सत्यमेव जयते

वर्गीय अपेक्षाओं के लिए मानक

टीईसी ५८१२०:२०२५

(सं: टीईसी ५८१२०:२०१५ को अधिक्रमित करता है)

STANDARD FOR GENERIC REQUIREMENTS

TEC 58120:2025

(Supersedes No: TEC 58120:2015)

संकेत स्थानांतरण बिन्दु (एस.टी.पी.)

SIGNALLING TRANSFER POINT (S.T.P)

ISO 9001:2015

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FOREWORD

Telecommunication Engineering Centre (TEC) is the technical arm of Department of Telecommunications (DOT), Government of India. Its activities include:

- Framing of TEC Standards for Generic Requirements for a Product/Equipment, Standards for Interface Requirements for a Product/Equipment, Standards for Service Requirements & Standard document of TEC for Telecom Products and Services
- Formulation of Essential Requirements (ERs) under Mandatory Testing and Certification of Telecom Equipment (MTCTE)
- Field evaluation of Telecom Products and Systems
- Designation of Conformity Assessment Bodies (CABs)/Testing facilities
- Testing & Certification of Telecom products
- Adoption of Standards
- Support to DoT on technical/technology issues

For the purpose of testing, four Regional Telecom Engineering Centers (RTECs) have been established which are located at New Delhi, Bangalore, Mumbai, and Kolkata.

ABSTRACT

This document covers the Generic Requirements (GR) of Signalling Transfer Point (STP) to be connected in core network of Telecom Service provider infrastructure for transferring signalling messages between various switching/signalling nodes and for implementation of number portability. The scope of this document is limited to the general requirements of STP for transfer of signalling messages for speech communication, SMS and number portability. This document also covers transfer of SS7 signalling messages over IP network using Signalling Transport (SIGTRAN) protocols. It does not cover the exhaustive STP facilities, features, its performance requirements.

CONTENTS

HISTORY SHEET

S. No.	*Standard GR No.*	*Title*	*Remarks*
1.	GR/STP-01/01.SEP 2002	Generic Requirements of Stand Alone Signalling Transfer Point (STP)	Issue 01
2.	GR/STP-02/01.SEP 2002	Generic Requirements of Integrated Signalling Transfer Point (STP)	Issue 01
3.	GR/STP-01/02.MAY 2007	Generic Requirements of Stand Alone Signalling Transfer Point (STP)	Issue 02
4.	GR/STP-02/02.MAY 2007	Generic Requirements of Integrated Signalling Transfer Point (STP)	Issue 02
5.	TEC/GR/SW/STP-001/03. November.2011	Generic Requirements of Signalling Transfer Point (STP)	Issue 3 • Mandatory and desirable requirements has been segregated • Document has been made more generic • GRs on Stand-alone & Integrated STPs have been merged in to single GR • Diagnostic, System Supervision, Command Log, System back-up, password management and Monitoring have been Incorporated

6.	TEC 58120:2015 (Earlier No: TEC/GR/SW/ STP-001/04. OCT-2015)	Generic Requirements of Signalling Transfer Point (STP)	Issue 4 IP capability of STP (SGTRAN) incorporated
6.	TEC 58120:2025 (Supersedes No: TEC 58120:2015)	Generic Requirements of Signalling Transfer Point (STP)	Issue 5 [Prepared as per new format of GR, updated Safety,security, EMI and EMC requirements incorporated]

REFERENCES

S.No.	Document No.	Title/Document Name
	Telecom Engineering Centre Documents	
1	TEC/IR/CCS-SIG	Interface Requirements for CCS7
2	SD/CCS-03	National SCCP standards
3	SD/INP-01	Intelligent Network application Protocol (INAP) National Standards
4	GR/SYN-01	Digital Network Synchronization equipment
5	TEC/EMI/TEL-001	Electromagnetic Interference
	ITU-T Recommendations	
1	Q.513 (3/93)	Digital exchange interfaces for operations, administration and maintenance
2	Q.701(03/93)	Functional description of the message transfer part (MTP) of Signalling System No.7
3	Q.702 (11/88)	Signalling data link
4	Q.703 (07/96)	Signalling link
5	Q.704 (07/96)	Signalling network functions and messages
6	Q.705 (03/93)	Signalling network structure
7	Q.706 (03/93)	Message transfer part signalling performance
8	Q.714 (05/01)	Signalling connection control part procedures
9	Q 716 (03/93)	Signalling System No 7 - Signalling connection control part (SCCP) performance
10	Q 750 (06/96)	Overview of Signalling System No 7 management
11	Q 752 (06/97)	Monitoring and measurements for Signalling System No 7 networks

12	Q 753 (06/97)	Signalling System No 7 management functions MRVT, sent and CVT and definition of the OMASE-user
13	Q 754 (06/97)	Signalling System No 7 management Application Service Element (ASE) definitions
14	Q 755 (05/98)	Signalling System No 7 protocol tests

CHAPTER - 1

1.0 INTRODUCTION

1.1 This document describes the basic operational, functional requirement and performance standards of Signalling Transfer Point (STP) used in the Indian Telecom networks. STP is used for PSTN, PLMN and Intelligent networks. STP is also used for implementation of 'Number portability' among various license service areas.

1.2 This GR is intended to facilitate the verification of the capability of the equipment for correct receipt and transfer of message between SPs/STPs deployed in the Indian Telecom networks.

1.3 (a) For all ITU–T/IEEE recommendations, TEC standards/specification and other standards referred in this document, the latest release/issue with all associated amendments, addendum and corrigendum shall be applicable.

(b) The RFC's documents of IETF are subject to periodic revision. Hence, where ever RFC's are mentioned in this document, the offered product shall meet either the referred RFC or its previous version or its previous draft or its updated version. Wherever a feature of RFC is mentioned, the product shall comply with the part of RFC specifying the feature.

(c) For all IETF RFC's, the interpretation of clauses of RFC's shall be as per RFC 2119

1.4 All the requirements described in chapter 2 of this document are suggestive requirements and shall be decided by the purchaser at the time of procurement/ tender as per its requirements. However, the requirements described in Chapter-2 shall not be tested/ verified by TEC at the time of initial certification.

2.0 Description

2.1 STPs are packet switches in the Common Channel Signalling (CCS) network that transfer messages from one signalling link to another at Level 3. It is also used to carry user information for services and features between switching offices and databases. STP uses information contained in the message in conjunction with information stored in its memory to route the message to appropriate signalling point. STP's main function is to identify the best path between two SEPs to communicate.

2.2 The STP system acts as a transit system for the transfer of signalling data from one location to a distant location through defined transmission network. Signalling System No. 7 (SS7) is a signalling protocol that is employed globally, across telecommunications networks, to provide signalling. The Short Message Service (SMS) is also treated as signalling data.

2.3 The CCS7 Network consists of following nodes, interconnected by transmission links, called Data Signalling Links (SLK).

a) Service Switching Points [SSP]

A Service Switching Point (SSP) is a voice switch that incorporates SS7 functionality. An SSP can originate and terminate messages, but it cannot transfer them. If a message is received with a point code that does not match the point code of the receiving SSP, the message is discarded

b) Signalling Transfer Points [STP]

Nodes that serve as intermediate signalling message transport switches are called STPs. STP's main function is to identify the best path for two SSPs to communicate.

c) Service Control Points [SCP]

Service Control Points (SCPs) are the SPs that provide database access to support transaction-based services. SCP acts as an interface between telecommunications databases and the SS7 network.

2.4 SS7 can deploy different types of signalling network structures. The choice between these different structures depends upon the factors such as administrative aspects and the structure of the telecommunication network to be served by the signalling system. Accordingly, there are two types of STPs, namely.

I) Type-1 ; Integrated STP

When STP functionality is incorporated along with ‘Service Switching Point’ in the ‘Service Switching Node’, it is known as Integrated Signalling Transfer Point. It performs call switching functions as well as Signalling transfer functions.

II) Type -2 : Standalone STP

Standalone STP performs only the core function of SS7 signalling transfer. It enables the operator to manage the network resources in more effective way and to host more applications.

2.5 Link Types - Links employed in the SS7 network are divided into 6 different types depending on which two network nodes are connected by the link. A typical network topology is shown in Fig.1. Each type has a maximum and a minimum allowed number of links in the linkset.

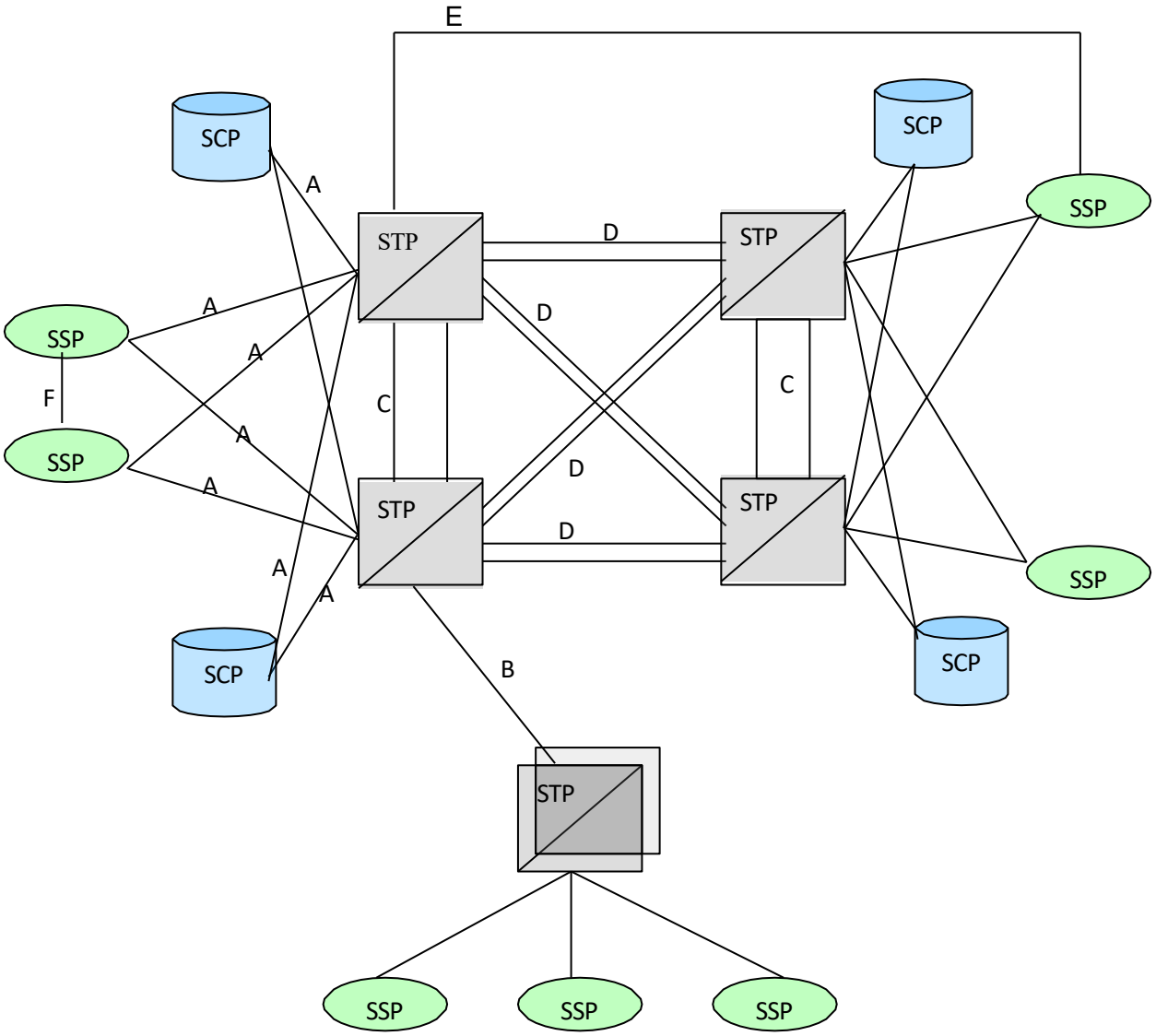
(a) A-links - An "A" (access) link connects a signalling end point (e.g., an SCP or SSP) to an STP. Only messages originating from or destined to the signalling end point are transmitted on an "A" link. Each linkset has at least one and at most 16 “A” links supporting it.

(b) B-links- A "B" (bridge) link connect one mated STP pair to another mated STP pair at the same hierarchical level (two pairs of regional STPs for example). Typically, a quad of "B" links interconnect peer (or primary) STPs (e.g., the STPs from one network to the STPs of another network)

(c) C-links- A "C" (cross) link connects STPs performing identical functions into a mated pair. They only carry user traffic in case of congestion or network failure but usually are reserved for network management messages. They are always deployed in pairs for redundancy

(d) D-links- A "D" (diagonal) link connect mated (e.g., local or regional) STP pairs at one hierarchical level to mated STPs at another hierarchical level in a quad-link configuration. They are deployed in the same fashion as B links. Secondary STPs within the same network are connected via a quad of "D" links.

(e) E-links- An "E" (extended) link are used to connect an SSP to a remote STP. They are used when there is a significant amount of traffic going between the nodes to avoid congestion. "E" links are not usually provisioned unless the benefit of a marginally higher degree of reliability justifies the added expense.



Typical Network Topology

Figure 1

(f) F-links- An "F" (fully associated) link connect two signalling end points (i.e., SSPs and SCPs) when there is either a large amount of traffic between the two SSPs or when the SSPs cannot be connected through an STP.

2.6 Depending upon the network in which (National or international) STP is used, there are three types of STPs:

i National Signalling Point (NSP) which belongs to the national signalling network only and is identified by a Signalling point code according to national numbering plan of signalling points;

ii International signalling point (ISP) which belongs to the international signalling network only and is identified by a Signalling point code according to international numbering plan of signalling points;

iii Signalling Gateway which function both as an ISP and NSP and therefore belongs to both the international signalling network and a national signalling network and accordingly is identified by a specific signalling point code in each of the signalling networks.

2.7 If discrimination between international and national signalling point code is necessary at a signalling point, the network indicator is used.

2.8 Global Title Translation (GTT)

Global Title Translation (GTT) is an indirect addressing method. GTT is a process where the GT address is mapped to a signalling point code for routing purposes. This function is provided by the Signalling Connection Control Part (SCCP), where the addressing identity is placed in a field named Global Title, together with other information such as Translation Type, Numbering Plan, Encoding Scheme and Nature of Address. GTT eliminates the need for the originating nodes to determine where a message should be routed. Instead, the Signal Transfer Points (STPs) determine the routing based on the type of query and some identifying numbers like Type of Number (TON) or Nature of Address Indicator (NAI) parameter, scope of the address value, (such as whether it is an international number including the country code), a subscriber Mobile Identification Number (MIN), a Mobile Directory Number (MDN), or other type of number.

All nodes in the network are identified by a unique point code. This point code is used by CCS #7 as the Origination Point Code (OPC) and the Destination Point

Code (DPC) in the routing label of all Message Signalling Units (MSUs). SCCP translates addresses (Global titles) from signalling messages that do not contain explicit information thereby allowing the MTP to route the message. MTP routing is data base application (for example, database transactions to support IN/cellular, toll-free number and so on) at the SCP (Figure 2).

In general, ANSI networks are interconnected with ITU networks through a gateway, which does the translation between the ANSI signalling format and the ITU format by means of mapping the signalling addresses, irrespective of where the gateway in located.

STP with GTT capability

Figure 2

3.0 **Functional/Operational Requirements:**

All the functional requirements described in clause 3.1 to 3.29, shall be complied by both types of STPs irrespective of type of STP for which the applicant has sought the approval.

3.1 General- Functions of various elements of signalling systems shall be in accordance with level concept in which the functions of Message Transfer Part are separated in to three functional levels namely

1. Level 1 – Signalling data link
2. Level 2 – Signalling Link Functions
3. Level 3 – Signalling Network Functions

The User Parts (If applicable) shall constitute parallel element at the fourth functional level

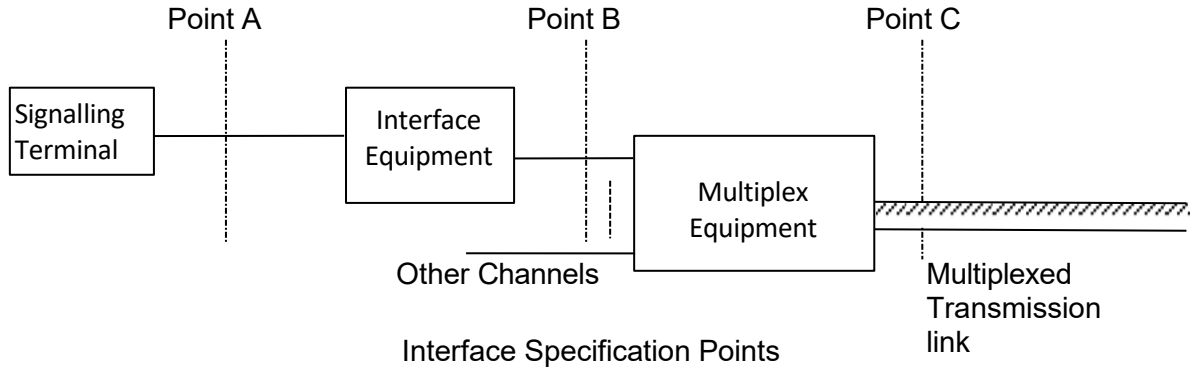
3.1.1 Above functions shall be in accordance with functional description as given in ITU-T Recommendations Q.701 (1993). However inter-working of Yellow, Red and Blue book implementations (Refer clause 7.1, 7.2, 7.3 of ITU-T rec. Q.701) and SIF (Service Information Field) Compatibility mechanism (Refer clause 7.2.6 of ITU-T rec. Q.701) shall not be used.

3.2 Signalling Data Link

The signalling data link provided for CCS7 shall be as per ITU-T Rec. Q.702.

3.2.1 Only Standard bit rate of 64 kbps shall be used for digital signalling data link which shall be derived either from 2048-kbits/s or from STM-1.

3.2.2 Interface at point C shall follow Q.703 ITU-T Recommendation for electrical characteristics and G.704 for functional characteristics, the frame structure. (Refer figure 3 below)



Interface Specification Points

Fig. 3

3.2.3 Interface specifications at points A and B are not applicable (Refer clause 4 of ITU-T Recommendation Q.702).

3.3 Signalling Link - The functions and procedures related to transfer of signalling messages over a data link shall be as per ITU-T Recommendation Q.703. This provides the layer 2 functions for the CCS7 protocol stack.

3.3.1 All the facilities as per ITU-T Recommendation Q.703, including the following for National use, shall be provided. STP initialization, alignment, activation shall be as described in ITU-T rec. Q.781

3.3.2 The STP shall be capable of transmitting and receiving MSUs with Signalling Information Field (SIF) greater than or equal to 2 octets and less than or equal to 272 octets.

3.3.3 Both Basic and Preventive Cyclic Retransmission (PCR) method of error correction shall be provided (Refer clauses 5 and 6 of ITU-T Rec. Q.703).

3.3.4 Values of N 1 and N 2 (Refer clause 6.4.2 of ITU-T recommendation Q.703): The range for N1 shall be 1 to 127 and the nominal value shall be 127. The range for N2 shall be 1 to 4095 and the nominal value for satellite links shall be 2001.

3.3.5 Only 64 kbps Signal unit error rate monitor values of T, D and N shall be used. (Refer clause 10.2.5 of ITU-T recommendation Q.703).

The three parameters which determines the signal unit error rate are: the number T (signal unit), of consecutive signal unit received in error, 1/D is unit errors/signal unit and N is the number of octets

Value of the three parameters for 64 kbps are:

T = 64 signals unit

D = 256 signal units/signal unit error

N = 16 octets

3.4 Synchronization

3.4.1 The synchronization method shall be master/slave.

3.4.2 The acceptable slip rate shall be in accordance with ITU-T recommendation G.822.

3.4.3 Bit Error Rate -

I. A long term bit error rate of the signalling data link should be less than 10^{-6}

II. A medium term bit error rate should be less than 10^{-4}

3.4.4 Due to random errors and errors bursts including long bursts which might occur in the signalling link (e.g. due to loss of frame, alignment or octet slip) maximum interruption should not be more than 128 ms.

3.5 Level 2 Timer- All the level 2 timers shall be provided as per ITU-T Recommendation Q.703, including those given in TABLE 1 of this document, for National use (Refer clause 12.3 of ITU-T Recommendation Q.703).

TABLE 1

Level 2 Timer	Name and purpose	Range	Nominal Value
TI T1(64)	Timer “alignment ready” Bit rate of 64 kbps	40-50 s	45 s
T2 T2 low T2 high	Timer “ not aligned” Only for automatic allocation of signalling data links and terminals	5-150 s 5-50 s 70-150 s	60 s
T3	Timer “aligned”	1-2 s	1.5s
T4 T4n (64) T4e(64)	Proving period of timer (Pn)=2^{16} or 2^{12} octet transmission time Normal proving period at 64 kbps (corresponding to Pn=2^{16}) Emergency proving period at 64 kbps (corresponding to P_e=2^{16})	 7.5-9.5s 400-600 ms	 8.2 s 500 ms
T5	Timer “sending SIB”	80-120 ms	100 ms
T6 T6(64)	Timer “remote congestion” Bit rate of 64 kbps	3-6 s	5 s
T7 T7 (64)	Timer “excessive delay of acknowledgement” Bit rate of 64 kbps	0.5-2 s For PCR 0.8 – 2 s	1 s

Pe Emergency proving period

Pn Normal proving period

s seconds

ms milliseconds

Note 1: Timer T1 is calculated as follows: As per clause 10.3.4 (ITU-T Recom. Q.704), proving can be tried M (=5) times. If normal alignment is assumed each time, the time taken for each proving period is T4n (= 8.2 s). Total time taken for 5 trials is 41 s (5X8.2). As per clause 12.2.1.2 of ITU-T Recommendation Q.704, timer T17 (= 1s) is given bath-acne proving period. So T1 = 41 + T17 X 4 = 45 s.

3.6 Signalling Network Functions and Messages

The functions and procedures relating to transfer of signalling messages between the signalling points shall be as per ITU-T Recommendation Q.704. This provides the layer 3 functions for the case protocol stack.

3.6.1 All the facilities, except those which are barred in following clauses of this document, shall be provided as per ITU-T Recommendation Q.704, including the following for National use.

3.6.2 Standard Routing label shall be used (Refer from clause 2.2.1 to clause 2.2.5 of ITU-T Recommendation Q.704).

3.6.3 The following cases of load sharing shall be applicable (Refer clause 2.3.2 of ITU-T Recommendation Q 704):

a. Load sharing between signalling links belonging to the same link set.

b. Load sharing between signalling links not belonging to same link set

3.6.4 If UPU message is received, then the actions recommended in clause 11.2.7 of ITU-T Recommendation Q.704 shall be taken.

3.6.5 Procedures used in connection with link status changes: All the sub-clauses of clause 3.3 of ITU-T Recommendation Q.704 shall be applicable except “Transfer-Restricted” facility.

3.6.6 Congestion status of signalling links (Refer clause no 3.8.2 of ITU-T Recommendation Q.704). In the national signalling network one congestion and one congestion abatement shall be provided similar to international signalling network as given in clause 3.8.2.1(a) of ITU-T recommendation Q.704.

3.6.7 Congestion status of signalling route sets (Refer clause no. 3.8.4 of ITU-T Recommendation Q.704). In the national signalling network two states shall be provided similar to International signalling network as given in clause 3.8.4 (a) of ITU-T Recommendation Q.704.

3.6.8 Controlled re-routing- (Refer clause 8 of ITU-T Recommendation Q.704). All clauses shall be applicable with the exception that clauses pertaining to 'transfer-restricted message' are not applicable.

3.6.9 MTP restart procedure as defined in clause 9 of ITU-T Recommendation Q.704, shall be used.

3.6.10 Signalling route set congestion (International network) as defined in clause 11.2.3 of ITU-T Recommendation Q.704 shall be applicable.

3.6.11 Basic Signalling link management procedure as defined in clause 12.2 of ITU-T Recommendation Q.704 shall be used.

3.6.12 Signalling-route-set-test (Refer clause 13.5 of ITU-T Recommendation Q.704). All clauses shall be applicable with the exception that “transfer restricted" message shall not be used.

3.6.13 Transfer controlled (Congestion priorities) message of ITU-T Recomm. Q.704 shall be applicable.

3.6.14 Signalling-route-set-congestion test as defined ITU-T Recomm. Q.704 shall be applicable.

3.6.15 STP MSU routing, load sharing, congestion shall be handled as described in ITU-T rec. Q.781

3.7 Signalling message handling: The measurements as given in Table-2 (as per Table 6 of ITU-T Recommendation Q.752), shall be feasible.

Table -2

S.No.	Description of measurement	Units	Usage	Duration
6.1	Number of SIF and SIO octets received with a given OPC or set of OPCs at an SEP	Octets/OPC set	A,N,P P,A,N	15 min 30 min
6.2	Number of SIF and SIO octets transmitted with a given OPC or set of OPCs at an SEP	Octets/DPC set	P,A,N P,A,N	15 min 30 min
6.3	Number of SIF and SIO octets handled with a given SI or SI set at an SEP	Octets/SI set	P,A,N P,A,N	15 min 30 min
6.4	Number of SIF and SIO octets received with a given OPC or OPCs set and SI or SI set, at an SEP	Octets/SI set/ OPC set	P,A,N P,A,N	15 min 30 min
6.5	Number of SIF and SIO octets transmitted with a given DPC or DPCs set and SI or SI set, from an SEP	Octets/SI set/ DPC set	P,A,N P,A,N	15 min 30 min
6.6	Number of SIF and SIO octets handled with a given OPC or OPCs set and SI or SI set, at an STP	Octets/SI set/ OPC set/ DPC set	P,A,N P,A,N	15 min 30 min
6.7	Number of MSU handled with a given OPC set, DPC set and SI set, at an STP	MSUs/ SI set/ OPC set/ DPC set	A,P,R,N P,A,N	15 min 30 min

However the number of measurements shall be limited to small number at any given time.

Where A, P & N stands for

A – Accounting Management

P - Performance

Management

N – Network administration & planning

3.8 Routing

3.8.1 The routing label shall not be modified for national use (Refer clause 2.2.6 of ITU-T Recommendation Q 704).

3.8.2 The service indicator shall not be used for routing purpose. Note to clause 2.3.1 of ITU-T Recommendation Q.704 shall not apply.

3.8.3 Local processor shall not be blocked when signalling traffic is diverted from affected link to alternative link (Refer clause 3.3.5.1 of Q.704).

3.8.4 “Signalling route restricted” as given in clauses 3.4.3 and 3.5.3 of ITU-T Recommendation Q 704, shall not be used.

3.8.5 Signalling route congestion procedure shall not be used.

3.8.6 “Signalling route restricted” as defined in clauses 4.1.2 and 4.7 of ITU-T Recommendation Q 704 shall not be used.

3.8.7 'Transfer-restricted' procedure as defined in clause 6.2.3 of ITU-T Recommendation Q.704 shall not be used.

3.8.8 The clause 6.2.4 of ITU-T recommendation Q.704, regarding “Restricted destination'' shall not be applicable.

3.8.9 Signalling route set congestion (National option with and without congestion priorities) as defined in clauses 11.2.4 and 11.2.5 of ITU-T Recommendation Q.704 shall not be used.

3.8.10 Transfer Restricted” facility as defined in clause 13.4 of ITU-T Recommendation Q.704 shall not be used.

3.8.11 “Transfer controlled'' facility (International network and National option without congestion priorities) as defined in clauses 13.6 and 13.8 of ITU-T Recommendation Q 704, shall not be used.

3.8.12 The service indicator as defined in clause 14.2.1 of ITU-T recommendation Q.704 shall not be used to perform message routing.

3.8.13 The two spare bits as defined in clause 14.2.2 of ITU-T Recommendation Q.704 shall not be used for any special purpose.

3.8.14 Routing messages: The STP shall use the MTP to transport messages among switching offices, SCPs and other STPs.

A message route refers to a succession of signalling links on which a message is transported from the originating SP to the destination SP. The message route for a given message is predetermined by the routing label, but routing does allow for the traffic to a given destination to be transported over multiple message routes. That is, two messages with different routing labels may be transmitted over a different succession of signalling links to a given destination

3.8.15 The STP shall use the message discrimination and distribution functions of the MTP designed to deliver the message to the proper application in the STP.

3.8.16 Using SCCP, STP shall perform Global Title Translation (GTT) functions on certain type of messages, which do not explicitly contain sufficient information, allowing MTP to route the message. (Refer clause 2.4 of ITU-T recom. Q.714).

3.8.17 SCCP management procedures shall allow alternate routing to replicate applications if an application is failed or inaccessible.

3.8.18 STP shall support routing of CCS7 messages on the basis of Signalling Point Code as well as following codes network indicator defined in ITU-T recommendation Q.704 clause 14

Bits	D	C	
	0	0	International Network
	0	1	Spare (for international use only)
	1	0	Indian Telecom Network
	1	1	Reserved for Indian Telecom Network

3.9 Formats and codes

The level 3 messages, formats and codes, except those mentioned below shall be provided as per ITU-T Recommendation Q.704 (07/96)

a. RSR- Signalling- route-set-test signal for restricted destination

b. TFR- Transfer restricted signal

3.10 Timers and timer values (Refer clause 16.8 of ITU-T rec. Q.704)

3.10.1 All level 3 timers, given in TABLE-3 of this document shall be provided. The level 3 timers given in TABLE-4 of this document shall not be provided.

TABLE 3

LEVEL 3 Timers for National Use

Timer	Purpose of timer	Range(*)
T1	Delay to avoid message mis-sequencing on changeover	500 (800) to 1200 ms
T2	Waiting for changeover acknowledgement	700 (1400) to 2000 ms
T3	Time controller diversion delay to avoid mis-sequencing on changeback	500 (800) to 1200 ms
T4	Waiting for changeback acknowledgement (first attempt)	500 (800) to 1200 ms
T5	Waiting for changeback acknowledgement (second attempt)	500 (800) to 1200 ms
T6	Delay to avoid message mis-sequencing on controlled rerouting	500 (800) to 1200 ms
T8	Transfer prohibited inhibition timer (transient solution).	800 to 1200 ms
T10	Waiting to repeat Signalling route set test message	30 to 60 s
T12	Waiting for Uninhibit acknowledgement	800 to 1500 ms
T13	Waiting for forced Uninhibit	800 to 1500 ms
T14	Waiting for Inhibition acknowledgement	2 to 3 s
T15	Waiting to Start signalling route set congestion test	2 to 3 s
T16	Waiting for Route set congestion status update	1.4 to 2s
T17	Delay to avoid oscillation of initial alignment failure and link restart	800 to 1500 ms
T18	Timer within a signalling point whose MTP restarts for supervising link and linkset activation as well as the receipt of routing	Refer clause 9.2 of ITU-T Recommendation Q.704

	information	
T19	Supervision timer during MTP restart to avoid possible Ping-Pong of TFP, TFR and TRA messages	67 to 69 s
T20	Overall MTP restart timer at a signalling point whose MTP restarts	59 to 61 s
T21	Overall MTP restart timer at a signalling point adjacent to one shoes MTP restarts	63 to 65 s
T22	Local Inhibit test timer (provisional value)	3 to 6 m
T23	Remote Inhibit test timer (Provisional value)	3 to 6 m

(*) Note: The values, in brackets, are the minimum values for use when routes with long propagation delays are used e.g. routes including satellite sections.

m minutes
s seconds
ms milliseconds

TABLE- 4

Level 3 timers NOT to be used

Timer	Purpose of timer
T9	Not used
T11	Transfer restricted timer
T24	Stabilising timer after removal of local processor outage, used in LPO latching to RPO

3.11 Facilities to be Provided in the STP for MTP –

The following facilities shall be provided in the STP for proper inter-working with the connected STPs in the network:

3.11.1 It shall be possible to assign the signalling data link to any timeslot of the PCM except timeslot 0.

3.11.2 It shall be possible to assign multiple Signalling data links on the same PCM.

3.11.3 The STP shall provide report for failure of any signalling data link.

3.11.4 The STP shall provide audio-visual alarm on O&M terminal. NMC/OSS based alarm window shall be supported

3.11.5 Basic error correction method and error correction by Preventive Cyclic Retransmission (Refer clauses 5 and 6 of ITU-T recommendation, Q.703): It shall be possible to assign a signalling link set to specifically follow one of the two methods. A STP may therefore have both the methods working simultaneously on different signalling link sets. The assignment of error correction method shall be programmable by MML.

3.11.6 Values of N 1 and N2 (Refer Clause 6.4.2 of ITU-T recommendation Q.703): It shall be possible to set the values of N1 and N2 within the range specified, using MML command. The nominal values shall be set by the system as default.

3.11.7 It shall be possible to set the values of Level 2 timers within the range specified. The nominal values shall be set by the system as default.

3.11.8 If automatic allocation of Signalling link and signalling terminals have been provided, it shall be possible to use either this procedure or Basic procedure on a link set basis as defined in clauses 12.1.1 and 12.1.2 of ITU-T rec. Q.704.

3.12 Signalling Connection Control Part - The STP should support the Signalling Connection Control Part (SCCP) given in National SCCP Standards (SD/CCS- 03).

3.13 Procedures to prevent unauthorized use of an STP

3.13.1 It shall be possible to authorize transmission of CCS7 message by Man-Machine communication as defined in ITU-T recommendation Q.705.

3.13.2 Identifying unauthorized CCS7 messages

In addition to the normal signalling message handling procedures specified in Recommendation Q.704, it shall be possible to inhibit/allow messages designated for another signalling point (SP) based on any one or combination of the following options:

a. To inhibit/allow STP access by a combination of designated incoming link sets to designated DPCs. This combination of DPC/incoming link set shall effectively operate in the form of a single matrix. This matrix shall consist of a maximum of 512 DPCs and a maximum of 512 incoming link sets.

b. To inhibit/allow STP access by a combination of designated outgoing link sets to designated DPCs.

This combination of DPC/outgoing link set shall effectively operate in the form of a single matrix. This matrix shall consist of a maximum of 512 DPCs and a maximum of 512 outgoing link sets.

c. To inhibit/allow STP access by examination of OPC and DPC combination in the incoming STP message.

This combination of DPC/OPC shall effectively operate in the form of a single matrix. This matrix shall consist of a maximum of 512 DPCs and a maximum of 512 OPCs

3.13.3 Treatment of unauthorized messages

a) STP identifying unauthorized messages should be able, on a per link set or per signalling point code basis, to

i. provide all unauthorized messages with the same handling as authorized traffic, or

ii. discard all unauthorized messages

b) In addition, an STP should be able to

i. allow all STP messages outside the designated ranges as given in clause 3.1.13.2 above;

ii. bar (discard) all STP messages outside the designated ranges as given in clause 3.1.13..2 above

3.13.4 Measurements- An STP should be able to identify the unauthorized messages coming from another network and should count and record the details of the unauthorized messages on a per link set and/or signalling point code basis

3.13.5 Notification to unauthorized user –

An STP identifying unauthorized messages from another network shall notify the Administration about unauthorized message(s). An urgent alarm shall be given with OPC, date, time, signalling link.

In addition, a violation fault report shall be issued giving the unauthorized message content. It shall be possible to selectively restrict the number of violation reports per link set and/or signalling point code basis.

It shall also be possible to inhibit the violation reporting mechanism on a point

code/link set basis, nodal or on a message direction, i.e. if an inhibited message is destined for all ROA then it shall be possible to suppress the violation reports whilst allowing violation reports on inhibited messages from the ROA.

3.14 Screening functionality**:**

Screening of MTP, SCCP and MAP messages shall be possible, allowing discard or further processing of messages. Rejected data shall be registered. Screening/ monitoring function shall be possible on all the signalling links.

3.14.1 MTP Screening shall provide

a. OPC/DPC/SIO screening
b. Incoming Linkset/DPC screening
c. Network Indicator Screening
d. Screening Network Managements messages by affected Point Code.

3.14.2 SCCP Screening : screening on following parameters shall be provided

a. SCCP Message type
b. SCCP Calling Party Address parameters {Routing Indicator, RI, Sub system number (SSN), Translation Type (TT), Numbering Plan, Point Code}
c. SCCP Called Party Address before GTT
d. SCCP Called Party Address after GTT
e. GT digits
f. Screening Sub-system Managements messages by affected Point Code
g. The STP shall be capable of analysing incoming messages and enforcing screening and filtering rules based on combinations of the following criteria: Originating node (e.g. SCCP CgPA GTA) + Destination node (e.g. SCCP CdPA GTA) + Message type (e.g. MAP Operation Code)
h. It shall be possible to screen only on origination, only on destination, only on message type, or any combination thereof.

3.14.3 MAP Screening: It shall provide screening of MAP operations code relating to SMS traffic providing following capabilities:

a. Block SMS traffic from certain SMSCs of other Operators.
b. Prevent misuse of self owned SMSC for SMS traffic coming from other Operators.
c. Allow Roaming traffic for all services except SMS traffic.

3.14.4 It shall support screening of ISUP message type per OPC & DPC.

3.14.5 All screening violations should be recorded and reported.

3.14.6 A test mode functionality for screening shall be provided that can be applied per linkset. In the test mode, the potential screened out messages shall be reported but not discarded. They are passed through the network without any impact. It shall be possible to turn on/off/test mode screening per linkset

3.14.7 It shall be possible to specify intelligent actions to be taken as a result of a received message matching the screening criteria (in addition to discard and report).

3.14.8 It shall be possible to copy a message and deliver to an offline system for analysis, while allowing the original message to be routed (useful for monitoring)

3.14.9 It shall also be possible to redirect a message based on the screening criteria such that it goes to a redefined destination other than the originally intended destination.

3.15 Number Portability & Routing Applications:

STP shall support number portability feature for mobile as well as fixed network application with any of the following mechanisms for implementing number portability.

i. All call Query (ACQ)
ii. Query on release (QOR)
iii. Drop-back or release to Pivot (RPT)
iv. Onward routing

STP shall support at least “All call Query (ACQ)” for number portability. Other methods of number portability, if required, may be decided by the purchaser.

3.15.1 Routing methods: All common Routing methods shall be provided

a. Indirect routing: The message is just routed to the recipient network and in case the number is ported, the Number portability is performed.
b. Partial Direct Routing: Number Portability function is applied for foreign numbers only.
c. Direct Routing: The originating network always performs the Network Portability function

3.15.2 Types**:** All types of porting shall be provided such as:

a. Geographic number portability

b. Non-Geographic number portability

c. Location portability

3.16 Alternate routes - Generally, the most direct route from an STP to a destination is provisioned as the normal route. It shall be possible to provision routes of 3 priorities not only to the primary SP, but also to the secondary SPs. The STP shall update the status of an affected signalling route when the status of a route changes, whether that route is the current route or not. On the failure of a current (combined) link set, traffic shall be diverted to the next highest priority (combined) link set that is available.

3.17 Addressing:

(a) Each STP shall be uniquely identified by a network address called a Signalling Point Code (SPC). An SPC is a 24-bit address (as per ANSI standard) and a 14- bit address (as per ITU-T standard) as given below:

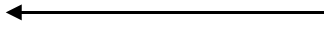
Message Signalling unit (MSU) – ANSI module

8	24	24	5	14	2	8	Length in bits
SIO	DPC	OPC	SLS	CIC	spare	Message Type	Message contents (Variable length)

Transmission direction

Message Signalling unit (MSU) – ITU module

8	14	14	5	14	2	8	Length in bits
SIO	DPC	OPC	SLS	CIC	spare	Message Type	Message contents (Variable length)



Transmission direction

When used as 'National signalling Point' (NSP), 14-bit address shall be used. However, when used as International Signalling Point (ISP) in the International network or Signalling Gateway to function both as an ISP & NSP both 14-bit as well as 24-bit address shall be supported. Purchaser may decided if 14-bit address or 24-bit address or both type of address support is required as per its requirements.

(b) The STP shall support IP addressing as per IPv4 (as per RFC 791) and IPv6 (optional) (as per RFC2460, RFC1981, RFC4443, RFC4861 and RFC 4862).

Purchaser may decide the support of IPv6 depending upon its requirement and the prevalent rules & regulations.

3.18 NMS/eMS connectivity- It should be possible for STP to interface with Network Management system (NMS)) either directly or through Element management System (eMS). The north-bound interface from STP/eMS to NMS should support SNMP/XML/CORBA etc. From NMS/eMS, it shall be possible to create different user category for local and remote O&M terminal (including LCTs) with different privilege for configuration & other management functions.

Following FCAPS management functions shall be supported:

3.18.1 Fault management – The system shall provide for visual/audible alarms to assist in efficient administration. The following minimum printouts/alarms are envisaged:

a) The alarm program shall provide an alarm on O&M terminal to indicate the failure of power supply.

b) A suitable message on O&M terminal shall be provided to indicate the operating status of the processors, signalling links e.g. link/link set failure, inaccessibility of a signalling point

c) A visual display of faults detected with identification of faulty units. The display/message shall contain the date and the time.

d) Alarm and printout in case of failure of CCS7 signalling link/signalling route.

e) Alarm Threshold Administration

f) Alarm Monitoring SS7 network

g) Logging and browsing of performance alarms

3.18.2 Configuration management-

MTP Routing Verification –In STP it shall be possible to verify the routing of signalling traffic between an originating point and the destination point within the SS7 network.

a) Verification of primary as well as alternate routes
b) Detection of MTP routing loops
c) Detection of unknown destination points
d) Checking bi-directional operation of a signalling relation.
e) Checking bi-directional operation of individual routes.
f) Tasks characterized by either a single command or scripts that combine a sequence of commands to one compound task.
g) Maintain an active archive of configuration files for managed network devices.
h) Maintain information on multiple configuration files and modifications made.
i) Export of configuration files to 3rd party applications for modelling, integrity checking or generating reports
j) The standard Event Report Management function shall be provided

3.18.3 Accounting management – (Applicable only for SSTP)

Accounting of MTP, SCCP and MAP messages shall be provided. It shall be possible to account the following resources per interconnecting service provider per week:

a) MTP Message accounting

It shall record the traffic volume of transferred SS7 messages (number of MSUs and bytes). The system shall handle minimum 255 MTP accounts. Each account may comprise of one linkset or a group of linksets leading to an operator.

Number of MSUs incoming to STP, which are transmitted by the MTP to other Signalling point per interconnecting service provider as well as per signalling link shall be accounted. Any incoming MSU blocked by screening shall not be counted.

MSU shall include CCS7 messages like MTP management messages, MTP test messages, ISUP messages, SCCP messages, INAP messages, MAP messages However, it shall not include MSU blocked/filtered

The following set of MSU accounting data shall be stored:

- Number of transited MSU received per incoming signalling link per DPC per SI per operator combination.
- Number of transited octets (SIF + SIO) per DPC per SI per operator combination
- Number of transited MSUs sent per (OPC/DPC/SI) and operator combination.
- Number of transited octets (SIF + SIO) sent per (Outgoing signalling link DPC/SI) per operator combination

(b) SCCP Message accounting

SCCP messages received for Global Title Translation shall be accounted separately per interconnecting service provider. In this case DPC of SCCP message shall be signalling point code of STP. The following set of SCCP accounting data shall be stored:

* Mobile Roaming transaction
* SMS messages sent per operator
* Any SCCP message Octets

SCCP accounting shall enable to determine what traffic is using the SCCP function of the STP. The system shall handle minimum 255 SCCP accounts, in which one or more point codes can be grouped together to identify SCCP gateways of another operator. The accounting functionality shall comprise all possibilities described in Screening.

(c) It shall be possible to create number of different accounting class combinations (Number of accounting class required may be specified by the purchaser) for each MTP/SCCP/MAP account for accounting and billing purpose. It shall be possible to transfer the accounting data to Central NMS/EMS/Billing centre at configurable periodic interval. (Minimum configurable period shall be specified by the purchaser)

(d) Signalling Data Record generate by the STP for messages shall have at least following information. ASN notation shall be used for SDR:

i. SDR Number
ii. Date and time of message
iii. Calling and Called Number

iv. OPC and DPC
v. Disconnection Cause
vi. Chargeable time
vii. TMSI
viii. MSISDN
ix. IMSI
x. Roaming Number
xi. Operation Code in TCAP messages
xii. Signalling Link Number
xiii. SI
xiv. Total OCTETS in the message
xv. SSN
xvi. Message header code

Note: Whether the STP supports NMS/TMN connectivity directly or through eMS, shall be indicated in TAC.

3.18.4 Performance management –

Performance management module shall support collection, processing and presentation of the performance related data from all the network elements for the purpose of study of subscriber profile, traffic study, planning of capacities, monitoring of network health etc. it shall include

a) Collection of traffic measurement data
b) Data Storage in a relational database system
c) Generation of Historical Data yielding long-term-statistics
d) Web reports based performance analysis
e) Real Time Performance Alarms through Threshold Supervision and forwarding to umbrella management system via SNMP
f) Comprehensive and flexible reporting features to facilitate quick and easy investigations of network traffic problems. Various reports shall be possible to be generated such as:
   - Date & time of fault on circuit or network elements
   - Date & time of fault restoration on circuit or network elements
   - Circuit availability

- Reports for evaluation of AMC performance etc.

If any other parameter is required, it shall be specified by the purchaser

g) Customization of Reports: It shall be possible to customize the reports. The Purchaser shall be free to ask for customization of reports based on the data available in the database from time to time during warranty period & AMC period. It shall be possible to generate the customized reports as per purchaser requirement.

h) Correlation with, historical traffic values such as daily, weekly monthly statistics

i) Monitoring at programmed intervals.

3.18.5 Security management - Security requirements shall be as described in Clause 8.1 of this document.

3.19 Priority Processing of Network Management Tasks

The STP shall provide the capability to prioritize its network management functions to assure that critical network management functions receive high processing priority in its network management processors. This capability shall be particularly available when network management processor is overloaded.

3.20 Load Sharing –

a) STP shall provide MTP load sharing across multiple link-sets and multiple links within a single link-set.

b) STP shall provide SCCP load sharing up to 16 primary destinations at equal distribution across the destinations.

3.21 Multiple SS7 network - STP shall be able to operate with number of independent and separate Networks simultaneously. (Number of SS7 networks shall be specified by the purchaser). It shall have independent SS7 functions for each of the multiple networks or SS7 domains with individual treatment of SCCP/MTP traffic streams in each domain.

3.22 O&M terminal (LCT) -

The O&M terminal i.e. LCT shall be provided for exchange of information between the STP system and the maintenance and operating personnel. From LCT, it shall be possible to do System configuration, system supervision, fault monitoring, fault repairing etc. It shall also be possible to transfer system log to NMS/eMS. It shall be possible to create different user category for O&M terminal (i.e. LCTs) with different privilege for configuration & other management functions either locally or from NMS. In case of loss of eMS/NMS connectivity, LCT shall remain functioning for local management and after restoration of connectivity, LCT shall transfer system log to NMS/eMS.

In case of 'Integrated STP', if these functionalities have been tested for switching node in which STP is integrated, same need not be repeated

3.22.1 The LCT shall support Graphical User Interface (GUI) for maintenance, configuration, management and supervision.

3.22.2 It shall provide facility for cancelling and aborting the execution of commands.

3.22.3 Where several such terminals are in use on a single system, a mechanism shall be available to avoid clashes.

3.23 Diagnostic

a. On a faulty condition, the equipment shall identify the faulty sub-system and shall run diagnostic automatically and make it out of service. Normal function of the system shall not be affected due to invocation of any diagnostic program. The resolution of the fault diagnosis in the offered system shall be indicated. It shall be possible to diagnose up to single PCB level in at least 99% of the cases. In the rest of the cases, the fault diagnosis shall be limited to 2 cards.

b. Details of the off-line diagnostic programs shall be given. The procedure for invoking such programs shall be described. The procedure for consulting fault dictionary for diagnostic programs should be made available.

c. In case a fault requiring reloading of the program is detected, this shall be carried out automatically. In case of manual re-loading, it should be possible to stop and start at any particular point in the program.

3.24 Command/Command Log

3.24.1 Under normal conditions, the execution of any command shall not result in malfunctioning and/or over loading of the system.

3.24.2 It shall be implemented in such a way that errors in commands or control actions shall not cause the system to stop or unduly alter the system configuration.

3.24.3 Command errors detected by the system shall be indicated by the output of error messages.

3.24.4 The system shall support priority messages to interrupt an input or output message of lower priority.

3.24.5 Commands which are used for modification of system program or data shall be logged in a file and it shall be possible to retrieve the same on demand whenever required, using MML command. It should not be possible to modify or delete log file by any MML command.

3.24.6 It shall be possible to store at least the last 20 commands on the screen and by scrolling and editing any command can be re-executable.

3.25 System back-up

3.25.1 It should be possible to save system back-up automatically at a specified time in the system hard disk. In addition, it should also be possible to save system backup automatically in CD-ROM/DVD/ Optical disk /Cartridge etc. It shall be possible to define the above time by MMC.

3.25.2 It shall be possible to take complete system backup on the same device. It shall also be possible to load the system from the backup. It shall be possible to store multiple files of charging information, detailed billing information, traffic statistics, command log, system software, office data etc. on the same device

3.26 Capacity:

a. The signalling links of STP shall be dimensioned for traffic load of 0.1 Erlang per signalling link but it shall be capable of handling up to 0.8 Erlang per signalling link.

b. STP shall meet the minimum performance requirements specified in clause 5 of this document with all features as defined by the purchaser turned on and with full

capacity (including all accounting and screening features, if specified by the purchaser), with an average MSU length of 100 bytes.

c. The link/terminal capacity of an STP, as well as memory capacity, shall be sufficient to allow E-link deployment for direct routing as well as back-up routing, without affecting the normal STP operations.

d. The STP shall also provide the ability for the alternate route(s) to be engineered to handle all the normal traffic together with the traffic that is normally sent on the E-link set.

3.27 System Redundancy

a. The equipment shall have availability figure of 99.999%. The MTBF (Mean Time between Failure) and MTTR (Mean Time to Restore) Predicted and observed values shall be furnished along with calculations by the manufacturer.

b. Sufficient redundancy shall be built into the design of the system so that the failure of any component/sub-system STP shall not result in the total system failure.

c. System shall be equipped with redundancy for power supply

3.28 Hardware**:** The plug in units (if any) shall be hot swappable to allow their removal/ insertion while the equipment is in energized condition.

3.29 Software

3.29.1 The normal operation of the system should not be adversely affected (excluding planned outage) while undertaking

i. Extension to existing equipment (Hardware expansion).

ii. Enhancement of facilities.

iii. Correction to programs or functional blocks.

iv. Software up-gradation

3.29.2 Facilities shall be in-built to ensure automatic system recovery on detection of software fault.

3.29.3 The software shall not pose any problem, due to changes in date and time based by events such as changeover of millennium/century, leap year etc , in the normal functioning of the system.

3.29.4 Software version of the equipment offered for type approval must be indicated.

3.29.5 The functional modularity of the software shall permit addition or removal any functionality without disturbing the other functionality.

3.30 In addition to functional requirements described clause 3.1 to 3.29 of this chapter, clauses 30 to 32 specifies the functional requirements of Standalone STPs

3.30.1 Signalling Connection Control Part –
STP shall provide Global Title Translation (GTT) as defined in ITU-T rec. Q.714 for following capabilities:

a National and international roaming for mobile subscribers.

b Routing of SMS messages as per defined rules.

c Efficient routing of calls when IN services is distributed across multiple SCPS.

d To localize routing database in case of number portability. Network access verification for blocking call or allowing call for particular service (s).

3.31 Operation Maintenance and administration Part

3.31.1 Provision shall exist in STP to support Operation Maintenance and Administration Part (OMAP) given in ITU-T recommendation Q 750, Q.753, Q.754 and other related ITU-T recommendation for MTP routing verification test MRVT.

3.31.2 STP shall have provision to record processors load (% occupancy).

3.31.3 All measurements (obligatory and others) included in Table 1 to 16 of Q.752 (ITU-T 06/97) shall be provided.

3.31.4 Accounting of deferent utilization in multi-operators environment. Facility shall be provided to assemble information for setting accounts with different operators using resources of STP. Accounting of MTP, SCCP and MAP messages shall be provided, in accordance with ITU-T Q.751, Q.752, in order to bill and charge connected Operators. Volume of transferred SS7 messages (number of MSUs and total bytes) and traffic type shall be accounted for.

3.31.5 Sufficient redundancy shall be provided for storage and retrieval of the accounting data. It shall be possible to transfer the accounting data to a central NMS location or any other accounting system for further processing.

3.32 Power Supply

Option 1:

The equipment shall be capable of working with –40 V to -60 V. DC input from power supply.

Switching mode Power Supply (SMPS) shall be used. Power supply and battery shall be modular and expendable to support the ultimate equipment configuration.

Option 2:

AC Mains supply of 220 Volts with a tolerance of -15% to + 10% would be available. The frequency may be 50 Hz $\pm$ 2 Hz. UPS and other power requirements are to be specified by the system developer.

Purchaser may decide option 1 or option 2 of power supply as per its requirement.

4.0 Interface Requirements

4.1 An STP shall be able to communicate with other nodes in the CCS network using the MTP, SCCP, and OMAP of the SS7 protocol as defined in following documents-

a) The STP shall transport the CCS7 messages as specified in TEC/IR/CCS- SIG and SD/INP-01. The TCAP provides the ability to exchange information between CCS7 nodes to provide services. The TCAP uses SCCP for transport.

b) STP shall inter-work with ANSI CCS7 standards used for CDMA technology.

4.2 The STP interface to other SP/STP shall be 2.048 Mbps/156 Mbps PCM links. It should be possible to use any time slot for signalling data link in any 2.048 Mbps/156 Mbps PCM system (digital system) except Time slot 0

4.3 The STP shall support standard interfaces to Operations Systems (OSs) for provisioning, administration, maintenance and network management functions for on site and remote maintenance console

4.4 IP capability in STP

It shall be possible to connect STP with IP network over Ethernet interface.

4.4.1 The physical interfaces (Ethernet connections used) shall consist of Gigabit Ethernet interface and/or 10/100 Base T with 1+1 redundancy, built on separate card/hardware. Type of Physical Interface port supported shall be indicated in TAC.

4.4.2 It shall support SCTP (Stream Control Transport Protocol) for reliable transportation of SS7 messages in the IP network. It shall convert the ISUP, SCCP, TCAP, INAP, Map and CAP messages in to IP packets and send them IP network.

4.4.3 STP shall support following IETF RFCs.

S.No.	RFC	Details
1.	RFC 2719	Frame work Architecture for signalling transport
2.	RFC 3309, RFC 3286 RFC 2960	SCTP
3.	RFC 3332	MTP3 User Adaptation Layer Protocol
4.	RFC 4165	MTP2 Peer to Peer Adaptation protocol
5.	RFC 3868	SCCP user Adaptation protocol

5.0 Quality Requirements.

All the functional requirements described in clause 5.1 to 5.3, shall be complied by both types of STPs irrespective of type of STP for which the applicant has sought the approval.

5.1 For all User Parts, the following conditions shall be complied by the STP:-

(a) Undetected errors - On a signalling link employing a signalling data link (which has the error rate characteristic as described in Recommendation Q.702) not more than one in 10^{10} of all message signal units will contain an error that is undetected by the STP.

(b) Loss of messages - Not more than one in 10^{7} messages will be lost due to failure in the MTP.

(c) Messages out-of-sequence - Not more than one in 10^{10} messages will be delivered out-of-sequence to the Use Parts due to failure In the STP. This value also includes duplication of messages.

5.2 Signalling Message Transfer Delay

The maximum Signalling Message Transfer Delay STP shall not be worse than the value listed in the TARLE- 5.

TABLE- 5

Signalling Message Transfer Delay

Percent of connections	Delay (ms)	
	Message type	
	Processing simple	Processing intensive
50%	300	440
95%	410	620

5.3 Changeover performance time: There are two performance times associated with link changeover. Both times are maximum time values (not normal values). They are defined to be the point at which 95% of the event should occur within the recommended performance time at a signalling point traffic load that is 30% above normal. The performance times are measured from outside the signalling point. (Refer clause 4.5.4 of ITU-T rec. Q.706).

5.3.1 Failure response time

This time describes the time taken by a signalling point to recognize that a changeover is needed for a signalling link. This time begins when the signalling link is unavailable and ends when the signalling point sends a changeover (or emergency changeover) order to the remote signalling point. A link is unavailable when a signalling unit with status indication out of service (SIOS) or processor outage (SIOS) is sent or received on the link.

Failure response time (maximum permissible): 500 ms

5.3.2 Answer time to changeover order

This time describes the time taken by a signalling link to answer a changeover (or emergency changeover) order. This time begins when the signalling point receives a changeover (or emergency changeover) order and ends when the signalling point sends a changeover (or emergency changeover) acknowledgement message.

Answer to changeover order (maximum permissible): 300 ms.

5.3.3 Estimates for message transfer times (Refer clause 5 of ITU-T rec. Q.706)

The estimates must take account of

i. the length of the signal unit;

ii. the signalling traffic load;

iii. the signalling bit rate;

iv. the signalling loop delay (terrestrial or satellite);

v. the error correction method used;

vi. the bit error rate.

The estimates are presented in the form of

- mean values,
- 95% level values.

The figures are related to 64 kbits/s signalling bit rate. The normal signalling traffic load is that load for which the signalling transfer point is engineered. A mean value of 0.2 Erlang per signalling links assumed.

5.3.4 Estimates for T_{cs}

The estimates for T_{cs} for a signalling transfer point are given in Table 6 below:

TABLE 6/ (Ref.Q.706)

Message transfer time at an STP (T_{cs})

STP signalling traffic load	(Tcs) ms	
	Mean	95%
Normal	20	40
15%	40	80
30%	100	200
NOTE- The values in the table were determined based on TUP message. TUP message are not used in Indian CCS7 network.		

The message length distribution is as given in Table 3 of ITU-T rec. Q.706 For the User Parts defined later than the TUP, larger message lengths are typical. For these larger message lengths, the mean values for T_{cs} are not given as a whole, but can be calculated by adding the mean values of T_{od} and T_{ph}.

5.3.5 Estimates for STP processor handling time T_{ph}

The delay times for T_{ph} are implementation dependent. The implementation hardware depends on the state of technology at the time it was developed. Advances in technology may reduce the delay values presented in this section.

The proposed values for T_{ph} shown below in the table 7 relate to hardware of the Red Book/blue Book time frame.

The overall mean delay in an STP can be estimated by adding the mean values of T_{od} and T_{ph}. However, the overall 95% delay in an STP cannot be estimated by a single summation of the 95% values for T_{od} and T_{ph}.

TABLE 7

(Ref. Table 11/Q.706)

STP processor handling time Tph

Processor load	Delay value	Mean message SU length			
		23 bytes	50 bytes	140 bytes	279 bytes (Note)
Normal	Mean	19	22	33	55
	95%	35	40	50	75
30%	Mean	60	70	100	160
	95%	120	140	200	320
NOTE- The MSU size is fixed in this case at 279 bytes.					

5.4 In addition to functional requirements described in Sub-clauses of clause 5.1 to 5.3, Sub-clauses of this clause specifies the Signalling Connection Control Part (SCCP) Performance requirements of Standalone STP

5.4.1 Internal parameters for classes 0 and 1

(a) Transit time of a UDT message in a relay point

The transit time of a UDT message in a relay point is composed time of a UDT message for the relay function in a relay point and of the time elapsed in the MTP at this relay point for the UDT message. It is measurable externally. It is described in Figure 2 of ITU-T recommendation Q.716 and it should not exceed the values given in TABLE- 8. The normal traffic load for the translation function is the load for which the point is dimensioned.

These figures assume a message length distribution as given in TABLE- 8 (short messages with a mean message length of 120 bits). Clause 4 of Q.716 considers the effect of longer messages and other factors on the SCCP performance.

TABLE- 8

Transit time of a UDT message in a relay point

Traffic load for the translation function	Transit time (ms)	
	Mean	95%
Normal	50-155	100-310
+15%	100-233	200-465
+30%	250-388	500-775

(b) Unavailability of a relay point - The unavailability of a relay point should not exceed 10^{-4}.

5.4.2 Internal parameters for classes 2 and 3

(a) Transit time of a CR message at a relay point without coupling

The transit time of a CR message at a relay point without coupling is composed of the transit time of a CR message for the relay function in a relay point without coupling and of the time elapsed in the MTP at this relay point without coupling for the CR message: it is measurable externally. It should not exceed the values given in TABLE- 9.

The normal traffic load for the relay function is the load for which the point is dimensioned.

These figures assume a message length distribution as given in TABLE 9 (short messages with a mean message length of 120 bits).

TABLE- 9

Transit time of a CR message in a relay point without coupling

Traffic load for the relay function	Transit time (ms)	
	Mean	95%
Normal	50-155	100-310
+15%	100-233	200-465
+30%	250-388	500-775

(b) Transit time of a CR message in a relay point with Coupling

The transit time of a CR message at a relay point with coupling is composed of the transit time of a CR message for the relay function in a relay point with coupling and of the time elapsed m the STP at this relay

point with coupling for the CR message, it is measurable externally. It should not exceed the values given in TABLE- 10.

The normal traffic load for the relay function is the load for rich the point is dimensioned.

TABLE- 10

Transit time of a CR message in a relay point with coupling

Traffic load for the relay function	Transit time (ms)	
	Mean	95%
Normal	75-180	150-360
+15%	150-270	300-540
+30%	375-450	750-900

(c) Transit time of a CC message in a relay point with coupling

The transit time of a CC message at a relay point with coupling is composed of the transit time of a CC message for the relay function in a relay point with coupling and of the time elapsed in the STP at this relay point with coupling for the CC message, it is measurable externally. It should not exceed the values given in TABLE- 11.

The normal tragic load for the relay function is the load for which the point is dimensioned.

TABLE- 11

Transit time of a CC message in a relay point with coupling

Traffic load for the relay function	Transit time (ms)	
	Mean	95%
Normal	30-110	60-220
+15%	60-165	120-330
+30%	150-275	300-550

(d) Transit time of a DT message in a relay point with coupling

The transit time of a DT message (DTI or DT2) at a relay point with coupling is composed of the transit time of a DT message for the relay function in a relay point with coupling and of the time elapsed in the MTP at this relay point with coupling for the DT message; it is measurable externally. It should not exceed the values given in TABLE- 12.

TABLE- 12

Transit time of a DT message in a relay point with coupling

Traffic load for the relay function	Transit time (ms)	
	Mean	95%
Normal	30-110	60-220
+15%	60-165	120-330
+30%	150-275	300-550

(e) Unavailability of a relay point without coupling

The unavailability of a relay point without coupling should not exceed 10^{-4}.

6.0 EMI/EMC Requirements

The equipment shall conform to the EMC requirements for Class A:

General Electromagnetic Compatibility (EMC) Requirements: - The equipment shall conform to the EMC requirements as per the following standards and limits indicated therein. A test certificate and test report shall be furnished from an accredited test agency.

a) Conducted and radiated emission (applicable to telecom equipment):

Name of EMC Standard: "CISPR 32 (2015) with amendments - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment".

Limits:-

i) To comply with Class B of CISPR 32 (2015) with amendments for indoor deployments and Class A of CISPR 32 (2015) with amendments with amendments for outdoor deployments.

b) Immunity to Electrostatic discharge:

Name of EMC Standard: IEC 61000-4-2 {2008) "Testing and measurement techniques of Electrostatic discharge immunity test".

Limits:-

i) Contact discharge level 2 {± 4 kV} or higher voltage;

ii) Air discharge level 3 {± 8 kV} or higher voltage;

c) Immunity to radiated RF:

Name of EMC Standard: IEC 61000-4-3 (2010) "Testing and measurement techniques-Radiated RF Electromagnetic Field Immunity test".

Limits:-

For Telecom Equipment and Telecom Terminal Equipment without Voice interface (s)

Under Test level 2 {Test field strength of 3 V/m} for general purposes in frequency range 80 MHz to 1000 MHz and for protection against digital radio telephones and other RF devices in frequency ranges 800 MHz to 960 MHz and 1.4 GHz to 6.0 GHz.

d) Immunity to fast transients (burst):

Name of EMC Standard: IEC 61000-4-4 {2012) "Testing and measurement techniques of electrical fast transients/burst immunity test".

Limits:-

Test Level 2 i.e.

a) 1 kV for AC/DC power lines;

b) 0. 5 kV for signal / control / data / telecom lines;

e) Immunity to surges:

Name of EMC Standard: IEC 61000-4-5 (2014) “Testing & Measurement techniques for Surge immunity test".

Limits:-

i) For mains power input ports : (a) 2 kV peak open circuit voltage for line to ground coupling (b) 1 kV peak open circuit voltage for line to line coupling

ii) For telecom ports : (a) 2kV peak open circuit voltage for line to ground (b) 2KV peak open circuit voltage for line to line coupling.

f) Immunity to conducted disturbance induced by Radio frequency fields:

Name of EMC Standard: (IEC 61000-4-6 (2013) with amendments) "Testing & measurement techniques-Immunity to conducted disturbances induced by radio- frequency fields”.

Limits:-

Under the test level 2 {3 V r.m.s.} in the frequency range 150 kHz-80 MHz for AC / DC lines and Signal /Control/telecom lines.

Immunity to voltage dips & short interruptions (applicable to only ac mains power input ports, if any):

Name of EMC Standard: IEC 61000-4-11 (2004) “Testing & measurement techniques-voltage dips, short interruptions and voltage variations immunity tests”.

Limits:-

i) a voltage dip corresponding to a reduction of the supply voltage of 30% for 500ms (i.e. 70 % supply voltage for 500 ms)

ii) a voltage dip corresponding to a reduction of the supply voltage of 60% for 200ms; (i.e. 40% supply voltage for 200ms) and

iii) a voltage interruption corresponding to a reduction of supply voltage of > 95% for 5s.

iv) a voltage interruption corresponding to a reduction of supply voltage of >95% for 10s.

g) Immunity to voltage dips & short interruptions (applicable to only DC power input ports, if any):

Name of EMC Standard: IEC 61000-4-29:2000: Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests.

Limits:-

i. Voltage Interruption with 0% of supply for 10ms. Applicable Performance Criteria shall be B.

ii. Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. Applicable Performance Criteria shall be C.

iii. Voltage dip corresponding to 40% & 70% of supply for 10ms, 30 ms. Applicable Performance Criteria shall be B.

iv. Voltage dip corresponding to 40% & 70% of supply for 100ms, 300 ms and 1000ms. Applicable Performance Criteria shall be C.

v. Voltage variations corresponding to 80% and 120%of supply for 100 ms to10s as per Table 1c of IEC 61000-4-29. Applicable Performance Criteria shall be B.

Note: - For checking compliance with the above EMC requirements, the method of measurements shall be in accordance with TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16 and the referenced base standards i.e. IEC and CISPR standards and the references mentioned therein unless otherwise specified specifically. Alternatively, corresponding relevant Euro Norms of the above IEC/CISPR standards are also acceptable subject to the condition that frequency range and test level are met as per above mentioned sub clauses (a) to (h) and TEC Standard TEC/SD/DD/EMC-221/05/OCT-16. The details of IEC/CISPR and their corresponding Euro Norms are as follows:

IEC/CISPR	Euro Norm
CISPR 11	EN 55011
CISPR 32	EN55032
IEC 61000-4-2	EN 61000-4-2
IEC 61000-4-3	EN 61000-4-3
IEC 61000-4-4	EN 61000-4-4
IEC 61000-4-5	EN 61000-4-5
IEC 61000-4-6	EN 61000-4-6
IEC 61000-4-11	EN 61000-4-11
IEC 61000-4-29	EN 61000-4-29

7.0 Safety Requirements

7.1 “The equipment shall conform to relevant safety requirements as per to IS/IEC 62368-1: 2023 Audio / Video, Information and Communication Technology Equipment as prescribed under Table no. 1 of the TEC document ‘SAFETY REQUIREMENTS OF TELECOMMUNICATION EQUIPMENT”: TEC10009: 2024”

7.2 A test certificate and test report shall be furnished from an accredited test agency.

7.3 The test agency for safety requirements tests shall be an ISO 17025 accredited agency and details of accreditation shall be submitted.

8 Security Requirements

8.1 Unauthorised Access

8.1.1 Access to system operations shall be controlled through multi-level password and authentication checks.

8.1.2 The man-machine communication programs shall have the facility of restricting the use of certain commands or procedures to certain passwords and terminals

8.1.3 It shall be possible to define users and user groups with different access rights

8.1.4 It shall be possible to modify user password number of times.

8.1.5 Session ID shall be logged with information of user ID, password, time of login, commands/parameters given etc.

8.1.6 All passwords shall be stored in encrypted form and no user including 'Network Manager' shall be able to read the password.

8.1.7 The system must support 'session logout timing with configurable time periods

8.1.8 The system should block the access from local as well from remote terminals after receipt of consecutive predefined (say 5) wrong login/passwords and unauthorised commands.

8.1.9 Appropriate security mechanisms for authentication, integrity and confidentiality shall be used for secured transportation through IP network as per IETF RFC 2401and RFC 2402.

8.2 Monitoring

8.2.1 STP shall pose no limitation in Lawful interception and monitoring.

8.2.2 In case of IP connectivity with STP, the system shall have safe guards to prevent Denial of Service (DOS) attacks. It should be possible to configurable IP port linking it with IP address or port number interface identity (Applicable for IP interface only)

9.0 Various requirements of category/configuration of the product for testing

9.1 An STP can exist in one of two forms:

a. Standalone STP: It is stand alone STP having only signalling functionalities. These are neither the source nor the destination for MTP user traffic. It is deployed in "mated" pairs for the purposes of redundancy. Under normal operation, the mated pair shares the load. If one of the STPs fails or isolation occurs because of signalling link failure, the other STP takes the full load until the problem with its mate has been rectified.

b. Integrated STP (SP with STP): combine the functionality of an SSP and an STP. These are both the source and destination for MTP user traffic. They also can transfer incoming messages to other nodes.

9.2 The applicant may seek type approval for any types of STP given below:

i Type 1 – Integrated STP

ii Type 2 - Standalone STP

CHAPTER 2

Information for the procurer of product

10.0 The various functions/ facilities/ features described in this chapter are comprehensive and suggestive which may be useful. These need not be treated as mandatory for the product. However, the purchaser will select the functions/ facilities/features of STP as per its requirements at the time of procurement/ tendering.

The functions/ facilities/ features described in this chapter will not be tested/ verified by TEC

10.1 Input-output devices (LCT)

10.1.1 Necessary software package to prevent loading of any unauthorised software or driver on the I/O terminal (without specific authorisation from PC administrator) may be provided.

10.1.2 Adequate number of man-machine interfaces may facilitate various types of system administrations listed.

10.1.3 If provision is made for monitoring from a remote terminal, it shall be ensured that the data links conform to the ITU-T Recommendations Q.513. Care shall be taken that the reliability of the data links does not, in any way, affect the reliability of the STP system. Special provision may also be made for transmission of a failure signal even when the system is unable to transmit an output message.

10.1.4 It may be possible to give all the man-machine commands from remote location. Purchaser may access the requirement of eMS as per its network architecture.

10.2 Hardware

10.2.1 The system may support adequate redundancy for different sub-systems (e.g. processors, control links, storage, power supplies and I/O ports etc.) so as to comply with the requirements of system reliability and stability as specified for the system.

10.2.2 Adequate backup memory may be provided.

10.2.3 Provision may be made to prevent the loss/alteration of memory contents due to power failures, improper operating provides and the procedure for restoring the system to its normal state, etc.

10.2.4 Colour code used for power feeding bus-bars/cables and earth may be identical for a given voltage throughout the equipment.

10.2.5 Fuses may have a suitable marking for the different ratings to enable easy identification and replacement. Marking may ensure easy trace ability

10.3 Software

10.3.1 The software may be modular and structured

10.3.2 The functional modularity of the software may permit introducing of changes wherever necessary with least impact on other modules.

10.3.3 It may be open-ended to allow addition of new features.

10.3.4 Right to use: There may be no imposition of any sort of precondition on the -Right to Use' of software.

10.3.5 The supplier may undertake to supply on continuous basis all software updates, for a period of seven years (to be specified by purchaser) from the date of taking over of system. These updates may include new features and services and other maintenance updates.

10.3.6 The suppliers may set up facilities for software maintenance.

10.3.7 The following functions are expected to be served by such facilities:

i. Post dump Analysis
ii. Developing simple new features
iii. System analysis and coding for above
iv. Debugging for above
v. Patch realization
vi. Patch verification
vii. Pitch implementation at sites
viii. Version control of software
ix. Document generation
x. Repository of working versions

New software jobs will be mutually discussed/negotiated for terms and implementation, so long as they are not covered by normal and/or life time warranties).

10.3.8 All the software updates may be provided on continuous basis

10.4 Signalling Links:

The following facilities may be provided optionally. If provided, it shall be possible to either use or disable the facilities.

10.4.1 Repetition of message signal units using Basic error correction method (Refer clause 5 3.3 of ITU-T Recommendation Q.703)

10.4.2 Automatic allocation of signalling terminals and signalling data links (Refer clause 7.3 foot note 4 of ITU-T Recommendation Q.703).

10.4.3 The facility to establish the Signalling data link over a digital path made up by digital sections, based on different digital hierarchies (Refer clause 5.4 of ITU-T Recommendation Q.702) may be provided. It may be possible to either use or disable the facility.

10.5 Signalling Network Functions and messages: The following facilities can be provided optionally. If provided, it shall be possible to either use or disables the facilities:

a The transmission of User Part Unavailable (UPU) (Refer clause 2.4.2 of ITU-T Recommendation) received message is mandatory

b Signalling link management procedures based on automatic allocation of signalling data links and signalling terminals as given in clauses 12.3 and

12.4 of ITU-T Recommendation Q 704.

10.6 Capacity-. Purchaser may specify the value of following parameters as per its network requirements

(a)

S.No.	Parameter	Unit	Typical value
a.	MSU throughput	MSU/sec	200,000
b.	GTT throughput	GTT/sec	30,000
c.	GTT entries	Numbers	100,000
d.	GTT length	Digits	21
e.	SCTP association over IP	Numbers	100
f.	Link-sets	Numbers	1024
g.	Route-sets	Numbers	2048
h.	Routes/link-set	Numbers	1024
i.	Links/route-set	Numbers	4
j.	Routes	Numbers	16,000
k.	Screening Matrix		512X512

I.	Number portability BHCA	Transactions/sec	1500

Values given are typical values. However, purchaser may define the above values depending upon its requirement as per its network architecture, network traffic, link capacity etc.

(b) Number portability Capacity

The number porting capacity may be minimum 1 million numbers modularly expandable to 8 million. Central Database with disaster recovery may be provided for the purpose co-located with NMS locations The BHCA may be 5 million modularly expandable to 50 million

10.7 Formats and codes

The following messages can be provided optionally. If provided, it may be possible to either enable or disable them:

CNP - Connection-not-possible
CNS - Connection not successful
CSS - Connection successful
DLC -Signalling-data-link-connection-order
UPU - Sending of User part Unavailable

10.8 The level 3 timers given in TABLE-13 of this document can be provided. If provided, it may be possible to either enable or disable the timer

TABLE- 13

Optional Level 3 timer

Timer	**Purpose of timer**	**Range**
T7	Waiting for signaling data link connection acknowledgement	1 to 2 seconds

10.9 Operation Maintenance and administration Part

Provision may exist in STP to support Operation Maintenance and Administration Part (OMAP) given in ITU-T recommendation Q 750, Q.753, Q.754 and other related ITU-T recommendation for SCCP routing verification test SRVT.

10.10 The purchaser may specify the standard interface required for mediation device required for billing.

10.11 Labelling potential - The system may provide the potential for labels to identify 16384 signalling points

10.12 Flexible Routing for GSM Network- This may enable flexible number handling for MSISDN (E.164) and IMSI so that HLR is independent of the IMSI or the MSISDN number, resulting in efficient usage of HLR resources.

10.13 Traffic partitioning **-** In addition to SCCP called party address parameters, SCCP routing may also be possible based on various flexible options resulting in different GTT translations such as:

a. OPC dependent GTT
b. Calling Party Address (SSN/SPC/TT/NP/GT Digits) dependent GTT
c. Destination SCCP user address

10.14 SM Offload: It may be possible to route MAP messages (which are related to SMS messages) via an IP-backbone network to the appropriate SMSC.

10.15 Advanced SMS Traffic Routing**:** The STP may be capable of inter-working with SMSCs so that advanced Routing for SMS messages through SMSC as given below can be provided:

i. Direct routing of SMS messages from mobile to Extended Short Message Entity (ESME).
ii. Routing to multiple application ESME Servers based on the SMS application.
iii. Routing SMS messages to an external e-mail Gateway Server.
iv. Provision of load-sharing SMS messages to multiple SMSC.
v. Provision of load-sharing SMS messages to multiple ESME (Per each application).
vi. Support of SS7-TDM and SS7 over IP protocol to route SMS message to SMSC.
vii. Support for SMDPP protocol (version 3.4)/SMPP protocol to route VMS messages to ESME.
viii. Support of multiple address types such as Short Code, a-mail address for SMS routing.
ix. Capability to buffer SMS messages for handling temporary failure of both ESME servers and IP route. Once, the failure is removed, the STP will automatically send the buffered SMS.
x. Authenticating SMS sender for message routed to ESME.

10.16 CDMA & GSM SMS inter-working: In order to ensure seamless exchange of SMS messages between CDMA and GSM subscribers, the STP may support transparent handling of both GSM MAP and ANS-41 MAP protocols. The STP may transfer ANSI-41 and GSM MAP messages. For example, an ANSI's originated MAP message can be routed either to a GSM SMSC or ANSI-41 SMSC or vice versa.

10.17 In case of standalone STP, purchaser may specify the power requirement (Option1 or option2) as per clause 3.32. The equipment shall operate over this range without any degradation in performance.

10.17.1 The equipment may be protected in case of voltage variation beyond the range specified in clause 10.17 above and also against input reverse polarity. The manufacturer/applicant may furnish the data on the voltages at which protection will operate.

10.17.2 The derived DC voltages in the equipment may have protection against over voltage, short circuit and overload.

10.17.3 The quality plan describing the quality assurance system followed by the manufacturer may conform to the guidelines given by Quality Assurance unit of Service Provider from time to time.

10.18 Digital Distribution Frame (DDF) **-** A suitable DDF may be provided. Procurement authority may specify its requirement along with DDF capacity at the time of procurement

10.19 Documentation:

Number of copies (hard and soft) of following documents required may be specified by the purchaser.

i). System description documents

ii). System operation and maintenance documents

iii). Training documents

iv). Installation Documents

v). Repair related documents

Further details of documentation required have to be specified by the purchaser.

10.19.1 All the documents to be provided by the supplier shall be in English language whether in soft copy or in hard copy.

10.20 Procurement /Tendering information

10.20.1 The value of various parameters are indicative and may be special by the purchaser at the time of procurement

10.20.2 The purchaser may review that the Advanced SMS Traffic Routing through STP is required or not.

10.20.3 The purchaser may review that the SMS offload through STP is required or not.

10.20.4 The purchaser may review that whether CDMA & GSM SMS inter-working is required through STP or not.

10.20.5 Locations in the network where STP(s) is/are to be installed.

10.20.6 The purchaser may specify whether the STP is to be implemented in integrated mode or to be supplied as Stand-alone equipment.

10.20.7 In case of STP handling IP, extent of Diameter Signalling may be accessed by the purchaser.

10.21 Purchaser may specify the following at the time of procurement.

i Addressing required (Refer clause 3.1.17)

a) 14-bit addressing as per ITU or 24-bit addressing as per ANSI or both

b) Purchaser may decide the support of IPv6 w.r.t clause no. 3.1.17(b) depending upon its requirement and the prevalent rules & regulations

ii Additional method(s) of number portability required, if any (Refer clause 3.1.15)

iii STP support for NMS/TMN connectivity required – Direct connectivity or through eMS (Refer clause 3.1.18)

iv Northbound interface from STP/eMS required e.g. SNMP/XML/CORBA etc.23

v Number of accounting class required. (Refer clause 3.18.3 c)

vi Minimum configurable periodic. (Refer clause 3.18.3 c)

10.22 Terms and conditions of various licenses require that the equipment may comply with relevant contemporary Indian or International Security Standards e.g. IT and IT related elements against ISO/IEC 15408 standards, for Information Security Management System against ISO 27000 series Standards, Telecom and Telecom related elements against 3GPP security standards, 3GPP2 security standards etc. The certification

for above may be obtained only from authorized and certified agencies/labs in India or as may be specified by the DoT/Govt. of India.
At the time of procurement, the purchaser may take appropriate safe guards/care to comply with above licensing requirement."

10.23 While planning the network architecture (i.e. location of various STPs/eMS/ NMS), purchaser may take in to consideration the disaster requirements.

11.0 Following shall be indicated in the Type approval certificate:

i. Type of STP (i.e. Standalone STP/Integrated STP)
ii. Physical port supported (i.e. 10/100 Base T and/or Gb Ethernet)
iii. Type of Power supply supported (i.e. AC/DC)
iv. Connectivity with NMS/TMN (i.e. directly/through eMS/both)
v. Number portability methods supported (i.e. ACQ/QOR/RPT/onward routing)
vi. IP addressing supported: IPv4/IPv6 or both

ABBREVIATIONS

ANSI	American National Standards Institution
ASE	Application Service Element
CCS7	Common channel Signalling System No.7. Also known as SS No.7
CDMA	Code Division Multiple Access
CISPR	International Special Committee on Radio Interference
DDF	Digital Distribution Frame
DOS	Denial of Service
DPC	Destination Signalling Point Code
EMC	Electromagnetic Compatibility
ESME	Extended Short Message Entity
GR	Generic Requirements
GTT	Global Title Translation
GUI	Graphic User Interface
HLR	Home Location Register
IEC	International Electro technical Commission
IMSI	International Mobile Subscriber Identity
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
IP	Internet Protocol
IS	International System
ISO	International Standard Organisation
ISP	International Signalling Point
ISUP	ISDN User Part
ITU-T	International Telecommunication Union- Telecommunication

LCT	Local Craft Terminal
MAP	Mobile Application Part
MML	Man Machine Command
MRVT	MTP Route Verification Test
MSC	Mobile Switching Centre
MSISDN	Mobile Subscriber ISDN
MSU	Message Signalling Unit
MTP	Message Transfer Part
NMS	Network Management Service
NSP	Network Service Part/ National Signalling Point
OMAP	Operation Maintenance and administration Part
OPC	Originating Signalling Point Code.
OR	Operational Requirements
OSI	Open System Interconnection model
OSS	Operation Support System
PCB	Printed Card Board
PCM	Pulse Code Modulation
PCR	Preventive Cyclic Retransmission
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
QR	Qualitative Requirements
ROA	Restricted Operator/Administration
NSP	National Signalling Point
SCCP	Signalling Connection Control Point
SDL	Specification & Description Language

SCP	Signalling Control point
SEP	Signalling End Point
SI	Service Indicator
SIF	Service Information Field
SIO	Service information Octet
SIOS	Status Indication Out-of Service
SLK	Data Signalling Link
SMS	Short Message Service
SMSC	Short Message service Centre
SP	Signalling point
SPC	Signalling Point Code
SRVT	SCCP Routing verification Tests
SSN	Sub-system Number
SSP	Service switching point
STP	Signalling Transfer Point
TAC	Type Approval Certificate
TCAP	Transaction Capability Application Part
TEC	Telecommunication Engineering Centre
TMN	Telecommunications Management Network
TMSI	Temporary Mobile Subscriber Identity
TT	Translation Type
TUP	Telephone User Part
VRLA	Valve Regulated Lead Acid (battery)

End of document