

Prepared (also subject responsible if other) ETMEMOD Tímea Moder		No. 1551-CNL 113 832 Uen		
Approved GFBEGFBGAACB [Julianna Rózsa]	Checked ETHGASZ	Date 2016-03-18	Rev A	Reference GASK2

## MobileL3 (v13.4.0) Protocol Modules for TTCN-3 Toolset with TITAN, Function Description

### Abstract

This is the Description for the MobileL3 v13.4.0 protocol module. The MobileL3v 13.4.0 protocol module is developed for the TTCN-3 Toolset with TITAN. This document should be read together with Product Revision Information [5].

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## 1 Functionality

The MobileL3 v13.4.0 protocol module implements the message structures of the related protocol [6] in a formalized way, using the standard specification language TTCN-3. This allows defining of test data (templates) in the TTCN-3 language and correctly encoding/decoding messages when executing test suites using the Titan TTCN-3 test environment.

The MobileL3 v13.4.0 protocol module uses Titan's RAW encoding attributes [1] and hence is usable with the Titan test toolset only.

### 1.1 Implemented protocols

This set of protocol modules implements a subset of protocol messages and constants of the Mobile L3 protocol. It includes GMM, SM, RRM, SMS and SS. SM and GMM are based on 24.008 v13.4.0 (see [4]), RRM are based on 44.018 v13.0.0 (see [6]), SMS are based on 24.011 v13.0.0 (see [7]) and 23.040 v13.0.0 (see [8]), and SS are based on 24.080 v13.0.0 (see [9]) with the modifications specified in 3.2.

### 1.2 Modifications/deviations related to the protocol specification

#### 1.2.1 Unimplemented and Implemented Messages, Information Elements and Constants

##### 1.2.1.1 Messages for mobility management (MM)

All the messages are implemented according to Table 9.2.1 and 10.2 of 24.008 (see [4]).

##### 1.2.1.2 Messages for circuit switched call control (CC)

All the messages are implemented according to Table 9.54 and 9.3 of 24.008 (see [4]).

##### 1.2.1.3 GPRS Mobility Management (GMM) Messages

All the messages are implemented according to Table 10.4 of 24.008 (see [4]).

##### 1.2.1.4 GPRS Session Management (SM) Messages

All the messages are implemented according to Table 10.4a of 24.008 (see [4]).

##### 1.2.1.5 Common Information Elements (CommonIE)

All the information elements implemented according to 10.5.1 of 24.008 (see [4]).

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#### 1.2.1.6 Radio Resource Management (RRM) messages

Some of the messages that are used are implemented according to table 9.1.1 of 44.018 (see [6]).

#### 1.2.1.7 Short Message Service (SMS) messages

All the CP-messages are implemented according to 7.2 of 24.011 (see [7]).

All the RP-messages are implemented according to 7.3 of 24.011 (see [7]).

All the TPDU-messages are implemented according to 9.2.2 of 23.040 (see [8]).

#### 1.2.1.8 Supplementary Service Management (SS) messages

All the SS-messages are implemented according to table 2.1 of 24.080 (see [9]).

#### 1.2.2 Ericsson-specific changes

None

#### 1.3 Backward incompatibilities

None

#### 1.4 System Requirements

Protocol modules are a set of TTCN-3 source code files that can be used as part of TTCN-3 test suites only. Hence, protocol modules alone do not put specific requirements on the system used. However, in order to compile and execute a TTCN-3 test suite using the set of protocol modules the following system requirements must be satisfied:

- Titan TTCN-3 Test Executor version CRL 113 200/5 R4A (5.4.pl0) or higher installed. For Installation Guide see [2]. Please note: This version of the test port is not compatible with Titan releases earlier than CRL 113 200/5 R4A.

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## 2 Usage

### 2.1 Installation

The set of protocol modules can be used in developing TTCN-3 test suites using any text editor; however, to make the work more efficient a TTCN-3-enabled text editor is recommended (for example `nedit`, `xemacs`). Since the MobileL3 protocol is used as a part of a TTCN-3 test suite, this requires TTCN-3 Test Executor be installed before the module can be compiled and executed together with other parts of the test suite. For more details on the installation of TTCN-3 Test Executor see the relevant section of [3].

### 2.2 Configuration

None.

### 2.3 Examples

None.

## 3 Interface description

### 3.1 Top Level PDU

The top level PDUs are the TTCN-3 records `PDU_L3_MS_SGSN`, `PDU_L3_SGSN_MS`, `PDU_ML3_NW_MS`, `PDU_ML3_MS_NW`.

### 3.2 Encoding/decoding and other related functions

This product also contains encoding/decoding functions, which assure correct RAW encoding of messages when sent from TITAN and correct RAW decoding of messages when received by TITAN.

#### 3.2.1 Implemented encoding and decoding functions

<u>Name</u>	<u>Type of formal parameters</u>	<u>Type of return value</u>
<code>enc_PDU_L3_MS_SGSN</code>	<code>PDU_L3_MS_SGSN</code>	<code>octetstring</code>
<code>enc_PDU_L3_MS_SGSN_fast</code>	<code>in PDU_L3_MS_SGSN,</code> <code>out octetstring</code>	
<code>dec_PDU_L3_MS_SGSN</code>	<code>octetstring</code>	<code>PDU_L3_MS_SGSN</code>
<code>dec_PDU_L3_MS_SGSN_backtrack</code>	<code>in octetstring,</code> <code>out PDU_L3_MS_SGSN</code>	<code>integer (0: success,</code> <code>1: decoding failed)</code>
<code>enc_PDU_L3_SGSN_MS</code>	<code>PDU_L3_SGSN_MS</code>	<code>octetstring</code>

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enc_PDU_L3_SGSN_MS_fast	in PDU_L3_SGSN_MS, out octetstring	
dec_PDU_L3_SGSN_MS	octetstring	PDU_L3_SGSN_MS
dec_PDU_L3_SGSN_MS_backtrack	in octetstring, out PDU_L3_SGSN_MS	integer (0: success, 1: decoding failed)
enc_PDU_ML3_NW_MS	PDU_ML3_NW_MS	octetstring
enc_PDU_ML3_NW_MS_fast	in PDU_ML3_NW_MS, out octetstring	
dec_PDU_ML3_NW_MS	octetstring	PDU_ML3_NW_MS
dec_PDU_ML3_NW_MS_backtrack	in octetstring, out PDU_ML3_NW_MS	integer (0: success, 1: decoding failed)
enc_PDU_ML3_MS_NW	PDU_ML3_MS_NW	octetstring
enc_PDU_ML3_MS_NW_fast	in PDU_ML3_MS_NW, out octetstring	
dec_PDU_ML3_MS_NW	octetstring	PDU_ML3_MS_NW
dec_PDU_ML3_MS_NW_backtrack	in octetstring, out PDU_ML3_MS_NW	integer (0: success, 1: decoding failed)
enc_SS_FacilityInformation	SS_FacilityInformation	octetstring
dec_SS_FacilityInformation	octetstring	SS_FacilityInformation
dec_SS_FacilityInformation	in octetstring, out SS_FacilityInformation	integer (0: success, 1: decoding failed)
enc_TPDU_RP_DATA_MS_SGSN_fast	in TPDU_RP_DATA_MS_SGSN out octetstring	
dec_TPDU_RP_DATA_MS_SGSN_backtrack	in octetstring out TPDU_RP_DATA_MS_SGSN	integer (0: success, 1: decoding failed)
enc_TPDU_RP_DATA_SGSN_MS_fast	in TPDU_RP_DATA_SGSN_MS out octetstring	
dec_TPDU_RP_DATA_SGSN_MS_backtrack	in octetstring out TPDU_RP_DATA_SGSN_MS	integer (0: success, 1: decoding failed)
enc_TPDU_RP_ACK_MS_SGSN_fast	in TPDU_RP_ACK_MS_SGSN out octetstring	
dec_TPDU_RP_ACK_MS_SGSN_backtrack	in octetstring out TPDU_RP_ACK_MS_SGSN	integer (0: success, 1: decoding failed)
enc_TPDU_RP_ACK_SGSN_MS_fast	in TPDU_RP_ACK_SGSN_MS out octetstring	
dec_TPDU_RP_ACK_SGSN_MS_backtrack	in octetstring out TPDU_RP_ACK_SGSN_MS	integer (0: success, 1: decoding failed)

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enc\_TPDU\_RP\_ERROR\_MS\_SGSN\_fast in TPDU\_RP\_ERROR\_MS\_SGSN  
out octetstring

dec\_TPDU\_RP\_ERROR\_MS\_SGSN\_backtrack  
in octetstring integer (0: success,  
out TPDU\_RP\_ERROR\_MS\_SGSN 1: decoding failed)

enc\_TPDU\_RP\_ERROR\_SGSN\_MS\_fast  
in TPDU\_RP\_ERROR\_SGSN\_MS  
out octetstring

dec\_TPDU\_RP\_ERROR\_SGSN\_MS\_backtrack  
in octetstring integer (0: success,  
out TPDU\_RP\_ERROR\_SGSN\_MS 1: decoding failed)

enc\_RPDU\_SGSN\_MS\_fast  
in RPDU\_SGSN\_MS  
out octetstring

dec\_RPDU\_SGSN\_MS\_backtrack  
in octetstring integer (0: success,  
out RPDU\_SGSN\_MS 1: decoding failed)

enc\_RPDU\_MS\_SGSN\_fast  
in RPDU\_MS\_SGSN  
out octetstring

dec\_RPDU\_MS\_SGSN\_backtrack  
in octetstring integer (0: success,  
out RPDU\_MS\_SGSN 1: decoding failed)

## 4 Terminology

### 4.1 Abbreviations

3GPP	3 <sup>rd</sup> Generation Partnership Project
GMM	GPRS Mobility Management
GPRS	General Packet Radio Service
IE	Information Element
L3	Layer 3
PDU	Protocol Data Unit
SM	Session Management
TTCN-3	Testing and Test Control Notation version 3
MM	Mobility Management
CC	Circuit Switched Call Control
RRM	Radio Resource Management
SMS	Short Message Service

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SS                      Supplementary Service Management

## 4.2                      Terminology

TITAN                TTCN-3 Test Executor (see [3]).

## 5                        References

- [1]        ETSI ES 201 873-1 v4.5.1 (2013-04)  
The Testing and Test Control Notation version 3. Part 1: Core Language
- [2]        1/ 198 17-CRL 113 200/5 Uen  
User Guide for TITAN TTCN-3 Test Executor
- [3]        2/198 17-CRL 113 200/5 Uen  
Programmer's Technical Reference for Titan TTCN-3 Test Executor
- [4]        3GPP TS 24.008 V13.4.0 (2015-12),  
3<sup>rd</sup> Generation Partnership Project; Technical Specification Group  
Core Network and Terminals; Mobile radio interface Layer 3  
specification; Core network protocols; Stage 3 (Release 13)
- [5]        109 21-CNL 113 832-1 Uen  
MobileL3 (v13.4.0) Protocol Modules for TTCN-3 Toolset with TITAN,  
Product Revision Information
- [6]        3GPP TS 44.018 V13.0.0 (2015-12),  
3<sup>rd</sup> Generation Partnership Project; Technical Specification Group  
GSM/EDGE Radio Access Network; Mobile radio interface Layer 3  
specification; Radio Resource Control (RRC) protocol; (Release 13)
- [7]        3GPP TS 24.011 V13.0.0 (2015-12),  
3<sup>rd</sup> Generation Partnership Project; Technical Specification Group  
Core Network and Terminals; Point-to-Point (PP) Short Message  
Service (SMS) support on mobile radio interface (Release 13)
- [8]        3GPP TS 23.040 V13.0.0 (2015-12),  
3<sup>rd</sup> Generation Partnership Project; Technical Specification Group  
Core Network and Terminals; Technical Realization of the Short  
Message Service (SMS) (Release 13)
- [9]        3GPP TS 24.080 V13.0.0 (2015-12),  
3<sup>rd</sup> Generation Partnership Project; Technical Specification Group  
Core Network and Terminals; Mobile radio interface layer 3  
supplementary services platform; Formats and coding (Release 13)

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**6            Change Information**

**6.1        R1A**

Initial implementation