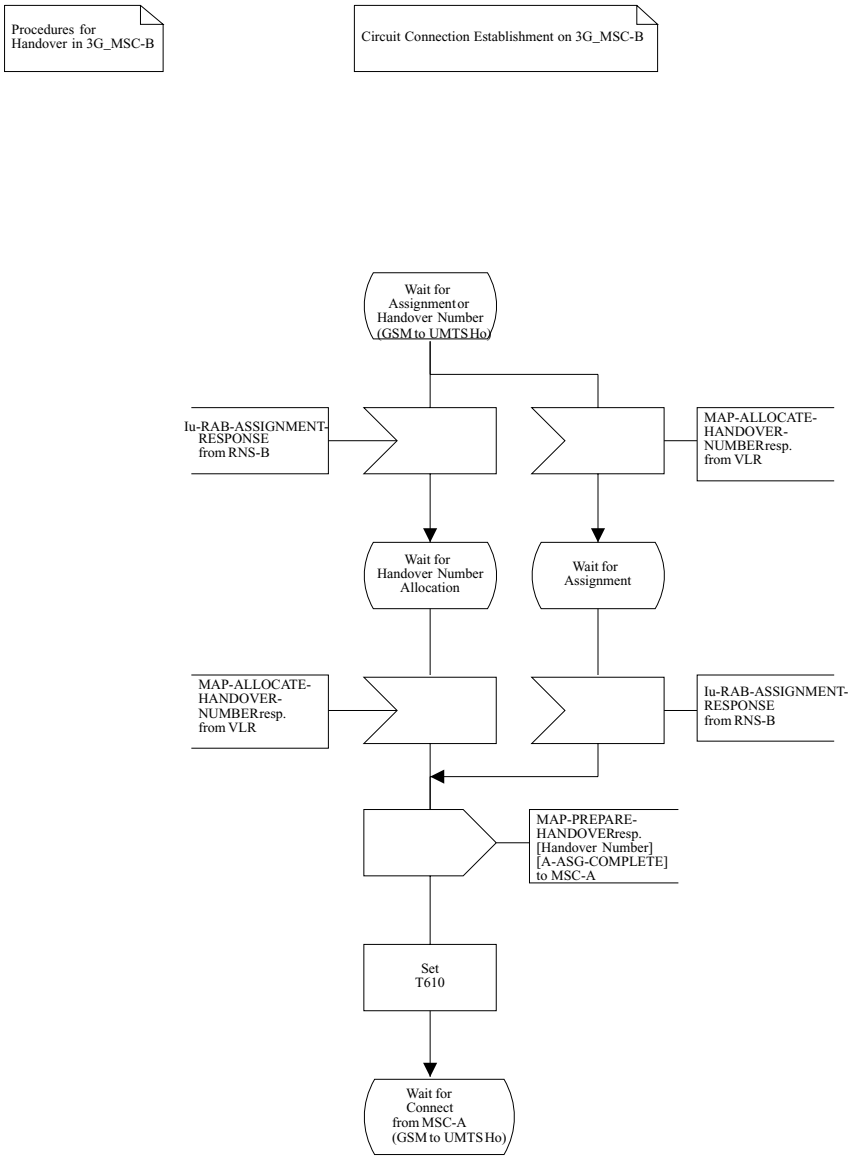



Figure 44 (Sheet 15 of 54): Handover control procedure in 3G_MSC-B

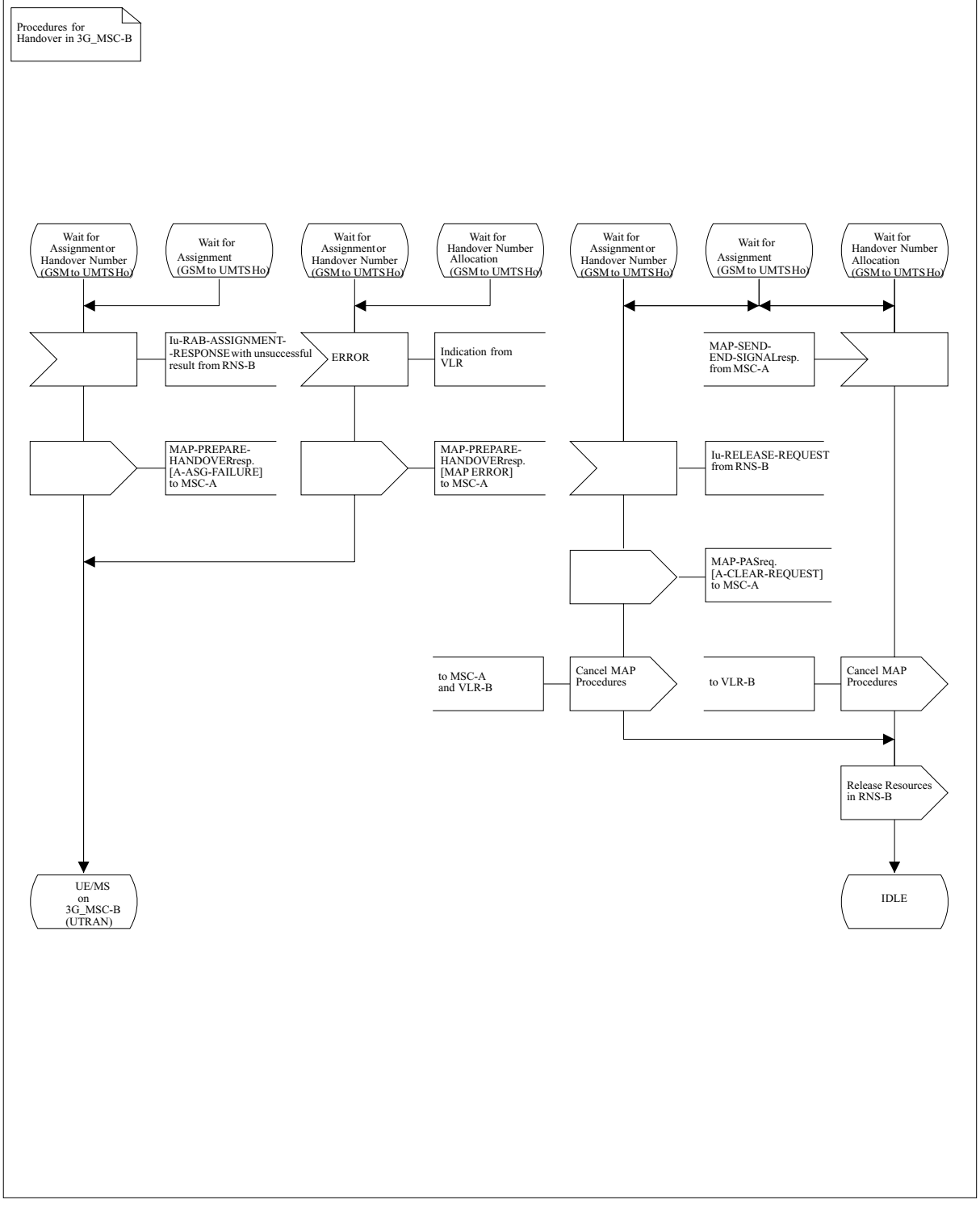



Figure 44 (Sheet 16 of 54): Handover control procedure in 3G_MSC-B

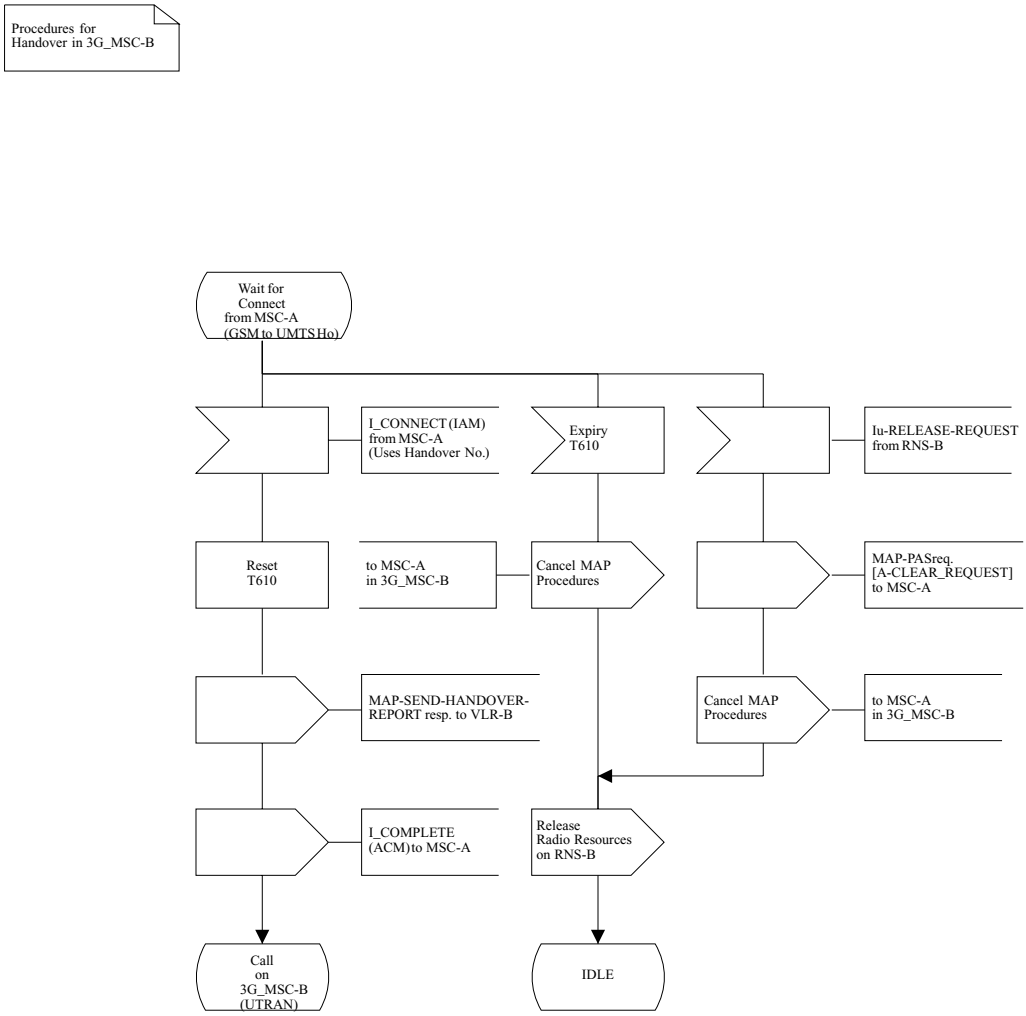



Figure 44 (Sheet 17 of 54): Handover control procedure in 3G_MSC-B

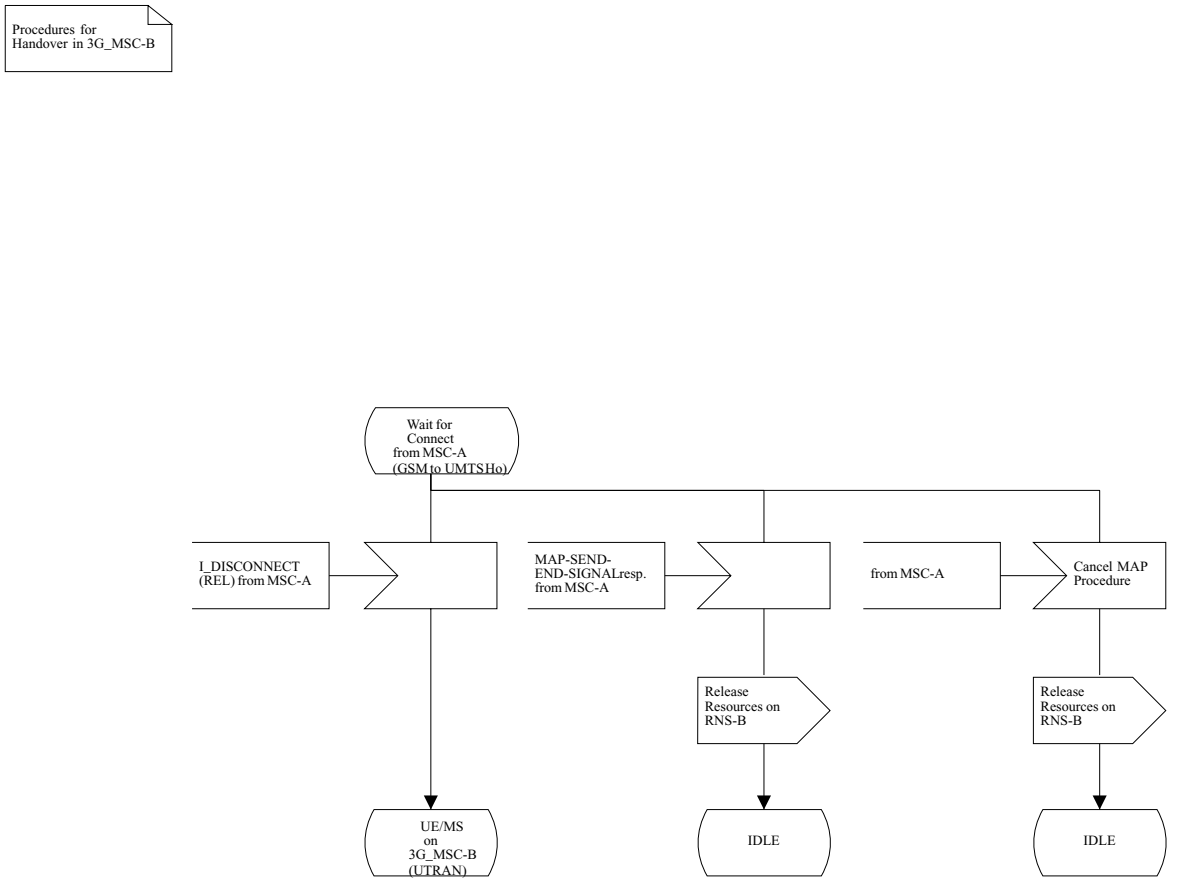



Figure 44 (Sheet 18 of 54): Handover control procedure in 3G_MSC-B

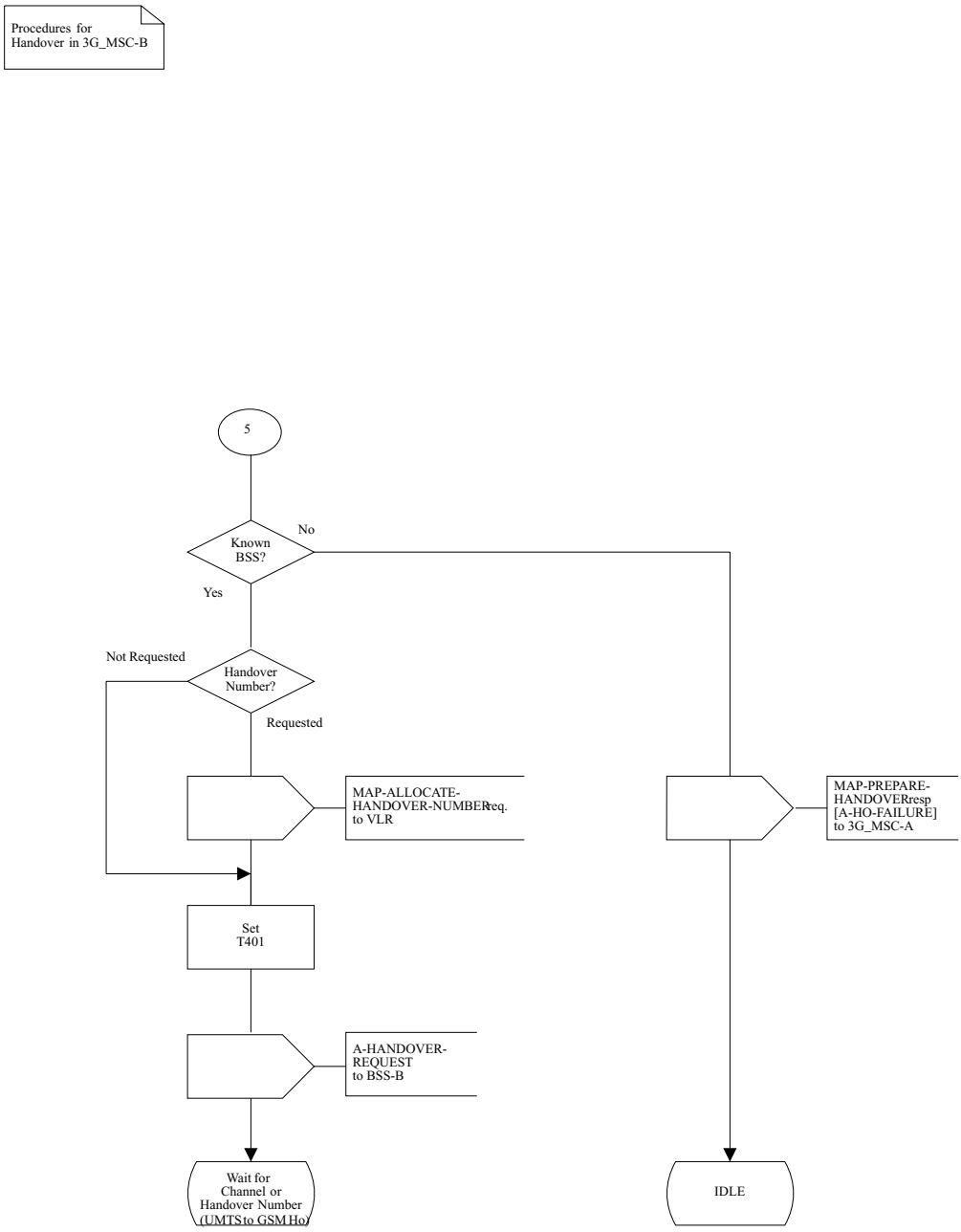



Figure 44 (Sheet 19 of 54): Handover control procedure in 3G_MSC-B

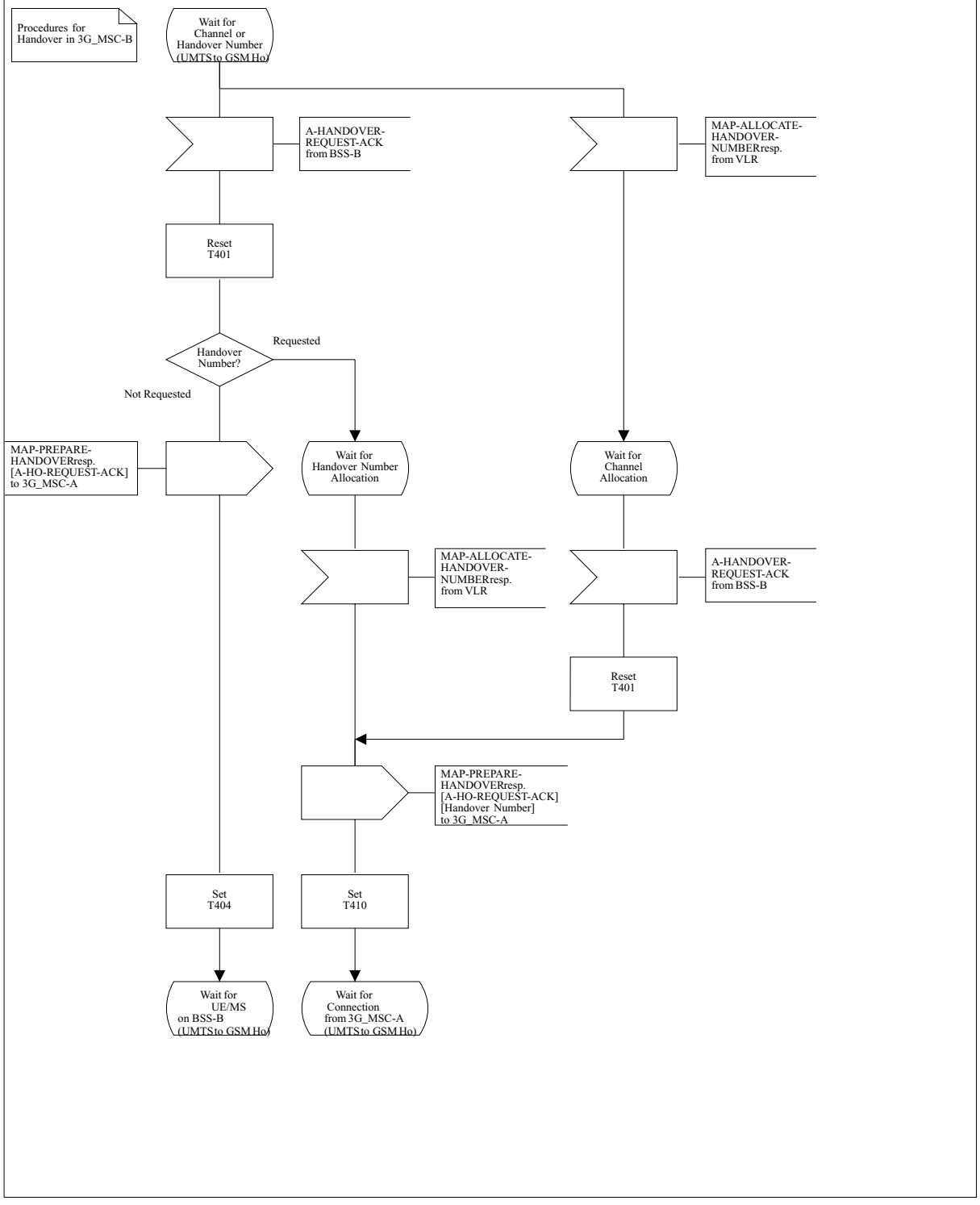



Figure 44 (Sheet 20 of 54): Handover control procedure in 3G_MSC-B

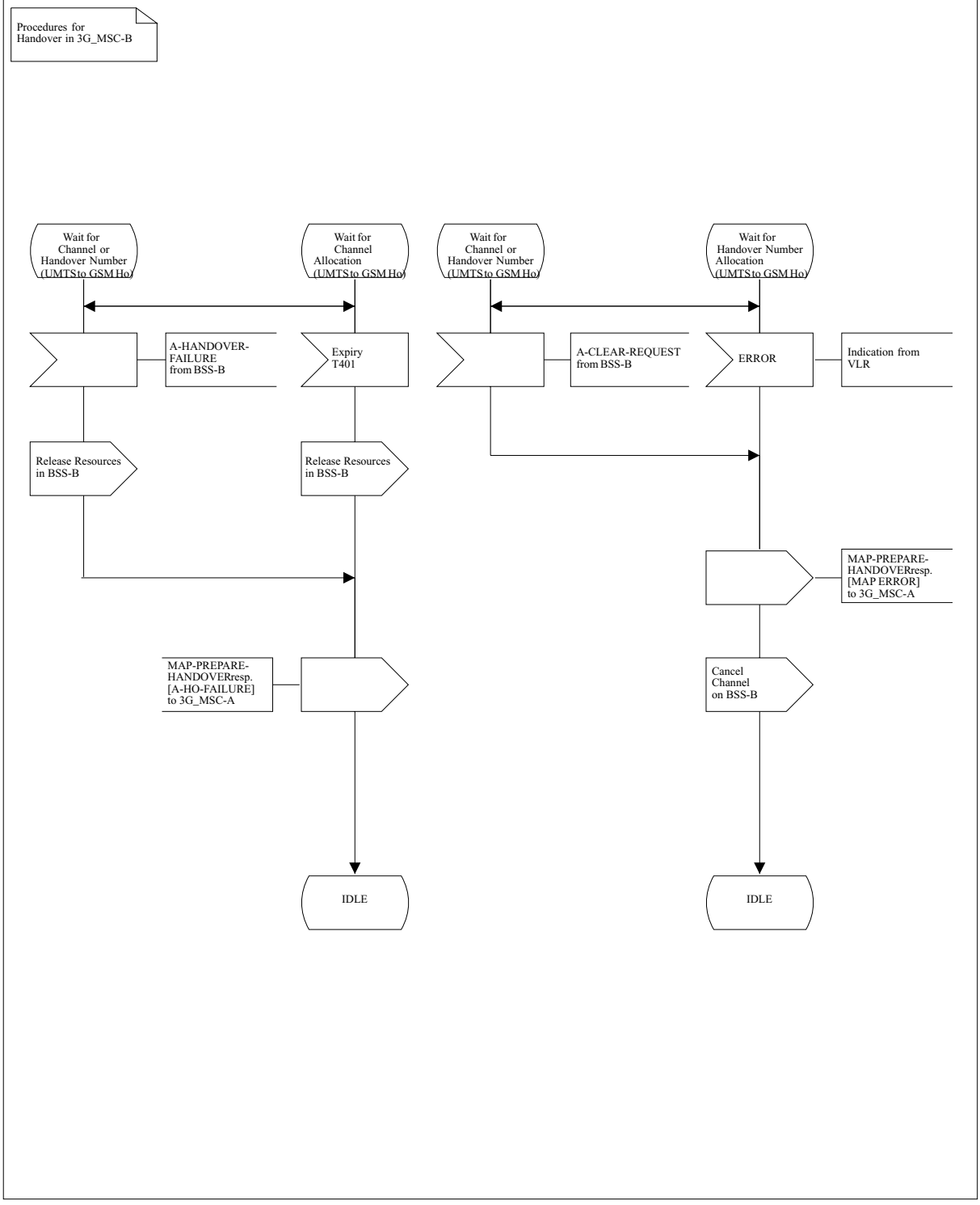



Figure 44 (Sheet 21 of 54): Handover control procedure in 3G_MSC-B

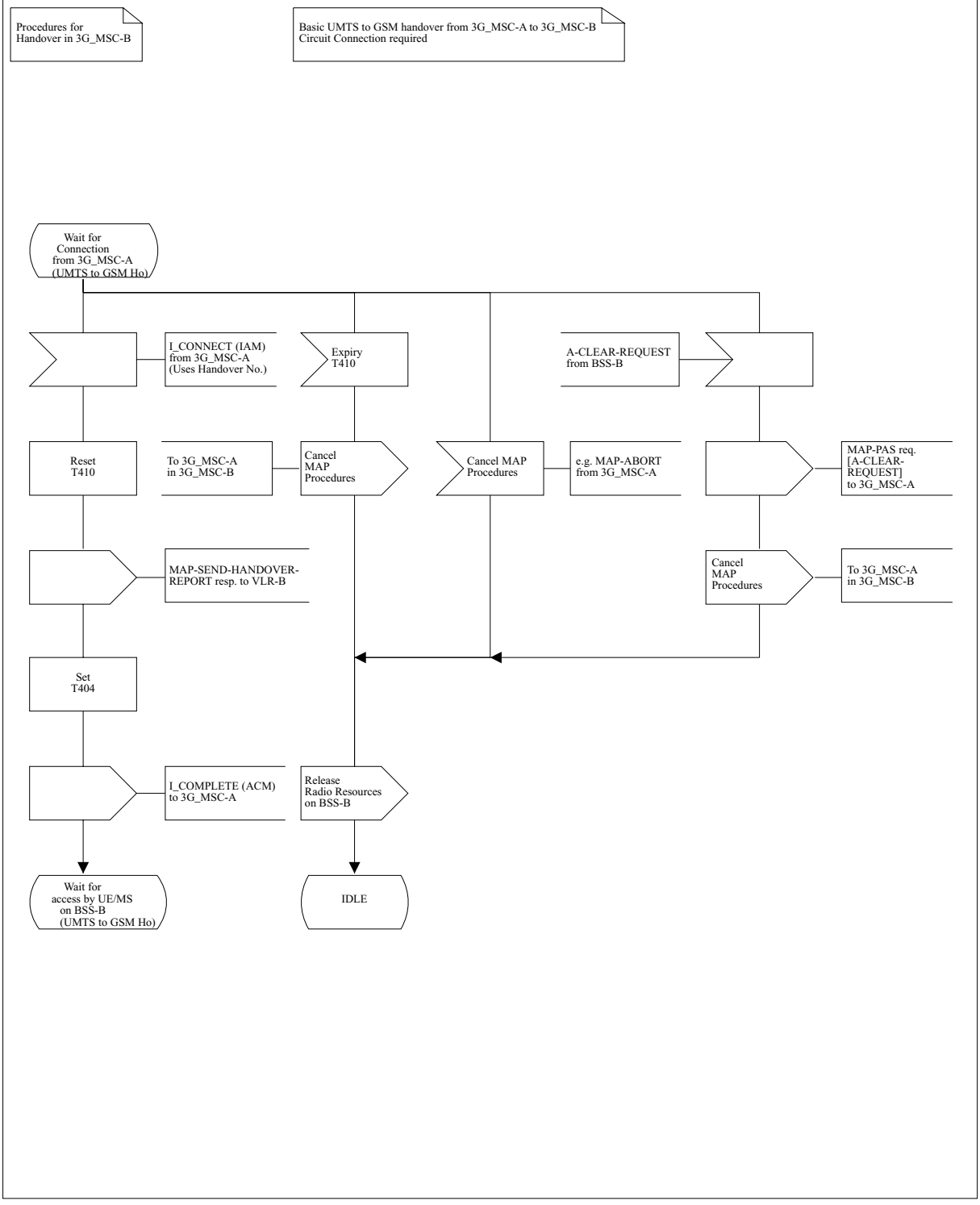



Figure 44 (Sheet 22 of 54): Handover control procedure in 3G_MSC-B

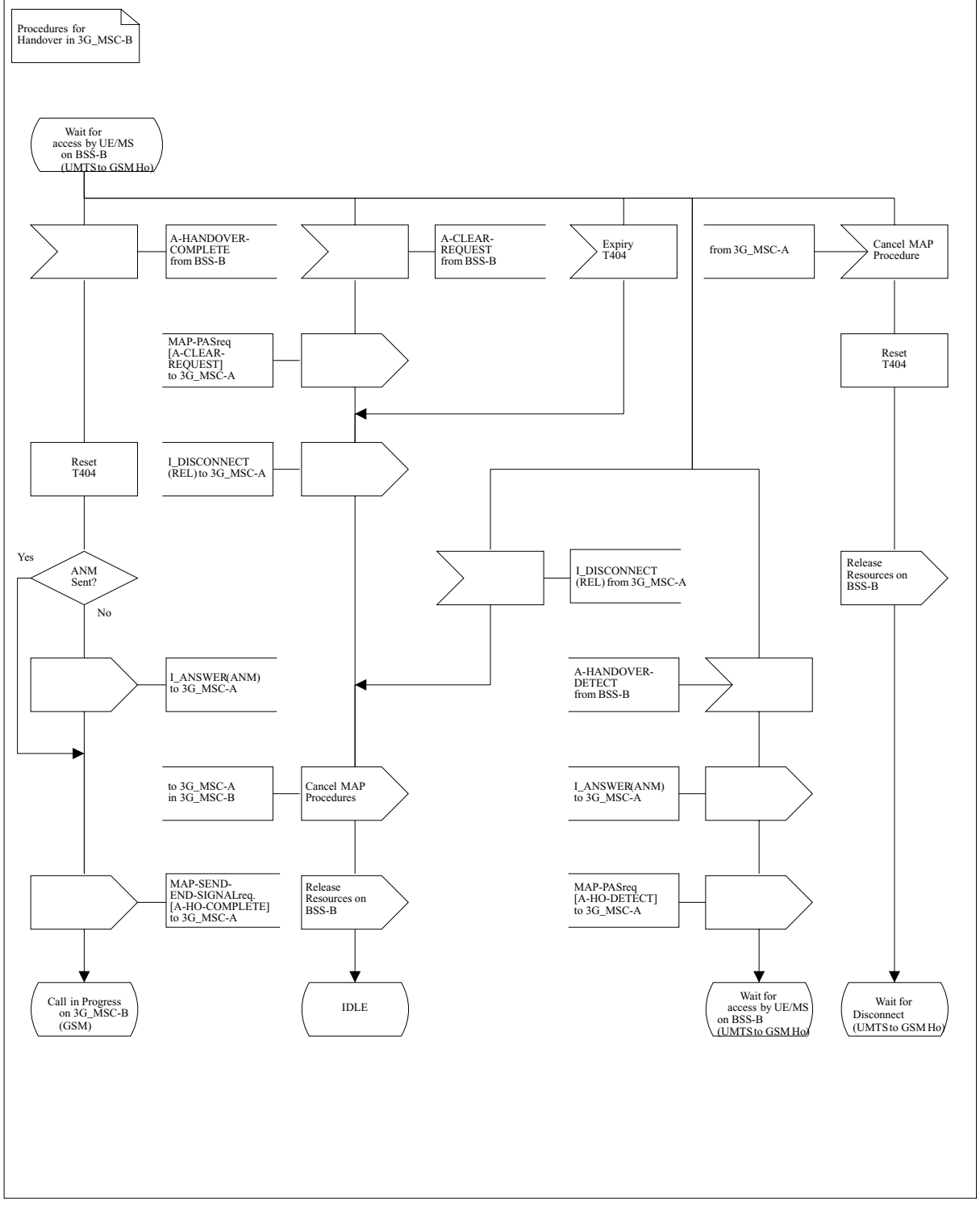



Figure 44 (Sheet 23 of 54): Handover control procedure in 3G_MSC-B

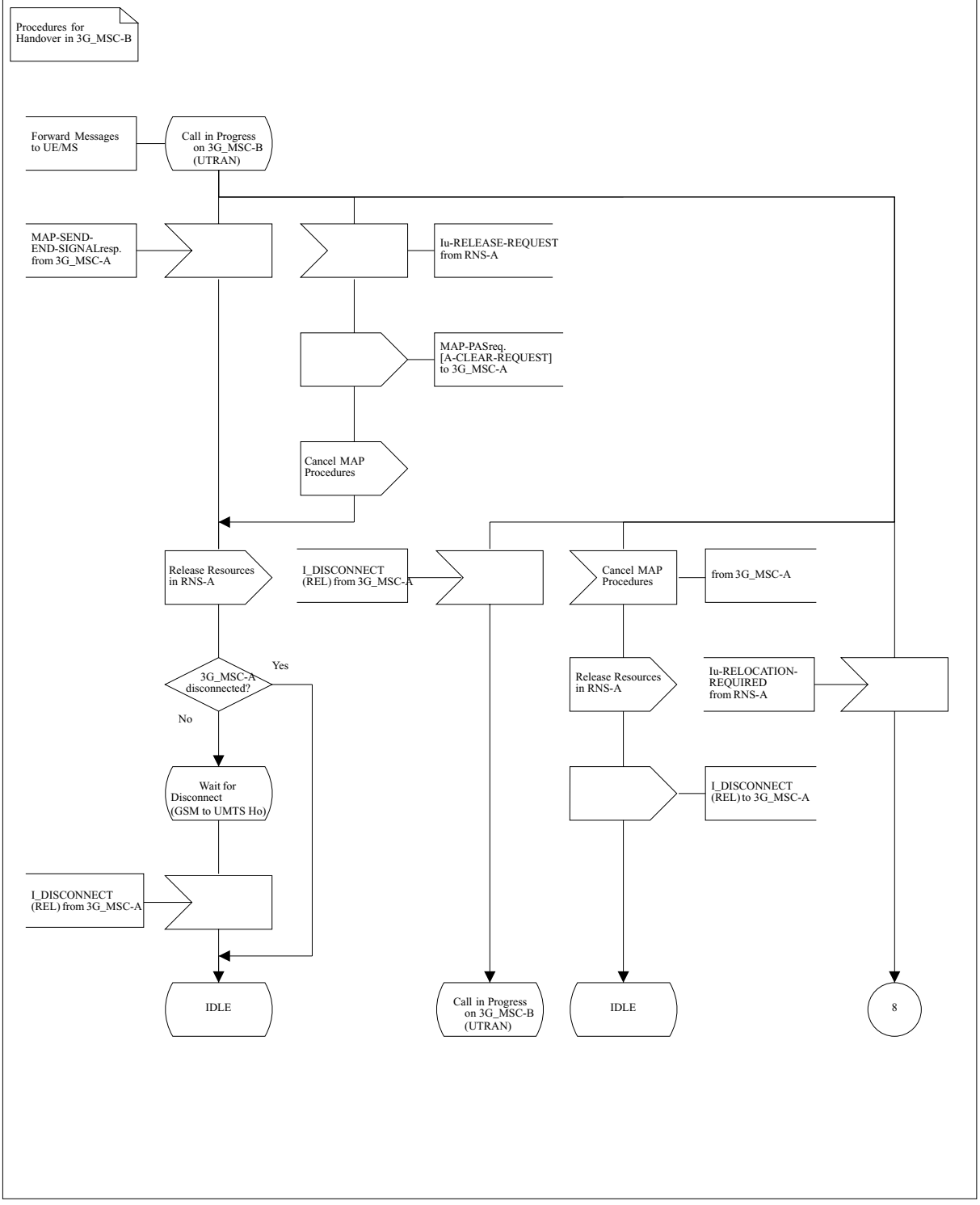



Figure 44 (Sheet 24 of 54): Handover control procedure in 3G_MSC-B

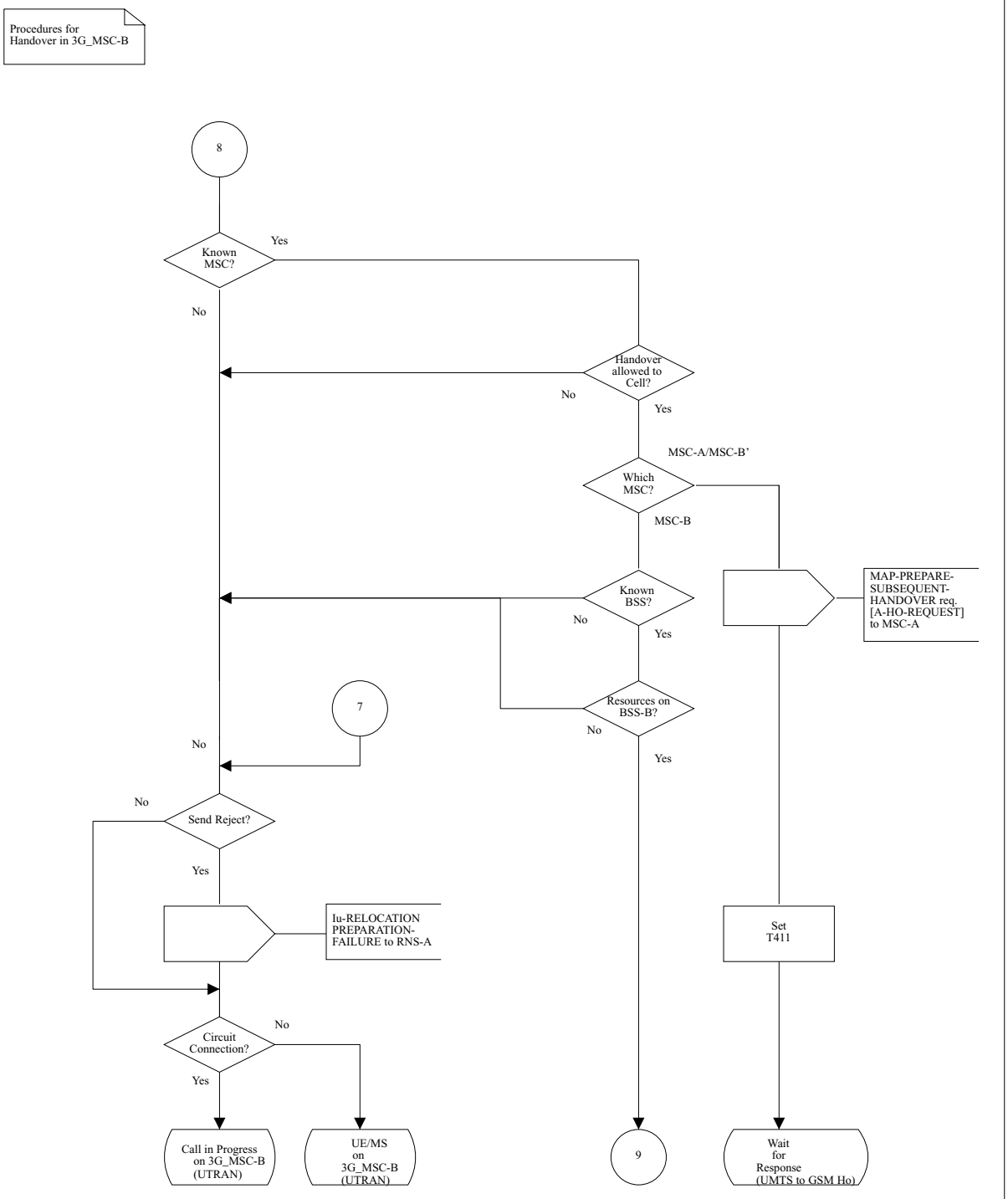



Figure 44 (Sheet 25 of 54): Handover control procedure in 3G_MSC-B

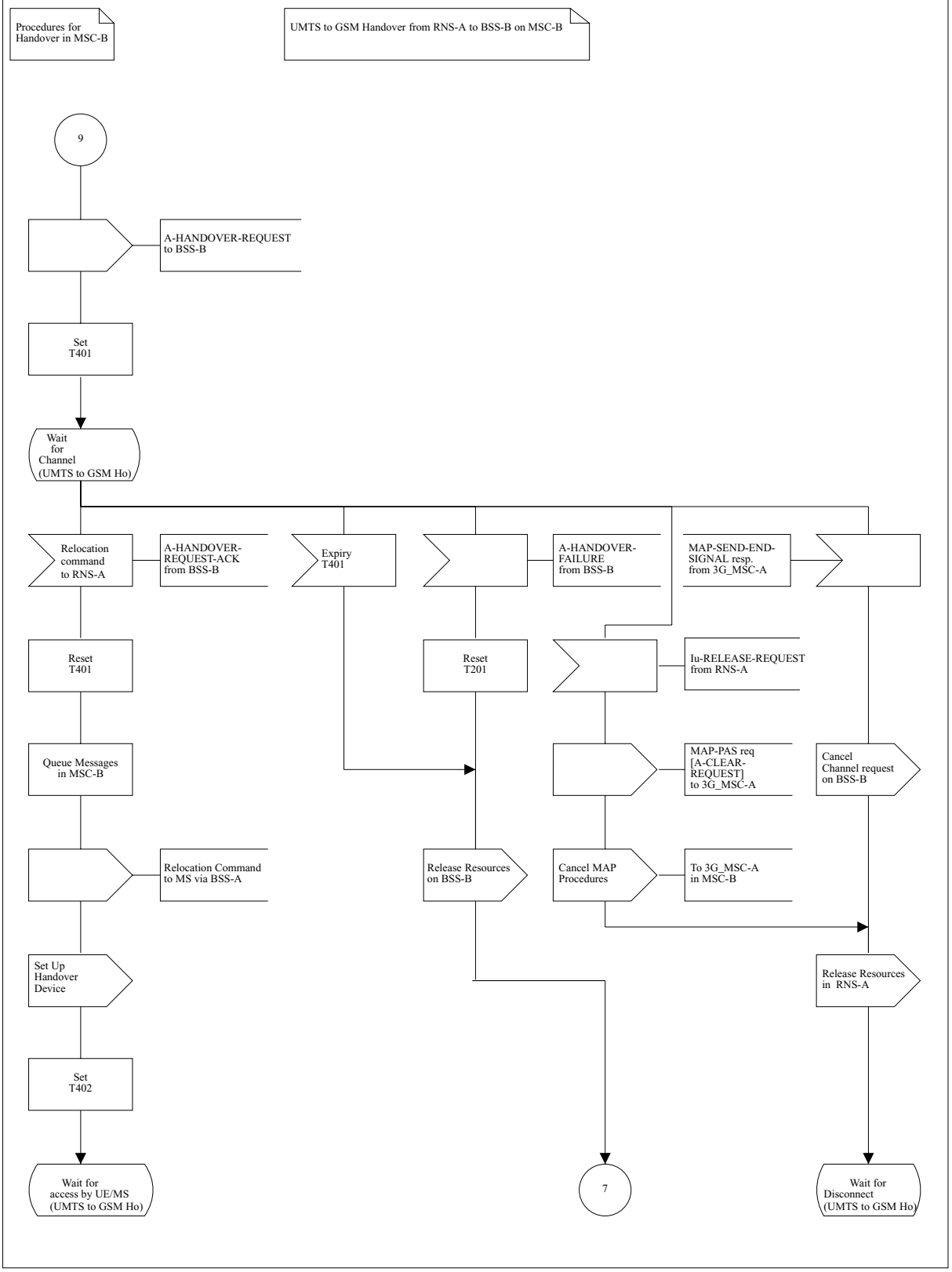



Figure 44 (Sheet 26 of 54): Handover control procedure in 3G_MSC-B

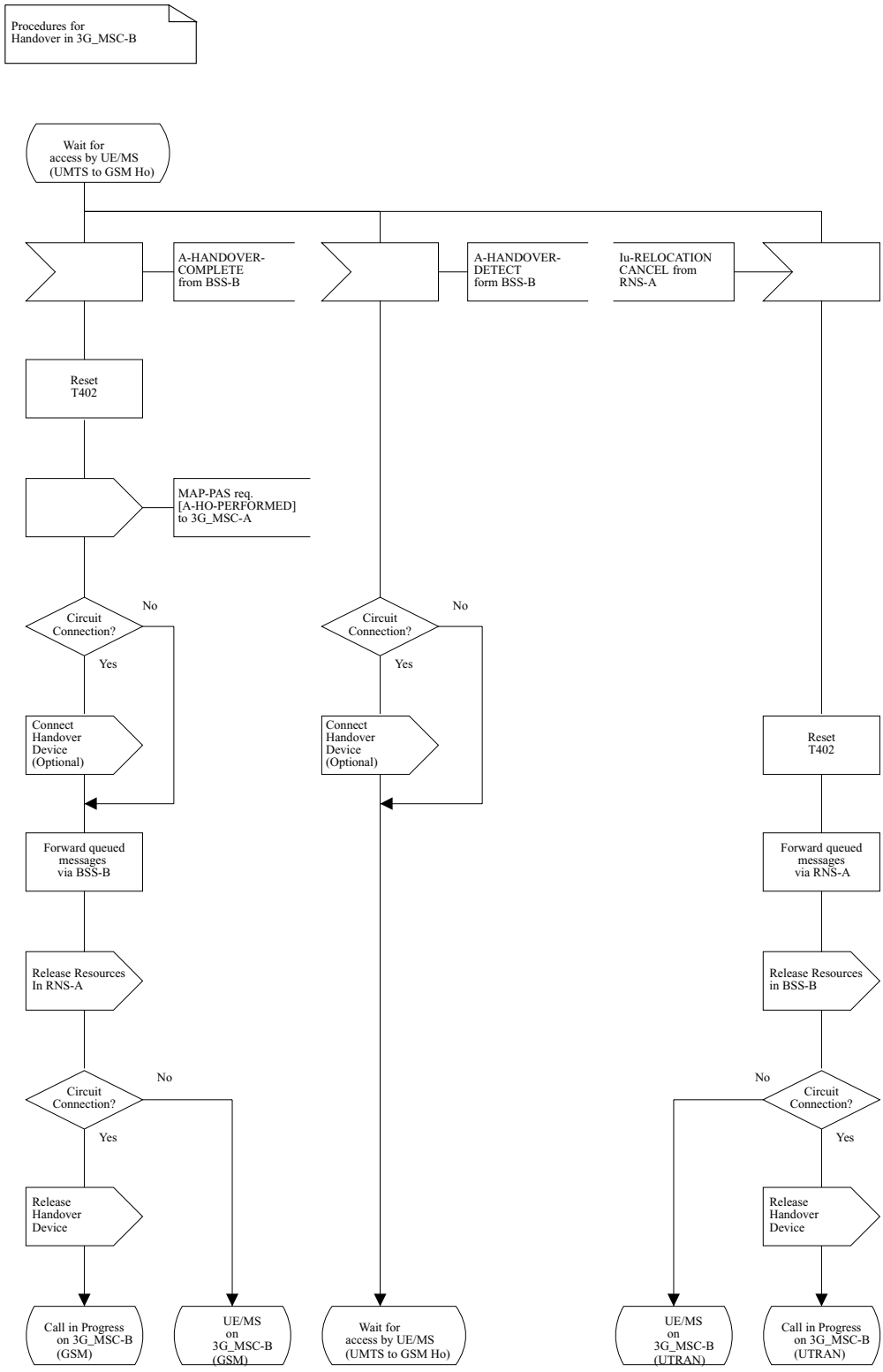



Figure 44 (Sheet 27 of 54): Handover control procedure in 3G_MSC-B

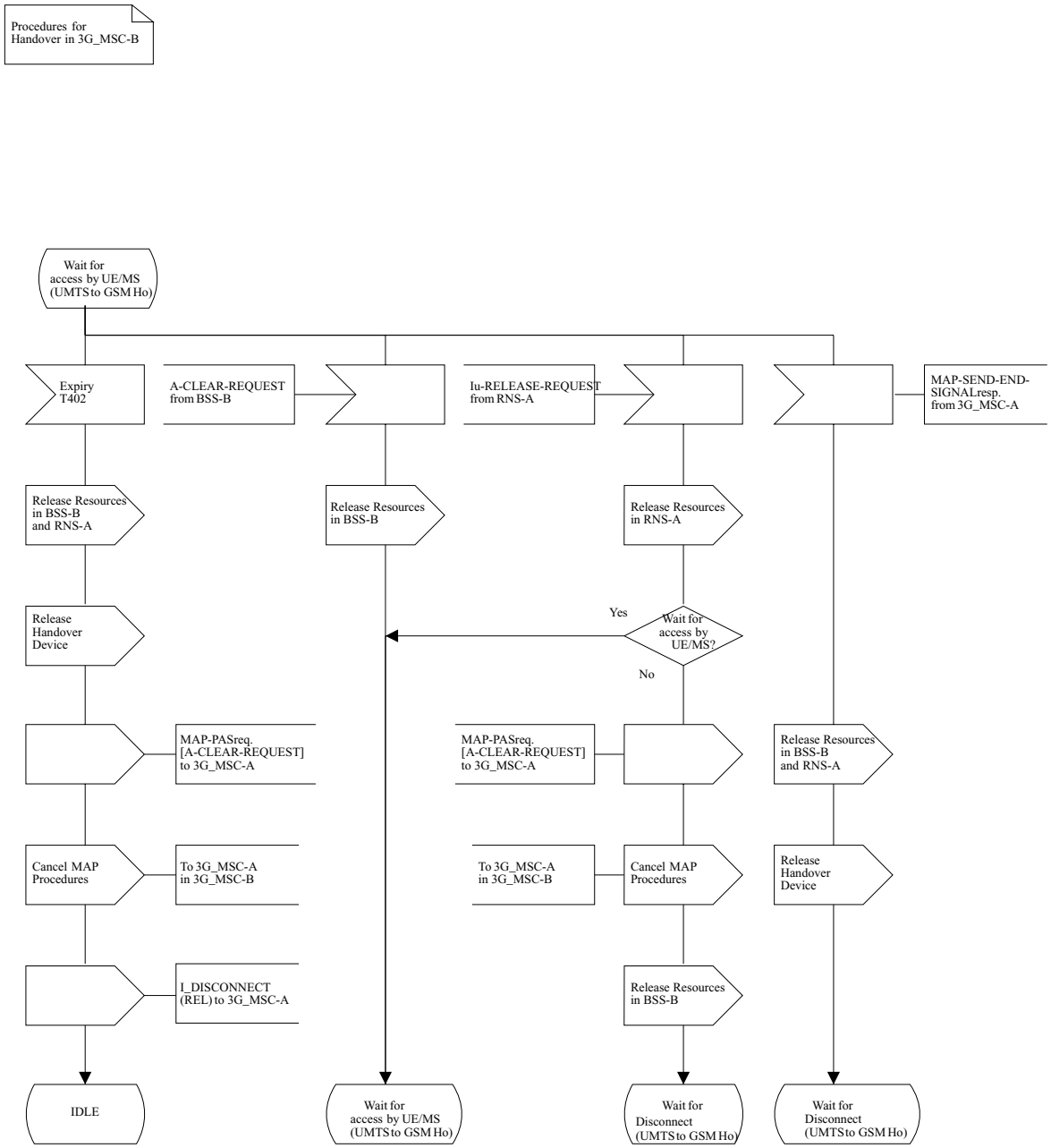



Figure 44 (Sheet 28 of 54): Handover control procedure in 3G_MSC-B

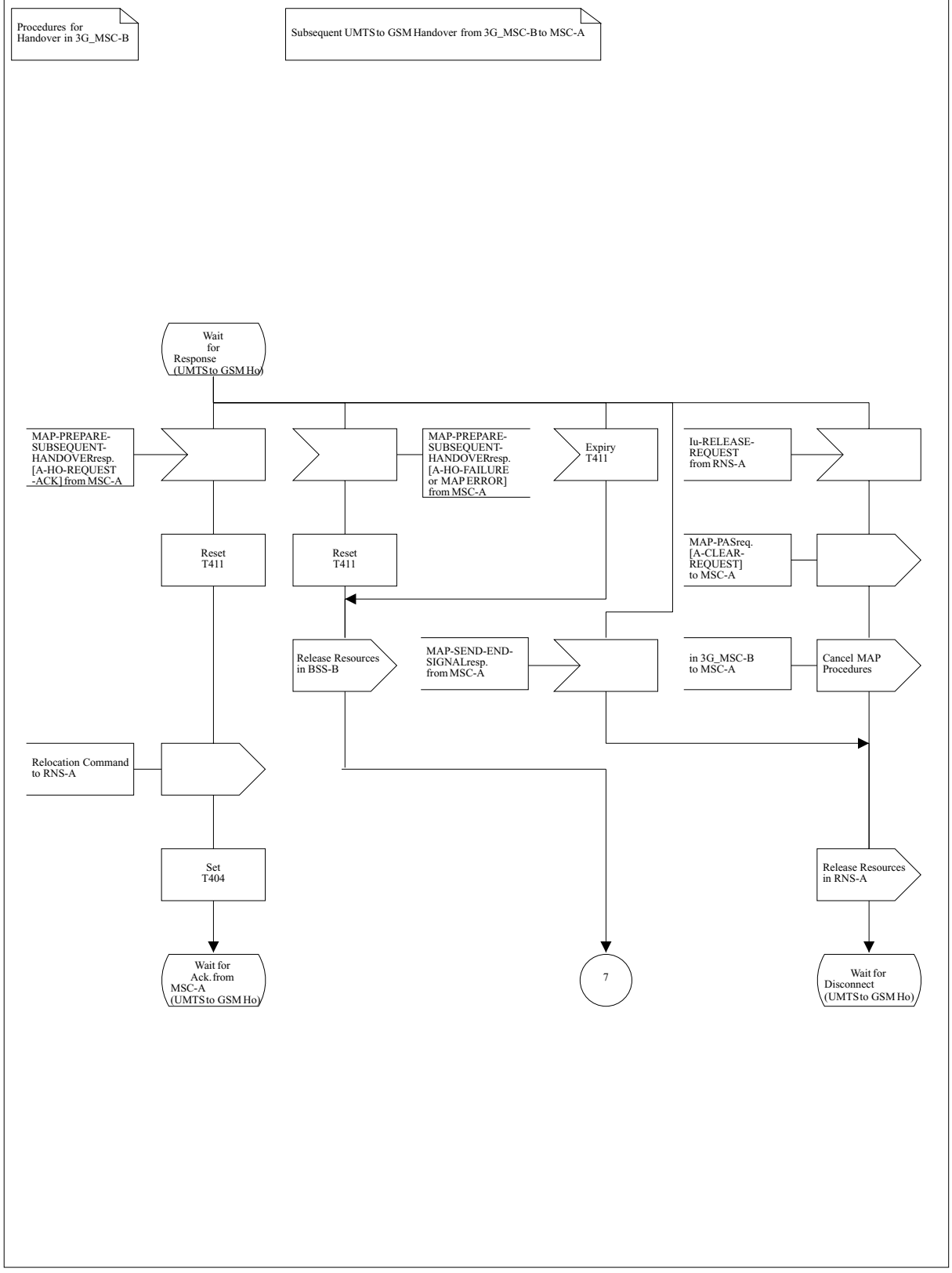



Figure 44 (Sheet 29 of 54): Handover control procedure in 3G_MSC-A

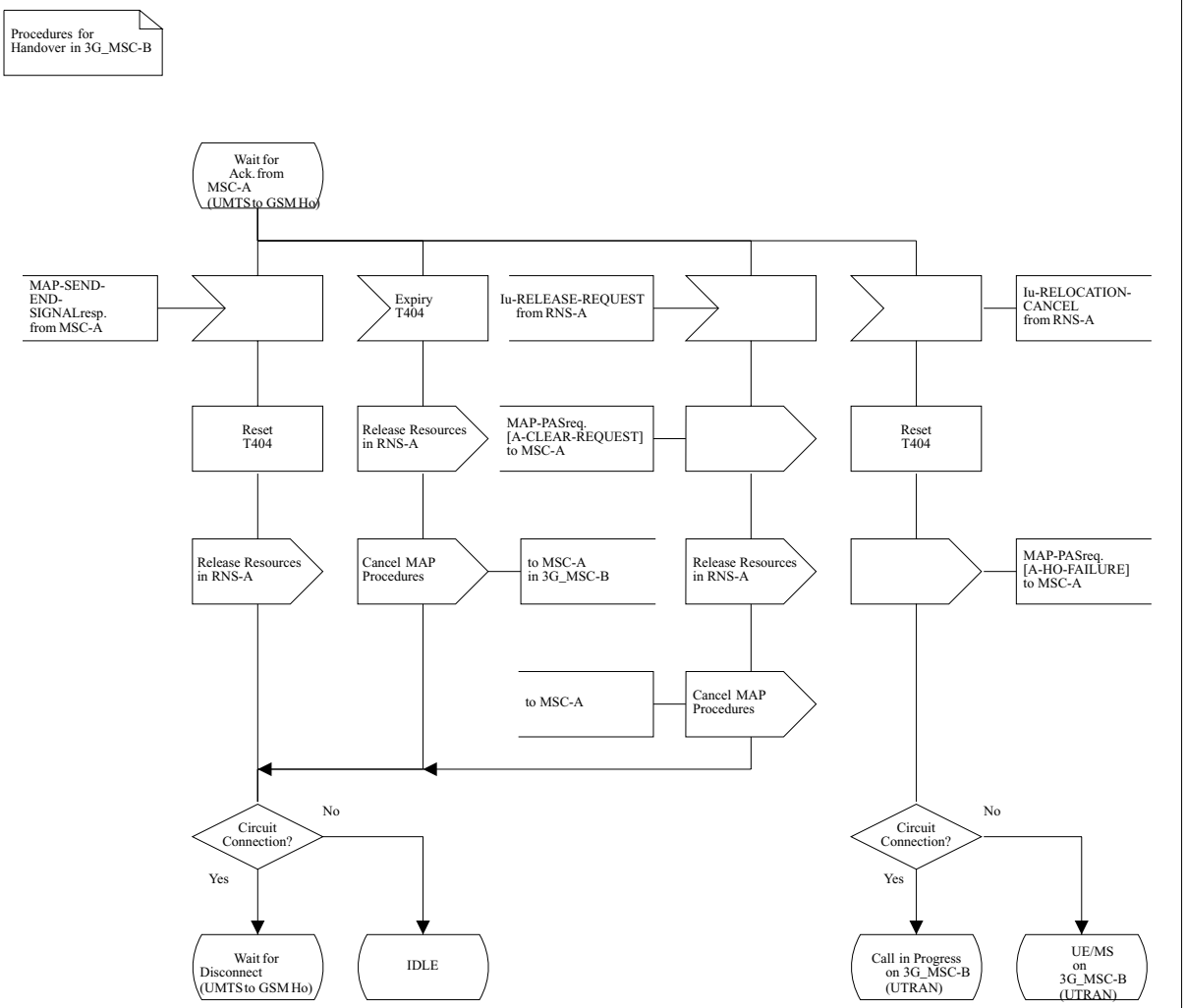



Figure 44 (Sheet 30 of 54): Handover control procedure in 3G_MSC-B

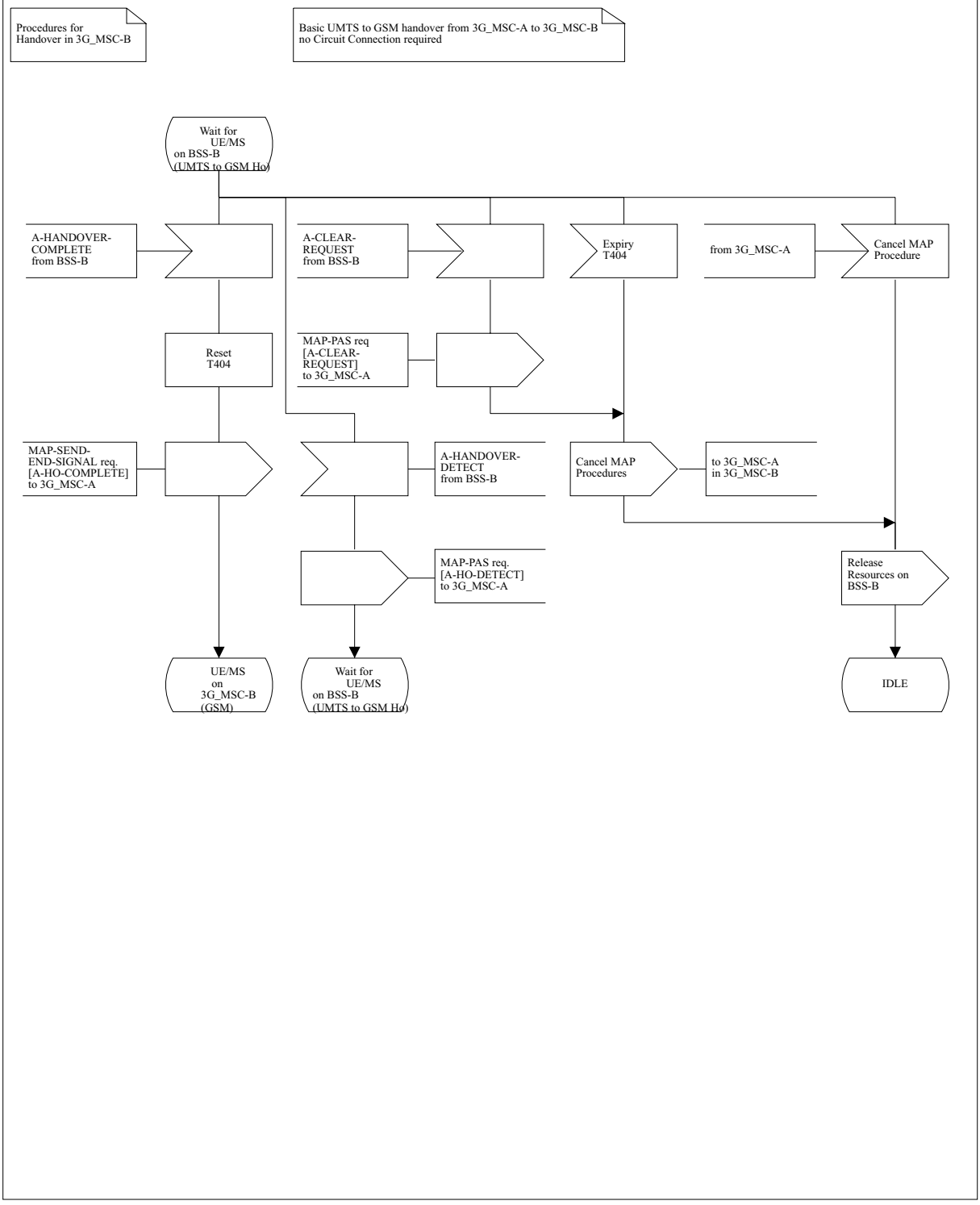



Figure 44 (Sheet 31 of 54): Handover control procedure in 3G_MSC-B

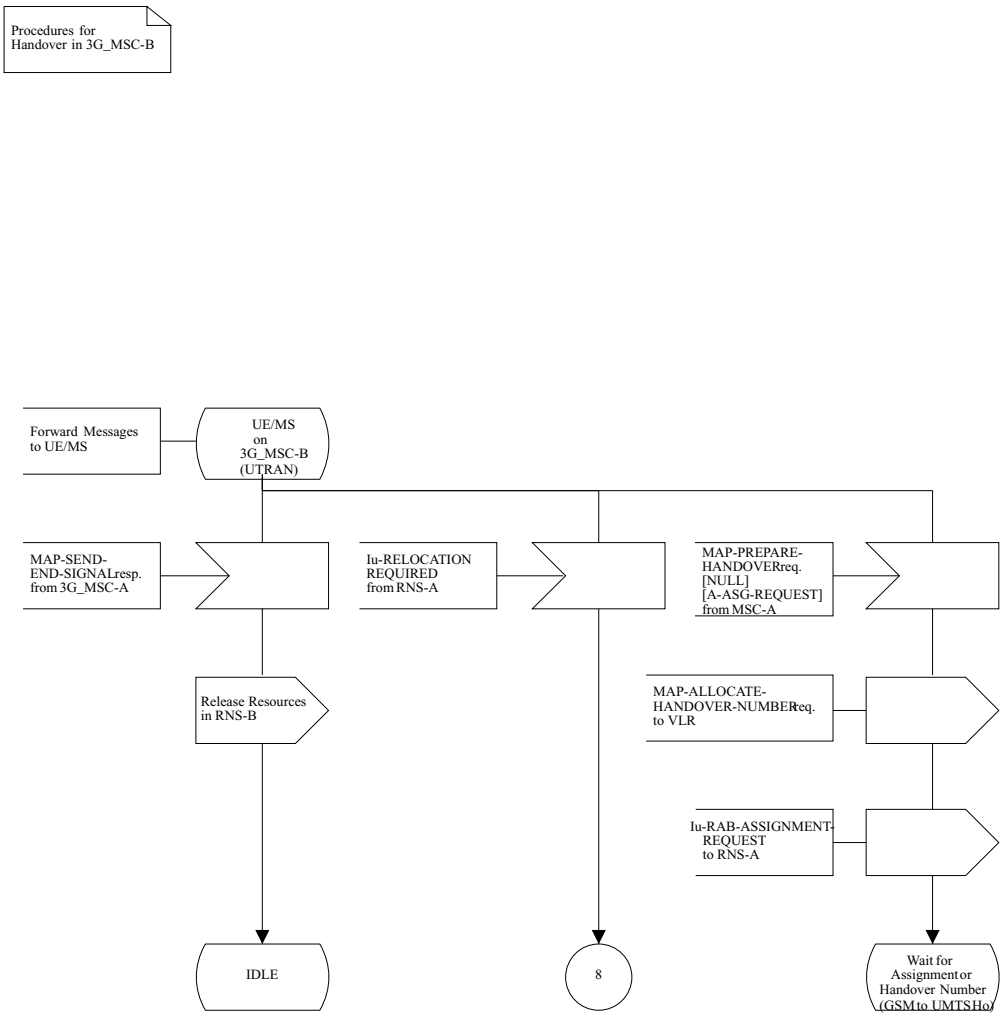



Figure 44 (Sheet 32 of 54): Handover control procedure in 3G_MSC-B

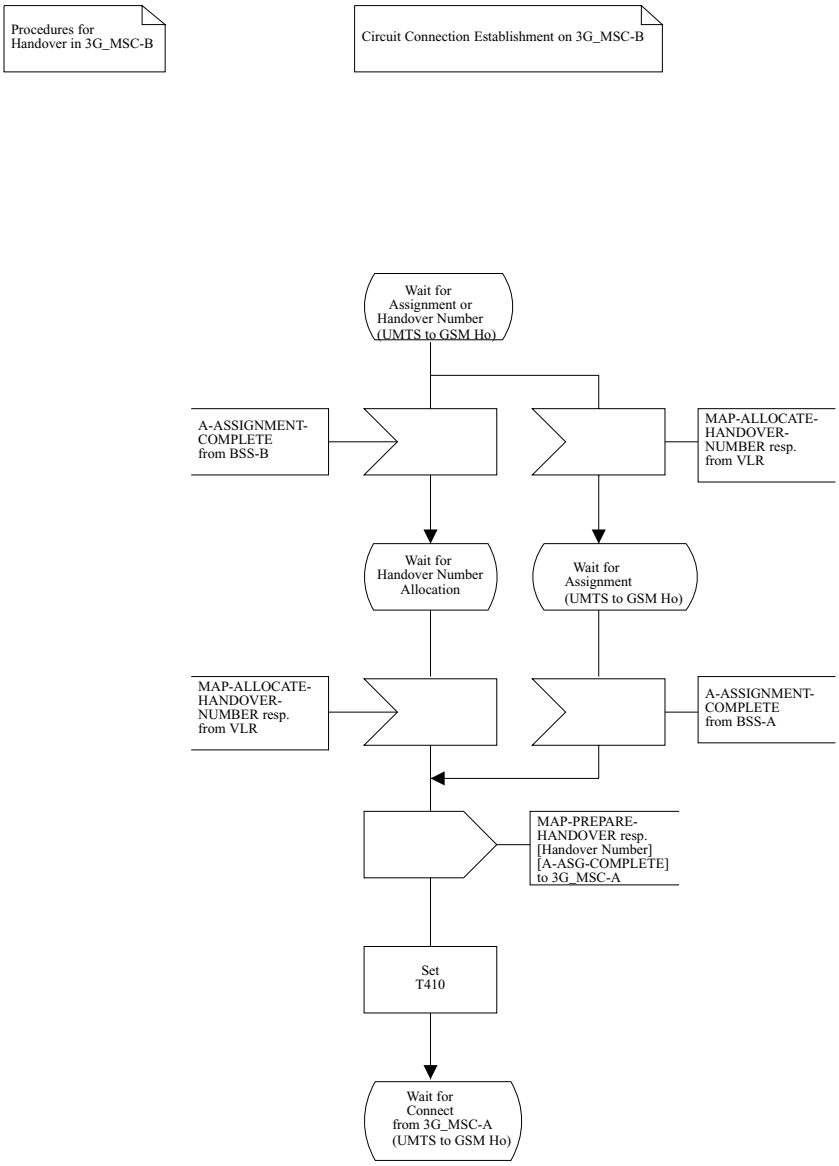



Figure 44 (Sheet 33 of 54): Handover control procedure in 3G_MSC-B

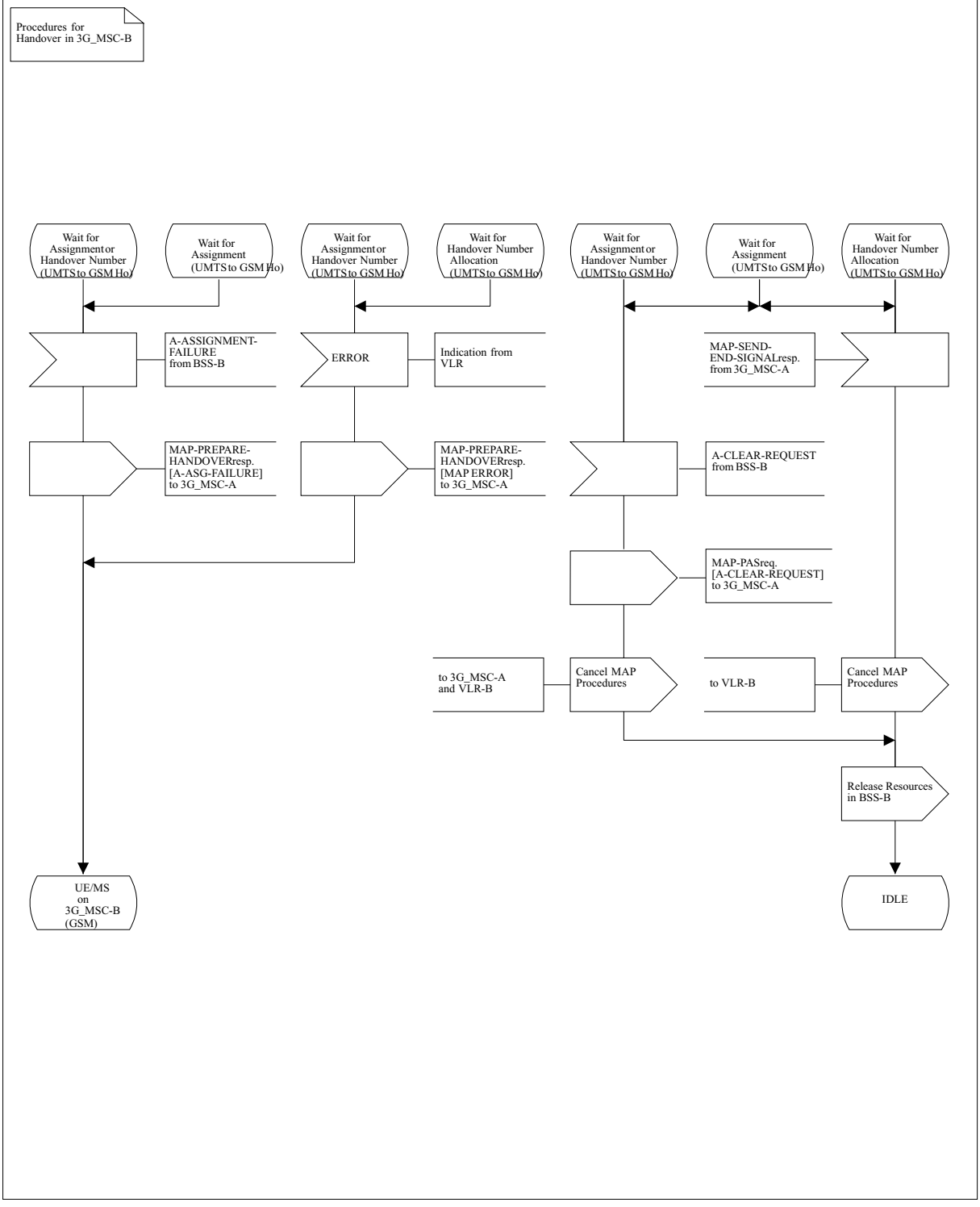



Figure 44 (Sheet 34 of 54): Handover control procedure in 3G_MSC-B

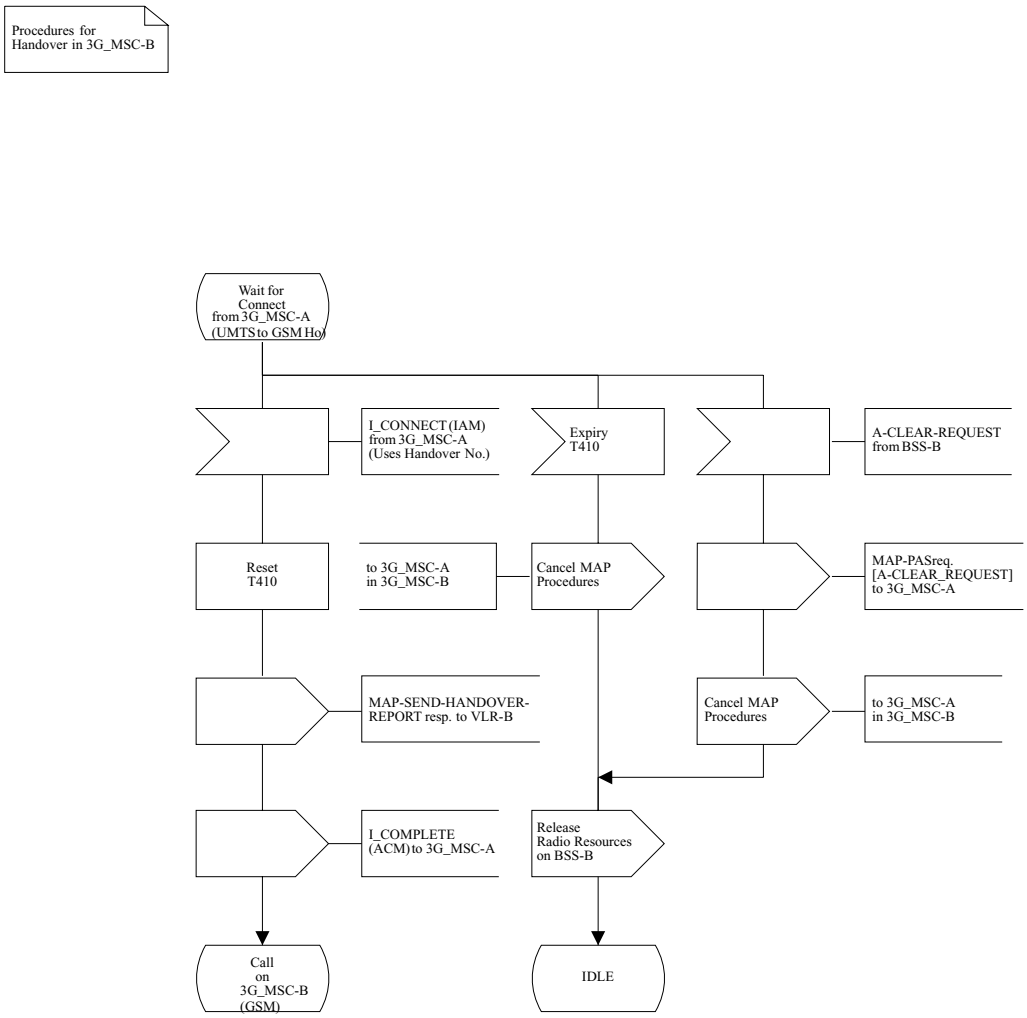



Figure 44 (Sheet 35 of 54): Handover control procedure in 3G_MSC-B

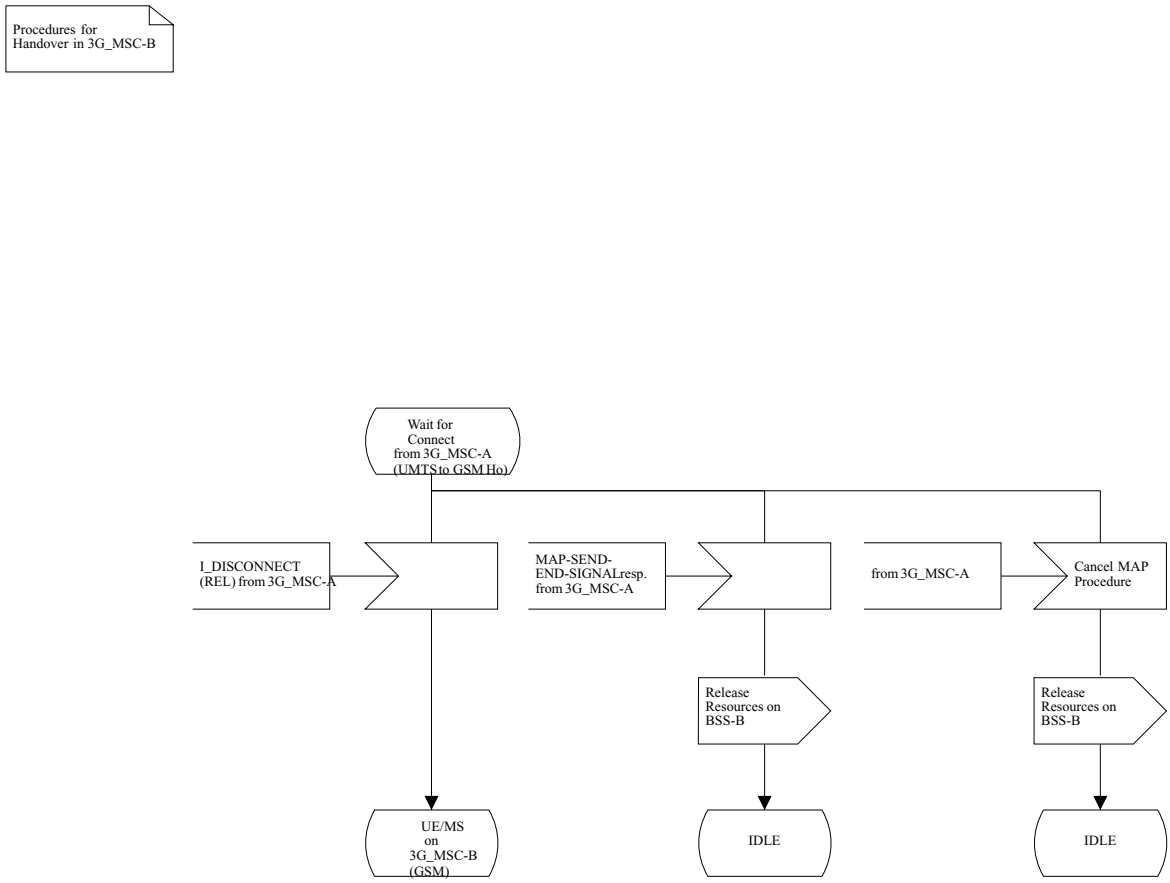



Figure 44 (Sheet 36 of 54): Handover control procedure in 3G_MSC-B

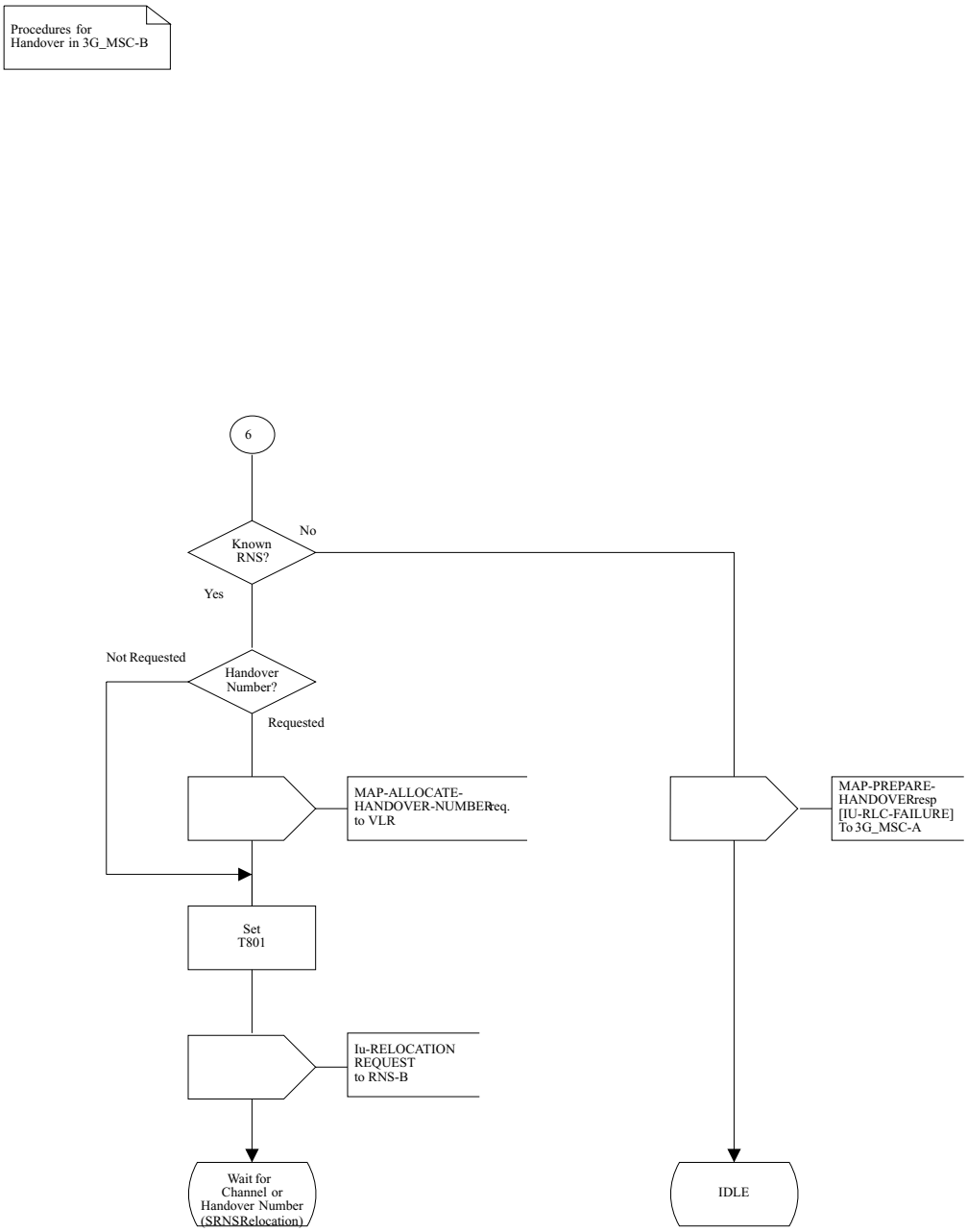



Figure 44 (Sheet 37 of 54): Handover control procedure in 3G_MSC-B

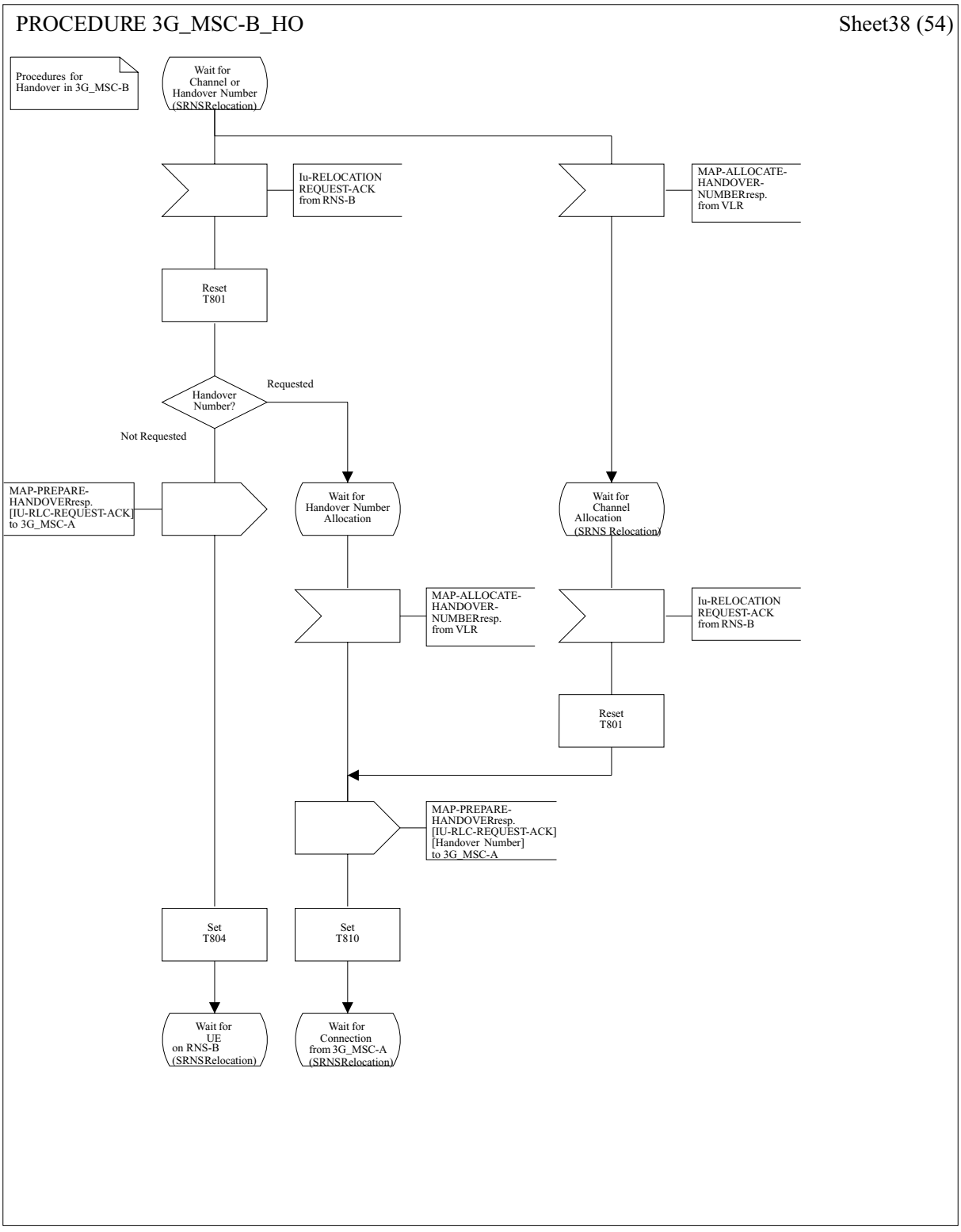



Figure 44 (Sheet 38 of 54): Handover control procedure in 3G_MSC-B

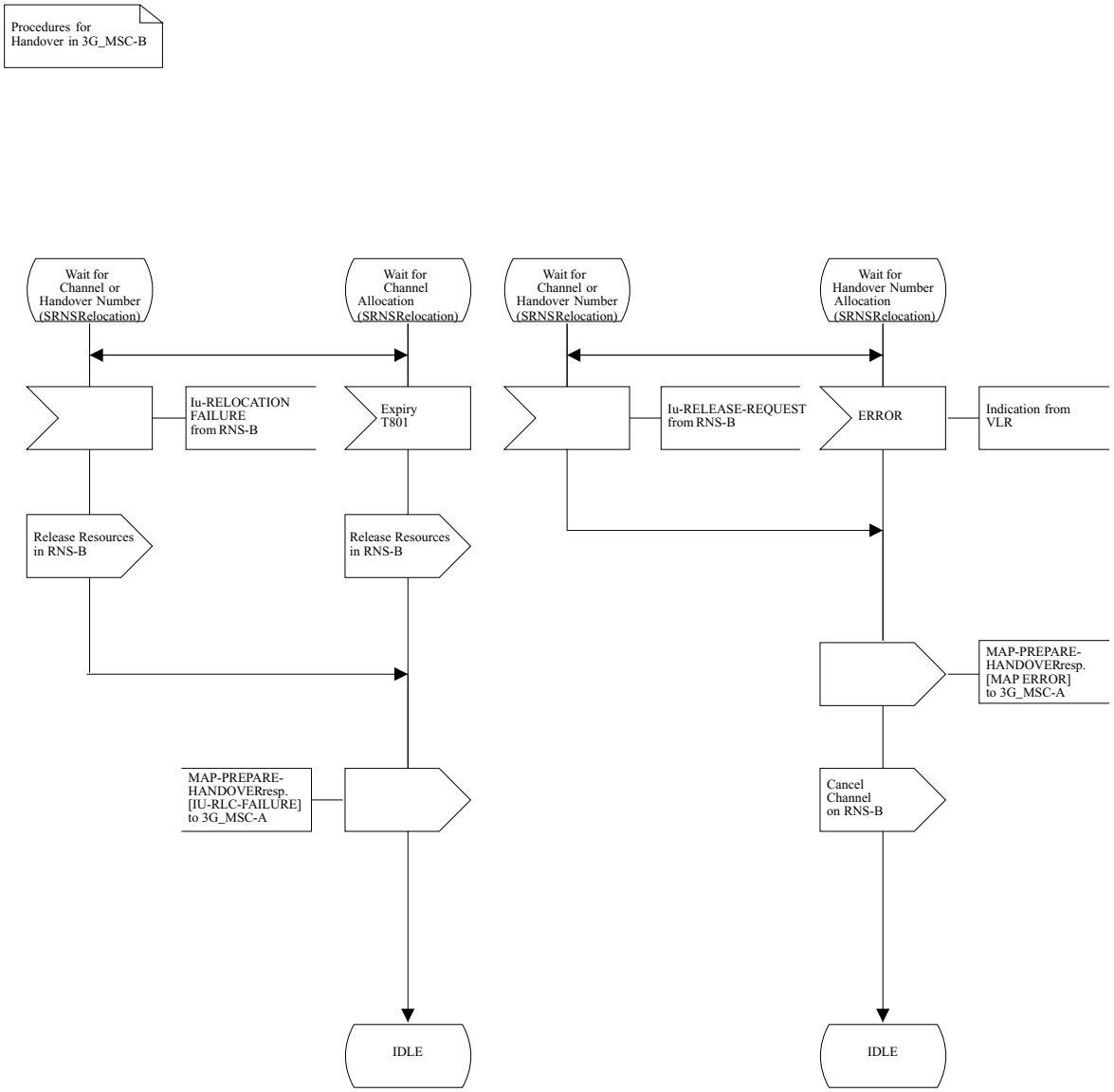



Figure 44 (Sheet 39 of 54): Handover control procedure in 3G_MSC-B

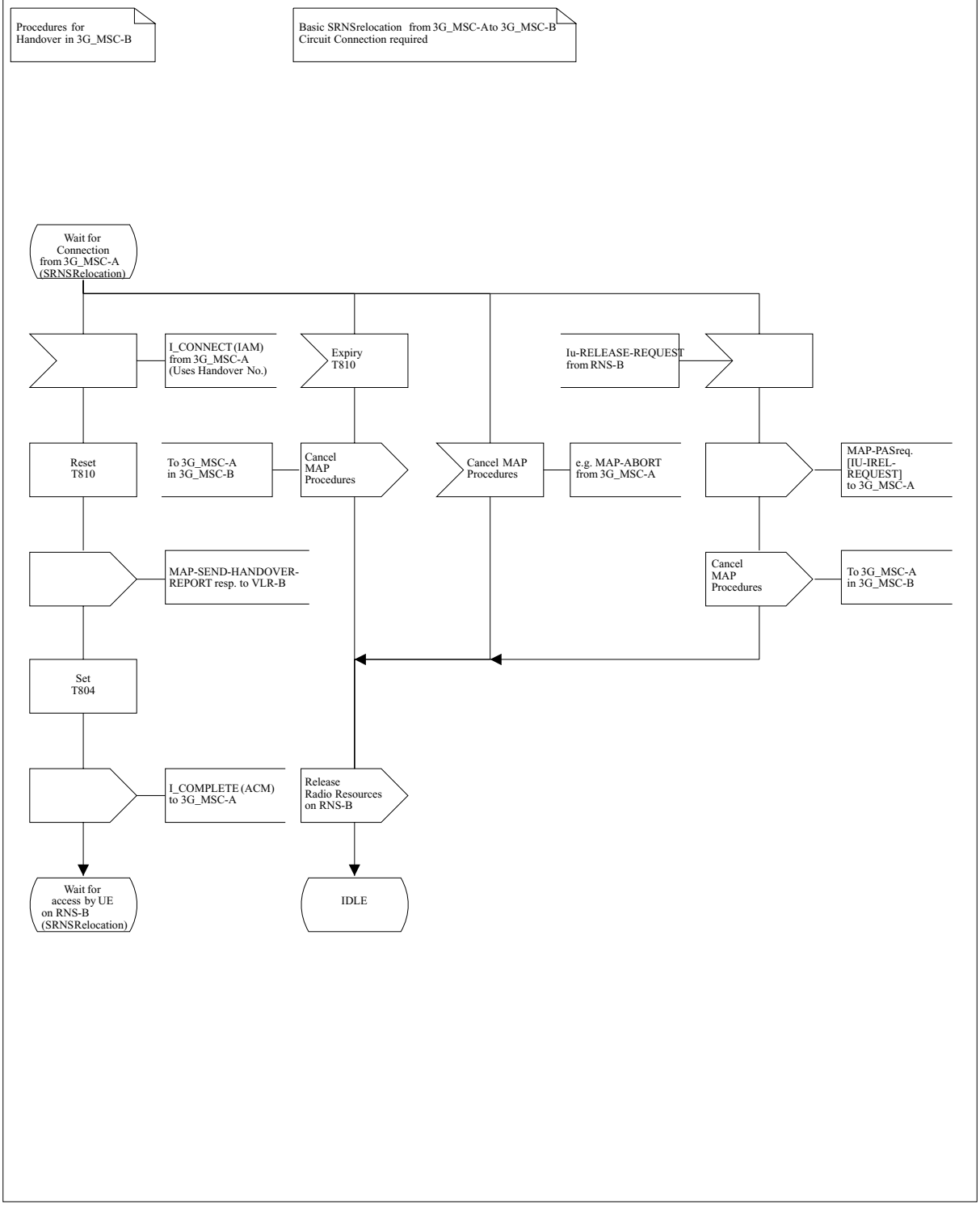



Figure 44 (Sheet 40 of 54): Handover control procedure in 3G_MSC-B

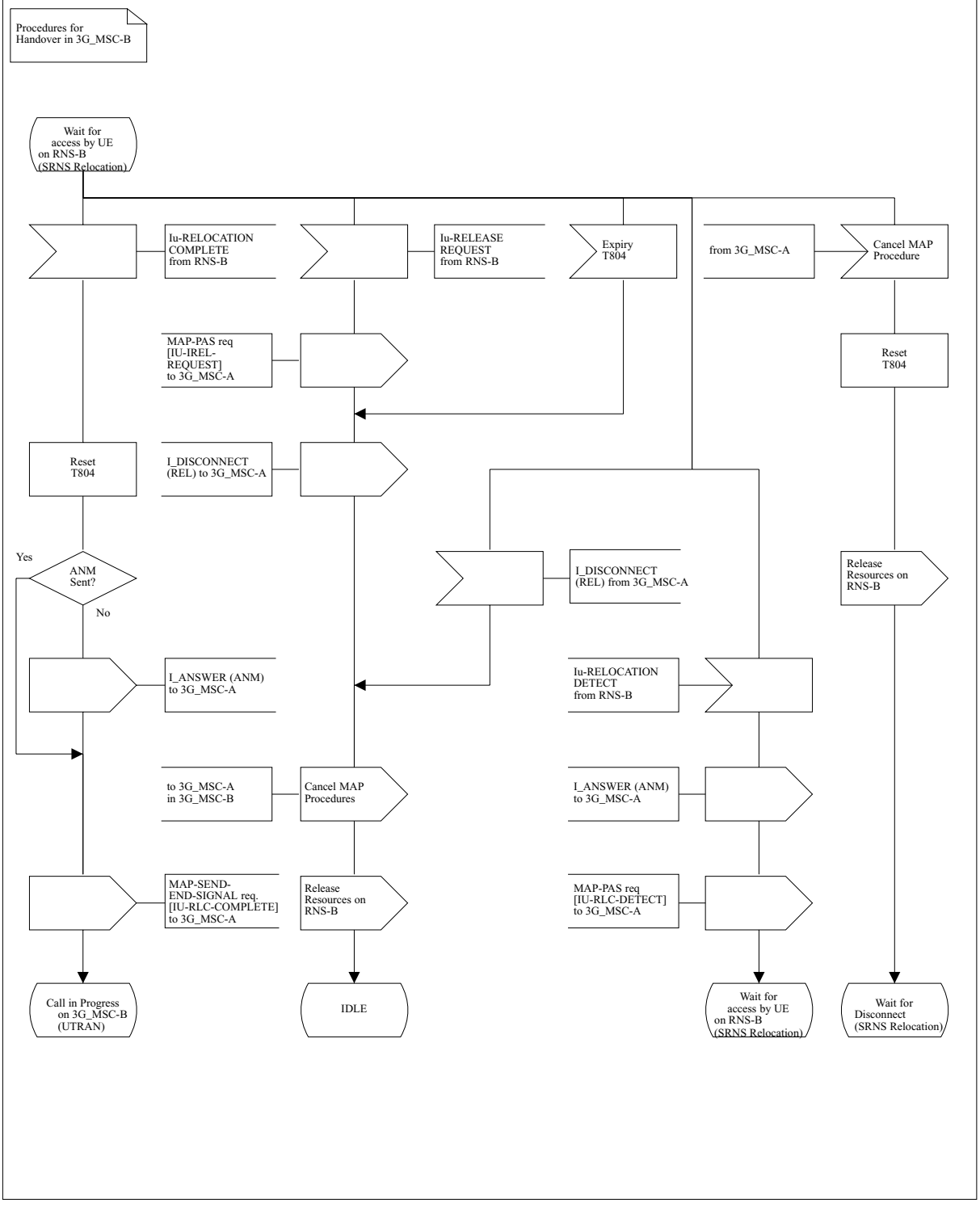



Figure 44 (Sheet 41 of 54): Handover control procedure in 3G_MSC-B

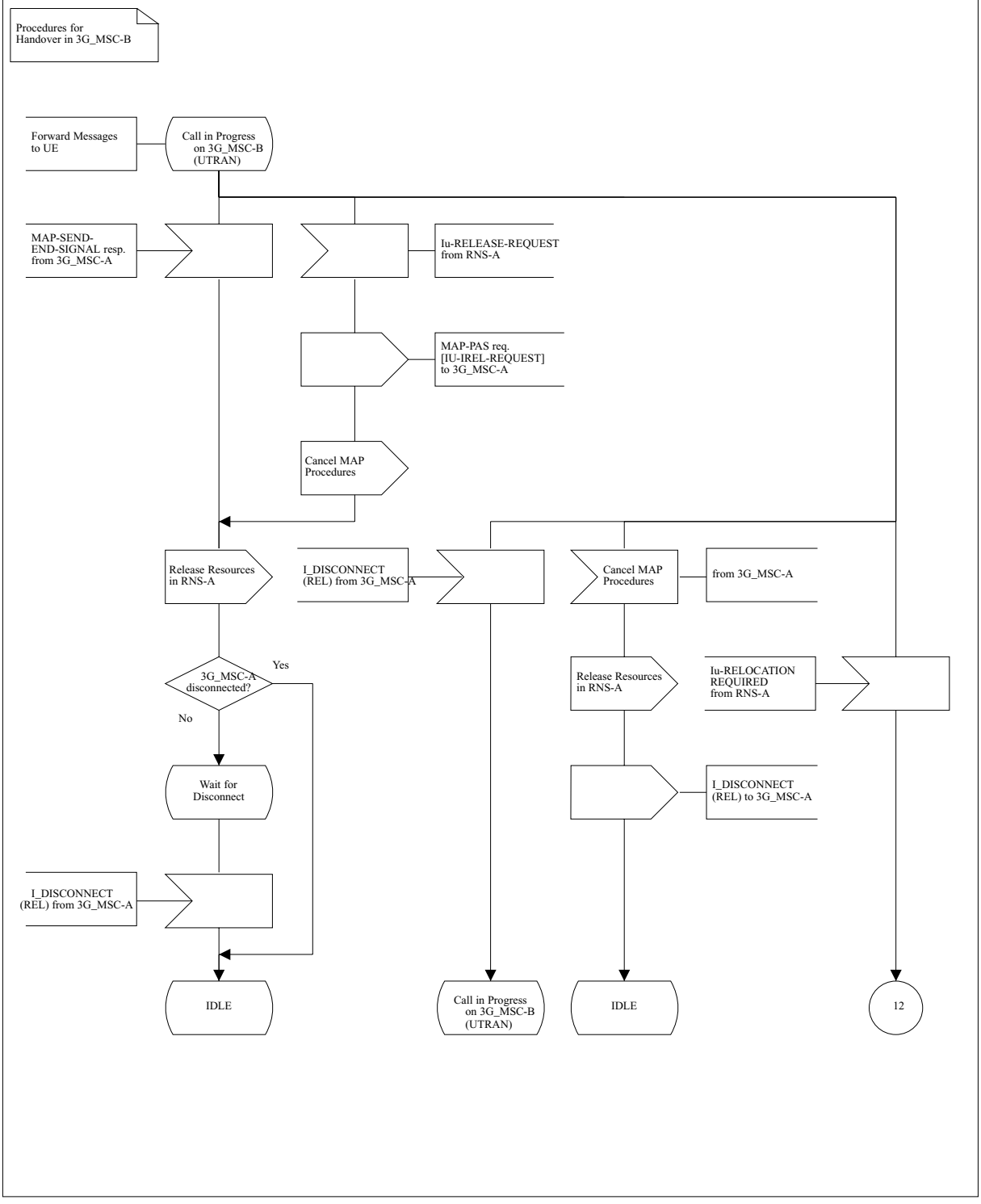



Figure 44 (Sheet 42 of 54): Handover control procedure in 3G_MSC-B

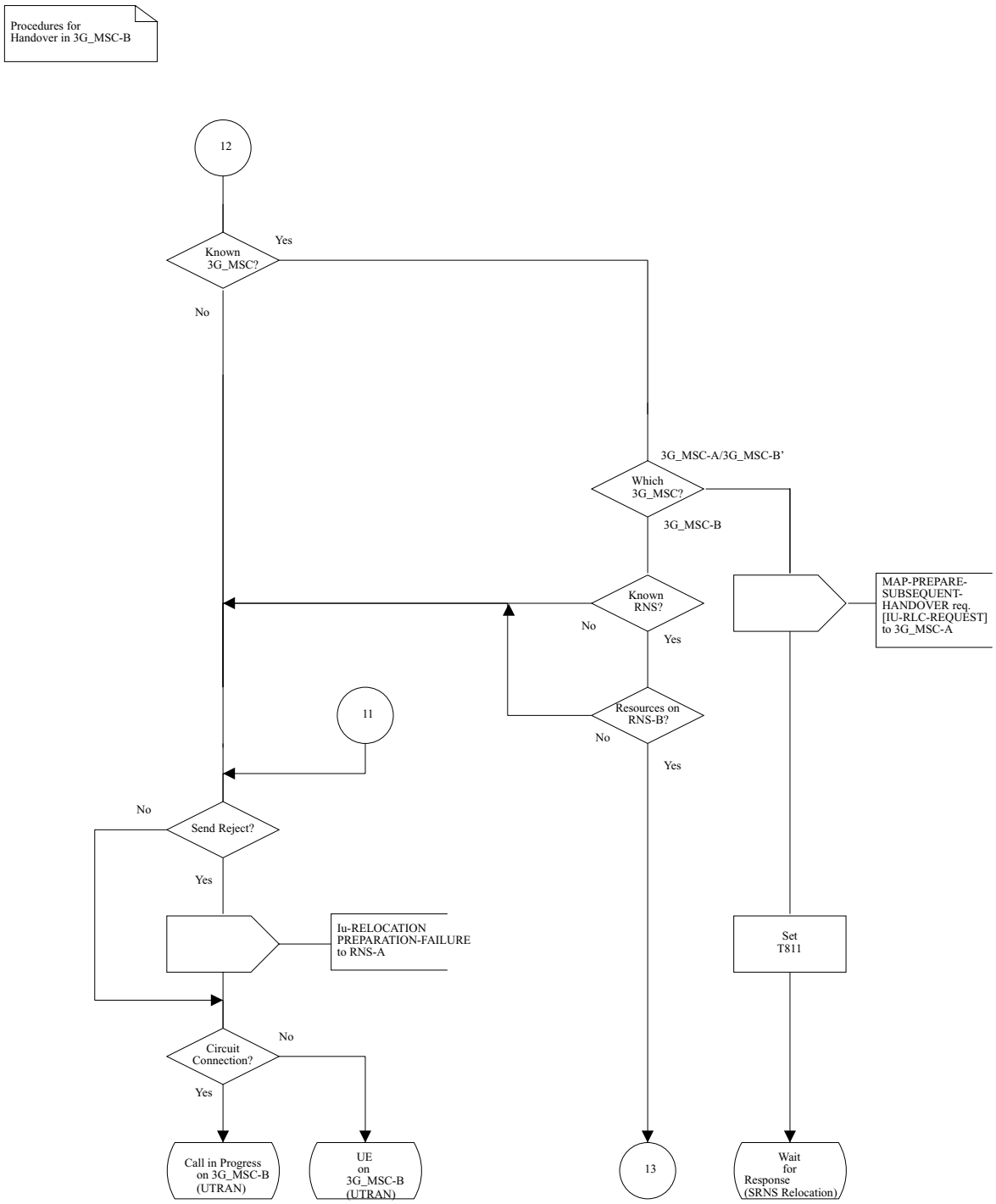



Figure 44 (Sheet 43 of 54): Handover control procedure in 3G_MSC-B

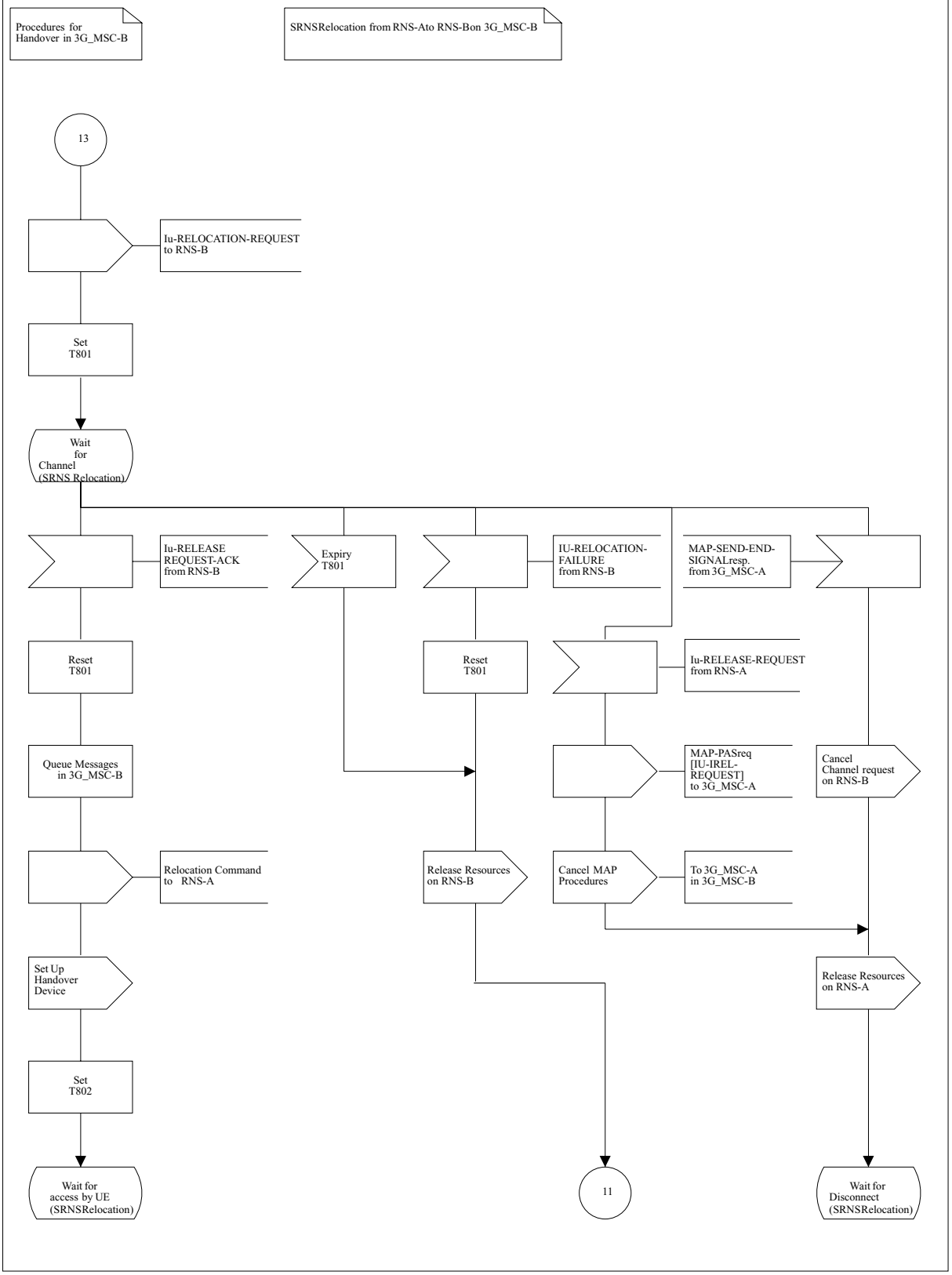



Figure 44 (Sheet 44 of 54): Handover control procedure in 3G_MSC-B

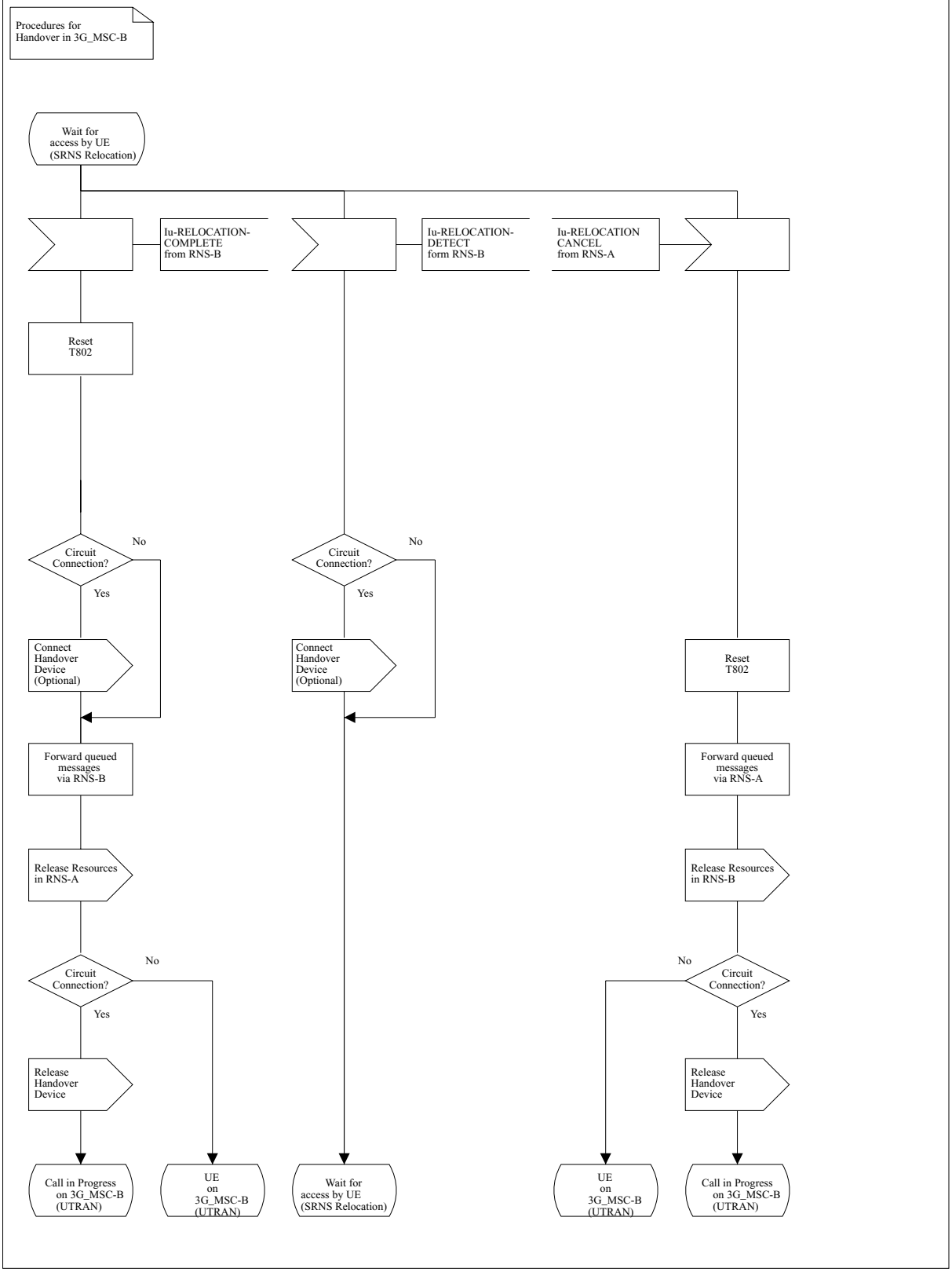



Figure 44 (Sheet 45 of 54): Handover control procedure in 3G_MSC-B

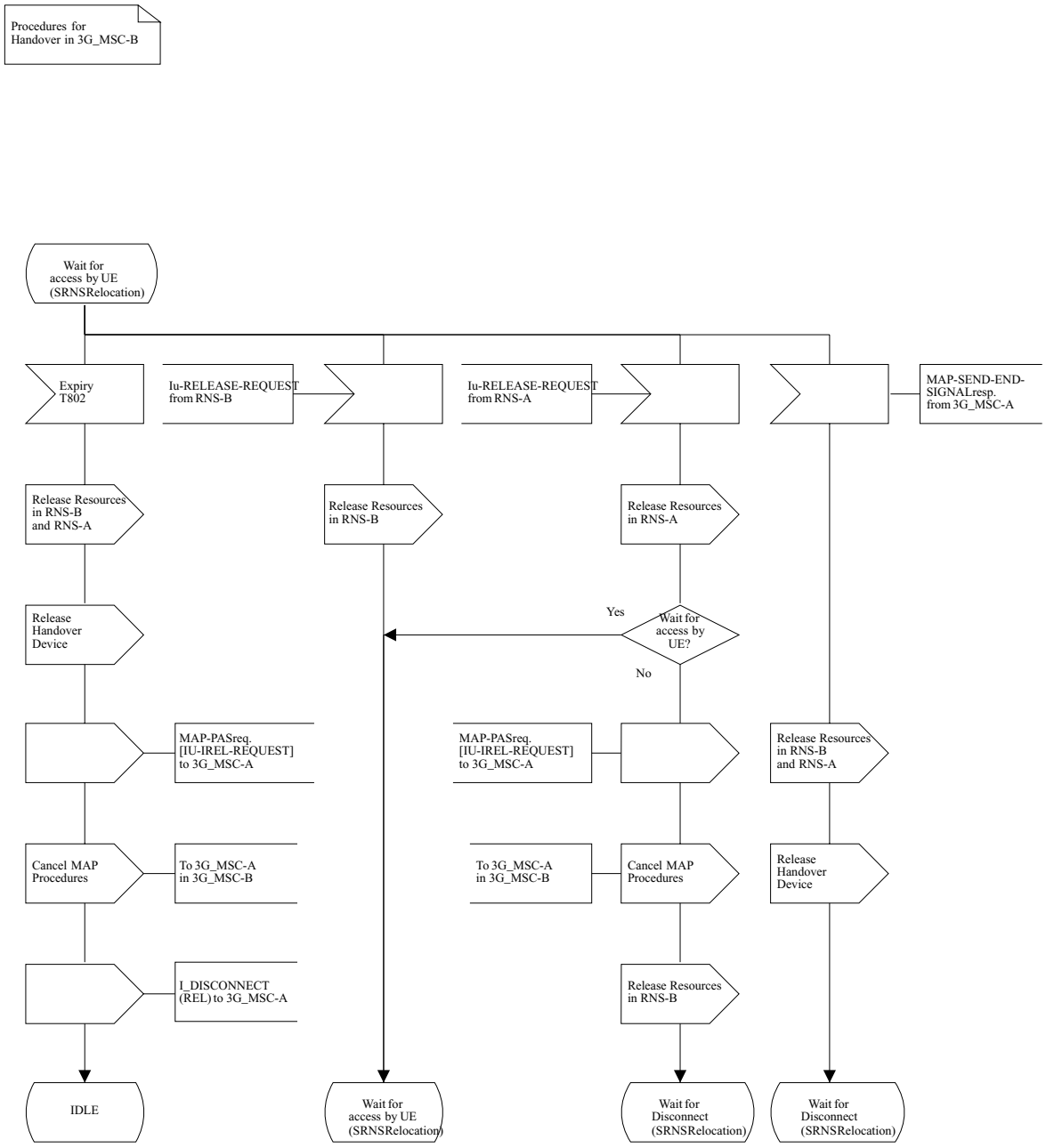



Figure 44 (Sheet 46 of 54): Handover control procedure in 3G_MSC-B

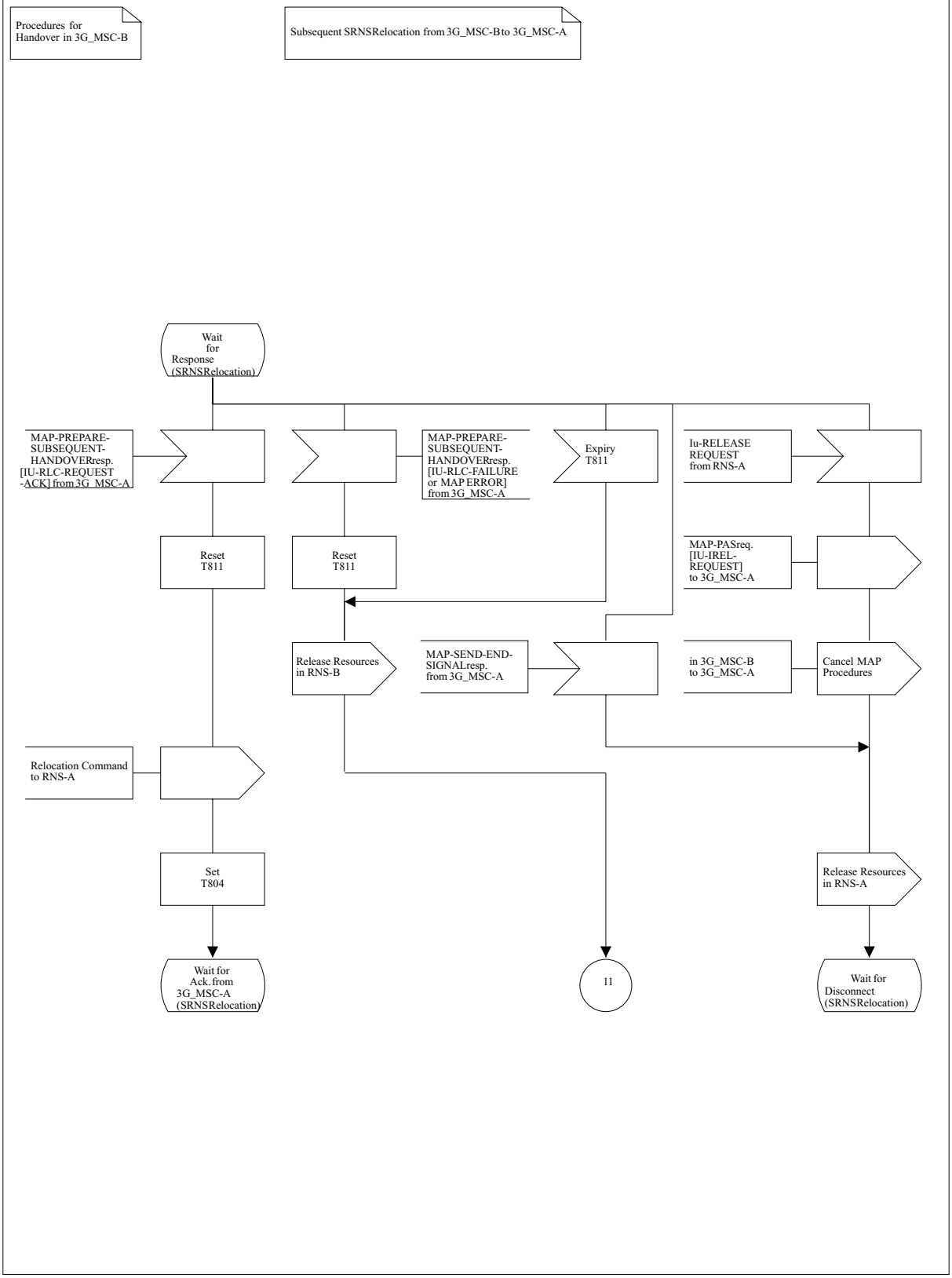



Figure 44 (Sheet 47 of 54): Handover control procedure in 3G_MSC-B

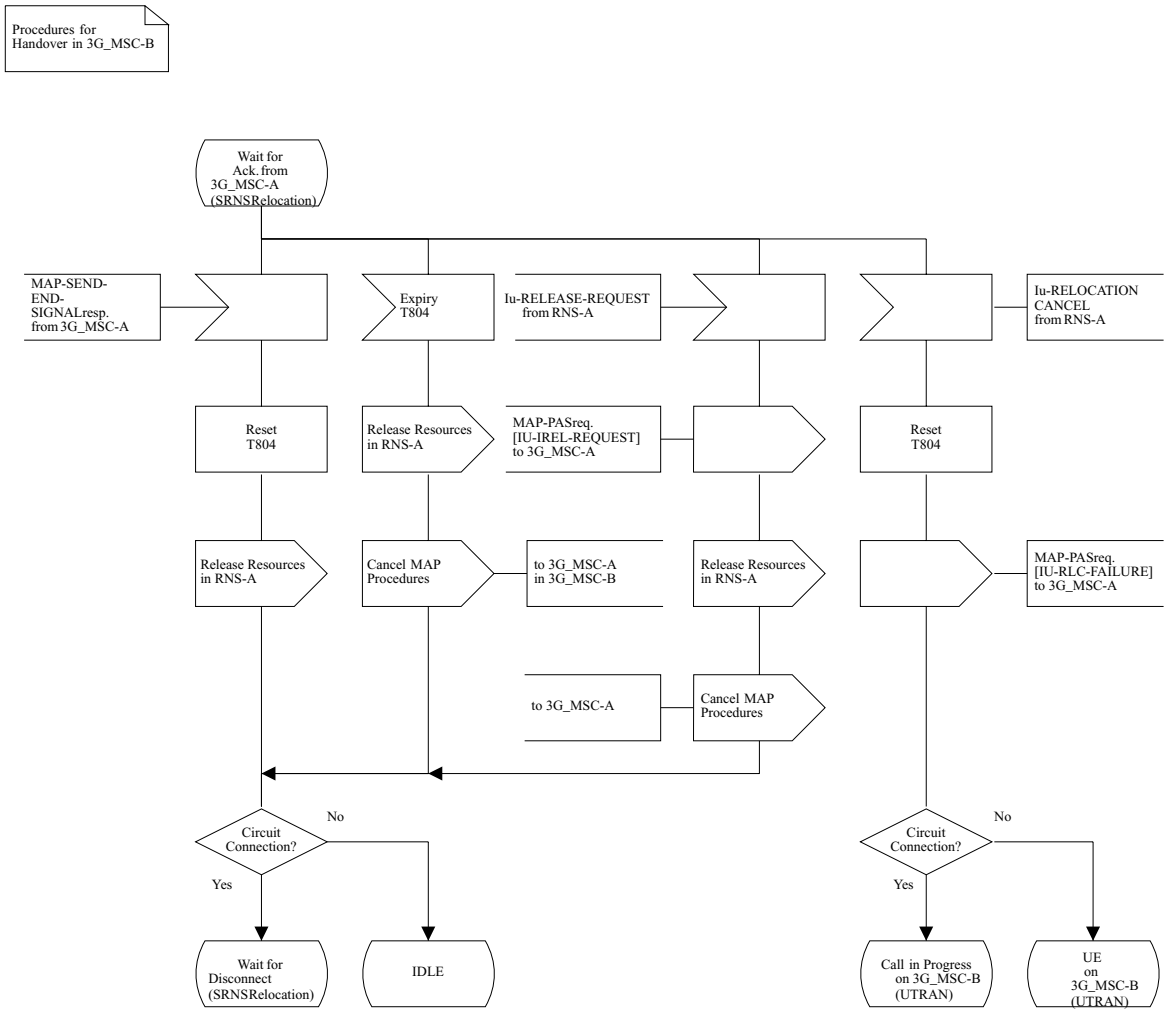



Figure 44 (Sheet 48 of 54): Handover control procedure in 3G_MSC-B

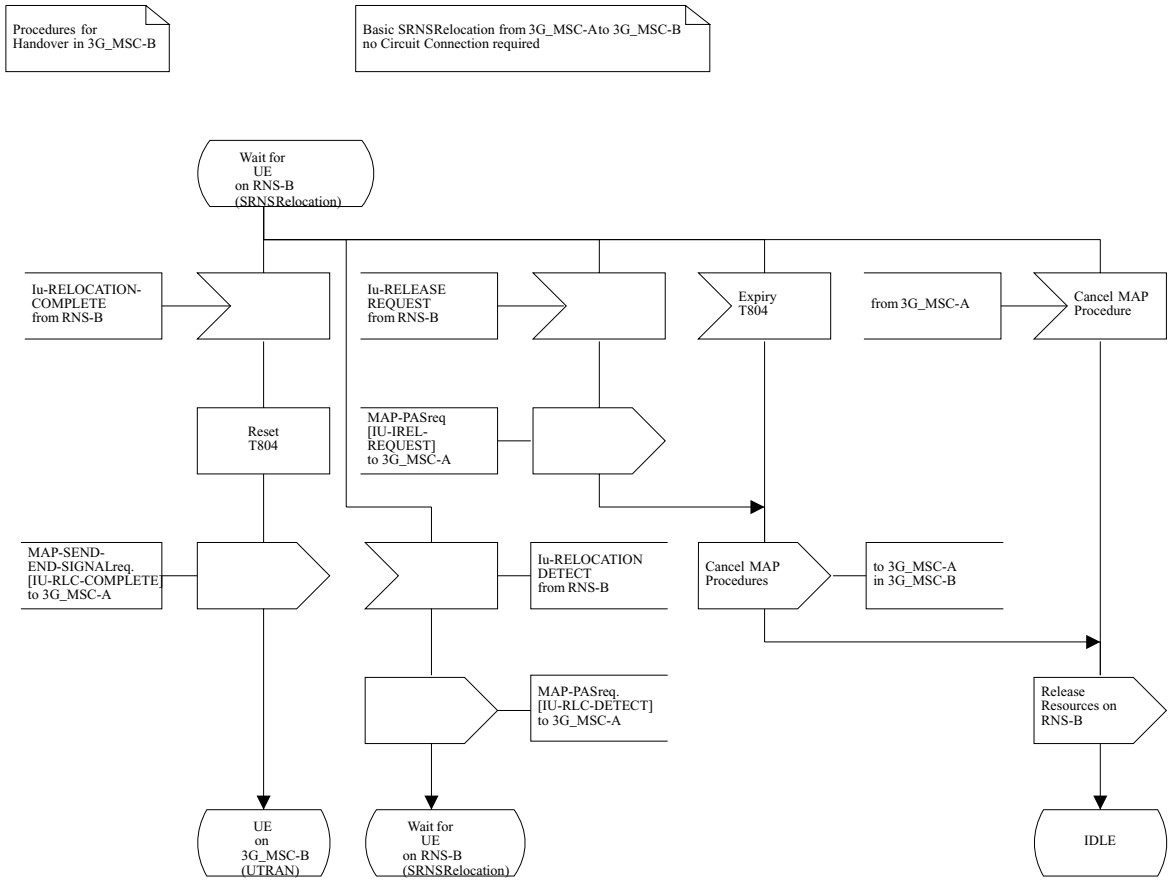



Figure 44 (Sheet 49 of 54): Handover control procedure in 3G_MSC-B

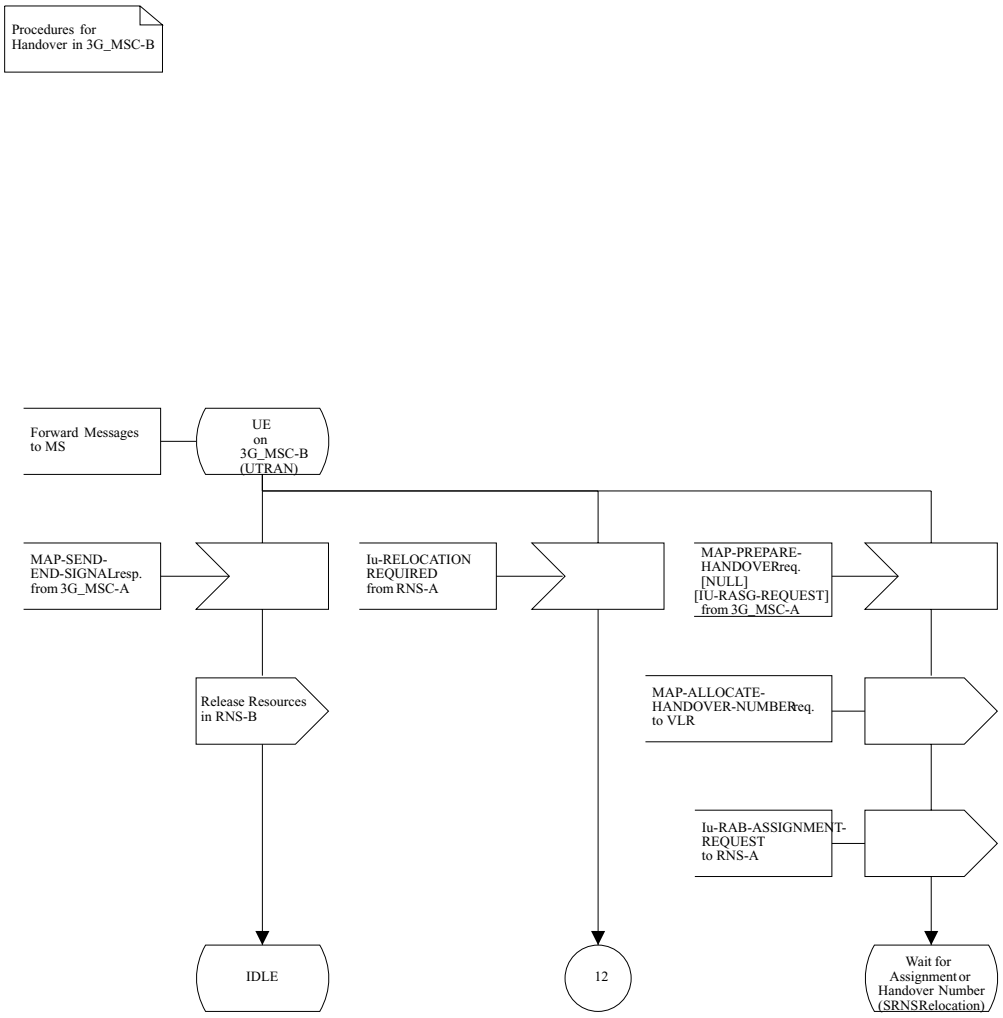



Figure 44 (Sheet 50 of 54): Handover control procedure in 3G_MSC-B

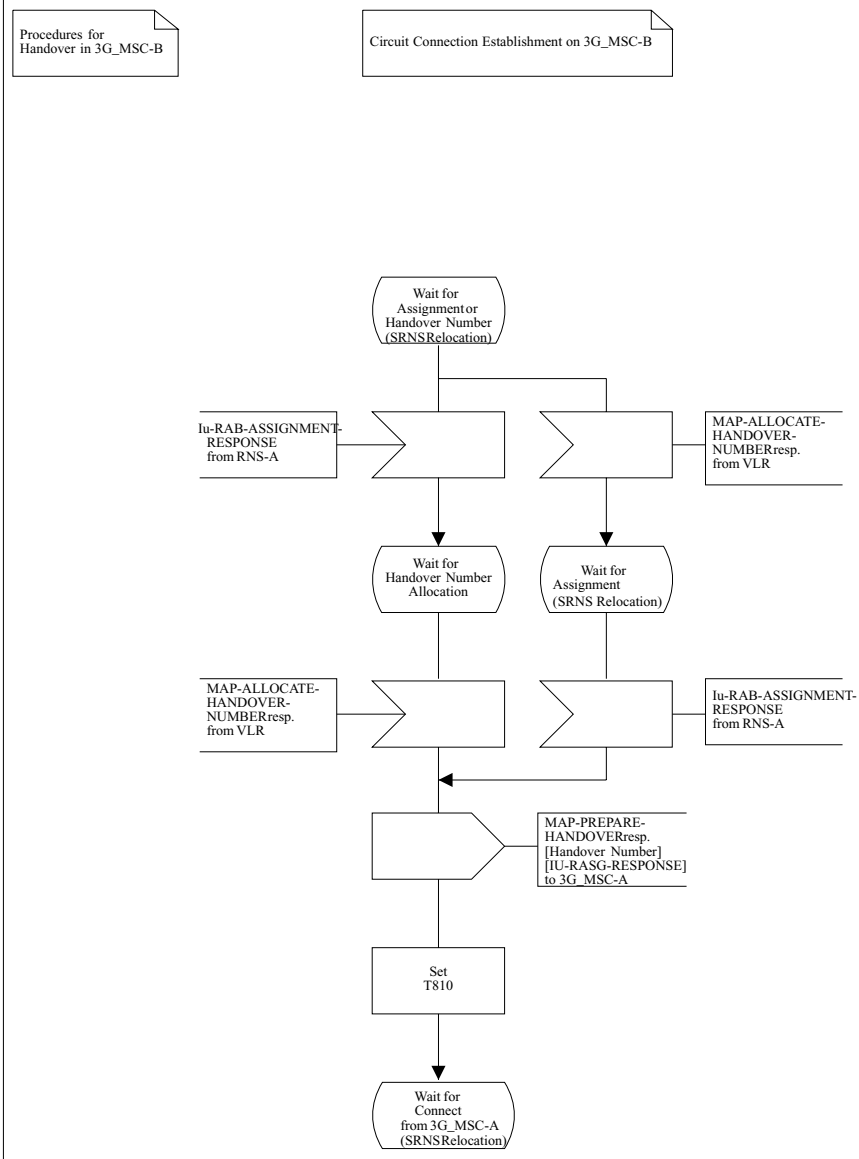



Figure 44 (Sheet 51 of 54): Handover control procedure in 3G_MSC-B

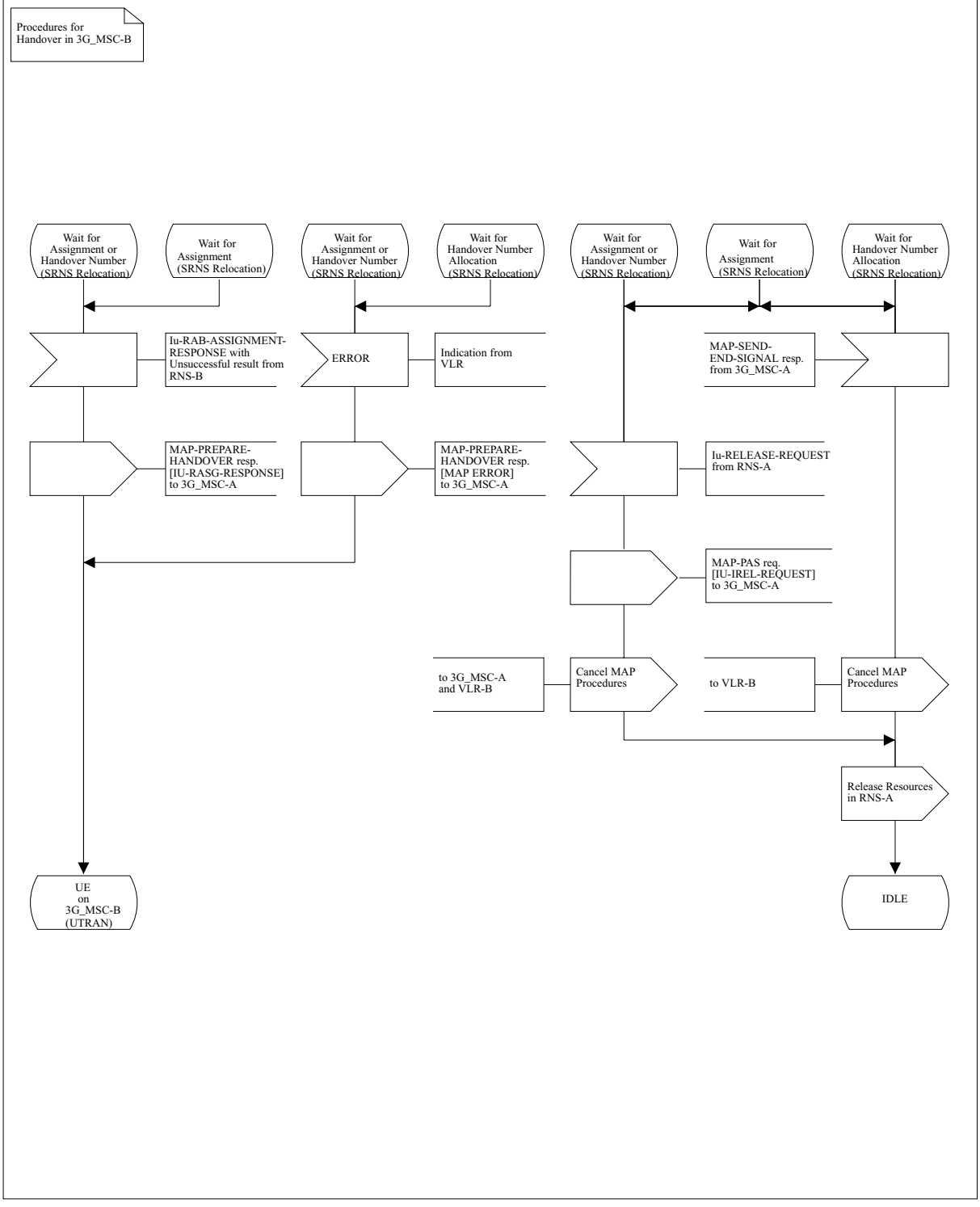



Figure 44 (Sheet 52 of 54): Handover control procedure in 3G_MSC-B

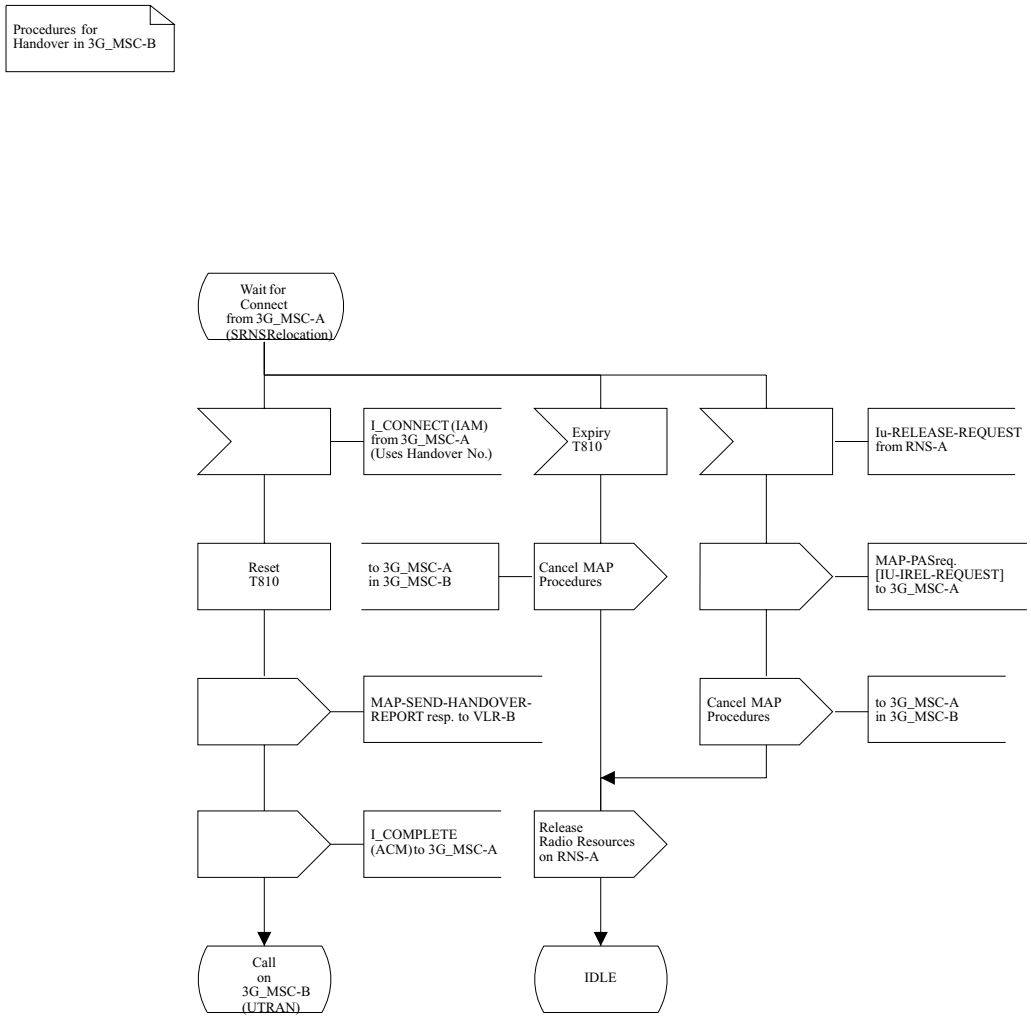



Figure 44 (Sheet 53 of 54): Handover control procedure in 3G_MSC-B

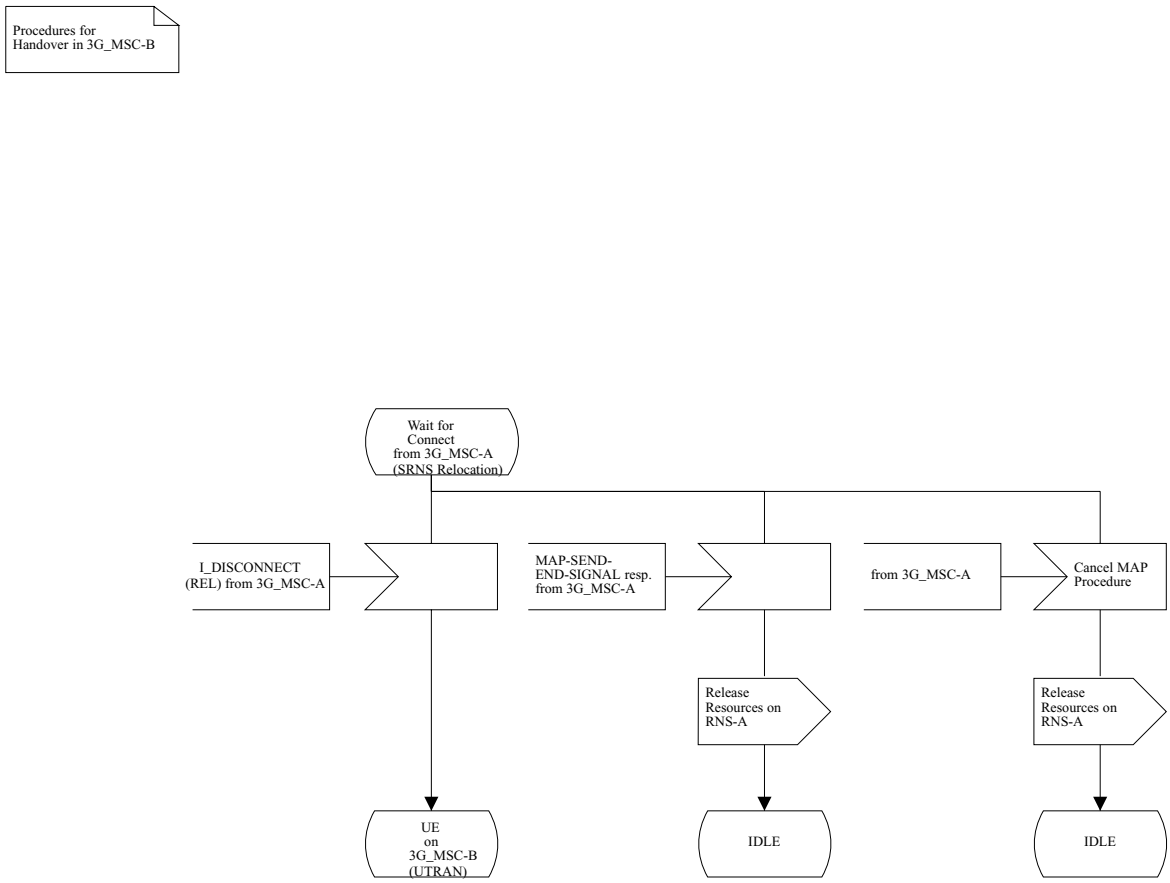



Figure 44 (Sheet 54 of 54): Handover control procedure in 3G_MSC-B

**3GPP/SMG Meeting #10**
**Abiko, Japan, 11 - 14 January.2000**

***Document N1-000084***
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| **24.007** | **CR** | **007** | Current Version: | 3.2.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: TSGN#7 *list expected approval meeting # here ↑* | for approval | X | strategic | | *(for SMG use only)* |
|---|---|---|---|---|---|
| | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

| **Proposed change affects:** *(at least one should be marked with an X)* | (U)SIM | | ME | X | UTRAN / Radio | | Core Network | X |
|---|---|---|---|---|---|---|---|---|

**Source:** CN1 **Date:** 03.01.00

**Subject:** Removal of Anonymous Access

**Work item:** GSM/UMTS interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | X | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:** According to SA1 decision (TSG S1 (99) 1043), the AA feature should be removed from R99. No backward compatibility issues is identified (a R99 MS will not request AA and a R99 network will ignore AA request from a pre-R99 MS supporting this feature).
Also Figure 5.3 is re-introduced without AA, since v.3.2.0 does not contain that object.

**Clauses affected:** 4.1, 4.3.3, 5.1, 5.2, 6.5, 6.5.1, 6.6, 6.6.1, 9.5, 9.5.1, 9.5.2

**Other specs affected:**

| | | | |
|---|---|---|---|
| Other 3G core specifications | | → List of CRs: | 23.060 CRxxx, 24.008 CR111 |
| Other GSM core specifications | | → List of CRs: | |
| MS test specifications | | → List of CRs: | |
| BSS test specifications | | → List of CRs: | |
| O&M specifications | | → List of CRs: | |

**Other comments:**

<--------- double-click here for help and instructions on how to create a CR.

## 4.1 General

Three models are defined for Layer 3, one model for non-GPRS services, one for GPRS services supporting Class C MSs only and one model for GPRS-services supporting Class A and Class B MSs. (The third model is a combination of the first two models listed).

The layer 3 for non-GPRS services provides the functions necessary

- for Radio Resource (RR) management;
- for Mobility Management (MM); and
- for the Connection Management (CM) functions, i.e. functions for the control, provision, and support of services offered by the network; among which there are, e.g.:
  - the functions to establish, maintain and terminate circuit-switched connections across a GSM PLMN and other networks to which the GSM PLMN is connected;
  - supporting functions for supplementary services control;
  - supporting functions for short messages service control.
  - supporting functions for location services control.

The layer 3 for non-GPRS services is composed of three sublayers comprising:

- the Radio Resource Management (RR) functions;
- the Mobility Management (MM) functions; and
- the Connection Management (CM) functions.

When CTS services are added to non-GPRS services, the following functions are added:

- CTS Radio Resource Management (CTS-RR) functions to RR; and
- CTS Mobility Management (CTS-MM) functions to MM.

The layer 3 for GPRS services is composed of four sublayers comprising :

- the Radio Resource Management (RR) functions;
- the Mobility Management (GMM~~ and GMM-AA~~);
- for the Logical Link Control (LLC);
- the Connection Management (CM) functions.
- Session Management (SM) functions to activate, modify and delete the contexts for packet data protocols (PDP)
- supporting functions for short messages service control.

The Connection Management (CM) sublayer is composed of functional blocks for:

- Call Control (CC) for non-GPRS services;
- Short Message Service Support (SMS) for non-GPRS services;
- GPRS Short Message Service Support (GSMS) (for GPRS services supporting Class A, B and C MSs);
- Session Management (SM) (for GPRS services supporting Class A, B and C MSs);
- Supplementary Services Support (SS) for non-GPRS services;
- Group Call Control for non-GPRS services;
- Broadcast Call Control (BCC) for non-GPRS services;
- Connection Management of Packet Data on Signalling channels for non-GPRS services.

- Location Services support (LCS) for non-GPRS services;

Within the context of LCS, for GSM LCS, the services defined for an MS are equally applicable to a type A LMU, unless otherwise stated. The following is a list of services essential for a type A LMU.

The layer 3 for non-GPRS services provides the functions necessary

- for Radio Resource (RR) management;
- for Mobility Management (MM); and
- supporting functions for location service control.

The layer 3 for non-GPRS services is composed of three sublayers comprising:

- the Radio Resource Management (RR) functions;
- the Mobility Management (MM) functions; and
- the Connection Management (CM) functions.

The Connection Management (CM) sublayer is composed of functional block for:

- location services support (LCS) for non-GPRS services.

This Technical Specification does not consider the distribution of signalling functions among the different network equipments. The signalling functions are described between two systems which represent the MS side and the network side of the radio interface of layer 3. Only the functions in the network for signalling communication with one MS is considered.

For GPRS services, in addition to the signalling functions also the user data transfer is included in this Technical Specification.

### 4.3.3 Protocols and peer-to-peer communication

By use of the services provided by lower (sub-)layers, peer entities in a (sub-)layer in the MS and the network exchange information. Exchange of information between two peer entities is performed according to the corresponding (sub-)layer protocols. A protocol is a set of rules and formats by which the information (control information and user data) is exchanged between the two peers. The information is exchanged by use of messages which are defined in the protocol. (Therefore, the messages are also called Protocol Data Units, PDUs).

There are several protocols of the RR sublayer, one protocol of the LLC sublayer, three protocols of the MM sublayer, and several protocols of the CM sublayer. For each functional block of the CM sublayer as defined in subclause 4.1 there is one protocol. The CM protocols are specified in the Technical Specifications identified in subclause 4.3.4.

In the model used in this ETS, there is:

1) for non-GPRS services:

- one RR sub-layer entity in the MS and one RR sub-layer entity in the network;
- one MM sub-layer entity in the MS and one MM sub-layer entity in the network;

  for each functional block of the CM sublayer as defined in subclause 4.1 which is supported in the MS (in the network), there are, depending on the protocol, one or more entities in the MS (in the network). Two different entities of the same functional block in the MS (in the network) are called parallel entities. The entities of the same functional block in the MS correspond in a one-to-one relation to the entities of the functional block in the network. The corresponding entities are called peer entities.

  2) for CTS services (in addition to non-GPRS services)

- one RR sub-layer entity in the MS and one in the CTS fixed part. These RR sub-layers include one CTS-RR sub-entity on each side.

- one MM sub-layer entity in the MS and one in the CTS fixed part These MM sub-layers include one CTS-MM sub-entity on each side.

- for each functional block of the CM sublayer as defined in subclause 4.1 which is supported in the MS (in the fixed part), there are, depending on the protocol, one or more entities in the MS (in the fixed part). Two different entities of the same functional block in the MS (in the fixed part) are called parallel entities. The entities of the same functional block in the MS correspond in a one-to-one relation to the entities of the functional block in the fixed part. The corresponding entities are called peer entities.

3) for GPRS services supporting Class C MSs :

- one RR sublayer entity (RR) in the MS and one RR sublayer entity in the network;

- six LLC sublayer entities (QoS1-QoS4, signalling, SMS) in the MS and six LLC sublayer entities in the network;

- one ~~or more~~ MM sublayer entity~~ies~~ (GMM ~~and/or 1-n GMM-AA~~) in the MS and one MM sublayer entity in the network (GMM ~~or GMM-AA, i.e. the network don't know if several MM sublayer entities belong to the same MS or not~~);

- one SM entity in the MS's CM sublayer and one SM sublayer entity in the network's CM sublayer;

- one or more GSMS functional blocks in the CM sublayer if supported.:

4) for non-GPRS and GPRS services supporting Class A and Class B MSs :

- two RR sublayer entities (RR) in the MS and two RR sublayer entities in the network;

- six LLC sublayer entities (QoS1-QoS4, signalling, SMS) in the MS and six LLC sublayer entities in the network;

- two ~~or more~~ MM sublayer entities (GMM + MM ~~or 1-n GMM-AA + MM or GMM + 1-n GMM-AA + MM~~) in the MS and one or two MM sublayer entities~~y~~ in the network (GMM ~~+~~or MM ~~or GMM-AA~~);

- one SM entity in the MS's CM sublayer and one SM entity in the network's CM sublayer;

- for each functional block of the CM sublayer as defined in subclause 4.1 which is supported in the MS (in the network), there are, depending on the protocol, one or more entities in the MS (in the network). Two different entities of the same functional block in the MS (in the network) are called parallel entities. The entities of the same functional block in the MS correspond in a one-to-one relation to the entities of the functional block in the network. The corresponding entities are called peer entities.

As each sub-layer entity is specified by one and only one protocol, it is also called a protocol entity or protocol control entity.

For GPRS-services supporting Class A and Class B MSs, the MM entities of the MM-sublayer are able to exchange information by means of GMM PDUs as well as MM PDU's. This means if a mobile is GPRS attached, non-GPRS mobility management procedures may make use of GRPS mobility management messages.

When two peer protocol entities exchange PDUs, a transaction is said to be established (or: to be active; or: to exist). It depends from the protocol when exactly a protocol entity considers the transaction to be active, normally this is the case.

- from the moment when it has passed the first suitable message to lower (sub-) layers or received the first suitable message from its peer entity.

up to the moment when it has released the transaction.

## 5.1 Basic groups of functions

Most functions of layer 3 and its sub-layers are described by the service specifications and protocol specifications of the (sub-)layers.

These functions are in the model realised by protocol control entities, see subclause 4.3.3.

In addition, routing functions are contained in layer 3 which are related to the transport of messages, e.g. multiplexing and splitting. These routing functions are defined in the Radio Resource Management and Mobility Management sub-layers.

1) They have the task to pass the messages from upper (sub-)layers to lower (sub-)layers.

2) They also have the task to pass messages provided by lower (sub-layers) to the appropriate sub-layer and, if applicable, entity.

The routing functions with task 2 make use of the protocol discriminator (PD) which is part of the message header.

A CM sublayer protocol may also define a transaction identifier (TI) as a part of the message header. This is at least the case if there are parallel entities of the same functional block, see subclause 4.3.3. If it is a part of a message, the TI is also used by the routing functions.

- The MM-sublayer routing function passes the messages of the CM entities as well as of the MM, GMM~~, GMM-AA~~ and CTS-MM entities of its own sublayer to the service access point of RR, GRR, LLC or CTS-RR. Furthermore it multiplexes them in case of parallel transactions.

- The routing function of Radio Resource Management distributes the messages to be sent according to their message type and protocol discriminator (PD), to the actual channel configuration, and, if applicable, to further information received from upper sub-layers to the appropriate service access point of layer 2 (identified by SAPI and logical channel). Paging messages received from the PPCH are always routed to GMM, while paging messages received from the PCH are distributed to GMM or MM based on the temporary identifier (TMSI or TLL).

- The messages provided at the different service access points of layer 2 are distributed by the RR sublayer routing function according to their protocol discriminator (PD). Messages with a PD equal to RR are passed to the RR entity of the own sublayer, all other messages are passed to the MM sublayer at the service access point RR-SAP.

- The routing function of MM-sublayer passes Standard L3 messages according to the protocol discriminator (PD) and, if applicable, the transaction identifier (TI) or the PDP address towards the MM entity or towards the CM entities via the various MM-SAP's. GPRS L3 messages are routed to mobility management or session management according to the protocol discriminator.

- The routing function of LLC passes the messages according to the SAPIs to the MM sublayer or to the SNDCP entities.

The message (message header or other parts of the message) are neither changed nor removed by the RR routing function or MM routing function before passing it to the appropriate service access point.

## 5.2 Protocol architecture

The protocol architecture is visualised for each of the three models:

- Figure 5.1/TS 24.007 shows the protocol architecture for a MS not supporting the GPRS service, restricting the representation of CM sublayer protocols to four paradigmatic examples, CC, LCS, SS, and SMS. Note that the protocol stack for a class C GPRS service may be present in the MS, but it is not active simultaneously.

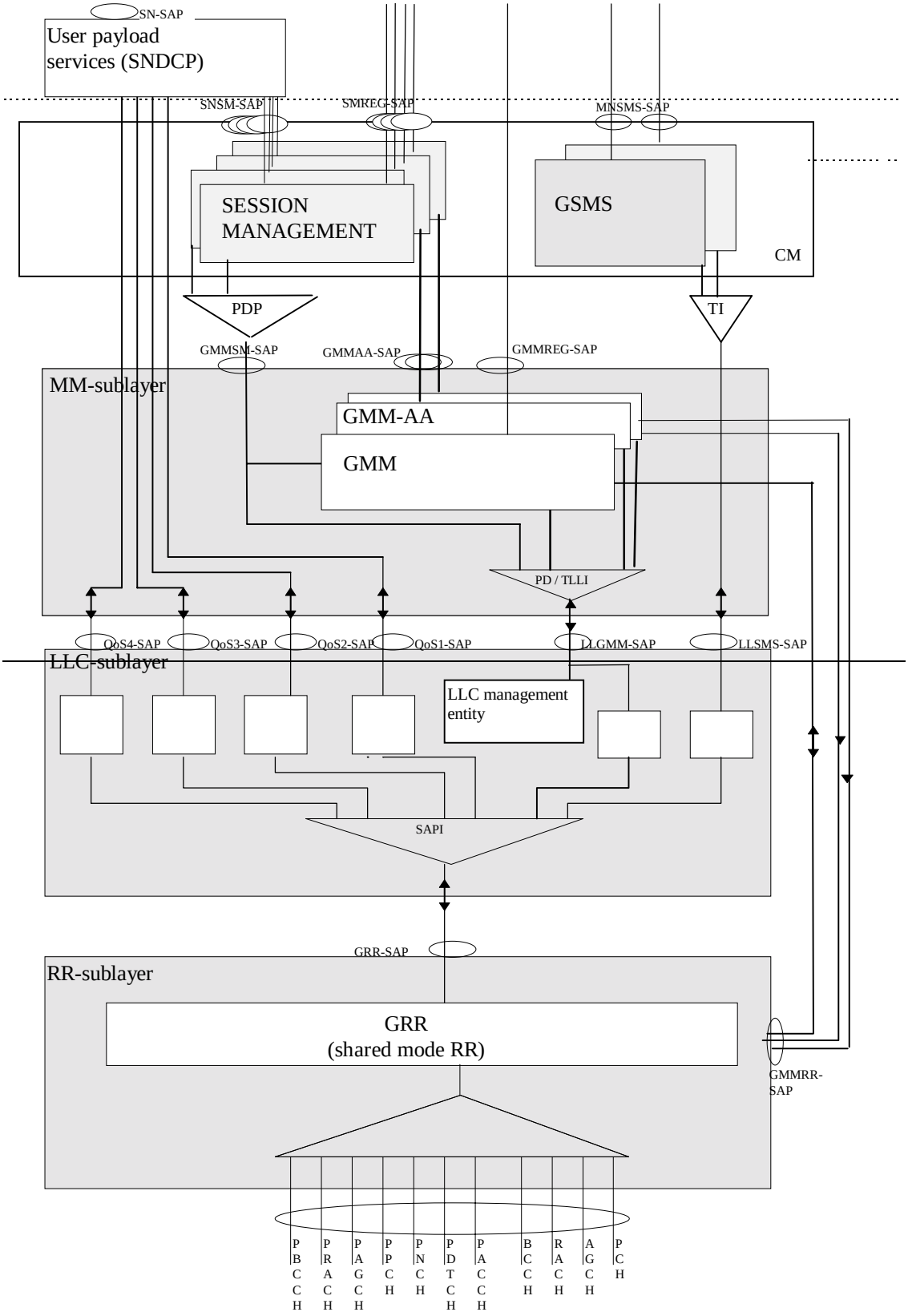
- Figure 5.2 shows the protocol architecture for a MS supporting the Class C GPRS service. (Note that the protocol stack for a circuit switched services may be present in the MS, but it is not active simultaneously)

- Figure 5.3 shows the protocol architecture for non-GPRS and GPRS-services supporting Class A and Class B MSs

- Figure 5.4 shows the protocol architecture for a MS supporting CTS services in addition to non-GPRS services.

- Figure 5.5 shows the protocol architecture for a MS supporting the PS mode of operation UMTS service

- Figure 5.6 shows the protocol architecture for UMTS services supporting CS/PS mode of operation MSs


SN-SAP
User payload services (SNDCP)
SNSM-SAP
SMREG-SAP
MNSMS-SAP
SESSION MANAGEMENT
GSMS
CM
PDP
TI
GMMSM-SAP
GMMAA-SAP
GMMREG-SAP
MM-sublayer
GMM-AA
GMM
PD / TLLI
QoS4-SAP
QoS3-SAP
QoS2-SAP
QoS1-SAP
LLGMM-SAP
LLSMS-SAP
LLC-sublayer
LLC management entity
SAPI
GRR-SAP
RR-sublayer
GRR
(shared mode RR)
GMMRR-SAP
PBCCH
PRACH
PAGCH
PPCH
PNCH
PDTCH
PACCH
BCCH
RACH
AGCH
PCH

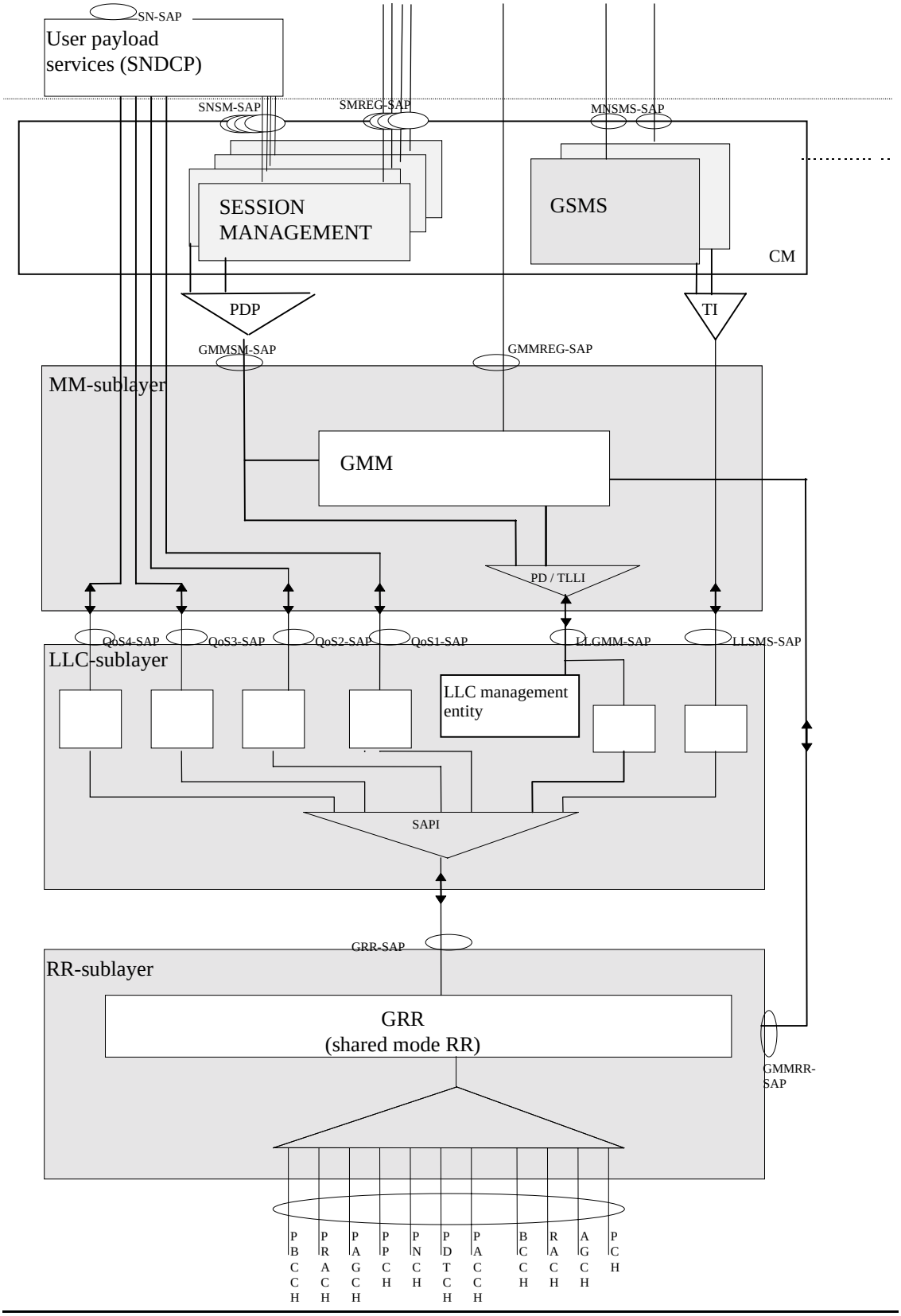



**Figure 5.2, Protocol architecture supporting GPRS class C MSs, MS - side**

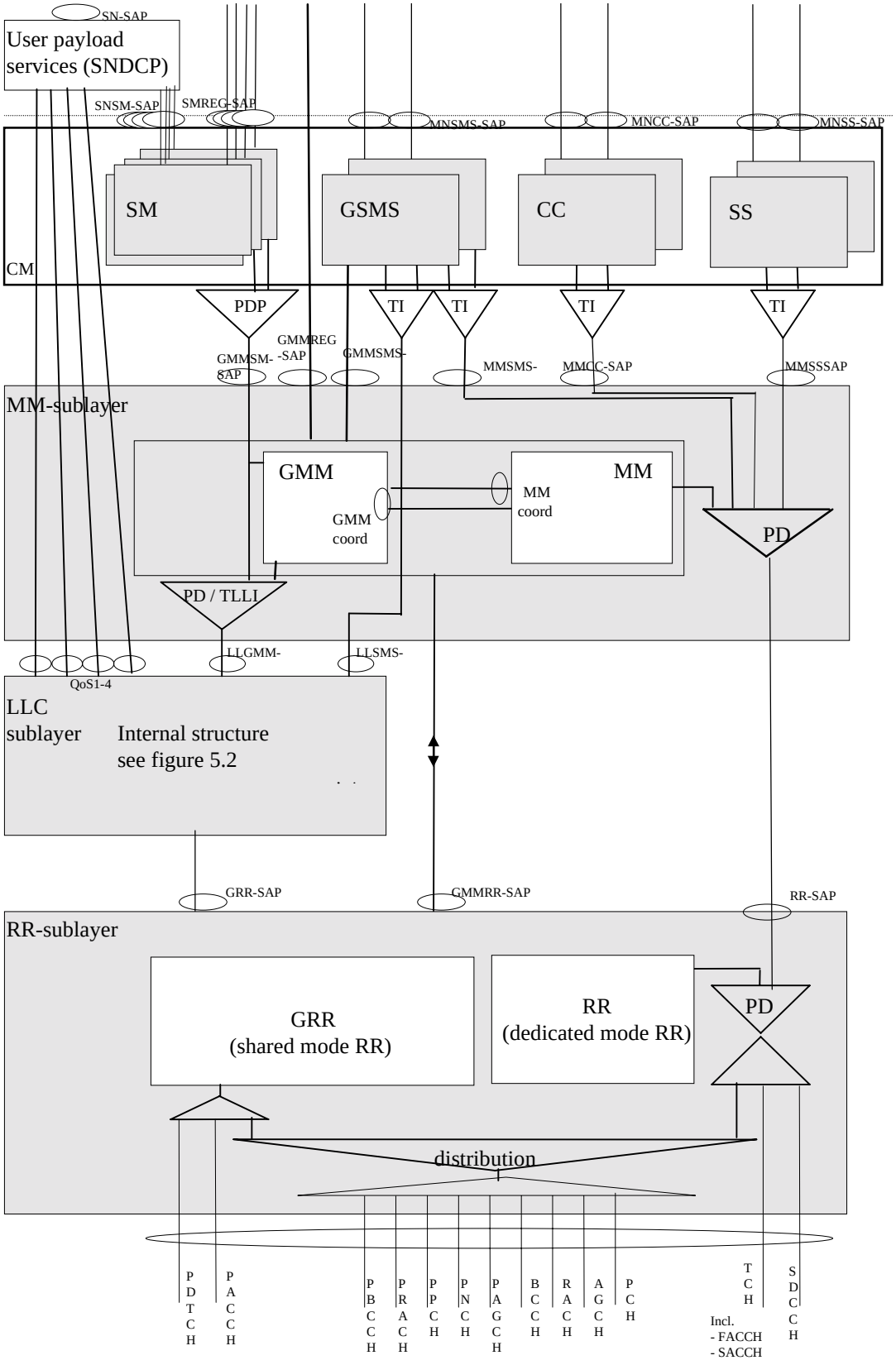
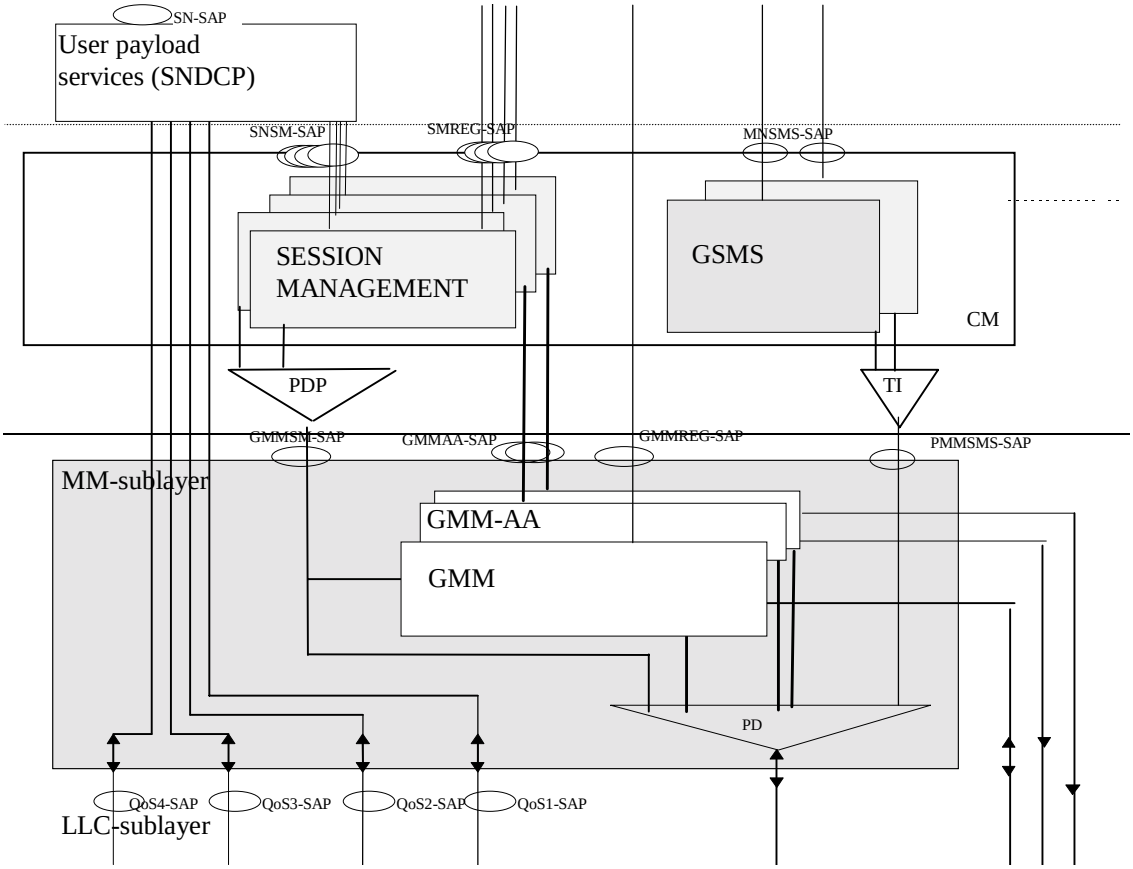



**Figure 5.3/ TS 24.007, Protocol architecture supporting GPRS class A and B MSs, MS - side**


SN-SAP
User payload services (SNDCP)
SNSM-SAP
SMREG-SAP
MNSMS-SAP
SESSION MANAGEMENT
GSMS
CM
PDP
TI
GMMSM-SAP
GMMAA-SAP
GMMREG-SAP
PMMSMS-SAP
MM-sublayer
GMM-AA
GMM
PD
QoS4-SAP
QoS3-SAP
QoS2-SAP
QoS1-SAP
LLC-sublayer

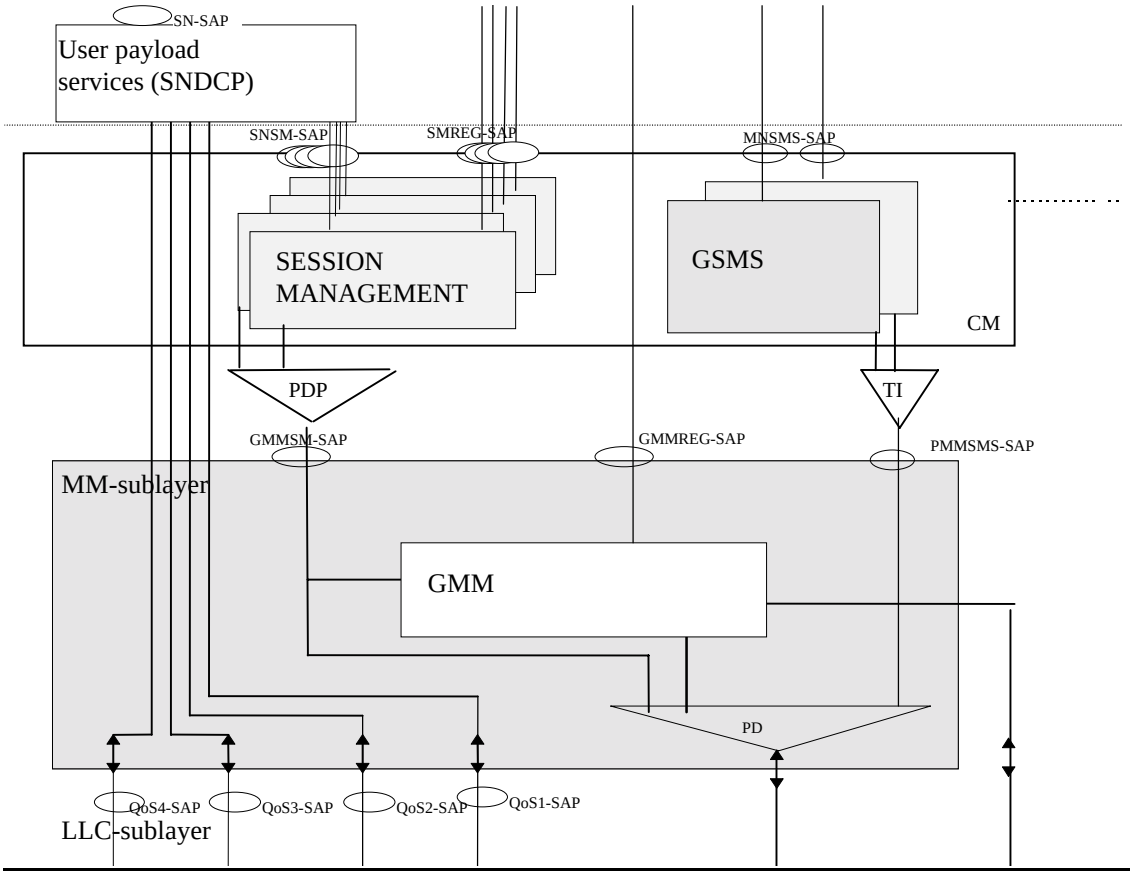
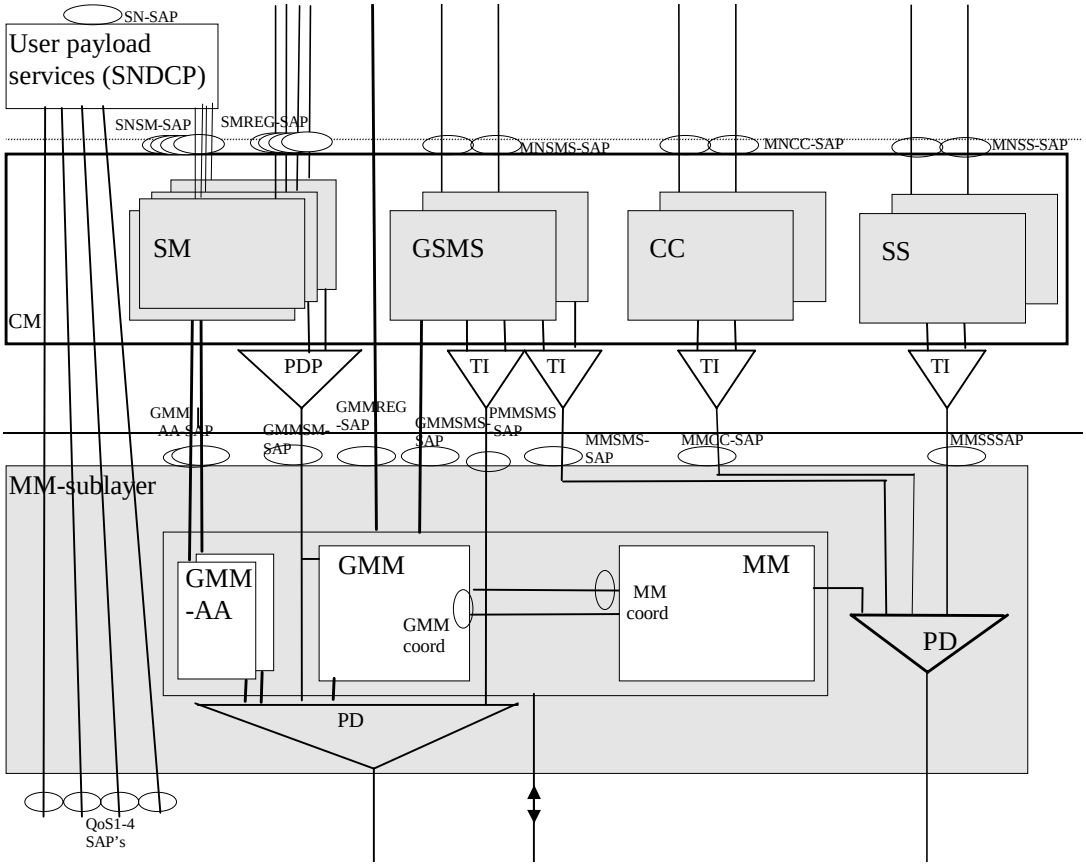

SN-SAP
User payload services (SNDCP)
SNSM-SAP
SMREG-SAP
MNSMS-SAP
SESSION MANAGEMENT
GSMS
CM
PDP
TI
GMMSM-SAP
GMMREG-SAP
PMMSMS-SAP
MM-sublayer
GMM
PD
QoS4-SAP
QoS3-SAP
QoS2-SAP
QoS1-SAP
LLC-sublayer

**Figure 5.5, Protocol architecture of Non Access Stratum supporting PS mode of operation MSs, MS – side**

Note: SMS un-related parts of this figure e.g. SNDCP ~~and GMM-AA~~ should be modified for UMTS.


SN-SAP
User payload services (SNDCP)
SNSM-SAP
SMREG-SAP
MNSMS-SAP
MNCC-SAP
MNSS-SAP
SM
GSMS
CC
SS
CM
PDP
TI
TI
TI
TI
GMM AA SAP
GMMSM-SAP
GMMREG-SAP
GMMSMS-SAP
PMMSMS SAP
MMSMS-SAP
MMCC-SAP
MMSSSAP
MM-sublayer
GMM-AA
GMM
GMM coord
MM
MM coord
PD
PD
QoS1-4 SAP's

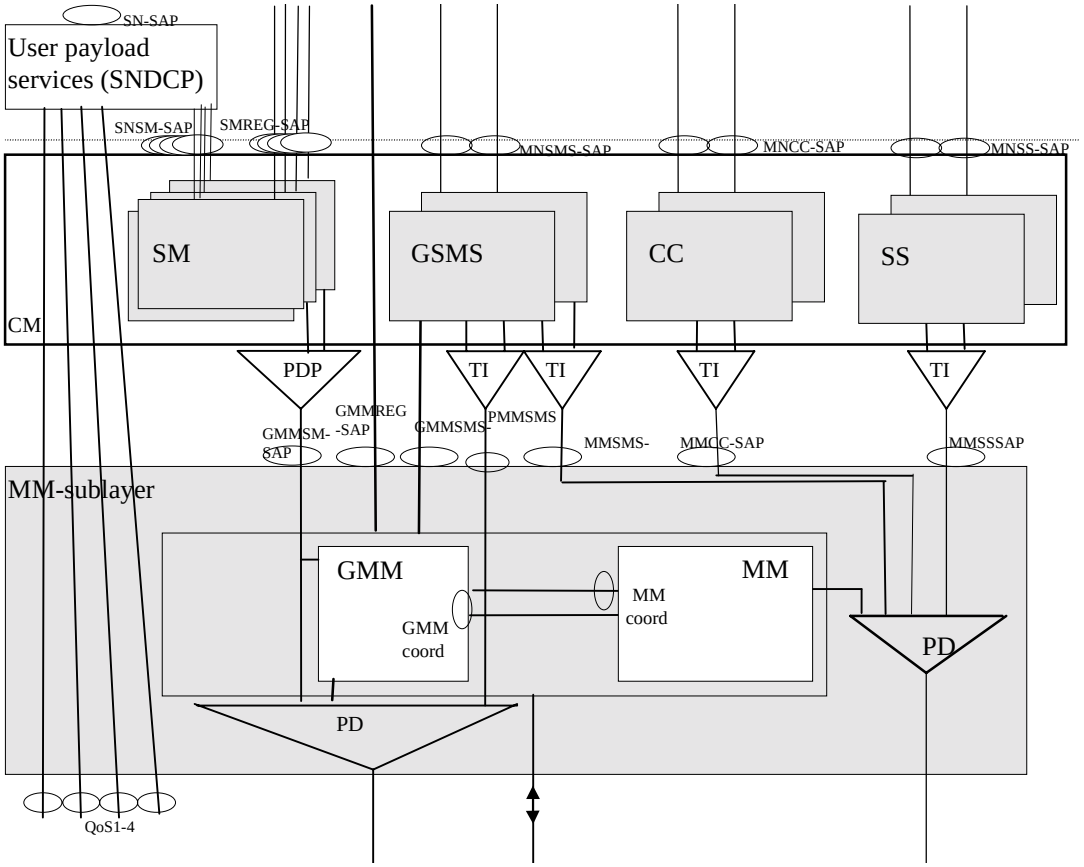

SN-SAP
User payload services (SNDCP)
SNSM-SAP
SMREG-SAP
MNSMS-SAP
MNCC-SAP
MNSS-SAP
SM
GSMS
CC
SS
CM
PDP
TI
TI
TI
TI
GMMSM-SAP
GMMREG-SAP
GMMSMS-
PMMSMS
MMSMS-
MMCC-SAP
MMSSSAP
MM-sublayer
GMM
GMM coord
MM
MM coord
PD
PD
QoS1-4

**Figure 5.6/ 24.007, Protocol architecture of Non Access Stratum supporting CS/PS mode of operation MSs, MS – side**

Note: SMS un-related parts of this figure, e.g. SNDCP ~~and GMM-AA~~ should be modified for UMTS.

As shown in figure 5.1 a hierarchy of 3 sublayers is defined:

- the RR sublayer provides services to the MM sublayer and utilizes the services of signalling layer 2;
- the MM sublayer provides common services to the entities of the Connection Management (CM) sublayer;
- the CM sublayer includes, among others, the CC, SS, and SMS entities, which are independent entities.

Figure 5.2 defines four sublayers for GPRS services supporting Class C MSs:

- the RR sublayer provides services to the MM and LLC sublayers;
- the LLC sublayer provides services to the MM sublayer, the SNDCP and GSMS entities and uses services of the RR sublayer;
- the MM sublayer provides services to the SM entities of the CM. The MM sublayer ~~either~~ includes ~~(a.)~~ one GMM entity ~~for non-anonymous access or (b.) one or more GMM-AA entities for anonymous access or (c.) one GMM entity and one or more GMM-AA entities~~;
- the CM sublayer includes the SM and GSMS entities. The SM entity provides services to the SNDCP entity and uses services of the MM sublayer. The GSMS entity is identical to the SMS entity for non-GPRS services except it uses the services from the LLC sublayer

Figure 5.3 defines four sublayers for non-GPRS and GPRS-services supporting Class A and Class B MSs :

- the RR sublayer provides services to the MM and LLC sublayers;
- the LLC sublayer provides services to the MM sublayer, the SNDCP and GSMS entities and uses services of the RR sublayer;
- the MM sublayer provides services to the SNDCP entity and to the entities of the Connection Management (CM) sublayer. In addition to the MM entity for non-GPRS services, the MM sublayer further includes ~~either (a.)~~ one GMM entity ~~for non-anonymous access or (b) one or more GMM-AA entities for anonymous access or (c.) one GMM entity and one or more GMM-AA entities~~;
- the CM sublayer includes, among others, the CC, SS, GSMS and SM entities, which are independent entities.

  The SM entity provides services to the SNDCP entity and uses services of the MM sublayer.
  The GSMS entity is an extension of the SMS entity for non-GPRS services. For message transfer it uses the services both from the LLC sublayer and the MM entity of the MM sublayer. Furthermore it retrieves from the MM entity information about which transport service to use.

Figure 5.4 defines three sub-layers for CTS services:

- the RR sublayer provides services (including CTS services) to the MM sublayer and uses the services of signalling layer 2;
- the MM sublayer provides common services to the entities of the Connection Management (CM) sublayer; it provides also specific CTS services to the entities above CM.
- the CM sublayer includes, among others, the CC, SS, and SMS entities, which are independent entities.

Figure 5.5 defines two sublayers for UMTS PS domain services supporting PS mode of operation:

- the MM sublayer provides services to the SM entities and GSMS entities of the CM. The MM sublayer ~~either~~ includes ~~(a.)~~ one GMM entity ~~for non-anonymous access or (b.) one or more GMM-AA entities for anonymous access or (c.) one GMM entity and one or more GMM-AA entities~~;

~~(GMM-AA for UMTS is FFS)~~

- the CM sublayer includes the SM and GSMS entities. The SM entity provides services to the PDCP entity and uses services of the MM sublayer. The GSMS entity is identical to the SMS entity for GPRS services in GSM except it uses the services from the GMM sublayer.

Figure 5.6 defines two sublayers for UMTS CS domain services and UMTS PS domain services supporting CS/PS mode of operation MSs :

- the MM sublayer provides services to the entities of the Connection Management (CM) sublayer. In addition to the MM entity for CS domain services, the MM sublayer further includes ~~either (a.)~~ one GMM entity ~~for non-anonymous access or (b) one or more GMM-AA entities for anonymous access or (c.) one GMM entity and one or more GMM-AA entities;~~

~~(GMM-AA for UMTS is FFS)~~

- the CM sublayer includes, among others, the CC, SS, GSMS and SM entities, which are independent entities.

The SM entity provides services to the PDCP entity and uses services of the MM sublayer.

The GSMS entity is an extension of the SMS entity for CS domain services. For message transfer it uses the services both from the GMM entity of the MM sublayer and the MM entity of the MM sublayer. Furthermore it retrieves from the MM entity information about which transport service to use.

# 6.5 Session Management Services for GPRS-Services

Session Management services are provided at the SMREG-SAP and the SNSM-SAP ~~for anonymous and non-anonymous access~~. The ~~non-anonymous and anonymous access~~ procedures for PDP context activation and PDP context deactivation are available at the SMREG-SAP. In addition there exists a PDP context modification ~~for non-anonymous PDP contexts~~.

Before SNDCP initiates any user data transfer, the PDP context activation procedure must be performed.

## 6.5.1 Session Management Services for SMREG-SAP

**Table 6.5: Primitives and Parameters at SMREG-SAP - MS side**

| PRIMITIVE | PARAMETER (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| SMREG-PDP-ACTIVATE-REQ | PDP type, QoS, NSAPI, APN, Data mode | 6.5.1.1 |
| SMREG-PDP-ACTIVATE-CNF | PDP type, PDP address, QoS, NSAPI, PDP config options | 6.5.1.2 |
| SMREG-PDP-ACTIVATE-REJ | cause | 6.5.1.3 |
| SMREG-PDP-ACTIVATE-IND | PDP type, QoS, NSAPI, APN | 6.5.1.4 |
| SMREG-PDP-DEACTIVATE-REQ | NSAPI(s) | 6.5.1.5 |
| SMREG-PDP-DEACTIVATE-CNF | NSAPI(s) | 6.5.1.6 |
| SMREG-PDP-DEACTIVATE-IND | NSAPI(s) | 6.5.1.7 |
| SMREG-PDP-MODIFY-IND | QoS(s), NSAPI(s) | 6.5.1.8 |
| ~~SMREG-AA-PDP-ACTIVATE-REQ~~ | ~~server address, QoS, NSAPI, Data mode~~ | ~~6.5.1.9~~ |
| ~~SMREG-AA-PDP-ACTIVATE-CNF~~ | ~~QoS~~ | ~~6.5.1.10~~ |
| ~~SMREG-AA-PDP-ACTIVATE-REJ~~ | ~~cause~~ | ~~6.1.5.11~~ |
| ~~SMREG-AA-PDP-DEACTIVATE-REQ~~ | ~~NSAPI~~ | ~~6.5.1.12~~ |

| | | |
|---|---|---|
| ~~SMREG-AA-PDP-DEACTIVATE-IND~~ | ~~NSAPI~~ | ~~6.5.1.13~~ |

### 6.5.1.1 SMREG-PDP-ACTIVATE-REQ

The MS initiates a PDP context activation. SM is requested to send the ACTIVATE PDP CONTEXT REQUEST message to the network. The PDP context is pending activation.

### 6.5.1.2 SMREG-PDP-ACTIVATE-CNF

The MS initiated PDP context activation succeeded. The network confirmed the PDP context activation, i.e. the ACTIVATE PDP CONTEXT ACCEPT message was received from the network. Then SM has ordered SNDCP to establish the needed LLC links. The PDP context is active.

### 6.5.1.3 SMREG-PDP-ACTIVATE-REJ

The PDP context activation failed, the PDP context is not activated. One reason for failure is that the network rejected the activation attempt, which means the ACTIVATE PDP CONTEXT FAILURE message was received. Another reason is e.g. that it was not possible to establish the needed LLC links.

### 6.5.1.4 SMREG-PDP-ACTIVATE-IND

The network asked for a PDP context activation. The REQUEST PDP CONTEXT ACTIVATION message was received from the network. The MS reacts either by initiating a new PDP context activation or by rejecting the network's request.

### 6.5.1.5 SMREG-PDP-DEACTIVATE-REQ

The MS initiates a PDP context deactivation: SM is requested to send a DEACTIVATE PDP CONTEXT REQUEST message to the network. The PDP context is pending deactivation.

### 6.5.1.6 SMREG-PDP-DEACTIVATE-CNF

The MS initiated PDP context deactivation has been done. The network confirmed the PDP context activation, i.e. the ACTIVATE PDP CONTEXT ACCEPT message was received from the network. Then SM has ordered SNDCP to locally release not further needed LLC links. The PDP context has been deactivated.

### 6.5.1.7 SMREG-PDP-DEACTIVATE-IND

A network initiated a PDP context deactivation has been performed. The DEACTIVATE PDP CONTEXT REQUEST message has been received from the network. The MS has acknowledged with the DEACIVATE PDP CONTEXT ACCEPT message. The PDP context has been deactivated, Not further needed LLC links were locally released,

### 6.5.1.8 SMREG-PDP-MODIFY-IND

A network initiated a PDP context modification has been performed. The MODIFY PDP CONTEXT REQUEST message has been received from the network. The modification has been acknowledged by sending the MODIFY PDP CONTEXT ACCEPT message. One or several PDP contexts have been modified. LLC links are adjusted.

### ~~6.5.1.9 SMREG-AA-PDP-ACTIVATE-REQ~~

~~The MS initiates an anonymous PDP context activation. SM is requested to send the ACTIVATE AA PDP REQUEST message to the network. The anonymous PDP context is pending activation.~~

### ~~6.5.1.10 SMREG-AA-PDP-ACTIVATE-CNF~~

~~The MS initiated anonymous PDP context activation succeeded. The network confirmed the PDP context activation, i.e. the ACTIVATE AA PDP CONTEXT ACCEPT message was received from the network. Then SM has ordered SNDCP to establish the needed LLC links. The anonymous PDP context is active.~~

### ~~6.5.1.11 SMREG-AA-PDP-ACTIVATE-REJ~~

~~The PDP context activation failed, the PDP context is not activated. One reason for failure is that the network rejected the activation attempt, which means the AA ACTIVATE PDP CONTEXT FAILURE message was received. Another reason is e.g. that it was not possible to establish the needed LLC links.~~

### ~~6.5.1.12 SMREG-AA-PDP-DEACTIVATE-REQ~~

~~The MS initiates the anonymous PDP context deactivation:~~

### ~~6.5.1.13 SMREG-AA-PDP-DEACTIVATE-IND~~

~~The MS anonymous PDP context deactivation has been performed. For example the MS's ready timer has expired, or the MS has left the routing area. Also the network may have requested deactivation, which means a DEACTIVATE AA PDP CONTEXT REQUEST message was received from the network.~~

The session management services provided at the service access point SMREG-SAP are illustrated in the state machines of figure 6.4 and 6.5 below. Note, that the state machine describes only one PDP context within the SM entity.

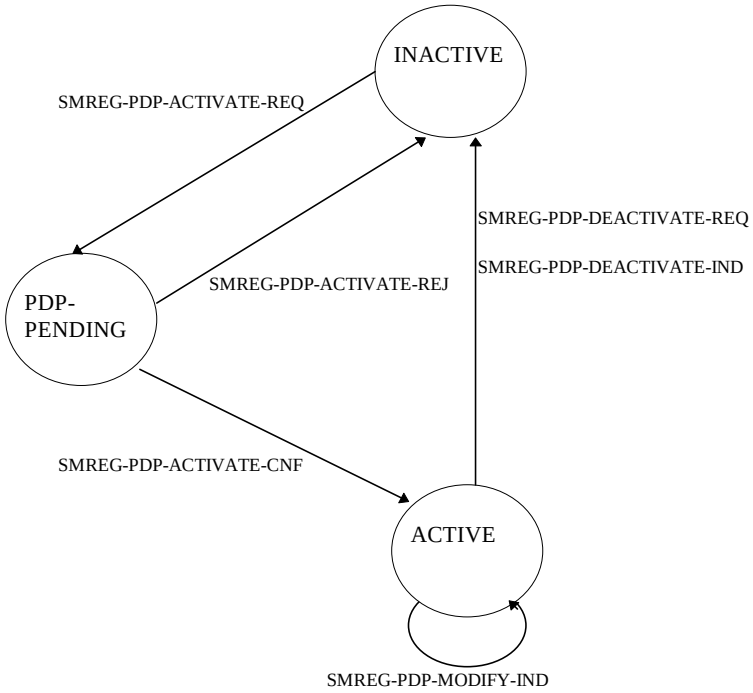
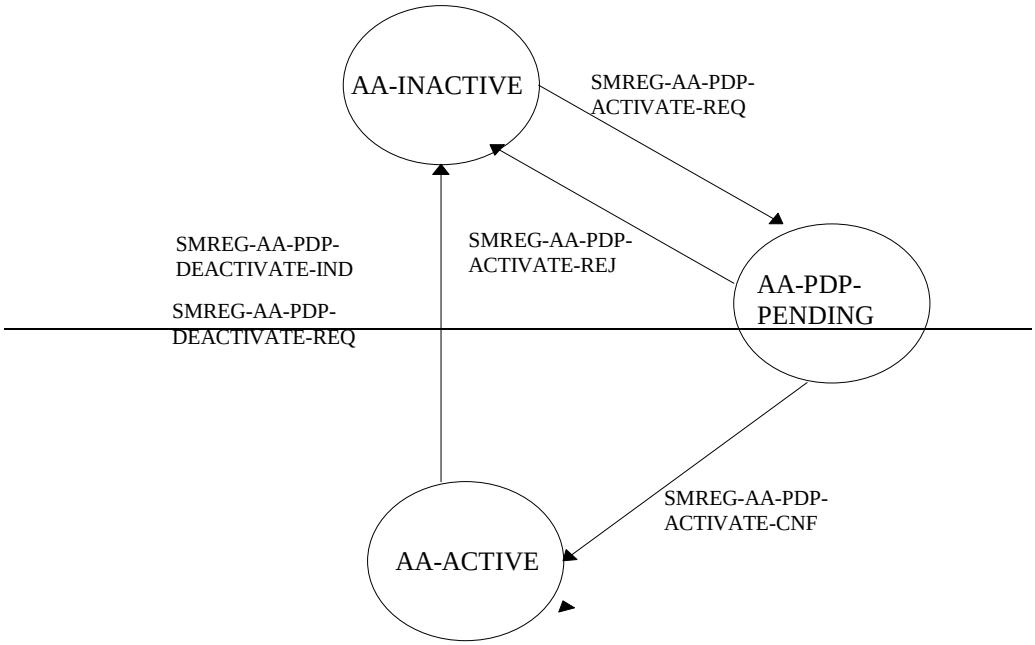



**Figure 6.4: Session Management service states at the SMREG-SAP for GPRS ~~non-anonymous~~ PDP context handling - MS side**




**~~Figure 6.5:Session management services states at SMREG-SAP for GPRS anonymous services - MS side~~**

## 6.6 Registration Services for GPRS-Services

The attach/detach procedures comprise the registration services which are provided at the GMMREG-SAP for ~~non-anonymous access~~.

It shall be noted, that the registration services for mobiles of class A or B may depend on the service states for GPRS and non-GPRS services. Therefore the internal access points MMCOORD and the GMMCOORD ( see figure 5.3) are used by GMM and MM to inform each other about the relevant conditions. No service primitives between the entities within the same sublayer, i.e. the MM sublayer, are defined in 04.07. The Mobility Management for class A and B mobiles is further specified in 04.08.

### 6.6.1 Registration Services for GMMREG-SAP

**Table 6.6.1: Service primitives and parameters at GMMREG-SAP - MS side**

| PRIMITIVE | PARAMETER (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| GMMREG-ATTACH-REQ | attach-type, READY-timer, STANDBY-timer | 6.6.1.1 |
| GMMREG-ATTACH-CNF | PLMNs MT-caps, attach-type. | 6.6.1.2 |
| GMMREG-ATTACH-REJ | cause | 6.6.1.3 |
| GMMREG-DETACH-REQ | detach-type, power-off/normal-detach | 6.6.1.4 |
| GMMREG-DETACH-CNF | detach-type | 6.6.1.5 |
| GMMREG-DETACH-IND | detach-type | 6.6.1.6 |

#### 6.6.1.1 GMMREG-ATTACH-REQ

MS initiates the GPRS and/or IMSI attach. GMM is requested to send an ATTACH REQUEST message to the network. The attachment is registration pending in the MS.

#### 6.6.1.2 GMMREG-ATTACH-CNF

The attach (either GPRS-attach or IMSI-attach or both) was successful. The network confirmed the attach, i.e. the ATTACH ACCEPT message was received by the MS. The LLC and RR sublayer will be informed by GMM about the TLLI to be used.

#### 6.6.1.3 GMMREG-ATTACH-REJ

The attach (either GPRS-attach or IMSI-attach or both) has failed. The network rejected the attach attempt, i.e. the message ATTACH REJECT was received from the network.

#### 6.6.1.4 GMMREG-DETACH-REQ

MS initiates GPRS and/or IMSI detach: GMM is requested to send a DETACH REQUEST message, the detach procedure is initiated. In case of MS initiated detach at power-off, the procedure is terminated in the MS after sending the DETACH REQUEST message.

#### 6.6.1.5 GMMREG-DETACH-CNF

The MS initiated detach (either GPRS-attach or IMSI-attach or both) has been completed.
The network confirmed the detach, i.e. the message DETACH ACCEPT was received from the network. This finalises the detach procedure (normal, not at power off). Any PDP context possibly activated before is deactivated.

#### 6.6.1.6 GMMREG-DETACH-IND

A network initiated detach has been performed. Or the detach has been performed locally due to expiration of the standby timer or a failed routing area update. In the first case the DETACH REQUEST message was from the network. Any PDP context possibly activated before is deactivated.

The registration services provided at the service access point GMMREG-SAP are illustrated in the state machine of figure 6.6 below. Note, that in state registered the MS may be suspended from GPRS mobility management due to an ongoing CS connection. The registration procedure Routing Area Updating, which is not provided at the GMMREG-SAP, is not visible within the diagram.

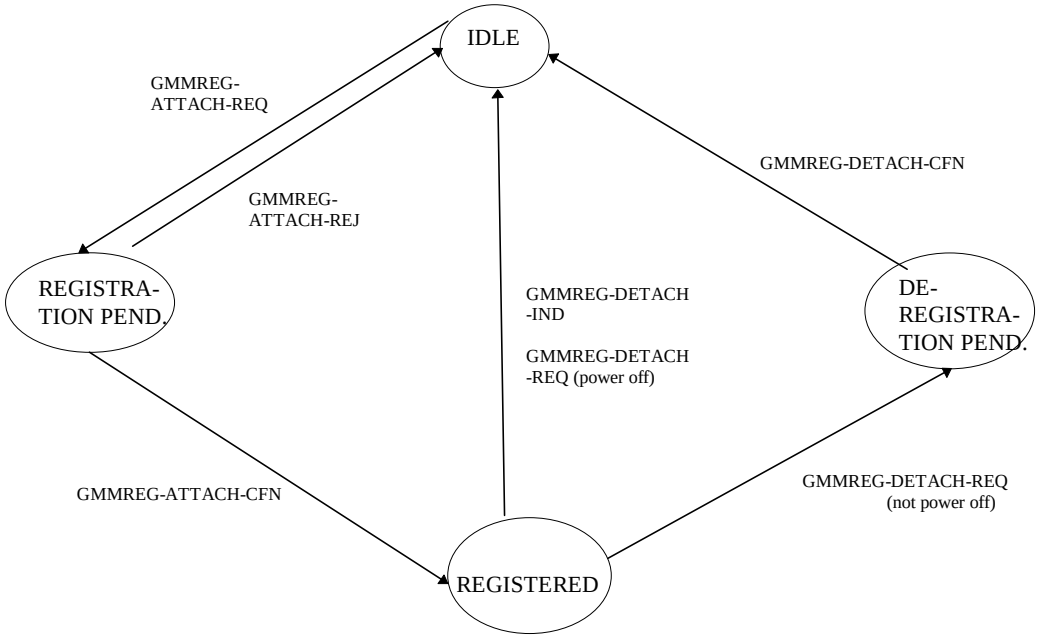



**Figure 6.6: Registration services states at GMMREG-SAP for GPRS ~~non-anonymous~~ attach and detach - MS side.**

#### 9.4.2.2 LL-UNITDATA-IND

An LLC UI frame has been received from the peer entity

## 9.5 Services provided by the GMM for GPRS services

The GPRS Mobility Management (GMM) sublayer provides services to the Session Management (SM) entity and the Short Message Service Support (GSMS) entity for message transfer.

### 9.5.1 Service primitives for GMMSM-SAP

Session management services ~~for non-anonymous~~ may request GPRS service registration before activating a PDP context.

**Table 9.5.1: Primitives and parameters at GMMSM-SAP - MS side**

| PRIMITIVE | PARAMETER (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| GMMSM-ESTABLISH-REQ | - | 9.5.1.1 |
| GMMSM-ESTABLISH-CNF | - | 9.5.1.2 |
| GMMSM-ESTABLISH-REJ | cause | 9.5.1.3 |
| GMMSM-RELEASE-IND | - | 9.5.1.4 |
| GMMSM-UNITDATA-REQ | SM-PDU | 9.5.1.5 |
| GMMSM-UNITDATA-IND | SM-PDU | 9.5.1.6 |

### 9.5.1.1 GMMSM-ESTABLISH-REQ

Request from Session Management to send an ATTACH REQUEST message to the network to setup a GMM connection. The request is only performed in case the MS is not already attached. The GPRS attach is then indirectly caused by a requested ~~non-anonymous~~ PDP context activation.

### 9.5.1.2 GMMSM-ESTABLISH-CNF

The network has send the ATTACH ACCEPT message to the MS, the indirect attach was successful. Now session management can proceed with PDP context activation.

### 9.5.1.3 GMMSM-ESTABLISH-REJ

The network has rejected the attach. The MS has received the ATTACH REJECT message.

### 9.5.1.4 GMMSM-RELEASE-IND

The GPRS mobility management informs the session management that the MS has been GPRS detached, e.g. by timer expiry, and therefore the PDP contexts are not valid anymore.

### 9.5.1.5 GMMSM-UNITDATA-REQ

The GMM is requested to forward a SM PDU to LLC in order to send it in unacknowledged more to the peer entity.

### 9.5.1.6 GMMSM-UNITDATA-IND

The GMM forwards a SM PDU, which has been received in unacknowledged mode via LLC from the peer entity.

## 9.5.2 Spareervice primitives for GMMAA-SAP

~~Session management services for an anonymous PDP require a mobility management entity which does not perform Routing Area Updating, but which requests the termination of the anonymous access in case of change of the RA.~~

**Table 9.5.2: Primitives and parameters at GMMAA-SAP - MS side**

| PRIMITIVE | PARAMETER (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| GMMAA-ESTABLISH-REQ | - | 9.5.2.1 |
| GMMAA-RELEASE-IND | - | 9.5.2.2 |
| GMMAA-ETSABLISH-REJ | - | 9.5.2.3 |

### 9.5.2.1 GMMAA-ESTABLISH-REQ

Request from Session Management to perform timer supervision (standby timer set to zero) and to disable routing area updating for anonymous PDP context(s).

### 9.5.2.2 GMMAA-RELEASE-IND

The GPRS mobility management informs the session management that the anonymous PDP contexts are deactivated.

### 9.5.2.3 GMMAA-ESTABLISH-REJ

The GPRS mobility management informs the session management that the anonymous PDP contexts activation was rejected.

**3GPP/SMG Meeting #10**
**Abiko, Japan, 11 - 14 January.2000**

***Document N1-000085***
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| **24.008** | **CR** | **111** | Current Version: | 3.2.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: TSGN#7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

| **Proposed change affects:** *(at least one should be marked with an X)* | (U)SIM | | ME | X | UTRAN / Radio | | Core Network | X |
|---|---|---|---|---|---|---|---|---|

**Source:** CN1 **Date:** 04.01.00

**Subject:** Removal of Anonymous access

**Work item:** GSM/UMTS interworking

**Category:** *(only one category shall be marked with an X)*

| | | |
|---|---|---|
| F | Correction | |
| A | Corresponds to a correction in an earlier release | |
| B | Addition of feature | |
| C | Functional modification of feature | X |
| D | Editorial modification | |

**Release:**

| | |
|---|---|
| Phase 2 | |
| Release 96 | |
| Release 97 | |
| Release 98 | |
| Release 99 | X |
| Release 00 | |

**Reason for change:** According to SA1 decision (TSG S1 (99) 1043), the AA feature should be removed from R99. No backward compatibility issues is identified (a R99 MS will not request AA and a R99 network will ignore AA request from a pre-R99 MS supporting this feature).

**Clauses affected:** 1.6, 2.2.2, 4.1, 4.7.1.4.1, 4.7.11, 6.1.1.1, 6.1.3.4, 6.1.3.5, 8.3.2, 8.5.5, 9.5.16, 9.5.17, 9.5.18, 9.5.19, 9.5.20, Table 10.4a, 10.5.6.8, Table 11.3a, Table 11.4a, 11.3.

**Other specs affected:**

| | | | |
|---|---|---|---|
| Other 3G core specifications | | → List of CRs: | 23.060 CRxxx, 24.007 CR007 |
| Other GSM core specifications | | → List of CRs: | |
| MS test specifications | | → List of CRs: | |
| BSS test specifications | | → List of CRs: | |
| O&M specifications | | → List of CRs: | |

**Other comments:**

<--------- double-click here for help and instructions on how to create a CR.

### 1.6.1 List of procedures

The following procedures are specified in this Technical Specification:

a) Clause 4 specifies elementary procedures for Mobility Management

- mobility management common procedures (subclause 4.3)
  - TMSI reallocation procedure (subclause 4.3.1)
  - authentication procedure (subclause 4.3.2)
  - identification procedure (subclause 4.3.3)
  - IMSI detach procedure (subclause 4.3.4)
  - abort procedure (subclause 4.3.5)
  - MM information procedure (subclause 4.3.6)
- mobility management specific procedures (subclause 4.4)
  - location updating procedure (subclause 4.4.1)
  - periodic updating (subclause 4.4.2)
  - IMSI attach procedure (subclause 4.4.3)
  - generic location updating procedure (subclause 4.4)
- connection management sublayer service provision
  - mobility management connection establishment (subclause 4.5.1)
  - mobility management connection information transfer phase (subclause 4.5.2)
  - mobility management connection release (subclause 4.5.3)
- GPRS specific mobility management procedures (subclause 4.7)
  - GPRS attach procedure (subclause 4.7.3)
  - GPRS detach procedure (subclause 4.7.4)
  - GPRS routing area updating procedure (subclause 4.7.5)
- GPRS common mobility management procedures (subclause 4.7)
  - GPRS P-TMSI reallocation procedure (subclause 4.7.6)
  - GPRS authentication and ciphering procedure (subclause 4.7.7)
  - GPRS identification procedure (subclause 4.7.8)
  - GPRS information procedure (subclause 4.7.12)

b) Clause 5 specifies elementary procedures for circuit switched Call Control comprising the following elementary procedures:

- mobile originating call establishment (subclause 5.2.1)
- mobile terminating call establishment (subclause 5.2.2)
- signalling procedures during the active state (subclause 5.3)
  - user notification procedure (subclause 5.3.1)
  - call rearrangements (subclause 5.3.2)

- DTMF protocol control procedure (subclause 5.5.7)
- in-call modification (subclause 5.3.4)

- call clearing initiated by the mobile station (subclause 5.4.3)
- call clearing initiated by the network (subclause 5.4.4)
- miscellaneous procedures
  - in-band tones and announcements (subclause 5.5.1)
  - status enquiry procedure (subclause 5.5.3)
  - call re-establishment procedure (subclause 5.5.4)

d) Clause 6 specifies elementary procedures for session management

- GPRS session management procedures (subclause 6.1)
  - PDP context activation (subclause 6.1.1)
  - PDP context modification (subclause 6.1.2)
  - PDP context deactivation (subclause 6.1.3)
  - ~~anonymous PDP context activation (subclause 6.1.4)~~
  - ~~anonymous PDP context deactivation (subclause 6.1.5)~~

The elementary procedures can be combined to form structured procedures. Examples of such structured procedures are given in clause 7. This part of the Technical Specification is only provided for guidance to assist implementations.

Clause 8 specifies actions to be taken on various error conditions and also provides rules to ensure compatibility with future enhancements of the protocol.

## 2.2.2 Vocabulary

The following terms are used in this Technical Specification:

- **idle mode:** In this mode, the mobile station is not allocated any dedicated channel; it listens to the CCCH and the BCCH;
- **group receive mode:** (only applicable for mobile stations supporting VGCS listening or VBS listening) In this mode, the mobile station is not allocated a dedicated channel with the network; it listens to the downlink of a voice broadcast channel or voice group call channel allocated to the cell. Occasionally, the mobile station has to listen to the BCCH of the serving cell as defined in TS 23.022 and 05.08;
- **dedicated mode:** In this mode, the mobile station is allocated at least two dedicated channels, only one of them being a SACCH;
- **group transmit mode:** (only applicable for mobile stations supporting VGCS talking) In this mode, one mobile station of a voice group call is allocated two dedicated channels, one of them being a SACCH. These channels can be allocated to one mobile station at a time but to different mobile stations during the voice group call;
- **packet idle mode**: (only applicable for mobile stations supporting GPRS) In this mode, mobile station is not allocated any radio resource on a packet data physical channel; it listens to the PBCCH and PCCCH or, if those are not provided by the network, to the BCCH and the CCCH, see GSM 04.60.
- **packet transfer mode**: (only applicable for mobile stations supporting GPRS) In this mode, the mobile station is allocated radio resource on one or more packet data physical channels for the transfer of LLC PDUs.
- **main DCCH:** In Dedicated mode and group transmit mode, only two channels are used as DCCH, one being a SACCH, the other being a SDCCH or a FACCH; the SDCCH or FACCH is called here "the main DCCH";

- A channel is **activated** if it can be used for transmission, in particular for signalling, at least with UI frames. On the SACCH, whenever activated, it must be ensured that a contiguous stream of layer 2 frames is sent;

- A TCH is **connected** if circuit mode user data can be transferred. A TCH cannot be connected if it is not activated. A TCH which is activated but not connected is used only for signalling, i.e. as a DCCH;

- The data link of SAPI 0 on the main DCCH is called the **main signalling link**. Any message specified to be sent on the main signalling link is sent in acknowledged mode except when otherwise specified;

- The term **"to establish"** a link is a short form for **"to establish the multiframe mode"** on that data link. It is possible to send UI frames on a data link even if it is not established as soon as the corresponding channel is activated. Except when otherwise indicated, a data link layer establishment is done without an information field.

- **"channel set"** is used to identify TCHs that carry related user information flows, e.g., in a multislot configuration used to support circuit switched connection(s), which therefore need to be handled together.

- A **temporary block flow** (TBF) is a physical connection used by the two RR peer entities to support the uni-directional transfer of LLC PDUs on packet data physical channels, see GSM 04.60.

- **RLC/MAC block:** A RLC/MAC block is the protocol data unit exchanged between RLC/MAC entities, see GSM 04.60.

- A **GMM context** is established when a GPRS attach procedure is successfully completed.

-- **Network operation mode**

The three different network operation modes I, II, and III are defined in TS 23.060 [74].

The network operation mode shall be indicated as system information. For proper operation, the network operation mode should be the same in each cell of one routing area.

-- **GPRS MS operation mode**

The three different GPRS MS operation modes A, B, and C are defined in TS 23.060 [74].

~~**Anonymous access** refers to limited service provisioning to an MS whose identity is unknown in the network.~~

- **RR connection:** A RR connection is a dedicated physical circuit switched domain connection used by the two RR or RRC peer entities to support the upper layers' exchange of information flows.

- **PS signalling connection** is a peer to peer UMTS connection between MS and CN packet domain node.

- **Inter-System change** is a change of radio access between different radio access technologies such as GSM and UMTS.

- **GPRS:** Packet Services for GSM and UMTS system.

- The label **(GSM only)** indicates this section or paragraph applies only to GSM system. For multi system case this is determined by the current serving radio access network.

- The label **(UMTS only)** indicates this section or paragraph applies only to UMTS system. For multi system case this is determined by the current serving radio access network.

- **In GSM,...** Indicates this paragraph applies only to GSM System. For multi system case this is determined by the current serving radio access network.

- **In UMTS,...** Indicates this paragraph applies only to UMTS System. For multi system case this is determined by the current serving radio access network.

- **SIM,** Subscriber Identity Module (see TS GSM 02.17). This specification makes no distinction between SIM and USIM.

- **MS,** Mobile Station. This specification makes no distinction between MS and UE.

# 4.1 General

This section describes the procedures used for mobility management for non-GPRS services and for GPRS-services at the radio interface (Reference Point Um and Uu).

The main function of the Mobility Management sublayer is to support the mobility of user terminals, such as informing the network of its present location and providing user identity confidentiality.

A further function of the MM sublayer is to provide connection management services to the different entities of the upper Connection Management (CM) sublayer (see TS 24.007).

There are two sets of procedures defined in this chapter:

- MM procedures for non-GPRS services (performed by the MM entity of the MM sublayer); and
- GMM procedures for GPRS services (performed by the GMM entity ~~and GMM-AA entity~~ of the MM sublayer), see TS 24.007 [20].

All the MM procedures described in this section can only be performed if a RR connection has been established between the MS and the network. Else, the MM sublayer has to initiate the establishment of a RR connection (see GSM 04.18 section 3.3 and TS 25.331 section 8.2.3). The GMM procedures described in this section, use services provided by the RR sublayer without prior RR connection establishment.

GMM procedures are mandatory and applicable only for GPRS MSs and networks supporting those MSs. For GPRS MSs which are IMSI attached for both GPRS and non-GPRS services, some MM procedures are replaced by GMM combined procedures provided that the network operates in network operation mode I, i.e. is supporting combined GMM procedures. GMM combined procedures are not applicable for the GPRS MS operation mode C but are mandatory for the GPRS MS operation modes A and B and networks supporting network operation mode I, see TS 23.060.

#### 4.7.1.4.1 Radio resource sublayer address handling (GSM only)

This section describes how the RR addressing is managed by GMM. For the detailed coding of the different TLLI types and how a TLLI can be derived from a P-TMSI, see TS 23.003 [10].

Two cases can be distinguished:

- a valid P-TMSI is available in the MS; or
- no valid P-TMSI is available in the MS

~~NOTE: For anonymous access, the RR address assignment is handled by the SM sublayer as described in section 6.1.1.1.~~

i) valid P-TMSI available

If the MS has stored a valid P-TMSI, the MS shall derive a foreign TLLI from that P-TMSI and shall use it for transmission of the:

- ATTACH REQUEST message of any GPRS combined/non-combined attach procedure; and
- ROUTING AREA UPDATE REQUEST message of a combined/non-combined RAU procedure if the MS has entered a new routing area, or if the GPRS update status is not equal to GU1 UPDATED.

Any other GMM message is transmitted using a local TLLI derived from the stored P-TMSI. This includes a ROUTING AREA UPDATE REQUEST message that is sent within a periodic routing area update procedure.

ii) no valid P-TMSI available

When the MS has not stored a valid P-TMSI, i.e. the MS is not attached to GPRS, the MS shall use a randomly selected random TLLI for transmission of the:

- ATTACH REQUEST message of any combined/non-combined GPRS attach procedure.

The same randomly selected random TLLI value shall be used for all message retransmission attempts and for the cell updates within one attach attempt.

Upon receipt of an ATTACH REQUEST message, the network assigns a P-TMSI to the MS, derives a local TLLI from the assigned P-TMSI, and transmits the assigned P-TMSI to the MS.

Upon receipt of the assigned P-TMSI, the MS shall derive the local TLLI from this P-TMSI and shall use it for addressing at lower layers.

In both cases, the MS shall acknowledge the reception of the assigned P-TMSI to the network. After receipt of the acknowledgement, the network shall use the local TLLI for addressing at lower layers.

## 4.7.11 Spare~~GMM support for anonymous access~~

~~The GMM-AA entity within the MM sublayer (see GSM 04.07) supports SM message routing for anonymous PDP context handling independently of the GMM procedures described throughout section 4.7 as described in section 6.1.1.1. There are no dedicated signalling procedures specified for the GMM-AA entity.~~

~~An AA-READY timer is implemented in the GMM-AA entity. This timer is used to supervise the time an anonymous access may be active without user data transfer.~~

### ~~4.7.11.1 MS side~~

~~The AA-READY timer value shall either be the default value or a value set by the network and sent to the MS by means of an SM message. The AA-READY timer shall be reset and restarted in the MS when the GMM-AA entity receives an indication from lower layers that an LLC frame has been transmitted on the radio interface. When the AA-READY timer expires or a routing area border is crossed, the MS shall deactivate the anonymous access locally, i.e. no signalling messages are exchanged between the MS and the network.~~

~~While the AA-READY timer is running, the MS shall perform cell updates when a new cell is selected within the same RA.~~

### ~~4.7.11.2 Network side~~

~~The AA-READY timer value shall either be the default value or a value received from the MS and possibly modified by the network and sent to the MS by means of an SM message. The AA-READY timer shall be reset and restarted by the network when the GMM-AA entity receives an indication from lower layers that an LLC frame has been successfully received by the network. When the AA-READY timer expires, the network shall deactivate the anonymous access locally, i.e. no signalling messages are exchanged between the network and the MS.~~

~~To account for the LLC frame uplink transmission delay, the AA-READY timer value should be slightly shorter in the network than in the MS. This is a network implementation issue.~~

## 6.1.1 General

The main function of the session management (SM) is to support PDP context handling of the user terminal. The SM comprises procedures for

~~-~~ identified PDP context activation, deactivation and modification~~; and~~

~~- anonymous PDP context activation and deactivation, (FFS in UMTS)~~.

SM procedures for identified access can only be performed if a GMM context has been established between the MS and the network. If no GMM context has been established, the MM sublayer has to initiate the establishment of a GMM context by use of the GMM procedures as described in chapter 4. After GMM context establishment, SM uses services offered by GMM (see TS 24.007 [20]). Ongoing SM procedures are suspended during GMM procedure execution.

~~For anonymous access no GMM context is established.~~

For the session management protocol, the extended TI mechanism may be used (see 24.007)

~~6.1.1.1 Radio resource sublayer address handling for anonymous access (FFS in UMTS)~~

~~In the case of anonymous access, no P-TMSI shall be used by the MS or by the network. The MS shall use a randomly selected random TLLI for transmission of the ACTIVATE AA PDP CONTEXT REQUEST message in order to activate the AA PDP context.~~

~~Upon receipt of the ACTIVATE AA PDP CONTEXT REQUEST message, the network assigns an auxiliary TLLI (A-TLLI) to the AA PDP context and transmits the assigned A-TLLI to the MS. After receipt of the assigned A-TLLI, the MS shall use it for further data transmission to the network for the lifetime of the AA PDP context.~~

6.1.3.4 Spare~~AA PDP context activation (FFS in UMTS)~~

~~The purpose of this procedure is to anonymously establish a PDP context between the MS and the network for a specific QoS on a specific NSAPI. The AA PDP context activation shall only be initiated by the MS.~~

~~6.1.3.4.1 Successful AA PDP context activation initiated by the mobile station~~

~~In order to activate an anonymous PDP context, the MS sends an ACTIVATE AA PDP CONTEXT REQUEST message to the network, enters the state PDP-ACTIVE-PENDING and starts timer T3380. As long as no auxiliary TLLI is allocated to the MS, a random TLLI is used for addressing on lower layers.~~

~~Upon receipt of an ACTIVATE AA PDP CONTEXT REQUEST message, the network selects a radio priority level based on the QoS negotiated, assigns a AA-TID to the PDP context and sends an ACTIVATE AA PDP CONTEXT ACCEPT message to the MS. The message shall contain a the selected radio priority level and negotiated QoS allocated by the network. If the offered QoS parameters received from the network differ from the QoS requested by the MS, the MS shall accept the QoS offered by the network. If the LLC SAPI indicated by the network can not be supported by the MS, the MS shall initiate the implicit AA PDP context deactivation procedure. Upon receipt of the message ACTIVATE AA PDP CONTEXT ACCEPT, the MS shall stop timer T3380, shall enter the state PDP-ACTIVE and shall initiate establishment of the logical link for the LLC SAPI indicated by the network with the negotiated QoS.~~

~~6.1.3.4.2 Unsuccessful AA PDP context activation~~

~~Upon receipt of the ACTIVATE AA PDP CONTEXT REQUEST message the network may indicate the failure of the MS initiated AA PDP context activation by sending the ACTIVATE AA PDP CONTEXT REJECT message to the MS. The message contains a cause code that typically indicates one of the following causes:~~

~~# 32: service option not supported;~~
~~# 34: service option temporarily out of order;~~
~~# 90 - 111: protocol errors.~~

~~The MS shall stop the timer T3380.~~

~~6.1.3.4.3 Abnormal cases~~

~~a) Expiry of timers~~

~~On the first expiry of timer T3380, the MS shall retransmit the ACTIVATE AA PDP CONTEXT REQUEST message and shall reset and restart timer T3380.~~

~~This retransmission is repeated four times, i.e. on the fifth expiry of timer T3380, the MS shall indicate the failure of the AA PDP context activation procedure to the register functions, shall release all resources possibly allocated for this invocation and shall abort the procedure; no automatic AA PDP context activation re-attempt shall be performed.~~

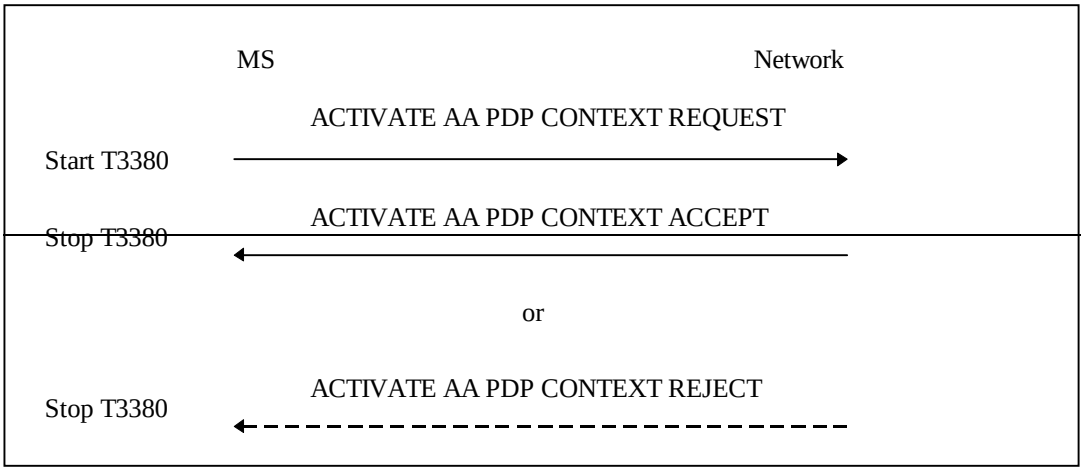



**Figure 6.10 TS 24.008: MS initiated AA PDP context activation procedure**

### 6.1.3.5 SpareAA PDP context deactivation

#### 6.1.3.5.1 Implicit AA PDP context deactivation

The implicit deactivation is performed without signalling message exchange as specified below.

The AA PDP context on the network side shall be deactivated when:

- the AA READY timer expires in the GMM-AA entity.

The AA PDP context in the MS shall be deactivated when:

- the AA READY timer expires in the GMM-AA entity;
- the MS changes the routing area;
- the LLC SAPI indicated by the network can not be supported by the MS during activation, or
- user requested.

#### 6.1.3.5.2 Explicit AA PDP context deactivation

An explicit AA PDP context deactivation shall only be initiated by the network. The procedure shall be performed when a misuse of the anonymous PDP context has been detected.

In order to deactivate the AA PDP context, the network sends the message DEACTIVATE AA PDP CONTEXT REQUEST and starts timer T3397. The message shall contain the transaction identifier in use for the AA PDP context to be deactivated. After sending the message the network initiates the release of the logical link.

The MS shall, upon receipt of this message, reply with the DEACTIVATE AA PDP CONTEXT ACCEPT message after the logical link has been released.

Upon receipt of the DEACTIVATE AA PDP CONTEXT ACCEPT message, the network shall stop the timer T3397.

#### 6.1.3.5.3 Abnormal cases

a) Expiry of timers

- On the first expiry of timer T3397, the network shall retransmit the message DEACTIVATE AA PDP CONTEXT REQUEST and shall reset and restart timer T3397.
- This retransmission is repeated four times, i.e. on the fifth expiry of timer T3397, the network shall release all remaining resources allocated for that MS and shall erase the AA PDP context related data for that MS.

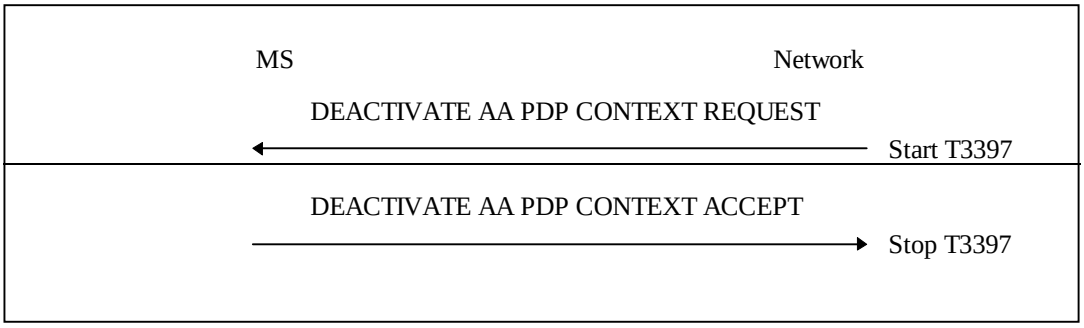



**Figure 6.11/TS 24.008: Network initiated AA PDP context deactivation procedure**

b) Lower layer failure

If a lower layer failure is indicated before the DEACTIVATE AA PDP CONTEXT ACCEPT message is sent, the MS shall abort the procedure and shall locally de-allocate the P-TMSI from the LLC sublayer.

If a lower layer failure is indicated before the DEACTIVATE AA PDP CONTEXT ACCEPT message is received, the network shall abort the procedure and shall locally de-allocate the P-TMSI from the LLC sublayer.

## 8.3.2 Session Management

The mobile station and network shall reject a session management message other than SM-STATUS received with TI EXT bit = 0 by immediately sending an SM-STATUS message using the received 2 octet TI value encoding. Otherwise, the following procedures shall apply:

a) Whenever any session management message except ACTIVATE PDP CONTEXT REQUEST, ACTIVATE AA PDP CONTEXT REQUEST or SM-STATUS is received by the network specifying a transaction identifier which is not recognized as relating to an active context or to a context that is in the process of activation or deactivation or has been [recently] deactivated, the network should send a SM-STATUS message with cause #81 "invalid transaction identifier value" using the received transaction identifier value and remain in the PDP-INACTIVE state.

b) Whenever any session management message except REQUEST PDP CONTEXT ACTIVATION or SM-STATUS is received by the MS specifying a transaction identifier which is not recognized as relating to an active context or to a context that is in the process of activation or deactivation or has been [recently] deactivated, the MS shall send a SM-STATUS message with cause #81 "invalid transaction identifier value" using the received transaction identifier value and remain in the PDP-INACTIVE state.

c) When an ACTIVATE AA PDP CONTEXT REQUEST or REQUEST PDP CONTEXT ACTIVATION message is received with a transaction identifier flag set to "1", this message shall be ignored.

d) When an ACTIVATE PDP CONTEXT REQUEST message is received specifying a transaction identifier which is not recognized as relating to a context that is in the process of activation, and with a transaction identifier flag set to "1", this message shall be ignored.

e) Whenever an ACTIVATE PDP CONTEXT REQUEST or ACTIVATE AA PDP CONTEXT REQUEST message is received by the network specifying a transaction identifier relating to a PDP context not in state PDP-INACTIVE, the network shall deactivate the old PDP context relating to the received transaction identifier without notifying the MS. Furthermore, the network shall continue with the activation procedure of a new PDP context as indicated in the received message.

f) Whenever a REQUEST PDP CONTEXT ACTIVATION message is received by the MS specifying a transaction identifier relating to a PDP context not in state PDP-INACTIVE, the MS shall locally deactivate the old PDP context relating to the received transaction identifier. Furthermore, the MS shall continue with the activation procedure of a new PDP context as indicated in the received message.

## 8.5.5 Session management

a) If the message is a DEACTIVATE PDP CONTEXT REQUEST, a DEACTIVATE PDP CONTEXT ACCEPT message shall be returned. All resources allocated for that context shall be released.

~~b)If the message is a DEACTIVATE AA PDP CONTEXT REQUEST, a DEACTIVATE AA PDP CONTEXT ACCEPT message shall be returned. All resources allocated for that context shall be released.~~

~~c)~~b) If the message is a REQUEST PDP CONTEXT ACTIVATION, a REQUEST PDP CONTEXT REJECT message with cause # 96 "Invalid mandatory information" shall be returned.

~~d)~~c) If the message is an ACTIVATE PDP CONTEXT REQUEST, an ACTIVATE PDP CONTEXT REJECT message with cause # 96 "Invalid mandatory information" shall be returned.

~~If the message is an ACTIVATE AA PDP CONTEXT REQUEST, an ACTIVATE AA PDP CONTEXT REJECT message with cause # 96 "Invalid mandatory information" shall be returned.~~

## 9.5.16 Spare~~Activate AA PDP context request (FFS in UMTS)~~

~~This message is sent by the MS to the network to initiate activation of an AA PDP context.~~
~~See table 9.5.16/TS 24.008.~~

~~Message type: ACTIVATE AA PDP CONTEXT REQUEST~~

~~Significance: global~~

~~Direction: MS to network~~

**~~Table 9.5.16/TS 24.008: ACTIVATE AA PDP CONTEXT REQUEST message content~~**

| ~~IEI~~ | ~~Information Element~~ | ~~Type/Reference~~ | ~~Presence~~ | ~~Format~~ | ~~Length~~ |
|---|---|---|---|---|---|
| | ~~Protocol discriminator~~ | ~~Protocol discriminator 10.2~~ | ~~M~~ | ~~V~~ | ~~1/2~~ |
| | ~~Transaction identifier~~ | ~~Transaction identifier 10.3.2~~ | ~~M~~ | ~~V~~ | ~~1/2~~ |
| | ~~Activate AA PDP context request message identity~~ | ~~Message type 10.4~~ | ~~M~~ | ~~V~~ | ~~1~~ |
| | ~~Requested NSAPI~~ | ~~Network service access point identifier 10.5.6.2~~ | ~~M~~ | ~~V~~ | ~~1~~ |
| | ~~Requested LLC SAPI~~ | ~~LLC service access point identifier 10.5.6.9~~ | ~~M~~ | ~~V~~ | ~~1~~ |
| | ~~Requested QoS~~ | ~~Quality of service 10.5.6. 5~~ | ~~M~~ | ~~LV~~ | ~~19~~ |
| | ~~Requested packet data protocol address~~ | ~~Packet data protocol address 10.5.6.4~~ | ~~M~~ | ~~LV~~ | ~~3 - 19~~ |
| ~~28~~ | ~~Access point name~~ | ~~Access point name 10.5.6.1~~ | ~~O~~ | ~~TLV~~ | ~~3 - 102~~ |
| ~~27~~ | ~~Protocol configuration options~~ | ~~Protocol configuration options 10.5.6.3~~ | ~~O~~ | ~~TLV~~ | ~~3 - 253~~ |
| ~~29~~ | ~~Requested AA-READY timer value~~ | ~~GPRS Timer 10.5.7.3~~ | ~~O~~ | ~~TV~~ | ~~2~~ |

### ~~9.5.16.1 Access point name~~

~~This IE is included in the message when the MS selects a specific external network to be connected to.~~

### ~~9.5.16.2 Protocol configuration options~~

~~This IE is included in the message when the MS provides protocol configuration options for the external PDN.~~

### ~~9.5.16.3 Requested AA-READY timer value~~

~~This IE may be included if the MS wants to indicate a preferred value for the AA-READY timer.~~

## 9.5.17 SpareActivate AA PDP context accept (FFS in UMTS)

This message is sent by the network to the MS to acknowledge the activation of an AA PDP context. See table 9.5.17/TS 24.008.

Message type: ACTIVATE AA PDP CONTEXT ACCEPT

Significance: global

Direction: network to MS

**Table 9.5.17/TS 24.008: ACTIVATE AA PDP CONTEXT ACCEPT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Protocol discriminator | Protocol discriminator 10.2 | M | V | 1/2 |
| | Transaction identifier | Transaction identifier 10.3.2 | M | V | 1/2 |
| | Activate AA PDP context accept message identity | Message type 10.4 | M | V | 1 |
| | Negotiated LLC SAPI | LLC service access point identifier 10.5.6.9 | M | V | 1 |
| | Negotiated QoS | Quality of service 10.5.6. 5 | M | LV | 19 |
| | Allocated P-TMSI | Mobile identity 10.5.1.4 | M | LV | 6 |
| | Packet data protocol address | Packet data protocol address 10.5.6.4 | M | LV | 3 - 19 |
| | Radio priority | Radio priority 10.5.7.2 | M | V | 1/2 |
| | Spare half octet | Spare half octet 10.5.1.8 | M | V | 1/2 |
| 27 | Protocol configuration options | Protocol configuration options 10.5.6.3 | O | TLV | 3 - 253 |
| 29 | Negotiated AA-Ready timer value | GPRS Timer 10.5.7.3 | O | TV | 2 |
| 34 | Packet Flow Identifier | Packet Flow Identifier 10.5.6.11 | O | TLV | 3 |

### 9.5.17.1 Protocol configuration options

This IE may be included if the network wishes to transmit protocol configuration options from the external PDN.

### 9.5.17.2 Negotiated AA-Ready timer value

This IE may be included if the network wants to indicate a value for the AA-READY timer.

### 9.5.17.3 Packet Flow Identifier

This IE may be included if the network wants to indicate the Packet Flow Identifier associated to the PDP context.

## 9.5.18 SpareActivate AA PDP context reject

This message is sent by the network to the MS to reject the activation of an AA PDP context. See table 9.5.18/TS 24.008.

Message type: ACTIVATE AA PDP CONTEXT REJECT

Significance: global

Direction: network to MS

**Table 9.5.18/TS 24.008: ACTIVATE AA PDP CONTEXT REJECT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Protocol discriminator | Protocol discriminator 10.2 | M | V | 1/2 |
| | Transaction identifier | Transaction identifier 10.3.2 | M | V | 1/2 |
| | Activate AA PDP context reject message identity | Message type 10.4 | M | V | 1 |
| | SM Cause | SM Cause 10.5.6.6 | M | V | 1 |
| 27 | Protocol configuration options | Protocol configuration options 10.5.6.3 | O | TLV | 3 - 253 |

### 9.5.18.1 Protocol configuration options

The protocol configuration options IE may only be inserted by the network (see TS29.060) if the SM Cause indicates "activation rejected by GGSN".

## 9.5.19 SpareDeactivate AA PDP context request

This message is sent to request deactivation of an active AA PDP context. See table 9.5.19/TS 24.008.

Message type: DEACTIVATE AA PDP CONTEXT REQUEST

Significance: global

Direction: network to MS

**Table 9.5.19/TS 24.008: DEACTIVATE AA PDP CONTEXT REQUEST message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Protocol discriminator | Protocol discriminator 10.2 | M | V | 1/2 |
| | Transaction identifier | Transaction identifier 10.3.2 | M | V | 1/2 |
| | Deactivate AA PDP context request message identity | Message type 10.4 | M | V | 1 |
| | AA deactivation cause | AA deactivation cause 10.5.6.8 | M | V | 1/2 |
| | Spare half octet | Spare half octet 10.5.1.8 | M | V | 1/2 |

## 9.5.20 SpareDeactivate AA PDP context accept

This message is sent to acknowledge deactivation of an AA PDP context requested by the corresponding *Deactivate AA PDP context request* message. See table 9.5.20/TS 24.008.

Message type: DEACTIVATE AA PDP CONTEXT ACCEPT

Significance: global

Direction: MS to network

**Table 9.5.20/TS 24.008: DEACTIVATE AA PDP CONTEXT ACCEPT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Protocol discriminator | Protocol discriminator 10.2 | M | V | 1/2 |
| | Transaction identifier | Transaction identifier 10.3.2 | M | V | 1/2 |
| | Deactivate AA PDP context accept message identity | Message type 10.4 | M | V | 1 |

**Table 10.4a/TS 24.008: Message types for GPRS session management**

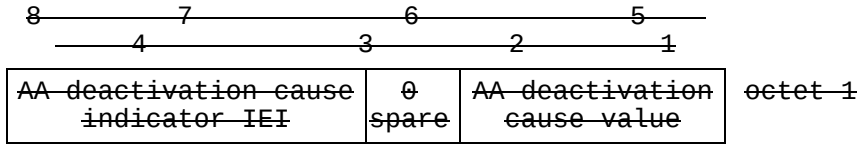
| Bits 8 7 6 5 4 3 2 1 | |
|---|---|
| 0 1 - - - - - - | Session management messages |
| 0 1 0 0 0 0 0 1 | Activate PDP context request |
| 0 1 0 0 0 0 1 0 | Activate PDP context accept |
| 0 1 0 0 0 0 1 1 | Activate PDP context reject |
| 0 1 0 0 0 1 0 0 | Request PDP context activation |
| 0 1 0 0 0 1 0 1 | Request PDP context activation rej. |
| 0 1 0 0 0 1 1 0 | Deactivate PDP context request |
| 0 1 0 0 0 1 1 1 | Deactivate PDP context accept |
| 0 1 0 0 1 0 0 0 | Modify PDP context request(Network to MS direction) |
| 0 1 0 0 1 0 0 1 | Modify PDP context accept (MS to network direction) |
| 0 1 0 0 1 0 1 0 | Modify PDP context request(MS to network direction) |
| 0 1 0 0 1 0 1 1 | Modify PDP context accept (Network to MS direction) |
| 0 1 0 0 1 1 0 0 | Modify PDP context reject |
| 0 1 0 0 1 1 0 1 | Activate secondary PDP context request |
| 0 1 0 0 1 1 1 0 | Activate secondary PDP context accept |
| 0 1 0 0 1 1 1 1 | Activate secondary PDP context reject |
| 0 1 0 1 0 0 0 0 | ~~Activate AA PDP context request~~ Reserved: was allocated in earlier phases of the protocol |
| 0 1 0 1 0 0 0 1 | ~~Activate AA PDP context accept~~ Reserved: was allocated in earlier phases of the protocol |
| 0 1 0 1 0 0 1 0 | ~~Activate AA PDP context reject~~Reserved: was allocated in earlier phases of the protocol |
| 0 1 0 1 0 0 1 1 | ~~Deactivate AA PDP context request~~Reserved: was allocated in earlier phases of the protocol |
| 0 1 0 1 0 1 0 0 | ~~Deactivate AA PDP context accept~~ Reserved: was allocated in earlier phases of the protocol |
| 0 1 0 1 0 1 0 1 | SM Status |

## 10.5.6.8 Spare~~AA deactivation cause~~

~~The purpose of the *AA deactivation cause* information element is to indicate the reason why a AA PDP context was deactivated by the network.~~

~~The *AA deactivation cause* information element is coded as shown in figure 10.5.140/TS 24.008 and table 10.5.158/TS 24.008.~~

~~The *AA deactivation cause* is a type 1 information element.~~




**~~Figure 10.5.140/TS 24.008: *AA deactivation cause* information element~~**

~~**Table 10.5.158/TS 24.008: *AA deactivation cause* information element**~~

~~AA deactivation cause value (octet 1)~~
~~Bits~~
~~3 2 1~~

~~0 0 0 Normal, unspecified~~
~~0 0 1 Server address violation~~
~~0 1 0 Network overload~~
~~0 1 1 Server not reachable~~

~~All other values are interpreted as *Normal, unspecified* by this version of the protocol.~~

**Table 11.3a/TS 24.008: GPRS Mobility management timers – MS side**

| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | ON EXPIRY |
|---|---|---|---|---|---|
| T3302 | T3212<br>Note 4 | GMM-DEREG<br>or<br>GMM-REG | At attach failure and the attempt counter is greater than or equal to 5.<br>At routing area updating failure and the attempt counter is greater than or equal to 5. | At successful attach<br>At successful routing area updating | On every expiry, initiation of the<br>GPRS attach procedure<br>or<br>RAU procedure |
| T3312 | Default 54 min<br>Note1 | GMM-REG | In GSM, when READY state is left.<br>In UMTS, when PMM-CONNECTED mode is left. | When entering state GMM-DEREG | Initiation of the Periodic RAU procedure |
| T3314<br>READY<br>(GSM only) | Default 44 sec<br>Note 2 | All except GMM-DEREG | Transmission of a PTP PDU | Forced to Standby | No cell-updates are performed |
| ~~T3316 AA-READY~~ | ~~Default 44 sec Note 2~~ | ~~-~~ | ~~Transmission of a PTP PDU~~ | ~~-~~ | ~~-~~ |
| T3317<br>(UMTS only) | 10s | GMM-REG | SERVICE REQ sent | Security mode setting procedure is completed,<br>SERVICE ACCEPT received, or<br>SERVICE REJECT received | Abort the procedure |

NOTE 1: The value of this timer is used if the network does not indicate another value in a GMM signalling procedure.

NOTE 2: The default value of this timer is used if neither the MS nor the Network send another value, or if the Network sends this value, in a signalling procedure.

NOTE 3: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.

NOTE 4: T3302 is loaded with the same value which is used to load T3212.

**Table 11.4a/TS 24.008: GPRS Mobility management timers - network side**

| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | ON EXPIRY |
|---|---|---|---|---|---|
| T3313 | Note1 | GMM_REG | Paging procedure initiated | Paging procedure completed | Network dependent |
| T3314 READY (GSM only) | Default 44 sec Note 2 | All except GMM-DEREG | Receipt of a PTP PDU | Forced to Standby | The network shall page the MS if a PTP PDU has to be sent to the MS |
| ~~T3316 AA-READY~~ | ~~Default 44 sec Note 2~~ | - | ~~Receipt of a PTP PDU~~ | - | - |
| Mobile Reachable | Default 4 min greater than T3312 | All except GMM-DEREG | In GSM, change from READY to STANDBY state<br>In UMTS, change from PMM-CONNECTED mode to PMM-IDLE mode. | PTP PDU received | Network dependent but typically paging is halted on 1st expiry |

NOTE 1: The value of this timer is network dependent.

NOTE 2: The default value of this timer is used if neither the MS nor the Network send another value, or if the Network sends this value, in a signalling procedure. The value of this timer should be slightly shorter in the network than in the MS, this is a network implementation issue.

NOTE 3: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.

## 11.2.3 Timers of session management

**Table 11.2c/TS 24.008: Session management timers - MS side**

| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | ON THE $1^{st}$, $2^{nd}$, $3^{rd}$, $4^{th}$ EXPIRY |
|---|---|---|---|---|---|
| T3380 | 30s | PDP-ACTIVE-PEND | ACTIVATE PDP CONTEXT REQUEST or ACTIVATE SECONDARY PDP CONTEXT REQUEST sent | ACTIVATE PDP CONTEXT ACCEPT or ACTIVATE SECONDARY PDP CONTEXT ACCEPT received<br>ACTIVATE PDP CONTEXT REJECT or ACTIVATE SECONDARY PDP CONTEXT REJECT received | Retransmission of ACTIVATE PDP CONTEXT REQ or ACTIVATE SECONDARY PDP CONTEXT REQUEST |
| T3381 | 8s | PDP-MODIFY-PENDING | MODIFY PDP CONTEXT REQUEST sent | MODIFY PDP CONTEXT ACCEPT received | Retransmission of MODIFY PDP CONTEXT REQUEST |
| T3390 | 8s | PDP-INACT-PEND | DEACTIVATE PDP CONTEXT REQUEST sent | DEACTIVATE PDP CONTEXT ACC received | Retransmission of DEACTIVATE PDP CONTEXT REQUEST |

NOTE: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.

**Table 11.2d/TS 24.008: Session management timers - network side**

| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | ON THE 1st, 2nd, 3rd, 4th EXPIRY |
|---|---|---|---|---|---|
| T3385 | 8s | PDP-ACT-PEND | REQUEST PDP CONTEXT ACTIVATION sent | ACTIVATE PDP CONTEXT REQ received | Retransmission of REQUEST PDP CONTEXT ACTIVATION |
| T3386 | 8s | PDP-MOD-PEND | MODIFY PDP CONTEXT REQUEST sent | MODIFY PDP CONTEXT ACC received | Retransmission of MODIFY PDP CONTEXT REQ |
| T3395 | 8s | PDP-INACT-PEND | DEACTIVATE PDP CONTEXT REQUEST sent | DEACTIVATE PDP CONTEXT ACC received | Retransmission of DEACTIVATE PDP CONTEXT REQ |
| ~~T3397~~ | ~~8s~~ | ~~PDP-INACT-PEND~~ | ~~DEACTIVATE AA PDP CONTEXT REQUEST sent~~ | ~~DEACTIVATE AA PDP CONTEXT ACCEPT received~~ | ~~Retransmission of DEACTIVATE AA PDP CONTEXT REQUEST~~ |

NOTE: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.

**3GPP TSG-CN WG1 Meeting #10**
**Abiko, Japan, 11-14 Jan 2000**

***Document* N1-00080**
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

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| 24.008 | CR | 109 | Current Version: | 3.2.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | CN#7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]
*(at least one should be marked with an X)*

**Source:** CN1 **Date:** 00-01-11

**Subject:** Service Request procedure in the chapter 4.1.1.

**Work item:** GSM/UMTS interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | X | | Release 97 | |
| C | Functional modification of feature | | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:** The purpose of the CR is to introduce the service request procedure into the chapter 4.1.1.

**Clauses affected:** 4.1.1

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**

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<--------- double-click here for help and instructions on how to create a CR.

# 4 Elementary procedures for Mobility Management

## 4.1 General

This section describes the procedures used for mobility management for non-GPRS services and for GPRS-services at the radio interface (Reference Point Um and Uu).

The main function of the Mobility Management sublayer is to support the mobility of user terminals, such as informing the network of its present location and providing user identity confidentiality.

A further function of the MM sublayer is to provide connection management services to the different entities of the upper Connection Management (CM) sublayer (see TS 24.007).

There are two sets of procedures defined in this chapter:

- MM procedures for non-GPRS services (performed by the MM entity of the MM sublayer); and
- GMM procedures for GPRS services (performed by the GMM entity and GMM-AA entity of the MM sublayer), see TS 24.007 [20].

All the MM procedures described in this section can only be performed if a RR connection has been established between the MS and the network. Else, the MM sublayer has to initiate the establishment of a RR connection (see GSM 04.18 section 3.3 and TS 25.331 section 8.2.3). The GMM procedures described in this section, use services provided by the RR sublayer without prior RR connection establishment.

GMM procedures are mandatory and applicable only for GPRS MSs and networks supporting those MSs. For GPRS MSs which are IMSI attached for both GPRS and non-GPRS services, some MM procedures are replaced by GMM combined procedures provided that the network operates in network operation mode I, i.e. is supporting combined GMM procedures. GMM combined procedures are not applicable for the GPRS MS operation mode C but are mandatory for the GPRS MS operation modes A and B and networks supporting network operation mode I, see TS 23.060.

### 4.1.1 MM and GMM procedures

#### 4.1.1.1 Types of MM and GMM procedures

Depending on how they can be initiated, three types of MM procedures can be distinguished:

1) MM common procedures:

   A MM common procedure can always be initiated whilst a RR connection exists. The procedures belonging to this type are:

   Initiated by the network:

   - TMSI reallocation procedure;
   - authentication procedure;
   - identification procedure;
   - MM information procedure;
   - abort procedure.

     However, abort procedure is used only if an MM connection is being established or has already been established i.e. not during MM specific procedures or during IMSI detach procedure, see section 4.3.5.

   Initiated by the mobile station:

   - IMSI detach procedure (with the exceptions specified in section 4.3.4).

ii) MM specific procedures:

A MM specific procedure can only be initiated if no other MM specific procedure is running or no MM connection exists. The procedures belonging to this type are:

- normal location updating procedure;
- periodic updating procedure;
- IMSI attach procedure.

iii) MM connection management procedures:

These procedures are used to establish, maintain and release a MM connection between the mobile station and the network, over which an entity of the upper CM layer can exchange information with its peer. A MM connection establishment can only be performed if no MM specific procedure is running. More than one MM connection may be active at the same time. Depending on how they can be initiated, two types of GMM procedures can be distinguished:

i) GMM common procedures:

Initiated by the network when a GMM context has been established:

- P-TMSI (re-) allocation;
- GPRS authentication and ciphering;
- GPRS identification;
- GPRS information.

ii) GMM specific procedures:

Initiated by the network and used to detach the IMSI in the network for GPRS services and/or non-GPRS services and to release a GMM context:

- GPRS detach.

Initiated by the MS and used to attach or detach the IMSI in the network for GPRS services and/or non-GPRS services and to establish or release a GMM context:

- GPRS attach and combined GPRS attach;
- GPRS detach and combined GPRS detach.

Initiated by the MS when a GMM context has been established:

- normal routing area updating and combined routing area updating;
- periodic routing area updating.

In UMTS, initiated by the MS and used to establish a secure connection to the network and/or to request the resource reservation for sending data:

- Service Request

**3GPP N1/SMG3 WPA Meeting #11**
**Umeå/Sweden, 28th Feb. - 3rd March, 2000**

***Document*** ***N1-00 0330***

# CHANGE REQUEST

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| **24.008** | **CR** | 141 | Current Version: | 3.2.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

For submission to: CN#7 *list expected approval meeting # here ↑*

for approval [X] for information [ ]

strategic [ ] non-strategic [ ] *(for SMG use only)*

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

**Source:** CN1 **Date:** 22.02.00

**Subject:** SM IEI value

**Work item:** GSM / UMTS interworking

**Category:** *(only one category shall be marked with an X)*

| | | |
|---|---|---|
| F | Correction | [X] |
| A | Corresponds to a correction in an earlier release | [ ] |
| B | Addition of feature | [ ] |
| C | Functional modification of feature | [ ] |
| D | Editorial modification | [ ] |

**Release:**

| | |
|---|---|
| Phase 2 | [ ] |
| Release 96 | [ ] |
| Release 97 | [ ] |
| Release 98 | [ ] |
| Release 99 | [X] |
| Release 00 | [ ] |

**Reason for change:** As the *radio priority* is a type 1 information element, the current value '33' for the IEI in the message definition of the Modify PDP context accept (Network to MS direction) message is wrong. It is proposed to use '8-' instead.

**Clauses affected:** 9.5.12

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**

## 9.5.12 Modify PDP context accept (Network to MS direction)

This message is sent by the network to the MS to acknowledge the modification of an active PDP context. See table 9.5.12/TS 24.008.

Message type: MODIFY PDP CONTEXT ACCEPT (NETWORK TO MS DIRECTION)

Significance: global

Direction: Network to MS

**Table 9.5.12/TS 24.008: modify PDP context accept (NETWORK to ms direction) message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Protocol discriminator | Protocol discriminator<br>10.2 | M | V | 1/2 |
| | Transaction identifier | Transaction identifier<br>10.3.2 | M | V | 1/2 |
| | Modify PDP context accept message identity | Message type<br>10.4 | M | V | 1 |
| 30 | Negotiated QoS | Quality of service<br>10.5.6.5 | O | TLV | FFS |
| 32 | Negotiated LLC SAPI | LLC service access point identifier<br>10.5.6.9 | O | TV | 2 |
| ~~33~~8- | New radio priority | Radio priority<br>10.5.7.2 | O | TV | 1 |
| 34 | Packet Flow Identifier | Packet Flow Identifier<br>10.5.6.11 | O | TLV | 3 |

### 9.5.12.1 Negotiated QoS

This IE is included in the message if the network assigns a new QoS.

### 9.5.12.2 Negotiated LLC SAPI

This IE is included in the message if the network assigns a new LLC SAPI.

### 9.5.12.3 New radio priority

This IE is included in the message only if the network modifies the radio priority.

### 9.5.12.4 Packet Flow Identifier

This IE may be included if the network wants to indicate the Packet Flow Identifier associated to the PDP context.

*next section for information only!*

### 10.5.7.2 Radio priority

The purpose of the *radio priority* information element is to specify the priority level that the MS shall use at the lower layers for transmission of data related to a PDP context or for mobile originated SMS transmission.

The *radio priority* information element is coded as shown in figure 10.5.143/TS 24.008 and table 10.5.161/TS 24.008.

The *radio priority* is a type 1 information element.

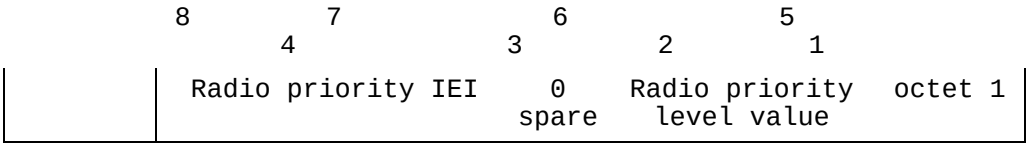


**Figure 10.5.143/TS 24.008: *Radio priority* information element**

**Table 10.5.161/TS 24.008: *Radio priority* information element**

| |
|---|
| Radio priority level value (octet 1)<br>Bits<br>3 2 1<br><br>0 0 1 priority level 1 (highest)<br>0 1 0 priority level 2<br>0 1 1 priority level 3<br>1 0 0 priority level 4 (lowest)<br><br>All other values are interpreted as priority level 4 by this version of the protocol. |

**3GPP/SMG Meeting #10**
**Abiko, Japan, 11 – 13 Jan. 2000**

***Document N1-000167***
*Revised N1-000032*
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

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| 24.011 | CR | 003r1 | Current Version: | 3.1.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | CN#7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

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**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

**Source:** CN1 **Date:** 14.1.00

**Subject:** SMC-GP SDL modification to transfer SMS messages via GMM

**Work item:** GSM/UMTS Interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | X | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:**

In UMTS, the GMM shall be used for PS-SMS transfer and the corresponding modification of SMC-GP was already agreed in CR001r6 (N1-99F53) without SMC-GP SDL. This CR completes SMC-GP SDL for UMTS.

Since an MS can't release the PS signalling connection by itself, a GMM in MS side has to do nothing when it received a PMMSMS-REL-Req primitive from an SMC-GP. Even though without this primitive, PS signalling connection may release by the NW if it is needed. So PMMSMS-REL-Reqs in SDLs should be deleted. This also causes the modification of the sequence in Annex A and 24.007 descriptions.

And this CR also clarifies the SDL in some abnormal cases. These abnormal cases can be identified in the existing text.

**Clauses affected:** Annex A; Annex B

**Other specs affected:**

| | | | |
|---|---|---|---|
| Other 3G core specifications | X | → List of CRs: | 24.007 CR xxx |
| Other GSM core specifications | | → List of CRs: | |
| MS test specifications | | → List of CRs: | |
| BSS test specifications | | → List of CRs: | |
| O&M specifications | | → List of CRs: | |

**Other comments:**


help.doc

<--------- double-click here for help and instructions on how to create a CR.

# Annex A (informative): Arrow diagrams

Arrow diagram A1:

The diagram shows CS MO-message transfer by means of interlayer service primitives and the actual messages being transferred between the layer entities

Arrow diagram A2:

The diagram shows CS MT-messaging by means of interlayer service primitives and the actual messages being transferred between the layer entities in GSM.

Arrow diagram A5:

The diagram shows GPRS MO-message transfer by means of interlayer service primitives and the actual messages being transferred between the layer entities.

- MNSMS-primitives indicate services provided by CM to SM-RL.
- LLSMS-primitives indicate services provided by LLC to CM.
- CP-DATA is the CM-message carrying SM-RP data units.
- CP-ACK acknowledge CP-DATA reception on CM.

Arrow diagram A6:

The diagram shows GPRS MT-message transfer by means of interlayer service primitives and the actual messages being transferred between the layer entities in GSM.

- MNSMS-primitives indicate services provided by CM to SM-RL.
- LLSMS-primitives indicate services provided by LLC to CM.
- CP-DATA is the CM-message carrying SM-RP data units.
- CP-ACK acknowledge CP-DATA reception on CM.

Arrow diagram A7:

The diagram shows UMTS PS MO-message transfer by means of interlayer service primitives and the actual messages being transferred between the layer entities

- MNSMS-primitives indicate services provided by CM to SM-RL.
- PMMSMS-primitives indicate services provided by GMM to CM.
- CP-DATA is the CM-message carrying SM-RP data units.
- CP-ACK acknowledge CP-DATA reception on CM.

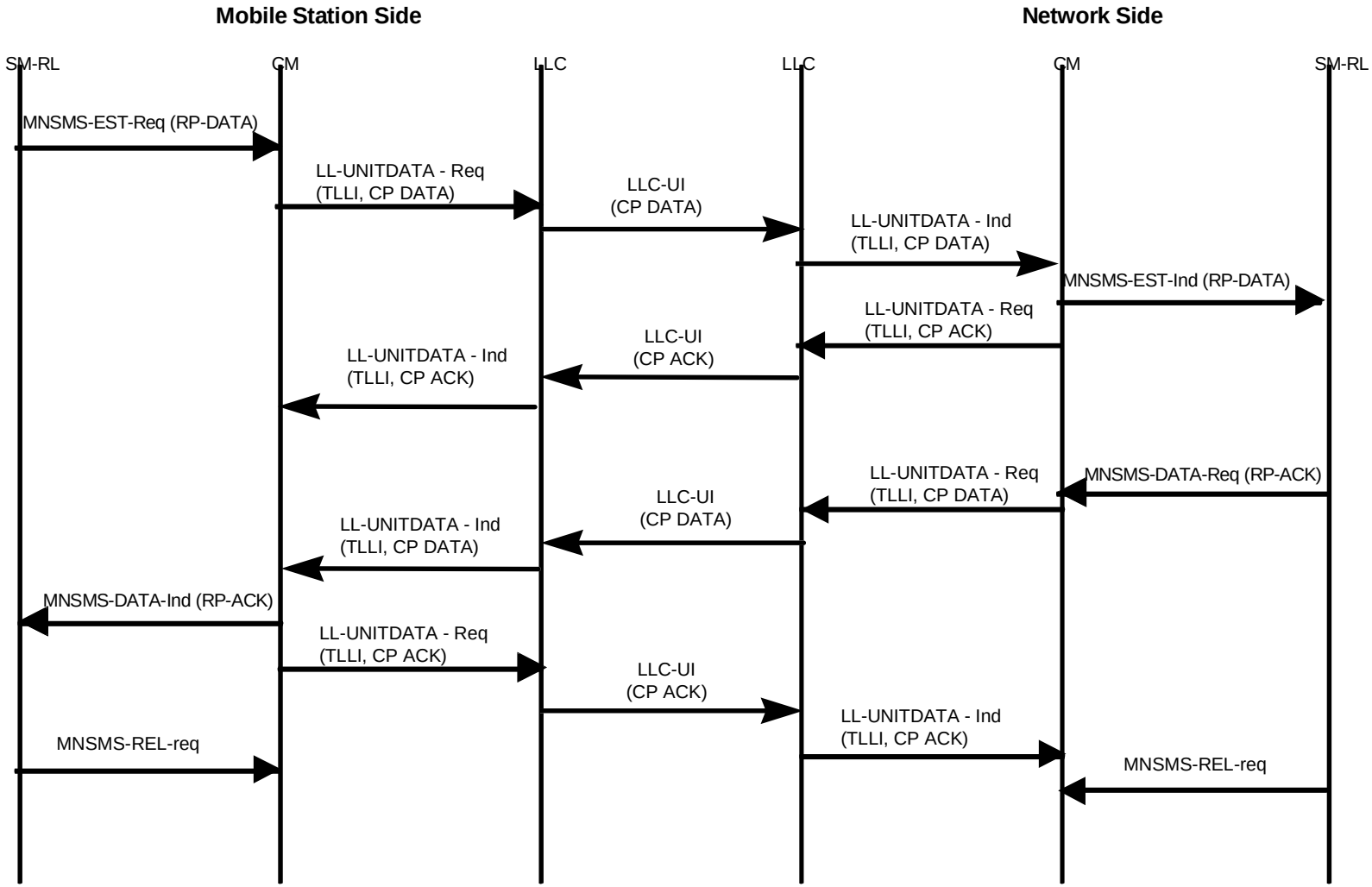
Arrow diagram A8:

The diagram shows UMTS PS MT-messaging by means of interlayer service primitives and the actual messages being transferred between the layer entities

- MNSMS-primitives indicate services provided by CM to SM-RL.
- PMMSMS-primitives indicate services provided by GMM to CM.
- CP-DATA is the CM-message carrying SM-RP data units.

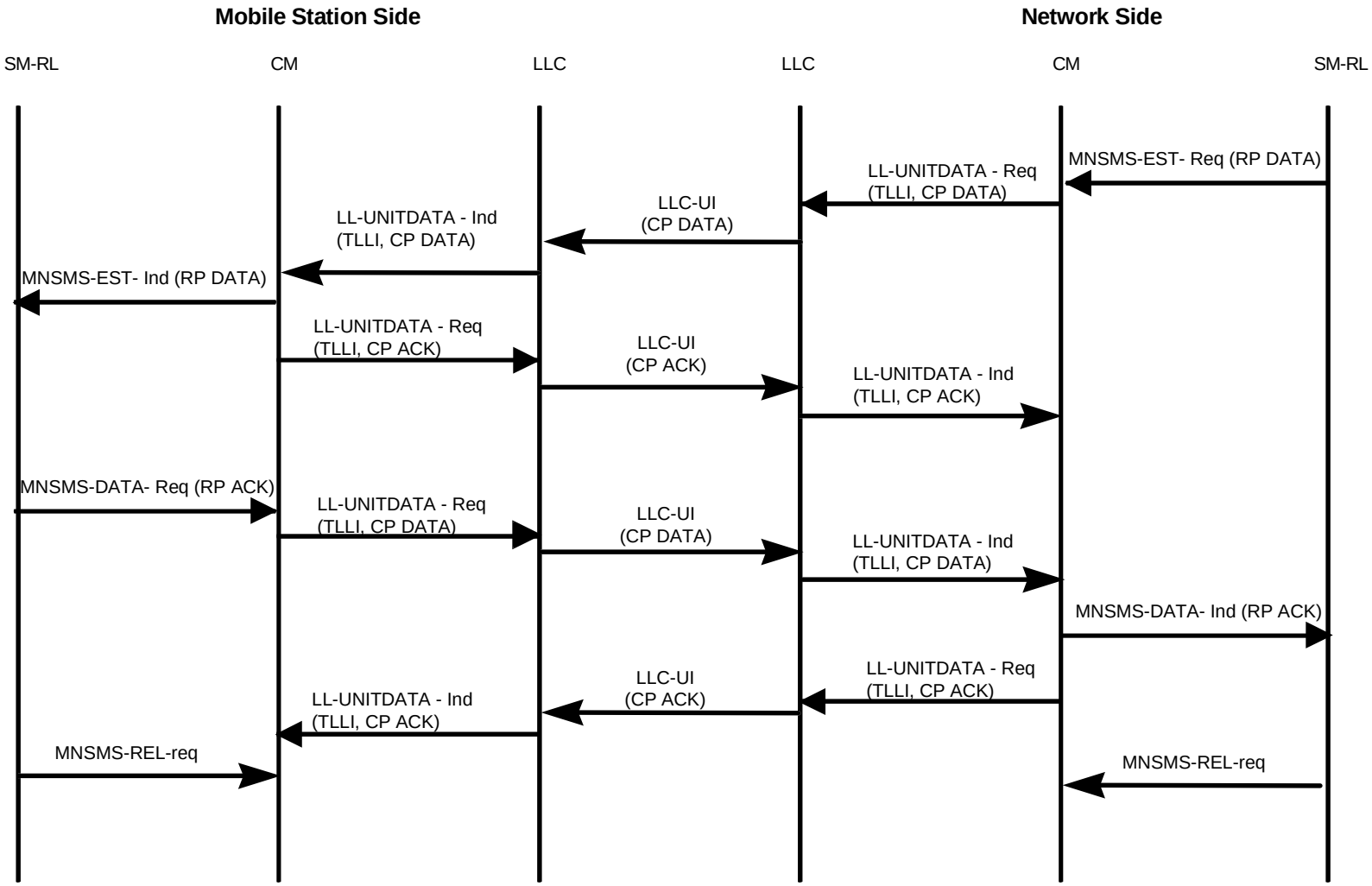
CP-ACK acknowledge CP-DATA reception on CM.

**GPRS Mobile Originated Messaging on CM-sublayer in GSM**

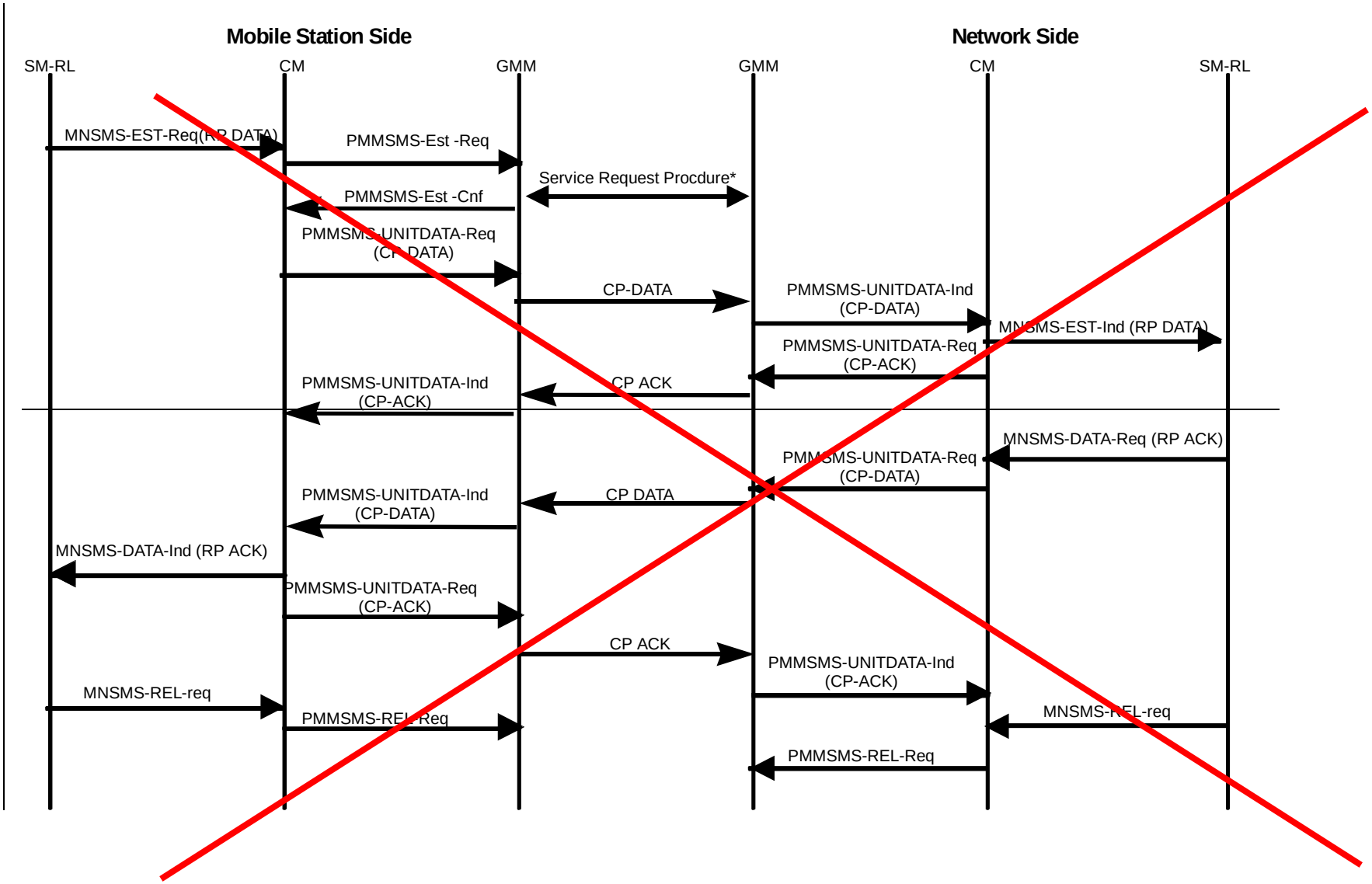


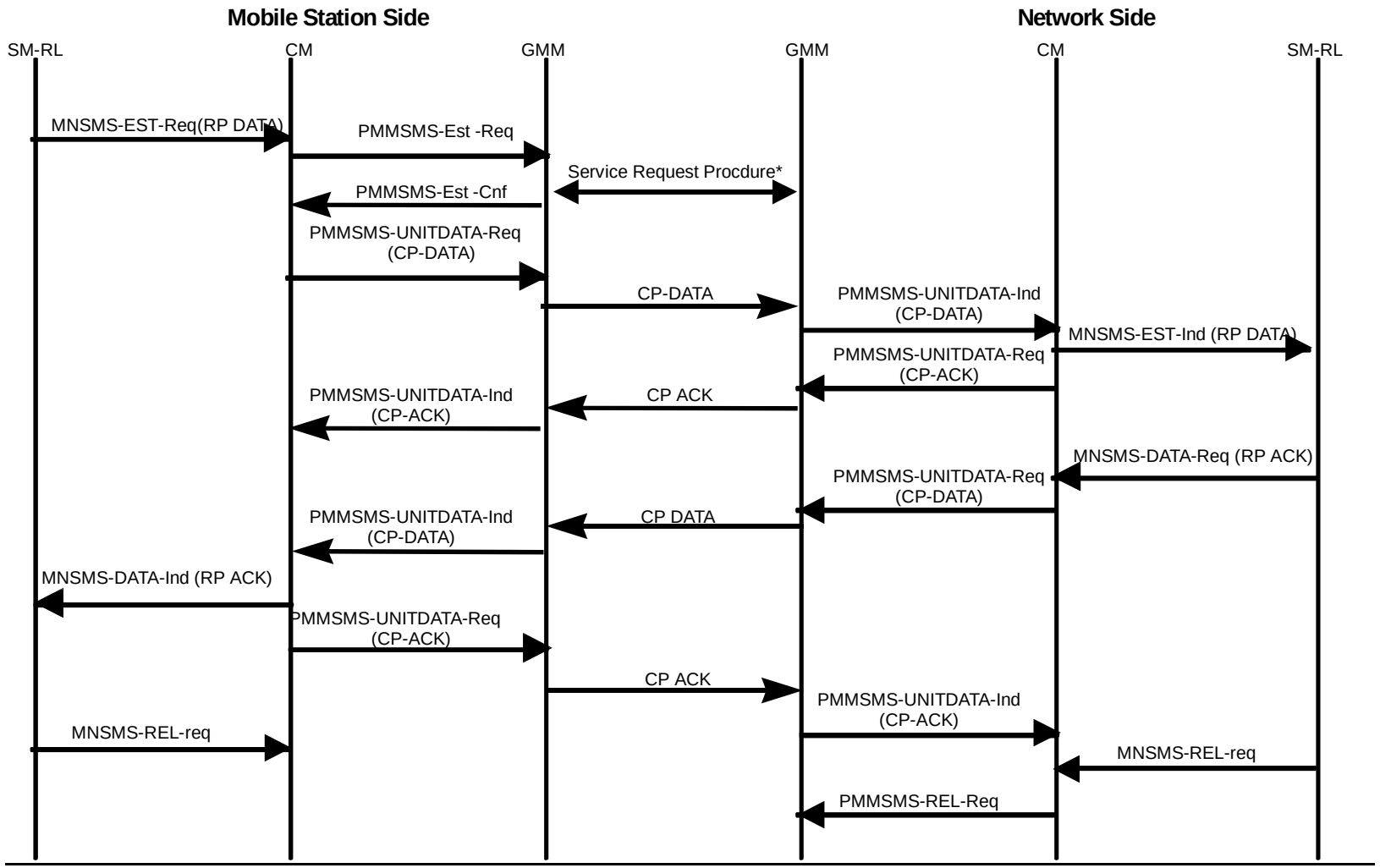

**Arrow diagram A5**

**GPRS Mobile Terminated Messaging on CM-sublayer in GSM**




**Arrow diagram A6**

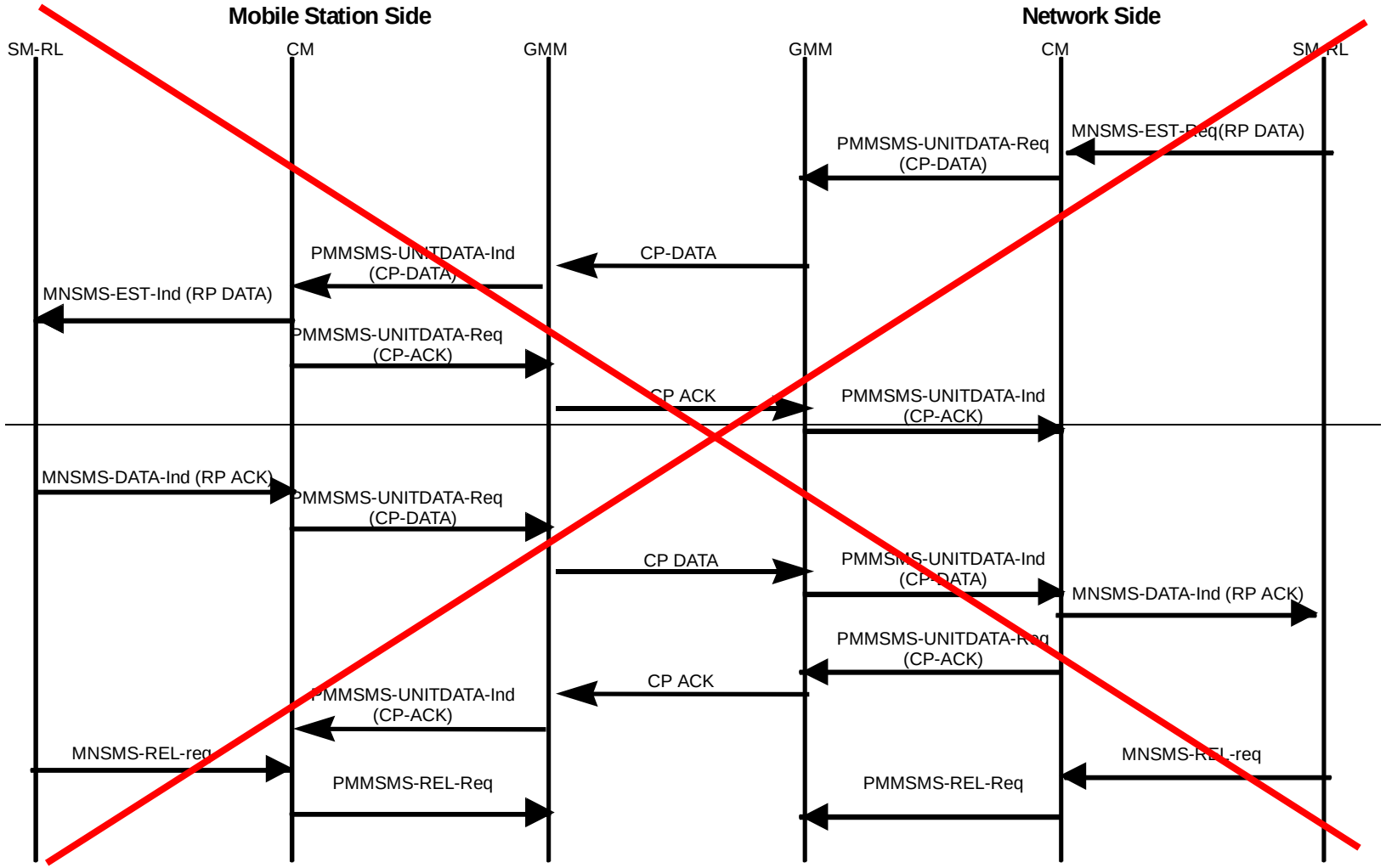

Mobile Station Side
Network Side
SM-RL
CM
GMM
GMM
CM
SM-RL
MNSMS-EST-Req(RP DATA)
PMMSMS-Est -Req
Service Request Procdure*
PMMSMS-Est -Cnf
PMMSMS-UNITDATA-Req
(CP-DATA)
CP-DATA
PMMSMS-UNITDATA-Ind
(CP-DATA)
MNSMS-EST-Ind (RP DATA)
PMMSMS-UNITDATA-Req
(CP-ACK)
PMMSMS-UNITDATA-Ind
(CP-ACK)
CP ACK
MNSMS-DATA-Req (RP ACK)
PMMSMS-UNITDATA-Req
(CP-DATA)
PMMSMS-UNITDATA-Ind
(CP-DATA)
CP DATA
MNSMS-DATA-Ind (RP ACK)
PMMSMS-UNITDATA-Req
(CP-ACK)
CP ACK
PMMSMS-UNITDATA-Ind
(CP-ACK)
MNSMS-REL-req
PMMSMS-REL-Req
MNSMS-REL-req
PMMSMS-REL-Req

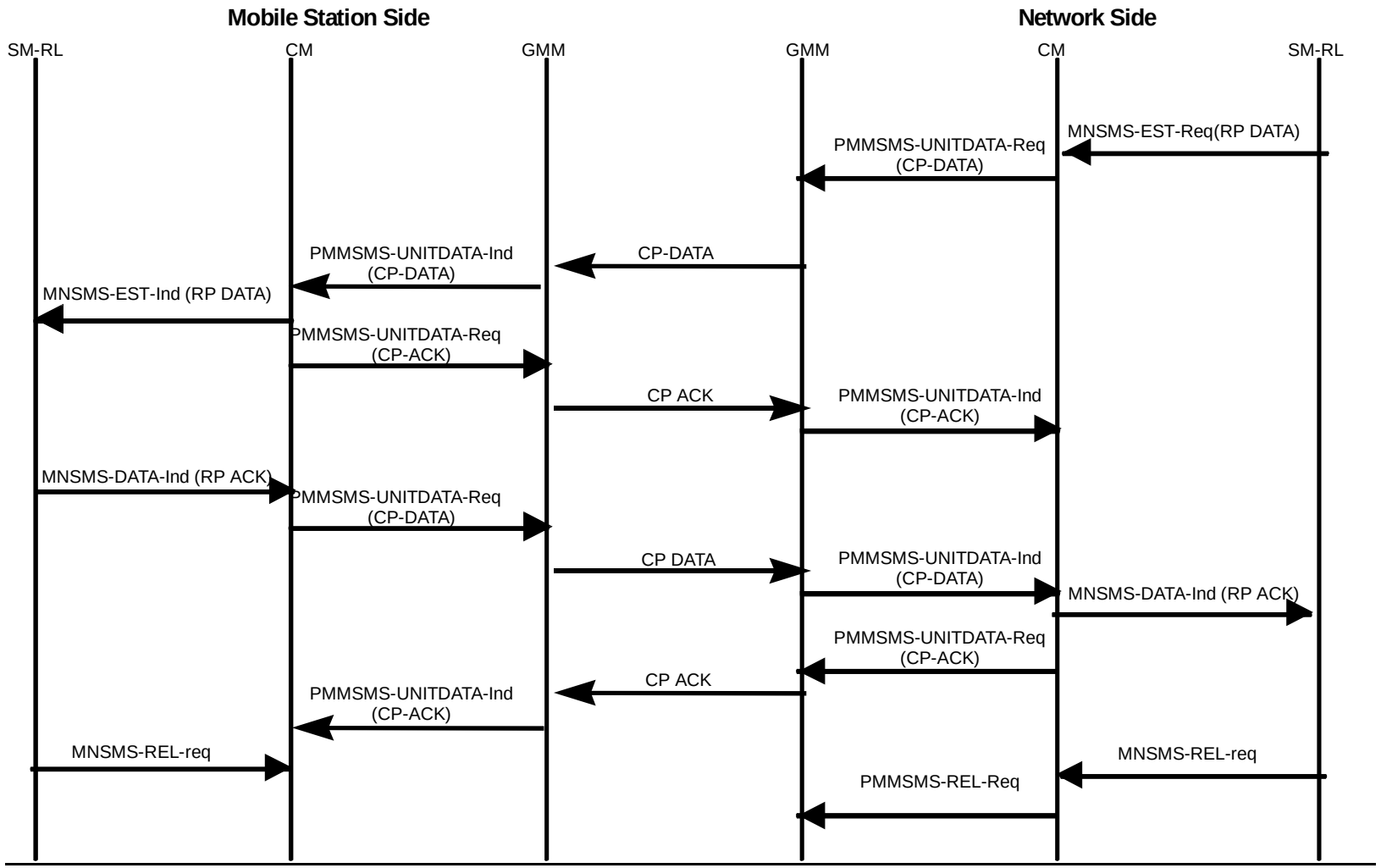



**Note: Service Request Procedure may not be initiated.**

**Arrow diagram A7**

**GPRS Mobile Terminated Messaging on CM-sublayer in UMTS**






**Arrow diagram A8**

# Annex B (normative): SDL-description of the CM-layer

## B.1 Introduction

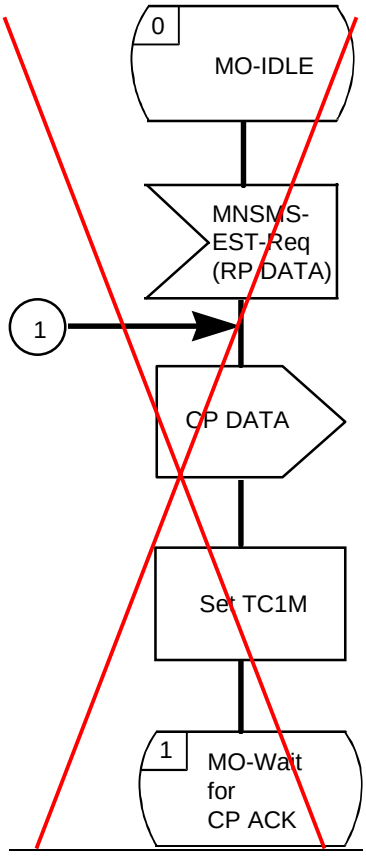
This annex contains an SDL-description of the Connection Management Sublayer in terms of the Short Message Service Support. The CM- sublayer provides services to Short Message Relay Layer.

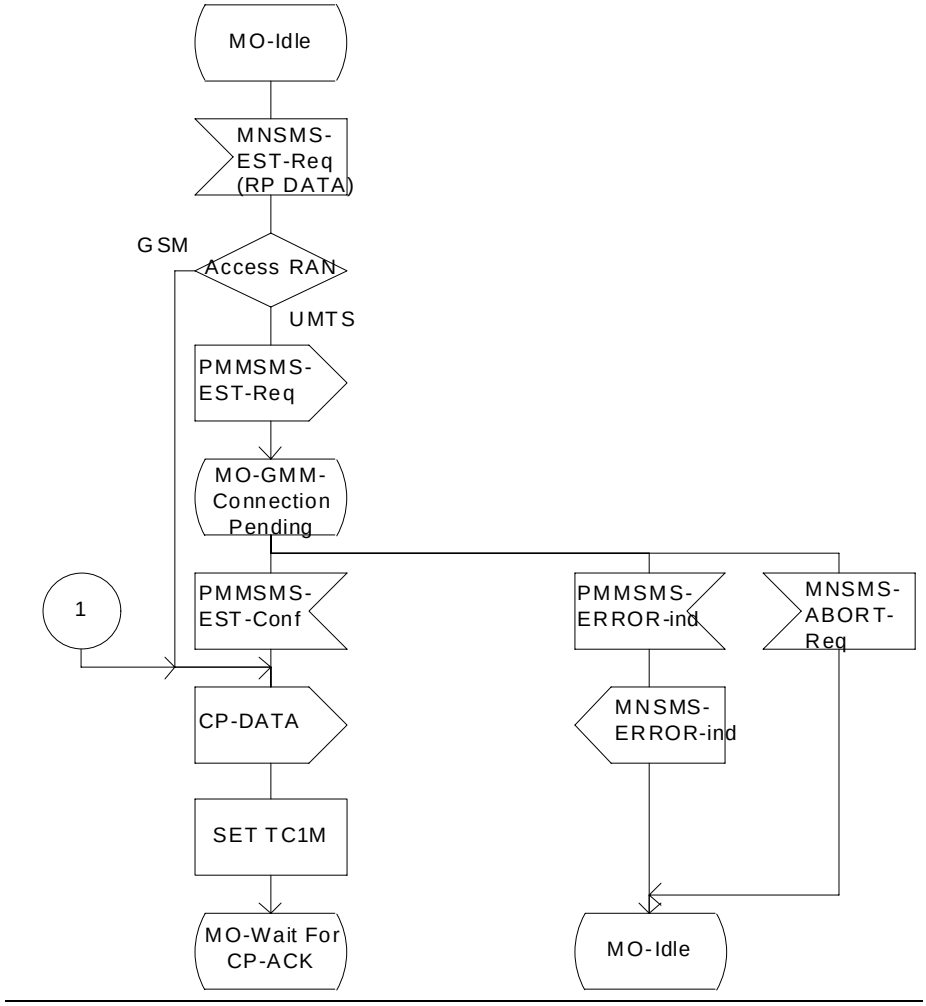
The SDLs contain a mixture of peer to peer messages and conceptual primitives between the layers SM-RL, CM, MM and LLC, as viewed by the SMC entities. SDL-1/2/3 show the CS SMC entity on MS-side for Mobile Originated (MO) short message transfer, SDL-4/5/6 show the CS SMC entity on MS-side for Mobile Terminated (MT) short message transfer, SDL-7/8/9 show the CS SMC entity on the network side for Mobile Originated (MO) short message transfer, and SDL-10/11/12 show the CS SMC entity on the network side for Mobile Terminated (MT) short message transfer.

SDL-13/14/15 show the GPRS SMC entity on MS-side for Mobile Originated (MO) short message transfer, ~~[FFS: These diagrams don't show new UMTS state.]~~

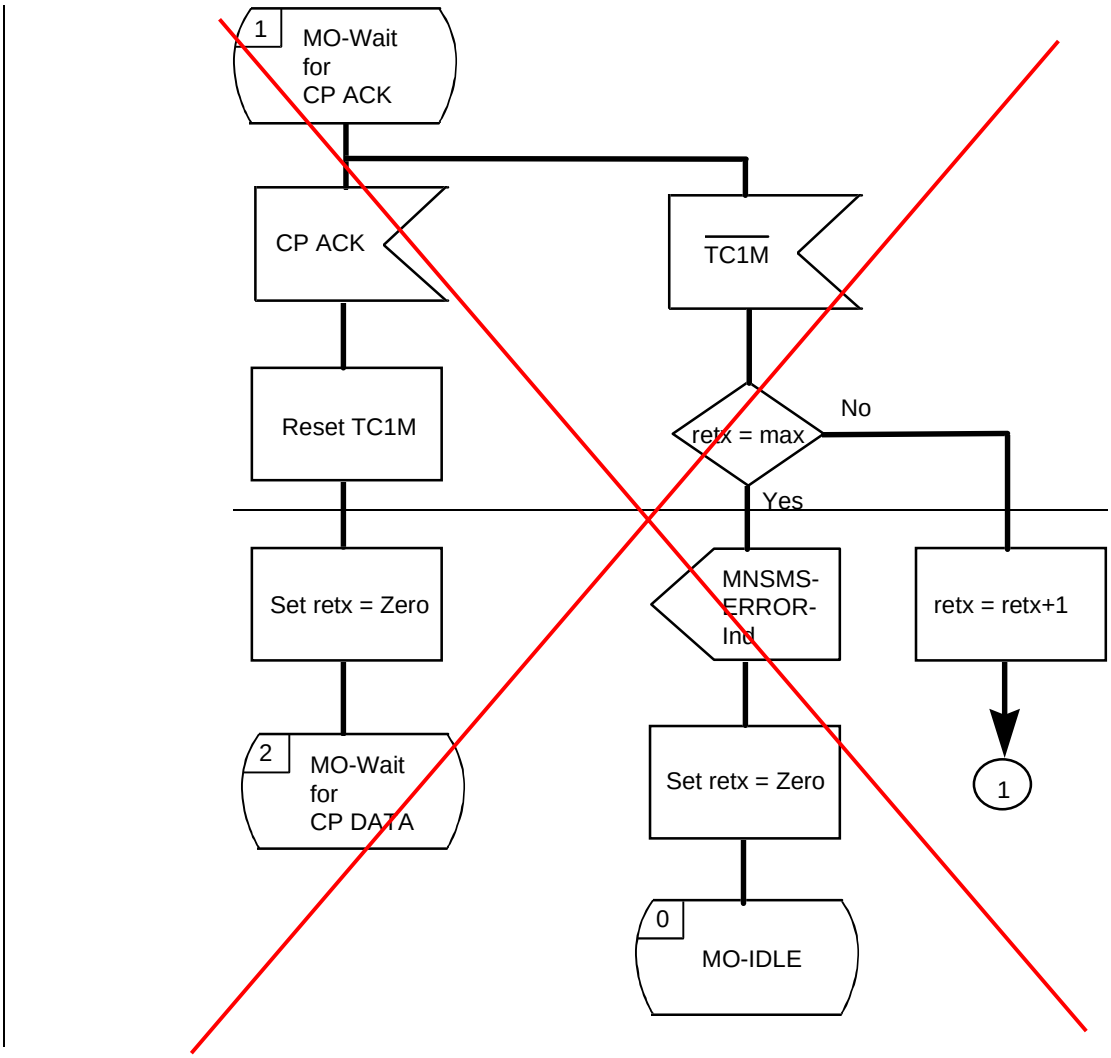
SDL-16/17/18 show the GPRS SMC entity on MS-side for Mobile Terminated (MT) short message transfer, SDL-19/20/21 show the GPRS SMC entity on the network side for Mobile Originated (MO) short message transfer, and SDL-22/23/24 show the GPRS SMC entity on the network side for Mobile Terminated (MT) short message transfer.

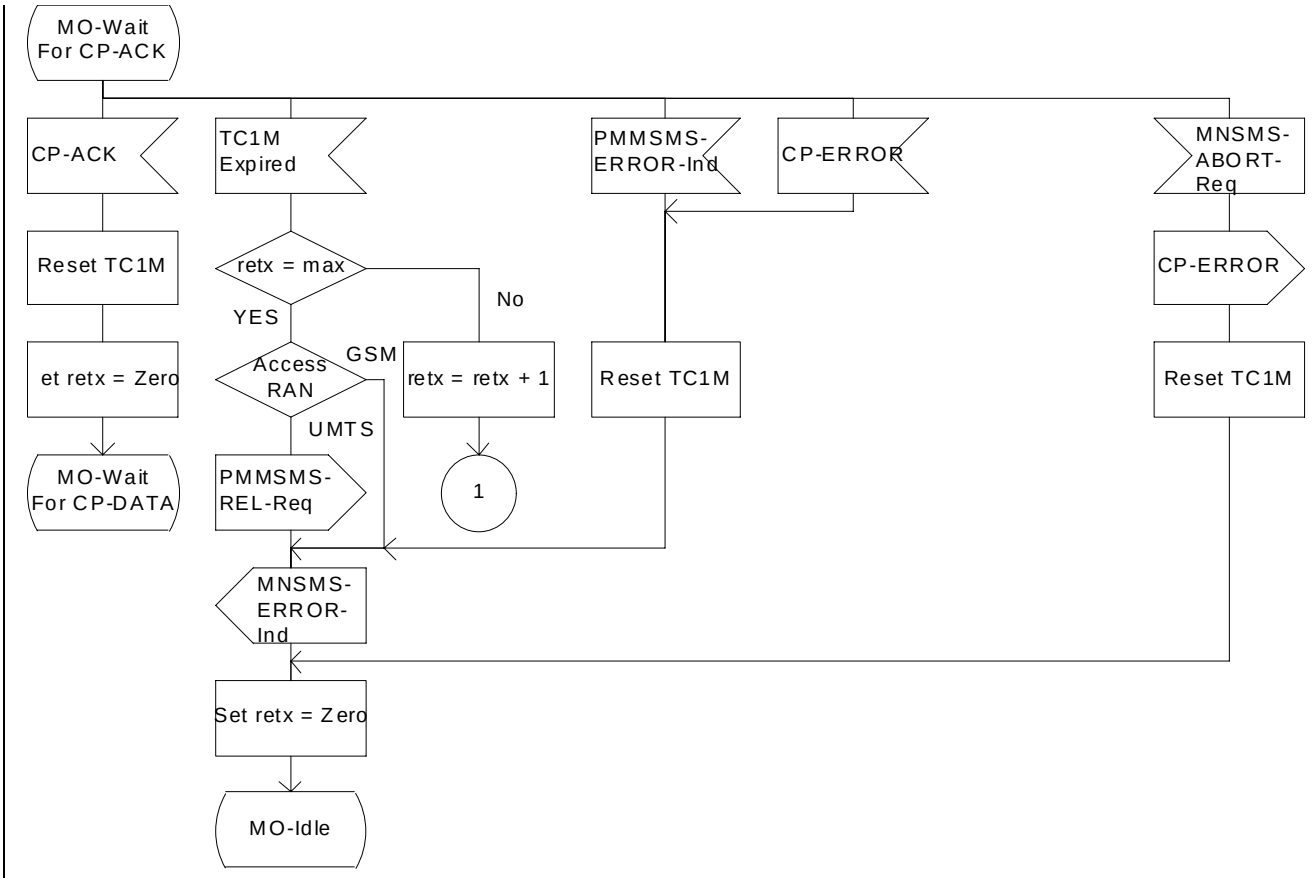
The lower layers (below MM , GMM and LLC) are transparent to an SMC entity.


0
MO-IDLE
MNSMS-
EST-Req
(RP-DATA)
1
CP DATA
Set TC1M
1
MO-Wait
for
CP ACK

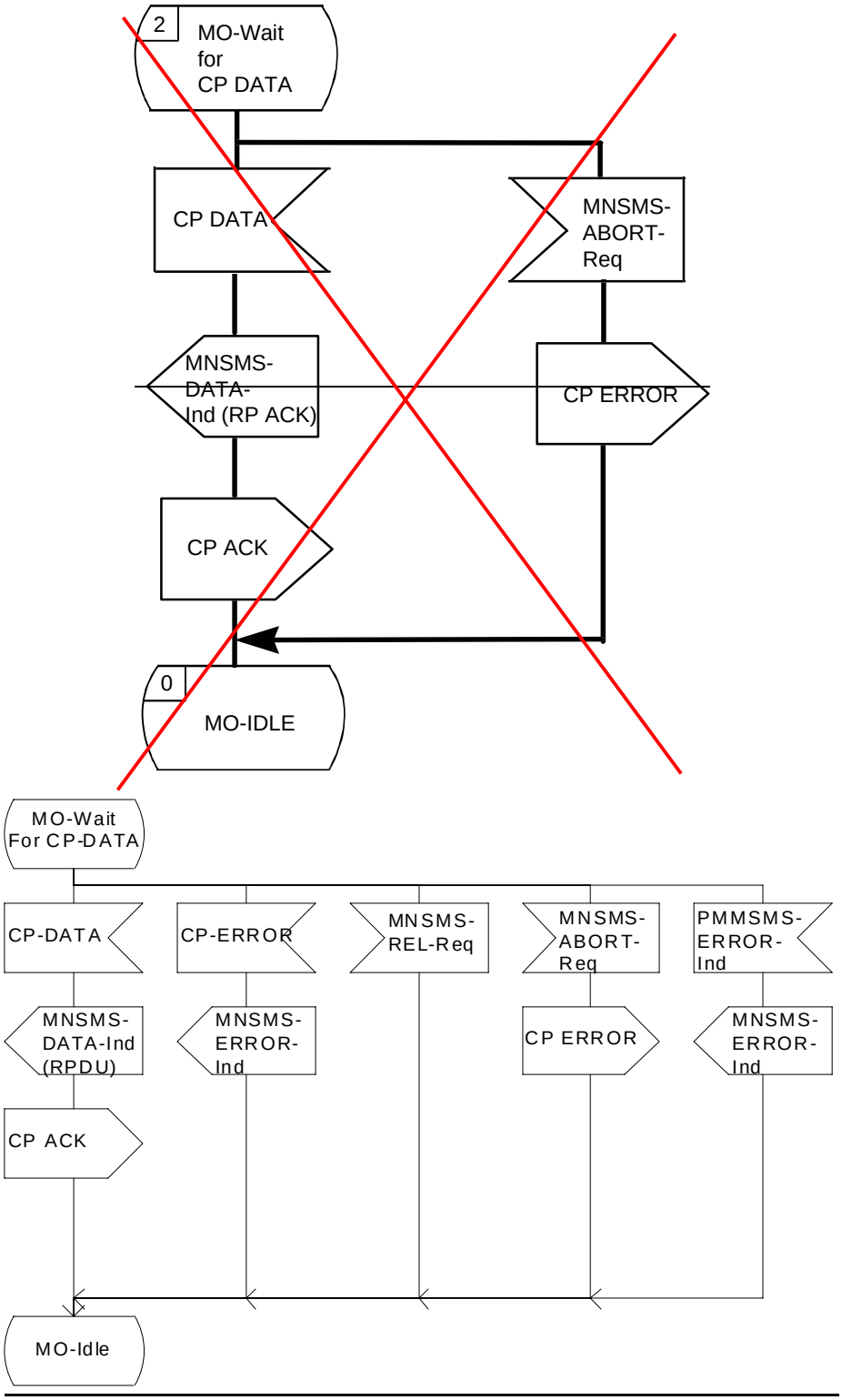



**MO-SMC-GP entity on MS-side for GPRS**
**SDL-13**

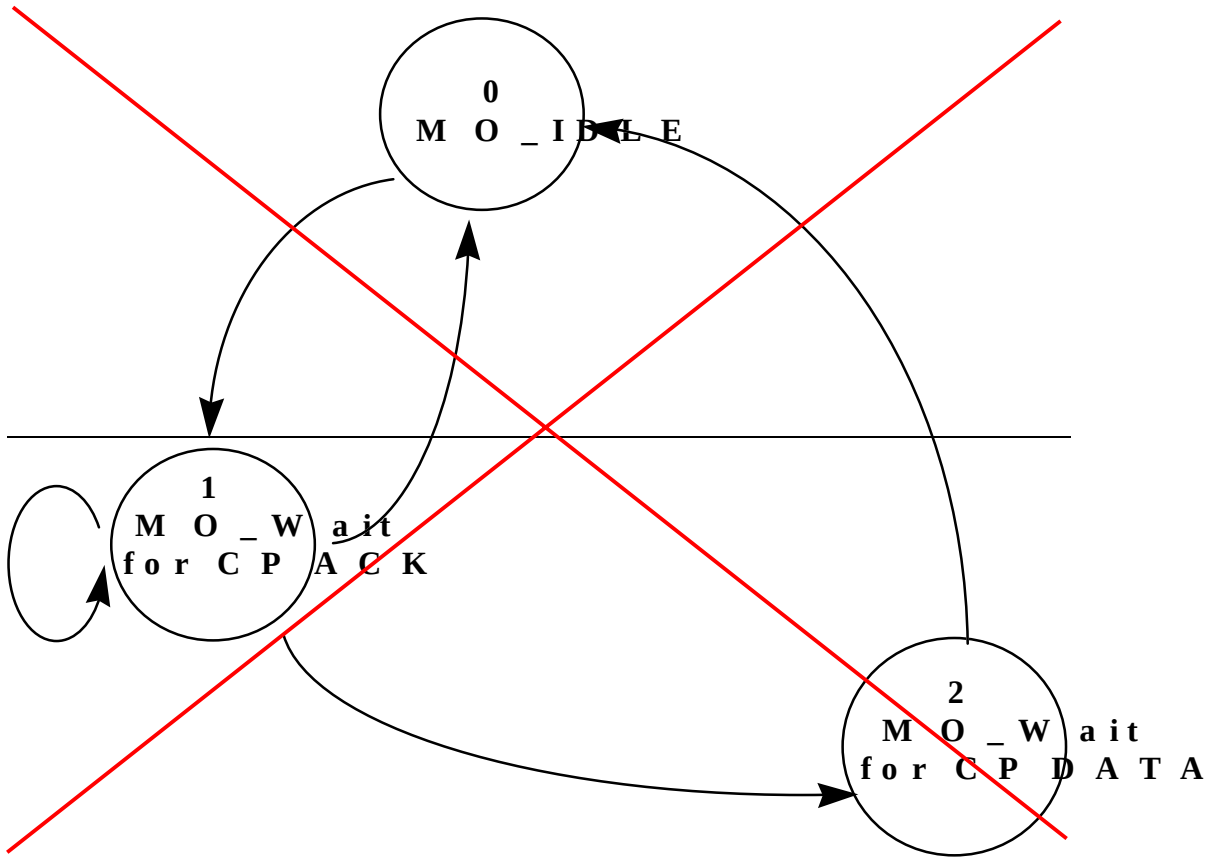

1
MO-Wait
for
CP ACK
CP ACK
TC1M
Reset TC1M
retx = max
No
Yes
Set retx = Zero
MNSMS-
ERROR-
Ind
retx = retx+1
2
MO-Wait
for
CP DATA
Set retx = Zero
1
0
MO-IDLE

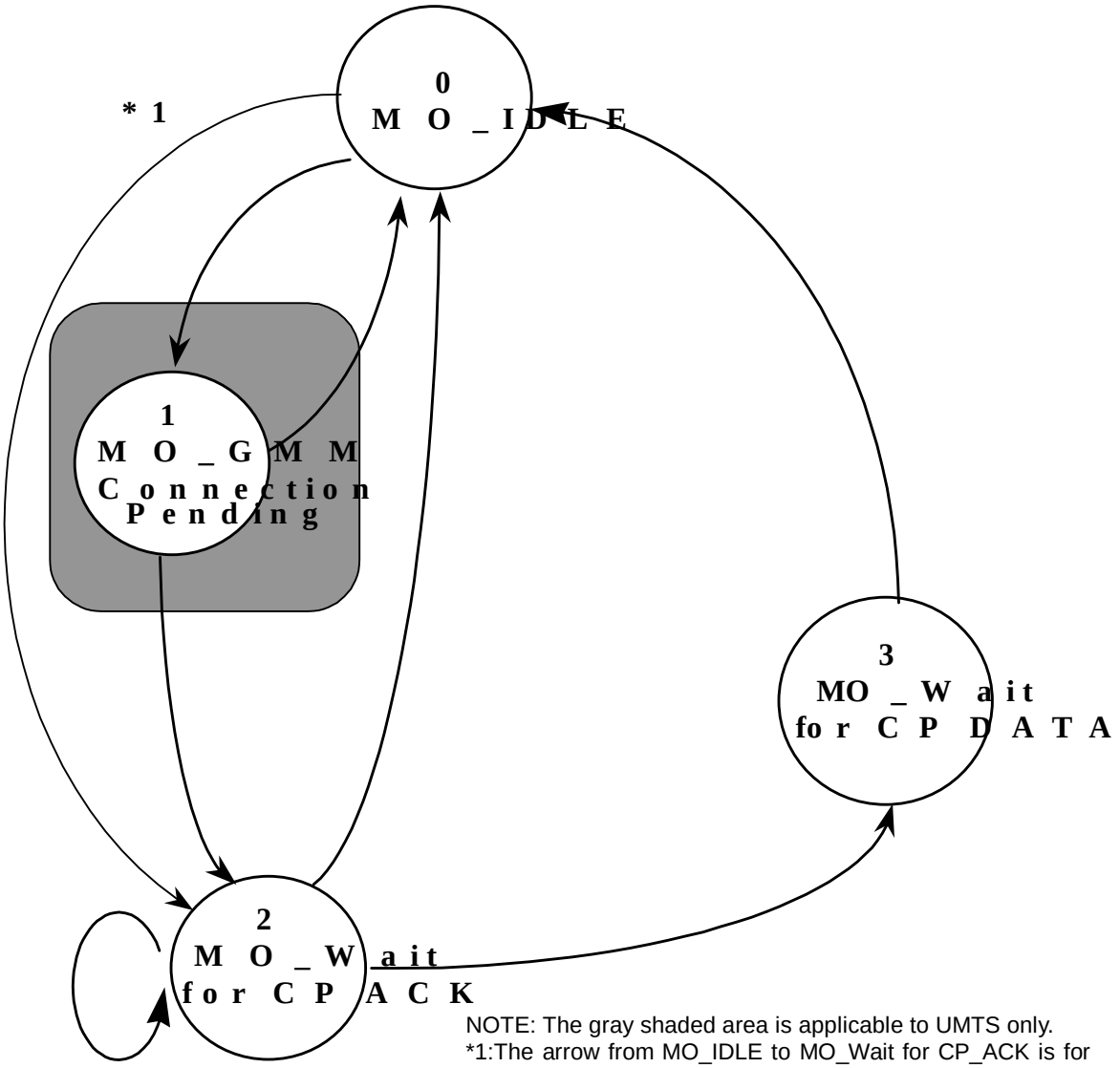



**MO-SMC-GP entity on MS-side for GPRS**
**SDL-14**



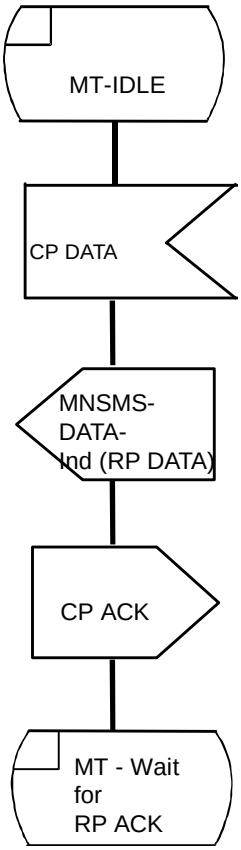

**MO-SMC-GP entity on MS-side for GPRS**
**SDL-15**


0
M O _ I D L E
1
M O _ W a i t
f o r C P A C K
2
M O _ W a i t
f o r C P D A T A

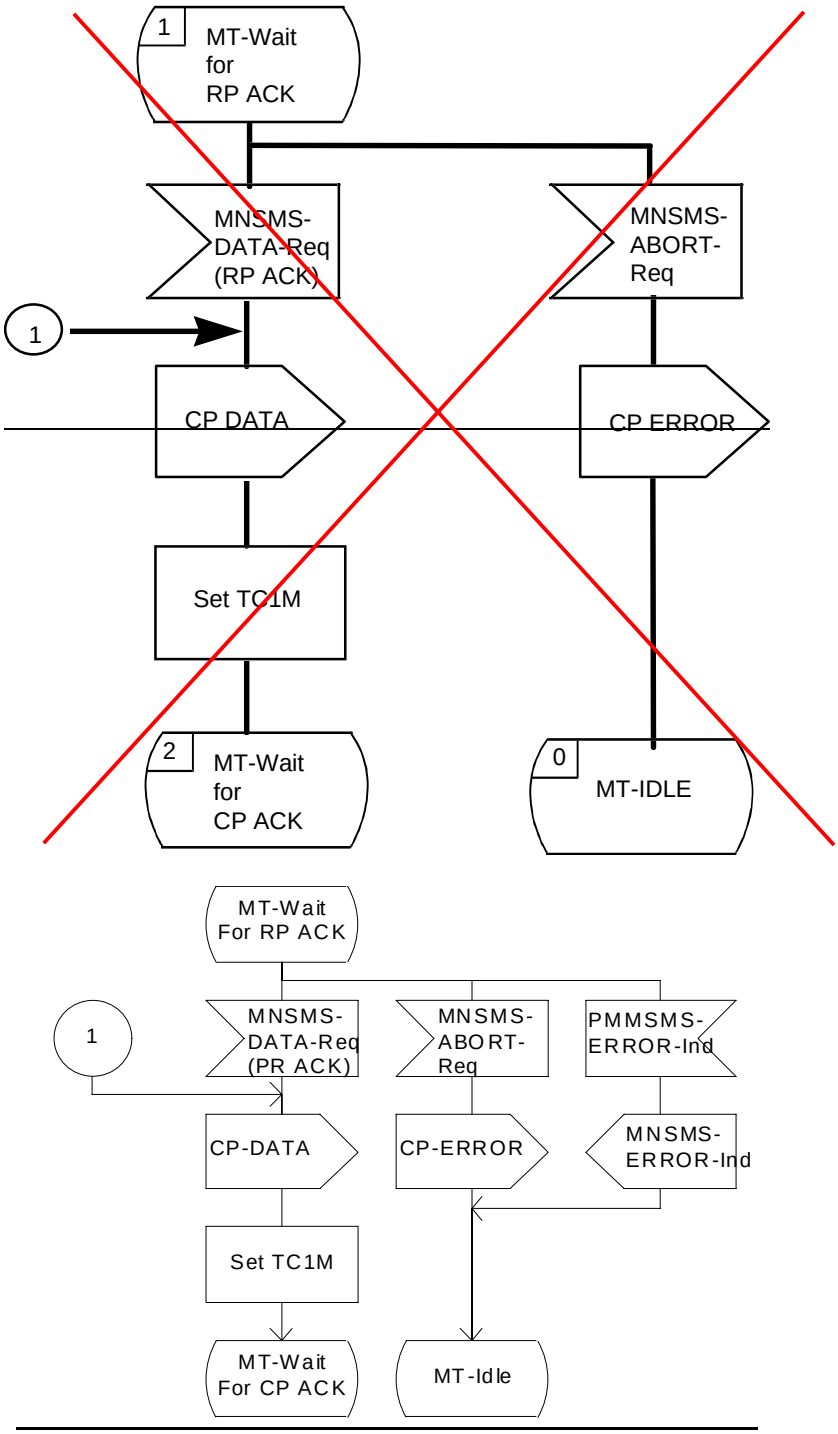



NOTE: The gray shaded area is applicable to UMTS only.
*1:The arrow from MO_IDLE to MO_Wait for CP_ACK is for GSM only.

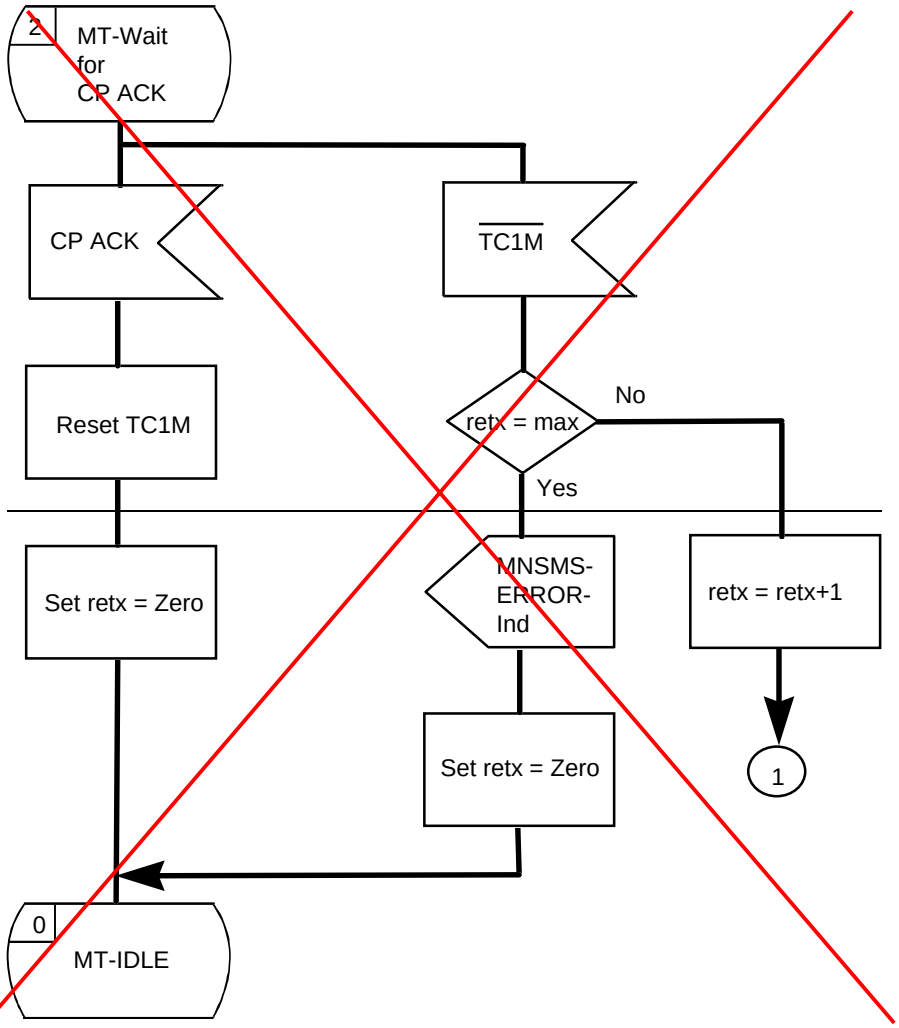
**MO-SMC-GP entity on MS-side for GPRS**
**State transition diagram**

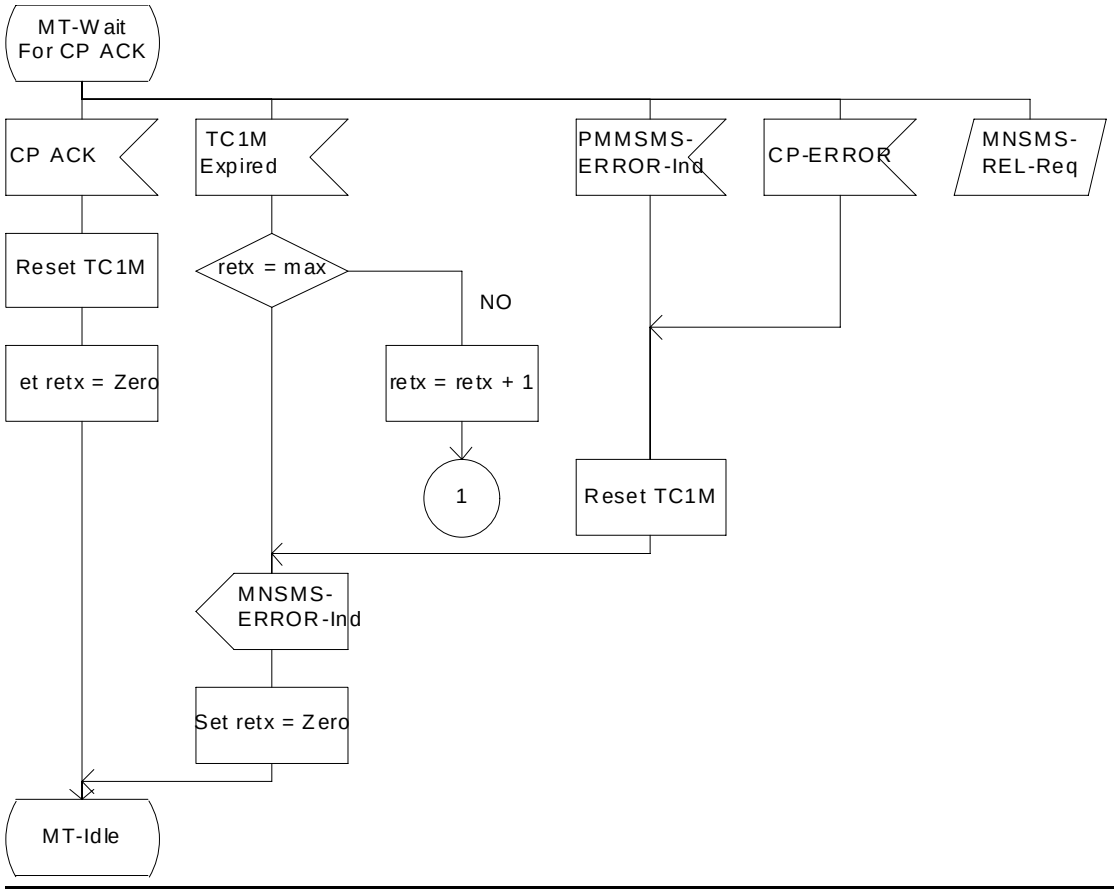



**MT-SMC-GP entity on MS-side for GPRS**
**SDL-16**



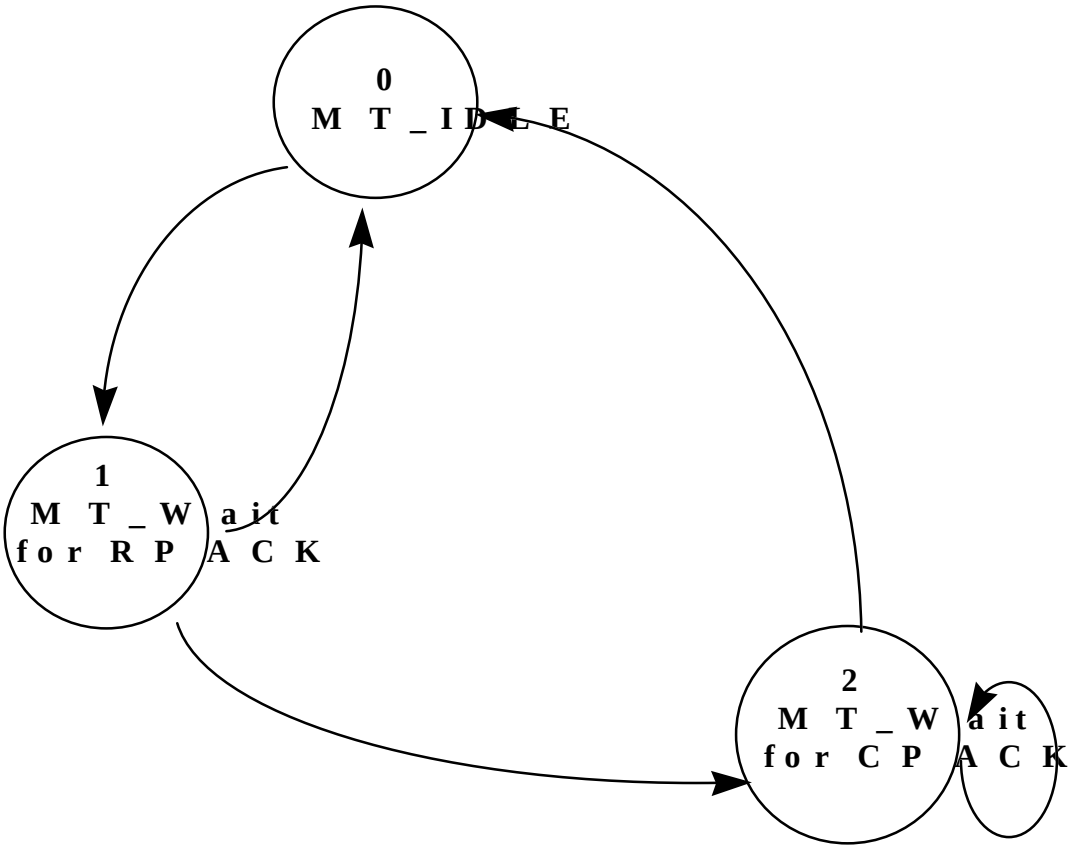

**MT-SMC-GP entity on MS-side for GPRS**
**SDL-17**


2
MT-Wait for CP ACK
CP ACK
TC1M
Reset TC1M
retx = max
No
Yes
Set retx = Zero
MNSMS-ERROR-Ind
retx = retx+1
Set retx = Zero
1
0
MT-IDLE

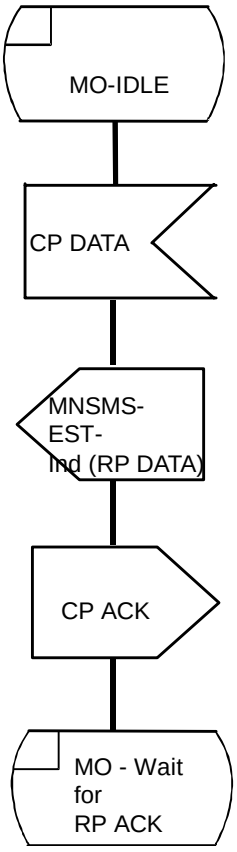



Note: The MNSMS-REL-Req is delayed until the next state.

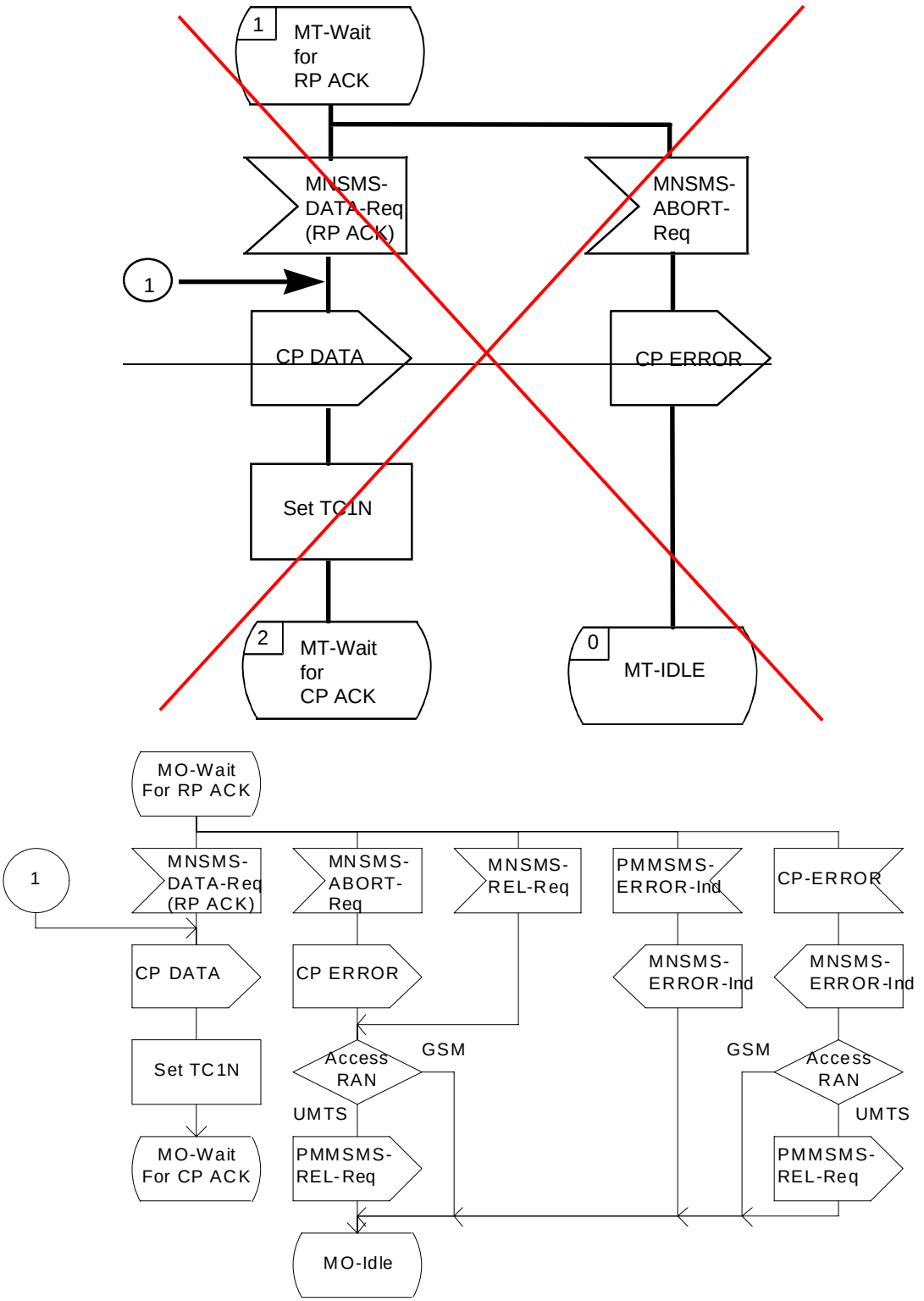
**MT-SMC-GP entity on MS-side for GPRS**
**SDL-18**



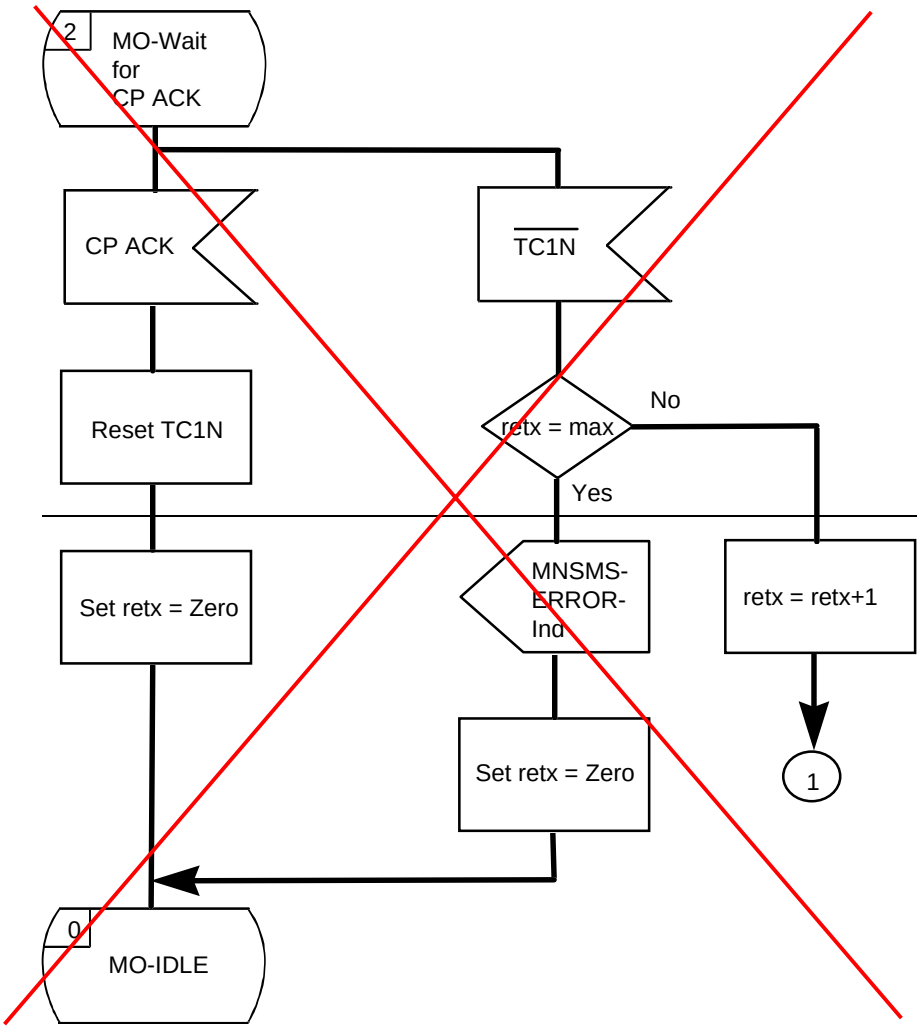

**MT-SMC-GP entity on MS-side for GPRS**
**State transition diagram**

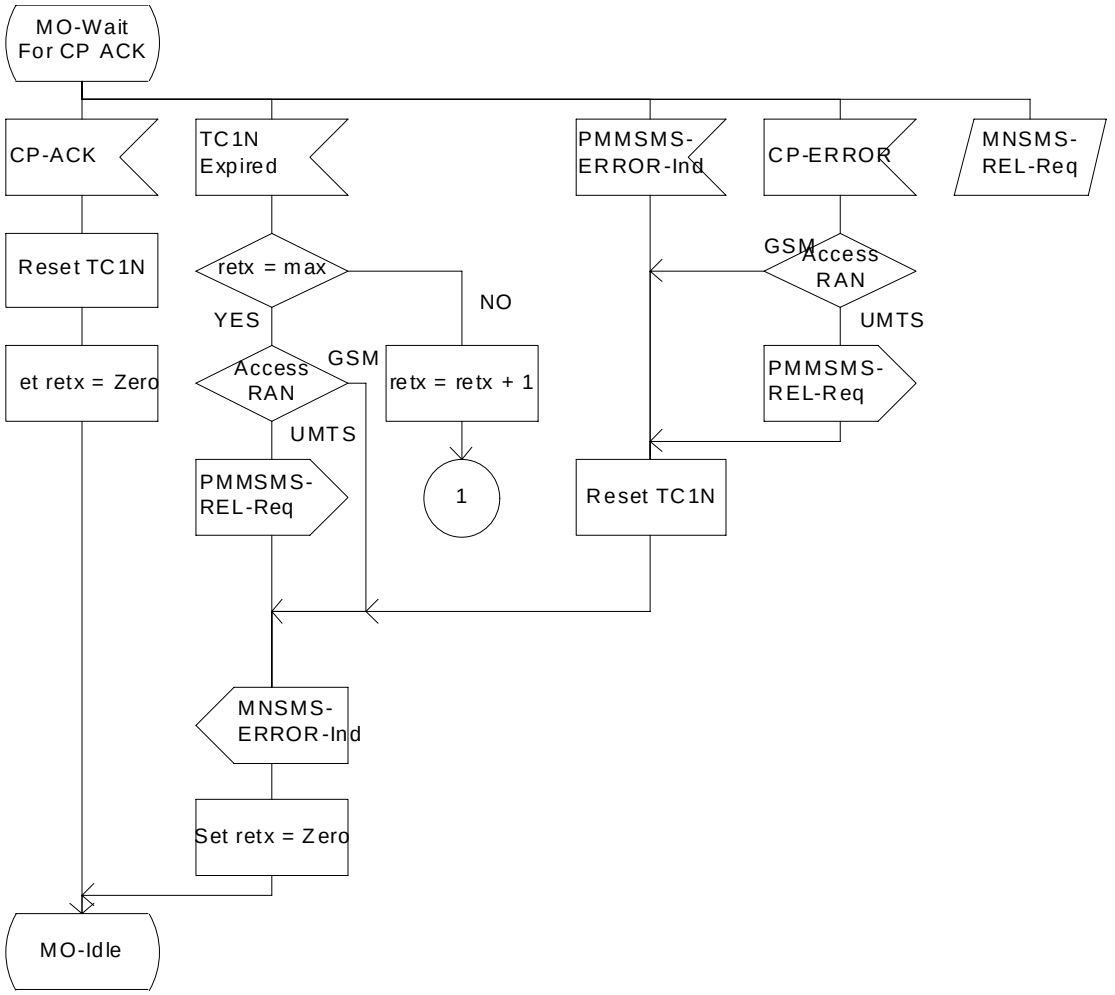



**MO-SMC-GP entity on Network side for GPRS**
**SDL-19**



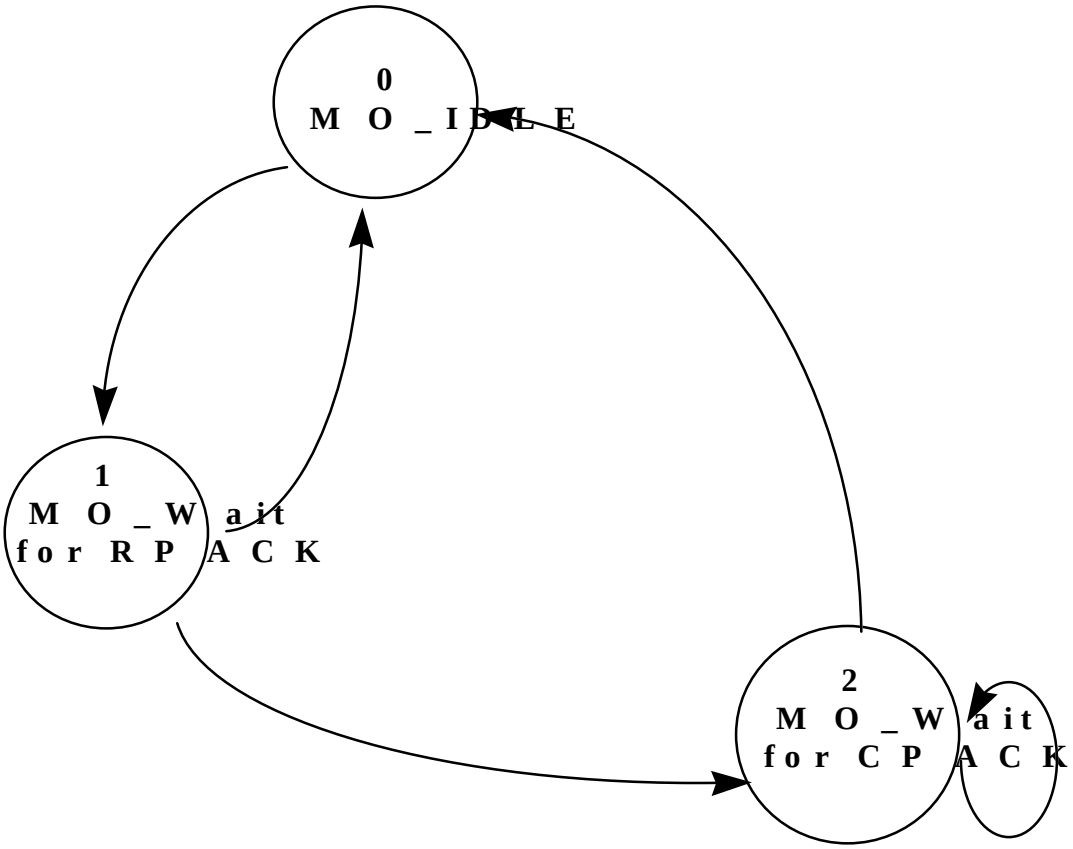

**MO-SMC-GP entity on Network side for GPRS**
**SDL-20**


2
MO-Wait for CP ACK
CP ACK
TC1N
Reset TC1N
retx = max
No
Yes
Set retx = Zero
MNSMS-ERROR-Ind
retx = retx+1
Set retx = Zero
1
0
MO-IDLE

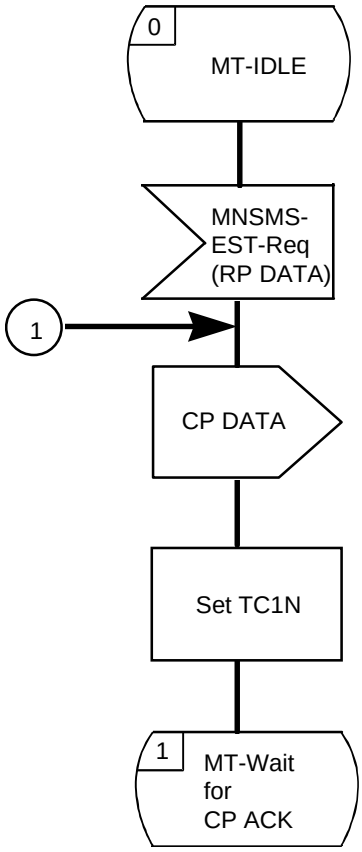



Note: The MNSMS-REL-Req is delayed until next state.

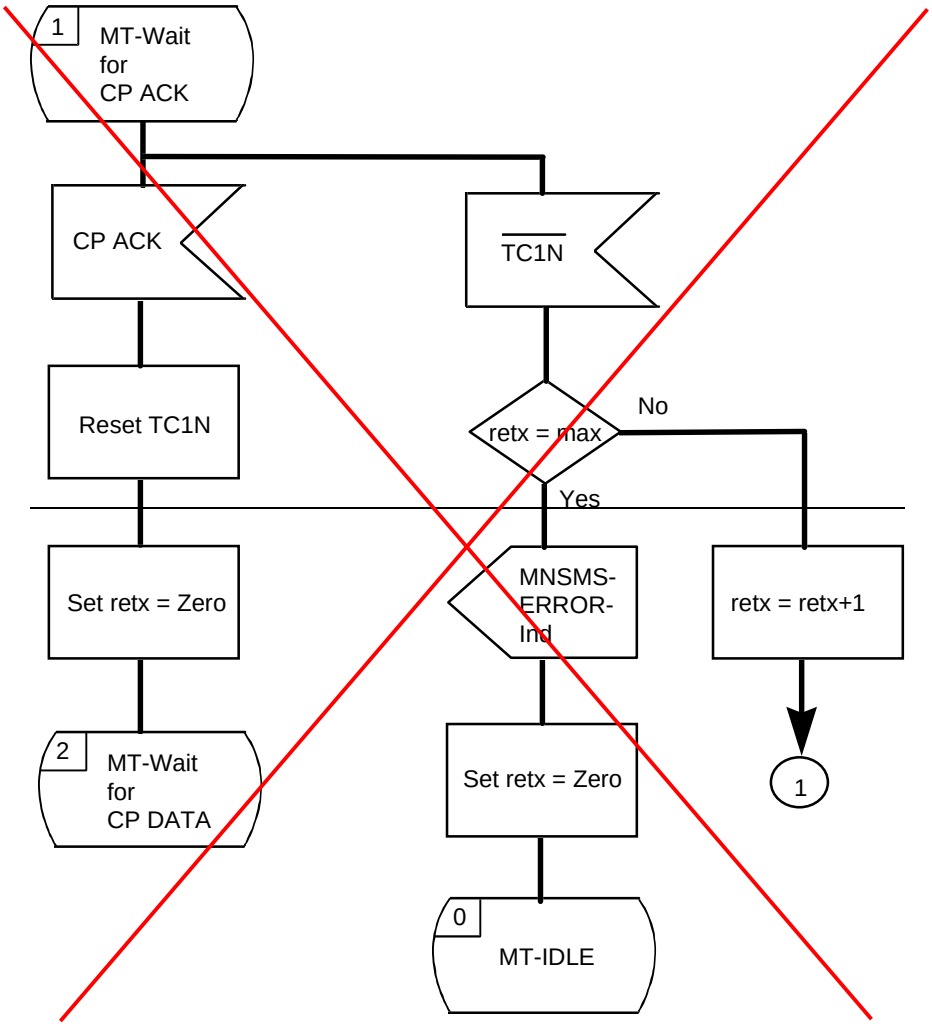
**MO-SMC-GP entity on Network side for GPRS**
**SDL-21**

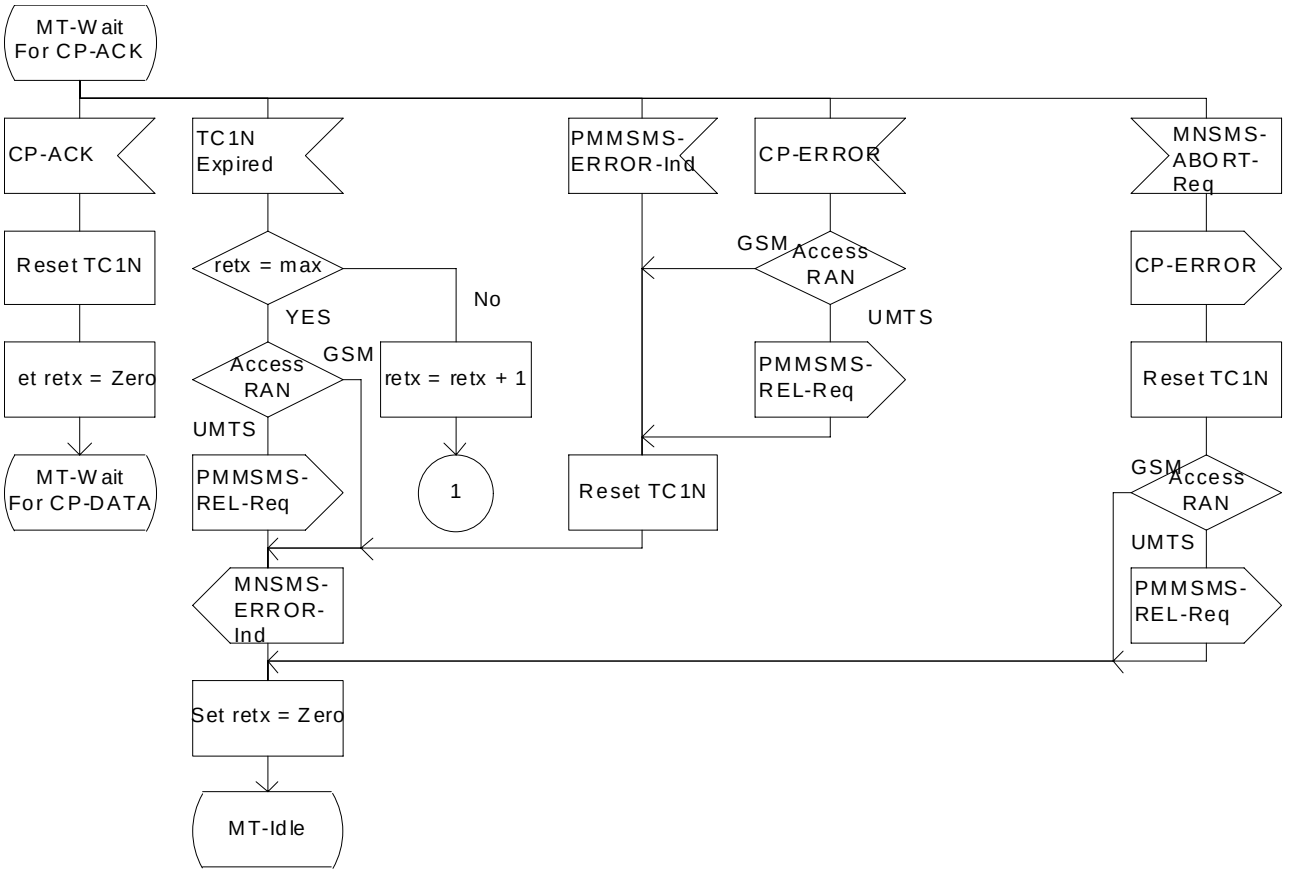



**MO-SMC-GP entity on Network-side for GPRS**
**State transition diagram**

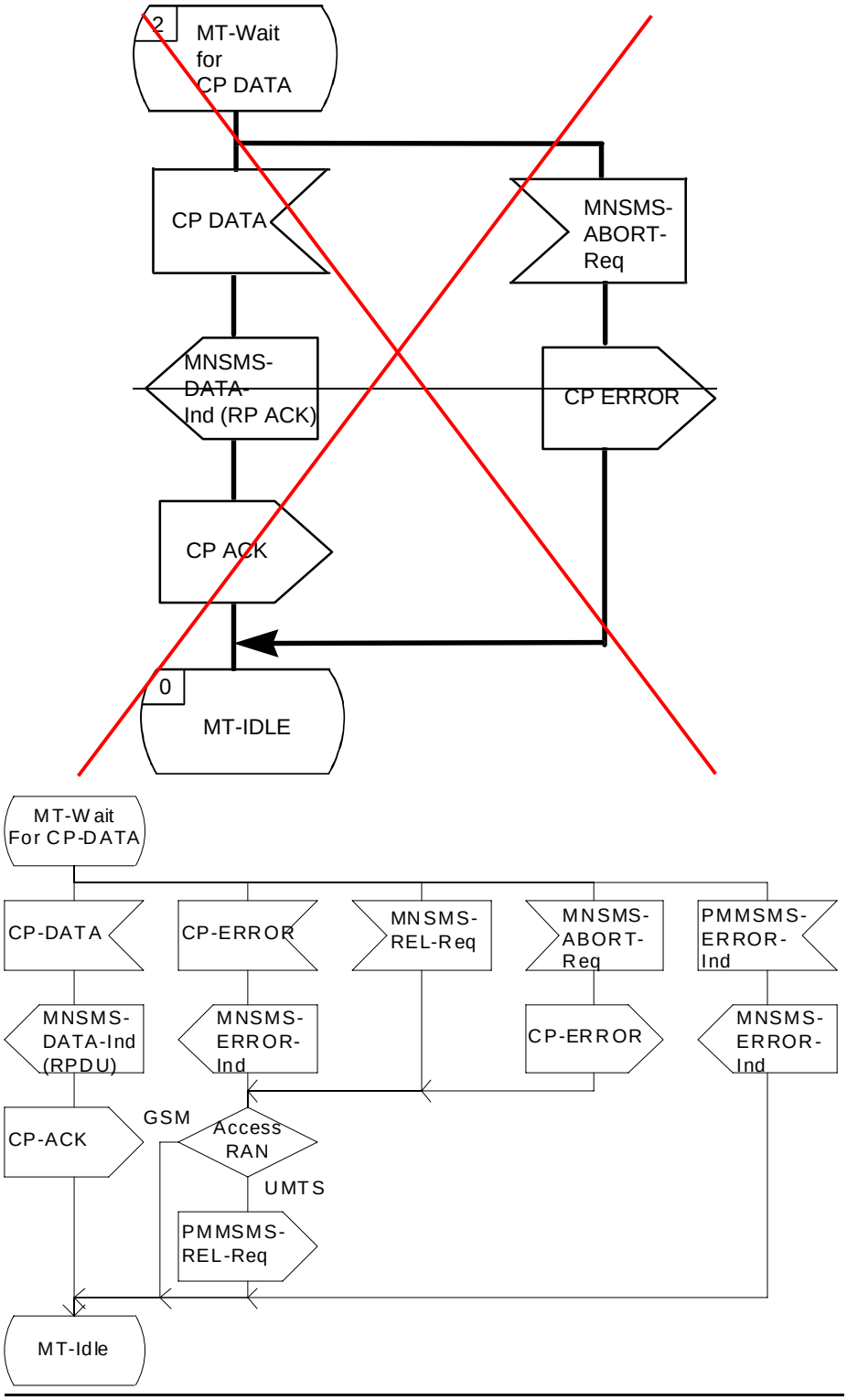



**MT-SMC-GP entity on Network-side for GPRS**
**SDL-22**

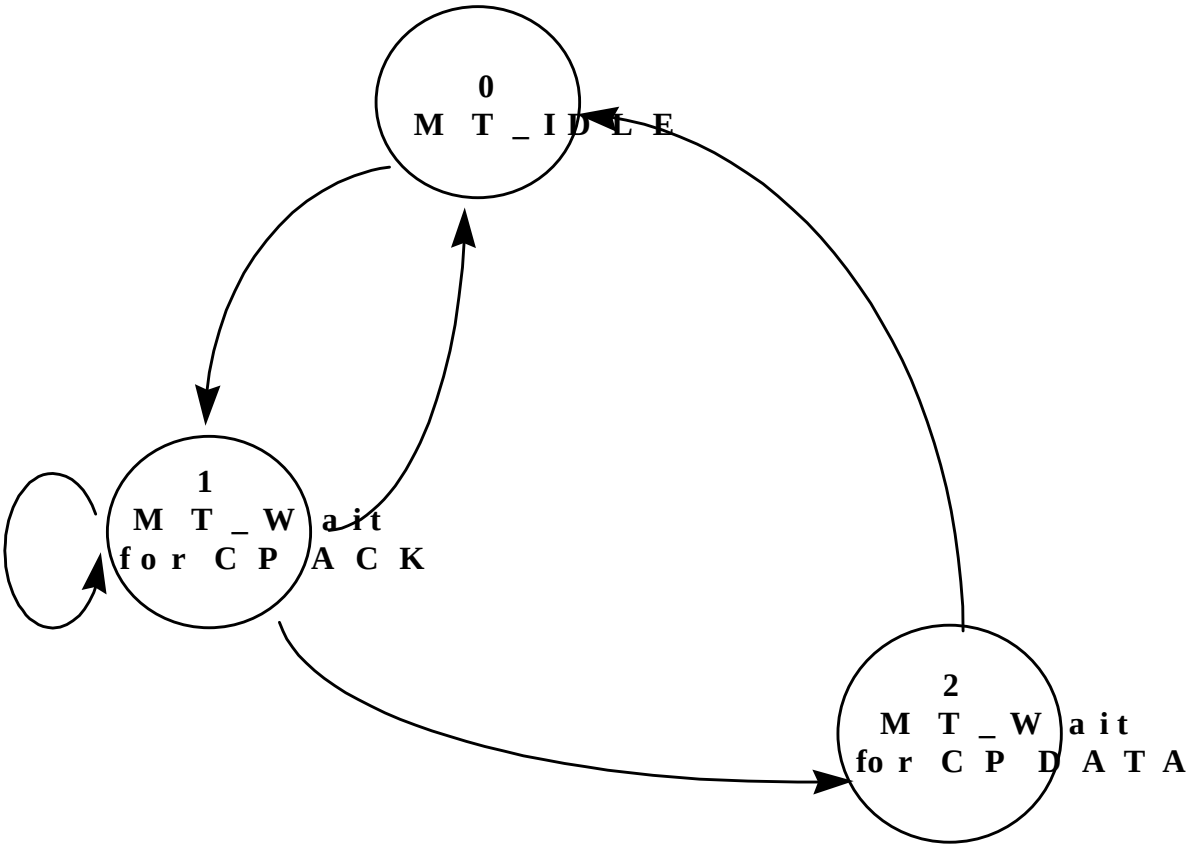

1
MT-Wait
for
CP ACK
CP ACK
TC1N
Reset TC1N
retx = max
No
Yes
Set retx = Zero
MNSMS-
ERROR-
Ind
retx = retx+1
2
MT-Wait
for
CP DATA
Set retx = Zero
1
0
MT-IDLE




**MT-SMC-GP entity on Network-side for GPRS**
**SDL-23**




**MT-SMC-GP entity on Network-side for GPRS**
**SDL-24**




**MT-SMC-GP entity on Network-side for GPRS**
**State transition diagram**

**3GPP/SMG Meeting #11**
**Umea, Sweden, 28 February - 03 March.2000**

***Document*** ***N1-000500***
~~***N1-000304***~~
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| **23.034** | **CR** | **004/r1** | Current Version: | 3.1.1 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | TSG_CN#7 | for approval | X | strategic | | *(for SMG use only)* |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]
*(at least one should be marked with an X)*

**Source:** CN1 **Date:** 2000-02-29

**Subject:** Support of high speed data in UMTS/UTRAN

**Work item:** GSM/UMTS interworking

**Category:** *(only one category shall be marked with an X)*

| | | |
|---|---|---|
| F | Correction | |
| A | Corresponds to a correction in an earlier release | |
| B | Addition of feature | |
| C | Functional modification of feature | X |
| D | Editorial modification | |

**Release:**

| | |
|---|---|
| Phase 2 | |
| Release 96 | |
| Release 97 | |
| Release 98 | |
| Release 99 | X |
| Release 00 | |

**Reason for change:** In GSM multiple TCHs can be combined into a high speed bearer, which is indicated by some parameters in BC (Bearer Capability information element). Corresponding UMTS parameters are not needed as the UTRAN provides 'any size' bearers.

**Clauses affected:**

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**

help.doc

<--------- double-click here for help and instructions on how to create a CR.

# 3G TS 23.034 V3.1.1 (1999-12)

*Technical Specification*

# 3rd Generation Partnership Project; Technical Specification Group Core Network; High Speed Circuit Switched Data (HSCSD) - Stage 2 (3G TS 23.034 version 3.1.1)

Reference
DTS/TSGN-0123034U

Keywords
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# Contents

# Foreword

This Technical Specification has been produced by the 3GPP.

This TS specifies the Stage 2 description of High Speed Circuit Switched Data (HSCSD) within the 3GPP system.

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

Version 3.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 Indicates TSG approved document under change control.

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

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

# 1 Scope

This Technical Specification (TS) contains the stage 2 service description for a High Speed Circuit Switched Data (HSCSD) on GSM/GERAN. HSCSD utilizes the multislot mechanism, i.e. using multiple traffic channels (/bearers) for the communication. In UMTS/UTRAN one bearer can provide all needed data rates, and the multislot mechanism is therefore not needed. The UMTS aspects concerning HSCSD are described exclusively in section 4.2.

In analogy with ~~CCITT~~ITU-T Recommendations I.130 [6] (refer to annex A) and with reference of ~~CCITT~~ITU-T Recommendations VI.1 Q.65 [7] (Stage 2 of the method for characterization of services supported by an ISDN), the second stage of the HSCSD is defined as follows.

Stage 2 identifies the functional capabilities and information flows needed to support the service as described in High Speed Circuit Switched Data (HSCSD) - Stage 1, ~~GSM 02.34~~TS 22.034 [9]. Furthermore, it identifies various possible physical locations for the functional capabilities. The output of Stage 2, which is signalling system independent, is used as an input to Stage 3, the design of signalling system and switching Recommendations.

# 2 Normative references

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2] GSM 05.02 (ETS 300 908): "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[3] ~~GSM 04.08~~TS 24.008 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[4] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile-services Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[5] ~~GSM 04.22~~ TS 24.022(ETS 300 946): "Digital cellular telecommunications system (Phase 2+); Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[6] ~~CCITT~~ITU-T Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[7] ~~CCITT~~ITU-T Recommendation Q.65: "Stage 2 of the method for the characterization of services supported by an ISDN".

[8] ITU-T Recommendation I.460 "Multiplexing, rate adaptation and support of existing interfaces".

[9] ~~GSM 02.34~~TS 22.034: "Digital cellular telecommunications system (Phase 2+); High Speed Circuit Switched Data (HSCSD) - Stage 1".

[10] GSM 03.20 (ETS 300 929): "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[11] GSM 04.21 (ETS 300 945): "Digital cellular telecommunications system (Phase 2+); Rate adaption on the Mobile Station - Base Station System (MS - BSS) Interface".

[12] GSM 08.20: "Digital cellular telecommunications system (Phase 2+); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[13] ~~GSM 07.02~~TS 27.002: (ETS 300 914): "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

[14] ~~GSM 07.03~~TS 27.003: (ETS 300 915): "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[15] GSM 05.08 (ETS 300 911): "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[16] ~~GSM 03.08~~TS 23.008: "Digital cellular telecommunications system (Phase 2+); Organisation of subscriber data".

[17] GSM 04.18: 'RR part of 04.08'

# 3 Definitions and abbreviations

**GERAN** GSM/EDGE radio access network

**HSCSD** High Speed Circuit Switched Data.

**HSCSD configuration** A multislot configuration consisting of one or several full rate traffic channels for data transmission.

**HSCSD channel** A full rate traffic channel belonging to a HSCSD configuration.

**main channel** The only channel in a HSCSD configuration carrying an FACCH.

**symmetric configuration** A configuration consisting of bi-directional channels.

**asymmetric configuration** A configuration consisting of bi-directional channels and at least one uni-directional channel.

For further GSM abbreviations see GSM 01.04 [1].

# 4 Main concepts

The air interface user rate in the original GSM data transmission is limited to 9.6 kbps with the 12 kbps air interface rate. The HSCSD described in this TS Stage 2 description allows higher air interface user rates to be used for transparent and non-transparent data services.

NOTE: In this document the term "air interface user rate" corresponds to the transfer rate in radio interface for user data and "air interface rate" includes additional data related to transmission protocols.

HSCSD is a feature enabling the co-allocation of multiple full rate traffic channels (TCH/F) into a HSCSD configuration. The aim of HSCSD is to provide a mixture of services with different air interface user rates by a single physical layer structure. The available capacity of a HSCSD configuration is several times the capacity of a TCH/F, leading to a significant enhancement in the air interface data transfer rate.

Figure 1 represents the network architecture to support GSM HSCSD based on the concept of multiple independent channels in one HSCSD configuration.

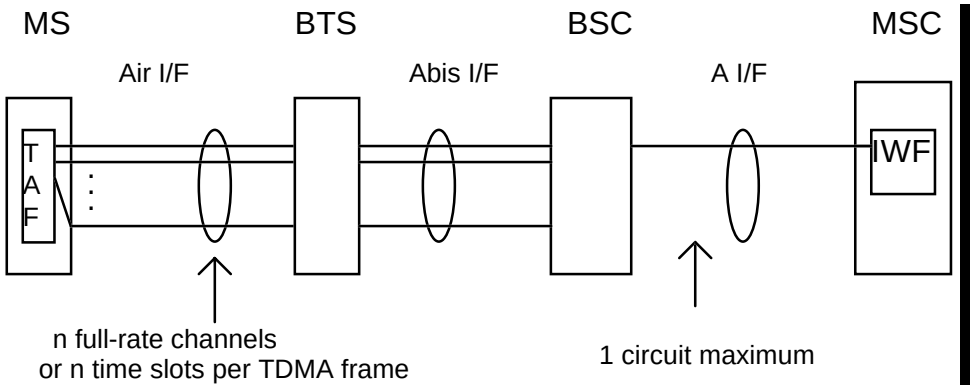



**Figure 1: Network architecture for supporting HSCSD**

In the above concept all lower layer standards for all interfaces between the network elements shall remain identical to those specified in Phase 2. A new functionality is introduced at the network and MS to provide the functions of combining and splitting the data into separate data streams which will then be transferred via n channels at the radio interface, where n = 1, 2, 3, ... 8. Once split, the data streams shall be carried by the n full rate traffic channels, called HSCSD channels, as if they were independent of each other, for the purpose of data relay and radio interface L1 error control, until to the point in the network where they are combined. However, logically the n full rate traffic channels at the radio interface belong to the same HSCSD configuration, and therefore they shall be controlled as one radio link by the network for the purpose of cellular operations, e.g. handover. This requires a new functionality in BSS.

The different user data substreams carried on the radio channels (one substream being the data flow over a single TCH) shall be mapped over the A interface, and vice versa, following the rules defined in ~~GSM 04.08~~24.008 [3] and GSM 08.20 [8].

On the A and E interfaces, the use of resources is restricted to one 64 kbps circuit by multiplexing the data streams into one A interface circuit (see ITU-T Recommendation I.460 [8]).

## 4.1 HSCSD service aspects

At call setup a user indicates a maximum number of TCH/F, acceptable channel codings, possible other modem type, and fixed network user rate values. For non-transparent HSCSD connection, in addition, wanted air interface user rate is indicated and the network resource needs, if user wishes to make use of the user initiated modification of the maximum number of TCH/F and/or wanted air interface user rate (user initiated service level up- and downgrading described in subclause 5.2.4) during the call. In case the indicated acceptable channel coding(s) implies that enhanced modulation is possible, the user may indicate a preference for channel coding asymmetry, i.e. downlink biased channel coding asymmetry, uplink biased channel coding asymmetry or channel coding symmetry. Together these parameters describe the HSCSD characteristics and network uses them to allocate an appropriate HSCSD connection.

For both transparent and non-transparent HSCSD connections the call can be established with any number of TCH/F from one up to the maximum number of TCH/F, i.e. the minimum channel requirement is always one TCH/F.

If the wanted air interface user rate requirement cannot be met using a symmetric configuration, an asymmetric configuration can be chosen. The network shall in this case give priority to fulfilling the air interface user rate requirement in downlink direction.

For non-transparent HSCSD connection the network can use dynamic allocation of resources, i.e. TCH/F, as long as the configuration is not in contradiction with the limiting values defined by the MS and the mobile equipment is capable of handling the allocated channel configuration. For transparent HSCSD connection the dynamic resource allocation is applicable, if the air interface user rate is kept constant. The change of channel configuration within the limits of minimum and maximum channel requirements is done with resource upgrading and resource downgrading procedures (described in subclause 5.2.3) during the call.

The MS may request a service level up- or downgrading during the call, if so negotiated in the beginning of the call. In the user initiated modification procedure, the user can modify the channel coding asymmetry preference when enhanced

modulation is indicated. This modification of channel requirements and/or wanted air interface user rate and/or channel coding asymmetry preference is applicable to non-transparent HSCSD connections only.

## 4.2 UMTS/UTRAN vs. HSCSD service aspects

The multislot mechanism is not needed in UMTS/UTRAN, as one bearer can provide all needed data rates. Consequently the parameters required for setup of a multislot call are not needed in a UMTS/UTRAN call setup, and the MSC shall ignore the parameters.

The parameters which are specific to multislot are (all contained in the Bearer Capability Information Element):

- Maximum number of traffic channels

- Acceptable Channel coding(s)

- UIMI, User initiated modification indication

- Acceptable Channel Codings extended

### 4.2.1 UMTS to GSM handover

In case of handover from UMTS to GSM the multislot parameters are required in the middle of an ongoing call. A dual mode mobile station shall therefore always include the multislot parameters in the setup, also in UMTS.

# 5 HSCSD architecture and transmission

## 5.1 Air interface

The HSCSD configuration is a multislot configuration using the TCH/F data channel mapping described in GSM 05.02 [2].

Two types of HSCSD configurations exist, symmetric configuration and asymmetric configuration. For both types of configurations the channels may be allocated on either consecutive or non-consecutive time slots taking into account the restrictions defined by the classmark.

An example of the HSCSD operation with two consecutive time slots is shown in figure 2.

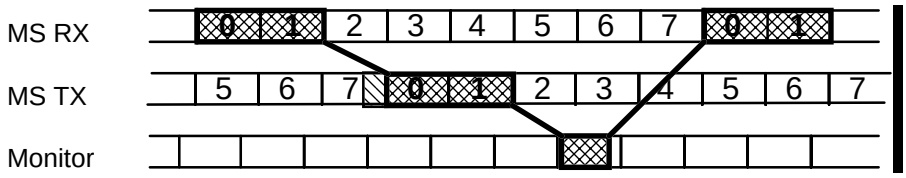



**Figure 2: Double slot operation in the air interface**

A symmetric HSCSD configuration consists of a bi-directional FACCH and co-allocated bi-directional TCH/F and SACCH channels. An asymmetric HSCSD configuration consists of a bi-direction FACCH and co-allocated uni-directional or bi-directional TCH/F and SACCH channels. A bi-directional channel is a channel on which the data is transferred in both uplink and downlink directions. On uni-directional channels for HSCSD the data is transferred in downlink direction, only.

In both symmetric and asymmetric HSCSD configurations one bi-directional channel, the main channel, carries a FACCH used for all the signalling not carried on the SACCH(s).

For HSCSD configuration all SACCHs are synchronized so that idle frames for each time slot coincide.

The classification of mobile stations used for HSCSD shall be based on Multislot classes, described in detail in GSM 05.02 [2].

The same frequency hopping sequence and training sequence is used for all the channels in the HSCSD configuration.

The same coding scheme as specified for the TCH/F9.6 and TCH/F4.8 data channels is used. Using a different radio interface channel coding may be considered at the later stage. The same channel coding is used for all the channels in the HSCSD configuration, though in the enhanced modulation mode, for non-transparent services, it is possible to have one channel coding used in the downlink and another channel coding used in the uplink. Different channel codings for up- and downlink could be applied in three cases, see 22.034:

a) If the mobile station only supports enhanced modulation in the downlink direction;

b) If the mobile station supports enhanced modulation in both directions, but the user indicates preference for uplink or downlink biased channel coding asymmetry;

c) If the mobile station supports enhanced modulation in both directions, and the user indicates preference for channel coding symmetry, but the link conditions justifies different channel coding in uplink or downlink

The change between different TCH/F channel codings can be provided with RR Channel Mode Modify or Configuration Change procedure.

In symmetric HSCSD configuration individual signal level and quality reporting for each HSCSD channel is applied.

For an asymmetric HSCSD configuration individual signal level and quality reporting is used for those channels, which have uplink SACCH associated with them. The quality measurements reported on the main channel are based on the worst quality measured among the main and the uni-directional downlink time slots used.

In both symmetric and asymmetric HSCSD configuration the neighbouring cell measurement reports are copied on every uplink channel used. See GSM 05.08 [15] for more detail on signal level and quality reporting.

Separate ciphering keys are used for each HSCSD channels. The ciphering keys used on different channels are derived from the Kc. See GSM 03.20 [10] for more details.

## 5.2 Functions and information flows

The procedures discussed in this subclause follow the procedures described in detail in GSM 08.08 [4] and ~~04.08~~24.008 [3]. Modifications are referred with text in brackets and conditional procedures with dashed line. Normal signalling or signalling presented earlier in the document is drawn with ovals.

### 5.2.1 Call establishment procedures

#### 5.2.1.1 Mobile originated call establishment

Figure 3 depicts the procedures for a successful HSCSD call establishment in mobile originated case.

The Multislot class is sent from MS to network using the early classmark sending.

At the call setup the mobile station sends a set of parameters describing the HSCSD characteristics to the network. These parameters and their presence in the Setup message in transparent (T) and non-transparent (NT) calls are as follows:

- Other Modem Type, OMT (T/NT)
- Fixed Network User Rate, FNUR (T/NT)
- Acceptable Channel Codings, ACC (T/NT)
- maximum number of traffic channels, Max TCH/F (T/NT)
- User Initiated Modification Indication, UIMI (NT)
- wanted Air Interface User Rate, AIUR (NT).and
- channel coding ASYMmetry indication, ASYM (NT)

In reply the network responds in Call Proceeding with the Other Modem Type, OMT, Fixed Network User Rate, FNUR, and User Initiated Modification Indication, UIMI (NT only), parameters it is prepared to give to the mobile station.

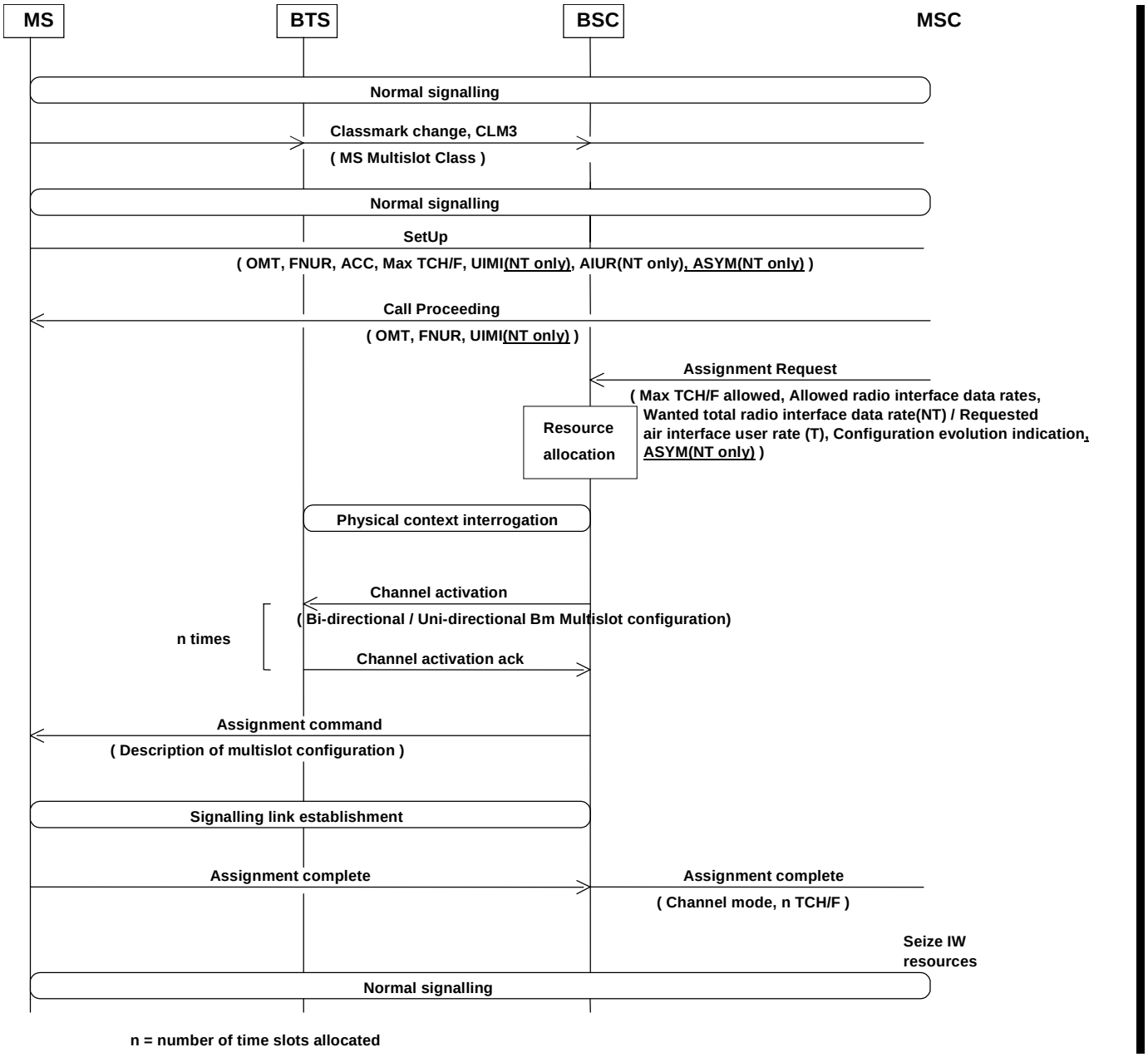



**Figure 3: Mobile originated call establishment**

The MSC requests the BSC to allocate the channel configuration using parameters derived from the HSCSD related parameters agreed in the setup phase. Based on these parameters and operator preferences the BSC then allocates a suitable number of channels and a suitable channel coding for the connection.

The following rule for the channel allocation apply:

The BSS shall try to reach but not exceed, with one exception, the wanted AIUR. The exception is the case when the chosen configuration can reach the wanted AIUR with lower number of TCH/F, e.g. in case AIUR=14.4 kbit/s, max number of TCH/F=3, ACC=TCH/F4.8 and TCH/F9.6, the network shall choose 2x9.6 over 3x4.8 if the TCH/F9.6 is available in the cell.

A separate channel activation is applied for each of the HSCSD channels before the selected channel configuration with information of the channel coding is forwarded to the mobile station. When the preference for downlink or uplink biased

channel coding asymmetry is indicated by the user, and an asymmetric channel coding connection is set up based on this indication, the BSC shall always assign a TCH/F14.4 channel on the unbiased link of the connection.

At assignment completion, the BSS informs the MSC of the chosen HSCSD configuration and the MSC may seize the IW resources accordingly.

#### 5.2.1.2 Mobile terminated call establishment

Figure 4 depicts the procedures for a successful HSCSD call establishment in mobile terminated case.

At the call setup the network sends the Other Modem Type,OMT, Fixed Network User Rate,FNUR, and User Initiated Modification Indication,UIMI (NT only), parameters to the mobile station.

In reply the mobile station responds to the network with the set of parameters describing the HSCSD characteristics. These parameters and their presence in the Call Confirmed message in transparent (T) and non-transparent (NT) calls are as follows:

- wanted Other Modem Type, OMT (T/NT)
- wanted Fixed Network User Rate, FNUR (T/NT)
- Acceptable Channel Codings, ACC (T/NT)
- maximum number of traffic channels, Max TCH/F (T/NT)
- User Initiated Modification Indication, UIMI (NT)
- wanted Air Interface User Rate, AIUR (NT).and
- channel coding ASYMmetry indication, ASYM (NT)

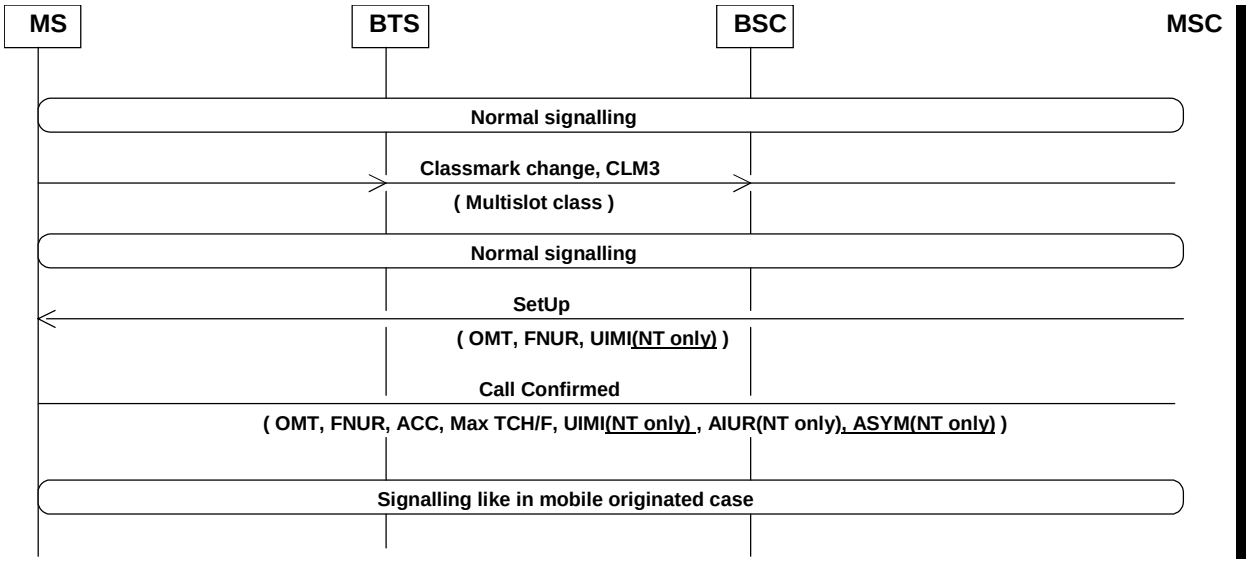



**Figure 4: Mobile terminated call establishment**

The MSC requests the BSC to allocate the channel configuration using parameters derived from the HSCSD related parameters agreed in the setup phase. Based on these parameters and operator preferences the BSC then allocates a suitable number of channels and a suitable channel coding for the connection.

The same channel allocation rules as in mobile originated case apply.

The same channel activation rules as in mobile originated case apply.

At assignment completion, the BSS informs the MSC of the chosen HSCSD configuration and the MSC may seize the IW resources accordingly.

## 5.2.2 Handover procedures

### 5.2.2.1 Intra BSC handover

Figure 5 depicts the procedures for a successful HSCSD intra BSC handover.

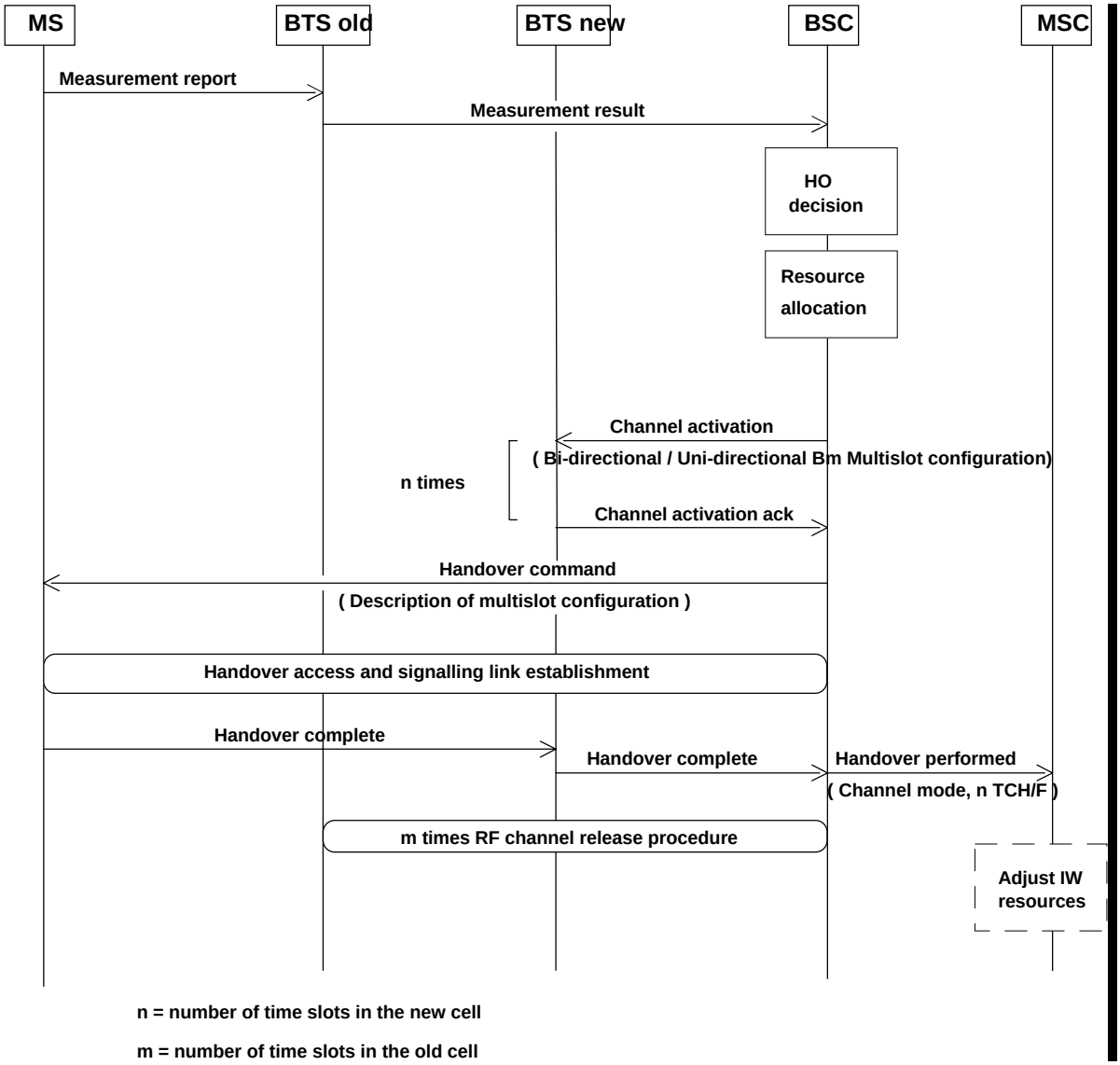



**Figure 5: Intra BSC handover**

For a non-transparent call, the HSCSD configuration may be modified during an intra BSS handover within the maximum number of TCH/F and channel codings acceptable for the user and allowed by the network.

The same allocation and activation rules as in call establishment apply.

At handover completion, the BSC signals to the MSC the new HSCSD configuration and the MSC may adjust the IW resources accordingly.

### 5.2.2.2 Inter BSC, intra-MSC handover

Figure 6 depicts the procedures for a successful HSCSD inter BSC handover.

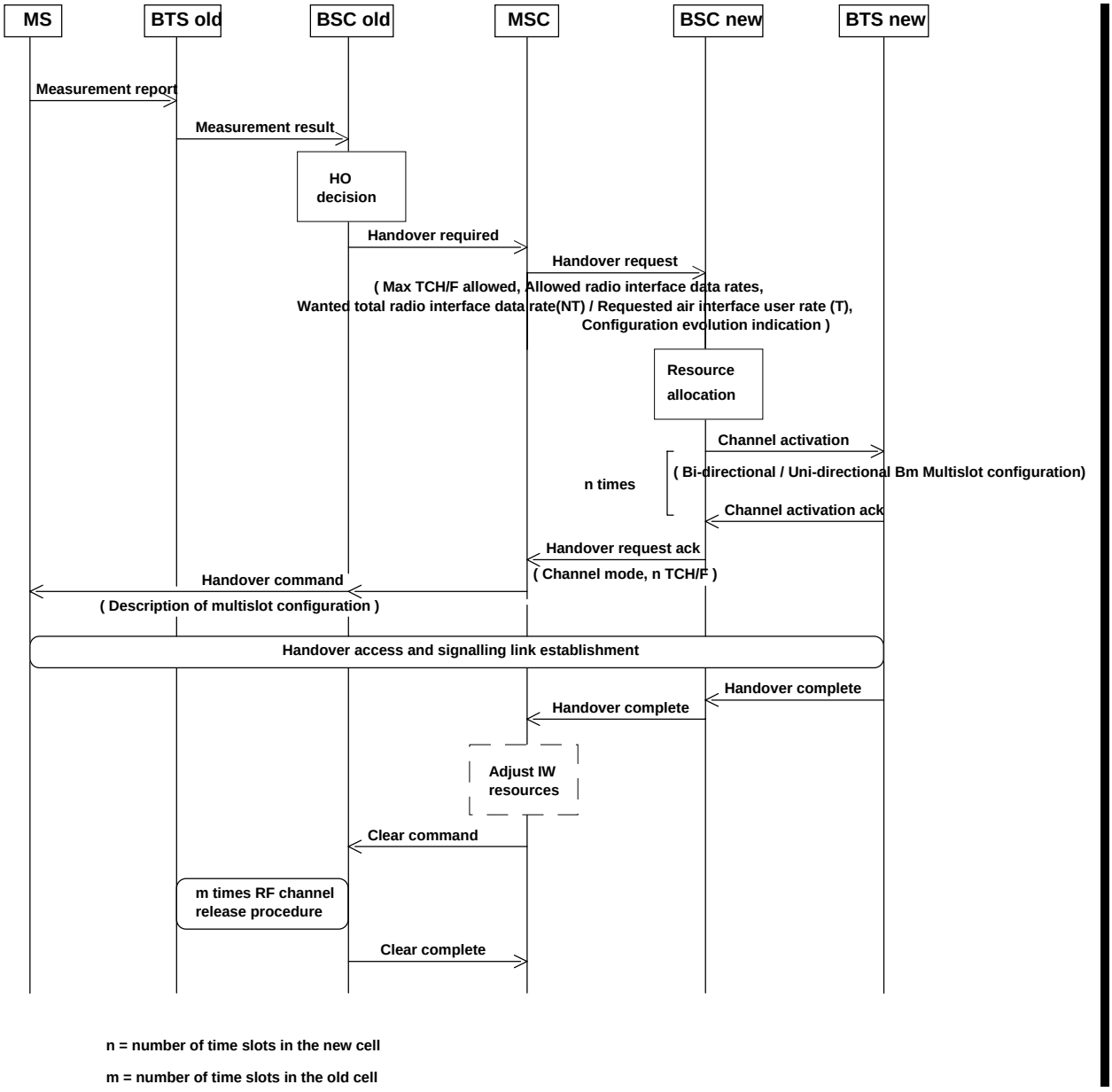



**Figure 6: Inter BSC intra MSC handover**

In inter BSS handover the MSC requests the new BSS to allocate a channel configuration using parameters derived from the HSCSD related parameters agreed earlier during the call. Based on these parameters and operator preferences the BSC then allocates a suitable number of TCH/F and a suitable channel coding for the connection.

For a non-transparent call, the HSCSD configuration may be modified during an intra BSS handover within the maximum number of TCH/F and channel codings acceptable for the user and allowed by the network.

The same channel allocation and activation rules as in call establishment apply.

The BSC informs the MSC of the chosen HSCSD configuration and at handover completion the MSC may adjusts the IW resources accordingly.

#### 5.2.2.3 Inter MSC handover

In inter MSC handover the requested channel configuration is forwarded to a BSS within the new MSC using MAP protocol between MSCs. Procedures similar to those in inter BSS handover case can be applied in order to establish the HSCSD connection in a new cell.

### 5.2.3 Resource upgrading, downgrading and configuration change

Resource upgrading means allocating more channels to the HSCSD configuration. Similarly, in resource downgrading channels are released.

Both of these procedures are initiated by the network and they are used in non-transparent calls to alter the channel resources between one TCH/F and the maximum number of TCH/F allowed. For transparent connection the alteration of resources is also applicable required that the AIUR for the connection remains constant.

Figure 7 depicts the procedures for a successful resource upgrading and downgrading for an ongoing HSCSD call, in case the position of the main TCH/F remains unchanged.

A separate channel activation for the new HSCSD channels is carried out and the earlier activated HSCSD channels may be modified, before RR Configuration change procedure is used for forwarding the new channel configuration to the mobile station. Similarly, the Configuration change procedure can be used in both transparent and non-transparent calls for reordering the channels in a call without changing the number of TCH/Fs allocated.

At resource modification completion, the BSC signals to the MSC the new HSCSD configuration and the MSC may adjusts the IW resources accordingly.

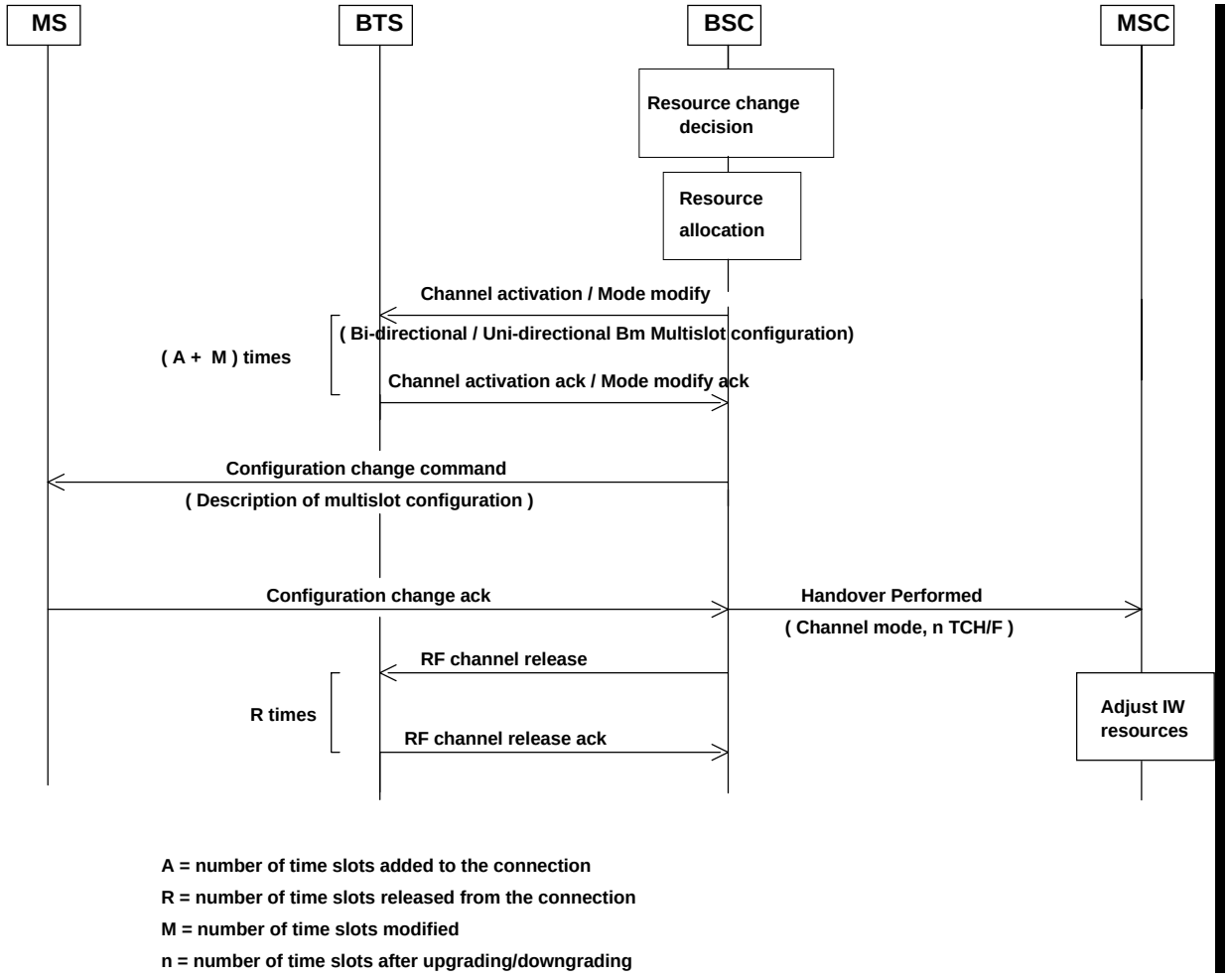
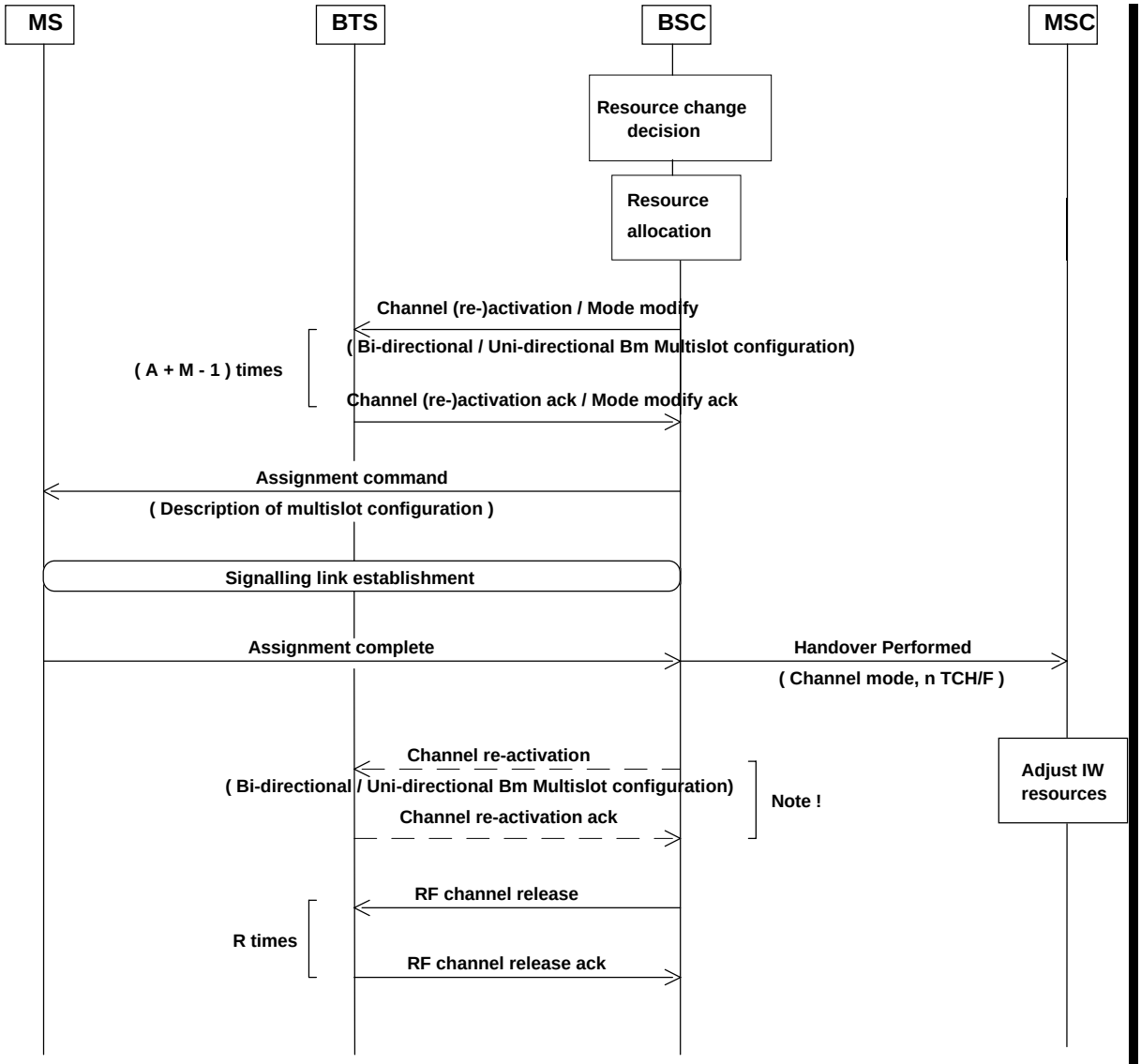



**Figure 7: Resource upgrading and downgrading, the position of the main channel unchanged**

Figure 8 depicts the procedures for a successful resource upgrading and downgrading for an ongoing HSCSD call in case the position of the main channel is changed.

A separate channel activation for the new HSCSD channels, is carried out and the earlier activated HSCSD channels may be modified or, in case of the new main channel, reactivated, before RR Assignment procedure is used for forwarding the new channel configuration to the mobile station. Similarly, the Assignment procedure can be used in both transparent and non-transparent calls for reordering the channels in a call without changing the number of TCH/Fs allocated.

At resource modification completion, the BSC signals to the MSC the new HSCSD configuration and the MSC may adjusts the IW resources accordingly.




**NOTE:** Deactivates the old signalling link by modifying the old main channel. The old main can not be modified before a new main has been established. If the time slot for the old main is not used in the new HSCSD configuration, RF channel release is used instead.

**A = number of time slots added to the HSCSD connection**

**R = number of time slots released from the HSCSD connection**

**M = number of time slots modified or re-activated**

**n = number of time slots after upgrading/downgrading**

**Figure 8: Resource upgrading and downgrading, the position of the main channel changed**

## 5.2.4 User initiated service level up- and downgrading

Figure 9 depicts the procedures for a successful user initiated service level up- and downgrading for on-going HSCSD call.

During a HSCSD call the user may request, if so indicated in the call setup, the network to change the current maximum number of traffic channels and air interface user rate parameters and/or channel coding asymmetry preference. This is done by using the CC User initiated service level up- and downgrading procedure.

If network allows the modification, the resulting new parameters are forwarded to BSC and the radio interface resources may be adjusted accordingly. The resource upgrading or downgrading is done separately from the change in HSCSD parameters. However, if a contradiction between the new parameters and the used air interface resources exists, the resource downgrading may be needed before the network acknowledges the new parameters.

The user initiated service level up- and downgrading is applicable in non-transparent mode connections, only.

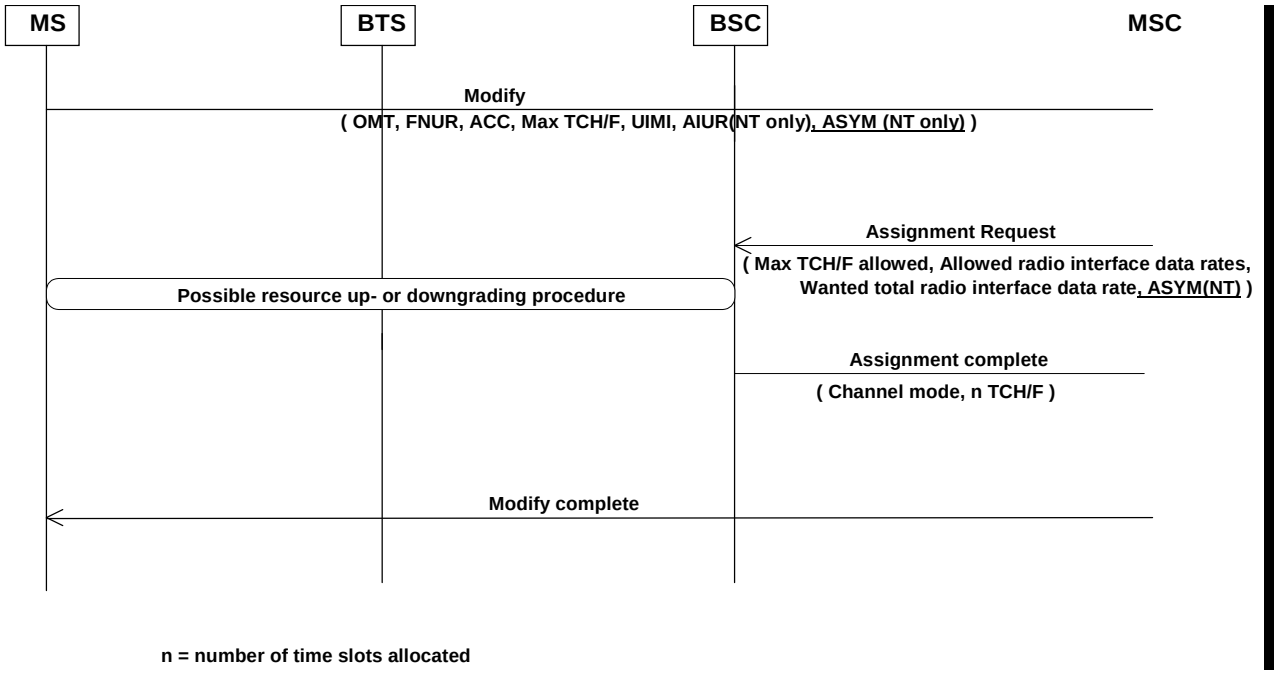



**Figure 9: User initiated service level up- and downgrading**

## 5.2.5 Start of ciphering

In order to start ciphering, the RR Encryption procedure is controlled by the main signalling link, only. The encryption information for secondary HSCSD channel is forwarded to the corresponding TCH/F in initial channel activation or later in the channel reactivation or Mode modify message.

The change of ciphering modes for separate channels within the HSCSD connection might not be perfectly synchronized.

# 5.3 Transparent data transmission

## 5.3.1 Numbering of data substreams

In transparent data transmission the V.110 data frames on the HSCSD channels carry data substream numbers to retain the order of transmission over GSM, between the split/combine functions. Between these functions a channel internal multiframing is also used in order to increase the tolerance against inter channel transmission delays. Depending on the location of the access point to external networks the split/combine functionality is located in the BSS or in the IWF on the network side, and at the mobile station.

A detailed description of the numbering scheme is given in GSM 04.21 [12].

## 5.3.2 Padding

HSCSD also supports user rates which are not multiples of rates provided by one TCH/F.

If the selected user rate requires n TCH/F channels but is less than the total rate that can be achieved with these n TCH/F then in the first n-1 channels the data frames carry user data on all D bits. In the n th channel the unneeded D bits of the V.110 frames are padded with fill bits.

# 5.4 Non-Transparent data transmission

## 5.4.1 HSCSD RLP

Non-transparent mode of HSCSD is realized by modifying the RLP and L2R functions to support multiple parallel TCH/Fs instead of only one TCH/F (figure 11). In addition the RLP frame numbering is increased to accommodate the enlarged data transmission rate.

The detailed specification of the RLP is given in ~~GSM 04.22~~ TS 24.022[5], and L2R is defined in ~~GSM 07.02~~TS 27.002 [13] and ~~GSM 07.03~~TS 27.003 [14].

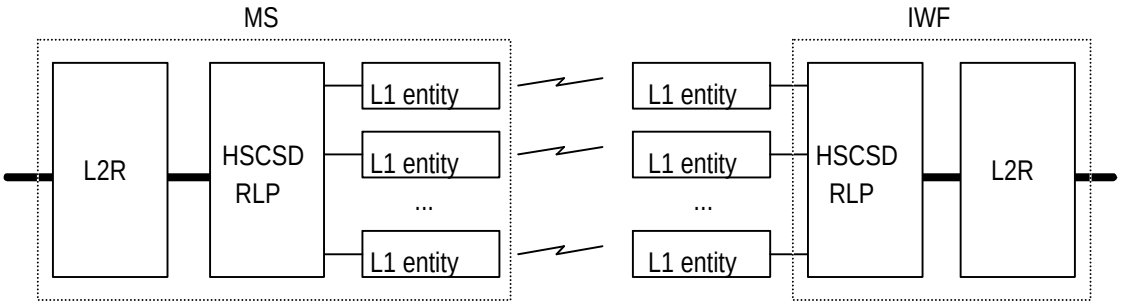



**Figure 11: The HSCSD concept in non-transparent mode**

# 5.5 Interworking

Interworking of HSCSD will be arranged to all the services to which interworking is provided in the existing GSM-system; these services are PSTN, ISDN, CSPDN and PSPDN.

# 5.6 Subscription aspects and storage of subscriber data

The HSCSD uses general bearer services defined in 02 series specifications. No HSCSD related subscriber data is stored in HLR or VLR with the exception of the bearer capability allocation (see ~~GSM 03.08~~TS 23.008 [16]).

# 6 Charging

## 6.1 General principles

The A party is liable for the usage of all TCH/F in her PLMN. The B party may have to pay for one or more TCH/F in her PLMN. In case the originating or terminating subscriber is in the PSTN there is no additional charge for them.

## 6.2 Call forwardings

The A party is liable for the leg A-B. The B party who forwards the call to the forwarded-to subscriber (C party) is liable for the primary (basic) channel on the leg B-C. Forwarded-to (C party) is liable for the usage of one or more TCH/F in her PLMN.

## 6.3 AoC and toll ticketing

MSC will send the modified e-parameters to the MS, both in MO and in MT calls, every time the charging rate will change. This can happen when:

- the coding on the air interface channel is changed;
- the number of TCH/F allocated is increased or decreased;

during an existing HSCSD data call and when AoC supplementary service is activated.

Appropriate information concerning these changes have to also be included in the charging record (toll ticket).

# Annex A:
# Change history

| Change history | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **TSG CN#** | **Spec** | **Version** | **CR** | **Rev.** | **Rel.** | **New Version** | **Subject** | **Comment** |
| Apr 1999 | GSM 03.34 | | | | | | | Transferred to 3GPP CN1 |
| CN#03 | 23.034 | | | | | 3.0.0 | | Approved at CN#03 |
| CN#5 | 23.034 | 3.0.0 | 001 | 2 | R99 | 3.1.0 | CR to 23.034 due to asymmetry for ECSD | V3.1.1 was to correct the implementation of this CR |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

# History

| Document history | | |
|---|---|---|
| V3.0.0 | May 1999 | Approved at TSGN #3. Under TSG TSG CN Change Control. |
| V3.1.0 | October 99 | Approved at TSGN # 5. |
| V3.1.1 | December 1999 | Editorial changes to correct the implementation of the previous version |
| | | |
| | | |

**3GPP/SMG Meeting TSG-CN-WG1 #11**
**Umeå, Sweden, 28 Feb - 3 March 2000**

***Document*** ***N1-000390***
*Revision of N1-000083*

# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| 24.007 | CR | 006 R1 | Current Version: | 3.2.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | TSG CN#7 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

**Source:** CN1 **Date:** 22.02.00

**Subject:** Updating Session Management (SM) for R99

**Work item:** GSM/UMTS Interworking

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | X | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:**

The CR updates 24.007 in accordance with the updates made to 24.008 for GPRS/UMTS SM for R99. It also makes some editorial corrections to faults found in 24.007 for SM.

This CR corrects SMREG-SAP and SNSM-SAP only. Further CRs will be needed for other SAPs.

**Clauses affected:** 6.5, 6.5.1, 6.5.2, 7.5, 7.5.1, 7.5.2

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**

Anonymous access has not been removed in this CR. Protocol architecture in figure 5.2 and 5.3 have not been updated for UMTS. This is FFS.

## 6.5 Session Management Services for GPRS-Services

Session Management services are provided at the SMREG-SAP and the SNSM-SAP for anonymous and non-anonymous access. The non-anonymous and anonymous access procedures for PDP context activation and PDP context deactivation are available at the SMREG-SAP. In addition there exists a PDP context modification for non-anonymous PDP contexts.

Before ~~SNDCP initiates~~ any user data transfer is initiated (eg.via SNDCP in GSM case), the PDP context activation procedure must be performed.

### 6.5.1 Session Management Services for SMREG-SAP

**Table 6.5: Primitives and Parameters at SMREG-SAP - MS side**

| PRIMITIVE | PARAMETER (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| SMREG-PDP-ACTIVATE-REQ | PDP ~~type~~address, QoS, NSAPI, APN, ~~Data mode,~~ Protocol configuration options | 6.5.1.1 |
| SMREG-PDP-ACTIVATE-CNF | ~~PDP type,~~ PDP address, QoS, NSAPI, ~~PDP~~ Protocol configuration options | 6.5.1.2 |
| SMREG-PDP-ACTIVATE-REJ | Cause, NSAPI, ~~PDP~~Protocol configuration options | 6.5.1.3 |
| SMREG-PDP-ACTIVATE-IND | PDP ~~type~~address, ~~QoS, NSAPI,~~ APN | 6.5.1.4 |
| SMREG-PDP-ACTIVATE-REJ-RSP | Cause, PDP address, APN | 6.5.1.14 |
| SMREG-PDP-DEACTIVATE-REQ | NSAPI(s), teardown indicator, cause | 6.5.1.5 |
| SMREG-PDP-DEACTIVATE-CNF | NSAPI(s) | 6.5.1.6 |
| SMREG-PDP-DEACTIVATE-IND | NSAPI(s), teardown indicator, cause | 6.5.1.7 |
| SMREG-PDP-MODIFY-IND | QoS~~(s)~~, NSAPI~~(s)~~ | 6.5.1.8 |
| SMREG-PDP-MODIFY-REQ | QoS, NSAPI, TFT | 6.5.1.18 |
| SMREG-PDP-MODIFY-CNF | QoS, NSAPI | 6.5.1.19 |
| SMREG-PDP-MODIFY-REJ | Cause, NSAPI | 6.5.1.20 |
| SMREG-PDP-ACTIVATE-SEC-REQ | QoS, NSAPI, TFT, Primary-NSAPI | 6.5.1.15 |
| SMREG-PDP-ACTIVATE-SEC-CNF | QoS, NSAPI | 6.5.1.16 |
| SMREG-PDP-ACTIVATE-SEC-REJ | Cause, NSAPI | 6.5.1.17 |
| SMREG-AA-PDP-ACTIVATE-REQ | server address, QoS, NSAPI, Data mode | 6.5.1.9 |
| SMREG-AA-PDP-ACTIVATE-CNF | QoS | 6.5.1.10 |
| SMREG-AA-PDP-ACTIVATE-REJ | Cause | 6.1.5.11 |
| SMREG-AA-PDP-DEACTIVATE-REQ | NSAPI | 6.5.1.12 |
| SMREG-AA-PDP-DEACTIVATE-IND | NSAPI | 6.5.1.13 |

#### 6.5.1.1 SMREG-PDP-ACTIVATE-REQ

The MS initiates a primary PDP context activation. SM is requested to send the ACTIVATE PDP CONTEXT REQUEST message to the network. The PDP context is pending activation.

#### 6.5.1.2 SMREG-PDP-ACTIVATE-CNF

The MS initiated primary PDP context activation succeeded. The network confirmed the PDP context activation, i.e. the ACTIVATE PDP CONTEXT ACCEPT message was received from the network. In GSM, ~~Then~~ this implies that SM has ordered SNDCP to establish the needed LLC link~~s~~. In the UMTS case, this implies that the RLC link towards the RNC has been established and that the SM has been informed about this from the RABM service entity in the MS. (RABM- RAB Management service entity is FFS and could lead to update of the protocol architecture in figure 5.2 and 5.3) The PDP context is active.

#### 6.5.1.3 SMREG-PDP-ACTIVATE-REJ

The primary PDP context activation failed, the PDP context is not activated. One reason for failure is that the network rejected the activation attempt, which means the ACTIVATE PDP CONTEXT ~~FAILURE~~ REJECT message was received. Another reason is e.g. that it was not possible to establish the needed LLC link~~s~~ in the GSM case.

#### 6.5.1.4 SMREG-PDP-ACTIVATE-IND

The network asked for a PDP context activation. The REQUEST PDP CONTEXT ACTIVATION message was received from the network. The MS reacts either by initiating a new primary PDP context activation or by rejecting the network's request.

#### 6.5.1.5 SMREG-PDP-DEACTIVATE-REQ

The MS initiates a PDP context deactivation: SM is requested to send a DEACTIVATE PDP CONTEXT REQUEST message to the network. The PDP context is pending deactivation. Presence of the teardown indicator will lead to deactivation of all PDP contexts coupled to the identified PDP address. NSAPI(s) to be deallocated from the SNDCP entity via the SNSM-SAP for the GSM case, are included in the primitive.

#### 6.5.1.6 SMREG-PDP-DEACTIVATE-CNF

The MS initiated PDP context deactivation has been done. The network confirmed the PDP context deactivation, i.e. the DEACTIVATE PDP CONTEXT ACCEPT message was received from the network. For GSM ~~Then~~ SM has ordered SNDCP to locally release not further needed LLC links. In the UMTS case, the release of the RLC link towards the RNC takes place as a result of a RAB release trigger from the network side. SM has been informed about this from the RABM service entity in the MS. (RABM- RAB Management service entity is FFS and could lead to update of the protocol architecture in figure 5.2 and 5.3) The PDP context has been deactivated.

#### 6.5.1.7 SMREG-PDP-DEACTIVATE-IND

A network initiated ~~a~~ PDP context deactivation has been performed. The DEACTIVATE PDP CONTEXT REQUEST message has been received from the network. The MS has acknowledged with the DEACIVATE PDP CONTEXT ACCEPT message. The PDP context has been deactivated, Not further needed LLC links were locally released, Presence of the teardown indicator will lead to deactivation of all PDP contexts coupled to the identified PDP address. NSAPI is included in the primitive to allow identification of the PDP context(s) needing deactivation.

#### 6.5.1.8 SMREG-PDP-MODIFY-IND

A network initiated ~~a~~ PDP context modification has been performed. The MODIFY PDP CONTEXT REQUEST message has been received from the network. The modification has been acknowledged by sending the MODIFY PDP CONTEXT ACCEPT message. One ~~or several~~ PDP context~~s~~ has~~ve~~ been modified. LLC link is ~~s~~ ~~are~~ adjusted.

#### 6.5.1.9 SMREG-AA-PDP-ACTIVATE-REQ

The MS initiates an anonymous PDP context activation. SM is requested to send the ACTIVATE AA PDP REQUEST message to the network. The anonymous PDP context is pending activation.

#### 6.5.1.10 SMREG-AA-PDP-ACTIVATE-CNF

The MS initiated anonymous PDP context activation succeeded. The network confirmed the PDP context activation, i.e. the ACTIVATE AA PDP CONTEXT ACCEPT message was received from the network. Then SM has ordered SNDCP to establish the needed LLC links. The anonymous PDP context is active.

#### 6.5.1.11 SMREG-AA-PDP-ACTIVATE-REJ

The PDP context activation failed, the PDP context is not activated. One reason for failure is that the network rejected the activation attempt, which means the AA ACTIVATE PDP CONTEXT FAILURE message was received. Another reason is e.g. that it was not possible to establish the needed LLC links.

#### 6.5.1.12 SMREG-AA-PDP-DEACTIVATE-REQ

The MS initiates the anonymous PDP context deactivation:

#### 6.5.1.13 SMREG-AA-PDP-DEACTIVATE-IND

The MS anonymous PDP context deactivation has been performed. For example the MS's ready timer has expired, or the MS has left the routing area. Also the network may have requested deactivation, which means a DEACTIVATE AA PDP CONTEXT REQUEST message was received from the network.

#### 6.5.1.14 SMREG-PDP-ACTIVATE-REJ-RSP

The network requested PDP context activation failed.

#### 6.5.1.15 SMREG-PDP-ACTIVATE-SEC-REQ

The MS initiates a secondary PDP context activation. SM is requested to send the ACTIVATE SECONDARY PDP CONTEXT REQUEST message to the network. The PDP context is pending activation.

#### 6.5.1.16 SMREG-PDP-ACTIVATE-SEC-CNF

The MS initiated secondary PDP context activation succeeded. The network confirmed the PDP context activation, i.e. the ACTIVATE SECONDARY PDP CONTEXT ACCEPT message was received from the network. In GSM, this implies that SM has ordered SNDCP to establish the needed LLC link. In the UMTS case, this implies that the RLC link towards the RNC has been established and that the SM has been informed about this from the RABM service entity in the MS. (RABM- RAB Management service entity is FFS and could lead to update of the protocol architecture in figure 5.2 and 5.3) The PDP context connected to the same PDP address as the PDP context identified by the linked NSAPI parameter in SMREG-PDP-ACTIVATE-SEC-REQ is active. ('Primary NSAPI' will point to any one of the other established PDP contexts for a given PDP address)

#### 6.5.1.17 SMREG-PDP-ACTIVATE-SEC-REJ

The secondary PDP context activation failed, the PDP context is not activated. One reason for failure is that the network rejected the activation attempt, which means the ACTIVATE SECONDARY PDP CONTEXT REJECT message was received. Another reason is e.g. that it was not possible to establish the needed LLC link in the GSM case.

#### 6.5.1.18 SMREG-PDP-MODIFY-REQ

An MS initiated PDP context modification is requested. The MODIFY PDP CONTEXT REQUEST message is sent to the network and pending acceptance. Affected PDP context is identified via the NSAPI value included in the primitive.

#### 6.5.1.19 SMREG-PDP-MODIFY-CNF

An MS initiated PDP context modification has been accepted by the network. The modification is acknowledged from the network via the MODIFY PDP CONTEXT ACCEPT message. The addressed PDP context has been modified. LLC or RLC link is adjusted according to the QoS returned from the network.

#### 6.5.1.20 SMREG-PDP-MODIFY-REJ

An MS initiated PDP context modification has been rejected by the network. The rejection is signalled from the network via the MODIFY PDP CONTEXT REJECT message with the cause code. The PDP context remains active without change of QoS.

The session management services provided at the service access point SMREG-SAP are illustrated in the state machines of figure 6.4 and 6.5 below. Note, that the state machine describes only one PDP context within the SM entity.

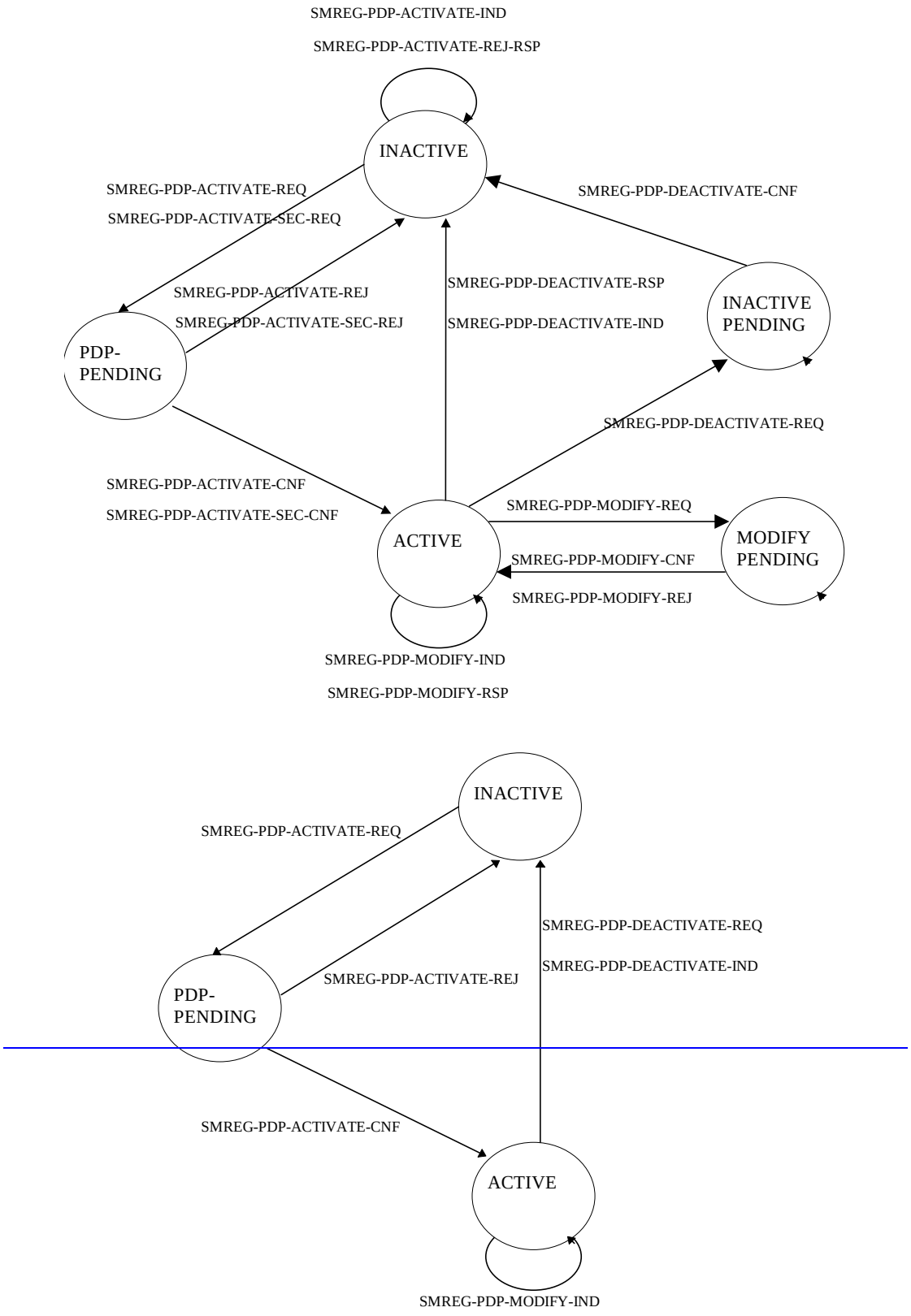



**Figure 6.4: Session Management service states at the SMREG-SAP for GPRS non-anonymous PDP context handling - MS side**

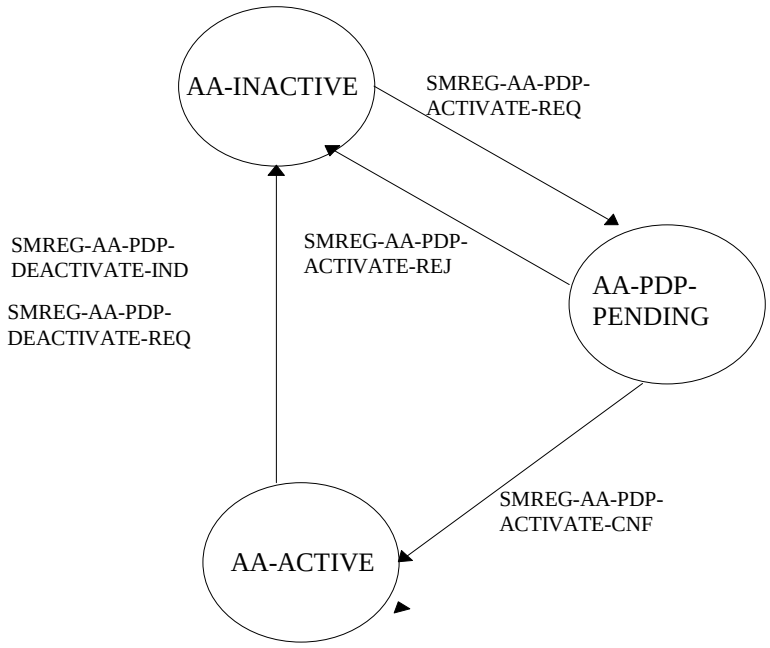



**Figure 6.5:Session management services states at SMREG-SAP for GPRS anonymous services - MS side**

## 6.5.2 Session Management Services for SNSM-SAP

### ~~6.5.2.1 Service primitives~~

~~This section is informative,~~The SNSM-SAP ~~the~~ service primitives are defined in GSM 04.65 [12a]~~]. They are included here to provide a complete overview of the radio interface protocol architecture.~~

**~~Table 6.5.2: Service primitives and parameters at SNSM-SAP - MS side~~**

| ~~PRIMITIVE~~ | ~~PARAMETER (message, info elements of message, other parameters)~~ | ~~REFERENCE~~ |
|---|---|---|
| ~~SNSM-ACTIVATE-IND~~ | ~~NSAPI, QoS, SAPI~~ | ~~6.5.2.1.1~~ |
| ~~SNSM-ACTIVATE-RSP~~ | ~~-~~ | ~~6.5.2.1.2~~ |
| ~~SNSM-DEACTIVATE-IND~~ | ~~NSAPI~~ | ~~6.5.2.1.3~~ |
| ~~SNSM-DEACTIVATE-RSP~~ | ~~-~~ | ~~6.5.2.1.4~~ |
| ~~SNSM-MODIFY-IND~~ | ~~NSAPI, QoS, SAPI~~ | ~~6.5.2.1.5~~ |
| ~~SNSM-MODIFY-RSP~~ | ~~-~~ | ~~6.5.2.1.6~~ |
| ~~SNSM-STATUS-REQ~~ | ~~-~~ | ~~6.5.2.1.7~~ |

#### ~~6.5.2.1.1 SNSM-ACTIVATE-IND~~

~~Indication used by the SM entity to inform the SNDCP entity that an NSAPI has been activated for data transfer. It also informs the SNDCP entity about the negotiated QoS profile and the SAPI assigned for this NSAPI. The request is sent by SM towards SNDCP during an ongoing PDP context activation procedure.~~

~~6.5.2.1.2 SNSM-ACTIVATE-RSP~~

~~Response used by the SNDCP entity to inform the SM entity that the indicated NSAPI is now in use and that the acknowledged peer-to-peer LLC operation for the indicated SAPI is established, if necessary.~~

~~6.5.2.1.3 SNSM-DEACTIVATE-IND~~

~~Indication used by the SM entity to inform the SNDCP entity that an NSAPI has been deallocated and cannot be used by the SNDCP entity anymore. The request is sent by SM towards SNDCP during an ongoing MS initiated as well as network initiated PDP context activation procedure.~~

~~6.5.2.1.4 SNSM-DEACTIVATE-RSP~~

~~Response used by the SNDCP entity to inform the SM entity that the NSAPI indicated is no longer in use and that the acknowledged peer-to-peer LLC operation for the associated SAPI is released, if necessary.~~

~~6.5.2.1.5 SNSM-MODIFY-IND~~

~~Indication used by the SM entity to trigger change of the QoS for an NSAPI and indication of the SAPI to be used. The request is sent by SM towards SNDCP during an ongoing PDP context modification procedure.~~

~~6.5.2.1.6 SNSM-MODIFY-RSP~~

~~Response used by the SNDCP entity to inform the SM entity that the indicated NSAPI and QoS profile are now in use and the acknowledged peer-to-peer LLC operations for the appropriate SAPIs are established and/or released, if necessary.~~

~~6.5.2.1.7 SNSM-STATUS-REQ~~

~~This primitive is used by the SNDCP entity to inform the SM entity that SNDCP cannot continue its operation due to errors at the LLC layer (as indicated with LL_Release.indication) or at the SNDCP layer. The Cause parameter indicates the cause of the error.~~

Next Modified Section

# 7.5 Session Management Services for GPRS

On the network side Session Management Services are provided ~~only~~ at the SNSM-SAP and SMREG-SAP. At the SMREG-SAP, the assumption taken is that the MS initiated primary and secondary PDP context activation, and MS initiated PDP context modification and deactivation, are not visible. I.e the service for these functions on the network side stops in the SM sublayer entity.

## 7.5.1 Session Management Services for SMREG-SAP

**Table 7.5.1: Primitives and Parameters at SMREG-SAP - network side**

| PRIMITIVE | PARAMETER (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| SMREG-PDP-ACTIVATE-REQ | ~~PDP type,~~ PDP address, ~~QoS,~~ ~~NSAPI,~~ APN~~, Data mode~~ | 7.5.1.1 |
| SMREG-PDP-ACTIVATE-REJ | Cause, PDP address, APN | 7.5.1.2 |
| SMREG-PDP-DEACTIVATE-REQ | NSAPI(s), teardown indicator, cause | 7.5.1.3 |

| | | |
|---|---|---|
| SMREG-PDP-DEACTIVATE-CNF | NSAPI(s)~~, PDP address~~ | 7.5.1.4 |
| SMREG-PDP-MODIFY-REQ | QoS~~(s)~~, NSAPI~~(s)~~ | 7.5.1.5 |
| SMREG PDP-MODIFY-CNF | ~~server address, QoS(s),~~ NSAPI~~(s)~~ | 7.5.1.6 |
| SMREG PDP-MODIFY-REJ | ~~server address, QoS(s),~~ NSAPI~~(s)~~ | 7.5.1.7 |

### 7.5.1.1 SMREG-PDP-ACTIVATE-REQ

The network initiates a PDP context activation. SM is requested to send the ~~ACTIVATE~~ REQUEST PDP CONTEXT ~~REQUEST~~ ACTIVATION message to the MS. The PDP context is pending activation. The network expects that the MS continues with a normal MS initiated context activation. Therefore at the SMREG-SAP no confirmation is provided.

### 7.5.1.2 SMREG-PDP-ACTIVATE-REJ

The network initiated PDP context activation failed. Either the ACTIVATE PDP CONTEXT ~~FAILURE~~ REJECT message was received from the MS, or lower layer failure or timer expiry caused abortion of the activation procedure.

### 7.5.1.3 SMREG-PDP-DEACTIVATE-REQ

The network initiates a PDP context deactivation. SM is requested to send a DEACTIVATE PDP CONTEXT REQUEST message. The PDP context is pending deactivation. Presence of the teardown indicator will lead to deactivation of all PDP contexts coupled to the identified PDP address. NSAPI(s) to be deallocated from the SNDCP entity via the SNSM-SAP for the GSM case, are included in the primitive.

### 7.5.1.4 SMREG-PDP-DEACTIVATE-CNF

The network initiated PDP context deactivation has been concluded. The MS confirmed the PDP context deactivation, i.e. the DEACTIVATE PDP CONTEXT ACCEPT message was received. Then SM ordered SNDCP to locally release ~~those~~ LLC link(s) not further needed ~~by other PDP contexts~~for the GSM case. In the UMTS case, release of affected GTP-U tunnel(s) towards the RNC has taken place. ~~-~~The PDP context is deactivated.

### 7.5.1.5 SMREG-PDP-MODIFY-REQ

The network initiates a modification of the PDP context. SM is requested to send a MODIFY PDP CONTEXT REQUEST message to the MS. The PDP context is pending modification.

### 7.5.1.6 SMREG-PDP-MODIFY-CNF

The PDP context modification has been concluded. The MS confirmed he PDP context modification, i.e. the MODIFY PDP CONTEXT ACCEPT message was received. Then, for the GSM case, SM ordered SNDCP to adjust the affected LLC link~~s~~ as required. For the UMTS case, RAB properties were updated as required. The PDP context is modified.

### 7.5.1.7 SMREG-PDP-MODIFY-REJ

The PDP context modification has been ~~failed~~rejected. Due to timer expiry or lower layer failure the modification procedure has been aborted.

## 7.5.2 Session Management Services for SNSM-SAP

The SNSM-SAP service primitives are defined in GSM 04.65 [12a].

**Table 7.5.2: Primitives and Parameters at SNSM-SAP - network side**

| PRIMITIVE | PARAMETER (message, info elements of message, other parameters) | REFERENCE |
|---|---|---|
| SNSM-ACTIVATE-IND | TLLI, NSAPI, QoS, SAPI | 7.5.2.1 |
| SNSMM-ACTIVATE-RSP | TLLI, | 7.5.2.2 |
| SNSM-DEACTIVATE-IND | TLLI, NSAPI | 7.5.2.3 |
| SNSM-DEACTIVATE-RSP | TLLI | 7.5.2.4 |
| SNSM-MODIFY-IND | TLLI, NSAPI, QoS, SAPI | 7.5.2.5 |
| SNSM-MODIFY-RSP | TLLI | 7.5.2.6 |
| SNSM-STATUS-REQ | TLLI, NSAPI, Cause | 7.5.2.7 |
| SNSM-WINDOW-IND | TLLI, NSAPI + MS's V(R)s | 7.5.2.8 |

### 7.5.2.1 SNSM-ACTIVATE-IND

Indication used by the SM entity to inform the SNDCP entity that an NSAPI has been activated for data transfer. It also informs the SNDCP entity about the negotiated QoS profile and the SAPI assigned for this NSAPI. The request is sent by SM towards SNDCP during an ongoing PDP context activation procedure.

### 7.5.2.2 SNSM-ACTIVATE-RSP

Response used by the SNDCP entity to inform the SM entity that the indicated NSAPI is now in use and that the acknowledged peer-to-peer LLC operation for the indicated SAPI is established, if necessary.

### 7.5.2.3 SNSM-DEACTIVATE-IND

Indication used by the SM entity to inform the SNDCP entity that an NSAPI has been de-allocated and cannot be used by the SNDCP entity anymore. The request is sent by SM towards SNDCP during an ongoing PDP context activation procedure, or by SM in the old SGSN during an ongoing inter-SGSN routeing area update procedure.

### 7.5.2.4 SNSM-DEACTIVATE-RSP

Response used by the SNDCP entity to inform the SM entity that the NSAPI indicated is no longer in use and that the acknowledged peer-to-peer LLC operation for the associated SAPI is released, if necessary.

### 7.5.2.5 SNSM-MODIFY-IND

Indication used by the SM entity to trigger change of the QoS for an NSAPI and indication of the SAPI to be used. It is also used by the SM entity to inform the SNDCP entity that an NSAPI shall be created, together with the (re-)negotiated QoS profile and the SAPI assigned. The former is used during an ongoing PDP context modification procedure. The latter is used in the new SGSN during an ongoing inter-SGSN routeing area update procedure.

### 7.5.2.6 SNSM-MODIFY-RSP

Response used by the SNDCP entity to inform the SM entity that the indicated NSAPI and QoS profile are now in use and the acknowledged peer-to-peer LLC operations for the appropriate SAPIs are established and/or released, if necessary.

### ~~7.5.2.7 SNSM-STATUS-REQ~~

~~This primitive is used by the SNDCP entity to inform the SM entity that SNDCP cannot continue its operation due to errors at the LLC layer (as indicated with LL-Release.indication) or at the SNDCP layer. The Cause parameter indicates the cause of the error.~~

### ~~7.5.2.8 SNSM-WINDOW-IND~~

~~This primitive is used in case of inter SGSN routing area updating. The LLC frames confirmed by the MS are indicated to the SNDCP sublayer. The SNDCP sublayer will retransmit an N-PDU again if the MS has not confirmed all LLC PDUs that belong to the possibly segmented N-PDU.~~

~~TCP/IP header and V.42bis data compression algorithms shall be reset before N-PDU transmission is resumed.~~