

SS7 MTP-L3 and M3UA IETF ANSI T1.111-2001

Statement of Compliance

STATEMENT OF COMPLIANCE

Copyright

© Ericsson AB 2008, 2011, 2015. All rights reserved. No part of this document may be reproduced in any form without the written permission of the copyright owner.

Disclaimer

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document.



Contents

1	General	1
1.1	Introduction	1
1.2	Concept	1
2	Compliance List	3
2.1	ANSI T1.111.4	3
2.2	ANSI T1.111.5	13
3	Notes and Comments	15
	Glossary	19
	Reference List	21





1 General

1.1 Introduction

This document describes to what extent the Ericsson SS7 MTPL3& M3UA IETF signaling component conforms with the standards [ANSI-1].

1.2 Concept

There are three columns marked "C", "N" and "P" in the compliance list. An "X" for a referred chapter in each respective column means the following:

- | | |
|----------|--|
| C | The Ericsson signaling component complies with the specified section in the standard. A dash ("-") in this column means that there is nothing to implement in the referred section |
| N | The Ericsson signaling component does not comply with the specified section in the standard. |
| P | The Ericsson signaling component complies partly with the specified section in the standard. |





2 Compliance List

2.1 ANSI T1.111.4

Table 1

References	C	N	P	Comments
1 Scope, Purpose and Application	-			
1.1 General Characteristics of the Signaling Network Functions	-			
1.1.1	-			
1.1.2	-			
1.1.2A	-			
1.2 Signaling Message Handling	-			
1.2.1	X			
1.2.2	X			
1.2.3	X			
1.3 Signaling Network Management			X	Note 1 on Page 15, Note 2 on Page 15
2 Signaling Message Handling	-			
2.1 General	X			
2.2 Routing Label	X			
2.3 Message Routing Function	X			
2.3A Handling of Messages under Signaling Point or Signaling Transfer Point Congestion			X	Note 4 on Page 15, Note 6 on Page 15, Note 20 on Page 16
2.4 Message Discrimination and Distribution Functions	-			
2.4.1			X	Note 23 on Page 17
2.4.2	X			
2.4.3	X			
2.4.3A	X			
2.4.4		X		
3 Signaling Network Management	-			
3.1 General			X	Note 1 on Page 15
3.2 Status of Signaling Links	X			



Table 1

3.3 Procedures Used in Connection with Link Status Changes	-			
3.3.1 Signaling Link Failed	-			
3.3.1.1 Signaling Traffic Management	X			
3.3.1.2 Signaling Link Management	X			
3.3.1.3 Signaling Route Management	X			
3.3.2 Signaling Link Restored	-			
3.3.2.1 Signaling Traffic Management	X			
3.3.2.2 Signaling Link Management	X			
3.3.2.3 Signaling Route Management			X	Note 4 on Page 15
3.3.3 Signaling Link Deactivated	-			
3.3.3.1 Signaling Traffic Management	X			
3.3.3.2 Signaling Link Management	X			
3.3.3.3 Signaling Route Management	X			
3.3.4 Signaling Link Activated	-			
3.3.4.1 Signaling Traffic Management	X			
3.3.4.2 Signaling Link Management	X			
3.3.4.3 Signaling Route Management			X	Note 4 on Page 15
3.3.5 Signaling Link Blocked	-			
3.3.5.1 Signaling Traffic Management	X			
3.3.5.2 Signaling Route Management			X	Note 4 on Page 15
3.3.6 Signaling Link Unblocked	-			
3.3.6.1 Signaling Traffic Management	X			
3.3.6.2 Signaling Route Management			X	Note 4 on Page 15
3.3.7 Signaling Link Inhibited	-			



Table 1

3.3.7.1 Signaling Traffic Management	X			
3.3.7.2 Signaling Link Management	X			
3.3.8 Signaling Link Uninhibited	-			
3.3.8.1 Signaling Traffic Management	X			
3.3.8.2 Signaling Link Management	X			
3.3.8.3 Signaling Route Management			X	Note 4 on Page 15
3.4 Status of Signaling Routes	X			
3.5 Procedures Used in Connection with Route Status Changes	X			
3.6 Status of Signaling Points	X			
3.7 Procedures Used in Connection with Point Status Changes	-			
3.8 Signaling Network Congested	-			
3.8.1 General	X			
3.8.2 Congestion Status of Signaling Links			X	Note 5 on Page 15
3.8.3 Procedures Used in Connection with Link Congestion Status Changes	X			
3.8.4 Congestion Status of Signaling Route Sets	X			
3.8.5 Procedures Used in Connection with Route Set Congestion Status Changes	X			
3.8.6 Signaling Point/Signaling Transfer Point Message Handling Congestion			X	Note 4 on Page 15
3.9 Status of Local SCCP for Alias Point Code Routing		X		
3.A Procedures Used in Connection with Local SCCP Status Changes	X			
4 Signaling Traffic Management	-			
4.1 General	-			
4.2 Normal Routing Situation	X			
4.3 Signaling Link Unavailability	X			



Table 1

4.4 Signaling Link Availability	-			
4.4.1 No heading	X			
4.4.2 No heading			X	Note 20 on Page 16
4.4.3 No heading	X			
4.5 Signaling Route Unavailability	X			
4.6 Signaling Route Availability	X			
4.7 Signaling Route Restriction	X			
4.8 Signaling Point Availability	X			
5 Changeover	-			
5.1 General	X			
5.2 Network Configurations for Changeover	X			
5.3 Changeover Initiation and Actions	X			
5.4 Buffer Updating Procedure	X			
5.5 Retrieval and Diversion of Traffic	X			
5.6 Emergency Changeover Procedures	X			
5.7 Procedures in Abnormal Conditions	X			
6 Changeback	-			
6.1 General	-			
6.1.1	X			
6.1.2	X			
6.2 Changeback Initiation and Actions	-			
6.2.1	X			
6.2.2	X			
6.2.3			X	Note 4 on Page 15
6.2.4	X			
6.2.5	X			
6.3 Sequence Control Procedure	X			
6.4 Time-Controlled Diversion Procedure	X			



Table 1

6.5 Procedures in Abnormal Conditions	X			
7 Forced Rerouting	X			
8 Controlled Rerouting	X			
9 MTP Restart	X			
10 Management Inhibiting	X			
11 Signaling Traffic Flow Control	-			
11.1 General	X			
11.2 Flow Control Indications	X			
11.2.1	X			
11.2.2	X			
11.2.3 Signaling Route Set Congestion (International Signaling Network)	X			
11.2.4 Signaling Route Set Congestion (National Option with Congestion Priorities)	X			
11.2.5 Signaling Route Set Congestion (National Option without Congestion Priorities)	-			
11.2.6 Signaling Point/Signaling Transfer Point Congestion			X	Note 4 on Page 15
11.2.7 MTP User Flow Control	-			
11.2.7.1	X			
11.2.7.2	X			
11.2.7.3	X			
11.2.7.4	X			
11.2.7.5	X			
11.2.7.6	X			
11.2.7.7	X			
12 Signaling Link Management	-			
12.1 General	-			
12.2 Basic Signaling Link Management Procedures	-			
12.2.1 Signaling Link Activation	X			
12.2.2 Signaling Link Restoration	X			



Table 1

12.2.3 Signaling Link Deactivation	X			
12.2.4 Link Set Activation	-			
12.2.4.1 Link Set Normal Activation	X			
12.2.4.2 Link Set Emergency Restart			X	Note 22 on Page 17
12.2.4.3 Time-out Values	X			
12.3 Signaling Link Management Procedures Based on Automatic Allocation of Signaling Terminals		X		Note 1 on Page 15
12.4 Signaling Link Management Procedures Based on Automatic Allocation of Signaling Data Links and Signaling Terminals		X		Note 1 on Page 15
12.5 Automatic Allocation of Signaling Terminals		X		
12.6 Automatic Allocation of Signaling Data Links		X		
12.7 Different Signaling Link Management Procedures at the Two Ends of a Link Set	X			
13 Signaling Route Management	-			
13.1 General	-			
13.2 Transfer Prohibited			X	Note 6 on Page 15
13.2.1	X			
13.2.2			X	Note 12 on Page 16
13.2.2A		X		Note 12 on Page 16, Note 16 on Page 16
13.2.3	X			
13.2.4	X			
13.3 Transfer-Allowed	-			
13.3.1	X			
13.3.2			X	Note 13 on Page 16
13.3.2A		X		Note 6 on Page 15
13.3.3	X			
13.3.4	X			
13.4 Transfer-Restricted	-			



Table 1

13.4.1			X	Note 4 on Page 15, Note 6 on Page 15
13.4.2			X	Note 4 on Page 15, Note 6 on Page 15
13.4.2A		X		Note 6 on Page 15
13.4.3			X	Note 4 on Page 15, Note 6 on Page 15
13.4.4			X	Note 4 on Page 15, Note 6 on Page 15
13.4.5			X	Note 4 on Page 15, Note 6 on Page 15
13.4.5A		X		Note 6 on Page 15
13.5 Signaling-Route-Set-Test	-			
13.5.1			X	Note 19 on Page 16
13.5.2	X			
13.5.2A		X		Note 6 on Page 15
13.5.3	X			
13.5.4	X			
13.5.4A		X		Note 6 on Page 15
13.5.5	X			
13.6 Transfer-Controlled (International Network)	X			
13.7 Transfer-Controlled (U.S. Networks)	-			
13.7.1	X			
13.7.2			X	Note 20 on Page 16
13.7.3	X			
13.7.4	X			
13.7.5	X			
13.7.6	X			
13.7.7	-			
13.7.8	-			
13.8 Transfer-Controlled (National Option with Congestion Priorities)	-			
13.9 Signaling-Route-Set-Congestion-Test	X			

Table 1

14 Common Characteristics of MTP Level 3 Message Formats	-			
14.1 General	X			
14.2 Service Information Octet	-			
14.2.1 Service Indicator	X			
14.2.2 Subservice Field			X	Note 3 on Page 15
14.3 Label	X			
15 Format and Codes of Signaling Network Management Messages	-			
15.1 General	-			
15.1.1	X			
15.1.2	X			
15.1.2A	X			
15.2 Label	X			
15.3 Heading Code (H0)	X			
15.4 Changeover Messages	-			
15.4.1	X			
15.4.2	X			
15.4.3	X			
15.5 Changeback Messages	-			
15.5.1	X			
15.5.2	X			
15.5.3	X			
15.5.4	X			
15.6 Emergency Changeover Message	-			
15.6.1	X			
15.6.2	X			
15.6.3	X			
15.7 Transfer-Prohibited Message	-			
15.7.1	X			
15.7.2	X			
15.7.3			X	Note 6 on Page 15
15.7.4			X	Note 6 on Page 15



Table 1

15.8 Transfer-Allowed Message	-			
15.8.1	X			
15.8.2	X			
15.8.3			X	Note 6 on Page 15
15.8.4			X	Note 6 on Page 15
15.9 Transfer-Restricted Message	-			
15.9.1	X			
15.9.2	X			
15.9.3			X	Note 6 on Page 15
15.9.4			X	Note 6 on Page 15
15.10 Signaling-Route-Set-Test Message	-			
15.10.1	X			
15.10.2	X			
15.10.3			X	Note 6 on Page 15
15.10.4			X	Note 6 on Page 15
15.11 Management Inhibit Message	X			
15.12 Signaling-Data-Link-Connection-Order Message		X		
15.13 Signaling-Data-Link-Connection-Acknowledgement Message		X		
15.14 Transfer-Controlled Message	X			
15.15 Signaling-Route-Set-Congestion-Test Message	X			
15.16 Traffic Restart Message	X			
15.17 User Part Unavailable Message	-			
15.17.1	X			
15.17.2	X			
15.17.3	X			
15.17.4	X			
15.17.5	X			
15.18 Abbreviations Used in Table 1/T1.111.4	-			
16 State Transition Diagrams	-			

*Table 1*

16.1 General	-			
16.2 Drafting Conventions	-			
16.3 Signaling Message Handling	-			
16.4 Signaling Traffic Management	-			
16.5 Signaling Link Management	-			
16.6 Signaling Route Management	-			
16.7 Abbreviations and Timers used in Figures 23 to 46C/T1.111.4		X		Note 7 on Page 15



2.2 ANSI T1.111.5

Table 2

References	C	N	P	Comments
1. Scope, Purpose and Application	-			
2. Network Components	X			
3. Structural Independence of International and National Signaling Networks	X			
4. Consideration Common to Both International and National Signaling Networks	-			
4.1 Availability of the Network	X			
4.2 Message Transfer Delay	X			
4.3 Message Sequence Control	X			
4.4 Number of Signaling Links used in Load Sharing	X			
4.5 Satellite Working	X			
5. International Signaling Network	-			
6. Signaling Network for Cross-Border Traffic	-			
6A. Signaling Network for Inter-Network Traffic			X	Note 8 on Page 15
7. National Signaling Networks	-			
7.1 General	X			
7.2 Network Structure	-			
7.2.1 One Level Hierarchy	X			
7.2.2 Two Level Hierarchy	X			
7.2.3 Clustering		X		
7.2.4 Signaling Point Access	X			
7.3 Routing	-			
7.3.1 Routing in the Absence of Failures	-			
7.3.1.1 Load Sharing			X	Note 9 on Page 15, Note 10 on Page 16
7.3.1.2 Normal Routing	X			
7.3.2 Routing under Failure Conditions.	-			



Table 2

7.3.2.1 Alternative Routing of Traffic from Failed Link			X	Note 9 on Page 15
7.3.2.2 Alternative Routing of Traffic from Failed Linkset			X	Note 11 on Page 16
7.4 Address Structure			X	Note 14 on Page 16
8. Procedures to Prevent Unauthorized Use of an STP	-			
8.1 General	-			
8.2 Identifying Unauthorized SS7 Messages			X	Note 15 on Page 16
8.3 Treatment of Unauthorized SS7 Messages			X	Note 16 on Page 16
8.4 Measurements			X	Note 17 on Page 16
8. 5 Notification to Unauthorized User			X	Note 18 on Page 16



3 Notes and Comments

- Note 1** Automatic allocation or reconfiguration of signaling equipment is not supported.
- Note 2** See the notes for the individual signaling network management messages (section 15).
- Note 3** Standard compliant behavior is a configurable option. It is possible always to send the priority bits transparently to/from the User Part or to set to 00 if the node belongs to International network.
- Note 4** Since version CAA9011817R2Z module can be configured to have the ability of TFR sending or not (for configuration options see parameter "Route restriction handling" in Reference [2]). Response method in TFR sending is not supported, only Broadcast method is used. In older versions module never initiates sending of TFR. Handling of incoming TFR is configurable. An incoming TFR may lead to TFRs being broadcasted.
- Note 5** When timer T31 expires (false link congestion), the link is considered as uncongested. According to 3.8.2.2 "an audit should trigger the link to be restarted".
- Note 6** Cluster messages are partly supported:
- SS7SEP:**
- TCA and TCP reception supported. Never generated.
- TCR messages are received, but silently discarded. Never generated.
- STP:**
- Not supported. Will result in error log.
- Note 7** Timers T7, T11, T19 and T24 are not used.
- Note 8** A signaling point is able to both be involved in signaling of national and international traffic. However, a signaling point is not able to relay traffic between a national and an international network.
- Note 9** Load sharing of messages is done using 8-bit SLS codes and 5-bit rotation.

- Note 10** Usage of the least significant bit of the SLS field for Link Set selection ("Modified SLS Rotation"), is configurable as ON or OFF see [General-1].
- "Modified SLS Rotation" is implemented as described in chapter 7.3.1.1 [ANSI-1], and is only in use for SS7SEP:s with two routes, if all links in a combined link set are carrying traffic.
- Note 11** When a link set failure is detected, traffic is immediately diverted from the failed route, that is timer T11 is not used (see also Note 7 on Page 15).
- Note 12** TFPs are always broadcasted.
- Note 13** Broadcast of TFA to adjacent signaling points as a configurable option, is not supported.
- Note 14** 24-bit SPCs are supported, but not clustering (see also Note 6 on Page 15).
- Note 15** Only inhibition of messages is supported, and then only according to point 3, that is inhibit STP access by examination of OPC and DPC combination in the incoming STP message.
- Note 16** An STP is only able to discard unauthorized SS7 messages on a SPC basis, not on a per linkset basis. Furthermore, STPs only permit discard of all unauthorized SS7 messages or all STP messages outside designated ranges.
- Note 17** Only monitoring of unauthorized messages on SPC basis is supported (see Note 16 on Page 16).
- Note 18** Restriction of the number of violation reports is not supported.
- Note 19** Signaling-route-set-test can not be deactivated on a particular point code. It is, however, possible to set the priority of the RST/RSR-messages.
- Note 20** Although multiple signaling links are unavailable within a link set, a newly available link will only receive its normal traffic load. The load may therefore be spread unevenly during link recovery.
- Note 21** Congestion status is handled on route set level. Node internal congestion handling is not supported.

**Note 22**

The following emergency restart situations are supported:

- the local signaling point is performing MTP Restart.
- when it is not possible to communicate with the signaling point at the remote end of the link set.

Link Set Emergency restart is supported as a management command.

Note 23

Circular Route Detection Test procedure is not supported. An STP does not analyse if the OPC of a message is equal to its own point code, nor are messages over C links with OPC equal to adjacent STP rejected.





Glossary

ANSI

American National Standards Institute

DPC

Destination Point Code

IETF

Internet Engineering Task Force

MTP

Message Transfer Part

MTP-L3

Message Transfer Part Level 3

M3UA

MTP-L3 User Adaptation layer

OPC

Originating Point Code

RSR

Route-Set Test for Restricted destination

RST

Route-Set Test

SCCP

Signaling Connection Control Part

SLS

Signaling Link Selection

SS7

Signaling System Number 7

SS7 SEP

SS7 Signaling End Point

SPC

Signaling Point Code

STP

Signaling Transfer Point

TCA

Transfer-Cluster-Allowed signal

TCP

Transfer-Cluster-Prohibited signal

TCR

Transfer-Cluster-Restricted signal

TFA

Transfer Allowed

TFP

Transfer Prohibited

TFR

Transfer Restricted





Reference List

ANSI standards

- [1] *American National Standard for Telecommunications, Specification of Signaling System No. 7 (SS7) - Message Transfer Part (MTP), ANSI T1.111 - 2001*

Ericsson AB

- [2] *Configuration File Description for MTPL3 & M3UA IETF, 19073-CAA 901 1817 Uen*