الاتصالات السعودية
SAUDI TELECOM

SAUDI TELECOM COMPANY

Reference Interconnection Offer (RIO)

Annex C, Attachment 3

SAUDI ARABIA SS7

SIGNALLING STANDARD

(SA-ISUP & MTP)

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1 SAUDI ARABIA SS7 SIGNALLING STANDARD

1.1 GENERAL

1.1.1 Telephony-related signalling is provided via the Integrated Services Digital Network User Part (ISUP) of the Signalling System No. 7 (S.S. No. 7) signalling network.

1.1.2 The specifications for the S.S. No. 7 ISUP protocols consist of the corresponding ITU-T and ETSI Recommendations, with clarification where the recommendations indicate implementation alternatives or are unclear.

1.1.3 STC only uses S.S.No. 7, consisting of the Message Transfer Part (MTP) and ISUP, for interconnection with Other Licensed Operators.

1.1.4 The specifications for the Saudi Arabia S.S. No.7 Signalling Network are as per the appropriate sections of the ITU-T recommendations Q.701 to Q.709, except where modified by statements in this document.

2 SAUDI ARABIAN ISUP (SA-ISUP)

2.1 INTRODUCTION

2.1.1 This section specifies the PSTN basic and supplementary services to be supported by SA-ISUP for the national network.

2.1.2 The implementation of these services shall be based on relevant CCITT/ITU-T recommendations or ETSI specification, to facilitate the interworking of exchange equipment from different vendors. Where the relevant standards have been adapted for Saudi Arabia, the Other Licensed Operator shall be prepared to make subsequent modifications to interwork with the STC network, as will be agreed to by the Technical Review Committee, described in Annex H (*Operations and Maintenance Manual)*.

2.2 SCOPE

2.2.1 This Standard provides the PICS proforma (Protocol Implementation Conformance Statement) for the ISDN User Part implemented in the national network, called SA-ISUP, supporting ISDN and PSTN basic and supplementary services for voice and non-voice applications. The SA-ISUP and MTP PICS proforma is based on functional rather than detailed requirements.

2.2.2 The OLO shall indicate the compliance of their ISUP implementation to the Saudi Arabian ISUP functional requirements by completing the SA-ISUP PICS proforma provided in Clause 2.4 below.

2.3 SA-ISUP SERVICE SUPPORT

2.3.1 This section specifies the PSTN basic and supplementary services to be supported by SA-ISUP for the national network.

2.3.2 The following services shall be supported:

PSTN Supplementary Services:

- Calling Line Identification Presentation (Clause 3 of Q.731)
- Restriction in the outgoing direction service (ITU-T fascicle II-2 Supp)
- Incoming call barring (Sec. 1.10, ITU-T fascicle II-2 Supp)
- 3-party services (Sec. 1.15, ITU-T fascicle II-2 Supp)
- Malicious call identification services (Sec.1.6, ITU-T fascicle II-2 Supp)
- Payphone service (Sec. 1.1, ITU-T fascicle II.2 Supp)
- Freephone service (Sec. 1.5, ITU-T fascicle II-2 Supp)
- Call waiting services (Sec. 2.23, ITU-T fascicle II-2 Supp)
- Call Forwarding Busy (ETS 300199)
- Call Forwarding No Reply (ETS 300201)
- Call Forwarding Unconditional (ETS 300200)

2.4 SA-ISUP FUNCTIONAL REQUIREMENTS

ITEM	NAME OF ITEM	STATUS	REFERENCES	SUPPORT	SEE NOTE
1	Normal call setup, enbloc and overlap operation	m	Q.764/2.1		
2	Connection types allowed: 1. Speech 2. 64 kbit/s unrestricted	 m m	Q.764/2.1		
3	Continuity check	m	Q.764/2.1.8		
4	Special procedures at interworking point Transit network selection	m	Q.764/2.1.9 Q.764/2.1.11		
5	Cross office check	m	Q.764/2.1.10		
6	Charging	m	Q.764/2.1.9		
7	Unsuccessful call set-up and normal call release, including returned tones and announcements	m	Q.764/2.2, 2.3		
8	Suspend & resume	m	Q.764/2.4		
9	Propagation delay termination procedure	o	Q.764/2.6		
10	Automatic repeat attempt	m	Q.764/2.8.1		
11	Blocking and unblocking of circuits and circuit groups	m	Q.764/2.8.2		
12	Dual seizure	m	Q.764/2..9.1		
13	Transmission alarm handling for digital inter-exchange circuits	m	Q.764/2..9.2		
14	Reset of circuits and circuit groups	m	Q.764/2.9.3		
15	Failure in blocking/unblocking sequences	m	Q.764/2.9.4		
16	Receipt of unreasonable and unrecognised signalling information messages	m	Q.764/2.9.5		
17	Failure to receive a release complete message	m	Q.764/2.9.6		
18	Other failure conditions	m	Q.764/2.9.8		
19	Temporary trunk blocking before release	m	Q.764/2.9.9		
20	ISUP signalling congestion control	m	Q.764/2.10		
21	Automatic congestion control (ACC)	m	Q.764/2.11		
22	Unequipped circuit identification code	m	Q.764/2.12		

2.5 Calling Party Categories (in line with ITU-T Q.763):

NAME OF ITEM	VALUE
Category unknown at this time	0
Reserved	1 - 8
National operator	9
Ordinary subscriber (International)	10
Subscriber with priority	11
Data call	12
Test call (maintenance equipment)	13
Spare	14
Payphone	15
Ordinary subscriber (National)	246
Calling subscriber with priority (National)	247
Data call (National voice band data)	248
International Coin Box	249
Call cabins & hotel metering subscribers	250
Interception service operator	251
Calls transferring subscriber	252
Spare	253
Mobile subscriber	254
all other values	---

2.6 **Cause Identifiers** (in line with ITU-T Q.850)

NAME OF ITEM	VALUE
a) Extension indicator	
1. octet continues through to next	0
2. last octet	1
b) Coding standard	
1. ITU-T standard	0
2. to	---
4. reserved	---
c) Location	
user	0
private network serving local user	1
public network serving local user	2
transit network	3
public network serving remote user	4
private network serving remote user	5
international network	7
beyond an interworking point	10
all other values	---
d) Recommendation	---
e) Cause value	
Class 0 and 1 - normal event:	
unallocated number	1
no route to specified network	2
no route to destination	3
send special information tone	4
misdialed trunk prefix	5
normal call clearing	16
user busy	17
no user responding	18
no answer from user	19
call rejected	21
number changed	22
destination out of order	27
address incomplete	28
facility rejected	29
normal unspecified	31
other values in range 0 to 31	---

3 SIGNALLING NETWORK STRUCTURE

3.1 The signalling network shall be structured as described in ITU-T Recommendation Q.705 as per figure 6 of this Annex C. Only OLO's STP's will directly connect to STC National STP's.

3.2 Signalling Point numbering of the POI Service Nodes is shown in Annex C, Attachment 2 (*Points of Interconnection & Signalling Point Codes (POIs & SPCs)*).

3.3 Numbering of OLO's Signalling Point Codes will follow the signalling numbering scheme as per CITC plan.

4 TESTING AND MAINTENANCE

4.1 Maintenance of the interconnection signalling links between OLO and STC networks shall generally follow the guidelines of ITU-T Recommendation M.4100.

4.2 The Other Licensed Operator shall support capability of performing the MTP and ISUP compatibility test requirements extracted from ITU-T Recommendations Q.780, Q.781, Q.782, Q.784 and Q.785.

5 PERFORMANCE REQUIREMENTS

5.1 The Performance Requirements for the implementation of S.S. No.7 shall be as described in the following:

a) Q.706: Message Transfer Part Signalling Performance
b) Q.709: Hypothetical Signalling Reference Connection
c) Q.766: Performance Objectives in the ISDN Application
d) ETS 300 008: Section 6.1 Signalling Link Loading

6 MONITORING & MEASUREMENTS FOR S.S.7 NETWORK

6.1 The signalling network measurement requirements shall be extracted from ITU-T Recommendation Q.752. These requirements shall be discussed with the Other Licensed Operator. The Other Licensed Operator shall be prepared to provide a list of the measurements that are supported by their S.S. No. 7 Signalling Network equipment, and to implement any additional measurements that are necessary.

7 MTP REQUIREMENTS FOR INTERCONNECTION

7.1 GENERAL

7.1.1 The requirements for interconnection are provided in paragraph 6.2 below, and consist of the appropriate sections of the ITU-T Recommendations Q.702, Q.703 and Q.704 with ETSI-based modifications in some sections, as indicated.

7.2 MTP PROTOCOL REQUIREMENTS

7.2.1 LEVEL 1 - SIGNALLING DATA LINK

ITEM	NAME OF ITEM	STATUS	REFERENCE: Q.702	SUPPORT	SEE NOTE
1	Digital SDL at 64 Kbit/s, derived from a digital multiplexed signal at 2048 Kbit/s	m	1, 2, 3, 4 & 5		1
2	Terrestrial & satellite transmission links	m	1.5		
3	Exclusive use of SDL for S.S.7	m	1.6		
4	Disabling echo suppressors, etc. to ensure transmission bit integrity	m	1.7		
5	Switching Matrix semi-permanent connection	m	1.8		

Note 1: The exchange shall also have the capability to use timeslot 1 for signalling.

7.2.2 LEVEL 2 - SIGNALLING LINK

ITEM	NAME OF ITEM	STATUS	REFERENCE: Q.703	SUPPORT	SEE NOTE
1	Basic Signal Unit Format, Delimitation	m	2, 3		1, 2
2	Signal Unit Acceptance, Error Detection	m	1.3, 4		
3	Basic and PCR Error Correction	m	1.4, 5, 6		3, 4
4	Initial Alignment	m	7		
5	Processor Outage	m	8		5
10	Level 2 Flow Control	m	9		
11	Signalling Link Error Monitoring	m	10		6
12	Level 2 Codes and Priorities	m	11		
13	State Transition Diagrams and Timers	m	12		

Note 1: Q.703 Section 2.3.4 SIO: All User Parts shall be handled with the same priority.

Note 2: The maximum number of flags to be transmitted between two signalling units shall be 32.

Note 3: The guidelines in 1.4.1 shall be used to decide the method of error correction. The type of error correction shall be command settable on a per link or linkset basis.

Note 4: Q.703 Section 5.3.3 Repetition of MSUs: This sub-section is not applicable.

Note 5: Q.703 Section 8 Processor Outage: For long-term Processor Outages, the procedures described in ETS 300 008 Section 5 for "Processor Outage" shall be applicable.

Note 6: In order to maintain satisfactory operation over radio systems subject to fading, the parameters defining the SUERM/AERM shall be changeable on a per link basis. It shall be possible to activate by command a secondary set of parameters for selected signalling links.

7.2.3 LEVEL 3 - SIGNALLING NETWORK FUNCTIONS AND MESSAGES

ITEM	NAME OF ITEM	STATUS	REFERENCE: Q704.	SUPPORT	SEE NOTE
1	Signalling Message Handling	m	2		1
2	Status of signalling link and status change procedures	m	3.2, 3.3		2
3	Status of signalling routes and status change procedures	m	3.4, 3.5		3
4	Status of signalling point and status change procedures	m	3.6, 3.7		
5	Congestion status of signalling link	m	3.8.2		
6	Procedures used in connection with link congestion status changes	m	3.8.2		4
7	Signalling route set congestion	m	3.8.4, 3.8.5		
8	Signalling Traffic Management	m	4		3
9	Changeover	m	5		5
10	Changeback	m	6		
11	Forced Rerouting	m	7		
12	Controlled Rerouting	m	8		3
13	Signalling Point Restart	m	9		
14	Management Inhibiting	m	10		
15	Signalling Traffic Flow Control - Signalling route set unavailability, availability - Signalling route set congestion (national option with congestion priorities) - SP/STP congestion - User flow control	 m m m m	 11.2.1, 11.2.2 11.2.4 11.2.6 11.2.7		
16	Signalling Link Management - Basic signalling link management procedures	m	12 12.2		6
17	Signalling Route Management - Transfer prohibited - Transfer allowed - Signalling route set test - Transfer controlled (national option with congestion priorities) - Signalling route set congestion test	 m m m m m	13 13.2 13.3 13.5 13.7 13.9		3
18	MSU formats	m	14, 15		3, 7, 8
19	State Transition Diagrams & Timers	m	16		3, 7, 9

Note 1: The standard routing label specified in 2.2 is used in the national network as well.

Note 2: LPO latching to RPO before performing changeover (Q.704, 3.3.5.1 national option) is not applicable.

Note 3: Restricted routes and associated messages and procedures are not applicable.

Note 4: The congestion thresholds shall be set on a per linkset basis and shall be changeable by command.

Note 5: Q.704 Section 5 Changeover: The section in ETS 300 008 Section 5 referring to "Time - controlled changeover" shall be added to section 5.6.2.

Note 6: The links in a linkset are all part of the same link group. All links in a link set are of equal priority.

Note 7: Signalling-data-link-connection messages and procedures are not applicable.

Note 8: The spare-bits of the SIO field shall be used to indicate message priority.

Note 9: Tenderers shall indicate the range of Level 3 timers they support and if such timers are permanent parameters or command adaptable (either on a per route or on a per node basis). The preferred level 3 timer values are given in Q.704, section 16.8.