

SS7 MTP-L3 and M3UA IETF ANSI 1996

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	10
2.3	ANSI T1.115	12
3	Notes and Comments	17
	Glossary	21
	Reference List	23





1 GENERAL

1.1 Introduction

This document describes to what extent the Ericsson SS7 MTPL3& M3UA IETF signaling component conforms with the standards Reference [1] and Reference [2].

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 17, Note 2 on Page 17
2 Signaling Message Handling	X			
3 Signaling Network Management	-			
3.1 General			X	Note 1 on Page 17
3.2 Status of Signaling Links	X			
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 17
3.3.3 Signaling Link Deactivated	-			
3.3.3.1 Signaling Traffic Management	X			
3.3.3.2 Signaling Link Management	X			



Table 1

References	C	N	P	Comments
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 17
3.3.5 Signaling Link Blocked	-			
3.3.5.1 Signaling Traffic Management				
3.3.5.2 Signaling Route Management			X	Note 4 on Page 17
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 17
3.3.7 Signaling Link Inhibited	-			
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 17
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			X	Note 5 on Page 17
3.A Status of Local SCCP for Alias Point Code Routing		X		
3.B Procedures Used in Connection with Local SCCP Status Changes	X			
4 Signaling Traffic Management	-			
4.1 General	-			
4.2 Normal Routing Situation	X			Note 26 on Page 19
4.3 Signaling Link Unavailability	X			



Table 1

References	C	N	P	Comments
4.4 Signaling Link Availability	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 17
6.2.4	X			
6.2.5	X			
6.3 Sequence Control Procedure	X			
6.4 Time-Controlled Diversion Procedure	X			
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	-			



Table 1

References	C	N	P	Comments
11.1 General	X			
11.2 Flow Control Indications	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			
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			
11.2.7.8			X	Note 34 on Page 20
12 Signaling Link Management	-			
12.1 General	-			Note 1 on Page 17
12.2 Basic Signaling Link Management Procedures	X			
12.3 Signaling Link Management Procedures Based on Automatic Allocation of Signaling Terminals		X		Note 1 on Page 17
12.4 Signaling Link Management Procedures Based on Automatic Allocation of Signaling Data Links and Signaling Terminals		X		Note 1 on Page 17
12.5 Automatic Allocation of Signaling Terminals		X		
12.6 Automatic Allocation of Signaling Data Links		X		



Table 1

References	C	N	P	Comments
12.7 Different Signaling Link Management Procedures at the Two Ends of a Link Set	X			
13 Signaling Route Management	-			
13.1 General	X			
13.2 Transfer Prohibited			X	Note 6 on Page 17
13.2.1	X			
13.2.2	X			
		X		Note 6 on Page 17
13.2.3	X			
13.2.4	X			
13.3 Transfer-Allowed	-			
13.3.1	X			
13.3.2	X			
13.3.2A		X		Note 6 on Page 17
13.3.3	X			
13.3.4	X			
13.4 Transfer-Restricted	-			
13.4.1			X	Note 4 on Page 17, Note 6 on Page 17
13.4.2			X	Note 4 on Page 17, Note 6 on Page 17
13.4.2A		X		Note 6 on Page 17
13.4.3				Note 4 on Page 17, Note 6 on Page 17
13.4.4			X	Note 4 on Page 17, Note 6 on Page 17
13.4.5			X	Note 4 on Page 17, Note 6 on Page 17
13.4.5A		X		Note 6 on Page 17
13.5 Signaling-Route-Set-Test	-			
13.5.1	X			
13.5.2	X			
13.5.2A		X		Note 6 on Page 17
13.5.3	X			



Table 1

References	C	N	P	Comments
13.5.4	X			
13.5.4A		X		Note 6 on Page 17
13.5.5	X			
13.6 Transfer-Controlled (International Network)	X			
13.7 Transfer-Controlled (U.S. Networks)	X			
13.8 Transfer-Controlled (National Option with Congestion Priorities)	-			
13.9 Signaling-Route-Set-Congestion-Test	X			
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 17
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			



Table 1

References	C	N	P	Comments
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 17
15.7.4			X	Note 6 on Page 17
15.8 Transfer-Allowed Message	-			
15.8.1	X			
15.8.2	X			
15.8.3			X	Note 6 on Page 17
15.8.4			X	Note 6 on Page 17
15.9 Transfer-Restricted Message	-			
15.9.1	X			
15.9.2	X			
15.9.3			X	Note 6 on Page 17
15.9.4			X	Note 6 on Page 17
15.10 Signaling-Route-Set-Test Message	-			
15.10.1	X			
15.10.2	X			
15.10.3			X	Note 6 on Page 17
15.10.4			X	Note 6 on Page 17
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			



Table 1

References	C	N	P	Comments
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	Note 15 on Page 18
15.18 Abbreviations Used in Table 1/T1.111.4	-			
16 State Transition Diagrams	-			
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 17 on Page 18

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			



Table 2

References	C	N	P	Comments
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 25 on Page 19
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 26 on Page 19, Note 27 on Page 19
7.3.1.2 Normal Routing	X			
7.3.2 Routing under Failure Conditions.	-			
7.3.2.1 Alternative Routing of Traffic from Failed Links			X	Note 26 on Page 19
7.3.2.2 Alternative Routing of Traffic from Failed Linkset			X	Note 28 on Page 19
7.4 Address Structure			X	Note 29 on Page 19
8. Procedures to Prevent Unauthorized Use of an STP	-			
8.1 General	-			
8.2 Identifying Unauthorized SS7 Messages			X	Note 30 on Page 19
8.3 Treatment of Unauthorized SS7 Messages			X	Note 31 on Page 19
8.4 Measurements			X	Note 32 on Page 20
8.5 Notification to Unauthorized User			X	Note 33 on Page 20



2.3 ANSI T1.115

Table 3

References	C	N	P	Comments
1 Scope, Purpose and Application	-			
1.1 Introduction	X			
1.2 Local and Global View	-			
1.3 Grouping of Measurements	-			
1.3.1	-			
1.3.2	-			
1.4 Guidelines for Uses of Measurements	-			
2 Definition of Terms	-			
2.1 Operation	-			
2.1.1	-			
2.1.2	-			
2.1.3	-			
2.2 Maintenance	-			
2.3 Administration	-			
2.3.1	-			
2.3.2	-			
3 Listing of Measurements	-			
3.1 General			X	Note 8 on Page 17, Note 9 on Page 17
3.2 Table 1/T1.115 MTP Signaling Link Performance	-			
3.2.1	X			Note 10 on Page 17
3.2.2			X	Note 11 on Page 17
3.2.3		X		Note 12 on Page 18
3.3 Table 2/T1.115 MTP Signaling Link Availability	-			
3.3.1	-			
3.3.2	-			
3.3.3			X	Note 11 on Page 17
3.3.4			X	Note 11 on Page 17
3.3.5	X			



Table 3

References	C	N	P	Comments
3.4 Table 3/T1.115 MTP Signaling Link Utilization	-			
3.4.1	-			
3.4.2	-			
3.4.3		X		
3.4.4	X			Note 16 on Page 18
3.4.5	X			
3.4.6	X			
3.4.7		X		
3.4.8		X		
3.4.9		X		
3.5 Table 4/T1.115 MTP Signaling Link Set and Route Set Availability	-			
3.5.1			X	Note 16 on Page 18
3.5.2	-			
3.6 Table 5/T1.115 MTP Signaling Point Status	-			
3.7 Table 6/T1.115 MTP Signaling Traffic Distribution (Signaling Route Utilization)	-			
3.7.1			X	Note 17 on Page 18
3.7.2	-			
3.8 Table 7/T1.115 SCCP Performance	-			
3.9 Table 8/T1.115 SCCP Subsystem Availability	-			
3.10 Table 9/T1.115 SCCP Utilization	-			
3.11 Table 10/T1.115 ISDN User Part Availability	-			
3.12 Table 11/T1.115 ISDN User Part Utilization	-			
3.13 Table 12/T1.115 ISDN User Part Performance / Stability	-			
3.14 Table 13/T1.115 ISDN User Part Circuit Availability	-			
3.15 Table 14/T1.115 ISDN User Part Connection Performance	-			



Table 3

References	C	N	P	Comments
3.16 Table 15/T1.115 TCAP Availability	-			
3.17 Table 16/T1.115 TCAP Utilization	-			
3.18 Table 17/T1.115 TCAP Performance	-			
4 Operations and Maintenance Part Support	-			
5 Uses of Measurements	-			
5.1 Introduction	X			
5.2 Operational Uses	-			
5.2.1 Message Transfer Part (MTP)	-			
5.2.1.1 Surveillance of Network Status			X	Note 18 on Page 18
5.2.1.2 Monitoring of Link and Network Traffic Performance			X	Note 19 on Page 18
5.2.2 Signaling Connection Control Part (SCCP)	-			
5.2.2.1 SCCP Routing Performance	-			
5.2.2.2 SCCP Availability	-			
5.2.3 Integrated Services Digital Network User Part - (ISDN-UP)	-			
5.2.3.1 ISDN-UP Performance	-			
5.2.3.2 ISDN-UP Availability	-			
5.2.4 Transaction Capabilities Application Part (TCAP)	-			
5.2.4.1 TCAP Availability	-			
5.2.4.2 TCAP Utilization	-			
5.3 Maintenance Uses	-			
5.3.1 Introduction	-			
5.3.2 Message Transfer Part (MTP)	-			
5.3.2.1 Detection of Increases in Link SU Error Rates			X	Note 20 on Page 18
5.3.2.2 Detection of Marginal Links Performance			X	Note 21 on Page 18
5.3.2.3 Detection of Link Failure Events in Either Performance			X	Note 22 on Page 19
5.3.2.4 Detection of Routing and Distribution Table Errors			X	Note 23 on Page 19



Table 3

References	C	N	P	Comments
5.3.2.5 Component Reliability and Maintainability Studies			X	Note 24 on Page 19
5.3.3 Signaling Connection Control Part (SCCP)	-			
5.3.3.1 SCCP Routing Performance	-			
5.3.3.2 SCCP Availability	-			
5.3.4 Integrated Services Digital Network User Part - (ISDN-UP)	-			
5.3.4.1 ISDN-UP Stability	-			
5.3.4.2 ISDN-UP Connection Performance	-			
5.3.4.3 ISDN-UP Circuit Performance	-			
5.3.5 Transaction Capabilities Application Part (TCAP)	-			
5.3.5.1 TCAP Availability	-			
5.3.5.2 TCAP Protocol Errors	-			
5.4 Administrative Uses	-			
5.4.1 Message Transfer Part (MTP)	-			
5.4.1.1 Monitoring of Link and Signaling Point Utilization			X	Note 14 on Page 18
5.4.2 Signaling Connection Control Part (SCCP)	-			
5.4.2.1 SCCP Utilization	-			
5.4.2.2 SCCP Routing Performance	-			
5.4.3 Integrated Services Digital Network User Part - (ISDN-UP)	-			
5.4.3.1 ISDN-UP Performance	-			
5.4.3.2 ISDN-UP Stability	-			
5.4.3.3 ISDN-UP Circuit Performance	-			
5.4.4 Transaction Capabilities Application Part (TCAP)	-			
5.4.4.1 TCAP Availability	-			
5.4.4.2 TCAP Utilization	-			
5.4.4.3 TCAP Protocol Errors	-			
5.5 Preparation of Traffic Forecasts	-			



Table 3

References	C	N	P	Comments
5.6 Network Planning	-			
5.7 Evaluation of Maintenance Force Effectiveness	-			
6 Referenced Standards	-			
6.1 Referenced American National Standards	X			
6.2 Other Referenced Standards	X			



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 [4]). Response method in TFR sending is not supported, only Broadcast method is used. In older versions module never initiates sending of TFR, however, an incoming TFR may lead to TFRs being broadcasted.
- Note 5** When timer T31 expires (false link congestion) an alarm is generated and the link is considered as not congested. 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 errolog.
- Note 7** Timers T7; T11; T15; T16; T19 and T24 are not used.
- Note 8** Every fault is only reported on occurrence.
- Note 9** Does not support time stamps for events that are reported on occurrence.
- Note 10** SL failure causes are optional in the standard and not implemented in the module.

Note 11	This module provides the necessary statistics/alarms to generate these measures but does not compute them directly.
Note 12	To be measured/monitored by MTP L2.
Note 13	The total number of TFA, TFP is measured.
Note 14	This module provides basic statistics/alarms to monitor network utilisation but it does not actively manage the system utilisation.
Note 15	Supports the unavailability cause "Unknown" but none of the other causes.
Note 16	The total number of octets are measured, however, not on a point code basis.
Note 17	Only items 6.1 and 6.2 are implemented.
Note 18	<ul style="list-style-type: none">- Items 1.10, 1.11, 4.3, 4.4, 5.3, 5.4 are implemented.- Items 2.10, 2.11, 3.6, and 3.9 are implemented as totals, not on a per-link basis.- Item 3.11 is partially implemented. Number of congestion events are counted, but no differentiation between threshold levels is performed.- Items 4.5 and 4.6 are partially implemented. No broadcast of TCP and TCA.- Items 2.A2 and 2.A3 are not implemented.
Note 19	<ul style="list-style-type: none">- Item 3.1, 3.4, and 3.7 are implemented.- Item 3.6 is counted as the total number of congestion events. No differentiation are made on links and congestion thresholds.- Items 3.10, 4.A1, and 5.5 are not implemented. Number of MSUs discarded is counted, however, no differentiation with respect to cause is performed.- Items 1.1, 2.1, 2.9, 2.A1, 3.7, 4.2, 5.2 are not implemented.
Note 20	Items 3.1 and 3.4 are implemented. Furthermore, this module provides the events necessary to compute items 1.1 and 2.1. However, items 1.8 and 1.9 are not implemented.



Note 21	SL alignment failure or proving failure are not implemented. However, items 1.11 and 3.6 are implemented totals, that is not on a per-link basis. Furthermore, this module provides the events necessary to compute item 1.10.
Note 22	Item 1.2 is implemented. However, the other items are not implemented.
Note 23	<ul style="list-style-type: none"> - Items 4.3, 4.4, 5.3, 5.4, and 5.5 are implemented. - Items 4.5 and 4.6 are partially implemented. No broadcast of TCP and TCA. - Items 4.2, 5.2 are not implemented.
Note 24	<ul style="list-style-type: none"> - Item 1.2 are implemented. - This module provide the events necessary for items 2.5, 2.6, 2.7, and 2.9. - Items 1.3, 1.4, 1.5, 1.6, 2.A2, 2.A3, 2.A4 are not implemented.
Note 25	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 international network.
Note 26	Load sharing of messages is done using 8-bit SLS codes and 5-bit rotation.
Note 27	<p>Usage of the least significant bit of the SLS field for Link Set selection ("Modified SLS Rotation"), is configurable as ON or OFF.</p> <p>"Modified SLS Rotation" is implemented as described in chapter 7.3.1.1 Reference [1], and is only in use for SS7SEPs with two routes, if all links in a combined link set are carrying traffic.</p>
Note 28	When a link failure is detected, traffic is immediately diverted from the failed route, that is timer T11 is not used (see also Note 7 on Page 17).
Note 29	24-bit SPCs are supported, but not clustering.
Note 30	Only inhibition of messages is supported, and then only according to point 8.2 3), that is inhibit STP access by examination of OPC and DPC combination in the incoming STP message.



- Note 31** 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 32** Only monitoring of unauthorized messages on a (see Note 31 on Page 19).
- Note 33** Restriction of the number of violation reports is not supported.
- Note 34** It is the responsibility of the originating user part to stop the generation of signaling information to the unequipped user.



Glossary

ISDN

Integrated Services Digital Network

ISDN-UP

ISDN User Part

M3-IETF

MTPL3&M3UA IETF

MTP

Message Transfer Part

SCCP

Signaling Connection Control Part

SLS

Signaling Link Selection

TCA

Transfer-Cluster-Allowed signal

TCAP

Transaction Capabilities Application Part

TFA

Transfer Allowed

TFP

Transfer Prohibited

TFR

Transfer Restricted

TRA

Traffic Restart Allowed

TCP

Transfer-Cluster-Prohibited signal

TCR

Transfer-Cluster-Restricted signal

TRW

Traffic Restart Waiting





Reference List

ANSI standards

- [1] American National Standard for Telecommunications, Specification of Signaling System No. 7 (SS7) - Message Transfer Part (MTP), ANSI T1.111 - 1996
- [2] American National Standard for Telecommunications, Specification of Signaling System No. 7 (SS7) - Monitoring and Measurements for Networks, ANSI T1.115 - 1990

Ericsson AB

- [3] 155 54-CAA 901 0180 Uen, "Managed Information Model and Configuration Parameters for Ericsson Signaling M3-IETF".
- [4] Configuration File Description for MTPL3 & M3UA IETF, 19073-CAA 901 1817 Uen.