

ETSI TS 148 058 V13.1.0 (2016-04)



TECHNICAL SPECIFICATION

**Digital cellular telecommunication system (Phase 2+) (GSM);
Base Station Controller -
Base Transceiver Station (BSC - BTS) Interface;
Layer 3 specification
(3GPP TS 48.058 version 13.1.0 Release 13)**

3GPP **GSM** [®]
GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS
A GLOBAL INITIATIVE

Reference

RTS/TSGG-0248058vd10

Keywords

GSM

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	7
1 Scope	8
1.1 References	8
1.2 Abbreviations	9
2 Protocol model	9
3 Radio Link Layer Management Procedures	10
3.1 Link establishment indication.....	10
3.2 Link establishment request	11
3.3 Link release indication	11
3.4 Link release request.....	11
3.5 Transmission of a transparent L3-Message in acknowledged mode	12
3.6 Reception of a transparent L3-Message in acknowledged mode.....	12
3.7 Transmission of a transparent L3-Message in unacknowledged mode	12
3.8 Reception of a transparent L3-Message in unacknowledged mode.....	12
3.9 Link error indication.....	13
Dedicated channel management procedures	13
4.1 Channel activation	13
4.1.1 Signalling Procedure.....	13
4.1.2 Activation for Intra-Cell Channel Change	14
4.1.3 Activation for Asynchronous Handover	15
4.1.4 Activation for Synchronous Handover	15
4.1.5 Activation for Secondary Channels in Multislot Configuration	15
4.1.6 Channel reactivation	15
4.2 Channel MODE MODIFY	16
4.3 Handover detection.....	16
4.4 Start of encryption.....	17
4.5 Measurement reporting.....	17
4.5.1 Basic measurement reporting.....	18
4.5.2 Measurement pre-processing	18
4.5.2.1 Pre-processing configuration.....	19
4.5.2.2 Pre-processed measurement reporting.....	19
4.5.3 Extended measurement reporting	19
4.6 Deactivate SACCH.....	20
4.7 Radio channel release	20
4.8 MS power control.....	20
4.9 Transmission power control	21
4.10 Connection failure	22
4.11 Physical context request	22
4.12 SACCH information modify	22
4.13 Talker detection.....	23
4.14 Listener detection	23
4.15 Remote Codec Configuration	23
4.16 Round Trip Delay Report.....	23
4.17 Pre-handover Warning	24
4.18 MultiRate Codec Configuration Change	24
4.19 MultiRate Codec Configuration Change Performed	25
4.20 TFO Report	25
4.21 TFO Modification Request.....	25
5 Common channel management procedures.....	26

5.1	Channel request by MS	26
5.2	Paging.....	26
5.3	Delete indication	26
5.4	CCCH load indication	27
5.5	Broadcast information modify.....	27
5.6	Short Message Cell Broadcast.....	27
5.7	IMMEDIATE ASSIGNMENT	30
5.8	Notification.....	31
6	TRX management procedures.....	31
6.1	Radio resource indication.....	31
6.2	SACCH filling information modify.....	32
6.3	Flow control	32
6.4	Error reporting.....	33
6a	Location services procedures	33
6a.1	LLP message transport	33
7	Error handling	34
7.1	General	34
7.2	Message discriminator error.....	34
7.3	Message type error	34
7.4	Message sequence error.....	34
7.5	General information element errors.....	34
7.6	Mandatory information element errors.....	34
7.7	Optional information element errors	35
7.8	Conditional information element errors	35
8	Message formats and contents.....	35
8.0	General	35
8.1	Transparent messages.....	36
8.2	Non-transparent messages (BSC-BTS specific messages).....	36
8.3	Radio link layer management messages	36
8.3.1	DATA REQUEST	37
8.3.2	DATA INDICATION.....	37
8.3.3	ERROR INDICATION.....	37
8.3.4	ESTABLISH REQUEST	37
8.3.5	ESTABLISH CONFIRM.....	38
8.3.6	ESTABLISH INDICATION.....	38
8.3.7	RELEASE REQUEST	38
8.3.8	RELEASE CONFIRM.....	38
8.3.9	RELEASE INDICATION	39
8.3.10	UNIT DATA REQUEST.....	39
8.3.11	UNIT DATA INDICATION	39
8.4	DEDICATED CHANNEL MANAGEMENT MESSAGES.....	39
8.4.1	CHANNEL ACTIVATION.....	40
8.4.2	CHANNEL ACTIVATION ACKNOWLEDGE.....	41
8.4.3	CHANNEL ACTIVATION NEGATIVE ACKNOWLEDGE.....	41
8.4.4	CONNECTION FAILURE INDICATION	42
8.4.5	DEACTIVATE SACCH.....	42
8.4.6	ENCRYPTION COMMAND.....	42
8.4.7	HANDOVER DETECTION.....	42
8.4.8	MEASUREMENT RESULT	42
8.4.9	MODE MODIFY	43
8.4.10	MODE MODIFY ACKNOWLEDGE.....	43
8.4.11	MODE MODIFY NEGATIVE ACKNOWLEDGE.....	44
8.4.12	PHYSICAL CONTEXT REQUEST	44
8.4.13	PHYSICAL CONTEXT CONFIRM	44
8.4.14	RF CHANNEL RELEASE.....	44
8.4.15	MS POWER CONTROL.....	44
8.4.16	BS POWER CONTROL.....	45
8.4.17	PREPROCESS CONFIGURE.....	45
8.4.18	PREPROCESSED MEASUREMENT RESULT	45

8.4.19	RF CHANNEL RELEASE ACKNOWLEDGE	45
8.4.20	SACCH INFO MODIFY	45
8.4.21	TALKER DETECTION	46
8.4.22	LISTENER DETECTION	46
8.4.23	REMOTE CODEC CONFIGURATION REPORT	46
8.4.24	ROUND TRIP DELAY REPORT	47
8.4.25	PRE-HANDOVER NOTIFICATION	47
8.4.26	MULTIRATE CODEC MODIFICATION REQUEST	47
8.4.27	MULTIRATE CODEC MODIFICATION ACKNOWLEDGE	47
8.4.28	MULTIRATE CODEC MODIFICATION NEGATIVE ACKNOWLEDGE	47
8.4.29	MULTIRATE CODEC MODIFICATION PERFORMED	48
8.4.30	TFO REPORT	48
8.4.31	TFO MODIFICATION REQUEST	48
8.5	COMMON CHANNEL MANAGEMENT MESSAGES	48
8.5.1	BCCH INFORMATION	49
8.5.2	CCCH LOAD INDICATION	49
8.5.3	CHANNEL REQUIRED	50
8.5.4	DELETE INDICATION	50
8.5.5	PAGING COMMAND	50
8.5.6	IMMEDIATE ASSIGN COMMAND	50
8.5.7	SMS BROADCAST REQUEST	51
8.5.8	SMS BROADCAST COMMAND	51
8.5.9	CBCH LOAD INDICATION	51
8.5.10	NOTIFICATION COMMAND	52
8.6	TRX MANAGEMENT MESSAGES	52
8.6.1	RF RESOURCE INDICATION	52
8.6.2	SACCH FILLING	53
8.6.3	OVERLOAD	53
8.6.4	ERROR REPORT	53
8.7	LOCATION SERVICES MESSAGES	54
8.7.1	LOCATION INFORMATION	54
9	Information element codings	54
9.1	Message discriminator	54
9.2	MESSAGE TYPE	55
9.3	Other information elements	56
9.3.1	Channel Number	57
9.3.2	Link Identifier	58
9.3.3	Activation Type	58
9.3.4	BS Power	59
9.3.5	Channel Identification	60
9.3.6	Channel Mode	60
9.3.7	Encryption information	62
9.3.8	Frame Number	62
9.3.9	Handover reference	63
9.3.10	L1 Information	63
9.3.11	L3 Information (message name)	63
9.3.12	MS Identity	63
9.3.13	MS Power	63
9.3.14	Paging Group	64
9.3.15	Paging Load	64
9.3.16	Physical Context	64
9.3.17	Access Delay	65
9.3.18	RACH Load	65
9.3.19	Request Reference	65
9.3.20	Release Mode	66
9.3.21	Resource Information	66
9.3.22	RLM Cause	66
9.3.23	Starting Time	67
9.3.24	Timing Advance	67
9.3.25	Uplink Measurements	67
9.3.26	Cause	68

9.3.27	Measurement result number.....	71
9.3.28	Message Identifier.....	71
9.3.29	SACCH Information.....	71
9.3.30	System Info Type.....	72
9.3.31	MS Power Parameters.....	73
9.3.32	BS Power Parameters.....	73
9.3.33	Pre-processing Parameters.....	74
9.3.34	Pre-processed Measurements.....	74
9.3.35	Full Immediate Assign Info.....	74
9.3.36	SMSCB Information.....	75
9.3.37	MS Timing Offset.....	75
9.3.38	Erroneous Message.....	75
9.3.39	Full BCCH Information (message name).....	75
9.3.40	Channel Needed.....	76
9.3.41	CB Command type.....	76
9.3.42	SMSCB Message.....	77
9.3.43	CBCH Load Information.....	77
9.3.44	SMSCB Channel Indicator.....	77
9.3.45	Group call reference.....	78
9.3.46	Channel description.....	78
9.3.47	NCH DRX information.....	78
9.3.48	Command indicator.....	78
9.3.49	eMLPP Priority.....	79
9.3.50	UIC.....	79
9.3.51	Main channel reference.....	79
9.3.52	MultiRate configuration.....	80
9.3.53	MultiRate Control.....	80
9.3.54	Supported Codec Types.....	80
9.3.55	Codec Configuration.....	82
9.3.56	Round Trip Delay.....	83
9.3.57	TFO Status.....	83
9.3.58	LLP APDU.....	84
9.3.59	TFO transparent container.....	84
9.3.60	DRX Info.....	84
Annex A (informative): Change History.....		85
History.....		86

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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 the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater 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 document.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/8c60821-dbc8-4903-ae20-f6a74e41d1cc/etsi-ts-148-058-v13.1.0-2016-04>

1 Scope

The present document specifies the general structure of layer 3 and traffic management procedures and messages used on the A-bis interface to support signalling procedures as defined in 3GPP TS 24.008 and 3GPP TS 44.018. Support for Location Services (LCS) related signalling, as defined in 3GPP TS 23.071, is also included. 3GPP TS 23.071 identifies new A-bis signalling to support BTS-embedded Type B LMUs as well as standalone, Type B LMUs. The standalone Type B LMU supports the layer 1 and 2 signalling for the A-bis as well as the Location Service message defined in the present document.

The use and general aspects of the Base Station Controller (BSC) to Base Station Transceiver (BTS) interface (the A-bis interface) are given in 3GPP TS 48.051.

Network management procedures and messages for the A-bis interface are defined in 3GPP TS 08.59.

The functional split between BSC and BTS is defined in 3GPP TS 48.052. The procedures and messages required to support this split are defined in detail in the present document.

1.1 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 43.020: "Security related network functions".
- [2a] 3GPP TS 23.071: "Location Services; Functional description – Stage 2".
- [3] 3GPP TS 44.004: "Layer 1 General requirements".
- [4] 3GPP TS 44.005: "Data Link (DL) layer General aspects".
- [5] 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".
- [6] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols; Stage 3".
- [7] 3GPP TS 44.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".
- [7a] 3GPP TS 44.071: "Mobile radio interface layer 3 Location Services (LCS) specification".
- [8] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [9] 3GPP TS 45.005: "Radio transmission and reception".
- [10] 3GPP TS 45.008: "Radio subsystem link control".
- [11] 3GPP TS 45.009: "Link Adaptation".
- [12] 3GPP TS 45.010: "Radio subsystem synchronization".
- [13] 3GPP TS 48.006: "Signaling transport specification mechanism for the Base Station System – Mobile-services Switching Centre (BSS - MSC) interface".

- [14] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC-BSS) interface; Layer 3 specification".
- [15] 3GPP TS 48.051: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface; General aspects".
- [16] 3GPP TS 48.052: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Interface principles".
- [17] 3GPP TS 48.056: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 2 specification".
- [18] 3GPP TS 26.103: "Speech Codec List for GSM and UMTS".
- [19] 3GPP TS 44.018: "Radio Resource Control Protocol".

1.2 Abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 apply.

2 Protocol model

A model for L3 can be found in figure 2.1.

L2 addressing is made to TRX (or BCF) using the TEI of LAPD. Different L2 links are used for traffic management messages (RSL, Radio Signalling Link), network management messages (OML, Operation & Maintenance Link) and L2 management messages (L2ML, Layer 2 Management Link).

For traffic management, two types of signalling messages have been defined:

Transparent Messages: Messages which are forwarded by BTS without interpretation or changes.

Non-Transparent Messages: Messages which are sent only between BSC and BTS and which BTS is acting upon or which are the results of BTS actions.

In addition, the messages have been grouped into four main groups: Radio Link Layer Management, Dedicated Channel Management, Common Channel Management and TRX Management messages.

Discrimination between these types and groups is based on the Message Discriminator which is sent as the first octet in all messages. Transparent and non-transparent messages are discriminated by a transparency flag (T-bit) in the Message Discriminator. Transparent messages are merely forwarded to L2 on the radio interface.

In order to address the relevant radio channel, a Channel Number element is included to support the distribution of messages to relevant physical channels on the TRX. A Link Identifier element supports the distribution on logical links/channels on the radio interface (compare the DLCI element of the A interface, 3GPP TS 48.006).

All messages in this GTS are to be transmitted on the A-bis interface using the I format of LAPD, except for MEASUREMENT RESULT which is sent in UI format.

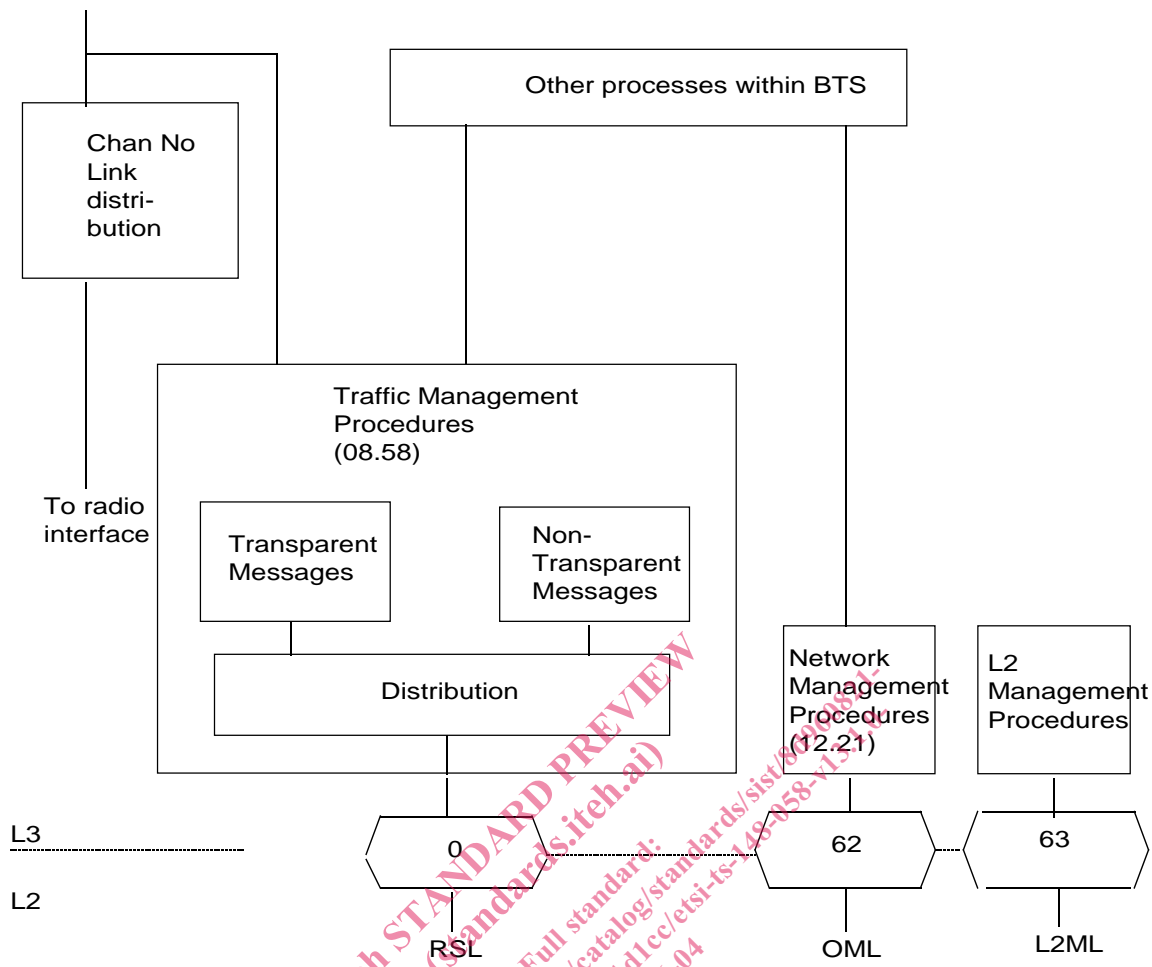


Figure 2.1/48.058: L3 model

3 Radio Link Layer Management Procedures

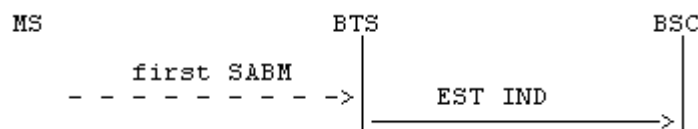
This sub-clause describes procedures related to the management of a link layer connection on the radio path.

3.1 Link establishment indication

This procedure is used by BTS to indicate to BSC that a layer 2 link on the radio path has been established in multi-frame mode at the initiative of an MS. BSC can use this indication to set up an SCCP connection to MSC.

Upon reception of a SABM frame on a link on an active channel, the BTS sends an ESTablish INDication message to BSC. The message contains the contents of the information field of the SABM frame if present.

The procedure is used in all establishment cases, for all channels and all SAPIs.

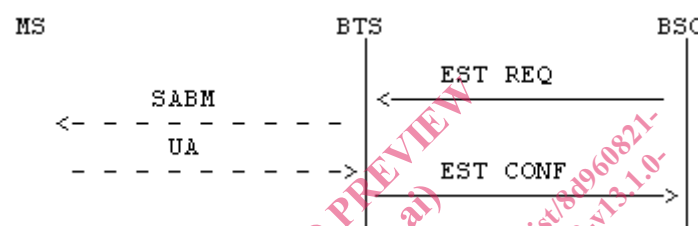


3.2 Link establishment request

This procedure is used by BSC to request the establishment of a link layer connection in multi-frame mode on the radio path.

The procedure is started by BSC sending an ESTablish REQuest message to BTS. BTS then establishes the link by sending an SABM frame. Upon reception of the acknowledgement (UA-frame) from MS, BTS sends an ESTablish CONFirm message to BSC.

In case of a failure, BTS sends a RELease INDication and an ERRor INDication message to BSC (cf. 3GPP TS 44.006).

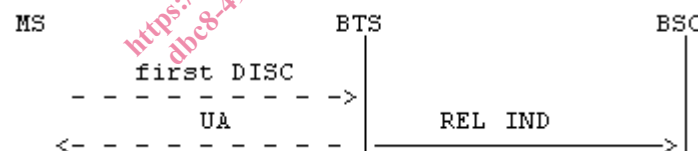


3.3 Link release indication

This procedure is used by BTS to indicate to BSC that a link layer connection on the radio path has been released at the initiative of an MS.

When receiving a DISC frame on a link layer connection in multi-frame mode, BTS sends a RELease INDication message to BSC. (If the link layer is in idle mode, BTS will send a DM frame to MS but does not notify BSC.)

Collision cases are treated as specified in 3GPP TS 44.006.



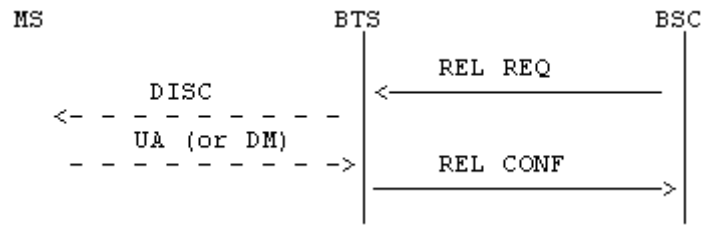
3.4 Link release request

This procedure is used by BSC to request the release of a link layer connection on the radio path.

The procedure is started by BSC sending a RELease REQuest message to BTS. BTS then sends a DISC frame to MS. When it has received the acknowledgement (UA or DM frame), BTS sends a RELease CONFirm message to BSC.

Collision cases are treated as specified in 3GPP TS 44.006.

If BTS has repeated the DISC frame N200 times, BTS sends a RELease INDication and an ERRor INDication message to BSC (cf. 3GPP TS 44.006).



3.5 Transmission of a transparent L3-Message in acknowledged mode

This procedure is used by BSC to request the sending of a L3 message to MS in acknowledged mode.

BSC sends a DATA REQuest message to BTS. The message contains the complete L3 message to be sent in acknowledged mode.



3.6 Reception of a transparent L3-Message in acknowledged mode

This procedure is used by BTS to indicate the reception of a L3 message in acknowledged mode.

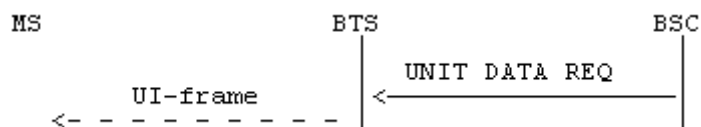
BTS sends a DATA INDication message to BSC. The message contains the received L3 message.



3.7 Transmission of a transparent L3-Message in unacknowledged mode

This procedure is used by BSC to request the sending of a L3 message to MS in unacknowledged mode.

BSC sends a UNIT DATA REQuest message to BTS. The message contains the L3 message to be sent to MS in unacknowledged mode.



3.8 Reception of a transparent L3-Message in unacknowledged mode

This procedure is used by BTS to indicate the reception of a L3 message in unacknowledged mode.