



TETRA SwMI Interoperability Certificate

4 April 2002

Nokia Telecommunications

Telelaboratoriet (TDC Mobil A/S) has witnessed that the Nokia infrastructure is operating in accordance with

TETRA Interoperability Profile – (TIP) Ver 2.1.1, March 2000

for the following features:

Features	Tested(Yes/No)
• PSTN interconnect	Yes
• Individual duplex call	Yes
• Individual simplex call (direct setup)	Yes
• Status messages	Yes
• Unannounced cell re-selection	Yes
• Announced type 3 cell re-selection	Yes
• Emergency call	Yes

The tests have been performed on Nokia infrastructure on the 24th of January 2000 with hardware release No. 2.0 and software release 2.0 (DXT W1 1.28-8, TBS TBCPGMWC. PAC 2.6-0, TBBM TBBDSPWB.COM 2.19-0) and during the period 20th-21th September 2000 with hardware Release 2.1 and software release 2.1 (DXT W2 2.14-0, TBS TBCPGM 5.12-0, TBBMTCWB 2.8-0, TBBDSP 4.3) and finally during the period 19th-22th March 2001 on the Nokia NTS 2.1 infrastructure with hardware release DXT64 and software release (DXT64 W2 2.17-0 CD2, TBS TBCPGM 5.23-0).

The test results for the tested features can be found in table 1, 2 and 3 of this certificate.

Authorised IOP test engineer

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Telelaboratoriet (TDC Mobil A/S) has made every effort to ensure that tests have been made correctly, and in accordance with TIP V2. Telelaboratoriet (TDC Mobil A/S) has no liability for the test results, or towards the manufacturers.

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Information about the equipment used for testing

Testing 24th January 2000:

The tests performed on 24th January 2000 were performed using the following terminals:

Manufacturer	Terminal Type	Software/Hardware Release No.
Motorola	MTM300	R30.11.07
Motorola	d700	D40.01.0E
Nokia ¹	TMR400	Hr01.0380
Marconi / OTE	Puma-T1	0.17
Simoco Digital Systems	SRP1000	4313 327 85911

They were used on Nokia infrastructure with hardware release No. 2.0 and software release 2.0 (DXT W1 1.28-8, TBS TBCPGMWC.PAC 2.6-0, TBBM TBBDSPWB.COM 2.19-0).

Testing 20th-21th September 2000:

The tests performed during 20th-21th of September 2000 were performed using the following terminals:

Manufacturer	Terminal Type	Software/Hardware Release No.
Motorola	MTM300	SW:ADP-R30.02.61, CP-2.61 HW:36
Nokia ¹	THR420	SW: HY11.0390 HW: HRU 420-02
Marconi / OTE	Puma-T1	0.17
Simoco Digital Systems	SRM1000	SW: 4313 327 84844 HW:M81TT001T20C00000
Cleartone	CM9000P	SW: .32 HW:1
Teltronic	MDT-400	SW: 1.01 HW:1.0.13

They were used on Nokia infrastructure with hardware release 2.1 and software release 2.1 (DXT W2 2.14-0, TBS TBCPGM 5.12-0, TBBMTCWB 2.8-0, TBBDSP 4.3).

¹ Terminals in their native system have not been targeted by IOP tests.

Testing 19th-22th March 2001:

The tests performed during the period 19th-22th of March 2001 were performed using the following terminal:

Manufacturer	Terminal Type	Software/Hardware Release No.
Nokia ¹	THR420E	SW: HY11.03-9 HW: HRU 420-02
Marconi/OTE	PUMA T1	SW: 2.1.M HW: 02.01
Teltronic	MDT-400	SW: 01.02.01 HW: 01.03
Simoco Digital Systems	SRM1000	SW: 4313-327-84844 HW:MS1TT001T20C0000
Simoco Digital Systems	SRP1000	SW: 4313-327-72097 HW: PS3TT001T30000B

They were used on Nokia NTS 2.1 infrastructure with hardware release DXT64 and software release (DXT64 W2 2.17-0 CD2, TBS TBCPGM 5.23-0).

¹ Terminals in their native system have not been targeted by IOP tests.

Additional information about the tests performed

The tests were performed in the 380-400 MHz band. The SwMI was operating with the following configuration:

MCC	238
MNC	2
Colour code	42
LA1 (Høje Tåstrup) carrier frequency (BS Tx)	393.6625 MHz
LA2 (Høje Tåstrup) carrier frequency (BS Tx)	393.5125 MHz
PSTN gateway	16777184
Subscriber classes	FFFF ₁₆

Test Results

The test results are shown in three tables. Table 1 is the test result as given in the TIPv2 certificate dated 06 June 2000. The information from the TIPv2 certificate dated 06 June 2000 is repeated here for informative purposes only.

Table 1 Test results from 26th January 2000:

Table 1 indicates the number of tests for each feature and the corresponding number of tests completed for each terminal.

For call setup, the two tests cover MS initiated setup and reception of a setup initiated from another station.

DTMF over-dial tests the transfer of DTMF digits from the terminal and the corresponding tone generation.

Setup queuing refers to the situation where the call is made on a busy site and the call is placed in a resource queue thus prolonging the setup phase. The call is subsequently completed when resources become available.

Status message testing includes transmission of uplink status and downlink acknowledgement status indicating success/failure of delivery.

The cell re-selection tests cover cell re-selection as well as call restoration for group call and simplex individual call.

Table 2 Test results from 20th-21th September 2000 and table 3 Test results from 19th-22th March 2001:

Table 2 and table 3 indicates whether or not tests addressing a specific requirement of the TIP specification have been performed, whether or not the requirement is applicable for the combination of the SwMI and the terminal, and the result of the test if executed. Each entry of the table may take one of six values: -: No test performed, N/A: Not applicable, P: Pass, F: Fail, I: Inconclusive or NTA: No test case being available. NTA will only be allocated if both SwMI and terminal has indicated that they support (comply with) the corresponding feature (requirement); if either has indicated the feature (requirement) as not being supported then the entry will be N/A. In case of all entries of a row being N/A it should be assumed that this feature is not supported by the SwMI.



The test results have been derived from examining the behaviour of a live system. The verdicts indicated are based on the log evaluation of the information exchange between the SwMI and the terminals indicated in table 2 and table 3. The verdicts reflect the fact that at the time of the IOP testing it was/was not possible to demonstrate a behaviour that was in accordance with the related requirement.

Table 1: Test performed on the 24th January 2000

Nokia SwMI	# of tests ¹	Marconi-OTE Puma-T1	Motorola MTM300	Motorola d700	Nokia TMR400	Simoco Digital Systems SRP1000
PSTN interconnect						
Setup	2	2	2	0	2	2
Clearing	1	1	1	0	1	1
DTMF over-dial	1	1	0	0	0	1
setup queuing	1	1	1	0	1	1
Status messages	1	1	1	0	1	1
Individual call (duplex)						
setup (on/off hook) (in coming/out going)	2	2	0	2	0	2
Modification to simplex	0	0	0	0	0	0
Clearing	1	1	0	1	0	1
Individual call (simplex)						
setup (direct)	2	2	0	2	2	2
setup queuing	0	0	0	0	0	0
Emergency group call						
Setup	2	2	2	0	2	0
Clearing	1	1	1	0	1	0
speech item request	1	1	0	0	0	0
Emergency Individual call						
Setup	2	2	0	0	2	2
Clearing	1	1	0	0	1	1
speech item request	1	1	0	0	1	0
Cell re-selection						
Unannounced	3	2	2	0	2	1
announced type 3	7	7	3	0	7	7

¹ This column indicates the total number of different test that has been executed for the SwMI. Each of the subsequent columns indicates the number of different tests, which have been executed using a specific combination of MS and SwMI. The number of tests in each column may be less than the total number of available test cases due to some test cases not being relevant for a given combination of MS and SwMI.

Nokia SwMI	Marconi-OTE Puma-T1	Motorola MTM300	Nokia THR420	Simoco Digital Systems SRM1000	Clearstone CM9000P	Teltronic MDT-400
9 Group call						
9.1 Call setup	-	P	P	P	P	P
9.1 Call setup (Queuing)	-	-	-	-	P	P
9.1.1 Call setup modifications	NTA	NTA	NTA	NTA	NTA	NTA
9.2.1 End of transmission	-	P	P	P	P	P
9.2.2 Request to transmit	-	P	P	P	P	P
9.2.3 Request for speech item	N/A	N/A	N/A	N/A	N/A	N/A
9.3 Call disconnection	-	P	P	P	P	P
9.4 Late entry	-	-	-	-	P	P
9.5 Emergency group call	-	-	-	N/A	P	P
9.5 Emergency group call(Setup to busy group)	-	-	-	N/A	P	I ³
9.5.1 Emergency speech item request	-	-	-	N/A	P	P
9.5.2 Emergency group call modification	-	-	-	N/A	-	-
10 Cell re-selection						
10.1 Undeclared cell re-selection	-	-	P	P	P	P
10.2.1 Unannounced cell re-selection with call restoration						
10.2.1 (Group call)	-	P	-	P	P	F ⁴
10.2.1 (Queuing, group call)	-	P	-	P	P	F ⁴
10.2.1 (individual call)	-	P	-	-	P	-
10.2.1 (Queuing, individual call)	-	P	-	-	P	-
10.2.2 Announced cell re-selection without Preferred Neighbour Selected with call restoration						
10.2.2 (Group call)	-	P	-	P	P	P ⁵
10.2.2 (Queuing, group call)	N/A	N/A	N/A	N/A	N/A	N/A
10.2.2 (Pre-emption, group call)	N/A	N/A	N/A	N/A	N/A	N/A
10.2.2 (individual call, traffic)	-	P	-	-	P	F ⁶
10.2.2 (individual call, inactivity)	-	P	-	-	P	P
10.2.2 (Queuing, individual call, traffic)	-	P	-	P	P	P
10.2.2 (Queuing, individual call, inactivity)	-	P	-	-	P	P
11 Short data service						
11.1 Status messages (to dispatcher)	-	-	-	-	P	P
11.1 Status messages (Text messaging)	-	-	-	P ⁷	P ⁸	-
12 Telephone call						
12.1 Gateway Addresses	NTA	NTA	NTA	NTA	NTA	NTA
12.2 Call Set-up	-	P	-	-	P	P
12.2.1 MS Originated, Late Through-Connect	-	P	-	-	P	P
12.2.2 MS Originated, Early Through-Connect	-	-	-	-	-	-
12.2.3 MS Originated, Call Queued	-	-	-	-	P	P
12.2.4 MS Terminated	-	-	-	-	P	P
12.3 Call Maintenance	NTA	NTA	NTA	NTA	NTA	NTA
12.4 DTMF Over-dial	-	P	-	-	P	-
12.5 Disconnect Causes	NTA	NTA	NTA	NTA	NTA	NTA
12.6 Emergency telephone call	NTA	NTA	NTA	NTA	NTA	NTA

Telelaboratoriet (TDC Mobil A/S) has made every effort to ensure that tests have been made correctly, and in accordance with TIP V2. However, Telelaboratoriet (TDC Mobil A/S) has no liability for the test results, or towards the manufacturers.

**Comments:**

- 1) The detachment reason signalled by the MS is "Unknown group identity". It should have been "User initiated".
- 2) The SwMI responds with D_LOCATION UPDATE REJECT, reject cause indicated by SwMI is "Illegal MS".
- 3) The logs, both from the MS and the SwMI, do not contain the necessary information to draw a conclusion.
- 4) The MS sends U-PREPARE.
- 5) The LA is missing in the U-RESTORE on LA2.
- 6) For some reason the call is disconnected following the cell reselection, the signalling does not indicate any reason why.
- 7) Short report is received.
- 8) The text message is group addressed, therefore no delivery report is received by the sending MS.

Nokia SwMI	Marconi-OTE Puma-T1	Motorola MTM300	Nokia THR420E	Simoco Digital Systems SRM1000	Simoco Digital Systems SRP1000	Clearstone CM9000P	Teltronic MDT-400
9 Group call							
9.1 Call setup	-	-	-	-	-	-	-
9.1 Call setup (Queuing)	-	-	-	-	-	-	-
9.1.1 Call setup modifications	NTA	NTA	NTA	NTA	NTA	NTA	NTA
9.2.1 End of transmission	-	-	-	-	-	-	-
9.2.2 Request to transmit	-	-	-	-	-	-	-
9.2.3 Request for speech item	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.3 Call disconnection	-	-	-	-	-	-	-
9.4 Late entry	-	-	-	-	-	-	-
9.5 Emergency group call	-	-	-	N/A	N/A	-	-
9.5 Emergency group call(Setup to busy group)	-	-	-	N/A	N/A	-	-
9.5.1 Emergency speech item request	-	-	-	N/A	N/A	-	-
9.5.2 Emergency group call modification	-	-	-	N/A	N/A	-	-
10 Cell re-selection							
10.1 Undeclared cell re-selection	-	-	-	-	-	-	-
10.2.1 Unannounced cell re-selection with call restoration							
10.2.1 (Group call)	-	-	-	-	-	-	-
10.2.1 (Queuing, group call)	-	-	-	-	-	-	P
10.2.1 (individual call)	-	-	-	-	-	-	-
10.2.1 (Queuing, individual call)	-	-	-	-	-	-	-
10.2.2 Announced cell re-selection without Preferred Neighbour Selected with call restoration							
10.2.2 (Group call)	-	-	-	-	-	-	-
10.2.2 (Queuing, group call)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10.2.2 (Pre-emption, group call)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10.2.2 (individual call, traffic)	-	-	-	-	-	-	P
10.2.2 (individual call, inactivity)	-	-	-	-	-	-	-
10.2.2 (Queuing, individual call, traffic)	-	-	-	-	-	-	-
10.2.2 (Queuing, individual call, inactivity)	-	-	-	-	-	-	-
11 Short data service							
11.1 Status messages (to dispatcher)	-	-	-	-	-	-	-
11.1 Status messages (Text messaging)	-	-	-	-	-	-	-
12 Telephone call							
12.1 Gateway Addresses	NTA	NTA	NTA	NTA	NTA	NTA	NTA
12.2 Call Set-up	-	-	-	-	-	-	P
12.2.1 MS Originated, Late Through-Connect	-	-	-	-	-	-	P
12.2.2 MS Originated, Early Through-Connect	-	-	-	-	-	-	-
12.2.3 MS Originated, Call Queued	-	-	-	-	-	-	-
12.2.4 MS Terminated	-	-	-	-	-	-	-
12.3 Call Maintenance	NTA	NTA	NTA	NTA	NTA	NTA	NTA
12.4 DTMF Over-dial	-	-	-	-	-	-	F ¹
12.5 Disconnect Causes	NTA	NTA	NTA	NTA	NTA	NTA	NTA
12.6 Emergency telephone call	NTA	NTA	NTA	NTA	NTA	NTA	NTA

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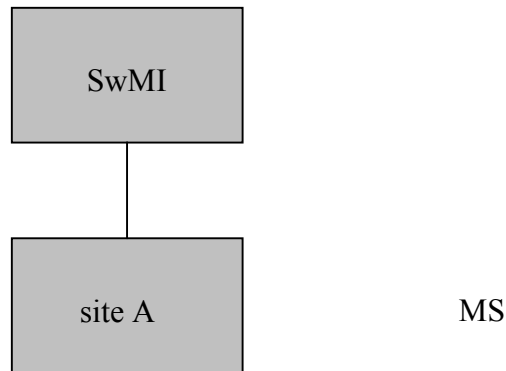


Comments:

- 1) The MS does not send U-INFO PDUs with DTMF tone start, only U-INFO PDUs with DTMF tone stop.

Test setup description

All tests except the cell re-selection test are carried out on a single site system with one carrier using standard antenna configurations.



For the cell re-selection test, an additional site is activated and the roaming MS is connected to the system via RF cables as illustrated below.

