ETSI TS 148 071 V15.0.0 (2018-07)



Digital cellular telecommunications system (Phase 2+) (GSM);
Location Services (LCS);
Serving Mobile Location Centre Base Station System (SMLC-BSS) interface;
Layer 3 specification
(3GPP TS 48.071 version 15.0.0 Release 15)



Reference RTS/TSGR-0648071vf00 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: <u>http://www.etsi.org/standards-search</u>

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 https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx

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.

© ETSI 2018. All rights reserved.

DECT[™], PLUGTESTS[™], UMTS[™] and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP[™] and LTE[™] are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M logo is protected for the benefit of its Members.

GSM[®] and the GSM logo are trademarks registered and owned by the GSM Association.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables 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.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

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 <u>ETSI Drafting Rules</u> (Verbal forms for the expression of provisions).

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

Contents

Intelle	ectual Property Rights	2
Forew	vord	2
Moda	l verbs terminology	2
Forew	/ord	5
1	Scope	6
2	References	6
3	Definitions and abbreviations	6
4	Messages functional definitions and contents	
4.1	General	7
4.2	Messages	7
4.2.1	TA Request	
4.2.2	TA Response	
4.2.3	(void)	
4.2.4	(void)	
4.2.5	Reject	
	ů	
4.2.6	Reset	
4.2.7	Abort	
4.2.8	TA Layer3	
4.2.9	MS Position Command	
4.2.10	MS Position Response	10
4.2.11	U-TDOA Request	10
4.2.12	U-TDOA Response	11
5	Information element encodings	
5.1	Message Type IE	14
5.2	Timing Advance IE	14
5.3	(void)	14
5.4	Cell Identity IE	14
5.5	(void)	15
5.6	(void)	15
5.7	(void)	
5.8	Channel Description IE	
5.9	(void)	
5.10	(void)	
5.11	(void)	
5.12	Measurement Report IE	
5.13	(void)	
5.14	Cause IE	
5.15	RRLP Flag IE	
5.16	RRLP IE	
5.17	Cell Identity List IE	
5.18	Enhanced Measurement Report IE	18
5.19	Location Area Code IE	18
5.20	Frequency List IE	19
5.21	MS Power IE	
5.22	Delta Timer IE	
5.23	Serving Cell Identifier IE	
5.24	Encryption Key IE	
5.25	Cipher Mode Setting IE	
5.26	Channel Mode IE	
5.27	MultiRate Configuration IE	
5.28	Polling Repetition IE	
5.29	Packet Channel Description IE	20
5.30	TLLI IE	21
5.31	TFI IE	21

5.32	Starting Time IE		21
5.33	_	ey IE	
5.34		ing Flag	
Annex	A (informative):	Change History	23
MIIICA	ii (iiiioiiiiative).	Change instory	······
History	,		24

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.

1 Scope

The present document contains the coding of information necessary for support of location service operation on the SMLC-BSS interface layer 3.

Clause 2 gives the functional definitions and contents of messages for location service operations. Clause 3 gives the general format and coding for messages used for location service and the format and coding of information elements used for location service operations.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.
- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications". [2] 3GPP TS 43.059: "Functional stage 2 description of Location Services (LCS) in GERAN". 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects". [3] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol". [4] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core network protocols; Stage 3". [4a] 3GPP TS 45.008: "Radio subsystem link control". [5] 3GPP TS 48.008: "Mobile Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 [6] specification". 3GPP TS 49.031: "Location Services (LCS); Base Station System Application Part LCS Extension [7] (BSSAP-LE)". 3GPP TS 44.031: "Location Services (LCS); Mobile Station (MS) - Serving Mobile Location [8] Centre (SMLC) Radio Resource LCS Protocol (RRLP)".

3 Definitions and abbreviations

For the purposes of the present document, the abbreviations, terms and definitions given in 3GPP TR 21.905 and 3GPP TS 43.059 apply.

4 Messages functional definitions and contents

4.1 General

This sub-clause defines the structure of the messages of the SMLC-BSS layer 3 protocol defined in 3GPP TS 43.059.

Each definition includes:

- a) a brief description of the message;
- b) a table listing the information elements in the order of their appearance in the message.

For each IE the table indicates:

- 1) the name of the IE (which gives an idea of the semantics of the element), which is used in this and other specifications as a reference to the IE within the message;
- 2) the name of the type of the IE (which indicates the coding of the value part of the IE), and a reference to a description of the value part of the IE;
- 3) the presence requirement indication (M, C or O) for the IE, as defined in 3GPP TS 24.007;
- 4) the format of the IE (T, V, TV, LV, TLV) as defined in 3GPP TS 24.007;
- 5) the length of the IE (or permissible range of lengths), in octets, in the message. The value of the length gives the number of octets in the IE following the length and element identifier. Where the length is encoded using more than one octet, the high order bit is bit 8 of the first (lowest numbered octet) and the low order bit is bit 1 of the last (highest numbered octet). When a length has a range of M to N octets, the notation "M-N" is used. The symbol "n" represents the maximum of a range when indefinite.
- c) sub-clauses specifying conditions for IEs with presence requirement C or O in the relevant message. Together with other conditions specified in 3GPP TS 43.059 this defines when the IE shall be included or not, what non-presence of such IEs means, and (for IEs with presence requirement C) the static conditions for presence and/or non-presence of the IEs (see 3GPP TS 43.059).

4.2 Messages

The following Location Services related messages are exchanged between the SMLC and the BSS:

- TA Request;
- TA Response;
- Reject;
- Reset;
- Abort;
- TA Layer3;
- MS Position Command;
- MS Position Response;
- U-TDOA Request;
- U-TDOA Response.

On the Lb interface the messages are contained in the BSSLAP APDU IE which is encapsulated in the following messages as specified in 3GPP TS 49.031:

- BSSMAP-LE CONNECTION ORIENTED INFORMATION message (for all messages except the TA LAYER 3 message);

- BSSMAP-LE PERFORM LOCATION REQUEST message (for the TA LAYER 3 message)
- BSSMAP-LE PERFORM LOCATION INFORMATION message (for the TA LAYER 3 message).

4.2.1 TA Request

The TA Request is a message from the SMLC to the BSS, requesting BSS to return the timing advance (or access delay) of the MS.

Table 4.2.1.1: TA Request message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	M	V	1

4.2.2 TA Response

The TA Response is a message from the BSS to the SMLC. It is a response to TA Request message and contains the following information elements.

Table 4.2.2.1: TA Response message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	M	V	1
Serving Cell Identity	Cell Identity IE / 5.4	M	TV	3
Timing Advance	Timing Advance IE / 5.2	M	TV	2
Measurement Report	Measurement Report IE / 5.12	0	TLV	18
Enhanced Measurement Report	Enhanced Measurement Report IE / 5.18	0	TLV	4-n
Measured Cell Identity List	Cell Identity List IE / 5.17	0	TLV	6-n
Concurrent Method Flag	Concurrent Positioning Flag IE / 5.34	O (note 1)	TV	2

NOTE 1: This IE is only included when the BSC allows a concurrent invocation of a first and second positioning procedure

4.2.3 (void)

4.2.4 (void)

4.2.5 Reject

The Reject is a message from the BSS to the SMLC. It is a possible response to TA Request, MS Position Command or U-TDOA Request and contains the following information elements.

Table 4.2.5.1: Reject message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	M	٧	1
Cause	Cause IE / 5.14	М	TV	2

The following are the expected cause values for Reject message:

- congestion;
- channel Mode not supported;
- positioning procedure not supported;
- failure for other radio related events;
- incorrect serving cell identity;
- BSSAP-LE Segmentation error;

- Concurrent Positioning not enabled.

4.2.6 Reset

The Reset is a message from the BSS to the SMLC. It is sent when the Response message contents for a positioning request are invalidated (e.g. due to handover) before the positioning procedure was completed.

Table 4.2.6.1: Reset message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	М	V	1
Cell ID	Cell Identity IE / 5.4	M	TV	3
Timing Advance	Timing Advance IE / 5.2	M	TV	2
Channel description	Channel Description IE / 5.8	M	TV	4
Cause	Cause IE / 5.1	M	TV	2
Measurement Report	Measurement Report IE / 5.12	0	TLV	18
Enhanced Measurement Report	Enhanced Measurement Report IE / 5.18	0	TLV	4-n
Measured Cell Identity List	Cell Identity List IE / 5.17	0	TLV	6-n
LAC	Location Area Code IE / 5.19	0	TV	3
Frequency List	Frequency List IE 5.20	C (note 1)	TLV	3-n
Channel Mode	Channel Mode IE 5.26	C (notes 2	TV	2
		& 4)		
MultiRate Configuration	MultiRate Configuration 5.27	C (notes 3	TLV	4-n
		& 4)		
Packet Channel Description	Packet Channel Description IE 5.29	C (note 5)	TV	4
TLLI	TLLI IE 5.30	C (note 5)	TV	5
TFI	TFI 5.31	C (note 5)	TV	2
TBF Starting Time	Starting Time IE 5.32	C (note 5)	TV	3
Encryption Key (Kc)	Encryption Key IE 5.24	C (note 6)	TV	9
Cipher Mode Setting	Cipher Mode Setting IE 5.25	C (note 4)	TV	2
Long Encryption Key (Kc128)	Long Encryption Key IE 5.33	C(note 7)	TV	17

- NOTE 1: The Frequency List IE is included only for U-TDOA when frequency hopping is used.
- NOTE 2: The Channel Mode IE is included only for U-TDOA using FR or AMR (not included for EFR).
- NOTE 3: The MultiRate Configuration IE is included only for U-TDOA using AMR.
- NOTE 4: This IE can only be present for CS U-TDOA location method NOTE 5: This IE can only be present for PS U-TDOA location method
- NOTE 6: This IE can only be present for CS U-TDOA location method and if the Ciphering Mode Setting IE indicates A5/1 or A5/3.
- NOTE 7: This IE can only be present for CS U-TDOA location method and if the Ciphering Mode Setting IE indicates A5/4.

The following are the expected cause values for Reset message:

- intra-BSS handover;
- failure for other radio related events;
- supervision Timer Expired;
- incorrect serving cell identity.

4.2.7 **Abort**

The Abort is a message from the BSS to the SMLC. Upon receiving this signal, the SMLC shall abort ongoing positioning procedure.

Table 4.2.7.1: Abort message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	М	V	1
Cause	Cause IE / 5.14	М	TV	2

The following are the expected cause values for Abort message:

- failure for other radio related events;
- supervision Timer Expired;
- inter BSS handover;
- loss of signalling connection to MS.

4.2.8 TA Layer3

The TA Layer3 is an optional encapsulated message from the BSS to the SMLC that adds the following information in Complete layer 3 Information as described in 3GPP TS 48.008.

Table 4.2.8.1: TA Layer3 message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	M	V	1
Timing Advance	Timing Advance IE / 5.2	M	TV	2
Measurement Report	Measurement Report IE / 5.12	0	TLV	18
Enhanced Measurement Report	Enhanced Measurement Report IE / 5.18	0	TLV	4-n
Measured Cell Identity List	Cell Identity List IE / 5.17	0	TLV	6-n

4.2.9 MS Position Command

The BSSLAP MS Position Command is a message from the SMLC to BSS that contains the following information elements.

Table 4.2.9.1: MS Position Command message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	M	V	1
flag	RRLP flag IE / 5.15	M	TV	2
RRLP Info	RRLP IE / 5.16	М	TLV	3-n

4.2.10 MS Position Response

The BSSLAP MS Position Response is a message from the BSS to the SMLC that contains the following information elements.

Table 4.2.10.1: MS Position Response message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE / 5.1	M	V	1
flag	RRLP flag IE / 5.15	M	TV	2
RRLP Info	RRLP IE / 5.16	M	TLV	3-n
Timing Advance	Timing Advance IE / 5.2	0	TV	2
Measurement Report	Measurement Report IE / 5.12	0	TLV	18
Enhanced Measurement Report	Enhanced Measurement Report IE / 5.18	0	TLV	4-n
Measured Cell Identity List	Cell Identity List IE / 5.17	0	TLV	6-n
Concurrent Method Flag	Concurrent Positioning Flag IE / 5.34	O (note 1)	TV	2

NOTE 1: This IE is only included when the BSC allows a concurrent invocation of a first and second positioning procedure

4.2.11 U-TDOA Request

The U-TDOA Request is a message from the SMLC to the BSS. It contains the following information elements.

Table 4.2.11.1: U-TDOA Request message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE 5.1	М	V	1
Delta Timer	Delta Timer IE 5.22	O (note 1)	TV	2
Polling Repetition	Polling Repitition IE 5.28 (note)	C (note 2)	TV	2
NOTE 1: This IE can only be present for CS U-TDOA location method				
NOTE 2: This IE is only present for PS U-TDOA location method				

4.2.12 U-TDOA Response

The U-TDOA Response is a message from the BSS to the SMLC. It is a response to the U-TDOA Request message. It contains the following information elements.

Table 4.2.12.1: U-TDOA Response message content

Information element	Type/Reference	Presence	Format	Length
Message Type	Message Type IE 5.1	М	V	1
Channel Description	Channel Description IE 5.8	М	TV	4
Serving Cell Identifier	Cell Identifier IE 5.23	М	TLV	4-n
Frequency List	Frequency List IE 5.20	C (note 3)	TLV	3-n
Timing Advance	Timing Advance IE 5.2	0	TV	2
MS Power	MS Power IE 5.21	0	TV	2
Measurement Report	Measurement Report IE 5.12	0	TLV	18
Encryption Key (Kc)	Encryption Key IE 5.24	C (note 7)	TV	9
Cipher Mode Setting	Cipher Mode Setting IE 5.25	C (note 4)	TV	2
Channel Mode	Channel Mode IE 5.26	C (notes 1 &	TV	2
		4)		
MultiRate Configuration	MultiRate Configuration IE 5.27	C (notes 1 &	TLV	4-n
		4)		
Measured Cell Identity List	Cell Identity List IE / 5.17	0	TLV	6-n
Packet Channel	Packet Channel Description IE	C (note 5)	TV	4
Description	5.29			
TLLI	TLLI IE 5.30	C (note 5)	TV	5
TFI	TFI IE 5.31	C (note 5)	TV	2
TBF Starting Time	Starting Time IE 5.32	C (note 5)	TV	3
Power-Up Starting Time	Starting Time IE 5.32	O (note 6)	TV	3
Long Encryption Key	Long Encryption Key IE 5.33	C (note 8)	TV	17
(Kc128)				
Concurrent Method Flag	Concurrent Positioning Flag IE /	O (note 9)	TV	2
	5.34			

- NOTE 1: The Channel Mode IE is included only for U-TDOA using FR or AMR (not included for EFR).
- NOTE 2: The MultiRate Configuration IE is included only for U-TDOA using AMR.
- NOTE 3: The Frequency List IE is included only when frequency hopping is used. NOTE 4: This IE can only be present for CS U-TDOA location method.
- NOTE 5: This IE can only be present for PS U-TDOA location method .
- NOTE 6: The Power-Up Starting Time IE is included if the Power-Up procedure is supported for U-TDOA location method. It represents the starting time of the power-up and DTX suspension.
- NOTE 7: This IE can only be present for CS U-TDOA location method and if the Ciphering Mode Setting IE indicates A5/1 or A5/3.
- NOTE 8: This IE can only be present for CS U-TDOA location method and if the Ciphering Mode Setting IE indicates A5/4.
- NOTE 9: This IE is only included when the BSC allows a concurrent invocation of a first and second positioning procedure

5 Information element encodings

This paragraph contains the coding of the signalling elements used.

The following conventions are assumed for the sequence of transmission of bits and bytes:

- each bit position is marked as 1 to 8. Bit 1 is the least significant bit and is transmitted first;
- in an element octets are identified by number, octet 1 is transmitted first, then octet 2 etc.

When a field extends over more than one octet, the order of bit values progressively decreases as the octet number increases. The least significant bit of the field is represented by the lowest numbered bit of the highest numbered octet of the field.

- For variable length elements a length indicator is included, this indicates the number of octets following in the element.
- All fields within Information Elements are mandatory unless otherwise specified. The Information Element Identifier shall always be included.

All spare bits are set to 0.

The elements used and their coding are:

Table 5.1: Element Indentifier codes

0000 0001 0000 1000 0000 1001 0000 1010 0000 1011 0000 1100 0001 0000 0001 0001 0001 0010 0001 0011	Timing Advance Reserved (note) Cell Identity Reserved (note) Reserved (note) Reserved (note) Channel Description Reserved (note) Reserved (note) Reserved (note) Reserved (note) Reserved (note) Reserved (note) Measurement Report	5.2 5.4 5.8
0000 1001 0000 1010 0000 1011 0000 1100 0001 0000 0001 0001 0001 0010	Cell Identity Reserved (note) Reserved (note) Reserved (note) Channel Description Reserved (note) Reserved (note) Reserved (note) Reserved (note)	
0000 1010 0000 1011 0000 1100 0001 0000 0001 0001 0001 0010	Cell Identity Reserved (note) Reserved (note) Reserved (note) Channel Description Reserved (note) Reserved (note) Reserved (note) Reserved (note)	
0000 1011 0000 1100 0001 0000 0001 0001 0001 0010	Reserved (note) Reserved (note) Channel Description Reserved (note) Reserved (note) Reserved (note)	5.8
0000 1100 0001 0000 0001 0001 0001 0010	Reserved (note) Channel Description Reserved (note) Reserved (note) Reserved (note)	5.8
0001 0000 0001 0001 0001 0010	Channel Description Reserved (note) Reserved (note) Reserved (note)	5.8
0001 0001 0001 0010	Reserved (note) Reserved (note) Reserved (note)	5.8
0001 0010	Reserved (note) Reserved (note)	
	Reserved (note)	
0001 0011	1 /	
	Measurement Report	Ti and the second secon
0001 0100	pricasarement report	5.12
0001 0101	Reserved (note)	
0001 1000	Cause	5.14
0001 1001	RRLP Flag	5.15
0001 1011	RRLP IE	5.16
0001 1100	Cell Identity List	5.17
0001 1101	Enhanced Measurement Report	5.18
0001 1110	Location Area Code	5.19
0010 0001	Frequency List	5.20
0010 0010	MS Power	5.21
0010 0011	Delta Timer	5.22
0010 0100	Serving Cell Identifier	5.23
0010 0101	Encryption Key (Kc)	5.24
0010 0110	Cipher Mode Setting	5.25
0010 0111	Channel Mode	5.26
0010 1000	MultiRate Configuration	5.27
0010 1001	Polling Repetition	5.28
0010 1010	Packet Channel Description	5.29
0010 1011	TLLI	5.30
0010 1100	TFI	5.31
0010 1101	TBF Starting Time	5.32
0010 1110	Power-Up Starting Time	5.32
0010 1111	Long Encryption Key (Kc128)	5.33
0011 0000	Concurrent Positioning Procedure Flag s of the codepoints shall not be used as they were used	5.34

protocol.

All unassigned codes are spare.

5.1 Message Type IE

Message Type uniquely identifies the message being sent. It is a single octet element, mandatory in all messages.

All unassigned codes are spare.

Table 5.1.1: Message Type codes

87654321	
0000000	Reserved.
0000001	TA REQUEST
0000010	TA RESPONSE
00000100	Reserved (note)
00000101	Reserved (note)
00001010	REJECT
00001011	RESET
00001100	ABORT
00001101	TA LAYER3
00001111	MS Position Command
00010000	MS Position Response
00010001	U-TDOA Request
00010010	U-TDOA Response
	e codepoints shall not be used as they were used
in an earlier version	n of the protocol.

5.2 Timing Advance IE

This element contains the Timing Advance measured by the BTS.

8	8 7 6 5 4 3						1	
	Element identifier							
	Timing Advance							octet 2

Figure 5.2.1: Timing Advance IE

The coding of the timing advance value field is the binary representation of the timing advance in bit periods; 1 bit period = 48/13 us, as described in 3GPP TS 44.018 with the difference that all 8 bits are significant (instead of the normal 6 bits), which is necessary in order to report TA from extended range cells. To be correct, values over 63 do not correspond to a TA used by the MS (maximum is 63). Instead values over 63 correspond to the access delay measured by the BTS.

5.3 (void)

5.4 Cell Identity IE

This element defines the cell identity of the MS serving cell.

8	7	6	5	4	3	2	1	
	Element identifier							
	Cell Identity							

Figure 5.4.1: Cell Identity IE

The coding of the Cell Identity field is as defined in 3GPP TS 24.008 (excluding IEI).

- 5.5 (void)
- 5.6 (void)
- 5.7 (void)

5.8 Channel Description IE

This element defines the physical channel allocation of the MS.

8	7	1	
		octet 1	
		octets 2-4	

Figure 5.8.1: Channel Description IE

The coding of Channel Description field is as defined in 3GPP TS 44.018 (excluding IEI).

- 5.9 (void)
- 5.10 (void)
- 5.11 (void)

5.12 Measurement Report IE

This element contains the measurement report from the BSS.

8	7	6	5	4	3	2	1						
		octet 1											
		octet 2											
Measurement Results								octet 3-18					

Figure 5.12.1: Measurement Report IE

The Measurement Results field is encoded as in 3GPP TS 44.018 (excluding IEI) with the changes specified below.

DTX-USED

The DTX-USED bit shall be set as the DTXd field in the UPLINK MEASUREMENTS message in 3GPP TS 48.058. If the DTX-USED field is set to "0" the SMLC shall use the RXLEV-FULL and RXQUAL-FULL values. If the DTX-USED field is set to "1" the SMLC shall use the RXLEV-SUB and RXQUAL-SUB values.

RXLEV-FULL-SERVING-CELL and RXLEV-SUB-SERVING-CELL

When the values of RXLEV-FULL-SERVING-CELL and RXLEV-SUB-SERVING-CELL from TS 44.018 are 0 or 63, then their value shall be encoded to the Measurement Results without change. Otherwise, the values of RXLEV-FULL-SERVING-CELL and RXLEV-SUB-SERVING-CELL shall be added with 2 times the power reduction value corresponding to the Power Level field in the BS POWER message in 3GPP TS 48.058. A result higher than the upper boundary shall be limited to 63 to avoid value out of range.

RXLEV-FULL-SERVING-CELL (parameter in Measurement Results)

- = RXLEV-FULL-SERVING-CELL (parameter from TS 44.018, in octet 2 of NMR section 10.5.2.20)
- + 2*(Power Level field in the BS POWER message)

RXLEV-SUB-SERVING-CELL (parameter in Measurement Results)

- = RXLEV-SUB-SERVING-CELL (parameter from TS 44.018)
- + 2*(Power Level field in the BS POWER message)

Example: If Power Level is "0010" then

RXLEV-FULL-SERVING-CELL (parameter in Measurement Results) = RXLEV-FULL-SERVING-CELL (parameter from TS 44.018) + (2*2)

5.13 (void)

5.14 Cause IE

This element contains the cause value.

8	7	
		octet 1
		octet 2

Figure 5.14.1: Cause IE

The cause field is coded as follows:

Table 5.14.1: Cause IE coding

0000 0000	Congestion			
0000 0001	Channel Mode not supported			
0000 0010	Positioning procedure not supported			
0000 0011	Failure for other radio related events			
0000 0100	Intra-BSS handover			
0000 0101	Supervision Timer Expired			
0000 0110	Inter-BSS handover			
0000 0111	Loss of signalling connection to MS			
0000 1000	Incorrect serving cell identity			
0000 1001	BSSAP-LE Segmentation error			
0000 1010	Concurrent Positioning Procedure not			
	enabled			
All unassigned codes are spare.				

5.15 RRLP Flag IE

This element is coded as:

8	7	6	5	4	3	2	1	
			Element			octet 1		
	SPARE							octet 2

Figure 5.15.1: RRLP Flag IE

The fields are coded as follows:

Flag 1 (Octet 2, bit 1):

- $0\quad Position \ Command \ (SMLC \ to \ BSC)$ or final response (BSC to SMLC).
- 1 Not a Positioning Command or final response.

5.16 RRLP IE

RRLP IE is coded as:

8 7 6 5 4 3 2 1								
		octet 1						
			octet 2-3					
		RRLP	APDU (30	GPP TS 4	44.031)			octet 4-n

Figure 5.16.1: RRLP IE

5.17 Cell Identity List IE

This element defines the list of cell identities of neighbour cells, for which measurements are reported. The Cell Identities are listed in the same order than the corresponding measurements in the (Enhanced) Measurement Report IE.

8	7	6	5	4	3	2	1	
	Element identifier							
			Ler	ngth				octet 2
	Spare Cell identification Discriminator 1							
	Cell Identification 1							
	Spare Cell identification Discriminator N						octet (n-q-1)	
	Cell Identification N							

Figure 5.17.1: Cell Identity IE

The coding of octet 2 is a binary number indicating the Length of the remaining element. The Length depends on the Cell identification discriminator i as well as the number of cells to be identified.

The Cell identification discriminator i is coded as follows:

0000	The whole Cell Global Identification, CGI, is used to identify the 2G cells.
0001	Location Area Code, LAC, and Cell Identify, CI, are used to identify the 2G cells.
0010	3G Cell identification container 1.
0011	3G Cell identification container 2.

All other values are reserved.

The coding of the Cell Identification i depends on the Cell identification discriminator i. Below the coding of the i-th Cell Identification is shown for each Cell identification discriminator (with "i" in the range 1 to n):

Coding of the i-th Cell Identification for Cell identification discriminator = 0000.

8	7	6	5	4	3	2	1	
	MCC	dig 2			MCC	dig 1		octet x+1
	MNC	dig 3				octet x+2		
	MNC	dig 2			octet x+3			
			LA	AC				octet x+4
			LAC	cont.			octet x+5	
			CI v	alue		octet x+6		
	•	•	CI valu	ie cont	octet x+7			

Figure 5.17.2: Cell identification for discriminator = 0000

The octet (x+2) bits 5-8 are filled by '1111' if 2 digit MNC is used.

The octets (x+1)-(x+5) are coded as the value part shown in 3GPP TS 24.008, Table 'Location Area Identification information element'.

The octets (x+6)-(x+7) are coded as the value part shown in 3GPP TS 24.008, Table 'Cell Identity information element'.

Coding of i-th Cell Identification for Cell identification discriminator = 0001.

8	8 7 6 5 4 3 2 1									
	LAC									
	LAC cont.									
	CI value									
	CI value cont									

Figure 5.17.3: Cell identification for discriminator = 0001

The octets (x+1)-(x+2) are coded as the value part shown in 3GPP TS 24.008, Table 'Location Area Identification information element'.

The octets (x+3)-(x+4) are coded as the value part shown in 3GPP TS 24.008, Table 'Cell Identity information element'.

Coding of the Target ID for Cell identification discriminator = 0010.

Octets (x+1) to (x+9) shall be ignored by the receiver.

NOTE: in the 3G Cell identification container 1, the transmitter may send PLMN-ID, LAC, RNC-ID and C-ID to identify a 3G cell.

Coding of the Target ID for Cell identification discriminator = 0011.

Octets (x+1) to (x+6) shall be ignored by the receiver.

NOTE: In the 3G Cell identification container 2, the transmitter may send LAC, RNC-ID and C-ID to identify a 3G cell.

5.18 Enhanced Measurement Report IE

This element contains the measurement report from the BSS.

8 7 6 5 4 3 2 1								
		octet 1						
		octet 2						
		octet 3-n						

Figure 5.18.1: Enhanced Measurement Report IE

The Enhanced Measurement Results field is encoded as the contents of the ENHANCED MEASUREMENT REPORT message in 3GPP TS 44.018 (excluding the fields: "RR short PD", "Message type" and "Short layer 2 header") with the changes specified below.

RXLEV VAL for serving cell

When the values of RXLEV_VAL from TS 44.018 is 0 or 63, then its value shall be encoded to the Enhanced Measurement Results without change. Otherwise, the value of RXLEV_VAL shall be added with 2 times the power reduction value corresponding to the Power Level field in the BS POWER message in 3GPP TS 48.058. A result higher than the upper boundary shall be limited to 63 to avoid value out of range.

RXLEV VAL (parameter in Enhanced Measurement Results)

- = RXLEV_VAL (parameter from TS 44.018 in section 9.1.55)
- + 2*(Power Level field in the BS POWER message)

Example: If Power Level is "0010" then

RXLEV_VAL (parameter in Enhanced Measurement Results)

= RXLEV VAL (parameter from TS 44.018) + (2*2).

5.19 Location Area Code IE

This element defines the cell identity of the MS serving cell.

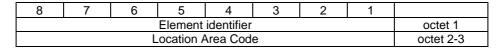


Figure 5.19.1: Location Area Code IE

The coding of the Location Area Code field is as defined in 3GPP TS 24.008 (excluding IEI, MCC, and MNC).

5.20 Frequency List IE

The Frequency List IE contains a list of frequencies used by the MS.

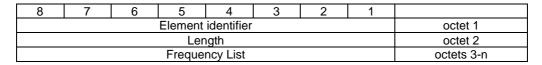


Figure 5.20.1: Frequency List IE

The coding of Frequency List field is as defined in 3GPP TS 44.018 (excluding IEI and length field).

5.21 MS Power IE

This element contains the MS power.

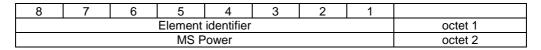


Figure 5.21.1: MS Power IE

The MS Power field is encoded as in 3GPP TS 44.018 (excluding IEI) and 3GPP TS 45.005.

5.22 Delta Timer IE

This element contains the value of the delta timer. The coding is as follows.

8	7	6	5	4	3	2	1	
		octet 1						
		octet 2						

Figure 5.22.1: Delta Timer IE

The Timer Value field is expressed in units of 0,1s.

5.23 Serving Cell Identifier IE

This element uniquely identifies a cell within a BSS and is of variable length containing the following fields:

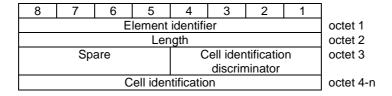


Figure 5.23.1: Serving Cell Identifier IE

The Serving Cell Identifier IE is encoded as in 3GPP TS 48.008 (excluding IEI and length field).

5.24 Encryption Key IE

This element defines the encryption key (Kc) of the MS being located.

8	7	6	5	4	3	2	1	
	Element identifier						octet 1	
	Encryption Key (Kc)							octet 2-9

Figure 5.24.1: Encryption Key IE

The Encryption Key (Kc) field contains the ciphering key to be used in connection with the encryption algorithms A5/1 and A5/3 as provided to the BSS by the MSC in the Encryption Information IE and as defined in TS 48.008.

5.25 Cipher Mode Setting IE

The purpose of the Cipher Mode Setting information element is to indicate whether stream ciphering shall be started or not and if it is to be started, which algorithm to use.

8	7	6	5	4	3	2	1	
	Element identifier							octet 1
Spare	Cipł	n Mod Se	t IEI	algor	ithm ider	ntifier	SC	octet 2

Figure 5.25.1: Cipher Mode Setting IE

The Cipher Mode Setting information element is coded as defined in TS 44.018 (excluding IEI).

5.26 Channel Mode IE

The purpose of the Channel Mode information element is to indicate the mode on coding/decoding and transcoding.

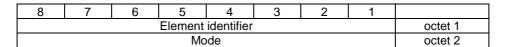


Figure 5.26.1: Channel Mode IE

The Channel Mode information element is coded as defined in TS 44.018 (excluding IEI).

5.27 MultiRate Configuration IE

The purpose of the MultiRate Configuration information element is to provide all parameters relevant to multi-rate speech codec.

8	7	1							
			Element	identifier				octet 1	
	Length								
Mul	tirate spe version	ech	NSC B	ICMI	Spare	Start	mode	octet 3	
	Parameters for multirate speech octet 4 - n								

Figure 5.27.1: MultiRate Configuration IE

The MultiRate Configuration information element is coded as defined in TS 44.018 (excluding IEI).

5.28 Polling Repetition IE

This element contains the value of the number of repetitions of the Packet Polling Request procedure. The coding is as follows:

8	7	6	5	4	3	2	1	
Element identifier								octet 1
Spare Number of polling repetitions (binary)						<u>')</u>	octet 2	

Figure 5.26.1: Polling Repetition IE

The Polling Repitition IE is a binary representation in the range of 4-63.

5.29 Packet Channel Description IE

This element contains the timeslot allocation and frequency parameters. The coding is as follows.

Γ	8 7 6 5 4 3 2 1								
L	0		U	J	7	9			
			octet 1						
		SN.1 bina	octets 2-5						
	des	cribed in	olus						
	padd	ling bits (binary 0)	as requir	ed to ach	nieve 4 co	omplete c	ctets	

Figure 5.29.1: Packet Channel Description IE

5.30 TLLI IE

The purpose of the *TLLI* information element is to provide the Temporary Logical Link Identifier.

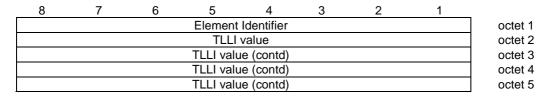


Figure 5.30.1: TLLI IE

The TLLI information element is coded as defined in TS 44.018 (excluding IEI).

5.31 TFI IE

This element contains the value of the TFI. The coding is as follows.

8	8 7 6 5 4 3 2 1							
		octet 1						
	Spare TFI							octet 2

Figure 5.31.1: TFI IE

The TFI information element is coded as defined in TS 44.060 (excluding IEI).

5.32 Starting Time IE

The purpose of the *Starting Time* information element is to provide the start TDMA frame number, FN modulo 42432 of the first transmission of the Packet Polling Request or first block of user data associated with the U-TDOA location method from the BSS to the MS. In the case that the power-up procedure for U-TDOA is supported, the *Starting Time* information element may provide the starting frame number of the power-up and DTX suspension.

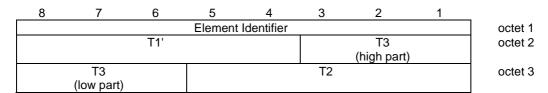


Figure 5.32.1: Starting Time IE

The Starting Time information element is coded and interpreted as defined in TS 44.018 (excluding IEI).

5.33 Long Encryption Key IE

This element defines the 128 bit encryption key (Kc128) of the MS being located.

8		7	6	5	4	3	2	1	
	Element identifier						octet 1		
	Long Encryption Key (Kc128)						octet 2-17		

Figure 5.24.1: Long Encryption Key IE

The Long Encryption Key (Kc128) field contains the ciphering key to be used in connection with encryption algorithm A5/4 as provided to the BSS by the MSC as defined in TS 48.008.

5.34 Concurrent Positioning Flag

This element contains the current BSC capability of the second, concurrent, independent location method. The coding is as follows:

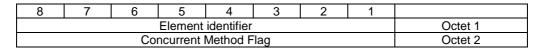


Figure 5.34.1: Concurrent Positioning IE

Table 5.34.1: Concurrent Method Flag Coding

Coding	Element name				
0000 0000	Second independent concurrent positioning Allowed				
1111 1111	Second independent concurrent positioning Disallowed				
NOTE: All other values reserved					

The combinations of first and second location procedures in concurrent positioning are limited to the following:

Figure 5.34.2 Allowed Concurrent Positioning Procedures

First Location Procedure	Second Location Procedure
TA Positioning	MS Positioning
UTDOA Positioning	MS Positioning
MS Positioning	TA Positioning
MS Positioning	U-TDOA Positioning

Annex A (informative): Change History

Meeting	J/Date	Tdoc	CR	Rev		Subject/Comment	New version
January 2	016				Vers	ion 13.0.0 based on version 12.0.0	13.0.0
Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-03	75					Version for Release 14 (frozen at TSG-75)	14.0.0
2018-06	SA-80	-	-	-	-	Update to Rel-15 version (MCC)	15.0.0

History

Document history						
V15.0.0	July 2018	Publication				