5i’

Recommendation Q.782

MTP LEVEL 3 TEST SPECIFICATION

1 Introduction

This Recommendation contains a set of detailed tests of signalling system No. 7 MTP level 3 protocol. These tests intend to validate the protocol specified in Q.704 and Q.707 Recommendations. The level 3 performance aspects specified in Q.706 Recommendation are also partly checked whenever possible. This Recommendation conforms to the Q.780 Recommendation. However, in addition to the objectives and guidelines of the latter Recommendation, other general principles specific to level 3 tests are presented below.

2 General principles of level 3 tests

2.1 *Presentation of test descriptions*

Each test description mentions the type of SP involved in the test. Three cases are possible:

— test applicable to an SP having no STP function: SP

— test applicable to an SP having STP function: STP

— test applicable to all types of SPs: ALL

Each test description includes the environment in which the point under test must be inserted in order to pass the test. Four test configurations are necessary (named A, B, C and D); they are presented in § 3.

Each test is precisely described. Nevertheless, some events not directly concerning the point under test, or without direct link with the test nature, are not explicitely described. This is, for example, the case of TFPs propagation when a point becomes isolated, or of the changeover procedure in a test concerning transfer allowed procedure.

In order to preserve the test description implementation independence, a certain flexibility has been left in the test descriptions. This is particularly the case when it is necessary to deactivate a link (where it is

only mentioned ‘‘Deactivate’’ with no more precision). The operator will choose, according to the implementation particularities and the events expected in the test description, the appropriate deactivation means (MML, provoked failure, etc.).

In the test descriptions, the signalling links are identified as follows: ‘‘number of linkset’’ — ‘‘number of link in the linkset’’ (e.g. 1 — 1 means link 1 of the linkset 1). This identification is independent of SLC attributed to these links. When the number of the link is X, that means that the concerned message can use any link of the linkset. When the field ‘‘number of link in the linkset’’ is, for example, ‘‘1, 2, . | | ’’, that means that the traffic uses all indicated links. Finally, when the links are identified by the mention ALL, that means that the traffic will use all available links of the point.

The orders ‘‘Start traffic’’, ‘‘Wait’’ and ‘‘Stop traffic’’ apply to the test configuration. They are placed at the beginning of the line.

2.2 *Presentation of the test list*

These tests, as a whole, aim at a complete validation of the level 3 protocol without redundancies.

The test list is presented in § 4. The national options and the various signalling link management ‘‘policies’’ are not included in this Recommendation.

The first set of tests in the list checks that, before some more precise tests, the point under test can perform the basic functions, i.e. can connect itself to the external environment and exchange signalling messages.

The second set basically validates the signalling message handling function of the point under test. A main point of this part concerns the validation of load sharing procedures. If an implementation does not use the load sharing between linksets, some tests would not be applicable, and other should be adapted.

The third and fourth sets check changeover and changeback procedures. They include tests like changeover and changeback to/from two linksets which will be performed only if the point under tests allows this possibility.

Rerouting procedures are checked using the tests in parts 5 and 6.

Part 7 concerns tests to check inhibition and uninhibition procedures. To limit the test numbers, it was not considered that the messages used in these procedures can be transferred via STPs.

Part 8 concerns tests to check transfer controlled procedure and MTP user flow control for the international signalling network.

Part 9 concerns tests to check signalling route management functions in a point having an STP function. To limit the test numbers and to avoid to complicate the test configuration, it was not considered that TFPs and TFAs can be transferred via STPs.

Part 10 concerns tests for the point restart procedure.

Part 11 deals with STP traffic test.

Part 12 checks the signalling link test procedure.

Finally, part 13 contains solely validation tests and aims at checking the actions of the tested system on reception of invalid level 3 messages.

2.3 *Test traffic*

Running the tests described in this Recommendation requires the exchange of traffic between the point under test and its environment. The traffic used is a test traffic especially generated for the test of the system. It uses variable length messages, structured as described below:

Figure T1109980-88, p.

The mechanisms of generation and reception of this test traffic may be internal to the point under test or external (using a simulator for example). The tests presented here do not impose the choice of one of these mechanisms except for the tests of the STP function itself (tests 2.7, 8.2, 10 and 11) where the test traffic is necessarily generated outside the STP. The test traffic should be recorded and analysed subsequently for each described test.

Note — For compatibility testing (CPT), use SI value for MTP testing user part, for validation testing (VAT) value is to be chosen as required.

3 Test configurations

3.1 *Definition*

The set of tests described in this Recommendation assumes that the point under test is inserted in a test environment called ‘‘test configuration’’. A **test configuration** is defined as being:

a) the set of points, real or simulated, linked between them by signalling linksets, real or simulated, and of which some are connected to the point under test by one or several signalling linksets,

b) the set of routing rules applied in different points and also in point under test,

c) the flows of test traffic generated and received by:

d) a set of generation and reception means (see § 2.3),

e) the means (program, operator interface, etc.) to run the described tests; notably the possibilities of storage and analysis of test traffic and level 3 messages, and, in the case of validation tests, the possibility to send at any stage of a test, any messages (level 3 or test) valid or not.

3.2 *Presentation of test configurations*

3.2.1 *General*

The set of tests described in this Recommendation requires 4 different configurations named A, B, C and D. For each test, only the three first aspects of the above definition are precisely defined (set of points, set of routing rules and test traffic flows, see § 3.1).

3.2.2 *Configuration A*

This simple configuration is adapted to the validation of all procedures concerning only one or more signalling links belonging to one linkset. It is used for the tests:

— of activation and deactivation of links;

— of changeover and changeback procedures;

— of inhibition and uninhibition of links;

— invalid messages.

Configuration A is shown in Figure 1/Q.782.

Figure 2/Q.782, p.

Configuration A makes use of a point C in all validation tests in order to check the impact of the procedures on various traffic flows. Point C is not used in configuration A in the case of compatibility tests.

Linkset 1 has four signalling links in order to check, for example, changeover procedure to several links within a linkset (test 3.15).

In real networks, the procedures checked with this configuration act on the traffic carried in both directions of a link. Consequently, the flows of test traffic used are, regarding the routing label of messages:

— OPC = A, DPC = B and OPC = B, DPC = A

— OPC = A, DPC = C and OPC = C, DPC = A (in validation test only).

H.T. [T1.782]

TABLE 1/Q.782

Routing rules in configuration A

	A	B	C
A	—	L1	L1
B	L1	—	L2
C	L2	L2	—

Table 1/Q.782 [T1.782] , p.

3.2.3 *Configuration B*

Configuration B is adapted to the validation of all procedures concerning several signalling linksets. It is used for the tests:

— of signalling message handling;

— of changeover and changeback;

— of forced and controlled rerouting.

Configuration B is shown in Figure 2/Q.782.

Figure 2/Q.782, p.

In configuration B, Table 2/Q.782, the point under test A is linked to the external world with 3 signalling linksets. This is the minimum required number of linksets in order to check:

— load sharing between three linksets;

— changeover and changeback from/to two linksets (Recommendation Q.704, § 5.3.1).

When the SP A is an SP having no STP function, this configuration is also the minimum to run the tests in a network situation where associated mode and quasi-associated mode are used (Recommendation Q.701, § 3.1.2).

This configuration comprises point D in all validation tests in order to check the impact of the procedures on various traffic flows (relations A-D and A-E). The point D is not used in configuration B in case of compatibility tests.

In a real network, some procedures (changeover, changeback) checked with this configuration act on the traffic in both directions on the concerned linksets. Consequently, the test traffic flows used are, regarding the routing label of messages:

— OPC = A, DPC = E and OPC = E, DPC = A

— OPC = A, DPC = D and OPC = D, DPC = A (in validation test only).

–v’1P’

H.T. [T2.782]

TABLE 2/Q.782

Routing rules in configuration B

	A	B	C	D	E
A	—	L2,L3	L3,L2	L1-L2-L3	L2-L3
B	L2,L4	—	L4	L5,L4	L6,L4
C	L3,L4	L4	—	L8,L4	L7,L4
D	L1,L5,L8	L5,L8	L8,L5	—	Any
E	L7,L6	L6,L7	L7,L6	Any	—

Li,Lj: Li normal linkset and Lj alternative linkset

Li-Lj: load sharing between Li and Lj

Tableau 2/Q.782, [T2.782] p.

3.2.4 *Configuration C*

This configuration is adapted to the validation of some functions specific to an STP like:

— message transfer function;

— sending of TFC;

— traffic test.

Configuration C is shown in Figure 3/Q.782.

Figure 3/Q.782, p.

In configuration C, Table 3/Q.782, the point under test A carries the test traffic from B to C and from C to B. The linkset 1 has two links, this a minimum to create an overload situation to trigger the sending of TFC independently of the implementation of the flow control procedure.

The tests performed with this configuration require that the traffic crosses the STP under test in both directions. Consequently the test traffic flows are, regarding the routing label of messages:

— OPC = B, DPC = C and OPC = C, DPC = B

H.T. [T3.782]

TABLE 3/Q.782

Routing rules in configuration C

	A	B	C
A	—	L1	L2
B	L1	—	L1
C	L2	L2	—

Table 3/Q.782 [T3.782] , p.

3.2.5 *Configuration D*

This configuration is adapted to the validation of all procedures concerning exclusively the points having an STP function. It is used to check the signalling route management procedures.

Configuration D is shown in Figure 4/Q.782.

Figure 4/Q.782, p.

Configuration D, Table 4/Q.782, is used only to check the signalling route management: transfer prohibited and transfer allowed procedures. Consequently, all linksets of this configuration have only one signalling link.

The STP under test is linked to the external world with three linksets: one terminal linkset (to an SP without STP function) and two inter STP linksets. This structure is minimal to check the various aspects of the broadcasting of TFPs and TFAs:

— TFPs or TFAs concerning several destinations;

— TFPs or TFAs to several destinations.

This configuration includes points D and E. This is necessary in order to check the sending of TFP on an alternative linkset: in A the routing rules are such that the linksets 1 and 2 are used to reach D using normal/alternative routing and to reach E using load sharing routing (sending of TFP in the first case and not in the second).

The tests performed with this configuration, which check the signalling route procedures, require that the test traffic uses the concerned signalling routes. The test traffic flows used in this Recommendation are, regarding the routing label messages:

— OPC = F, DPC = D OPC = D, DPC = F

— OPC = F, DPC = E OPC = E, DPC = F

— OPC = A, DPC = D OPC = A, DPC = E OPC = A, DPC = F

H.T. [T4.782]

TABLE 4/Q.782

Routing rules in configuration D

	A	B	C	D	E	F
A	—	L1,L2	L2,L1	L1,L2	L1,L2	L3
B	L1,L4	—	L4	L5,L4	L6,L4	L1
C	L2,L4	L4	—	L8,L4	L7,L4	L2
D	Any	—	Any			
E	Any	—	Any			
F	L3	L3	L3	L3	L3	—

Table 4/Q.782 [T4.782] , p.

4 Test list

All tests with the indication ‘‘*’’ are validation and compatibility tests. The tests without asterisk are validation test only.

1 *Signalling link management*

* 1.1 First signalling link activation

* 1.2 Signalling linkset deactivation

* 1.3 Signalling linkset activation

2 *Signalling message handling*

2.1 Message received with an invalid SSF (discrimination function)

2.2 Message received with an invalid DPC (discrimination function)

2.3 Message received with an invalid SI (distribution function)

2.4 Load sharing within a linkset

* 2.4.1 All links available

2.4.2 With one link unavailable

2.5 Load sharing between linksets

* 2.5.1 Between two linksets

2.5.2 Between three linksets

2.5.3 Between three linksets and one route unavailable

2.5.4 Between three linksets and one linkset unavailable

2.6 Inaccessible destination

2.6.1 Due to a linkset failure

2.6.2 Due to a route failure

2.6.3 Due to a linkset and route failures

* 2.7 Message transfer function

3 *Changeover*

3.1 Changeover initiated at one side of a linkset (COO <—> COA)

3.2 Changeover initiated at the both ends at the same time (COO <—> COO)

3.3 Changeover on expiration of timer T2 (COO or ECO —> —)

3.4 Unreasonable FSN in COO/COA

3.5 Reception of a changeover acknowledgement without sending a changeover order (— <— COA or ECA)

3.6 Reception of an additional changeover order (— <— COO or ECO)

3.7 Emergency changeover at one side of a linkset (COO <—> ECA)

3.8 Emergency changeover at one side of a linkset (COO <—> ECO)

3.9 Emergency changeover at one side of a linkset (ECO <—> COA)

3.10 Emergency changeover at one side of a linkset (ECO <—> ECA)

3.11 Emergency changeover at one side of a linkset (ECO <—> COO)

3.12 Emergency changeover initiated at the both ends at the same time (ECO <—> ECO)

3.13 Reactivation of a link during a changeover procedure

3.14 Simultaneous changeover

3.15 Changeover to several alternative links within a linkset

* 3.16 Changeover to another linkset with the adjacent SP accessible

* 3.17 Changeover to another linkset with the adjacent SP inaccessible

3.18 Changeover to two linksets

3.19 Changeover due to various reasons

3.20 Changeover as compatibility test

3.21 Reception of a changeover order on an available link

4 *Changeback*

* 4.1 Changeback within a linkset

4.2 Additional CBA

4.3 Additional CBD

4.4 No acknowledgement to first CBD

4.5 No acknowledgement of repeat changeback declaration

4.6 Simultaneous changeback

4.7 Changeback from several alternative links within a linkset

* 4.8 Changeback from another linkset

4.9 Changeback from two linksets

4.10 Changeback due to various reasons

* 4.11 Time controlled diversion procedure

* 5 *Forced rerouting*

* 6 *Controlled rerouting*

7 *Management inhibiting*

7.1 Inhibition of a link

* 7.1.1 Available link

* 7.1.2 Unavailable link

7.2 Inhibition not permitted

* 7.2.1 Local reject on an available link

* 7.2.2 Local reject on an unavailable link

7.2.3 Sending of LID

7.2.4 Reception of LID

7.3 Expiration of T14

7.3.1 On an available link

7.3.2 On an unavailable link

7.4 Additional inhibition messages (LIA, LID, LIN)

7.5 Inhibition asked by the both ends

7.6 Manual uninhibition of a link

* 7.6.1 With changeback

* 7.6.2 Without changeback

7.7 Expiration of T12

* 7.8 Not possible uninhibition

7.9 Automatic uninhibition of a link

7.10 Forced uninhibition of a link

7.10.1 Sending of LFU

7.10.2 Reception of LFU

7.11 Expiration of T13

7.12 Additional uninhibition messages (LUA, LUN, LFU)

7.13 Uninhibition at one side after test 7.5
7.14 Automatic uninhibition after test 7.5
7.15 Automatic uninhibition when two links are inhibited
7.16 Reception of traffic on an inhibited link
7.17 Management inhibiting test
* 7.17.1 Normal procedure
7.17.2 Reception of an LLT or LRT on an uninhibited link
7.17.3 Reception of an LLT on a link locally inhibited
7.17.4 Reception of an LRT on a link remotely inhibited
8 *Signalling traffic flow control*
8.1 Reception of a TFC
8.2 Sending of TFCs
8.3 Reception of an UPU
8.4 Sending of an UPU

9 *Signalling route management*
9.1 Sending of a TFP on an alternative route
* 9.1.1 Failure of normal linkset
* 9.1.2 On reception of a TFP
9.2 Broadcast of TFPs
* 9.2.1 On one linkset failure
* 9.2.2 On multiple failures
9.3 Reception of a message for an unaccessible destination
9.4 Sending of a TFA on an alternative route
* 9.4.1 Recovery of normal linkset
* 9.4.2 On reception of a TFA
9.5 Broadcast of TFAs
* 9.5.1 On one linkset recovery
* 9.5.2 Various reasons
9.6 Periodic sending of signallint-route-set-test messages
9.7 Reception of signalling-route-set-test messages
10 *Signalling point restart*
10.1 Recovery of a linkset (SP A has not the STP function)
* 10.1.1 With use of point restart procedure
10.1.2 Without use of point restart procedure
10.2 Recovery of a linkset (SP A has the STP function)
* 10.2.1 With use of point restart procedure
10.2.2 Without use of point restart procedure
10.3 An adjacent signalling point becomes accessible via another signalling point (SP A has not STP function)
10.4 An adjacent signalling point becomes accessible via another signalling point (SP A has STP function)
* 10.5 Restart of an SP having no STP function
* 10.6 Restart of an SP having STP function
10.7 Reception of an unexpected TRA
10.7.1 In an SP having no STP function
10.7.2 In an SP having STP function
11 *Traffic test*
12 *Signalling link test*
* 12.1 After activation of a link
12.2 No acknowledgement to first SLTM

12.3 No acknowledgement to second SLTM

12.4 Unreasonable field in an SLTA

12.5 Reception of an SLTM in an attempt state

* 12.6 Additional SLTA, SLTM

13 *Invalid messages*

13.1 Invalid H0.H1 in a signalling network management message

13.2 Invalid changeover messages

13.3 Invalid changeback messages

13.4 Invalid changeback code

13.5 Invalid inhibition messages

13.6 Invalid transfer control messages

13.7 Invalid signalling route management messages

13.8 Invalid Signalling-Route-Set-Test messages

13.9 Invalid traffic restart allowed message

13.10 Invalid H0-H1 in a signalling network testing and maintenance message

13.11 Invalid signalling link test messages

13.12 Invalid user part unavailable messages

H.T. [T5.782]
MTP LEVEL 3

TEST NUMBER: 1.1	PAGE: 1 of 1	

{
REFERENCE: Q.704 § 3 Fig. 7, Fig. 36, Fig. 37, Fig. 38
}		

{
TITLE: Signalling link management
}		

{
SUBTITLE: First signalling link activation
}		

{
PURPOSE:
To put into service a signalling linkset with
1 signalling link
}		

{
PRE-TEST CONDITIONS: Signalling links
deactivated
}		

CONFIGURATION: A	TYPE OF TEST: VAT, CPT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
Link			Link	
			1 — 1	:Activate
1 — 1	:Activate			
		<----------	1 — 1	SLTM
1 — 1	SLTA	---------->		
1 — 1	SLTM	---------->		
		<----------	1 — 1	SLTA
:Start traffic				

1 — 1	TRAFFIC	----------> <----------	1 — 1	TRAFFIC

:Wait :Stop traffic
TEST DESCRIPTION

1. Check that the signalling link becomes available. }	{
2. Check the reception and sending of variable length messages on the activated linkset from/to the SP at the other end of this linkset (and, in case of VAT, from/to other SP crossing the SP at the other end of this linkset). }	{
3. Check that, after the alignment, the level 2 does not send any message received before or during the deactivation. }	{
4. Check that all messages are correctly received (no loss of messages, no duplication and no missequencing). }	{
5. 6. Repeat the test with different SLC values. }	Stop traffic. {

Tableau [T5.782], p.

H.T. [T6.782]
MTP LEVEL 3

TEST NUMBER: 1.2	PAGE: 1 of 1

{
REFERENCE: Q.704 § 3 Fig. 7, Fig. 36, Fig. 37, Fig. 38
}

{
TITLE: Signalling link management
}

{
SUBTITLE: Signalling linkset deactivation
}

{
PURPOSE:
To remove from service a signalling linkset with 1 signalling link
}

{
PRE-TEST CONDITIONS: One signalling link (1-1) activated
}

CONFIGURATION: A	TYPE OF TEST: VAT, CPT	TYPE OF SP: ALL

MESSAGE SEQUENCE:

	SP A			SP B
Link 1 — 1	:Deactivate		Link	

TEST DESCRIPTION

1. Check that the signalling linkset becomes unavailable. }	{

Tableau [T6.782], p.

H.T. [T7.782]
MTP LEVEL 3

TEST NUMBER: 1.3	PAGE: 1 of 1

{
REFERENCE: Q.704 § 3, 12.2.4.1 Fig. 7, Fig. 36, Fig. 37, Fig. 38
}

{
TITLE: Signalling link management
}

{
SUBTITLE: Signalling linkset activation
}

{
PURPOSE:
To put into service a signalling linkset with 4 signalling links
}

{
PRE-TEST CONDITIONS: Signalling links deactivated
}

CONFIGURATION: A	TYPE OF TEST: VAT, CPT	TYPE OF SP: ALL

MESSAGE SEQUENCE:

	SP A			SP B
Link			Link	
			1 — 1	:Activate
1 — 1	:Activate			
			1 — 2	:Activate
1 — 2	:Activate			
			1 — 3	:Activate
1 — 3	:Activate			
			1 — 4	:Activate
1 — 4	:Activate			

:Start traffic

1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 3	TRAFFIC	---------->		
		<----------	1 — 3	TRAFFIC
1 — 4	TRAFFIC	---------->		
		<----------	1 — 4	TRAFFIC

:Wait
:Stop traffic
{
Note
— This test describes the activation of a linkset. The signalling link activation order is given simultaneously to all signalling links of the signalling linkset (Q.704 § 12.2.4.1). However, depending on in which order the links are getting aligned, changeback procedures will be performed. This test does not describe the transitory states (changeback procedure is checked in other tests).
}

TEST DESCRIPTION

1. Check that the signalling links become available and start traffic between A and B (and A and C in VAT). }	{

2. Check the reception and sending of variable length messages on the activated linkset from/to the SP at the other end of this linkset (and, in case of VAT, from/to other SP crossing the SP at the other end of this linkset). }	{
3. Check that, after the alignment, the level 2 does not send any message received before or during the deactivation. }	{
4. Check that all messages are correctly received (no loss of messages, no duplication and no missequencing). }	{
5.	Stop traffic.

Tableau [T7.782], p.

H.T. [T8.782]
MTP LEVEL 3

TEST NUMBER: 2.1	PAGE: 1 of 1

{
REFERENCE: Q.704 § 3 Fig. 24 § 2.4
}

{
TITLE: Signalling message handling
}

{
SUBTITLE: Message received with an invalid SSF (discrimination function)
}

{
PURPOSE:
To check the response to a message with an invalid SSF
}

{
PRE-TEST CONDITIONS: Signalling linkset activated
}

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL

MESSAGE SEQUENCE:

SP A			SP B
Link :Invalid SLTM : (invalid SSF) }	<----------	Link 1 — 1	{

TEST DESCRIPTION	
1. Send an SLTM with an erroneous SSF. }	{
2. Check that no response is received. }	{

Tableau [T8.782], p.

H.T. [T9.782]
MTP LEVEL 3

TEST NUMBER: 2.2	PAGE: 1 of 1

{
REFERENCE: Q.704 § 2 Fig. 24, Fig. 26
}

{
TITLE: Signalling message handling
}

{
SUBTITLE: Message received with an invalid DPC
}

{
PURPOSE:
To check the response to a message with an invalid DPC
}

{
PRE-TEST CONDITIONS: Signalling linkset activated
}

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL

MESSAGE SEQUENCE:

	SP A			SP B
Link			Link	
		<----------	1 — 1	{
:Invalid ECO				
:				
(erronenous DPC)				
}				
1 — 1	TFP	---------->	{	
(only if the tested point A has an STP function)				
}				

TEST DESCRIPTION

1. Send a ECO message with an erroneous DPC. }	{
2. Check that no response is received if the tested point has not STP function. If the tested point has the STP function, check that a TFP is received. }	{

Tableau [T9.782], p.

H.T. [T10.782]
MTP LEVEL 3

TEST NUMBER: 2.3	PAGE: 1 of 1

{
REFERENCE: Q.704 § 2.4 Fig. 24, Fig. 25
}

{
TITLE: Signalling message handling
}

{
SUBTITLE: Message received with an erroneous SI (distribution function)
}

{
PURPOSE:
To check the response to a message received with an erroneous SI
}

{
PRE-TEST CONDITIONS: Signalling linkset activated
}

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL

MESSAGE SEQUENCE:

	SP A			SP B
Link :invalid SLTM : (invalid SI) }		<----------	Link 1 — 1	{

TEST DESCRIPTION

1. Send an SLTM message with an invalid SI. }	{
2. Check that no response is received. }	{

Tableau [T10.782], p.

H.T. [T11.782]
MTP LEVEL 3

TEST NUMBER: 2.4.1	PAGE: 1 of 1

{
REFERENCE: Q.704 Fig. 26; §2.3 Q.705
§ 4.4
}

{
TITLE: Signalling message handling
}

{
SUBTITLE: Load sharing within a linkset — all links available
}

{
PURPOSE:
To check the load sharing within a linkset with all the links available
}

{
PRE-TEST CONDITIONS: Signalling linkset activated
}

CONFIGURATION: A	TYPE OF TEST: VAT, CPT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 3	TRAFFIC	---------->		
		<----------	1 — 3	TRAFFIC
1 — 4	TRAFFIC	---------->		
		<----------	1 — 4	TRAFFIC

:Wait
:Stop traffic

TEST DESCRIPTION

1. Start traffic to B (and C in VAT) for all SLS. }	{
2. Stop traffic, check that the messages have been transmitted on the correct link in accordance with the SLS field. }	{
3. Check that there was no loss of messages, no duplication and no missequencing. }	{

Tableau [T11.782], p.

H.T. [T12.782]
MTP LEVEL 3

TEST NUMBER: 2.4.2	PAGE: 1 of 1

{
REFERENCE: Q.704 Fig. 26; § 2.3 Q.705
§ 4.4
}

{
TITLE: Signalling message handling
}

{
SUBTITLE: Load sharing within a linkset — one link unavailable
}

{
PURPOSE:
To check the load sharing within a linkset when one link is unavailable
}

{
PRE-TEST CONDITIONS: Signalling link 1 — 3 deactivated
}

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL

MESSAGE SEQUENCE:

	SP A			SP B
Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 4	TRAFFIC	---------->		
		<----------	1 — 4	TRAFFIC
:Wait				
:Stop traffic				
TEST DESCRIPTION				
1. Start the traffic to B and C for all SLS, wait and stop. }	{			
2. Check that the messages have been transmitted on the correct link in accordance with the SLS field on the remaining links. }	{			

Tableau [T12.782], p.

H.T. [T13.782]
MTP LEVEL 3

TEST NUMBER: 2.5.1		PAGE: 1 of 1
{ REFERENCE: Q.704 Fig. 26; § 2.3 Q.705 § 4.4 }		
{ TITLE: Signalling message handling }		
{ SUBTITLE: Load sharing between linksets — between two linksets }		
{ PURPOSE: To check the load sharing between two linksets under normal conditions }		
{ PRE-TEST CONDITIONS: All linksets and routes available }		
CONFIGURATION: B	TYPE OF TEST: VAT, CPT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

SP A	SP B	SP C	SP E

Link			Link		Link		Link
:Start traffic							
3 — 1	TRAFFIC	{					
---------->							
}	7 — 1	---------->					
		{					
<----------							
}	3 — 1	<----------	7 — 1	TRAFFIC			
3 — 2	TRAFFIC	{					
---------->							
}	7 — 1	---------->					
		{					
<----------							
}	3 — 2	<----------	7 — 1	TRAFFIC			
2 — 1	TRAFFIC	-------->	6 — 1	{			
---------->							
}							
2 — 2	TRAFFIC	-------->	6 — 1	{			
---------->							
}							
:Wait							
:Stop traffic							

TEST DESCRIPTION	
1. Start the traffic to E for all SLS. }	{
2. Stop the traffic and check that the messages have been transmitted on the correct linkset in accordance with the SLS and DPC. }	{
3. Check that there was no loss of messages, no duplication and no missequencing. }	{

Tableau [T13.782], p.

H.T. [T14.782]
MTP LEVEL 3

TEST NUMBER: 2.5.2		PAGE: 1 of 1
{ REFERENCE: Q.704 Fig. 26; § 2.3 Q.705 § 4.4 }		
{ TITLE: Signalling message handling }		
{ SUBTITLE: Load sharing between linksets — between three linksets }		
{ PURPOSE: To check the load sharing between three linksets under normal conditions }		
{ PRE-TEST CONDITIONS: All linksets and routes available }		
CONFIGURATION: B	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

SP A	SP B	SP C	SP D

Link			Link		Link		Link
:Start traffic							
1 — 1	TRAFFIC	{					
---------->							
}							
		{					
<----------							
}	1 — 1	TRAFFIC					
1 — 2	TRAFFIC	{					
---------->							
}							
		{					
<----------							
}	1 — 2	TRAFFIC					
3 — 1	TRAFFIC	{					
---------->							
}	8 — 1	---------->					
3 — 2	TRAFFIC	{					
---------->							
}	8 — 1	---------->					
2 — 1	TRAFFIC	-------->	5 — 1	{			
---------->							
}							
2 — 2	TRAFFIC	-------->	5 — 1	{			
---------->							
}							
:Wait							
:Stop traffic							

TEST DESCRIPTION	
1. Start the traffic to D for all SLS.	{
}	
2. Stop the traffic and check that the messages have been transmitted on the correct linkset and on the correct link in accordance with the SLS.	{
}	
3. Check that there was no loss of messages, no duplication and no missequencing.	{
}	

Tableau [T14.782], p.

H.T. [T15.782]
MTP LEVEL 3

TEST NUMBER: 2.5.3			PAGE: 1 of 1
{ REFERENCE: Q.704 Fig. 26; § 2.3 Q.705 § 4.4 }			
{ TITLE: Signalling message handling }			
{ SUBTITLE: Load sharing between linksets — between three linksets and one route unavailable }			
{ PURPOSE: To check the load sharing between three linksets when one route is unavailable }			
{ PRE-TEST CONDITIONS: Linksets 4 and 8 unavailable (TFP, PC = D from C to A) }			
CONFIGURATION: B		TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:			

SP A	SP B	SP C	SP D

Link			Link		Link		Link
:Start traffic							
1 — 1	TRAFFIC	{					
---------->							
}							
		{					
<----------							
}	1 — 1	TRAFFIC					
1 — 2	TRAFFIC	{					
---------->							
}							
		{					
<----------							
}	1 — 2	TRAFFIC					
2 — 1	TRAFFIC	-------->	5 — 1	{			
---------->							
}							
2 — 2	TRAFFIC	-------->	5 — 1	{			
---------->							
}							
:Wait							
:Stop traffic							

TEST DESCRIPTION	
1. Start the traffic for all SLS, wait and stop.	{ }
2. Check that the traffic to D via C has been shared on the remaining linksets.	{ }

Tableau [T15.782], p.

H.T. [T16.782]
MTP LEVEL 3

TEST NUMBER: 2.5.4	PAGE: 1 of 1	

{
REFERENCE: Q.704 Fig. 26; § 2.3 Q.705
§ 4.4
}		

{
TITLE: Signalling message handling
}		

{
SUBTITLE: Load sharing between linksets — between three linksets and one linkset unavailable
}		

{
PURPOSE:
To check the load sharing between two linksets after the unavailability of the third linkset
}		

{
PRE-TEST CONDITIONS: Linkset 1 deactivated
}		

CONFIGURATION: B	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

SP A	SP B	SP C	SP D
Link		Link	Link
:Start traffic			
3 — 1 ---------->	TRAFFIC	{	
}	8 — 1	---------->	
3 — 2 ---------->	TRAFFIC	{	
}	8 — 1	---------->	
2 — 1 ---------->	TRAFFIC	-------->	5 — 1 {
}			
		<--------	2 — 1 {
<---------- }	5 — 1	TRAFFIC	
2 — 2 ---------->	TRAFFIC	-------->	5 — 1 {
}			
		<--------	2 — 2 {
<---------- }	5 — 1	TRAFFIC	
:Wait			
:Stop traffic			

TEST DESCRIPTION	
1. Start the traffic for all SLS to D, wait and stop.	{
}	
2. Check that the traffic has been shared on the remaining linksets.	{
}	

Tableau [T16.782], p.

H.T. [T17.782]
MTP LEVEL 3

TEST NUMBER: 2.6.1		PAGE: 1 of 1
REFERENCE: Q.704 Fig. 26		

{
TITLE: Signalling message handling
}		

{
SUBTITLE: Inaccessible destination — due to a linkset failure
}		

{
PURPOSE:
To check the signalling message handling when a destination becomes inaccessible due to a linkset failure
}		

{
PRE-TEST CONDITIONS: Signalling linkset with one link available
}		

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
Link				Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 1	:Deactivate			
TEST DESCRIPTION				
1. Start the traffic for all SLS to B and C. }	{			
2. Deactivate the last link 1 — 1 and check that the linkset becomes unavailable. }	{			
3. Check that the SPs B and C become inaccessible. }	{			
4. Check that all messages stored or received after the unavailability of the linkset are discarded. }	{			

Tableau [T17.782], p.

H.T. [T18.782]
MTP LEVEL 3

TEST NUMBER: 2.6.2			PAGE: 1 of 1
REFERENCE: Q.704 Fig. 26			

{
TITLE: Signalling message handling
}			

{
SUBTITLE: Inaccessible destination — due to a route failure
}			

{
PURPOSE:
To check the signalling message handling when a destination becomes inaccessible on reception of a TFP.
}			

{
PRE-TEST CONDITIONS: All links and routes available
}			

CONFIGURATION: A		TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:			

	SP A			SP B
Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 3	TRAFFIC	---------->		
		<----------	1 — 3	TRAFFIC
1 — 4	TRAFFIC	---------->		
		<----------	1 — 4	TRAFFIC
		<----------	1 — X	TFP, PC=C
TEST DESCRIPTION				
1. Start the traffic to B and C for all SLS. }	{			
2. Provoke the sending of a TFP (PC=C) from SP B to SP A. }	{			
3. Check that the SP C becomes inaccessible. }	{			
4.	Stop traffic.			
5. Check that all messages stored or received after the inaccessibility have been discarded. }	{			
6. Check that traffic to B has not been disturbed. }	{			

Tableau [T18.782], p.

H.T. [T19.782]
MTP LEVEL 3

TEST NUMBER: 2.6.3	PAGE: 1 of 1	
REFERENCE: Q.704 Fig. 26		

{
TITLE: Signalling message handling
}		

{
SUBITLE: Inaccessible destination — due to a linkset and a route failure
}		

{
PURPOSE:
To check the signalling message handling when a destination becomes inaccessible due to a linkset and a route failure
}		

{
PRE-TEST CONDITIONS: Linkset 4 unavailable
}		

CONFIGURATION: B	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A		SP B	SP C
Link		Link	Link	
:Start traffic				
1 — 1, 2	TRAFFIC	{		
<---------->				
}	SP D			
3 — 1	TRAFFIC	{		
---------->				
}	To D and E			
		{		
<----------				
}	3 — 1	TRAFFIC (from E)		
3 — 2	TRAFFIC	{		
---------->				
}	To D and E			
		{		
<----------				
}	3 — 2	TRAFFIC (from E)		
2 — 1	TRAFFIC	---------->	To D and E	
2 — 2	TRAFFIC	---------->	To D and E	
			7 — 1	:Deactivate
		{		
<----------				
}	3 — X	TFP, PC=E		
2 — 1	TRAFFIC	---------->	To D and E	
		<----------	2 — 1 TRAFFIC (from E)	
2 — 2	TRAFFIC	---------->	To D and E	
		<----------	2 — 2 TRAFFIC (from E)	
2 — 1	:Deactivate			
2 — 2	:Deactivate			
1 — 1, 2	TRAFFIC	{		
<---------->				
}	SP D			

:Wait
:Stop traffic
{
Note
— The transitory states (signalling network management procedures) are not described in this test which checks only the signalling message handling.
}	

TEST DESCRIPTION	
1. Start the traffic to the SPs D and E for all SLS. }	{
2. Initiate the sending of a TFP (DPC=E) from SP C to SP A, check that the traffic to E is routed via B and check that the traffic to D is not disturbed. }	{
3. Deactivate the linkset 2 and check that the destination E becomes inaccessible. Stop traffic. }	{
4. Check that all messages stored or received during the inaccessibility have been discarded. }	{

Tableau [T19.782], p.

H.T. [T20.782]
MTP LEVEL 3

TEST NUMBER: 2.7	PAGE: 1 of 1	
{ REFERENCE: Q.704 § 2 Fig. 26 }		
{ TITLE: Signalling message handling }		
{ SUBTITLE: Message transfer function }		
{ PURPOSE: To test the transfer function in an STP }		
{ PRE-TEST CONDITIONS: All links available }		
CONFIGURATION: C	TYPE OF TEST: VAT, CPT	TYPE OF SP: STP
MESSAGE SEQUENCE:		

	SP B		SP A	SP C
	Link			Link
:Start traffic	1 — 1, 2	TRAFFIC	---------->	2 — 1
			<----------	1 — 1, 2
:Wait			---------->	Link
			<----------	TRAFFIC
:Stop traffic				

{
Note
— The traffic used in this test is in conformance with the traffic model presented in Recommendation Q.706.
}

TEST DESCRIPTION	
1. Start traffic between B and C in both directions via A.	{ }
2. Check that transfer function is correctly performed.	{ }
3. Stop traffic and check that there were no loss of messages, no duplication and no missequencing. Check that the information field of these messages has not been corrupted.	{ }

Tableau [T20.782], p.

H.T. [T21.782]
MTP LEVEL 3

TEST NUMBER: 3.1		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }		
TITLE: Changeover		
{ SUBTITLE: Changeover initiated at one side of a linkset (COO <-> COA) }		
{ PURPOSE: To check the normal changeover procedure }		
{ PRE-TEST CONDITIONS: Linkset with two available links }		
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1 :Deactivate (MML command or failure)	{ }			
1 — 2	COO, SLC 1 — 1	---------->		
		<----------	1 — 2	COA, SLC 1 — 1
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				

TEST DESCRIPTION

1. { Start traffic to B and C on all the links. }

2. { Deactivate link 1 — 1, check that a COO is sent (from A) for 1 — 1 on 1 — 2 and respond with a COA within T2. }

3. { Check that the time between the deactivation and the sending of the COO is inside the specified value (see Q.706). }

4. { Check that the traffic from link 1 — 1 is changed over to 1 — 2 and check that the traffic normally carried by 1 — 2 is passed over to 1 — 2. }

5. { Stop traffic and check it has been received correctly (no lost messages no duplication and no missequencing). }

6. { Repeat the test by sending the COO from B (instead of A). In addition, check that the time between the reception of the COO and the sending of the COA is inside the specified value (see Q.706). }

Tableau [T21.782], p.

H.T. [T22.782]
MTP LEVEL 3

TEST NUMBER: 3.2		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }		
TITLE: Changeover		
{ SUBTITLE: Changeover initiated at both ends at the same time (COO <-> COO) }		
{ PURPOSE: To check the changeover procedure when the changeover is initiated at the both ends simultaneously }		
{ PRE-TEST CONDITIONS: Linkset with two available links }		
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1	{			
:Deactivate (MML command or failure)				
}				
1 — 2	COO (SLC 1 — 1)	---------->		
		<----------	1 — 2	COO (SLC 1 — 1)
1 — 2	COA (SLC 1 — 1)	---------->		
		<----------	1 — 2	COA (SLC 1 — 1)
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start the traffic to B and C on all the links.	{ }
2. Deactivate the link 1 — 1, check that the COOs and COAs for 1 — 1 are received on link 1 — 2.	{ }
3. Check that the traffic from link 1 — 1 changed over to 1 — 2 and stop traffic.	{ }
4. Repeat the test without sending of COA from SP B to SP A	{ }

Tableau [T22.782], p.

H.T. [T23.782]
MTP LEVEL 3

TEST NUMBER: 3.3		PAGE: 1 of 1

{
REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30
}		

TITLE: Changeover		

{
SUBTITLE: Changeover on expiration of timer
T2 (COO or ECO -> -)
}		

{
PURPOSE:
To check the changeover procedure when no COA is received
in response of a COO previously sent
}		

{
PRE-TEST CONDITIONS: Linkset with two available links
}		

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B

Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1 :Deactivate (MML command or failure)	{			
1 — 2 COO, SLC 1 — 1 **COO,** | **COO,** | **COO,** | T2 **COO,** | **COO,** |	{			
	}	---------->		
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				
TEST DESCRIPTION				
1. Start traffic to B and C on all the links.	{			
	}			
2. Deactivate link 1 — 1, check that a COO is received for 1 — 1 on link 1 — 2.	{			
	}			
3. After the expiration of T2, check that the changeover procedure is performed.	{			
	}			
4. Check that the duration of T2 is inside the specified range.	{			
	}			
5. Stop traffic and check that there was no duplication and no missequencing, some messages may be lost as the system should not perform retreival.	{			
	}			
6. Repeat the test but replacing COO by ECO.	{			
	}			

Tableau [T23.782], p.

H.T. [T24.782]
MTP LEVEL 3

TEST NUMBER: 3.4		PAGE: 1 of 1

{
REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30
}		

TITLE: Changeover		

{
SUBTITLE: Unreasonable FSN in COO/COA
}		

{
PURPOSE:
To check the changeover procedure on reception of a COO/COA
containing an unreasonable FSN
}		

{
PRE-TEST CONDITIONS: Linkset with two available links
}		

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B

Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1 :Deactivate (MML command or failure)	{			
}				
1 — 2	COO, SLC 1 — 1	---------->		
		<----------	1 — 2	{
COA, SLC 1 — 1 (unreasonable FSN)				
}				
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all the links.	{
}	
2. Deactivate link 1 — 1, check that a COO is received for 1 — 1 on link 1 — 2 and respond within T2 with a COA containing an unreasonable FSN.	{
}	
3. Stop traffic, check that the changeover procedure has been performed.	{
}	
4. Check that there was no duplication and no missequencing. Some messages may be lost as the system should not perform retreival.	{
}	
5. Check that an indication is given by the system.	{
}	
6. Repeat the test with a COO sent from B (instead COA) containing an unreasonable FSN.	{
}	

Tableau [T24.782], p.

H.T. [T25.782]
MTP LEVEL 3

TEST NUMBER: 3.5			PAGE: 1 of 1	
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }				
TITLE: changeover				
{ SUBTITLE: Reception of a changeover acknowledgement without sending a changeover order (- <- COA or ECA) }				
{ PURPOSE: To check the changeover procedure on reception of an unexpected changeover acknowledgement }				
{ PRE-TEST CONDITIONS: Linkset with two available links }				
CONFIGURATION: A		TYPE OF TEST: VAT	TYPE OF SP: ALL	
MESSAGE SEQUENCE:				

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
		<----------	1 — 2	COA, SLC 1 — 1
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all the links.	{ }
2. Send a COA for 1 — 1 on link 1 — 2, check that this message is ignored.	{ }
3. Stop traffic and check that it has been received correctly.	{ }
4. Repeat the test with an ECA instead of a COA.	{ }

Tableau [T25.782], p.

H.T. [T26.782]
MTP LEVEL 3

TEST NUMBER: 3.6			PAGE: 1 of 1	
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }				
TITLE: Changeover				
{ SUBTITLE: Reception of an additional changeover order (- <- COO or ECO) }				
{ PURPOSE: To check the action of the system when a changeover order relating to a particular link is received after completion of changeover }				
{ PRE—TEST CONDITIONS: Linkset with the link 1 — 2 available }				
CONFIGURATION: A		TYPE OF TEST: VAT	TYPE OF SP: ALL	
MESSAGE SEQUENCE:				

	SP A			SP B
	Link			Link
:Start traffic				
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
		<----------	1 — 2	COO, SL 1 — 1
1 — 2	ECA, SL 1 — 1	---------->		
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on link 1 — 2.	{ }
2. Send a COO for 1 — 1 on link 1 — 2 and check that an ECA is received in T2.	{ }
3. Stop traffic and check that it has been received correctly.	{ }
4. Check that an indication is given by the system.	{ }
5. Repeat the test with an ECO instead of a COO.	{ }

Tableau [T26.782], p.

H.T. [T27.782]
MTP LEVEL 3

TEST NUMBER: 3.7			PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }			
TITLE: Changeover			
{ SUBTITLE: Emergency changeover at one side of a linkset (COO <-> ECA) }			
{ PURPOSE: To check the emergency changeover procedure when a COO is acknowledged by an ECA }			
{ PRE-TEST CONDITIONS: Linkset with two available links }			
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL	
MESSAGE SEQUENCE:			

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1 :Deactivate (MML command or failure)	{ }			
1 — 2	COO, SLC 1 — 1	---------->		
		<----------	1 — 2	ECA, SLC 1 — 1
		<----------	1 — 2	TRAFFIC (from 1 — 1)
1 — 2	TRAFFIC (from 1 — 1)	---------->		
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all links.	{ }
2. Check the sending of a COO (from A) for 1 — 1 on 1 — 2 and check that an ECA is sent inside T2.	{ }
3. Check that the traffic is changed over from 1 — 1 to 1 — 2.	{ }
4. Stop traffic and check that it has been received correctly; no duplication and no missequencing. Some messages may be lost as the system should not perform retreival.	{ }
5. Repeat the test by sending COO from B (instead of A).	{ }

Tableau [T27.782], p.

H.T. [T28.782]
MTP LEVEL 3

TEST NUMBER: 3.8			PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }			
TITLE: Changeover			
{ SUBTITLE: Emergency changeover at one side of a linkset (COO <-> ECO) }			
{ PURPOSE: To check the emergency changeover procedure when a COO is acknowledged by an ECO }			
{ PRE-TEST CONDITIONS: Linkset with two available links. }			
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL	
MESSAGE SEQUENCE:			

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1 :Deactivate (MML command or failure)	{ }			
1 — 2	COO, SLC 1 — 1	---------->		
		<----------	1 — 2	ECO, SLC 1 — 1
1 — 2	COA, SLC 1 — 1	---------->		
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all links.	{ }
2. Check the sending of a COO (from A) for 1 — 1 on 1 — 2 and check that an ECO is sent (before T2 expires) and a COA is received.	{ }
3. Check that the traffic is changed over from 1 — 1 to 1 — 2.	{ }
4. Stop traffic and check that it has been received correctly; no duplication and no missequencing. Some messages may be lost as the system should not perform retreival.	{ }
5. Repeat the test but send COO from B (instead of A).	{ }

Tableau [T28.782], p.

H.T. [T29.782]
MTP LEVEL 3

TEST NUMBER: 3.9		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }		
TITLE: Changeover		
{ SUBTITLE: Emergency changeover at one side of a linkset (ECO <-> COA) }		
{ PURPOSE: To check the emergency changeover procedure when an ECO is acknowledged by a COA }		
{ PRE-TEST CONDITIONS: Linkset with two available links }		
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1	:Deactivate (failure)			
1 — 2	ECO, SLC 1 — 1	---------->		
		<----------	1 — 2	COA, SLC 1 — 1
		<----------	1 — 2	TRAFFIC (from 1 — 1)
1 — 2	TRAFFIC (from 1 — 1)	---------->		
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all links.	{ }
2. Check that an ECO is received for 1 — 1 on 1 — 2 and that a COA is sent before T2 expires.	{ }
3. Check that traffic is changed over from 1 — 1 to 1 — 2.	{ }
4. Stop traffic and check that it has been received correctly; no duplication and no missequencing, some messages may be lost as the system should not perform retreival.	{ }
5. Repeat the test but send ECO from B (instead of A).	{ }

Tableau [T29.782], p.

H.T. [T30.782]
MTP LEVEL 3

TEST NUMBER: 3.10				PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }				
TITLE: Changeover				
{ SUBTITLE: Emergency changeover at one side of a linkset (ECO <-> ECA) }				
{ PURPOSE: To check the emergency changeover procedure when an ECO is acknowledged by an ECA }				
{ PRE-TEST CONDITIONS: Linkset with two available links }				
CONFIGURATION: A		TYPE OF TEST: VAT		TYPE OF SP: ALL
MESSAGE SEQUENCE:				

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1	:Deactivate (failure)			
1 — 2	ECO, SLC 1 — 1	---------->		
		<----------	1 — 2	ECA, SLC 1 — 1
		<----------	1 — 2	TRAFFIC (from 1 — 1)
1 — 2	TRAFFIC (from 1 — 1)	---------->		
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all links.	{ }
2. Check that an ECO is received for 1 — 1 on 1 — 2 and that an ECA is sent before T2 expires.	{ }
3. Check that traffic is changed over from 1 — 1 to 1 — 2.	{ }
4. Stop traffic and check that it has been received correctly; no duplication and no missequencing. Some messages may be lost as the system should not perform retreival.	{ }
5. Repeat the test but send ECO from B (instead of A).	{ }

Tableau [T30.782], p.

H.T. [T31.782]
MTP LEVEL 3

TEST NUMBER: 3.11		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }		
TITLE: Changeover		
{ SUBTITLE: Emergency changeover at one side of a linkset (ECO <-> COO) }		
{ PURPOSE: To check the emergency changeover procedure when a COO is received in response to an ECO }		
{ PRE-TEST CONDITIONS: Linkset with two available links }		
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1	:Deactivate (failure)			
1 — 2	ECO, SLC 1 — 1	---------->		
		<----------	1 — 2	COO, SLC 1 — 1
1 — 2	ECA, SLC 1 — 1	---------->		
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all links.	{ }
2. Check that an ECO is received for 1 — 1 on 1 — 2 and that a COO is sent before T2 expires and acknowledged with an ECA.	{ }
3. Check that traffic is changed over from 1 — 1 to 1 — 2.	{ }
4. Stop traffic and check that it has been received correctly; no duplication and no missequencing. Some messages may be lost as the system should not perform retrieval.	{ }
5. Repeat the test but sent ECO from B (instead of A).	{ }

Tableau [T31.782], p.

H.T. [T32.782]
MTP LEVEL 3

TEST NUMBER: 3.12		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }		
TITLE: Changeover		
{ SUBTITLE: Emergency changeover initiated at both ends at the same time (ECO <-> ECO) }		
{ PURPOSE: To check the emergency changeover procedure when it is initiated at the both ends simultaneously }		
{ PRE-TEST CONDITIONS: Linkset with two available links }		
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
	Link			Link
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 1	:Deactivate (failure)			
1 — 2	ECO, SLC 1 — 1	---------->		
		<----------	1 — 2	ECO, SLC 1 — 1
1 — 2	ECA, SLC 1 — 1	---------->		
		<----------	1 — 2	ECA, SLC 1 — 1
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all links.	{ }
2. Check that an ECO is received for 1 — 1 on 1 — 2 and that an ECO is sent before T2 expires and acknowledged with ECA.	{ }
3. Check that traffic is changed over from 1 — 1 to 1 — 2.	{ }
4. Stop traffic and check that it has been received correctly; no duplication and no missequencing. Some messages may be lost as the system should not perform retrieval.	{ }
5. Repeat the test without sending ECA from SP B to SP A.	{ }

Tableau [T32.782], p.

H.T. [T33.782]
MTP LEVEL 3

TEST NUMBER: 3.13		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }		
TITLE: Changeover		
{ SUBTITLE: Reactivation of a link during a changeover procedure }		
{ PURPOSE: To check the changeover procedure when the link failure causing the changeover is removed during the procedure. }		
{ PRE-TEST CONDITIONS: Linkset with two available links }		
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
	Link			Link
:Start traffic				
	1 — 1	TRAFFIC	---------->	
			<----------	1 — 1 TRAFFIC
	1 — 2	TRAFFIC	---------->	
			<----------	1 — 2 TRAFFIC
	1 — 1	:Deactivate (failure)		
	1 — 1	:Activate (end of failure)		
:Wait				
:Stop traffic				
{ *Note* — This test will be performed if applicable (some systems may terminate the changeover procedure, then perform the changeback). }				

TEST DESCRIPTION	
1. Start traffic to B and C on all links.	{ }
2. Deactivate the link 1 — 1 and reactivate this link immediately.	{ }
3. Stop traffic and check that the changeover procedure has not been performed. Depending the time between the deactivation and the reactivation, a COO may be sent or not.	{ }
4. Check that the traffic used the links 1 — 1 and 1 — 2 normally.	{ }

Tableau [T33.782], p.

H.T. [T34.782]
MTP LEVEL 3

TEST NUMBER: 3.14		PAGE: 1 of 1

{
REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30
}		

TITLE: Changeover		

{
SUBTITLE:
Simultaneous changeover
}		

{
PURPOSE:
To check that the system can correctly handle simultaneous failures of several links
}		

{
PRE-TEST CONDITIONS: Linkset with three available links
}		

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B

Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 3	TRAFFIC	---------->		
		<----------	1 — 3	TRAFFIC
1 — 1, 1 — 2 :Deactivate (MML command or failure) }	{			
1 — 3	COO, SLC 1 — 1	---------->		
1 — 3	COO, SLC 1 — 2	---------->		
		<----------	1 — 3	COA, SLC 1 — 1
		<----------	1 — 3	COA, SLC 1 — 2
1 — 3 TRAFFIC (from 1 — 1 and 1 — 2) }	{ ---------->			
		<----------	1 — 3	{
TRAFFIC (from 1 — 1 and 1 — 2) }				
:Wait				
:Stop traffic				
TEST DESCRIPTION				
1. Start traffic to B and C on all links. }	{ 			
2. Deactivate the links 1 — 1 and 1 — 2 simultaneously. }	{ 			
3. Check that COOs are received on 1 — 3 for 1 — 1 and 1 — 2, and respond with COAs inside T2s. Check that traffic is changed over from 1 — 1 and 1 — 2 to 1 — 3. }	{ 			
4. Stop traffic and check that it has been received correctly (no lost messages, no duplication and no missequencing). }	{ 			

Tableau [T34.782], p.

H.T. [T35.782]
MTP LEVEL 3

TEST NUMBER: 3.15		PAGE: 1 of 1

{
REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30
}		

TITLE: Changeover		

{
SUBTITLE:
Changeover to several alternative links within a linkset
}		

{
PURPOSE:
To check the changeover porcedure when there are several alternative links
}		

{
PRE-TEST CONDITIONS: Linkset with all links available
}		

CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B

Link			Link	
:Start traffic				
1 — 1	TRAFFIC	---------->		
		<----------	1 — 1	TRAFFIC
1 — 2	TRAFFIC	---------->		
		<----------	1 — 2	TRAFFIC
1 — 3	TRAFFIC	---------->		
		<----------	1 — 3	TRAFFIC
1 — 4	TRAFFIC	---------->		
		<----------	1 — 4	TRAFFIC
1 — 1	{			
:Deactivate (MML command or failure)				
}				
1 — 2, 3 or 4	COO, SLC 1 — 1	---------->		
		<----------	1 — 2, 3 or 4	COA, SLC 1 — 1
1 — 2	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 2	TRAFFIC (from 1 — 1)
1 — 3	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 3	TRAFFIC (from 1 — 1)
1 — 4	TRAFFIC (from 1 — 1)	---------->		
		<----------	1 — 4	TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				

TEST DESCRIPTION	
1. Start traffic to B and C on all links. }	{
2. Deactivate the link 1 — 1 and check that the changeover is performed to links 1 — 2, 1 — 3 and 1 — 4. }	{
3. Stop traffic and check that it has been shared on the alternative links according to the load sharing policy of this linkset. }	{
4. Check that, for each destination and for each SLS, there was no lost messages, no duplication and no missequencing. }	{

Tableau [T35.782], p.

H.T. [T36.782]
MTP LEVEL 3

TEST NUMBER: 3.16		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30 }		
TITLE: Changeover		
{ SUBTITLE: Changeover to another linkset with adjacent SP accessible }		
{ PURPOSE: To check that the system performs changeover to an alternative route when the last link of a linkset becomes unavailable }		
{ PRE-TEST CONDITIONS: Linkset 1 and link 3 — 1 unavailable }		
CONFIGURATION: B	TYPE OF TEST: VAT, CPT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

SP A	SP B	SP C	SP •

Link			Link		Link		Link	
:Start traffic								

3 — 2 ----------> }	TRAFFIC	{ 7 — 1 ----------> {	8 — 1 <----------	SP E {	
<---------- } 2 — 1, 2 ----------> } ----------> } <---------- } 3 — 2 :Deactivate (MML command or failure) }	3 — 2 TRAFFIC 5 — 1 {	<---------- --------> SP E SP D <-------- SP D	7 — 1 6 — 1 5 — 1 2 — 1, 2	SP E { { {	
2 — X 2 — 1, 2 ----------> } ----------> } <---------- } <---------- } :Wait :Stop traffic	COO, SLC 3 — 2 TRAFFIC (from 3 — 2) 5 — 1 5 — 1 6 — 1	--------> <-------- --------> SP E SP D <-------- SP D <-------- SP E	4 — 1 2 — X 6 — 1 5 — 1 2 — 1, 2	--------> <-------- { { {	4 — 1 COA, SLC 3 —
TEST DESCRIPTION					
1. Start traffic to E (and D in VAT). } 2. Deactivate link 3 — 2 and check that a COO (for 3 — 2) is sent from A to C via B and that a COA (from 3 — 2) is sent from C to A via B within T2. } 3. Stop traffic and check that it has been shared on the alternative links 2 — 1 and 2 — 2 according to the load sharing rules of linkset 2. } 4. Check that, for each SLS, there was no lost messages, no duplication and no missequencing. } 5. Repeat the test but replace COO with ECO (some messages may have been lost). }	{ { { { {				

Tableau [T36.782], p.

H.T. [T37.782]
MTP LEVEL 3

TEST NUMBER: 3.17		PAGE: 1 of 1

{
REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30
}		

TITLE: Changeover		

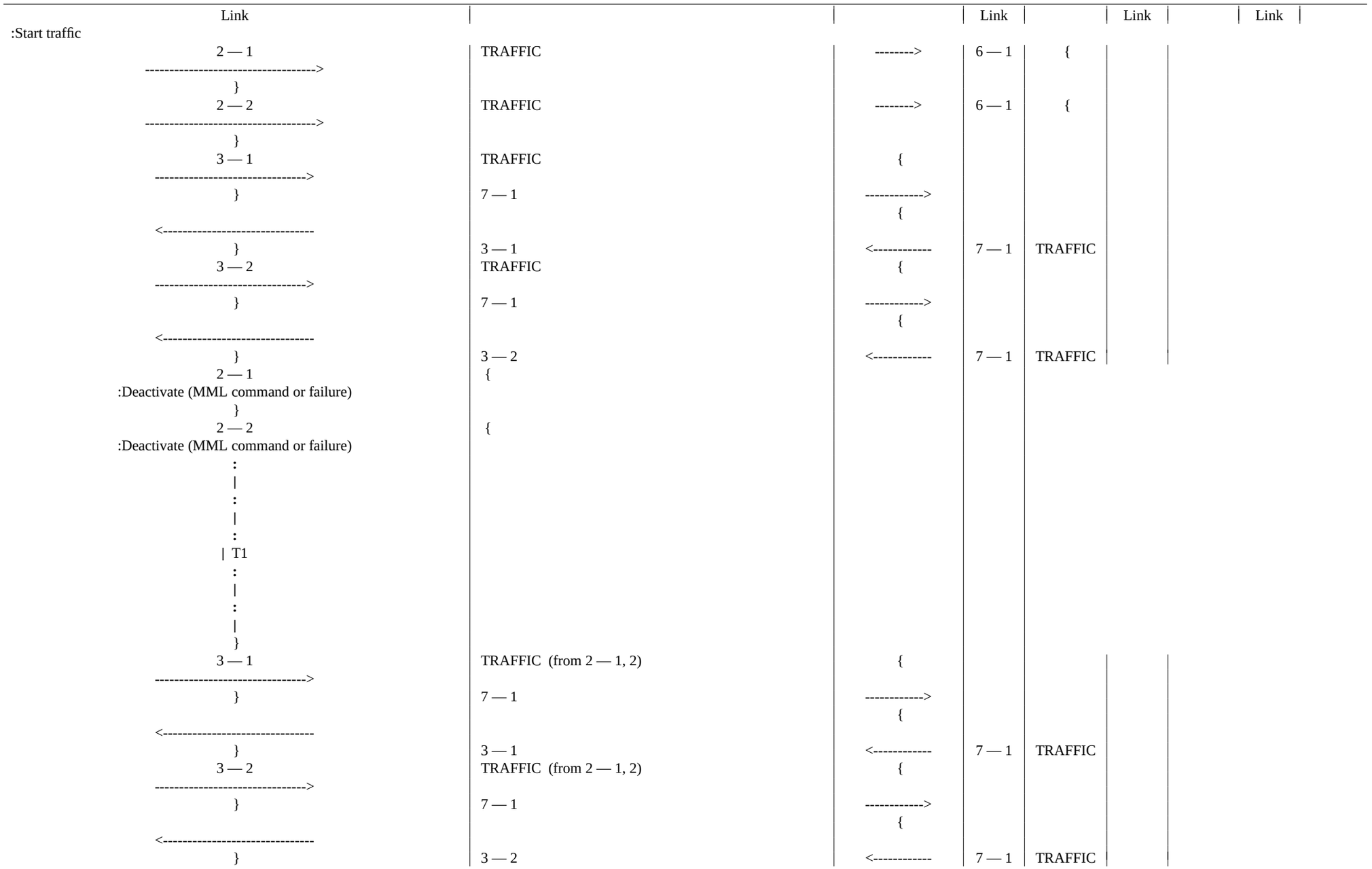
{
SUBTITLE:
Changeover to another linkset with adjacent SP inaccessible
}		

{
PURPOSE:
To check that the system responds correctly when there is no path between the ends of an unavailable link.
}		

{
PRE-TEST CONDITIONS: Linkset 4 unavailable
}		

CONFIGURATION: B	TYPE OF TEST: VAT, CPT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

SP A	SP B	SP C	SP E



TEST DESCRIPTION

1. {
Start traffic to E on linkset 2 and 3.
}

2. Deactivate the linkset 2.

3. {
Check that traffic continues on linkset 3 at the expiration of T1.
}

4. {
Stop traffic and check that it has been shared on links 3 — 1 and 3 — 2 according to the load sharing rules of the linkset 3.

}	
5. Check that the traffic has been received correctly. Some messages may have been lost but none should be missequenced or duplicated.. }	{
6. Check that the duration of T1 is inside the specified range. }	{

Tableau [T37.782], p.

H.T. [T38.782]
MTP LEVEL 3

TEST NUMBER: 3.18		PAGE: 1 of 1

{
REFERENCE: Q.704 § 5 Fig. 28, Fig. 29, Fig. 30
}		

TITLE: Changeover		

{
SUBTITLE:
Changeover to two linksets
}		

{
PURPOSE:
To check the changeover procedure when it is performed to several links pertaining to two linksets
}		

{
PRE-TEST CONDITIONS: Link 1 — 1 unavailable, all other available
}		

CONFIGURATION: B	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

SP A	SP B	SP C	SP D

Link			Link		Link		Link
:Start traffic							
1 — 2	TRAFFIC	{					
---------->							
}							
		{					
<----------							
}	1 — 2	TRAFFIC					
1 — 2	{						
:Deactivate (MML command or failure)							
}							
2 — X	COO, SLC | | (em |	-------->	5 — 1	{			
---------->							
}							
or 3 — X		{					
---------->							
}	8 — 1	---------->					
		<--------	2 — X	{			
<----------							
}	5 — 1	COA, SLC | | (em |					
2 — 1	TRAFIC (from 1 — 2)	-------->	5 — 1	{			
---------->							
}							
		<--------	2 — X	{			
<----------							
}	5 — 1	TRAFIC (from 1 — 2)					
2 — 2	TRAFIC (from 1 — 2)	-------->	5 — 1	{			
---------->							
}							
3 — 1	TRAFFIC (from 1 — 2)	{					
---------->							
}							
3 — 2	TRAFFIC (from 1 — 2)	{					
---------->							
}	8 — 1	---------->					
:Wait							
:Stop traffic							

TEST DESCRIPTION	
1.	Start traffic to D.
2.	{
Deactivate the link 1 — 2 and check that a COO for 1 — 2 is sent to D via B or C and that a COA is sent from D to A via B or C inside T2.	
}	
3.	{
Stop traffic and check that it has been shared on the alternative links 2 — 1, 2 — 2, 3 — 1 and 3 — 2 according to the load sharing rules in A.	
}	
4.	{
Check that, for each SLS, there were no lost messages, no duplication and no missequencing.	
}	
5.	{
Repeat the test but replace COO with ECO (some messages may have been lost).	
}	

Tableau [T38.782], p.

H.T. [T39.782]
MTP LEVEL 3

TEST NUMBER: 3.19		PAGE: 1 of 1
{ REFERENCE: Q.704 § 5 ; 3.2.2 }		
TITLE: Changeover		
{ SUBTITLE: Changeover due to various reasons }		
{ PURPOSE: To check the interface L2-L3 }		
{ PRE-TEST CONDITIONS: Linkset with two available links }		
CONFIGURATION: A	TYPE OF TEST: VAT	TYPE OF SP: ALL
MESSAGE SEQUENCE:		

	SP A			SP B
:Start traffic		Link 1 — 1		TRAFFIC
		Link 1 — 2		TRAFFIC
		Link 1 — 1		{
		:Deactivation due to various reasons (see Note)		}
		Link 1 — 2		CHANGEOVER TRAFFIC (from 1 — 1)
:Wait				
:Stop traffic				
{ *Note* — The object of this test is to check the interface L2-L3 by invoking a changeover by the different means listed in Q.704 (§ 3.2.2). These reasons are: high error rate, expiration of timer T1, T2, T6 and T7 of L2, equipement failure, erroneous BSN or FIB, reception of SIOS, SIN, SIE, SIO and SIPO of L2, and management request. The goal of this test is not to check the changeover procedure itself, but only that the COO is generated for each of these reasons. }				

TEST DESCRIPTION

1. { Start traffic to B and C on all links. }
2. { Invoke the deactivation of the link 1 — 1 (see Note above). }
3. { Check that traffic is changed over from 1 — 1 to 1 — 2. }
4. { Stop traffic and check that it has been received correctly. }
5. { Repeat the test for each reason. }

Tableau [T39.782], p.