H.T. [T43.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.6.1		
REFERENCE: Q.724 § 1.9		
TITLE: SSB		
SUBTITLE: SSB Received		
{ PURPOSE: To verify that the call will be immediately released by SP A if a Subscriber-busy signal is received and the correct indication is given to the calling party }		
{ PRE-TEST CONDITIONS: Called termination must be busy }		
CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	SSB
CLF	---------->	
	<----------	RLG
TEST DESCRIPTION		
1. Attempt to make a call from SP A to SP B. Record the message sequence with a signal monitor.	{ }	
2. CHECK A: IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | |	{ }	
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | |	{ }	
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |	{ }	
Note 1 — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received.	{ }	
Note 2 — This sequence may not be possible at International Gateways.	{ }	

H.T. [T44.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.6.2

REFERENCE: Q.724 § 1.9

TITLE: SSB

SUBTITLE: SSB Sent

{
PURPOSE: To verify th
at signalling point A is able to generate
or retransmit a subscriber busy signal
}

{
PRE-TEST CONDITIONS: The called ter
mination must be
busy
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP

EXPECTED MESSAGE SEQUENCE:

SP A		SP B
	<----------	IAM
SSB	---------->	
	<----------	CLF
RLG	---------->	

TEST DESCRIPTION

1. Attempt to make a call from SP B to SP A. Record the message sequence using a signal monitor. }	{
2. CHECK A: IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | | }	{
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note 1 — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	{
Note 2 — This sequence may not be possible at International Gateways. }	

H.T. [T45.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.7.1

REFERENCE: Q.724

TITLE: UNN

SUBTITLE: UNN Received

{
PURPOSE:
To verify that the call will be immediately released by
SP A if an Unallocated-number signal is received and the correct
indication is given to the calling
party
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point B such
that a UNN Signal is returned to the call
request
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP

EXPECTED MESSAGE SEQUENCE:

SP A		SP B
IAM	---------->	
	<----------	UNN
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. Attempt to make a call from SP A to SP B. Record the message sequence with a signal monitor. }	{
2. CHECK A: IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | | }	{
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note 1 — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	{
Note 2 — This sequence may not be possible at International Gateways. }	

H.T. [T46.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.7.2

REFERENCE: Q.724

TITLE: UNN

SUBTITLE: UNN Sent

{
PURPOSE:
To verify that signalling point A is able to generate
an Unallocated-number signal
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point A such
that a UNN Signal is returned to the call
request
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAM
UNN	---------->	
	<----------	CLF
RLG	---------->	

TEST DESCRIPTION

1. Attempt to make a call from SP B to SP A. Record the message sequence using a signal monitor. }	{
2. CHECK A: IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | | }	{
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note 1 — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	{
Note 2 — This sequence may not be possible at International Gateways. }	

H.T. [T47.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.8.1

REFERENCE: Q.724

TITLE: LOS

SUBTITLE: LOS Received

{
PURPOSE:
Verify that the call will be immediately released by SP A if a Line out of service signal is received and the correct indication is given to the calling party
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point B such that a LOS Signal is returned to the call request
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP

EXPECTED MESSAGE SEQUENCE:

SP A		SP B
IAM	---------->	
	<----------	LOS
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. Attempt to make a call from SP A to SP B. Record the message sequence with a signal monitor. }	{
2. CHECK A: IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | | }	{
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	

H.T. [T48.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.8.2

REFERENCE: Q.724

TITLE: LOS

SUBTITLE: LOS Sent

{
PURPOSE: To verify th
at signalling point A is able to retransmit
a Line-out-of-service signal
}

{
PRE-TEST CONDITIONS: Arrange the da
ta in signalling point A such
that a LOS Signal is returned to the call
request
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAM
LOS	---------->	
	<----------	CLF
RLG	---------->	

TEST DESCRIPTION

1. Attempt to make a call from SP B to SP A. Record the message sequence using a signal monitor. }	{
2. CHECK A: IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | | }	{
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note 1 — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	{
Note 2 — This sequence may not be possible at International Gateways. }	

H.T. [T49.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.9.1

REFERENCE: Q.724

TITLE: SST

SUBTITLE: SST received

{
PURPOSE:
To verify that a call will be immediately released by the outgoing signalling point if a send-special-information-tone signal is received and the correct indication is given to the calling party
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point B such that a SST signal is returned to the call request
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	SST
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION	
1. Attempt to make a call from SP A to SP B Record the message sequence with a signal monitor. }	{
2. CHECK A: IS THE APPROPRIATE TONE RETURNED TO THE CALLING PARTY? | | | | | | }	{
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	

H.T. [T50.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.9.2		
REFERENCE: Q.724		
TITLE: SST		
SUBTITLE: SST sent		

{
PURPOSE: To verify that signalling point A is able to gene
rate a
send-special-information-tone signal
}		

{
PRE-TEST CONDITIONS: Arrange the data in signal
ling point A
such that a SST signal is returned to the
call request
}		

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE: SP A SST RLG	 <---------- ---------->| <---------- ---------->	SP B IAM CLF
TEST DESCRIPTION		
1. Attempt to make a call from SP B to SP A Record the message sequence with a signal monitor. } 2. CHECK A: IS THE APPROPRIATE TONE RETURNED TO THE CALLING PARTY? | | | | | | } 3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | } 4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | } *Note* — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	{ { { { {	

H.T. [T51.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.10.1

REFERENCE: Q.724 § 10.2

TITLE: ACB

SUBTITLE: ACB received

{
PURPOSE:
To verify that because of incompatible CUG information
the call is rejected and an access barred signal is returned to the
call request
}

{
PRE-TEST CONDITIONS:
Arrange the signalling point data
such that the CUG information contained in the IAI is compatible
with the information stored at SP B
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OI
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAI	---------->	
	<----------	ACB
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1.
Make a CUG call from SP A to SP B.
Record the message sequence using a signal monitor.
{
}

2.
CHECK A:
IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | |
{
}

3.
CHECK B:
IS THE CIRCUIT IDLE? | | | | | |
{
}

4.
CHECK C:
WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |
{
}

{
Note
— It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received.
}

H.T. [T52.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.10.2		
REFERENCE: Q.724 § 10.2		
TITLE: ACB		
SUBTITLE: ACB sent		

{
PURPOSE:
To verify that SP A is able to generate or receive an access barred signal
}		

PRE-TEST CONDITIONS:		
CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAI
ACB	---------->	
	<----------	CLF
RLG	---------->	
TEST DESCRIPTION		
1. Make a CUG call from SP B to SP A. Record the message sequence using a signal monitor. }	{	
2. CHECK A: IS THE APPROPRIATE TONE OR ANNOUNCEMENT RETURNED TO THE CALLING PARTY? | | | | | | }	{	
3. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{	
4. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{	
Note — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }		

H.T. [T53.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.11.1

REFERENCE: Q.724 § 10.7

TITLE: DPN

SUBTITLE: DPN received

{
PURPOSE:
To verify that the call will be immediately released by
the
SP A if a digital path not provided signal is received and the correct
indicator is given to the calling party
}

{
PRE-TEST CONDITIONS:
a)
Ensure the IAM is set to indicate that an all digital
path is required.
b)
Ensure the data in signalling point B is configured such that a
digital path not provided signal is returned to the
call request.
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	DPN
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. Attempt to make a call from SP A to SP B. Ensuring that the IAM is set to indicate that an all digital path is required. Record the message sequence using a signal monitor. }	{
2. CHECK A: IS THE CIRCUIT IDLE? | | | | | | }	{
3. CHECK B: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	

H.T. [T54.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 4.11.2

REFERENCE: Q.724 § 10.7

TITLE: DPN

SUBTITLE: DPN sent

{
PURPOSE: To verify that signalling point A is able to gene
rate a
digital path not provided signal
}

{
PRE-TEST CONDITIONS: Arrange the data in signal
ling point A
such that a DPN signal is returned to the
call request
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAM
DPN	---------->	
	<----------	CLF
RLG	---------->	

TEST DESCRIPTION

1. Attempt to make a call from SP B to SP A. Record the message sequence with a signal monitor. }	{
2. CHECK B: IS THE CIRCUIT IDLE? | | | | | | }	{
3. CHECK C: WAS THE MESSAGE SEQUENCE AS SHOWN ABOVE? | | | | | | }	{
Note — It may not be possible to confirm that the appropriate tone is returned to the calling party. In this case it must be verified that the signalling point under test retransmits the signal received. }	

Tableau [T54.783], p.

H.T. [T55.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.1

REFERENCE: Q.724 § 6.2.1

{
TITLE: Inability to release in response to a CLF
}

SUBTITLE:

{
PURPOSE:
To verify that if the signalling point is unable to
return
a circuit to the idle condition in response to a clear forward
signal, the circuit will be blocked
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point A
such that it is unable to return the circuit to the idle condition
in response to a clear forward signal
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAM
ACM	---------->	
Ringing tone	{	
| fR		
| (hy----------		
}		
ANC	---------->	
Speech	{	
_____		
}	Speech	
	<----------	CLF
BLO	---------->	
	<----------	BLA
RLG	---------->	

TEST DESCRIPTION

1. {
Make a call from SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
The calling party should release the call.
}

6. {
CHECK C:
VERIFY THAT A CALL CAN NOT BE ORIGINATED FROM
EITHER SP
}

7. {

CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | } 8. Repeat this test in the reverse direction. }	{

Tableau [T55.783], p.

H.T. [T56.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.2

REFERENCE: Q.724 § 6.2.2

{
TITLE: Inability to release in response to a backward signal
}

SUBTITLE:

{
PURPOSE:
To verify that if signalling point is unable to return
the circuit to an idle condition in response to a backward
signal, the circuit will be blocked
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point A
such that it is unable to return the circuit to an idle condition
in response to a backward signal
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: S
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	ADI
BLO	---------->	
	<----------	BLA
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION	
1. Make a call from SP A to SP B, but do not enter the final digit. }	{
2. CHECK A: VERIFY THAT A CALL CAN NOT BE ORIGINATED FROM EITHER EXCHANGE }	{
3. CHECK B: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
4. Repeat this test in the reverse direction. }	{

H.T. [T57.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.3.1

REFERENCE: Q.724 § 6.4.3a

TITLE: Timers

SUBTITLE: T2

{
PURPOSE: To check the value of timer T2
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point B
such that an address complete message is not returned to the
call request
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM | (em	---------->	
{		
T2		
|		
T2 | 20-30 seconds		
T2		
|		
}		
CLF | (em	---------->	
	<----------	RLG

TEST DESCRIPTION

1.	{
Attempt to make a call from SP A to SP B.	
Record the message sequence with a signal monitor.	
}	
2.	{
CHECK A:	
WAS THE CLEAR FORWARD SIGNAL SENT BEFORE 20-30 SECONDS? | | | | |	
}	
3.	{
CHECK B:	
IS THE CIRCUIT IDLE? | | | | |	
}	
4.	{
CHECK C:	
WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | |	
}	

H.T. [T58.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.3.2

REFERENCE: Q.724 § 6.4.3b

TITLE: Timers

SUBTITLE: T3

{
PURPOSE: To check the value of timer T3
}

{
PRE-TEST CONDITIONS:
a)
Signalling point A should be able to determine that the proper number of digits have not been received.
b)
Arrange the data in signalling point B such that a clear forward signal is not returned in response to an address incomplete message.
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAM
ADI | (em	---------->	
{		
T3		
|		
T3 | 4-15 seconds		
T3		
|		
}		
CFL | (em	---------->	
	<----------	CLF
RLG	---------->	

TEST DESCRIPTION

1.	{
Attempt to make a call from SP B to SP A but do not dial the last digit.	
Record the message sequence using a signal monitor.	
}	
2.	{
CHECK A:	
WAS A CALL FAILURE SIGNAL SENT BETWEEN 4-15 SECONDS AFTER SENDING OF THE ADDRESS INCOMPLETE MESSAGE? | | | | |	
}	
3.	{
CHECK B:	
IS THE CIRCUIT IDLE? | | | | |	
}	
4.	{
CHECK C:	
WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | |	
}	

H.T. [T59.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.3.3

REFERENCE: Q.724 § 6.4.3b

TITLE: Timers

SUBTITLE: T4

{
PURPOSE: To check the value of timer T4
}

{
PRE-TEST CONDITIONS:
a)
Signalling point A should be able to determine that the proper number of digits have not been received.
b)
Arrange the data in signalling point B such that a clear forward signal is not returned in response to an address incomplete message.
c)
Arrange the data in signalling point B such that a clear forward signal is not returned in response to a call failure signal.
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP

EXPECTED MESSAGE SEQUENCE:

SP A		SP B
	<----------	IAM
ADI | (em	---------->	
{		
T3		
|		
T3 | 4-15 seconds		
T3		
—		
}		
CFL	---------->	
{		
T4		
|		
T4		
|		
T4 | 4-15 seconds		
T4		
|		
}		
CFL | (em	---------->	

TEST DESCRIPTION

1. {
Attempt to make a call from SP B to SP A but do not send the last digit.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
WAS THE CALL FAILURE SIGNAL REPEATED BETWEEN 4-15 SECONDS AFTER SENDING THE INITIAL CALL FAILURE SIGNAL? | | | | | |
}

3. {
CHECK B:
WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |
}

H.T. [T60.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.3.4
REFERENCE: Q.724 § 6.4.3b
TITLE: Timers
SUBTITLE: T5

{
PURPOSE: To check the value of timer T5
}

{
PRE-TEST CONDITIONS:
a)
Signalling point A should be able to determine that the proper number of digits have not been received.
b)
Arrange the data in signalling point B such that a clear forward signal is not returned in response to an address incomplete message.
c)
Arrange the data in signalling point B such that a clear forward signal is not returned in response to a call failure signal.
}

CONFIGURATION: 1 | TYPE OF TEST: VAT | TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:

SP	A			SP
			<----------	IAM
ADI		T3 |—	---------->	
		T3 | 4-15 seconds		
CFL	T5 |—	T3 |—	---------->	
	T5 |	T4 | 4-15 seconds		
CFL	T5 |	T4 |—	---------->	
	T5 |	T4 | 4-15 seconds		
CFL	T5 |	T4 |—	---------->	
	T5 | 1 minute			
RSC	T5 —		---------->	
TEST DESCRIPTION				

1. Attempt to make a call from SP B to SP A but do not send the last digit. Record the message sequence using a signal monitor. }	{
2. CHECK A: WAS THE CALL FAILURE SIGNAL REPEATED BETWEEN 4-15 SECONDS AFTER SENDING THE INITIAL CALL FAILURE SIGNAL? | | | | | | }	{
3. CHECK B: WAS THE CALL FAILURE SIGNAL REPEATED FOR A PERIOD OF ONE MINUTE? | | | | | | }	{
4. CHECK C: WAS A RESET CIRCUIT SIGNAL SENT ON THE EXPIRY OF TIMER T5? | | | | | | }	{
5. CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{

Tableau [T60.783], p.

H.T. [T61.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.3.5
REFERENCE: Q.724 § 6.2.3
TITLE: Timers
SUBTITLE: T6

{
PURPOSE: To check the value of timer T6
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point B such
that a release guard is not returned in response to a clear forward signal
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	ACM
	{	
| | fR		

}	**Ringing tone**	
CLF | (em	---------->	
{		
T6		
|		
T6 | 4-15 seconds		
T2		
|		
}		
CLF | (em	---------->	
TEST DESCRIPTION		

1. Make a call from SP A to SP B, record the message sequence using a signal monitor. }	{
2. CHECK A: IS RINGING TONE HEARD? | | | | | | }	{
3. The calling party should clear the call. }	{
4. CHECK B: WAS THE CLEAR FORWARD SIGNAL REPEATED BEFORE 4-15 SECONDS AFTER SENDING THE INITIAL CLEAR FORWARD SIGNAL? | | | | | | }	{
5. CHECK C: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{

Tableau [T61.783], p.

H.T. [T62.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.3.6
REFERENCE: Q.118
TITLE: Q.118 timers

{
SUBTITLE: Answer signal not received
}

{
PURPOSE:
To verify that if an answer signal is not received within
2-4 minutes after receiving an address complete signal the connection is released by the outgoing signalling point
}

{
PRE-TEST CONDITIONS: The ca
lled party should not answer the
call
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		

SP A		SP B
IAM	---------->	
IAM —	<----------	ACM
|		
| 2-4 minutes		
|		
CLF —	---------->	
	<----------	RLG
TEST DESCRIPTION		

1. Attempt to make a call from SP A to SP B. Record the message sequence using a signal monitor. }	{
2. CHECK A: IS RINGING TONE HEARD? | | | | | | }	{
3. The called party should NOT answer the call. }	{
4. CHECK B: WAS THE CLEAR FORWARD SEND WITHIN A PERIOD OF 2 To 4 MINUTES SIGNAL? | | | | | | }	{
5. CHECK C: IS THE CIRCUIT IDLE? | | | | | | }	{
6. CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note — The timer need only be run at the outgoing international exchange. }	{

Tableau [T62.783], p.

H.T. [T63.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.3.7
REFERENCE: Q.118
TITLE: Q.118 timers

{
SUBTITLE: Delay in clearing by calling party
}

{
PURPOSE:
Verify that the call will be released if the calling party has not cleared the call within 1-2 minutes after the called party clears
}

{
PRE-TEST CONDITIONS: The ca
lled party should not answer the
call
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	ACM
	{	
|| fR		

}	**Ringing tone**	
	<----------	**ANC**
Speech	**{**	
_____		
}	**Speech**	
—	<----------	**CBK**
{		
T6		
| 1-2 minutes		
}		
CLF —	---------->	
	<----------	RLG
TEST DESCRIPTION		

1. Make a call from SP A to SP B. Record the message sequence using a signal monitor. }	{
2. CHECK A: IS RINGING TONE HEARD? | | | | | | }	{
3. The called party should answer the call. }	{
4. CHECK B: IS SPEECH POSSIBLE? | | | | | | }	{
5. The called party should clear the call. }	{
6. CHECK C: WAS THE CLEAR FORWARD SENT WITHIN A PERIOD OF BETWEEN 1 AND 2 MINUTES? | | | | | | }	{
7. CHECK D: IS THE CIRCUIT IDLE? | | | | | | }	{
8. CHECK E: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{

Tableau [T63.783], p.

H.T. [T64.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.4.1
REFERENCE: Q.724 § 1.15

{
TITLE: Reset of circuits during a call
}

{
SUBTITLE: Of an outgoing circuit
}

{
PURPOSE: To verify t
hat on receipt of a reset circuit signal the call
is immediately released
}

{
PRE-TEST CONDITIONS:
a)
Called termination is free
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	ACM
	{	
|| fR		

}	Ringing tone	
	<----------	ANC
Speech	{	
_____		
}	Speech	
	<----------	RSC
CLF	---------->	
	<----------	RLG
TEST DESCRIPTION		
1. Make a call for SP A to SP B. Record the message sequence using a signal monitor. }	{	
2. CHECK A: IS RINGING TONE HEARD? | | | | | | }	{	
3. The called party should answer the call. }	{	
4. CHECK B: IS SPEECH POSSIBLE? | | | | | | }	{	
5. Arrange for SP B to send a reset-circuit signal. }	{	
6. CHECK C: IS THE CIRCUIT IDLE? | | | | | | }	{	
7. CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{	

Tableau [T64.783], p.

H.T. [T65.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.4.2

REFERENCE: Q.724 § 1.15

{
TITLE: Reset of circuit during call
}

{
SUBTITLE: Of an incoming circuit
}

{
PURPOSE: To verify th
at the circuit reset procedure can be correctly
initiated during a call
}

{
PRE-TEST CONDITIONS:
a)
Called termination is free
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAM
ACM	---------->	
Ringing tone	{	
|| fR		

}		
ANC	---------->	
Speech	{	
_____		
}	Speech	
	<----------	RSC
RLG	---------->	

TEST DESCRIPTION

1. {
Make a call from SP B to SP A.
Record the message sequence with a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
Arrange for SP B to send a reset circuit signal.
}

6. {
CHECK C:
IS THE CIRCUIT IDLE? | | | | | |
}

7. {
CHECK D:
WAS THE MESSAGE SEQUENCE AS
ABOVE? | | | | | |
}

H.T. [T66.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 5.5.1

REFERENCE: Q.724 § 6.5

{
TITLE: Receipt of unreasonable information during a call
}

SUBTITLE: Received

{
PURPOSE:
To verify that the action taken by a signalling point
upon receipt of unreasonable signalling information is as stated in Q.724
Section 6.5
}

{
PRE-TEST CONDITIONS:
a)
Circuit idle and unblocked
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP:
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	ACM
	{	
|| fR		

}	Ring tone	
	<----------	See Item 3 belo
	<----------	ANC
	{	
_____		
}	Speech	
	<----------	See Item 6 belo
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. {
Make a call from SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
Send a message which would be unreasonable at this point in the call
(i.e. COT) and confirm that the message is discarded.
}

4. {
The called party should answer the call.
}

5. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

6. {
SP B should send such a message which would be unreasonable at this point
in the call (i.e. ACM) and confirm that the message is discarded.
}

7. {
The calling point should clear the call.
}

8. CHECK C: IS THE CIRCUIT IDLE? | | | | | | }	{
9. CHECK D: WAS THE MESSAGE AS SHOWN ABOVE }	{

Note — This test covers only some of the ambiguous messages which could be received.

H.T. [T67.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.1.1

REFERENCE: Q.724 § 7.3

TITLE: Continuity check call

{
SUBTITLE: COT applied on an outgoing circuit
}

{
PURPOSE: To verify t
hat a call can be set up on a circuit
requiring a continuity check
}

{
PRE-TEST CONDITIONS: Arrange the da
ta in signalling point A such that
a continuity check is required on this circuit
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
Check tone	{	
---------- |		
|		
}		
	{	
---------- | f | fR		
}		
COT	---------->	
	<----------	ACM
	{	
_____		
}	Ringing tone	
	<----------	ANC
Speech	{	
_____		
}	Speech	
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. {
Make a call from SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
The calling party should clear the call.
}

6. {
CHECK C:
IS THE CIRCUIT IDLE? | | | | | |
}

7. CHECK D: WAS THE MESSAGE SEQUENCE AS SHOWN ABOVE? | | | | | | }	{
8. For validation testing repeat this test in the reverse direction. }	{

Tableau [T67.783], p.

H.T. [T68.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.1.2

REFERENCE: Q.724 § 7.3

TITLE: Special call set up

{
SUBTITLE: COT applied on a previous circuit
}

{
PURPOSE: To verify th
at a call can be set up if a continuity check is being performed on a previous circuit
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point A such
that
the signalling information indicates that a continuity check has been performed on a previous circuit
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT

EXPECTED MESSAGE SEQUENCE:

SP A	
IAM	---------->
	|
{ delay while check performed on previous circuit }	
	|
COT	---------->
	<----------
	{
_____	
}	Ringing tone
	<----------
Speech	{
_____	
}	Speech
CLF	---------->
	<----------

TEST DESCRIPTION

1. {
Make a call from SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
The calling party should clear the call.
}

6. {
CHECK C:
IS THE CIRCUIT IDLE? | | | | | |
}

7. {
CHECK D:

WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | } 8. CHECK E: WAS THE CONTINUITY CHECK INDICATOR SET TO A BINARY VALUE OF TWO (MESSAGE INDICATOR BITS E and F IN IAM)? | | | | | | } 9. For validation testing repeat this test in the reverse direction. }	{ {

H.T. [T69.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.1.3

REFERENCE: Q.724 § 7.5

TITLE: Continuity check call

{
SUBTITLE: COT on a satellite circuit
}

{
PURPOSE: To verify th
at a continuity check can be performed on a
satellite circuit
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point A such
that
the call is routed over a satellite circuit, with a continuity check applied
for
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
Check tone	{	
---------- |		
|		
}		
	{	
---------- | f | fR		
}		
COT	---------->	
	<----------	ACM
	{	
---------- | f | fR		
}	Ringing tone	
	<----------	ANC
Speech	{	
_____		
}	Speech	
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. {
Make a call from SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? \| \| \| \| \|
}

3. {
The called party should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? \| \| \| \| \|
}

5. {
The calling party should clear the call.
}

6. {
CHECK C:

IS THE CIRCUIT IDLE? | | | | | |	
}	
7.	{
CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |	
}	
8.	{
CHECK E: WAS THE SATELLITE INDICATOR BIT IN THE IAM SET TO 1? | | | | | |	
}	
9.	{
For validation testing repeat this test in the reverse direction.	
}	

Tableau [T69.783], p.

H.T. [T70.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.1.4

REFERENCE: Q.724 § 6.1

TITLE: Continuity check call

{
SUBTITLE: Calling party clears during COT
}

{
PURPOSE: To verify th
at the calling party can successfully clear
during the continuity check phase of the call
}

{
PRE-TEST CONDITIONS: Arrange the da
ta in signalling point B such that a continuity check is applied on this call
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
Check tone	{	
---------- | f | fR		
}		
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION	
1. Make a call from SP A to SP B. Record the message sequence with a signal monitor. }	{
2. The calling party should clear the call during the continuity check phase. }	{
3. CHECK A: IS THE CIRCUIT IDLE? | | | | | | }	{
4. CHECK B: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
5. For validation testing repeat this test in the reverse direction. }	{

Tableau [T70.783], p.

H.T. [T71.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.1.5

REFERENCE: Q.724 § 7.3

TITLE: Continuity check call

{
SUBTITLE: Delay of through connect
}

{
PURPOSE:
To verify that the switching though of the speech path
is delayed until the residual check-tone has propagated through the return
of the speech path
}

{
PRE-TEST CONDITIONS:
a)
The called termination is free
b)
Arrange the data in signalling point A such that a continuity check is
applied on this call
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
Check tone	{	
---------- |		
|		
}		
	{	
---------- | f | fR		
}		
COT	---------->	
	<----------	ACM
	{	
---------- | f | fR		
}	Ringing tone	
	<----------	ANC
Speech	{	
_____		
}	Speech	
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. {
Make a call from SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
WAS THE CONTINUITY CHECK TONE HEARD BY EITHER CALLED OR CALLING PARTY? | | | | |
}

3. {
CHECK B:
IS RINGING TONE HEARD? | | | | |
}

4. {
The called party should answer the call.
}

5. {
CHECK B:

IS SPEECH POSSIBLE? | | | | | |	
}	
6.	{
The calling party should clear the call.	
}	
7.	{
CHECK C:	
IS THE CIRCUIT IDLE? | | | | | |	
}	
8.	{
CHECK D:	
WAS THE MESSAGE SEQUENCE AS SHOWN ABOVE? | | | | | |	
}	
9.	{
For validation testing repeat this test in the reverse direction.	
}	

H.T. [T72.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.1.6

REFERENCE: Q.724 § 7.3

TITLE: Continuity check call

SUBTITLE: COT unsuccessful

{
PURPOSE: To verify th
at a repeat attempt of the continuity check is
made on the failed circuit
}

{
PRE-TEST CONDITIONS: Ensure th
at no backward tone is detected within the specified timeout
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF S
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
Check tone	{	
---------- |		
|		
}		
	{	
---------- | f | fR		
}		
CCF | (em	---------->	
{		
T9		
|		
T9 | 1-10 seconds		
T9		
|		
}		
CCR | (em	---------->	
Check tone	{	
---------- |		
|		
}		
	{	
---------- | f | fR		
}		
CCF | (em	---------->	
{		
T10		
|		
T10 | 1-3 minutes		
T10		
|		
}		Maintenance sta
CCR —	---------->	
Check tone	{	
---------- |		
|		
}		
	{	
---------- | f | fR		
}		

TEST DESCRIPTION

1. {

Initiate the continuity test call procedure at SP A.
Record the message sequence using a signal monitor.

}	
2. CHECK A: WAS THE SECOND CONTINUITY CHECK INITIATED WITHIN 1 TO 10 SECONDES? | | | | | |	{
}	
3. CHECK B: WERE THE MAINTENANCE STAFF ALERTED ON FAILURE OF THE SECOND CONTINUITY CHECK? | | | | | |	{
}	
4. CHECK C: WAS THE CHECK REPEATED AT INTERVALS OF 1 TO 3 MINUTES? | | | | | |	{
}	
5. CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |	{
}	
Note 1 — The repeated check will only finish when continuity is detected.	{
}	
Note 2 — On failure of the COT an automatic repeat attempt will be made —see test No. 6.2.5.	{
}	

H.T. [T73.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.1.7

REFERENCE: Q.724 § 7.3

TITLE: Continuity check call

{
SUBTITLE: COT received on an incoming circuit
}

{
PURPOSE: To verify t
hat a call can be set up on an incoming circuit
requiring a continuity check
}

{
PRE-TEST CONDITIONS: Arrange the da
ta in signalling point such that
a continuity check is required on this circuit
}

CONFIGURATION: 1	TYPE OF TEST: VAT and CPT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
	<----------	IAM
	{	
|		
| (hy----------		
}	Check tone	
	{	
| | fR		

}		
	<----------	COT
ACM	---------->	
Ringing tone	{	
| fR		
| (hy----------		
}		
ANC	---------->	
Speech	{	
_____		
}	Speech	
	<----------	CLF
RLG	---------->	

TEST DESCRIPTION

1. {
Make a call from SP B to SP A.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS THE RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
The calling party should clear the call.
}

6. {
CHECK C:

IS THE CIRCUIT IDLE? | | | | | |	
}	
7.	{
CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |	
}	
8.	{
For validation testing repeat this test in the reverse direction.	
}	

Tableau [T73.783], p.

H.T. [T74.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.2.1

REFERENCE: Q.724 § 3

{
TITLE: Automatic repeat attempt
}

SUBTITLE: Dual seizure

{
PURPOSE: To verify th
at an automatic repeat attempt will be made on
detection of a dual seizure
}

{
PRE-TEST CONDITIONS: Arrange t
he signalling point data such that SP B is the controlling exchange
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM (cic=x)	---------> <---------	IAM (cic=x)
ACM (cic=x)	---------->	
Ringing tone	{	
| fR		
| (hy----------		
}		
ANC (cic=x)	---------->	
Speech	{	
_____		
}	Speech	
IAM (cic=y)	---------->	
	<----------	ACM (cic=y)
	{	
| fR		
| (hy----------		
}	Ringing tone	
	<----------	ANC (cic=y)
Speech	{	
_____		
}	Speech	
CLF (cic=y)	---------->	
	<----------	RLG (cic=y)
	<----------	CLF (cic=x)
RLG (cic=x)	---------->	

TEST DESCRIPTION

1. {
Simultaneously transmit an IAM (containing the same value of cic) from each end of the link for a both way circuit.
Record the message sequence using a signal monitor
}

2. {
CHECK A:
IS RINGING TONE HEARD ON THE CALL ORIGINATED FROM SP B? | | | | | |
}

3. {
The called party at SP A should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. CHECK C: WAS A REPEAT ATTEMPT MADE BY SP A, WITH A DIFFERENT VALUE OF CIC IN THE IAM? | | | | | | }	{
6. CHECK D: IS RINGING TONE HEARD ON THE CALL ORIGINATED FROM SP A? | | | | | | }	{
7. The called party at SP B should answer the call. }	{
8. CHECK E: IS SPEECH POSSIBLE? | | | | | | }	{
9.	Clear both calls down.
10. CHECK F: ARE THE CIRCUITS IDLE? | | | | | | }	{
11. CHECK G: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | }	{
Note — The message sequence may not be as shown above. }	

H.T. [T75.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.2.2

REFERENCE: Q.724 § 3

{
TITLE: Automatic repeat attempt
}

SUBTITLE: Circuit reset

{
PURPOSE:
To verify that an automatic repeat attempt will be made
on receipt of circuit reset after sending of an initial address
message and before a backward signal has been received
}

{
PRE-TEST CONDITIONS:
a)
Arrange the data in signalling point B such that a circuit reset signal
is sent in response to the initial address message of the first call
request
b)
The called termination should be free
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	RSC
CLF	---------->	
	<----------	RLG
IAM	---------->	
	<----------	ACM
	{	
| fR		
| (hy----------		
}	Ringing tone	
	<----------	ANC
Speech	{	
_____		
}	Speech	
CLR	---------->	
	<----------	RLG

TEST DESCRIPTION

1. {
Make a call for SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | |
}

3. {
The called party should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | |
}

5. {
The calling party should clear the call.
}

6. {
CHECK C:

IS THE CIRCUIT IDLE? | | | | | | } 7. CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | } *Note* — The message sequence may not be as shown above. }	{ {

Tableau [T75.783], p.

H.T. [T76.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.2.3

REFERENCE: Q.724 § 3

{
TITLE: Automatic repeat attempt
}

{
SUBTITLE: Reception of unreasonable signalling information
}

{
PURPOSE:
To verify that a repeat attempt will be made on receipt
of unreasonable signalling information after sending the initial address
message and before one of the backward signals has been
received
}

{
PRE-TEST CONDITIONS:
a)
Arrange the data in signalling point B such that unreasonable signalling
information (see note below) is returned in response to the initial
address message of the first call request
b)
The called termination should be free
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------->	
	<----------	see Note 1 below
RSC	---------->	
	<----------	RLG
IAM	---------->	
	<----------	ACM
	{	
| fR		
| (hy----------		
}	Ringing tone	
	<----------	ANC
Speech	{	
_____		
}	Speech	
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. {
Make a call for SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
The calling party should clear the call.

}	
6. CHECK C: IS THE CIRCUIT IDLE? | | | | | |	{
}	
7. CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |	{
}	
Note 1 — This may be any message that if received at this point would be either ambiguous or inappropriate.	{
}	
Note 2 — The message sequence may not be as shown above.	{
}	

0

Tableau [T76.783], p.

H.T. [T77.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.2.4

REFERENCE: Q.724 § 3

{
TITLE: Automatic repeat attempt
}

{
SUBTITLE: Blocking of a circuit
}

{
PURPOSE:
To verify that an automatic repeat attempt will be made
on receipt of the blocking signal after sending an initial address message and before any backward messages have been received
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point B such
that a blocking signal is returned in response to the initial address message of the first call request
}

CONFIGURATION: 1	TYPE C
EXPECTED MESSAGE SEQUENCE:	
SP A	
IAM	----------
	<--------
BLA	----------
CLF	----------
	<--------
IAM	----------
	<--------
| fR | (hy----------	
}	Rin
	<--------
Speech _____	
}	S
CLF	----------
	<--------

TEST DESCRIPTION

1. {
Make a call for SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
The calling party should clear the call.
}

6. {
CHECK C:
IS THE CIRCUIT IDLE? | | | | | |
}

7. CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | | } *Note* — The message sequence may not be as shown above. }	{ {

Tableau [T77.783], p.

H.T. [T78.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.2.5

REFERENCE: Q.724 § 6

{
TITLE: Automatic repeat attempt
}

{
SUBTITLE: Continuity check failure
}

{
PURPOSE: To verify th
at an automatic repeat attempt will be made if on continuity check failure
}

{
PRE-TEST CONDITIONS:
Arrange the data in signalling point B such
that check tone is not returned within the specified limits to the first call request
}

CONFIGURATION: 1	TYPE OF TEST: VAT
EXPECTED MESSAGE SEQUENCE:	
SP A	
IAM	---------->
Check tone	{
---------- |	
|	
}	
	{
---------- | f | fR	
}	
CCF	---------->
{	
A repeat of the continuity check of the failed circuit will be made within 1-10 seconds see Q.724 Section 7.3	
}	
IAM	---------->
Check tone	{
---------- |	
|	
}	
	{
---------- | f | fR	
}	
	<----------
	{
---------- | f | fR	
}	Ringing tone
	<----------
Speech	{
_____	
}	Speech
CLF	---------->
	<----------

TEST DESCRIPTION

1. {
Make a call for SP A to SP B.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD? | | | | | |
}

3. {
The called party should answer the call.

}	
4.	{
CHECK B: IS SPEECH POSSIBLE? | | | | |	
}	
5.	{
The calling party should clear the call.	
}	
6.	{
CHECK C: IS THE CIRCUIT IDLE? | | | | |	
}	
7.	{
CHECK D: WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | |	
}	
	{
Note — The message sequence may not be as shown above.	
}	

Tableau [T78.783], p.

H.T. [T79.783]
TUP LEVEL 4 TEST SPECIFICATION

TEST NUMBER: 6.3.1

REFERENCE: Q.724 § 2.5

TITLE: Dual seizure

{
SUBTITLE: Dual seizure for controlling side
}

{
PURPOSE: To verify th
at on detection of dual seizure, the call
initiated by the controlling signalling point is completed
}

{
PRE-TEST CONDITIONS: Arrange th
e signalling point data such that SP B
is the controlling signalling point
}

CONFIGURATION: 1	TYPE OF TEST: VAT	TYPE OF SP: SP
EXPECTED MESSAGE SEQUENCE:		
SP A		SP B
IAM	---------> <---------	IAM
ACM	---------->	
	{	
| fR		
| (hy----------		
}	Ringing tone	
ANC	---------->	
Speech	{	
_____		
}	Speech	
CLF	---------->	
	<----------	RLG

TEST DESCRIPTION

1. {
Simultaneously transmit an IAM (containing the same value of cic) from each end of the link for a both way circuit.
Record the message sequence using a signal monitor.
}

2. {
CHECK A:
IS RINGING TONE HEARD ON THE CALL ORIGINATED FROM SP B? | | | | | |
}

3. {
The called party at SP A should answer the call.
}

4. {
CHECK B:
IS SPEECH POSSIBLE? | | | | | |
}

5. {
The calling party at SP B should clear the call.
}

6. {
CHECK C:
IS THE CIRCUIT IDLE? | | | | | |
}

7. {
CHECK D:
WAS THE MESSAGE SEQUENCE AS ABOVE? | | | | | |
}

8. {

CHECK E: WAS A REPEAT ATTEMPT MADE BY SP A ON ANOTHER CIRCUIT? | | | | | | } 9. Repeat this test in the reverse direction. }	{

SECTION 3

MONITORING AND MEASUREMENTS

Recommendation Q.791

MONITORING AND MEASUREMENTS FOR SIGNALLING | SYSTEM No. 7 NETWORKS

1 General

1.1 *Introduction*

1.1.1 In order to effectively manage the resources provided by a Signalling System No. 7 network, it is necessary to monitor and measure the present and estimate the future performance, utilization, and availability of these resources. Recommendation Q.791 is limited to measurements and monitoring of the MTP and SCCP. The principles and scope of this Recommendation are:

— measurements made on the signalling network resources are known as ‘‘raw’’ or primitive measurements and in general only these measurements are identified in this Recommendation;

— the recommended primitive measurements and at times, other derived measurements, whose computation using the primitive measurements is described, are those required for the effective management of the signalling network resources;

— a basic subset of signalling network measurements is recommended for international networks, but it is intended that this subset also be useful for national networks, which, however, may need additional measurements;

— monitoring and measuring are considered to be passive processes and although the results of monitoring and measuring may be used to invoke test and maintenance actions and procedures, it is left to other Recommendations, e.g. Recommendation Q.795, to provide details of such actions and procedures;

— Recommendation Q.791 is not intended to provide signalling network testing and maintenance procedures; it is left to other Recommendations to provide such procedures, e.g. Recommendations Q.707, Q.795 etc.

1.2 *Local and global view*

1.2.1 The signalling network measurements can provide both a local view and global network view of the performance of the signalling network. The primitive measurements which provide the two views are not necessarily different. Rather the global view is a result of a summary of measurements from more than a single signalling point so that the behaviour of the signalling network is centrally observable. A global view of the performance of the signalling network, in general, becomes more useful as the network becomes larger (i.e. more signalling points or multiple users).

1.3 *Grouping of measurements*

1.3.1 Each primitive measurement is classified for the purpose of guidance into one or more categories, called operations, maintenance and administration which will indicate its general area of use (see §§ 2 and 5).

1.3.2 A tabular listing of the primitive measurements according to the resource being measured is provided (see § 3). The tabular listing of the primitive measurements includes for each measurement an indication of the appropriate categories (operations, administration and maintenance) and reference to the pertinent Recommendations.

1.4 *Guidelines for uses of measurements*

1.4.1 The measurements may be used singly, or in conjunction with other measurements. It is not the intent of the Recommendation to specify the computations and algorithms to be applied to the primitive measurements. Guidelines, however, are provided (see § 5) for some uses of measurements so that, for example, the view at both ends of an international link is consistent.

2 Definition of terms

2.1 Operations (O)

2.1.1 The operation of network resources utilizes measurements that are used in real time, or are retained for short time intervals. Operations activities include signalling network surveillance.

2.1.2 Signalling network management ''on occurrence'' events and measurements include those which monitor and measure the signalling network response to abnormal conditions. (Requires further study.)

2.1.3 Signalling network surveillance measurements include those which monitor and measure the signalling network resources to ensure that the appropriate network performance is maintained.

2.2 maintenance (M)

2.2.1 Maintenance of the signalling network resources may involve the monitoring of the facility and equipment resources and maintaining network performance by expediting preventive and corrective effort when the measurements indicate a problem.

2.3 administration (A)

2.3.1 The administration of the signalling network resources involves measurements that are used on a long-term basis and are in general retained external to the signalling network resources (see Recommendation Q.795, § 2.6).

2.3.2 Administration activities include planning and dimensioning (engineering) the signalling network resources, including determination of the resource quantities, e.g. number of links set, and resource configuration, e.g. routing.

3 Listing of measurements

3.1 *General*

3.1.1 The recommended measurements are presented in the Tables 1/Q.791 to 9/Q.791. Explanatory notes relating to the contents of these tables are given below.

3.1.2 The obligatory column is used to indicate those measurements which must be provided at a signalling point. The additional ACT/PERM column indicates whether these measurements are permanently activated, or activated on demand. In non-obligatory cases, if the measurement is provided, the administration must also decide whether the measurement will be activated

on demand or be permanently active.

3.1.3 The count items in the tables, identified in the units column as ‘‘events/SP’’, ‘‘MSUs/SL’’ etc., implies the total count of events in the specified period and implicitly indicates the identity of what is being counted i.e. ‘‘events/SP’’ identifies the Signalling Point, ‘‘MSUs/SL’’ identifies the Signalling Link, etc.

3.1.4 The event items in the tables which are recorded ‘‘on occurence’’ are intended to be recorded with a time stamp, giving the unique network time when the event indicator was generated (see Recommendation Q.795, § 2.7). The resolution and accuracy of the time stamp should be as high as possible, to increase the ability to resolve complex and rapid sequences of events.

3.1.5 The periods of measurement are specified in the Duration of Measurement column.

3.2 *Table 1/Q.791*

3.2.1 The measurement of Signalling Link (SL) failure is recommended (Item 1.2). However, the specific cause for the failure (Items 1.3-1.6) is an additional optional measurement.

3.2.2 The measurement of ‘‘number of Signal Units received in error’’ contains the number of items (not necessarily the number of Signal Units) between what are perceived as ‘‘Flags’’ plus the number of sets of 16 octets received in the ‘‘octet counting’’ mode.

3.3 *Table 2/Q.791*

3.3.1 Local busy is defined as the period during which busy LSSUs are transmitted.

3.4 *Table 3/Q.791*

3.4.1 The notation ‘‘3/2’’ in the Level column indicates that the measured octets are those transferred across the Level 3/Level 2 boundary in the appropriate direction.

3.4.2 The opening flag and the check bits are included in Item 3.2

3.4.3 The signalling link congestion (Items 3.6-3.11) refers to link status ‘‘congested’’ at Level 3. A link is marked at Level 3 as congested when a congestion threshold is reached at the transmit side (see Recommendation Q.704, § 3.6 on Signalling Network Congestion and § 11 on Signalling Traffic Flow Control). These measurements should be kept as ‘‘thresholds 1, 2 and 3 separately’’ if that national option is selected.

3.5 *Table 4/Q.791*

3.5.1 Measurements 4.9 through 4.12 are required at Signalling Points in international networks if measurements 5.1 through 5.4 are not available to an RPOA. In other networks, measurements 5.1 through 5.4 at consecutive Signalling Points from origination to destination of a call might be used to derive measurements 4.9 through 4.12, consequently real time collection of the latter may not be necessary.

3.5.2 Measurements 4.9 and 4.10 are only obligatory in international networks.

3.5.3 Measurements 4.5 and 4.6 are only required at Signalling Transfer Points.

3.6 *Table 5/Q.791*

3.6.1 Measurement 5.5, the number of MSUs discarded due to a routing data error, can be used to trigger the MTP Route Verification Test (MRVT) described in Q.795, § 2.3.

3.7 *Table 6/Q.791*

3.7.1 Activation of the measurements in Table 6/Q.791 is recommended on a per Point Code (PC) or set of Point Codes and/or Service Information Octet (SIO) basis. The measurements are not obligatory.

3.7.2 Some of the measurements in Table 6/Q.791 may be of interest for accounting purposes.

3.8 *Table 7/Q.791*

3.8.1 Routing failure measurements (Items 7.1 through 7.7, and 7.9) refer to all possible failures (both local and remote) detected by SCCP Routing Control, and counts all SCCP messages which encounter transport problems, regardless of whether or not a unit data service message or N-NOTICE primitive is returned to the originator. Receipt of unit data service message is not included in this case of measurements.

3.9 *Table 8/Q.791*

3.9.1 Coordinated State Change Control measurements (Items 8.6 and 8.7) are to be taken at the signalling point of the sub-system requesting to go out of service. These measurements are only applicable at nodes with replicated sub-systems.

3.9.2 Unavailability measurements 8.1, 8.2, 8.3, 8.4 and 8.5 are architecturally dependent.

H.T. [T1.791]

TABLE 1/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks MTP — signalling link performance
}

Description of measurements	Units	Usage O	Usage A	Usage M	Duration of measurement	Level	Obligatory | ua)	A
{ 1.1 Duration of Link in the In-Service State }	secs/SL | ub)	O	A	M	30 min.	2	Yes	
{ 1.2 SL Failure-All Reasons }	event/SL			M	on occur.	2	Yes	
{ 1.3 SL Failure-Abnormal — FIBR/BSNR }	event/SL			M	on occur.	2	No	
{ 1.4 SL Failure-Excessive delay of ack. }	event/SL			M	on occur.	2	No	
{ 1.5 SL Failure-Excessive error rate }	event/SL			M	on occur.	2	No	
{ 1.6 SL Failure-Excessive duration of congestion }	event/SL			M	on occur.	2	No	
1.7 SL alignment failure	events/SL			M	30 min.	2	No	
{ 1.8 Number of Signal Units in error | uc) }	events/SL			M	30 min.	2	Yes	
{ 1.9 Number of negative ack. received }	events/SL			M	30 min.	2	No	
{ 1.10 Local Automatic changeover }	events/SL event/SL	. O		M	30 min. on occur.	3 3	No No	
{ 1.11 Local Automatic changeback }	event/SL	O		M	on occur.	3	No	
1.12 SL Restoration	event/SL			M	on occur.	3	No	

a) See § 3.1.2 (applies to all tables).

b) SL = Signalling Link.

c) The interpretation of this count is implementation dependant.

Tableau 1/Q.791 [T1.791] A L'ITALIENNE, p.

H.T. [T2.791]

TABLE 2/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks — MTP signalling link availability
}

Description of measurements	Units	Usage O	Usage A	Usage M	Duration of measurement	Level	Ob
{ 2.1 Duration of SL unavailability (for any reason) }	secs/SL	O	A	M	30 min.	3	
2.2-2.4 Deleted							
{ 2.5 Duration of SL inhibition due to local management actions }	secs/SL			M	30 min.	3	
{ 2.6 Duration of SL inhibition due to remote management actions }	secs/SL			M	30 min.	3	
{ 2.7 Duration of SL unavailability due to link failure }	secs/SL			M	30 min.	3	
2.8 Deleted.							
{ 2.9 Duration of SL unavailability due to remote processor outage }	secs/SL	O		M	30 min.	3	
{ 2.10 Start of remote processor outage }	event/SL	O		M	on occur.	3	
{ 2.11 Stop of remote processor outage }	event/SL	O		M	on occur.	3	
2.12 Deleted							
2.13 Local Management Inhibit	events/SL events/SL	. O		M	30 min. 5 min.	3 3	
{ 2.14 Local Management Uninhibit }	events/SL events/SL	. O		M	30 min. 5 min.	3 3	
2.15 Duration of Local Busy	secs/SL	O			30 min.	2	

Tableau 2/Q.791 [T2.791] A L'ITALIENNE, p.

H.T. [T3.791]

TABLE 3/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks
MTP signalling link utilization
}

Description of measurements	Units	Usage			Duration of measurement
		O	A	M	

{
3.1
Number of SIF and SIO octets transmitted
}
	octets/SL	O	A	M	30 min.

3.2 Octets retransmitted	octets/SL		A		30 min.

{
3.3
Number of message signal units transmitted
}
	MSUs/S		A		30 min.

{
3.4
Number of SIF and SIO octets received
}
	octets/SL	O	A	M	30 min.

{
3.5
Number of message signal units received
}
	MSUs/SL		A		30 min.

{
3.6
SL congestion indications
}
	{
	events/SL
	events/SL
	event/SL
		. O O	A	M	30 min. 5 min. on occur.

{
3.7
Cumulative duration of SL congestion
}
	secs/SL	O	A	M	30 min.

3.8 Deleted					
3.9 Stop of SL congestion	event/SL	O			on occur.

{
3.10
MSUs discarded due to SL congestion
}
	MSUs/SL	O			30 min.

{
3.11
Number of congestion events resulting in loss of MSUs
}
	events/SL event/SL	. O		M	30 min. on occur.

Tableau 3/Q.791 [T3.791] A L'ITALIENNE, p.

H.T. [T4.791]

TABLE 4/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks
MTP signalling link set and route set availability
}

Description of measurements	Units	Usage			Duration of measurement	Level	Obligat
		O	A	M			

4.1 Deleted
{
4.2
Duration of unavailability of signalling linkset
}
	secs/linkset	O		M	30 min.	3	N

{
4.3
Start of linkset failure
}
	event/linkset	O		M	on occur.	3	N

4.4 Stop of linkset failure	event/linkset	O		M	on occur.	3	N

{
4.5
Initiation of broadcast TFP due to failure of measured linkset | ua)
}
	event/linkset	O		M	on occur.	3	N

{
4.6
Initiation of broadcast TFA for recovery of measured linkset | ua)
}
	event/linkset	O		M	on occur.	3	N

4.7 - 4.8 Deleted
{
4.9
Unavailability of route set to a given destination of set of destinations
}
	events/destination(s)	O	A	M	30 min.	3	b

{
4.10
Duration of unavailability in 4.9
}
	secs/destination(s)	O	A	M	30 min.	3	b

{
4.11
Start of unavailability in 4.9
}
	event/destination(s)	O		M	on occur.	3	N

{
4.12
Stop of unavailability in 4.9
}
	event/destination(s)	O		M	on occur.	3	N

a) These measurements only apply to Signal Transfer Points.

b) These measurements are only obligatory in the international network.

Tableau 4/Q.791 [T4.791] A L'ITALIENNE, p.

H.T. [T5.791]

TABLE 5/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks
MTP adjacent signalling point status accessibility
}

Description of measurements	Units	Usage			Duration of measurement	Level	Ob
		O	A	M			
{ 5.1 Adjacent SP inaccessible } event/SP . events/SP	{ O . O		M M	on occur. 30 min. 5 min.	3	Yes	
{ 5.2 Duration of adjacent SP inaccessible }	secs/SP	O		. M	5 min. 30 min.	3	
5.3 Deleted							
{ 5.4 Stop of adjacent SP inaccessible }	event/SP	O		M	on occur.	3	
{ 5.5 MSU discarded due to a routing data error | ua) }	MSUs/SP	. O	A	. M	30 min. 5 min.		Y

a) The number of MSUs discarded can be used to trigger the MTP Route Verification Test (MVRT) described in Recommendation Q.795, § 2.3.

Tableau 5/Q.791 [T5.791] A L'ITALIENNE, p.

H.T. [T6.791]

TABLE 6/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks
MTP signalling link traffic distribution (Signalling route utilization)
}

Description of measurements	Units	Usage			Duration of measurement	Level
		O	A	M		

{
6.1
Number of SIF and SIO octets received with given OPC
}
	octets/OPC		A		30 min.	3

{
6.2
Number of SIF and SIO octets transmitted with given DPC
}
	octets/DPC		A		30 min.	3

{
6.3
Number of SIF and SIO octets handled with given SIO
}
	octets/SIO		A		30 min.	3

{
6.4
Number of SIF and SIO octets received with given OPC and SIO
}
	octets/SIO/OPC		A		30 min.	3

{
6.5
Number of SIF and SIO octets transmitted with given DPC and SIO
}
	octets/SIO/DPC		A		30 min.	3

{
6.6
Number of SIF and SIO octets handled with given OPC, DPC and SIO
}
	octets/SIO/OPC/DPC		A		30 min.	3

Note 1 — Activation of these measurements is recommended on per point code or sets of point codes and/or SIO.

Note 2 — Some of these measurements may be of interest for accounting purposes.

Tableau 6/Q.791 [T6.791] A L'ITALIENNE, p.

H.T. [T7.791]

TABLE 7/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks
SCCP performance
}

Description of measurements	Units	Usage O	Usage A	Usage M	Duration of measurement	Level	Ob
{ 7.1 Routing Failure — No translation for address of such nature | ua) }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	
{ 7.2 Routing Failure — No translation for this specific address | ua) }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	
{ 7.3 Routing Failure — Network Failure (Point Code not available) }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	
{ 7.4 Routing Failure — Network Congestion }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	
{ 7.5 Routing Failure — Subsystem Failure (unavailable) }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	
{ 7.6 Routing Failure — Subsystem Congestion | ub) }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	
{ 7.7 Routing Failure — Unequipped user (Subsystem) }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	
7.8 Syntax error detected	event msgs			M M	on occur. 30 min.	SCCP SCCP	
{ 7.9 Routing Failure — Reason unknown }	event msgs	O	. A	. M	on occur. 30 min.	SCCP SCCP	

a) These measurements only required at SCCP nodes with global title translation capabilities.

b) For further study.

Tableau 7/Q.791 [T7.791] A L'ITALIENNE, p.

H.T. [T8.791]

TABLE 8/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks sub-system availability
}

Description of measurements	Units	Usage O	Usage A	Usage M	Duration of measurement	Level	Obligatory	Act. pe
{ 8.1 Start of local SCCP unavailable failure | ua) }	event	O			on occur.	SCCP	No	perm
{ 8.2 Start of local SCCP unavailable — maintenance made busy | ua) }	event	O			on occur.	SCCP	No	perm
{ 8.3 Start of local SCCP unavailable — congestion | ua) }	event	O			on occur.	SCCP	No	perm
{ 8.4 Stop of local SCCP unavailable — (all reasons) | ua) }	event	O			on occur.	SCCP	No	perm
{ 8.5 Duration of local SCCP unavailable — (all reasons) | ua) }	secs		A		30 min.	SCCP	No	perm
{ 8.6 Subsystem out-of-service request granted }	event			M	on occur.	SCCP	b)	perm
{ 8.7 Subsystem out-of-service request denied }	event			M	on occur.	SCCP	b)	perm

a) These measurements are system architecture dependent.

b) These measurements are obligatory for replicated systems.

Tableau 8/Q.791 [T8.791] A L'ITALIENNE, p.

H.T. [T9.791]

TABLE 9/Q.791
{
Monitoring and measurements for Signalling System No. 7 networks
SCCP — Utilization
}

Description of measurements	Units	Usage			Duration of measurement	Level	Obligatory
		O	A	M			
9.1 UDTS message sent	msgs	O	A		30 min.	SCCP	No
9.2 UDTS message received	msgs	O	A		30 min.	SCCP	No
{ 9.3 Total messages handled (from local or remote subsystems) }	msgs		A		30 min.	SCCP	No
{ 9.4 Total messages intended for local subsystems }	msgs		A		30 min.	SCCP	No
{ 9.5 Messages requiring global title translation | ua) }	msgs		A		30 min.	SCCP	No
{ 9.6 Total messages sent (for connectionless only) (by class 0, 1) }	msgs/class		A		30 min.	SCCP	Yes
{ 9.7 Total messages received (for connectionless only) (by class 0, 1) }	msgs/class		A		30 min.	SCCP	Yes
{ 9.8 Messages sent to a backup subsystem }	msgs/SS		A		30 min.	SCCP	Note | ub)

a) This measurement is only required at SCCP nodes with global title translation capabilities.

b) This measurement is obligatory for replicated systems.

Tableau 9/Q.791 [T9.791] A L'ITALIENNE, p.

3.10 *Table 9/Q.791*

3.10.1 SCCP management messages are included in the totals of items 9.3, 9.4, 9.6 and 9.7.

3.10.2 SCCP utilization measurements, items 9.3 and 9.4, refers to all messages processed by SCCP Routing Control, whether or not the message is processed or delivered successfully.

3.10.3 Measurement 9.5 measures the utilization of the translation function within SCCP Routing Control and is a count of all messages for which global title translation is attempted. The measurement is only applicable at nodes with translation capabilities.

3.10.4 Measurement 9.8 refers only to those messages which would normally have been routed to a sub-system but because of a change in the translation process (e.g. due to a routing failure towards that sub-system), are directed to a backup sub-system. The measurement is only applicable at replicated nodes with translation capabilities.

4 Operations and maintenance part support

4.1 The measurements defined in this Recommendation are intended to be controlled through the use of the operations and maintenance application part defined in Recommendation Q.795. Recommendation Q.795 defines the functions needed to initiate and stop the measurements and the procedures to handle the transfer of data after collection. Long-term measurement collection procedures are defined in § 2.6 of Recommendation Q.795 and on-occurrence measurement reporting procedures in § 2.7.

5 Uses of measurements

5.1 *Introduction*

5.1.1 This section provides a context for the measurements listed in the Tables 1/Q.791 to 9/Q.791. It describes briefly the operational, maintenance and administrative activities likely to be associated with a Signalling System No. 7 network and how the measurements may be used to support these activities.

5.1.2 A list of supporting measurements (if any) follows each description. Each measurement is identified by its table number followed by a decimal point and the sequence number of the measurement within the table (e.g., Item 1.2 is the second measurement of Table 1B/FQ.791).

5.2 *Operational uses*

5.2.1 *Message Transfer Part (MTP)*

5.2.1.1 *Surveillance of network status*

This activity is concerned with surveillance of the network as a whole in order to coordinate and assign priorities to maintenance actions. The information to support this activity will come from indicators of the operational and congestion status. These indicators may be found in the tables designated as Usage ‘‘O’’ and duration of measurement ‘‘on-occurrence’’.

Measurements to survey network status:

— local automatic changeover (Item 1.10);

— local automatic changeback (Item 1.11);

— start of remote processor outage (Item 2.10);

— stop of remote processor outage (Item 2.11);

— SL congestion indications (Item 3.6);

— stop of SL congestion (Item 3.9);

— number of congestion events resulting in loss of MSUs (Item 3.11);

— start of linkset failure (Item 4.3);

— stop of linkset failure (Item 4.4);

— initiation of Broadcast TFP due to failure of measured linkset (Item 4.5);

— initiation of Broadcast TFA for recovery of measured linkset (Item 4.6);

— start of unavailability in measurement 4.9 (Item 4.11);

— stop of unavailability in measurement 4.9 (Item 4.12);

— adjacent signalling point inaccessible (Item 5.1);

— stop of adjacent signalling point inaccessible (Item 5.4).

Additional measurement may be provided to the operations user for determining the integrity of the network. These measurements will be provided on a five or thirty minute basis.

Measurements:

— duration of link in the in-service state (Item 1.1);

— duration of SL unavailability (for any reason) (Item 2.1);

— local management inhibit (Item 2.13);

— local management uninhibit (Item 2.14);

— duration of local busy (Item 2.15);

— number of SIF and SIO octets received (Item 3.4);

— unavailability of route set to a given destination or set of destinations (Item 4.9);

— duration of adjacent signalling point inaccessible (Item 5.2).

5.2.1.2 *Monitoring of link and network traffic performance*

This activity is concerned with ensuring that congestion thresholds and the numbers of discarded messages are within specification. If, for example, the number of Message Signal Units (MSUs) discarded due to a routing data error exceeds limits, the Routing Verification Test described in Recommendation Q.795 could be initiated to identify the source and type of routing data error.

Discarded message counts may be gathered signalling point by signalling point and added together to a give a total network performance measure.

One aspect of traffic performance can be monitored by measuring the amount of time that a given link is congested. The link loading or congestion duration must match the criteria upon which provisioning of links has been based.

Measurements to monitor links:

— number of Signalling Information Field (SIF) and Service Information Octet (SIO) octets transmitted (Item 3.1);

— SL congestion indications (Item 3.6);

— cumulative duration of SL congestion (Item 3.7).

Measurements of MSUs discarded:

— due to SL congestion (Item 3.10);

— due to routing data error (Item 5.5).

Duration measurements measure the effects of signalling link set and route set availability, by individual link set and route set. These measurements identify the effects of congestion or failure upon the surrounding network.

Measurements:

— duration of link in the in-service state (Item 1.1);

— duration of SL unavailability (for any reason) (Item 2.1);

— duration of SL unavailability due to remote processor outage (Item 2.9);

— duration of local busy (Item 2.15);

— cumulative duration of SL congestion (Item 3.7);

— duration of unavailability of signalling linkset (Item 4.2);

— duration of unavailability in measurement 4.9 (Item 4.10);

— duration of adjacent signalling point inaccessible (Item 5.2).

5.2.2 *Signalling Connection Control Part (SCCP)*

5.2.2.1 *SCCP Routing Performance*

The monitoring of routing failures allows SCCP Routing and Translation function to detect any abnormal number of messages which cannot be routed, independent of the originator being informed through message return.

Measurements:

Routing Failure due to:

— no translation for address of such nature (Item 7.1);

— no translation for this specific address (Item 7.2);

— network failure (point code not available) (Item 7.3);

— network congestion (Item 7.4);

— sub-system failure (unavailable) (Item 7.5);

— sub-system congestion (Item 7.6);

— unequipped user (sub-system) (Item 7.7);

— reason unknown (Item 7.9).

In addition, the following measurements can be used as a consistency check or a network protection mechanism:

— UDTS messages sent (Item 9.1);

— UDTS messages received (Item 9.2);

5.2.2.2 *SCCP unavailability*

The monitoring of SCCP unavailability may prove useful in the activation/deactivation of other network measurements.

Measurements:

Start of Local SCCP unavailable due to:

— failure (Item 8.1);

— maintenance made busy (Item 8.2);

— congestion (Item 8.3),

Stop of local SCCP unavailable;

— all reasons (Item 8.4).

5.2.3 *Telephony User Part*

For further study.

5.2.4 *Integrated Services Digital Network User Part (ISDN-UP)*

For further study.

5.2.5 *Transaction Capabilities Application Part (TCAP)*

For further study.

5.3 *Maintenance uses*

The activities described in this section relate basically to the detection of degraded performance and to the maintenance of a particular signalling point and the signalling links associated with that signalling point. They may be used on a near real time basis, or may be monitored over a period of days or weeks to detect unfavourable trends. They are designed so that one signalling point can monitor its own status without relying on measurements from adjacent signalling points.

5.3.1 *Message Transfer Part (MTP)*

5.3.1.1 *Detection of increases in link SU error rates*

This activity ensures that the signalling data link error rate is not rising beyond specification. The SU Error Rate Monitor is the basic instrument for monitoring signalling data link performance. Basic traffic counts are used to normalize performance measurements in order to compare system performance measurements.

Measurements:

— number of SIF and SIO octets transmitted (Item 3.1);

— number of SIF and SIO octets received (Item 3.4).

Operational measurements counting error events provide supplementary information to warn of impending failures or give a running assessment of signalling data link quality.

Measurements:

— number of Signal Units (SUs) in error (monitors incoming performance) (Item 1.8);

— number of Negative Acknowledgements (NACKs) received (monitors outgoing performance) (Item 1.9).

Counting total Signal Unit errors allows the estimation of Signalling Data Link bit error rates (see Recommendation Q.706, § 3.1) assuming that errors are random. The estimate uses measurements 1.1 duration of link in the in-service state, multiplied by the link transmission rate.

Measurements:

— duration of link in the in-service state (Item 1.1);

— duration of link unavailability (any reason) (Item 2.1).

5.3.1.2 *Detection of marginal links performance*

The SU Error Rate Monitor applies to lost alignment as well as corrupted data. Usually both conditions are caused by degraded performance of the transmission facility. Alignment and proving failures often indicate a marginally performing link.

Measurements:

— SL alignment failure (Item 1.7)

This activity is concerned with detecting routing instabilities caused by marginal link performance.

Measurements:

— local automatic changeover (Item 1.10);

— local automatic changeback (Item 1.11);

— SL congestion indications (Item 3.6);

— cumulative duration of SL congestion (Item 3.7);

— number of congestion events resulting in loss of MSUs (Item 3.11).

5.3.1.3 *Detection of link failure events in either direction*

By ‘‘link failure’’ is meant an event which causes a particular link to be unavailable for signalling (i.e. a failure at Level 1 or Level 2). Signalling link failures are detected in order to require preventive and corrective maintenance actions to restore the network capabilities. This maintenance action can be required on a single failure event or when the number of signalling links in failure for a link set or across different link sets exceeds a threshold.

Signalling link failure measurements are summarized not only for specific links sets, but also across many different link sets, where these may involve common transmission systems or signalling points. The distribution of failure and degradation sources may be randomly located, but if specific network elements appear to be common to a large number of the failures, then they are suspect as a significant failure source requiring further maintenance action.

Measurements:

— number of link failures:

all reasons (Item 1.2);

abnormal FIBR/BSNR (Item 1.3);

excessive delay of acknowledgement (Item 1.4);

excessive error rate (Item 1.5);

excessive duration of congestion (Item 1.6);

— signalling link restoration (Item 1.12).

5.3.1.4 *Detection of routing and distribution table errors*

In operation, the Signalling System No. 7 routing data will be updated frequently as the network changes. It is necessary to keep track of signalling point status and routing problems on a routine basis (see Recommendation Q.795, § 2.1)

Measurements:

— duration of unavailability of signalling linkset (Item 4.2);

— start of linkset failure (Item 4.3);

— stop of linkset failure (Item 4.4);

— initiation of Broadcast TFP due to failure of measured linkset (Item 4.5);

— initiation of Broadcast TFA for recovery of measured linkset (Item 4.6);

— unavailability of route set to a given destination or set of destinations (Item 4.9);

— duration of unavailability in measurement 4.9 (Item 4.10);

— start of unavailability in measurement 4.9 (Item 4.11);

— stop of unavailability in measurement 4.9. (Item 4.12);

— adjacent SP inaccessible (Item 5.1);

— duration of adjacent SP inaccessible (Item 5.2);

— stop of adjacent SP inaccessible (Item 5.4);

— MSUs discarded due to a routing data error (Item 5.5).

5.3.1.5 *Component reliability and maintainability studies*

These studies are concerned with calculating the mean time between failures (MTBF) and mean time to repair (MTTR) for each type of component in the Signalling System No. 7 network. It may be useful for some purposes to have MTBF and MTTR data by Signalling System No. 7 function with which to correlate associated maintenance action.

Measurements:

— number of link failures;

all reasons (Item 1.2);

abnormal FTBR/BSNR (Item 1.3);

excessive delay of acknowledgement (Item 1.4);

excessive error rate (Item 1.5);

excessive duration of congestion (Item 1.6);

— duration of SL inhibition due to local management actions (Item 2.5);

— duration of SL inhibition due to remote management actions (Item 2.6);

— duration of SL unavailability due to link failure (Item 2.7);

— duration of SL unavailability due to remote processor outage (Item 2.9);

— start of remote processor outage (Item 2.10);

— stop of remote processor outage (Item 2.11);

— local management inhibit (Item 2.13);

— local management uninhibit (Item 2.14).

5.3.2 *Signalling connection control part (SCCP)*

5.3.2.1 *SCCP routing performance*

Degraded SCCP performance may be detected from abnormal or excessive counts of measurements of routing failure, SCCP unavailability or protocol interworking difficulties.

Measurements:

Routing failures:

— no translation for address of such nature (Item 7.1);

— no translation for this specific address (Item 7.2);

— network failure (point code not available) (Item 7.3);

— network congestion (Item 7.4);

— sub-system failure (unavailable) (Item 7.5);

— sub-system congestion (Item 7.6);

— unequipped user (sub-system) (Item 7.7);

— reason unknown (Item 7.9).

Protocol interworking:

— syntax error detected (Item 7.8).

5.3.2.2 *SCCP availability*

It is useful to monitor the effectiveness of Coordinated State Change Control.

Measurements:

— sub-system out of service request granted (Item 8.6);

— sub-system out of service request denied (Item 8.7).

5.3.3 *Telephony user part*

For further study.

5.3.4 *Integrated services digital network user part (ISDN-UP)*

For further study.

5.3.5 *Transaction capabilities application part (TCAP)*

For further study.

5.4 *Administrative uses*

5.4.1 *Message transfer part (MTP)*

5.4.1.1 *Monitoring of link and signalling point utilization*

MTP utilization measurement is concerned with evaluating message flows to ensure that they are not beginning to exceed stated link and signalling point capacities. It also ensures that existing routing is resulting in proportionate utilization of available capacity.

Measurements by link:

— duration of link in the in-service state (Item 1.1);

— duration of SL unavailable (for any reason) (Item 2.1);

— number of SIF and SIO octets transmitted (Item 3.1);

— octets retransmitted (Item 3.2);

— number of message signal units transmitted (Item 3.3);

— number of SIF and SIO octets received (Item 3.4);

— number of message signal units received (Item 3.5);

— SL congestion indications (Item 3.6);

— cumulative duration of SL congestions (Item 3.7).

Measurements by signalling point:

— number of SIF and SIO octets received:

with given Origination Point Code (OPC) (Item 6.1);

with given OPC and SIO (Item 6.4);

— number of SIF and SIO octets transmitted:

with given Destination Point Code (OPC) (Item 6.2);

with given DPC and SIO (Item 6.5);

— number of SIF and SIO octets handled:

with given SIO (Item 6.3);

with given OPC, DPC, and SIO (item 6.6).

Measurements by signalling route set:

— unavailability of route set to a given destination or set of destinations (Item 4.9);

— duration of unavailability in measurement 4.9 (Item 4.10);

— MSUs discarded due to routing data error (Item 5.5).

5.4.2 *Signalling connection control part (SCCP)*

5.4.2.1 *SCCP utilization*

Network administration is interested in monitoring SCCP utilization for use in analyzing the current network and designing future network configurations. One way to monitor SCCP utilization is to measure the amount of SCCP traffic.

Measurements:

SCCP traffic received:

UDTS messages (Item 9.2);

total messages (for connectionless only)

(classes 0 & 1) (Item 9.7).

SCCP traffic sent:

UDTS messages (Item 9.1);

total messages (for connectionless only)

(classes 0 & 1) (Item 9.6).

General:

— total messages handled (from local or remote sub-systems) (Item 9.3);

— total messages intended for local sub-systems (Item 9.4);

— total messages requiring global title translation (Item 9.5);

— messages sent to a backup sub-system (Item 9.8).

5.4.2.2 *SCCP routing performance*

Network Administration is also interested in tracking long-term message routing performance of the SCCP. This can be obtained from the following measurements or their sum.

Measurements:

SCCP Routing failures:

— no translation for address of such nature (Item 7.1);

— no translation for this specific address (Item 7.2);

— network failure (point code not available) (Item 7.3);

— network congestion (Item 7.4);

— sub-system failure (unavailable) (Item 7.5);

— sub-system congestion (Item 7.6);

— unequipped user (sub-system) (Item 7.7);

— reason unknown (Item 7.9).

SCCP unavailability:

— duration of local SCCP unavailable (all reasons) (Ref. 8.5).

5.4.3 *Telephony user part*

For further study.

5.4.4 *Integrated services digital network user part (ISDN-UP)*

For further study.

5.4.5 *Transaction capabilities application part (TCAP)*

For further study.

5.5 *Preparation of traffic forecasts*

5.5.1 This activity is concerned with the calculation of values which will be entered into provisioning tables to determine future equipment quantities required. The data to be used are those already collected to support activities mentioned in §§ 5.2.1.2 and 5.4.1.1. Depending upon implementation, more detailed measurements may be required to provision such items as internal buffers or number of processors where these may vary.

5.6 *Network planning*

5.6.1 This activity requires longer-term traffic forecasts, based as much upon marketing intentions as upon extrapolations of existing patterns. Nevertheless, to understand existing patterns, planners need knowledge of traffic origins and destinations.

5.6.2 The measurements in Table 6/Q.791 and Table 9/Q.791 indicate how much traffic is being originated at the measured signalling point, and how much traffic has that signalling point as a destination. These measurements are useful for calculating traffic flows by originationB/Fdestination pair.

5.6.3 In reality, however, traffic flows do not spread randomly through a network. For each origin, distance and other factors result in a concentration of flows to favoured destinations. As a result, it will be necessary to measure flows on the network by destination.

5.6.4 Given the large potential number of destinations, measurements may have to be grouped (see explanatory notes for Table 6/Q.791 and Table 9/Q.791 in § 3).

5.7 *Evaluation of maintenance force effectiveness*

This activity consists of managerial control of the maintenance function, through examination of failure trends, equipment availabilities and the amount of outage due to manual as opposed to automatic busying of components. The activity is usually carried out with the aid of indices based upon data listed in § 5.3.

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