Interconnect test specification

BT – MOBILE CP SMS; MAP/SCCP signalling protocol

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Document history

Revision	Author	Date	Notes
Draft A	R K Felgate	6/8/03	
Draft B_02	Peter Gorringe (02)	15/08/03	Amendments required by mm02
Issue 1	R K Felgate	18/08/03	Editorial amendments
Issue 2	R K Felgate	25/11/03	Sub Title change; format made generic; section 2.16 STP tests deleted, section 2.17 Alarm tests renumbered as 2.16; STP diagram deleted from Appendix A. Font type changes.
Issue 3	A Fisk	09/02/16	Update to terminology.

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Contents

References

[1] Current issue of PNO-ISC/SPEC/003

[2] Current issue of PNO-ISC/SPEC/005

[3] Current issue of PNO-ISC/INFO/007

[4] ETS 300901

[5] ETS 300974

[6] ETSI ts 123040 v3.8.0

[7] ETSI ts 129002 v3.16.0

Glossary

Ack	Acknowledgement
BT	British Telecommunications plc
CLI	Calling Line Identity
CBA	Change Back Acknowledgement
CBD	Change Back Declaration
COA	Change Over Acknowledgement
COO	Change Over Order
CPE	Customer Premises Equipment
DASS2	Digital Access Signalling System No.2
DECT	Digital Enhanced Cordless Telecommunications
ETSI	European Telecommunications Standards Institute
FSMS	Fixed Short Message Service
FSMSC	Fixed Short Message Service Switching Centre
HLR	Home Location Register
ISDN Network	Integrated Services Digital Network
ISDN2	Basic Rate ISDN service using the DASS2 protocol
ISDN2e	Basic Rate ISDN service using the Q.931 protocol
MAP	Mobile Application Part
MOBILE CP	Other Licensed Mobile Operator
MMS	More Messages to follow
MSC	Mobile Switching Centre
MT	Mobile Terminate
NNG	National Number Group
OFTEL	Office of Telecommunications
OOS	Out of Service
PNO	Public Network Operator
POTS	Plain Ordinary Telephone System
RST	Route Set Test
RX	Receive
SCCP	Signalling Connection Control Point
SIE	Signalling Indication Emergency
SIM	Subscriber Identification Module
SIN	Signalling Indication Normal

SLC	Signalling Link Code
SMS	Short Message Service
SMSC	Short Message Service Switching Centre
SPR	Signalling Point Relay
SRI	Send Routing Information (digits required to reach MSC)
SS7	Signalling System No.7
STP	Signalling Transfer Point
TFP	Transfer Prohibited
TFA	Transfer Allowed
TX	Transmit
T/S	Timeslot
VSD	Voicemail platform

1   Introduction

This test specification is designed to test the MOBILE CP SS7 SCCP signalling interface. The interconnection with BT will be a route using 2 signalling channels in one linkset and a single signalling channel in a second linkset as shown in the configuration diagram 1 in Appendix A. This specification also checks the operation of transmission alarms.

The interconnect route will be able to carry MAP/SCCP messages between the MOBILE CP MSC and the BT Wordsworth platform for the transfer of SMS messages.

The test specification is designed to check correct operation of the services available across the Interconnect. The reactive nature of the testing process may prompt the test teams to execute additional tests to identify and fully understand the implications of a particular test scenario. This additional testing will be undertaken at the test team's discretion, but if significant departures from the agreed test specification are envisaged, the parties involved in the original agreement will review this. Where changes are made during the course of testing to overcome non compliance with the Interconnect requirements, an element of regression testing may be required to ensure that tests previously completed successfully have not been affected.

This interconnect testing is carried out against the specifications [1].[2],[3],[4],[5],[6],[7].

2   Test Schedule

2.1   Nomenclature

BT   BT Test Facility Model Network and associated CPE

MOBILE CP   MOBILE CP switch and associated CPE

ISDN2   Basic Rate ISDN using the DASS2 signalling system

ISDN2e   Basic Rate ISDN using the ETSI signalling system

ISDN   Primary Rate ISDN using the ETSI signalling system

2.2   Test Procedures

1. Check all received flag settings on initial call set-ups.

2. Overall call behaviour to be checked in all tests.

3. All test results on the signalling tester to be captured.

4. Link failures to be done by manually out of servicing the signalling at the relevant end, unless the test calls for the link to be broken.

5. Details for tests NOT required have been removed.

6. Number ranges for the BT NIF network are given in Appendix A

2.3   Signalling Link Management   Level 2 Operation

Start with all signalling links OOS. Use the 2-link linkset for these tests

2.3.1	Check signalling link Emergency Alignment (SIE messages) by initiating alignment from both BT and MOBILE CP ends		
Test	*Parameters*	*Comments*	*Results*
(a)	BT > MOBILE CP (SLC0)		
(b)	BT > MOBILE CP (SLC1)		
(c)	MOBILE CP > BT (SLC0)		
(d)	MOBILE CP > BT (SLC1)		

2.3.2	Check signalling link Normal Alignment by initiating Alignment (SIN messages) from both BT and MOBILE CP ends.		
Test	*Parameters*	*Comments*	*Results*
(a)	BT > MOBILE CP (SLC0)		
(b)	MOBILE CP > BT (SLC1)		

2.4   Signalling Link Management   Level 3 Operation

2.4.1	Check the correct activation of the first link of the linkset (SLC=0) from both MOBILE CP and BT ends. Ensure Changeback Declarations and Changeback Acknowledgements are correctly exchanged. NB Link SLC=1 should be in-service for this test.		
Test	*Parameters*	*Comments*	*Results*
(a)	BT > MOBILE CP		
(b)	MOBILE CP > BT		

2.4.2	Check the correct activation of the second link of the linkset (SLC=1) from both MOBILE CP and BT ends. Ensure Changeback Declarations (CBD) and Changeback Acknowledgements (CBA) are correctly exchanged. Link SLC=0 should be in service for this test.		
Test	*Parameters*	*Comments*	*Results*
(a)	BT > MOBILE CP		
(b)	MOBILE CP > BT		

2.4.3	Check the correct de-activation of the first link of the linkset (SLC=0) from both MOBILE CP and BT ends. Ensure Changeover Orders (COO messages) and Changeover Acknowledgements (COA messages) are correctly exchanged. Link SLC=1 should be in-service for this test.		
Test	*Parameters*	*Comments*	*Results*
(a)	BT > MOBILE CP		
(b)	MOBILE CP > BT		

2.4.4	Check the correct de-activation of the second link of the linkset (SLC=1) from both MOBILE CP and BT ends. Ensure Changeover Orders (COO messages) and Changeover Acknowledgements (COA messages) are correctly exchanged. Link SLC=0 should be in-service for this test.		
Test	*Parameters*	*Comments*	*Results*
(a)	BT > MOBILE CP		
(b)	MOBILE CP > BT		

2.4.5	Check signalling link Changeover (COO/COA messages) under fault conditions, e.g.. disconnection of the 2Megabit bearer		
Test	*Parameters*	*Comments*	*Results*
(a)	BT > MOBILE CP		
(b)	MOBILE CP > BT		

2.5   Link Failures – Testing the transfer of MAP messages during various link failure scenarios

This test will require a SS7 emulator to generate a stream of MAP SRI messages prior to and during the link failure scenarios

BT > MOBILE CP

2.5.1	Failure of First Choice Route. Messages should be transferred across the second choice route		
Test	*Parameters*	*Comments*	*Results*
(a)	(Failure initiated by BT)		
(b)	(Failure initiated by MOBILE CP)		

MOBILE CP > BT

2.5.2	Failure of First Choice Route. Messages should be transferred across the second choice route		
Test	*Parameters*	*Comments*	*Results*
(a)	(Failure initiated by BT)		

(b)	(Failure initiated by MOBILE CP)		

BT > MOBILE CP

2.5.3	Failure of link '0' within Two Link Linkset. Messages should be transferred across the remaining link (SLC=1)		
Test	*Parameters*	*Comments*	*Results*
(a)	(Failure of SLC = 0 initiated by BT)		
(b)	(Failure of SLC=0 initiated by MOBILE CP)		

MOBILE CP > BT

2.5.4	Failure of link '0' within Two Link Linkset. Messages should be transferred across the remaining link (SLC=1)		
Test	*Parameters*	*Comments*	*Results*
(a)	(Failure of SLC =0 initiated by BT)		
(b)	(Failure of SLC=0 initiated by MOBILE CP)		

2.5.5	Failure of both linksets during a test stream to check performance of the links upon restoration.		
Test	*Parameters*	*Comments*	*Results*
(a)	MOBILE CP> BT		
(b)	BT > MOBILE CP		

2.6   SMS Set-up Variants

2.6.1   Call to free subscriber

This test will be undertaken between a Fixed line equipped with a DECT handset and a Mobile handset.

Check call set up parameters.

N.B. The SMS service is not included in the OFTEL CLI Code of Practice, however OFTEL has decreed that SMS message MUST contain a CLI (No anonymous messages).

BT > MOBILE CP

Test 2.6.1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

MOBILE CP > BT

Test 2.6.1	Access code	Orig. Line	Term. Line	CLI	Comment	Results
(b)	11digits	Mobile	POTS	Released		

2.6.2   Call to busy subscriber

2.6.2.1 SMS attempt to a busy mobile.

As the mobile network will deliver the SMS message to a busy mobile, confirm successful delivery of the message

BT > MOBILE CP

Test 2.6.2.1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.6.2.2 SMS attempt to a busy fixed line equipped with a DECT handset

Confirm whether the message is delivered to the busy handset or whether it is stored and delivered later when the handset is free.

MOBILE CP > BT

Test 2.6.2.2	Access code	Orig. Line	Term. Line	CLI	Comment	Results
(a)	11digits	Mobile	POTS	Released		

2.6.3   Call to unregistered Fixed SMS customer

BT will deliver the SMS message via the text to speech converter.

MOBILE CP > BT

Test 2.6.3	Access code	Orig. Line	Term. Line	CLI	Comment	Results
(a)	11digits	Mobile	POTS	Released		

2.6.4   Call to out of range/switched off mobile –

The Fixed SMSC will generate an SRI query to the 02 HLR which will return a SRI Ack with reason i.e. 'absent mobile', the FSMS will store the message. When the mobile has reattached, the HLR will generate an 'alert service centre' message to inform the SMS that the mobile is now active. The FSMSC will start a new MT forward SMS transaction to send the message to the mobile. In both cases after the failed delivery attempt, the mobile will be 'reattached' to confirm the successful subsequent delivery of the SMS message.

2.6.4.1 SMS attempt to a mobile where battery removed (Absent detached)

BT > MOBILE CP

Test 2.6.4.1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.6.4.2 SMS attempt to a mobile which has been switched off (Fully detached)

BT > MOBILE CP

Test 2.6.4.2	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.6.5   Call to invalid/OOS number/stolen or barred mobile .

 2.6.5.1 Attempt to generate SMS message to an Invalid 'mobile' number

BT > MOBILE CP

Test 2.6.5 .1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.6.5.2 Attempt to generate SMS message to an Out of Service Mobile

BT > MOBILE CP

Test 2.6.5 .2	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.6.5.3 Attempt to generate SMS message to a Barred Mobile.

BT > MOBILE CP

Test 2.6.5 .3	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.6.5.4 Attempt to generate SMS message to a Stolen Mobile.

BT > MOBILE CP

Test 2.6.5 .4	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.6.6   Call to invalid/OOS fixed line number.

2.6.6.1 Attempt to generate SMS message to an number with an invalid NNG range

Reference: | Issue: 3 (09/02/16)

MOBILE CP > BT

Test 2.6.6 .1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.6.6.2 Attempt to generate SMS message to a number with an invalid 'subscriber' number within a valid NNG range.

MOBILE CP > BT

Test 2.6.6 .2	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.6.6.3 Attempt to generate SMS to an OOS line without a 1571 service.

MOBILE CP > BT

Test 2.6.6 .3	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.6.6.4 Attempt to generate SMS to an OOS line with a 1571 service

MOBILE CP > BT

Test 2.6.6 .4	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.6.7   Call to line on divert

The SMS will be delivered to the Mobile handset for all types of call forward (one cannot call forward SMS messages)

BT > MOBILE CP

Test 2.6.7	Access code	Orig. Line	Term. Line	Divert status	Comments	Results
(a)	11digits	POTS	Mobile	All	SMS delivered to handset	

MOBILE CP > BT

Test 2.6.7	Access code	Orig. Line	Term. Line	Divert status	Comment	Results
(d)	11digits	Mobile	POTS	All		
(e)	11digits	Mobile	POTS	Busy		
(f)	11digits	Mobile	POTS	No reply		

2.7 Mobile Originated messages containing at least 321 characters to a Fixed line equipped with a DECT phone.

Note: A MAP message can only support a maximum of 160 character, thus in this case there will be three SMS 'messages' between the calling and called line. In this case the SMS process is designed for a single SRI interchange which is followed by 'multiple SMS messages, (known as More Messages to Follow(MMS)) to the fixed SMSC.

This test is required to confirm that the fixed SMSC and the BT SMS delivery mechanism can support the 'MMS' feature.

MOBILE CP > BT

Test 2.7.1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.8 Check performance of BT text to speech converter.

This test is required to understand the customer experience of the text to speech converter, where the 'SMS speech' to delivered to the called line

2.8.1   Mobile originated SMS messages containing 'known' abbreviations.

MOBILE CP > BT

Test 2.8.1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.8.2   Mobile originated SMS messages containing 'unknown' abbreviations

MOBILE CP > BT

Test 2.8.2	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.8.3   Mobile originated SMS messages containing 'Adult content'

MOBILE CP > BT

Test 2.8.3	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.8.4   Mobile originated SMS message with greater than 321 characters (testing multiple delivery).

MOBILE CP > BT

Test 2.8.4	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.8.5   Mobile originated SMS containing a picture

MOBILE CP > BT

Test 2.8.5	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.8.6   Generate SMS from VSD platform template

MOBILE CP > BT

Test 2.8.6	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.9   Check performance of BT text to speech delivery to a 1571 voicebox.

This test is required to understand the customer experience of the text to speech converter, where the 'SMS speech' is delivered to the 1571 voicebox associated with the called line

2.9.1   Mobile originated SMS messages containing 'known' abbreviations.

MOBILE CP > BT

Test 2.9.1	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.9.2   Mobile originated SMS messages containing 'unknown' abbreviations.

MOBILE CP > BT

Test 2.9.2	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.9.3   Mobile originated SMS messages containing 'Adult content'.

MOBILE CP > BT

Test 2.9.3	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.9.4   Mobile originated SMS message with greater than 321 characters (testing multiple delivery).

MOBILE CP > BT

Test 2.9.4	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.9.5   Mobile originated SMS containing a picture

MOBILE CP > BT

Test 2.9.5	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.9.6   Generate SMS from VSD platform template

MOBILE CP > BT

Test 2.9.6	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.9.7   Generate sufficient 1571 maximum deposits to confirm treatment of subsequent messages.

MOBILE CP > BT

Test 2.9.7	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	Mobile	POTS	Released		

2.10   Generate sufficient fixed originated SMS to fill a SIM card to achieve the 'SIMFULL' response to confirm treatment of subsequent.

BT > MOBILE CP

Test 2.10	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

2.11   Generate SMS messages in both directions using international (+44) and National Called Party Numbers.

BT > MOBILE CP

Test 2.11	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Released		

MOBILE CP > BT

Test 2.11	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(b)	11digits	Mobile	POTS	Released		

2.12   Attempt to generate fixed originated SMS messages with no CLI and withheld CLI.

BT > MOBILE CP

Test 2.12	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	11digits	POTS	Mobile	Unavailable		
(b)	11digits	POTS	Mobile	Withheld		

2.13   Generate Fixed originated SMS messages to MOBILE CP Short Codes

BT > MOBILE CP

Test 2.13	Access code	Orig. Line	Term. Line	CLI	Comments	Results
(a)	tba	POTS	Mobile	Released		

2.14   Provocative Tests - Normal Conditions

2.14.1	At BT, and with calls in progress, out of service a SS7 signalling card associated with the MOBILE CP signalling route. Check for satisfactory interworking behaviour. Clear the calls. Return to service and check for satisfactory interworking behaviour.	
	Comments	*Results*

2.14.2	At MOBILE CP, and with calls in progress, out of service a SS7 signalling card associated with the BT signalling route. Check for satisfactory interworking behaviour. Clear the calls. Return the affected hardware to service and check for satisfactory interworking behaviour	
	Comments	*Results*

2.14.3	2 Megabit bearer line breaks Only one PCM system to be broken - the other remains intact throughout the test.		
Test	*Combination*	*Comment*	*Results*
(a)	BT 2sec break TX		
(b)	BT 20sec break TX		
(c)	BT 2sec break RX		
(d)	BT 20sec break RX		
(e)	BT 2sec break TX and RX		
(f)	BT 20sec break TX and RX		
(g)	BT 6mins break TX and RX		
(h)	MOBILE CP 2sec break TX		
(i)	MOBILE CP 20sec break TX		
(j)	MOBILE CP 2sec break RX		
(k)	MOBILE CP 20sec break RX		
(l)	MOBILE CP 2sec break TX and RX		
(m)	MOBILE CP 20sec break TX and RX		
(n)	MOBILE CP 6mins break TX and RX		

2.15   Restart and Restoration Tests

2.15.1	*BT SPR Restart (small)*

Comments	*Results*

2.15.2	*BT SPR Restoration (Large restart)*	
Comments		*Results*

2.15.3	*MOBILE CP Small Restart* .	
Comments		*Results*

2.15.4	*MOBILE CP Restoration (Large Restart)*	
Comments		*Results*

2.16   Alarm tests

2.16.1	*Check that the nominal pulse rate is 2048kbits/s +/- 50ppm*	
Comments		*Results*

2.16.2	*Check that the frame alignment signal errors does not exceed 1 in a 15 minute period*	
Comments		*Results*

2.16.3	*Check that an alarm indication is generated for a loss of the outgoing signal*	
Comments		*Results*

2.16.4	*Check that an alarm indication is generated for a loss of outgoing frame alignment*	
Comments		*Results*

2.16.5	*Check that an alarm indication is generated if the error rate in the frame alignment signal is 1 in 10^3*	
Comments		*Results*

2.16.6	*Check response to AIS (alarm indication signal)*	
Comments		*Results*

2.16.7	*Check for false AIS*	
Comments		*Results*

END OF MAIN TEXT

APPENDIX A　　　　TEST CONFIGURATION

BT – MOBILE CP model interconnect via megastreams
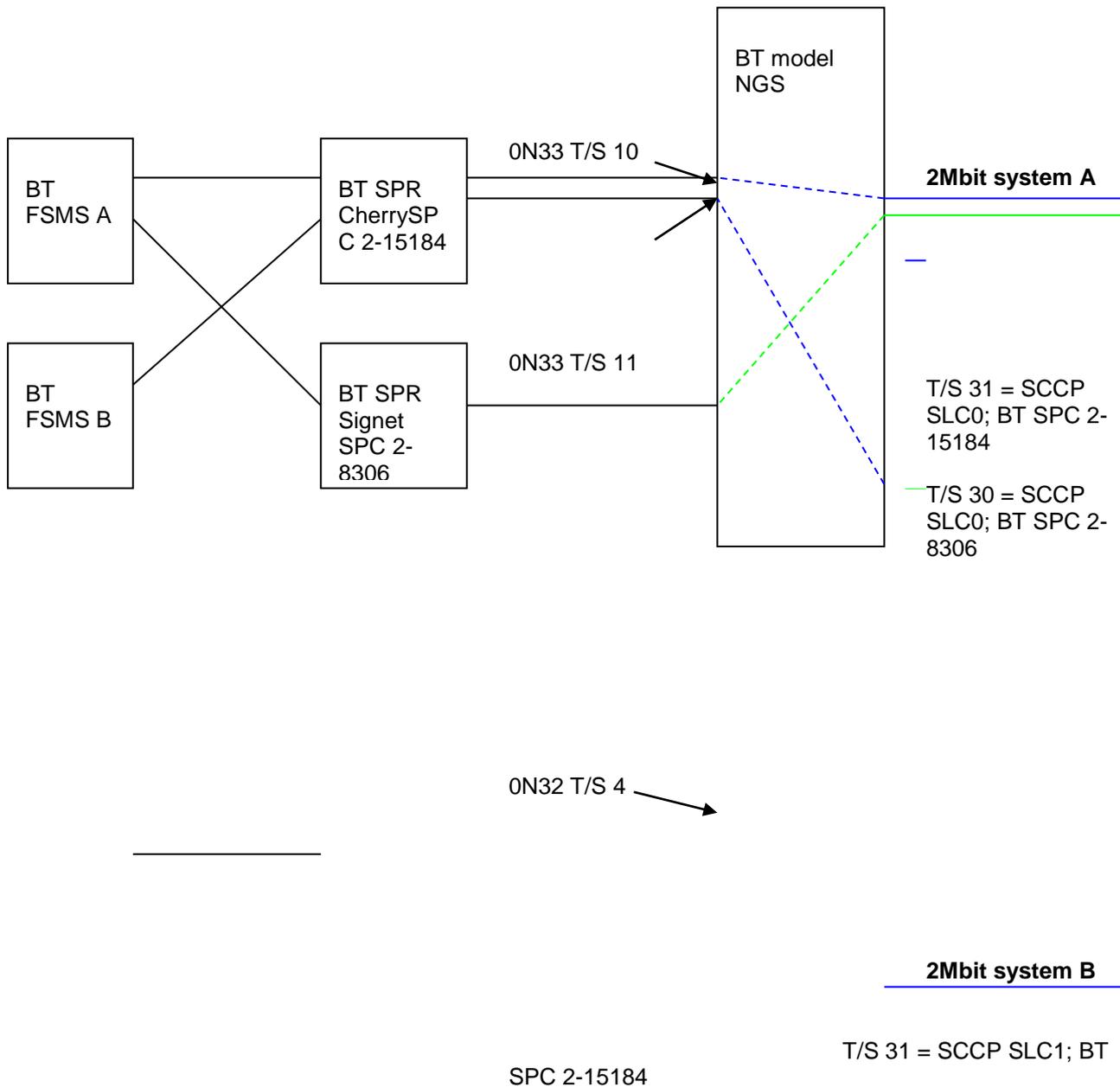
For SCCP, the NGS has through connected circuits to the SPR's which are the signalling node.

MOBILE CP Point Code = tba   BT Point Code = 2-15184 (dec) Cherry
                                     BT point code = 2-8306 (dec) Signet

MOBILE CP Number Plan   BT Number Plan

tba   0191 2 + 6 digits (Local System X)

                                     02920 + 6 digits (Local System X)

                                     0207 3 + 6 digits (Local AXE10)

                                     01333/4 + 6 digits (Local AXE10)

END OF APPENDIX A

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