9.2.5 Messages with semantically incorrect contents

When a message with semantically incorrect contents is received, the foreseen reactions of the procedural part of GSM 04.11 are performed. If however no such reactions are specified, the mobile station shall proceed as follows:

- When the corresponding SM transfer is not seen as successfully transferred, the mobile station shall ignore the message and return a CP-ERROR message with cause value #95 "semantically incorrect message", if an appropriate connection exists.
- When the SM transfer is seen as successfully transferred, the mobile station shall ignore the message and enter the Idle State.
- In the case that the message received is a CP-ERROR message, the mobile station shall ignore the message and enter the Idle State.

The network may follow the same procedure.

9.3 RP Error Handling

Upon receiving or sending an RP-ERROR message the SMR entity shall behave as described in the procedural description in clause 6.

9.3.1 Message too short

When a message is received that is too short to contain a complete message type information element and Message Reference, that message shall be ignored.

9.3.2 Unknown or unforeseen Message Reference

Whenever any RP-ACK message is received specifying a Message Reference which is not associated with an active SM transfer, the mobile station shall discard the message and return an RP-ERROR message with cause #81, "Invalid short message transfer reference value" using the received Message Reference, if an appropriate connection exists.

When an RP-ERROR message is received specifying a Message Reference which is not associated with an active SM transfer, the mobile station shall discard the message.

When the mobile station's SMR entity is not in the Idle state, and it receives an RP-DATA message specifying a Message Reference which is not associated with the active SM transfer, then it shall either:

- send an RP-ERROR message with cause #81, "Invalid short message transfer reference value" using the received Message Reference, if an appropriate connection exists; or
- behave as described below for the receipt of an message not consistent with the protocol state.

The same procedures may apply to the network.

9.3.3 Unknown or unforeseen message type

If the Mobile Station receives a RP-message indicating a value of the message type indicator (MTI) defined as reserved, it shall ignore the message and return an RP-ERROR message with cause #97 "message type non-existent or not implemented", if an appropriate connection exists.

If the Mobile Station receives a message (except RP-ERROR) not consistent with the protocol state, the Mobile Station shall ignore the message and return a RP-ERROR message with cause #98 "Message type not compatible with Short Message protocol state", if an appropriate connection exists.

If the Mobile Station receives an RP-ERROR message not consistent with the protocol state, the Mobile Station shall ignore the message.

The network may follow the same procedures.

9.3.4 Non-semantical mandatory information element errors

When on receipt of a message:

- an "imperative message part" error; or
- a "missing mandatory IE" error;

is diagnosed or when a message containing a syntactically incorrect mandatory IE is received, the mobile station shall (except for the case of a reserved value of the MTI as defined above) proceed as follows:

- when the message is an RP-DATA or RP-ACK, the mobile station shall ignore the message and return an RP-ERROR message with cause #96 "invalid mandatory information", if an appropriate connection exists;
- when the message is an RP-ERROR, the mobile station shall treat the message as an RP-ERROR message carrying RP-Cause value 111 without any diagnostic field, and with no RP-User Data.

The network may follow the applicable procedures defined in this subclause.

9.3.5 Messages with semantically incorrect contents

When a message with semantically incorrect contents is received, the foreseen reactions of the procedural part of GSM 04.11 are performed. If however no such reactions are specified then:

- if the message was not an RP-ERROR message, the MS shall ignore the message and return an RP-ERROR message with cause value #95 "semantically incorrect message", if an appropriate connection exists; while
- if the message was an RP-ERROR message, the mobile station shall treat the message as an RP-ERROR message carrying RP-Cause value #111 without any diagnostic field, and with no RP-User Data.

The network may follow the same procedure.

10 Timers

The present document places the following requirements on the timers described in this ETS:

- timer TR1M shall be greater than 35 seconds and less than 45 seconds;
- the value of timer TRAM shall be greater than 25 seconds and less than 35 seconds;
- timer TR2M shall be greater than 12 seconds and less than 20 seconds.

Annex A (informative): Arrow diagrams

Arrow diagram A1:

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

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.

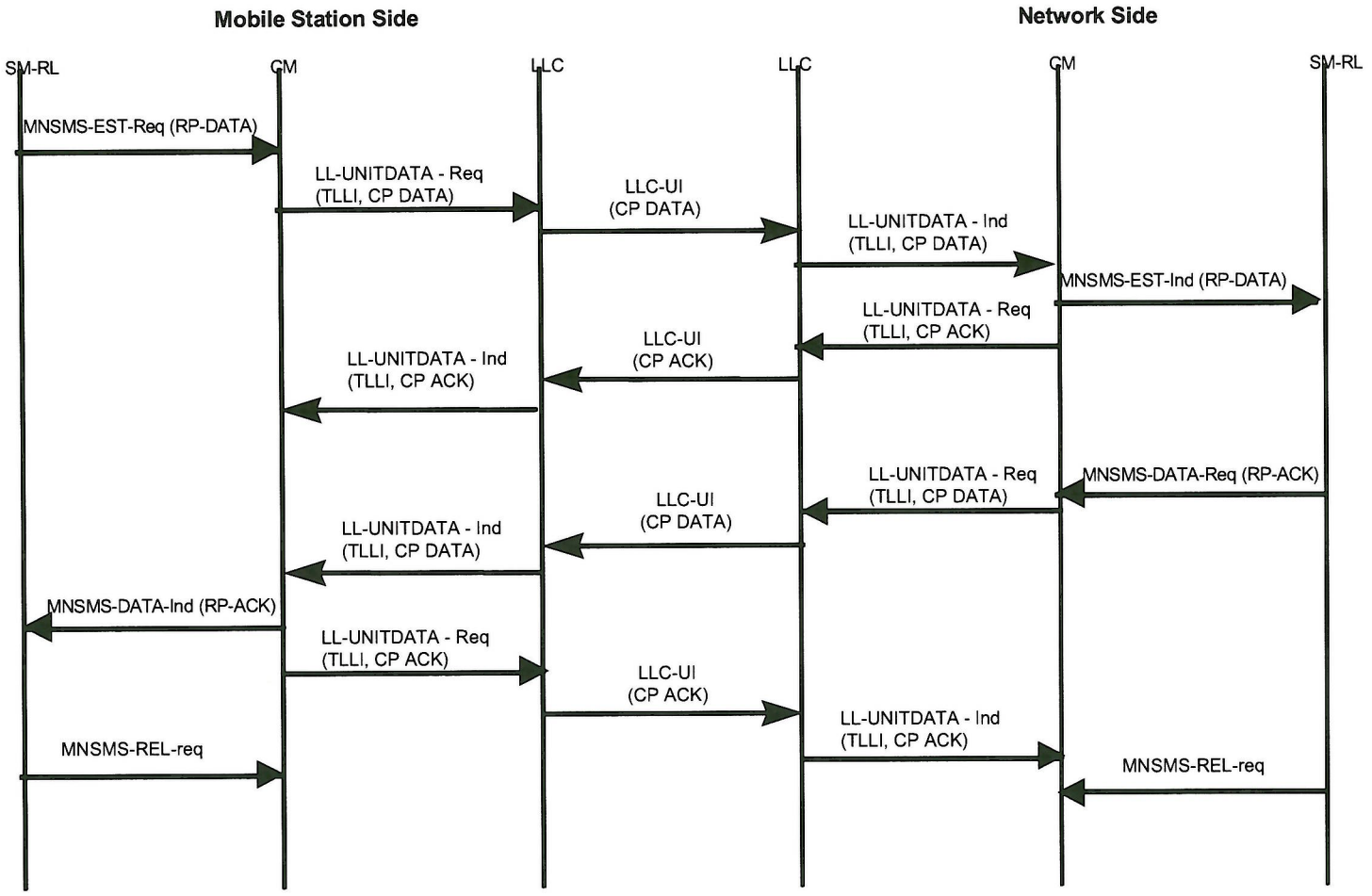
- MNSMS-primitives indicate services provided by CM to SM-RL.
- LLSMS-primitives indicate services provided by LLC to CM.
- CP-DATA is the CM-message carrying SM-RP data units.
- CP-ACK acknowledge CP-DATA reception on CM.

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.

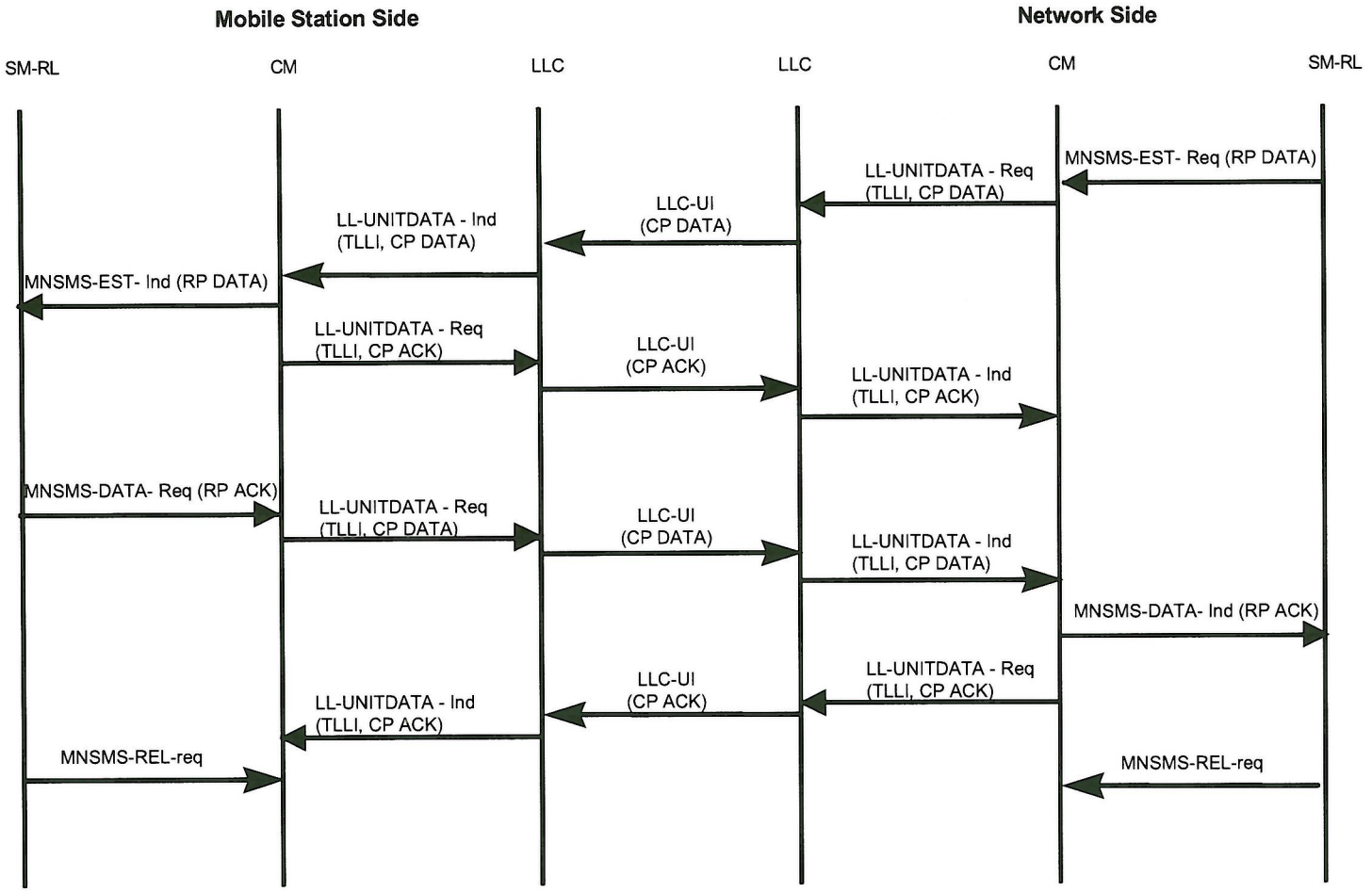
- MNSMS-primitives indicate services provided by CM to SM-RL.
- LLSMS-primitives indicate services provided by LLC to CM.
- CP-DATA is the CM-message carrying SM-RP data units.
- CP-ACK acknowledge CP-DATA reception on CM.

GPRS Mobile Originated Messaging on CM-sublayer



Arrow diagram A5

GPRS Mobile Terminated Messaging on CM-sublayer



Arrow diagram A6

Annex B (normative): SDL-description of the CM-layer

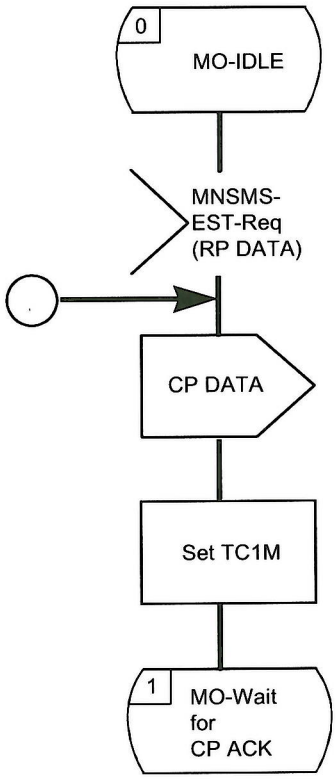
B.1 Introduction

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.

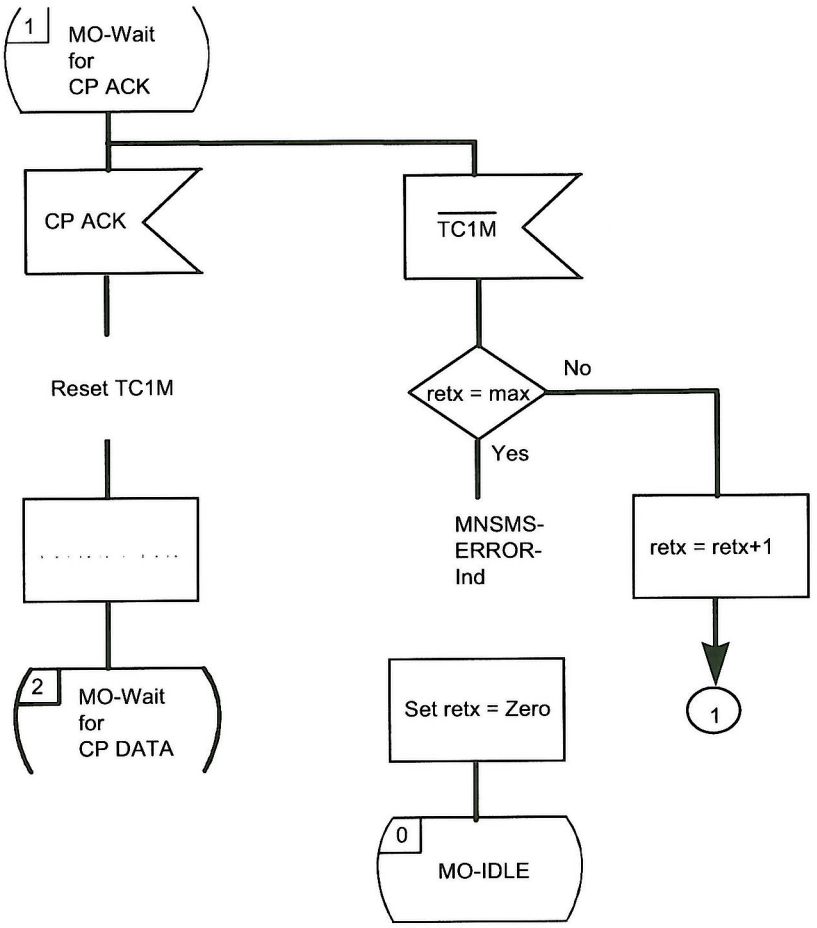
The SDLs contain a mixture of peer to peer messages and conceptual primitives between the layers SM-RL, CM, MM and LLC, as viewed by the SMC entities. SDL-1/2/3 show the CS GSM SMC entity on MS-side for Mobile Originated (MO) short message transfer, SDL-4/5/6 show the CS GSM SMC entity on MS-side for Mobile Terminated (MT) short message transfer, SDL-7/8/9 show the CS GSM SMC entity on the network side for Mobile Originated (MO) short message transfer, and SDL-10/11/12 show the CS GSM 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, 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.

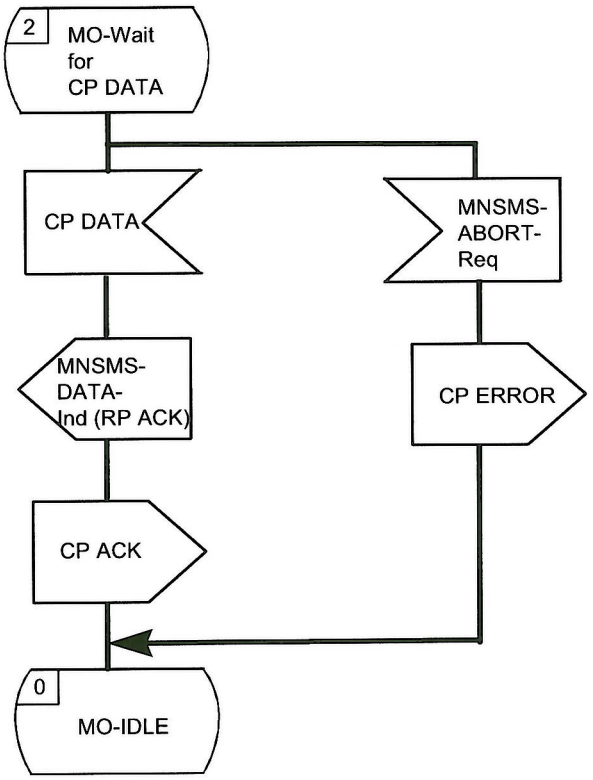
The lower layers (below MM and LLC) are transparent to an SMC entity.



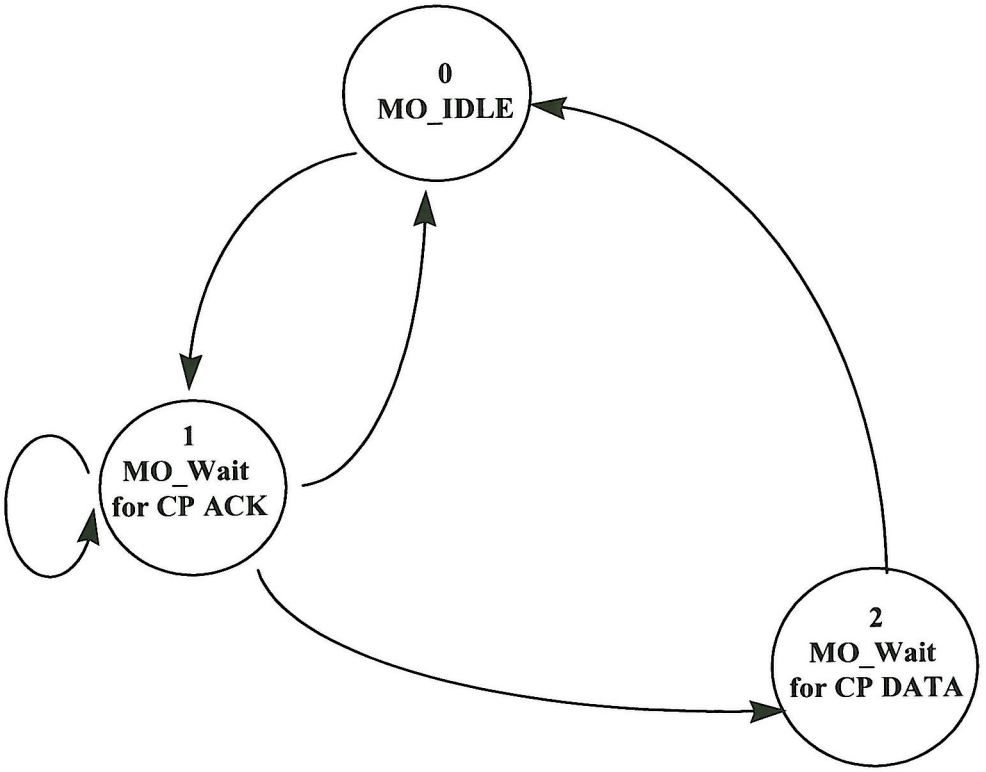
MO-SMC-GP entity on MS-side for GPRS
SDL-13



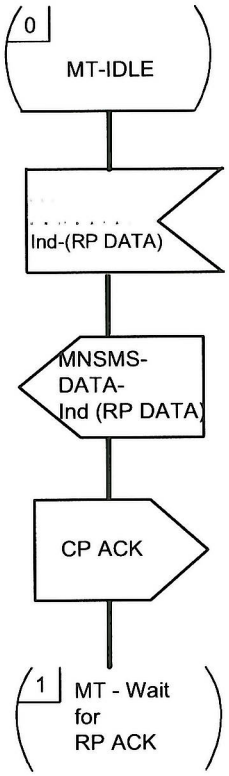
MO-SMC-GP entity on MS-side for GPRS
SDL-14



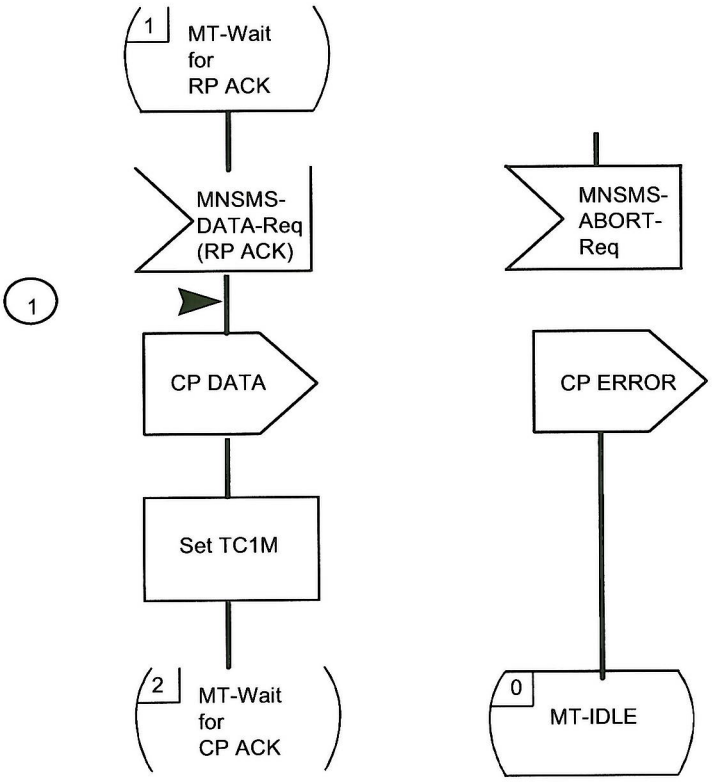
MO-SMC-GP entity on MS-side for GPRS
SDL-15



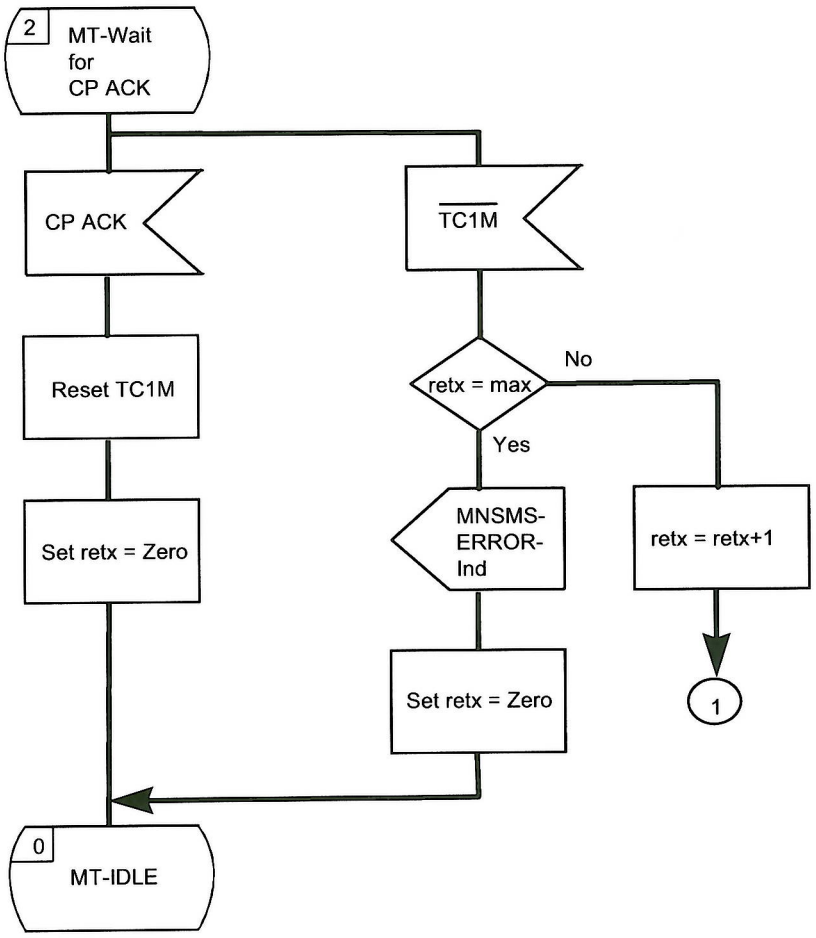
MO-SMC-GP entity on MS-side for GPRS
State transition diagram



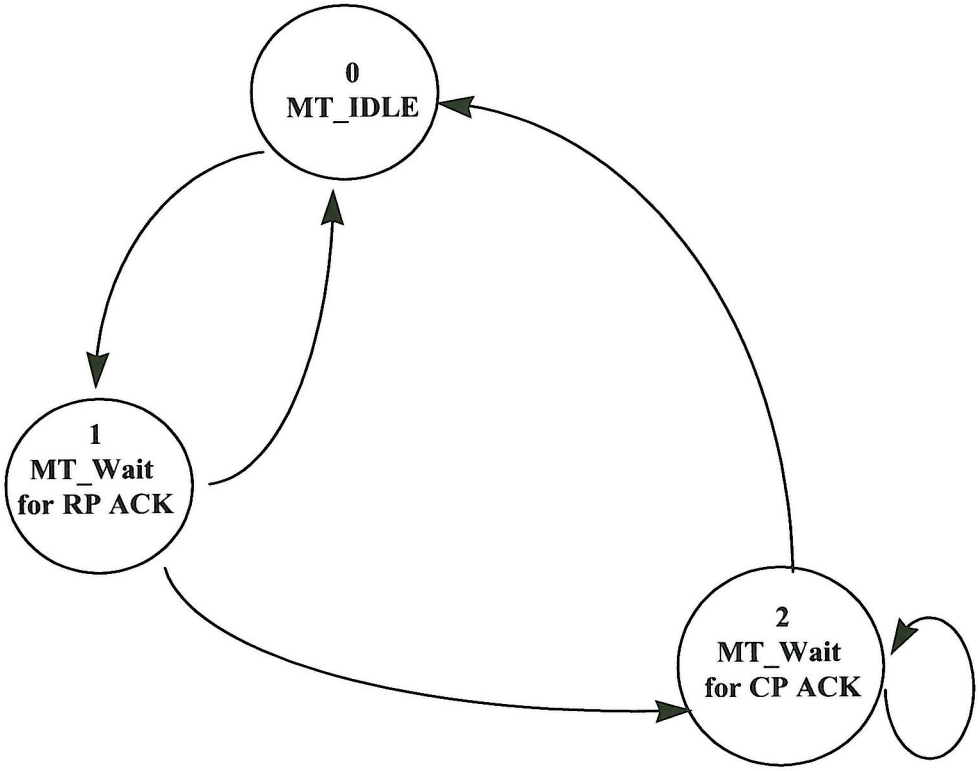
MT-SMC-GP entity on MS-side for GPRS
SDL-16



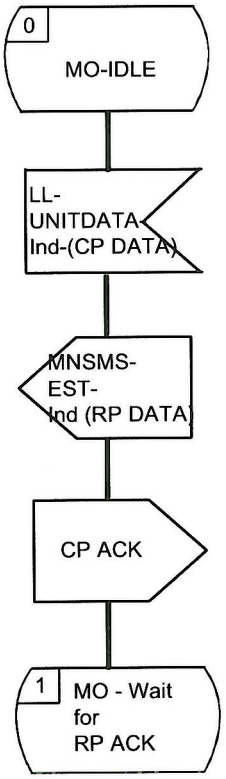
MT-SMC-GP entity on MS-side for GPRS
SDL-17



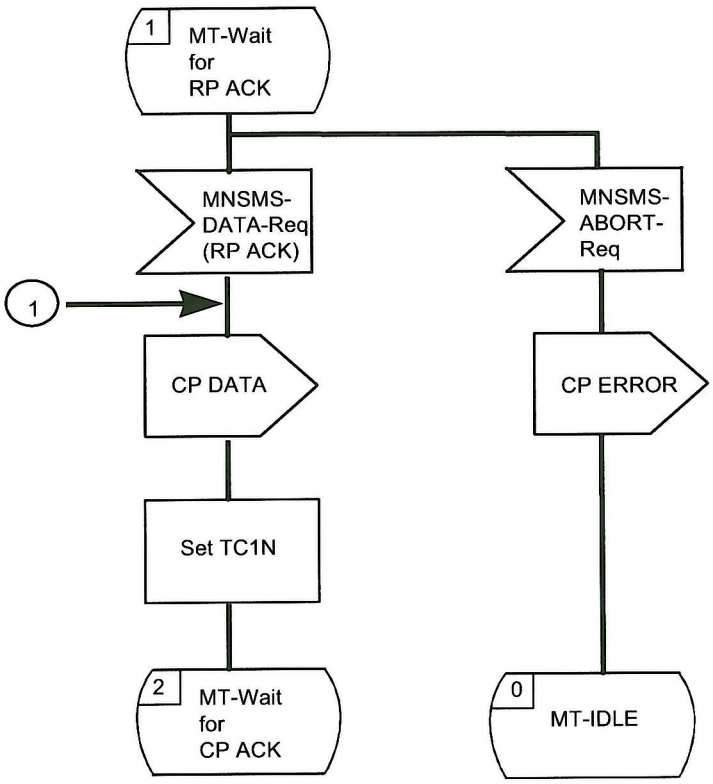
MT-SMC-GP entity on MS-side for GPRS
SDL-18



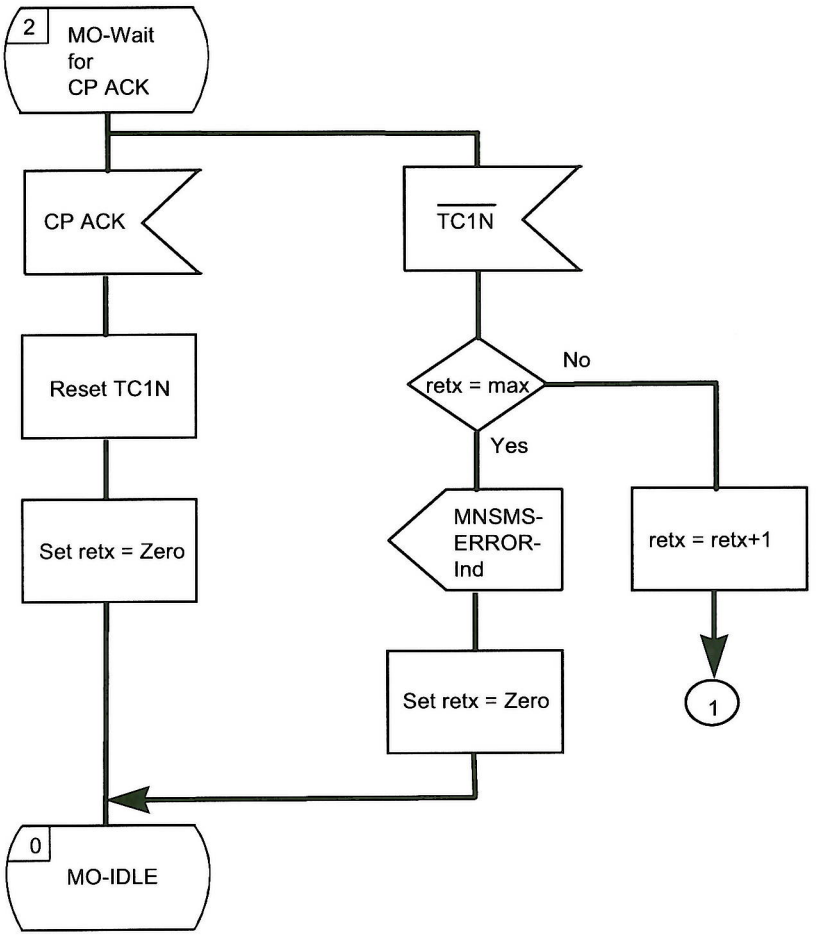
MT-SMC-GP entity on MS-side for GPRS
State transition diagram



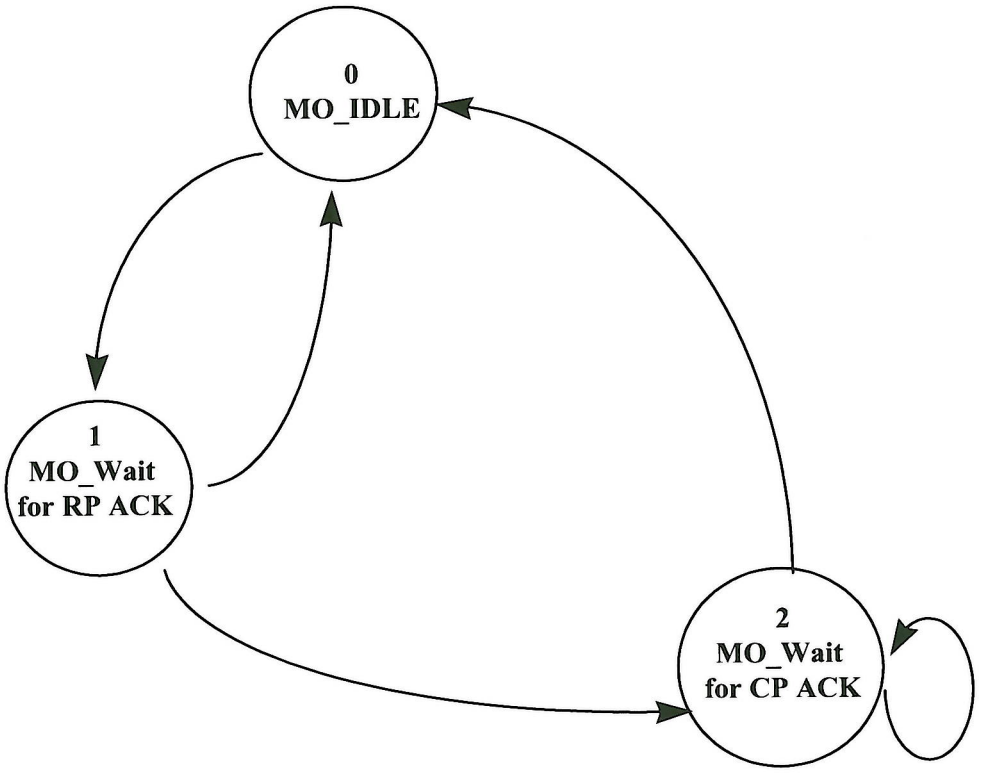
MO-SMC-GP entity on Network side for GPRS
SDL-19



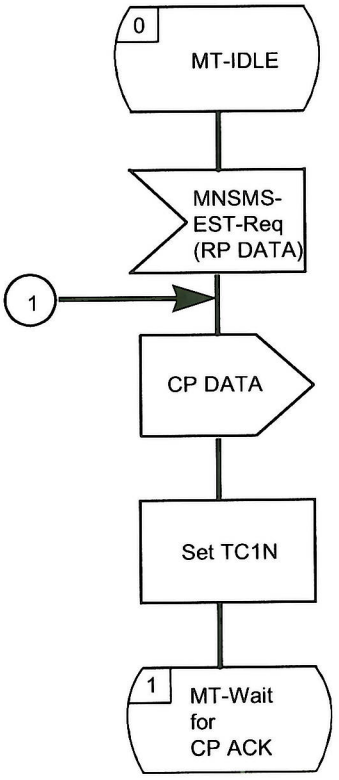
MO-SMC-GP entity on Network side for GPRS
SDL-20



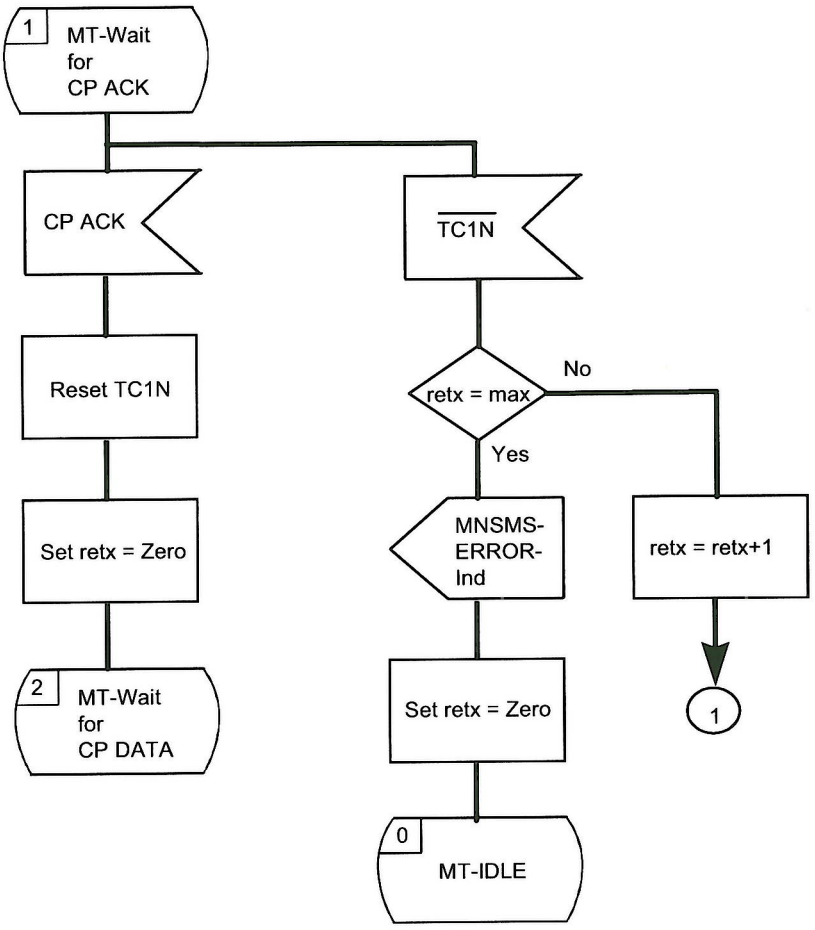
MO-SMC-GP entity on Network side for GPRS
SDL-21



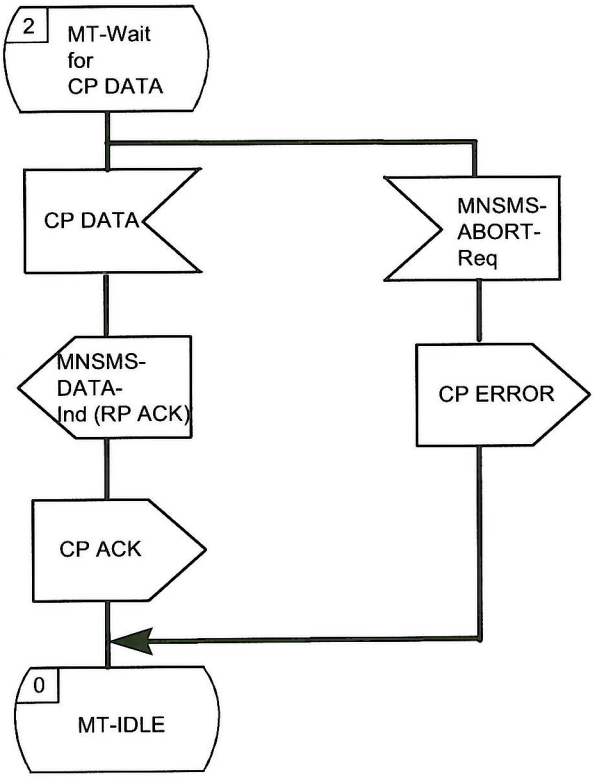
MO-SMC-GP entity on Network-side for GPRS
State transition diagram



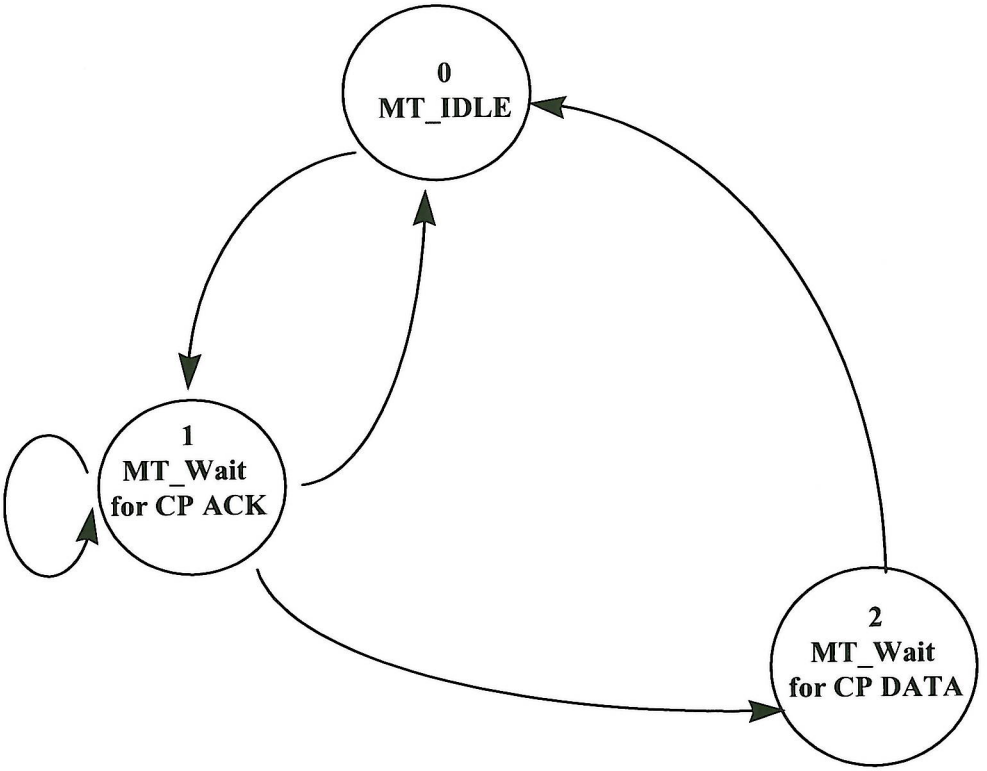
MT-SMC-GP entity on Network-side for GPRS
SDL-22



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

Annex C (informative): Arrow diagrams

Arrow diagram C1:

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

- SM-RL-primitives indicate services provided by SM-RL to SM-TL and RL (* see note).
- MNSMS-primitives indicate services provided by CM to SM-RL.
- RP-DATA is the SM-RL message carrying SM-TP data units.
- RP-ACK acknowledges RP-DATA reception on SM-RL.

Arrow diagram C2:

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

- SM-RL-primitives indicate services provided by SM-RL to SM-TL and RL (* see note).
- MNSMS-primitives indicate services provided by CM to SM-RL.
- RP-DATA is the SM-RL message carrying SM-TP data units.
- RP-ACK acknowledges RP-DATA reception on SM-RL.

Arrow diagram C3:

The diagram reflects memory available notification transfer by means of interlayer service primitives and the actual messages being transferred between the layer entities.

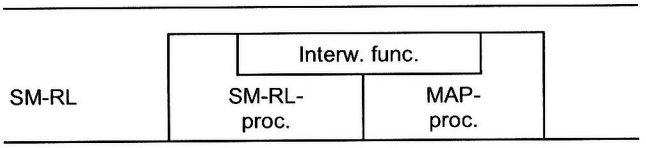
- SM-RL-primitives indicate services provided by SM-RL to SM-TL and RL (* see note).
- MNSMS-primitives indicate services provided by CM to SM-RL.
- RP-SMMA is the SM-RL message indicating that the mobile has memory available to receive one or more short messages.
- RP-ACK acknowledges RP-SMMA reception on SM-RL.
- RP-ERROR reports a failure in the notification procedure on the network side.

Arrow diagram C4:

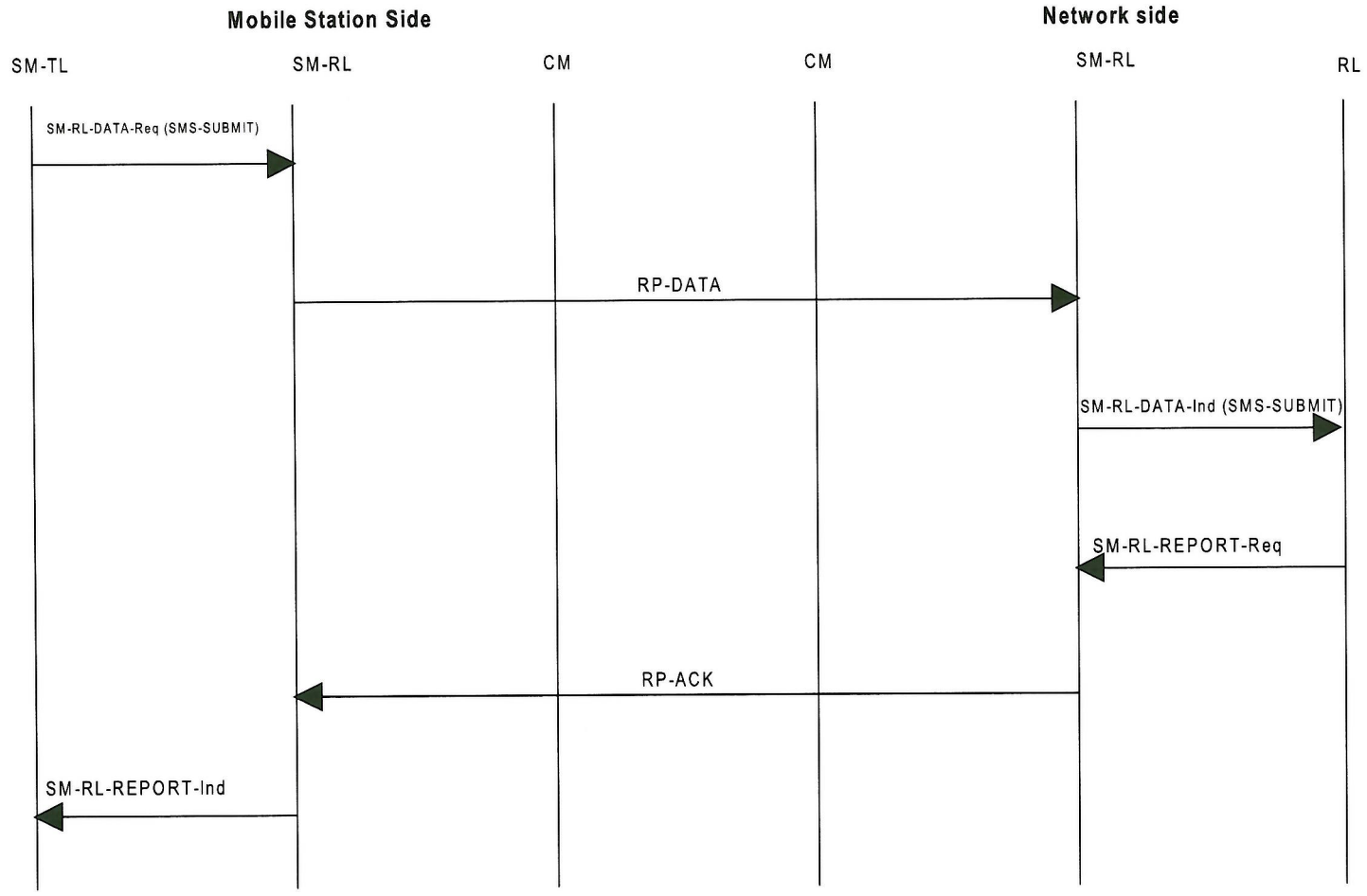
The diagram reflects the abort of any retransmission of a memory available notification by SM-RL by means of the SM-RL-MEMORY-AVAILABLE interlayer service primitive request with the SM-MEM-NOTIF-ABORT parameter present. The use of this primitive and the associated parameter are, of course, local to the mobile station.

- SM-RL-primitives indicate services provided by SM-RL to SM-TL and RL (note).
- MNSMS-primitives indicate services provided by CM to SM-RL.
- RP-SMMA is the SM-RL message indicating that the mobile has memory available to receive one or more short messages.
- RP-ACK acknowledges RP-SMMA reception on SM-RL.
- RP-ERROR reports a failure in the notification procedure on the network side.

NOTE: The SM-RL being the upper layer in the MSC, an interworking function between SM-RL-procedures and MAP-procedure is necessary. The term "RL" is used in the diagrams to indicate this function (see figure).

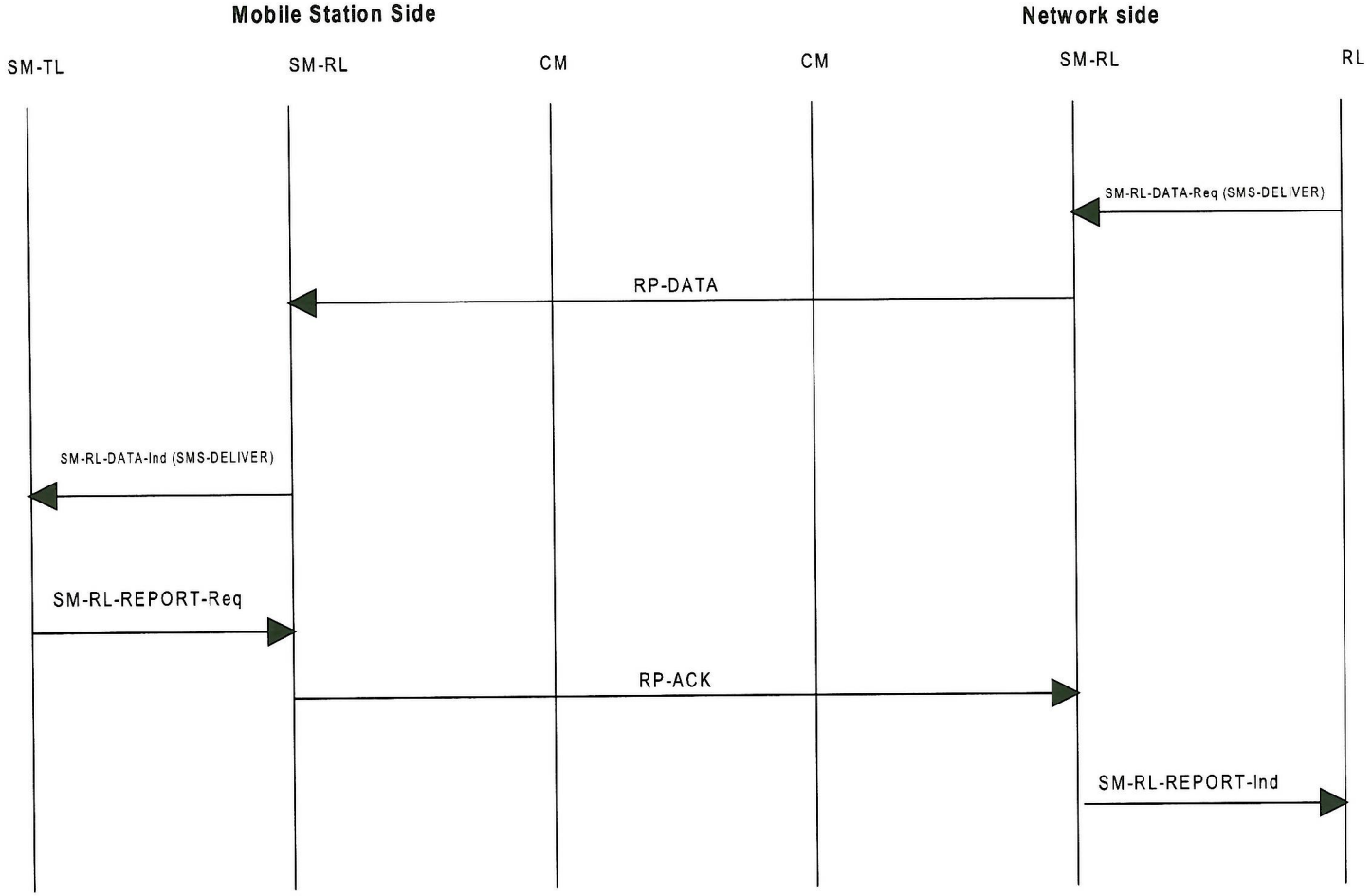


Mobile Originated Messaging on SM-RL



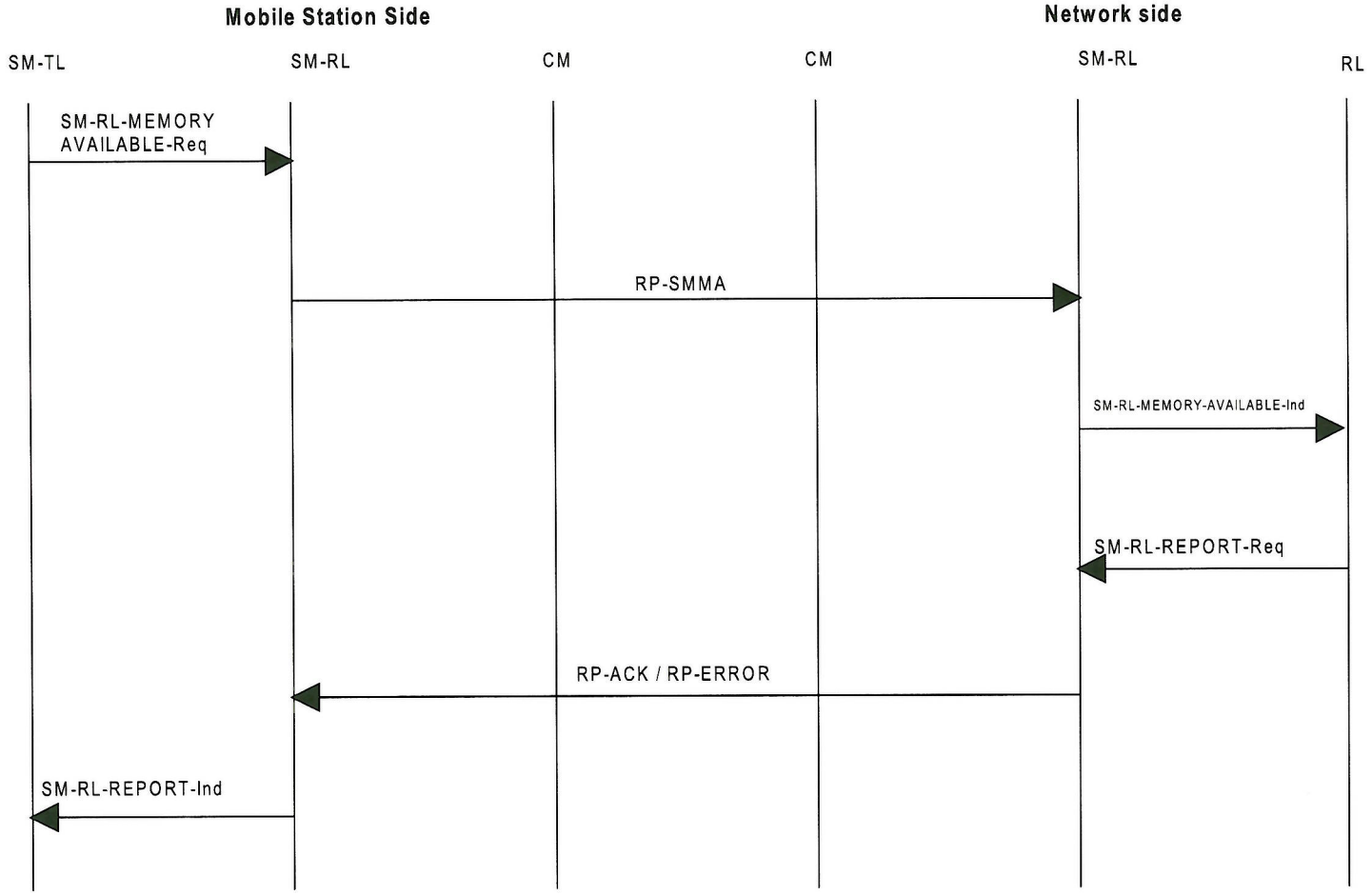
Arrow diagram C1

Mobile Terminated Messaging on SM-RL



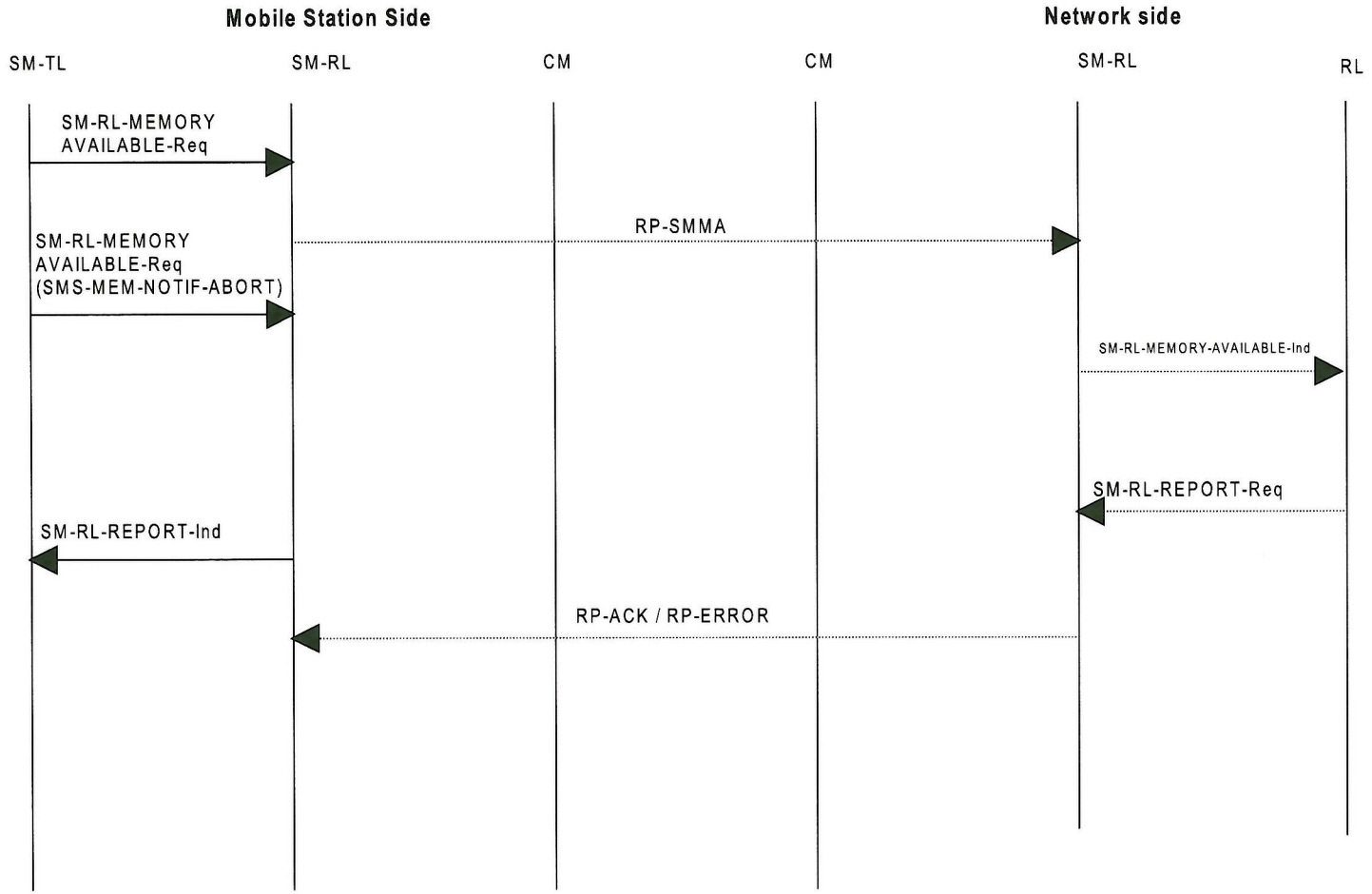
Arrow diagram C2

Memory Available Notification on SM-RL



Arrow diagram C3

Memory Available Notification Abort on SM-RL



NOTE: Dashed lines indicates messages that may be sent, even though an abort request was given.

Arrow diagram C4

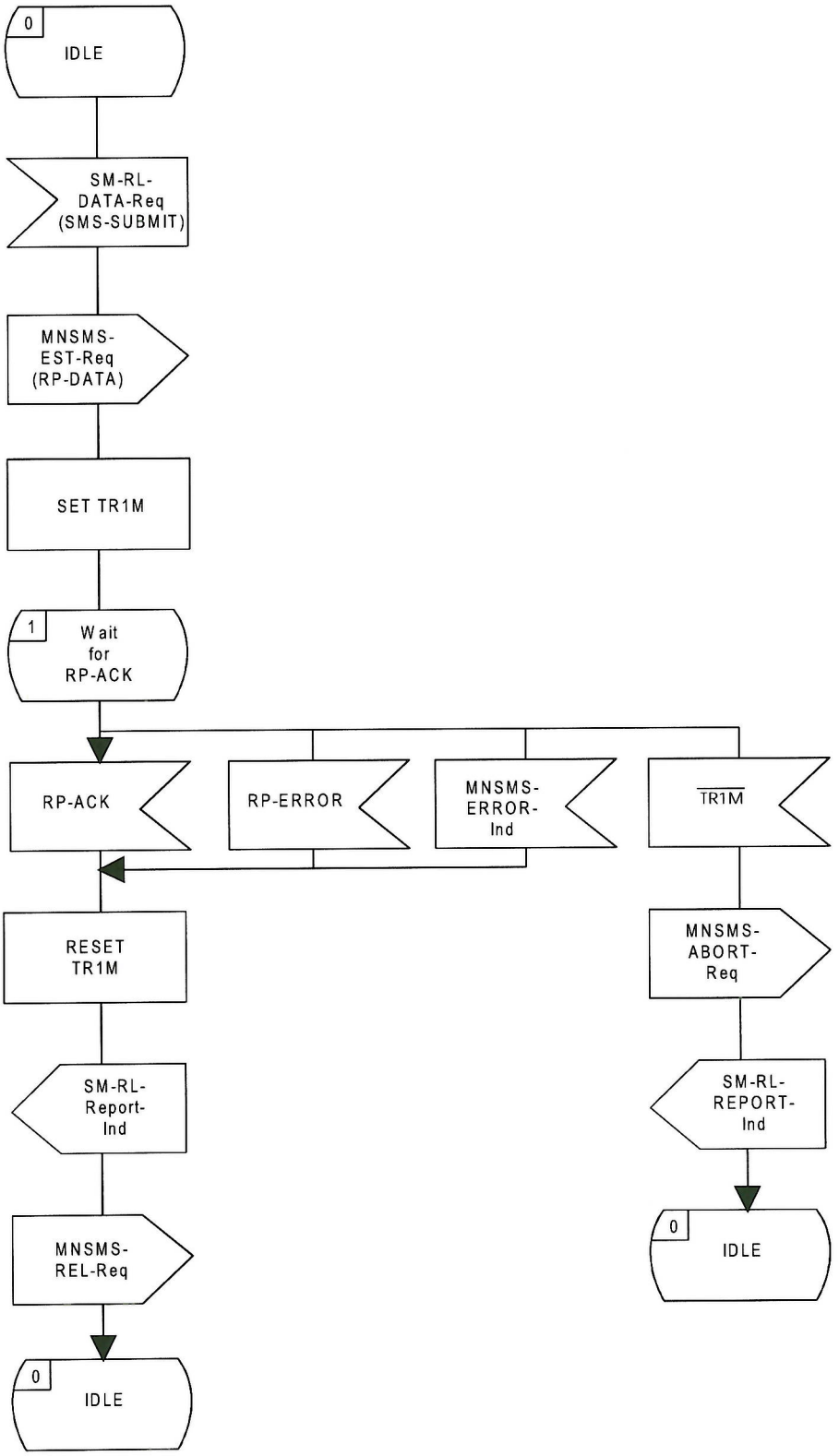
Annex D (normative): SDL-description of the short message relay layer

D.1 Introduction

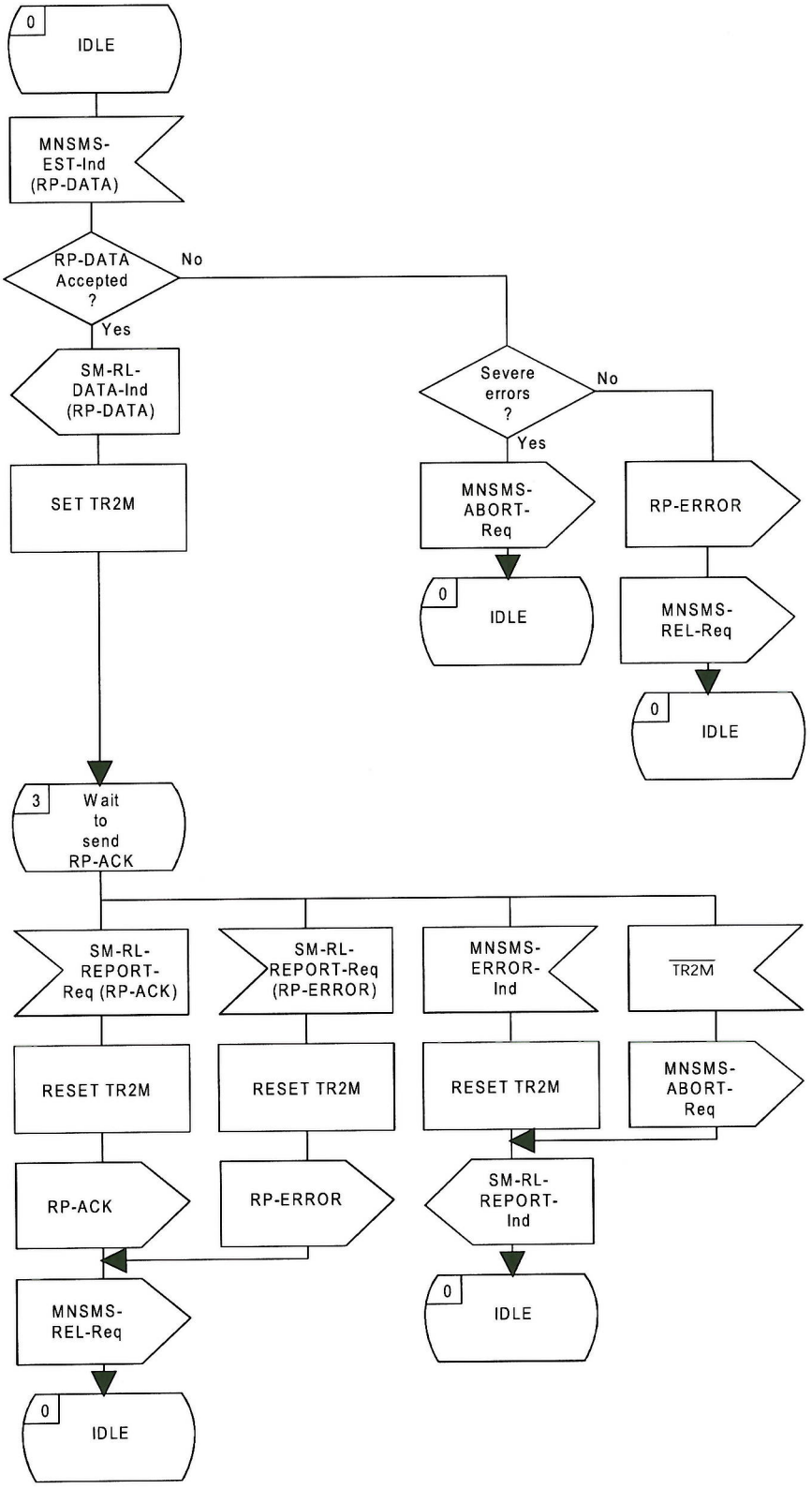
This annex contains an SDL-description of the Short Message Relay Layer in terms of the Short Message Service Support. The Short Message Relay Layer provides services to Short Message Transfer Layer.

The SDLs contain a mixture of peer to peer messages and conceptual primitives between the layers SM-TL, SM-RL and CM, as viewed by the SMR entities. SDL-1/2/3 show the SMR entity on MS-side, and SDL-4/5 on the network side.

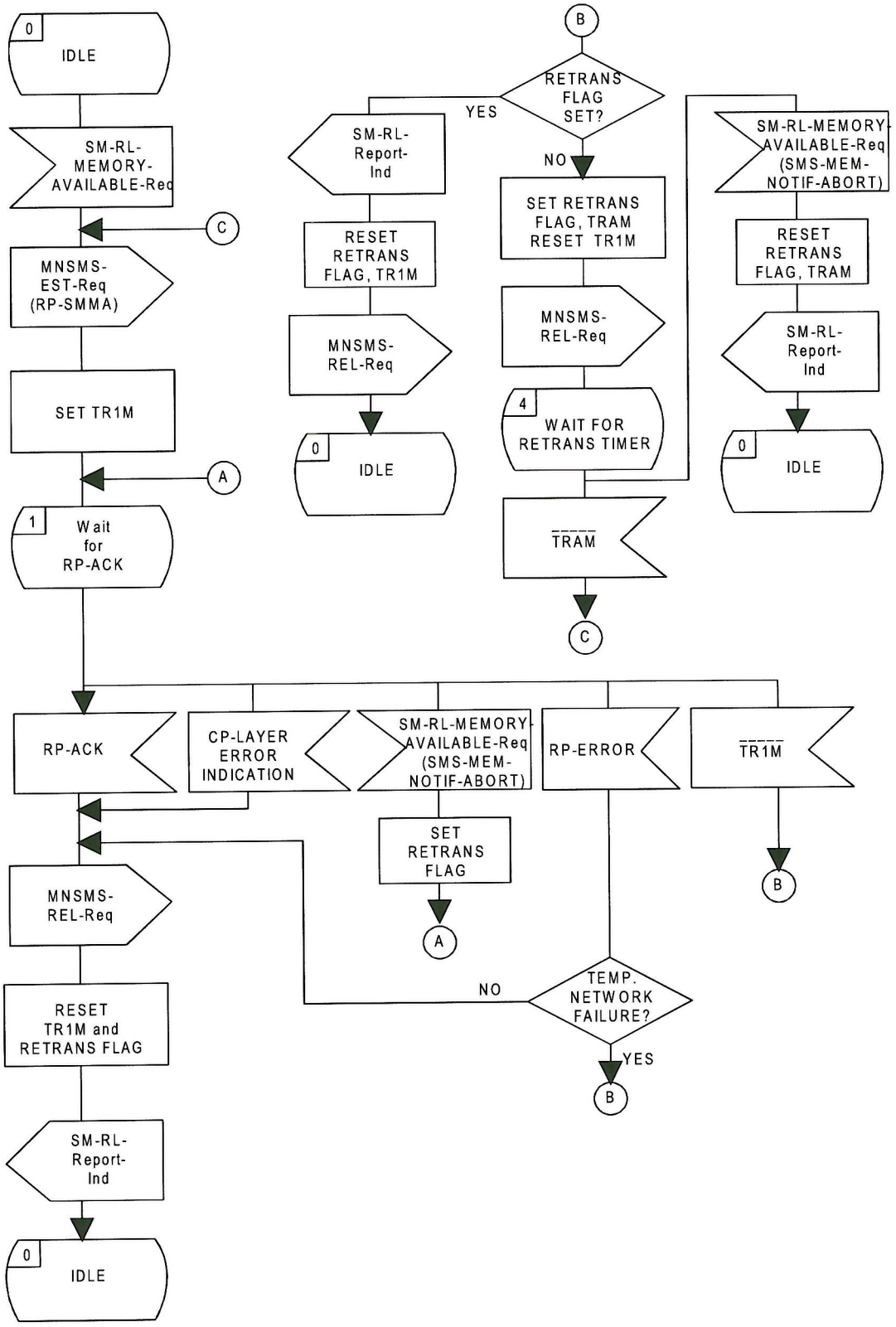
The lower layers (below CM) are transparent to an SMR entity.



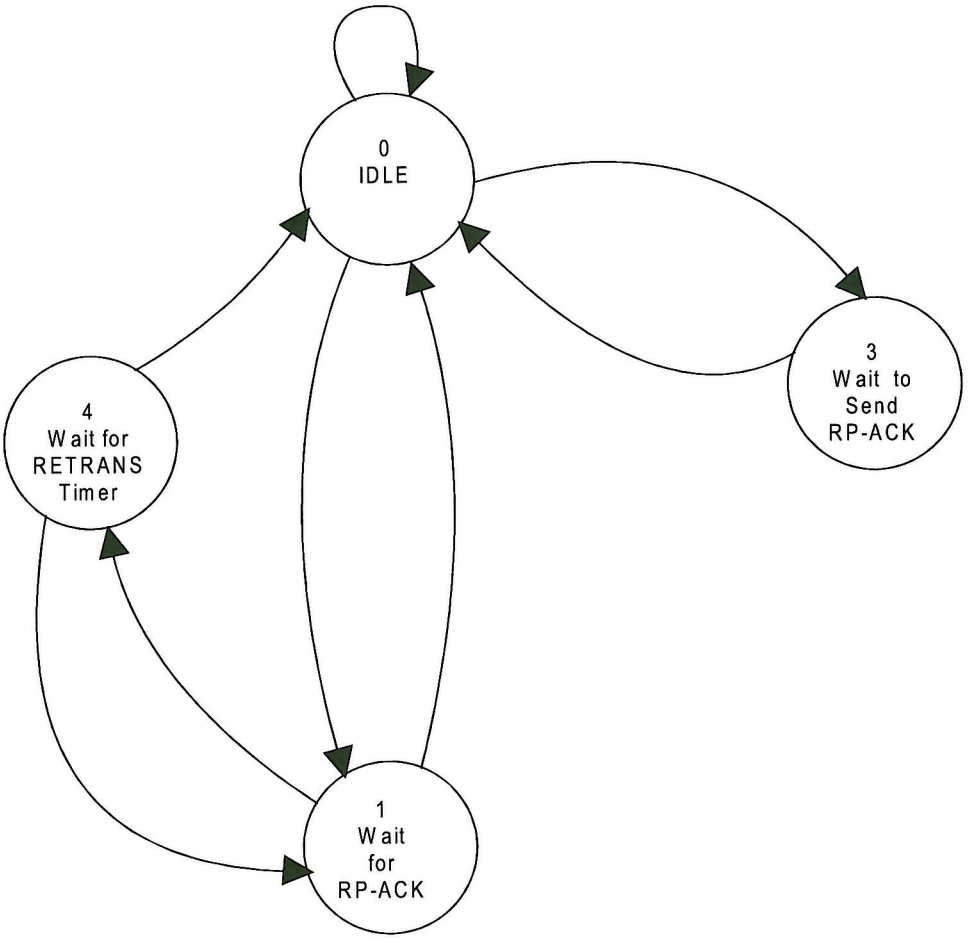
SMR-entity on MS-side
MO Short Message transfer
SDL-1



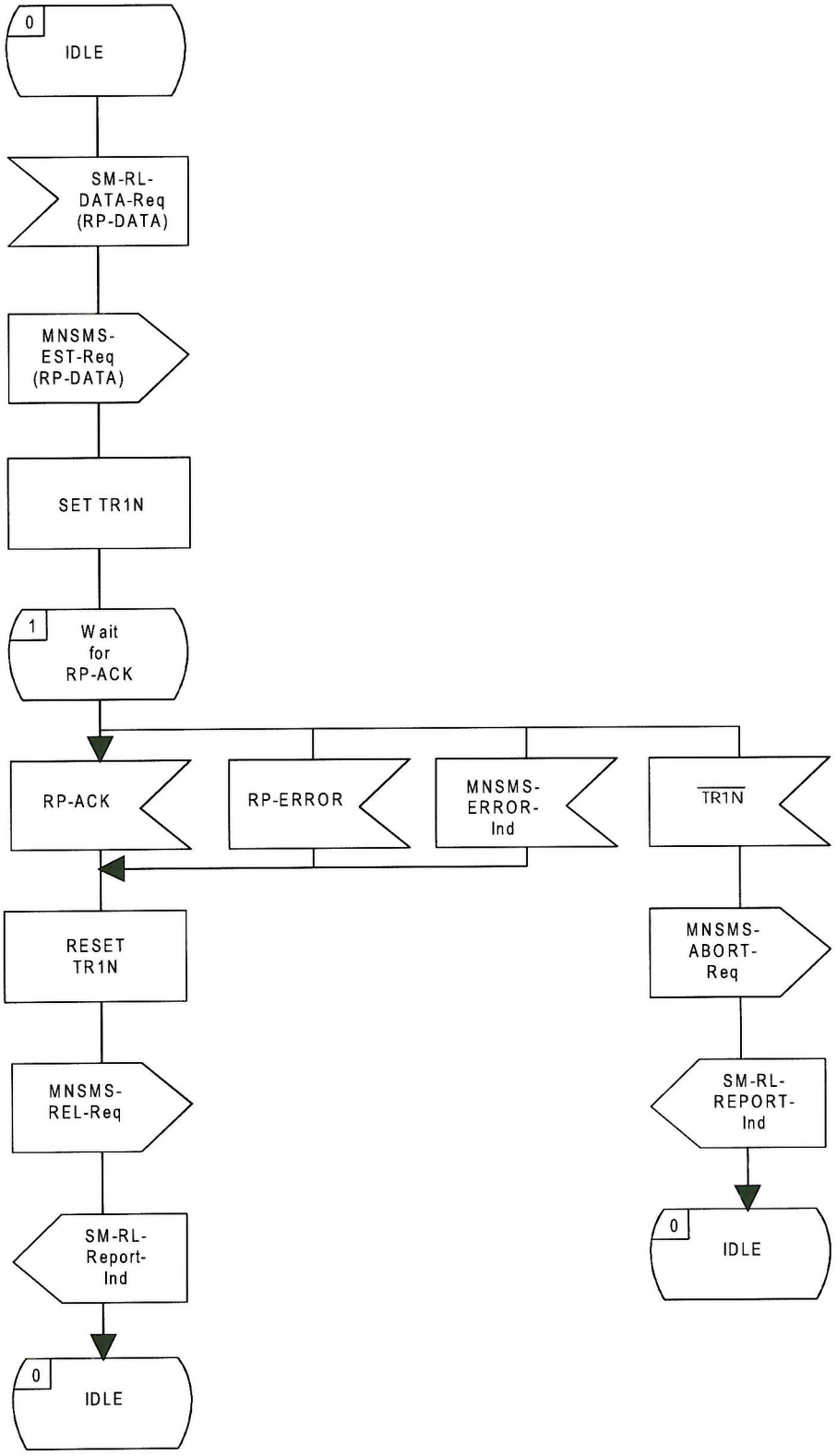
SMR-entity on MS-side
MT Short Message transfer
SDL-2



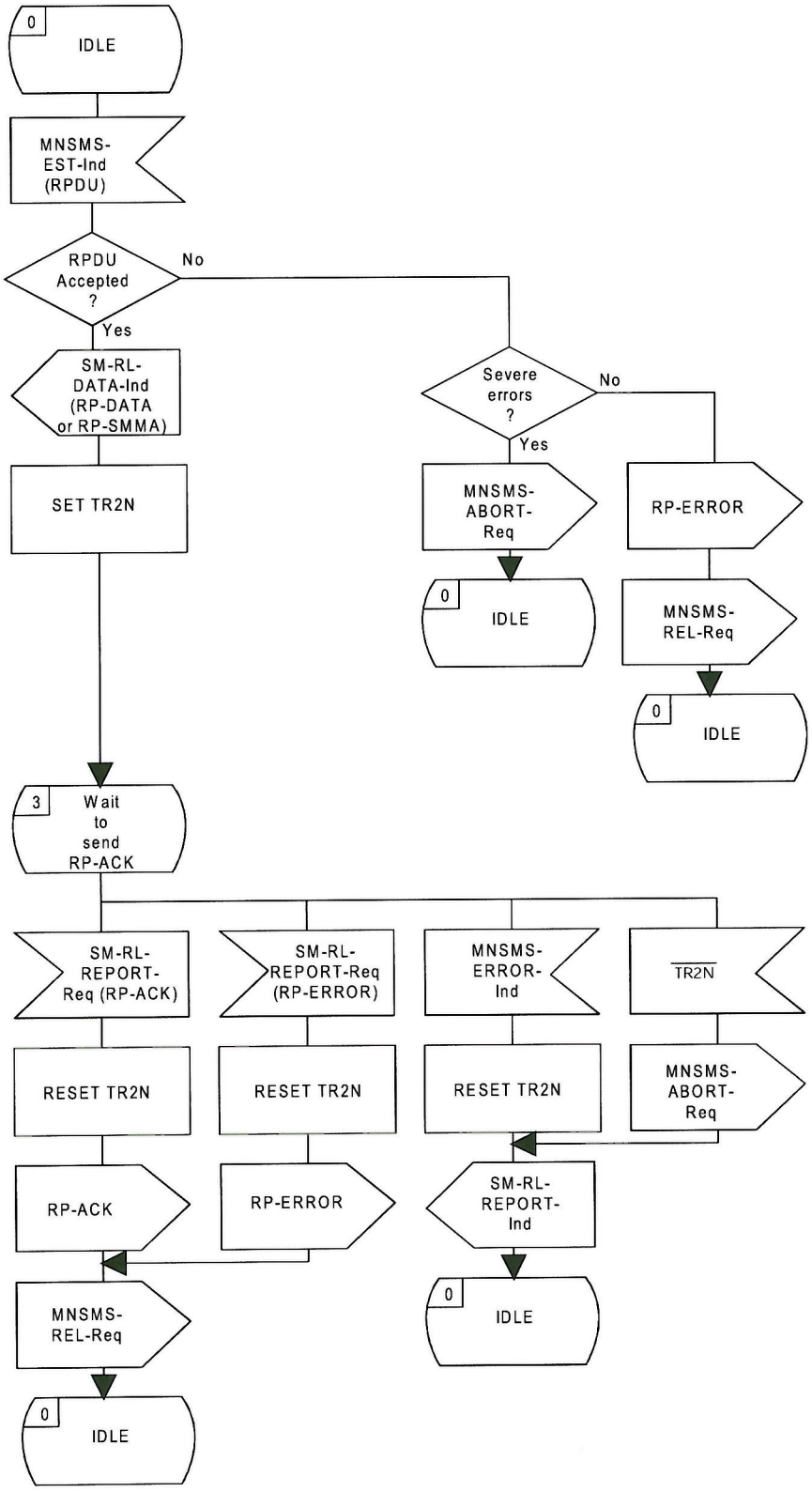
SMR-entity on MS-side
Memory Available Notification
SDL-3



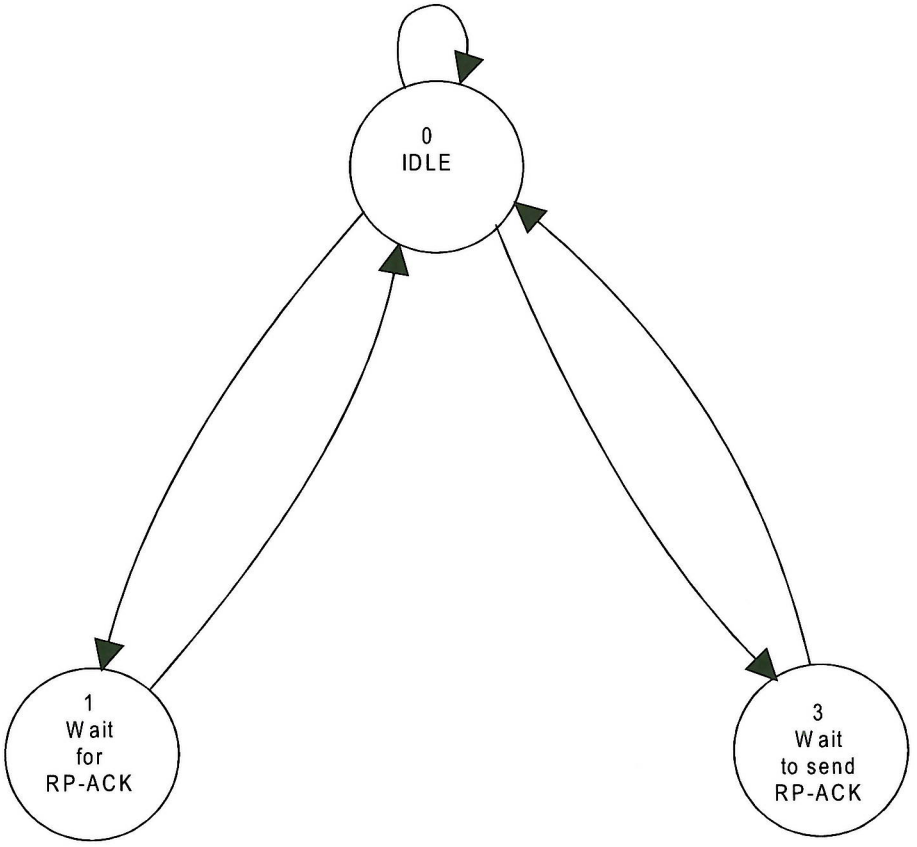
SMR-entity on MS-side
State transition diagram



SMR-entity on Network-side
MT Short Message transfer
SDL-4



SMR-entity on Network-side
MO Short Message and Notification transfer
SDL-5



SMR-entity on Network-side
State transition diagram

Annex E (informative): Cause definition

E-1: CP-cause definition

Cause no. 17: "Network failure"

This cause is sent to the MS if the MSC cannot service an MS generated request because of PLMN failures, e.g. problems in MAP.

Cause no. 22: "Congestion"

This cause is sent if the service request cannot be actioned because of congestion (e.g. no channel, facility busy/congested etc.).

Cause no. 81: "Invalid Transaction Identifier"

This cause indicates that the equipment sending this cause has received a message with a Transaction Identifier which is currently not use on the MS - network interface.

Cause no. 95: "Semantically incorrect message"

This cause is used to report the receipt of a message with semantically incorrect content.

Cause no. 96: "Invalid mandatory information"

This cause indicates that the equipment sending this cause has received a message with non-semantical mandatory information element errors.

Cause no. 97: "Message type non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined or defined but not implemented by the equipment sending this cause.

Cause no. 98: "Message not compatible with short message protocol state"

This cause indicates that the equipment sending this cause has received a message not compatible with the Short Message protocol state.

Cause no. 99: "Information element non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message which includes information elements not recognized because the information element identifier is not defined or it is defined but not implemented by the equipment sending the cause.

However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.

Cause no. 111: "Protocol error, unspecified"

This cause is used to report a protocol error event only when no other cause applies.

E-2: RP-cause definition mobile originating SM-transfer

Cause no. 1: "Unassigned (unallocated) number"

This cause indicates that the destination requested by the Mobile Station cannot be reached because, although the number is in a valid format, it is not currently assigned (allocated).

Cause no. 8: "Operator determined barring"

This cause indicates that the MS has tried to send a mobile originating short message when the MS's network operator or service provider has forbidden such transactions.

Cause no. 10: "Call barred"

This cause indicates that the outgoing call barred service applies to the short message service for the called destination.

Cause no. 21: "Short message transfer rejected"

This cause indicates that the equipment sending this cause does not wish to accept this short message, although it could have accepted the short message since the equipment sending this cause is neither busy nor incompatible.

Cause no. 27: "Destination out of service"

This cause indicates that the destination indicated by the Mobile Station cannot be reached because the interface to the destination is not functioning correctly. The term "not functioning correctly" indicates that a signalling message was unable to be delivered to the remote user; e.g., a physical layer or data link layer failure at the remote user, user equipment off-line, etc.

Cause no. 28: "Unidentified subscriber"

This cause indicates that the subscriber is not registered in the PLMN (i.e. IMSI not known).

Cause no. 29: "Facility rejected"

This cause indicates that the facility requested by the Mobile Station is not supported by the PLMN.

Cause no. 30: "Unknown subscriber"

This cause indicates that the subscriber is not registered in the HLR (i.e. IMSI or directory number is not allocated to a subscriber).

Cause no. 38: "Network out of order"

This cause indicates that the network is not functioning correctly and that the condition is likely to last a relatively long period of time; e.g., immediately reattempting the short message transfer is not likely to be successful.

Cause no. 41: "Temporary failure"

This cause indicates that the network is not functioning correctly and that the condition is not likely to last a long period of time; e.g., the Mobile Station may wish to try another short message transfer attempt almost immediately.

Cause no. 42: "Congestion"

This cause indicates that the short message service cannot be serviced because of high traffic.

Cause no. 47: "Resources unavailable, unspecified"

This cause is used to report a resource unavailable event only when no other cause applies.

Cause no. 50: "Requested facility not subscribed"

This cause indicates that the requested short message service could not be provided by the network because the user has not completed the necessary administrative arrangements with its supporting networks.

Cause no. 69: "Requested facility not implemented"

This cause indicates that the network is unable to provide the requested short message service.

Cause no. 81: "Invalid short message transfer reference value"

This cause indicates that the equipment sending this cause has received a message with a short message reference which is not currently in use on the MS-network interface.

Cause no. 95: "Invalid message, unspecified"

This cause is used to report an invalid message event only when no other cause in the invalid message class applies.

Cause no. 96: "Invalid mandatory information"

This cause indicates that the equipment sending this cause has received a message where a mandatory information element is missing and/or has a content error (the two cases are indistinguishable).

Cause no. 97: "Message type non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined or defined but not implemented by the equipment sending this cause.

Cause no. 98: "Message not compatible with short message protocol state"

This cause indicates that the equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the short message transfer state.

Cause no. 99: "Information element non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message which includes information elements not recognized because the information element identifier is not defined or it is defined but not implemented by the equipment sending the cause.

However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.

Cause no. 111: "Protocol error, unspecified"

This cause is used to report a protocol error event only when no other cause applies.

Cause no. 127: "Interworking, unspecified"

This cause indicates that there has been interworking with a network which does not provide causes for actions it takes; thus, the precise cause for a message which is being send cannot be ascertained.

E-3: RP-cause definition mobile terminating SM-transfer

Cause no. 22: "Memory capacity exceeded"

This cause indicates that the mobile station cannot store the incoming short message due to lack of storage capacity.

Cause no. 81: "Invalid short message reference value"

This cause indicates that the equipment sending this cause has received a message with a short message reference which is not currently in use on the MS-network interface.

Cause no. 95: "Invalid message, unspecified"

This cause is used to report an invalid message event only when no other cause in the invalid message class applies.

Cause no. 96: "Invalid mandatory information"

This cause indicates that the equipment sending this cause has received a message where a mandatory information element is missing and/or has a content error (the two cases are indistinguishable).

Cause no. 97: "Message type non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined or defined but not implemented by the equipment sending this cause.

Cause no. 98: "Message not compatible with short message protocol state"

This cause indicates that the equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the short message transfer state.

Cause no. 99: "Information element non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message which includes information elements not recognized because the information element identifier is not defined or it is defined but not implemented by the equipment sending the cause.

However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.

Cause no. 111: "Protocol error, unspecified"

This cause is used to report a protocol error event only when no other cause applies.

E-4: RP-Cause definition memory available notification

Cause no. 30: "Unknown Subscriber"

This cause indicates that the subscriber is not registered in the HLR (i.e. IMSI or directory number is not allocated to a subscriber).

Cause no. 38: "Network out of order"

This cause indicates that the network is not functioning correctly and that the condition is likely to last a relatively long period of time; e.g., immediately reattempting the short message transfer is not likely to be successful.

Cause no. 41: "Temporary failure"

This cause indicates that the network is not functioning correctly and that the condition is not likely to last a long period of time; e.g., the Mobile Station may wish to try another short message transfer attempt almost immediately.

Cause no. 42: "Congestion"

This cause indicates that the short message service cannot be serviced because of high traffic.

Cause no. 47: "Resources unavailable, unspecified"

This cause is used to report a resource unavailable event only when no other cause applies.

Cause no. 69: "Requested facility not implemented"

This cause indicates that the network is unable to provide the requested memory available notification service.

Cause no. 95: "Invalid message, unspecified"

This cause is used to report an invalid message event only when no other cause in the invalid message class applies.

Cause no. 96: "Invalid mandatory information"

This cause indicates that the equipment sending this cause has received a message where a mandatory information element is missing and/or has a content error (the two cases are indistinguishable).

Cause no. 97: "Message type non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined or defined but not implemented by the equipment sending this cause.

Cause no. 98: "Message not compatible with short message protocol state"

This cause indicates that the equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the short message transfer state.

Cause no. 99: "Information element non-existent or not implemented"

This cause indicates that the equipment sending this cause has received a message which includes information elements not recognized because the information element identifier is not defined or it is defined but not implemented by the equipment sending the cause.

However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.

Cause no. 111: "Protocol error, unspecified"

This cause is used to report a protocol error event only when no other cause applies.

Cause no. 127: "Interworking, unspecified"

This cause indicates that there has been interworking with a network which does not provide causes for actions it takes; thus, the precise cause for a message which is being send cannot be ascertained.

Annex F (informative): LAPDm SAPI 3 handling for short message service

This annex describes several typical SMS message transfer scenarios for circuit switched GSM.

For GPRS SMS transfer, refer to GSM 03.60 for channel set up and upper layer message flow.

Case A: Mobile originating short message transfer, no parallel call.

The mobile station side will initiate SAPI 3 establishment by a SABM command on the SDCCH after the cipher mode has been set. If no hand over occurs, the SAPI 3 link will stay up until the last CP-ACK is received by the MSC, and the clearing procedure is invoked.

Case B: Mobile terminating short message transfer, no parallel call.

The network side, i.e. the BSS will initiate SAPI3 establishment by a SABM command on the SDCCH when the first CP-Data message is received from the MSC. If no hand over occurs, the link will stay up until the MSC has given the last CP-ack and invokes the clearing procedure.

Case C: Mobile originating short message transfer, parallel call.

The mobile station will send a SABM command on the SACCH when a CM_SERV_ACC message has been received from the network, allowing the short message transfer to start. If no hand over occurs the link will stay up until the MSC orders a explicit release, or the clearing procedure is invoked. If the parallel call is cleared before the short message transfer is finalized, the MSC will delay the clearing procedure toward the BSS, i.e. the channel release procedure is delayed.

Case D: Mobile terminating short message transfer, parallel call.

The network side, i.e. the BSS will initiate SAPI3 establishment by a SABM command on the SACCH when the first CP-DATA message is received from the MSC. The further handling is exactly as described for case C.

Case E: Mobile terminating short message transfer together with Inter-MSC hand over, parallel call.

The MAP procedures "Forward access signalling" and "Process access signalling" will be used between the two MSCs to transfer the CP-DATA, CP-ACK and CP-ERROR messages.

Case F: Mobile terminating short message transfer on SDCCH channel together with Inter-MSC hand over.

The MAP procedures "Forward access signalling" and "Process access signalling" will be used between the two MSC's to transfer the CP-DATA, CP-ACK and CP-ERROR messages.

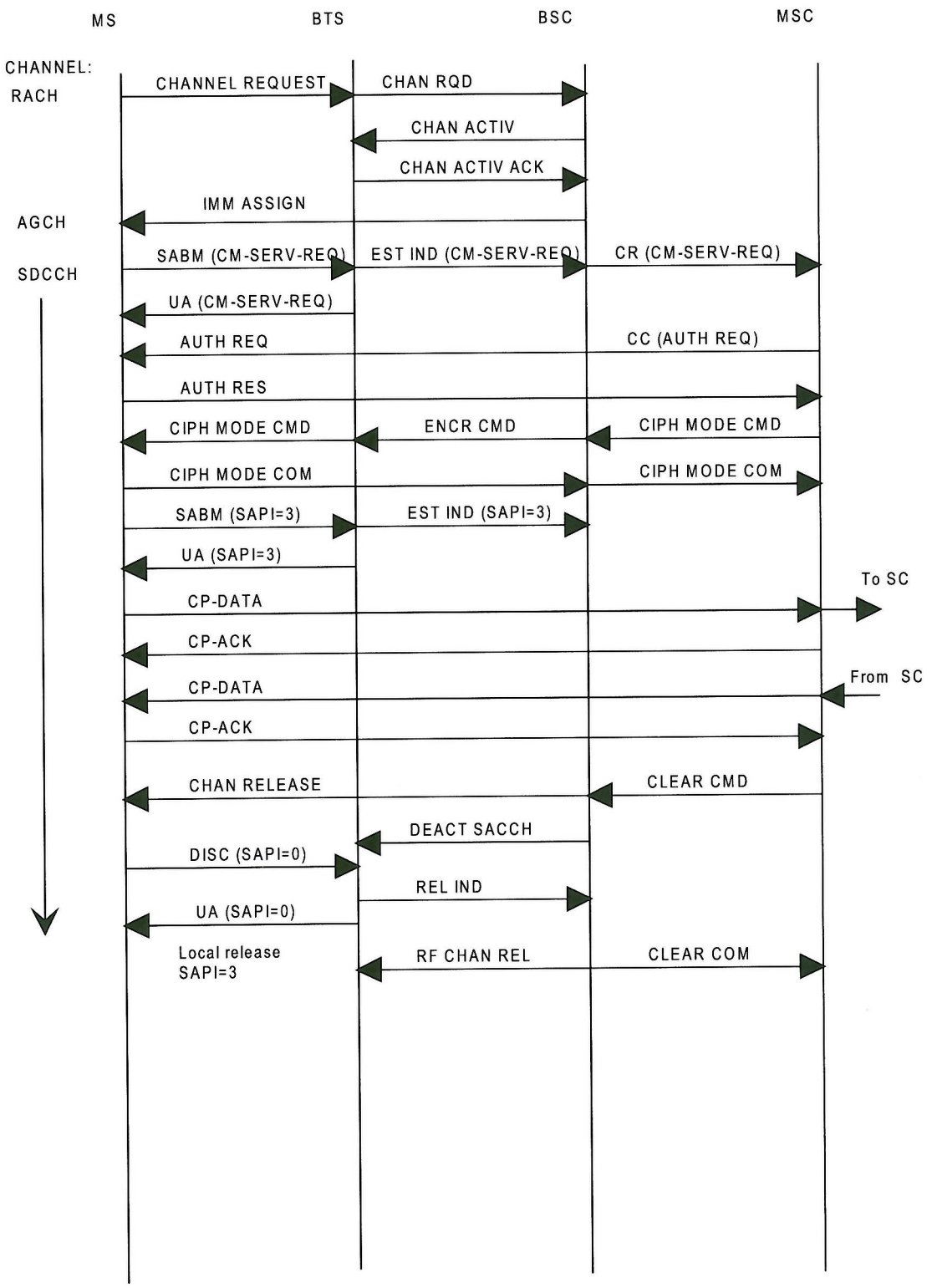


Figure F1/GSM 04.11: Mobile originated Short Message on SDCCH

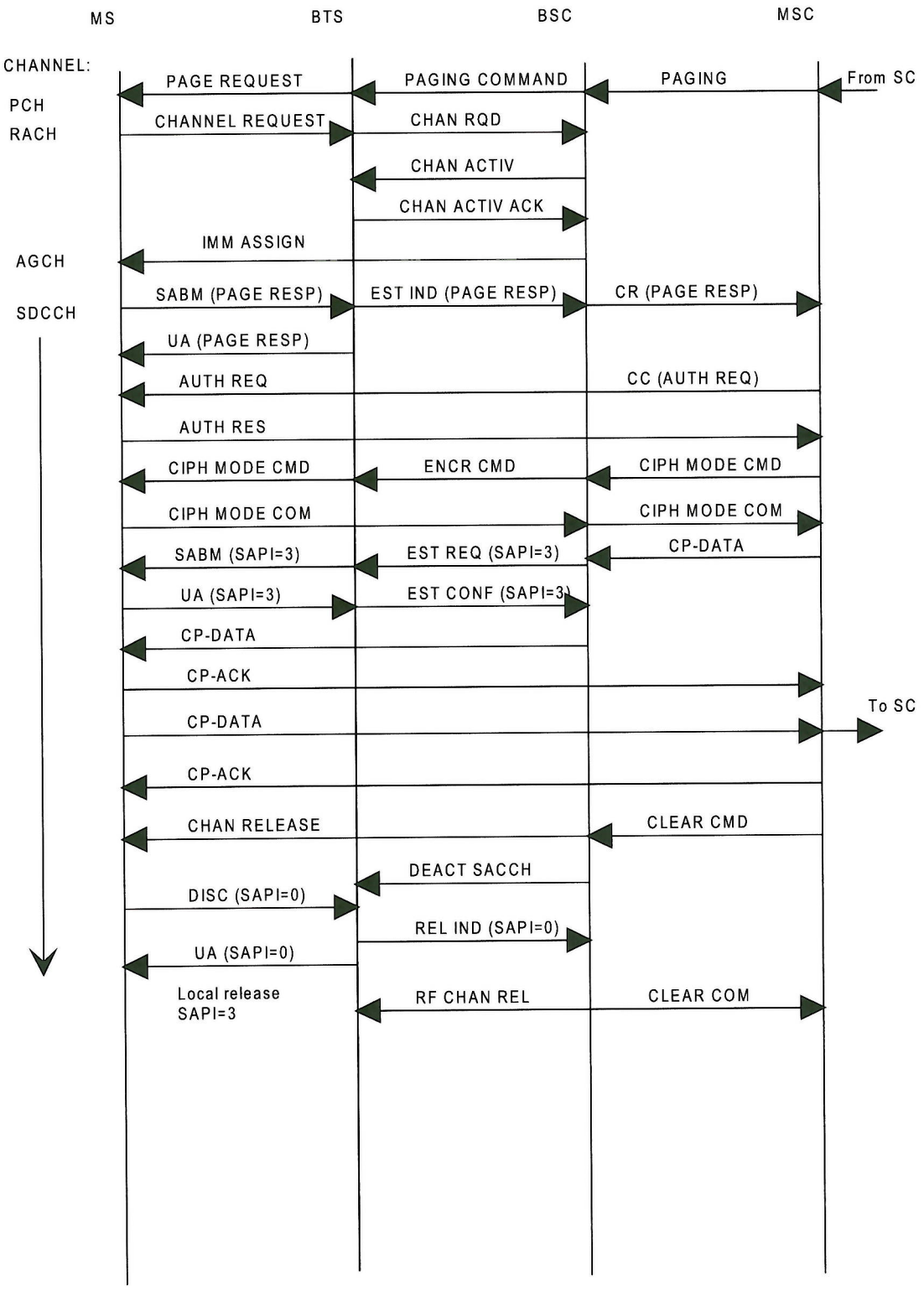


Figure F2/GSM 04.11: Mobile terminated Short Message on SDCCH

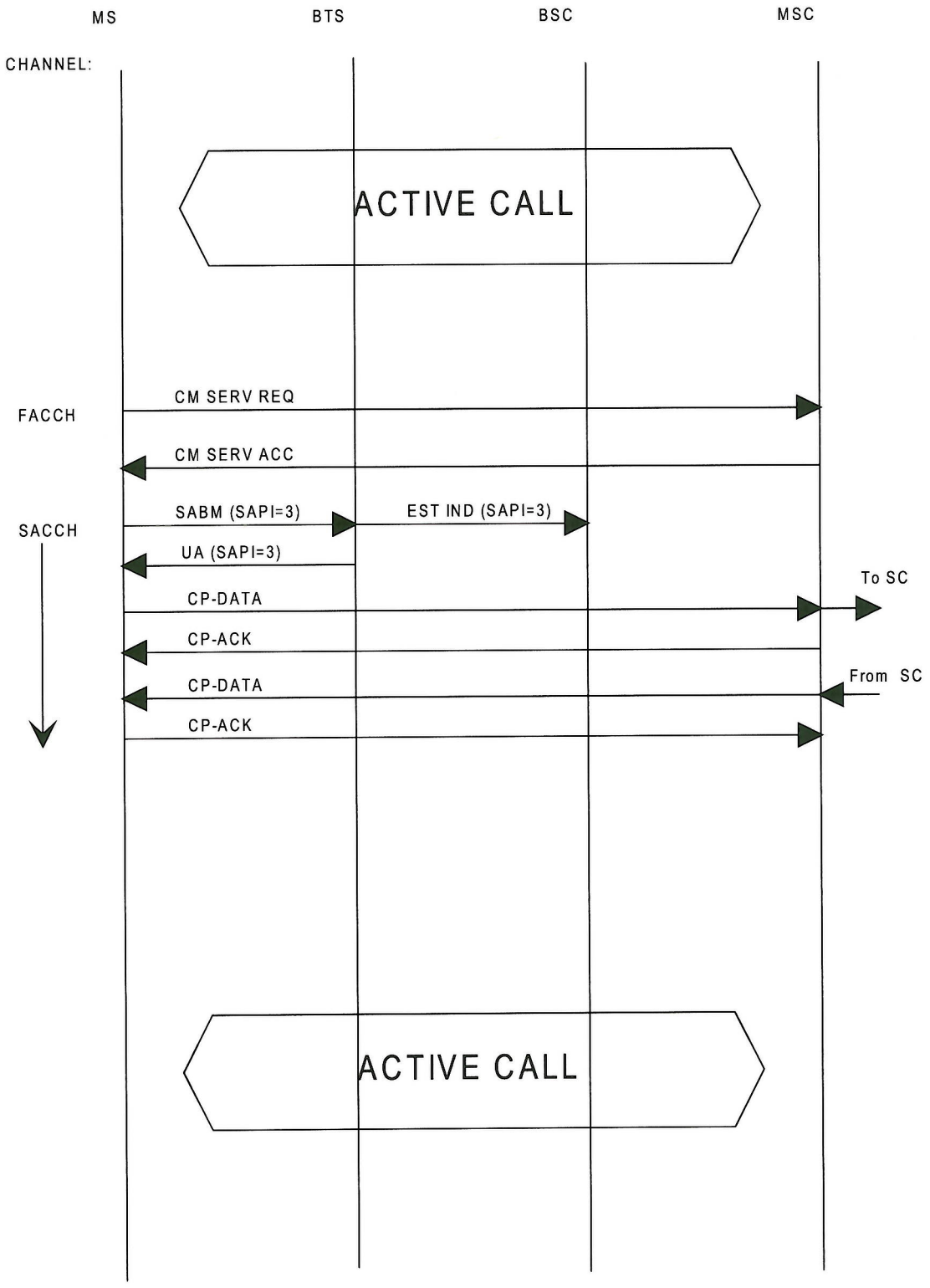


Figure F3/GSM 04.11: Mobile originated Short Message on SACCH

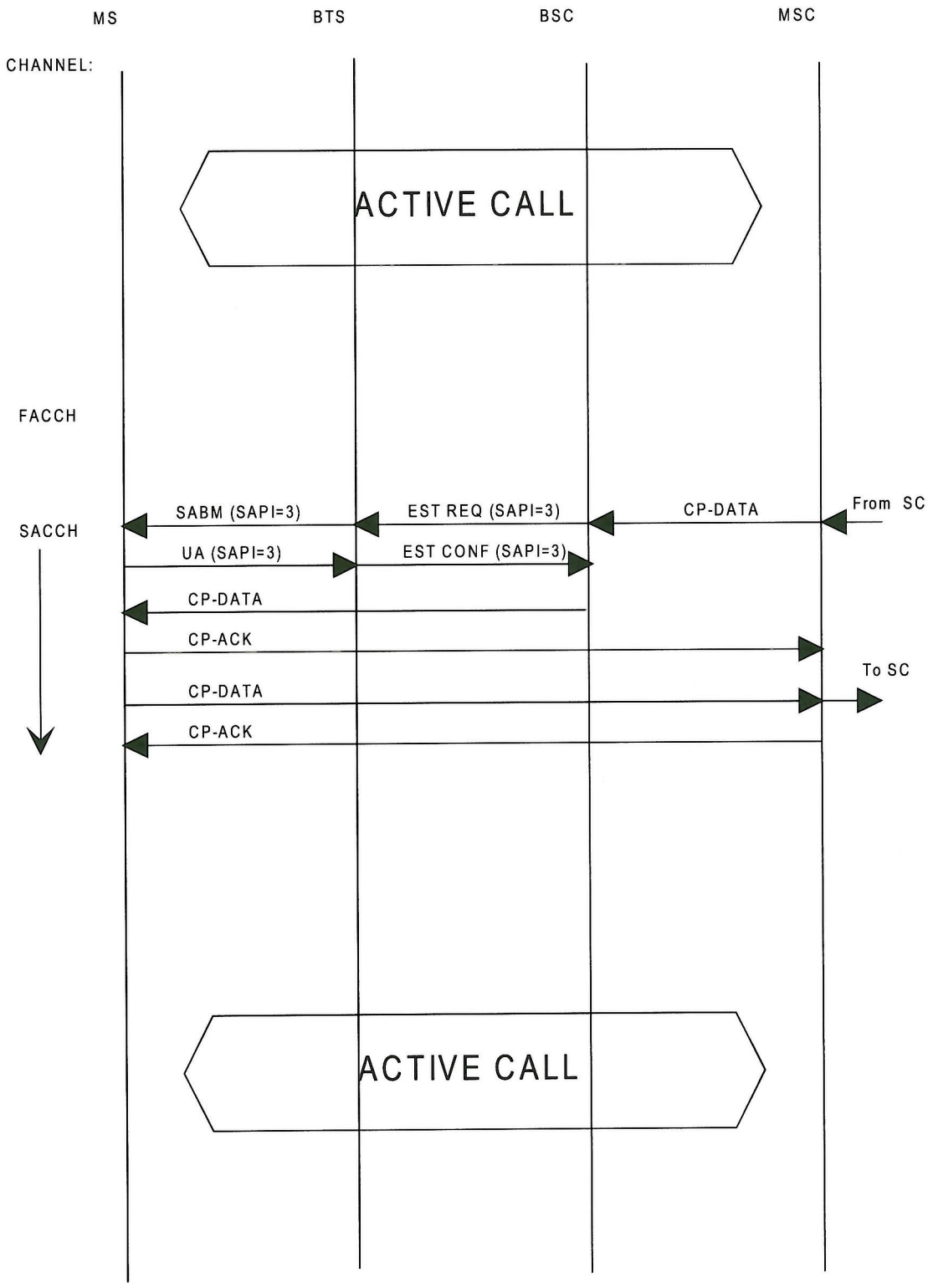


Figure F4/GSM 04.11: Mobile terminated Short Message on SACCH

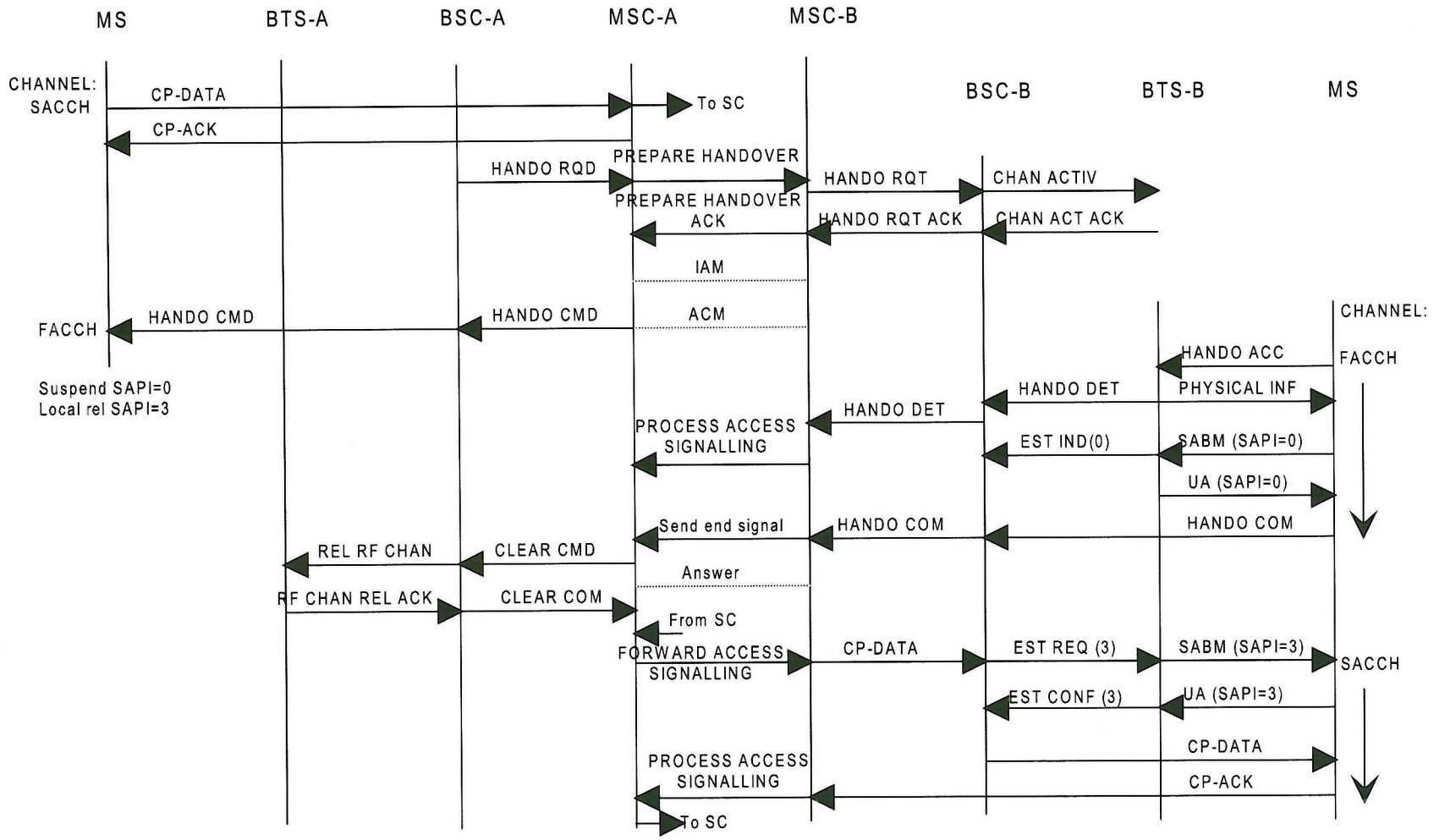


Figure F5/GSM 04.11: Inter/MSC handover during Short Message transfer on SACCH

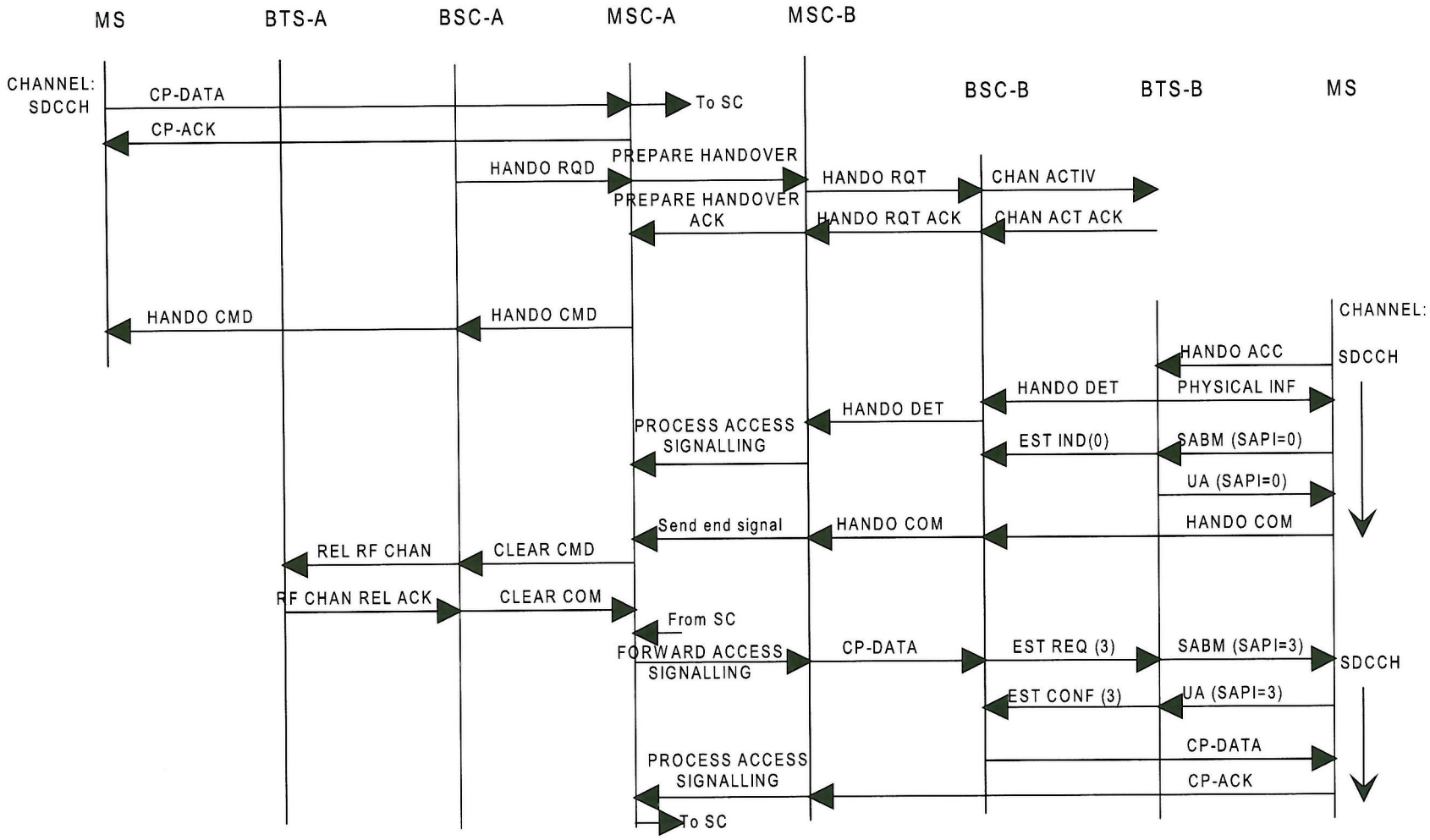


Figure F6/GSM 04.11: Inter/MSC handover during Short Message transfer on SDCCH

Annex G (informative): Change history

SMG	CR	RE	PHA	VERS	NEW_VE	SUBJECT
s25	A081	2	R97	5.2.1	6.0.0	PTP SMS over GPRS for Radio Interface
				6.0.0	6.0.1	Editorial changes for Publication
					7.0.0	Specification upgrade to Release 1998

History

Document history		
V7.0.0	August 1999	Publication

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