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].

Contents

[1 Functionality 2](#_Toc446060167)

[1.1 Implemented protocols 2](#_Toc446060168)

[1.2 Modifications/deviations related to the protocol specification 2](#_Toc446060169)

[1.2.1 Unimplemented and Implemented Messages, Information Elements and Constants 2](#_Toc446060170)

[1.2.2 Ericsson-specific changes 3](#_Toc446060171)

[1.3 Backward incompatibilities 3](#_Toc446060172)

[1.4 System Requirements 3](#_Toc446060173)

[2 Usage 4](#_Toc446060174)

[2.1 Installation 4](#_Toc446060175)

[2.2 Configuration 4](#_Toc446060176)

[2.3 Examples 4](#_Toc446060177)

[3 Interface description 4](#_Toc446060178)

[3.1 Top Level PDU 4](#_Toc446060179)

[3.2 Encoding/decoding and other related functions 4](#_Toc446060180)

[3.2.1 Implemented encoding and decoding functions 4](#_Toc446060181)

[4 Terminology 6](#_Toc446060182)

[4.1 Abbreviations 6](#_Toc446060183)

[4.2 Terminology 7](#_Toc446060184)

[5 References 7](#_Toc446060185)

[6 Change Information 8](#_Toc446060186)

[6.1 R1A 8](#_Toc446060187)

# 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.

## 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.

## Modifications/deviations related to the protocol specification

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

#### Messages for mobility management (MM)

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

#### 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]).

#### GPRS Mobility Management (GMM) Messages

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

#### GPRS Session Management (SM) Messages

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

#### Common Information Elements (CommonIE)

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

#### 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]).

#### 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]).

#### Supplementary Service Management (SS) messages

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

### Ericsson-specific changes

None

## Backward incompatibilities

None

## 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.

# Usage

## 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].

## Configuration

None.

## Examples

None.

# Interface description

## 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.

## 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.

### Implemented encoding and decoding functions

Name Type of formal parameters Type of return value

enc\_PDU\_L3\_MS\_SGSN PDU\_L3\_MS\_SGSN octetstring

enc\_PDU\_L3\_MS\_SGSN\_fast in PDU\_L3\_MS\_SGSN,  
 out octetstring

dec\_PDU\_L3\_MS\_SGSN octetstring PDU\_L3\_MS\_SGSN

dec\_PDU\_L3\_MS\_SGSN\_backtrack in octetstring, integer (0: success,  
 out PDU\_L3\_MS\_SGSN 1: decoding failed)

enc\_PDU\_L3\_SGSN\_MS PDU\_L3\_SGSN\_MS octetstring

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, integer (0: success,  
 out PDU\_L3\_SGSN\_MS 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, integer (0: success,  
 out PDU\_ML3\_NW\_MS 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, integer (0: success,  
 out PDU\_ML3\_MS\_NW 1: decoding failed)

enc\_SS\_FacilityInformation SS\_FacilityInformation octetstring

dec\_SS\_FacilityInformation octetstring SS\_FacilityInformation

dec\_SS\_FacilityInformation in octetstring, integer (0: success,  
 out SS\_FacilityInformation 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 integer (0: success,  
 out TPDU\_RP\_DATA\_MS\_SGSN 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 integer (0: success,  
 out TPDU\_RP\_DATA\_SGSN\_MS 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 integer (0: success,  
 out TPDU\_RP\_ACK\_MS\_SGSN 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 integer (0: success,  
 out TPDU\_RP\_ACK\_SGSN\_MS 1: decoding failed)

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)

# Terminology

## Abbreviations

3GPP 3rd 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

SS Supplementary Service Management

## Terminology

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

# 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),  
    3rd 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),   
   3rd 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),   
   3rd 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),   
   3rd 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),   
   3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Mobile radio interface layer 3 supplementary services platform; Formats and coding (Release 13)

# Change Information

## R1A

Initial implementation