



# TETRA SwMI Interoperability Certificate

4 April 2002

## Marconi Communications

Telelaboratoriet (TDC Mobil A/S) has witnessed that the Marconi/OTE 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 Marconi/OTE infrastructure on the 25<sup>th</sup> January 2000 with hardware/software release (SCN: 5.3.1, BS:1.1.3), and during the period 12<sup>th</sup> -13<sup>th</sup> September 2000 with hardware MPU 130-3432/01-05, Software 7.5.8.IOP and finally during the period 23<sup>th</sup> and 26<sup>th</sup>-28<sup>th</sup> March 2001 on Marconi/OTE infrastructure System Version 2.1.0 with hardware: SCN-T774-0117/01, Software: TETRA\_SCN\_7\_6\_15.

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

Authorised IOP test engineer

Telelaboratoriet, TDC Mobil A/S

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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 25<sup>th</sup> January 2000:

The tests performed on 25<sup>th</sup> January 2000 were performed using the following terminals:

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

They were used on Marconi/Ote infrastructure with hardware/software release (SCN: 5.3.1, BS:1.1.3).

### Testing 12<sup>th</sup> - 13<sup>th</sup> September 2000:

The tests performed on 12<sup>th</sup>-13<sup>th</sup> of September 2000 were performed using the following terminals:

Manufacturer	Terminal Type	Software/Hardware Release No.
Motorola	MTM300	SW: APP-R30-0261, CP-2.61 HW: 36
Nokia	THR420	SW: HY11.0390 HW: HRU 420-02
Marconi / OTE <sup>1</sup>	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 HW:1.0.

They were used on Marconi/OTE infrastructure with hardware: MPU 130-3432/01-05, Software: 7.5.8.IOP

<sup>1</sup> Terminals in their native system have not been targeted by IOP tests.

### Testing 23<sup>th</sup> and the 26<sup>th</sup> -28<sup>th</sup> of March 2001:

The tests performed during the period 23<sup>th</sup> and 26<sup>th</sup>-28<sup>th</sup> of March 2001 were performed using the following terminals:

Manufacturer	Terminal Type	Software/Hardware Release No.
Marconi/OTE <sup>1</sup>	PUMA T1	SW: 2.1.M HW: 02.01
Motorola	MTM300	SW: R.30.03.32 HW: M12PCN6TZ5AN
Nokia	THR420E	SW: HY11.03-9 HW: HRU 420-02
Simoco Digital Systems	SRM1000	SW: 4313-327-84999 HW: MS1TT001T20C00000
Simoco Digital Systems	SRP1000	SW: 4313-327-72097 HW: PS3TT001T30000B
Teltronic	MDT-400	SW: 01.02.01 HW: 01.03.

They were used on Marconi/OTE infrastructure System Version 2.1.0 with hardware: SCN-T774-0117/01, Software: TETRA\_SCN\_7\_6\_15.

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<sup>1</sup> 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	5
Colour code	44
LA1 (Høje Tåstrup) carrier frequency (BS Tx)	393.5875 MHz
LA2 (Høje Tåstrup) carrier frequency (BS Tx)	393.6875 MHz
PSTN gateway	43552609
Subscriber classes	FFFF <sub>16</sub>

## 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 25<sup>th</sup> 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 12<sup>th</sup>-13<sup>th</sup> September 2000 and table 3 Test results from 23<sup>th</sup> and 26<sup>th</sup>-28<sup>th</sup> 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 the 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 25<sup>th</sup> January 2000**

Marconi SwMI	# of tests <sup>1</sup>	Marconi-OTE Puma-T1	Motorola MTM300	Nokia TMR400	Simoco Digital Systems SRP1000
<b>PSTN interconnect</b>					
Setup	2	2	2	2	2
Clearing	1	1	1	1	1
DTMF over-dial	1	1	0	0	1
setup queuing	1	1	1	1	1
<b>Status messages</b>	1	1	1	1	1
<b>Individual call (duplex)</b>					
setup (on/off hook) (in coming/out going)	2	2	0	0	2
Modification to simplex	1	0	0	1	0
Clearing	1	1	0	0	1
<b>Individual call (simplex)</b>					
setup (direct)	2	2	0	2	2
setup queuing	1	1	0	1	1
<b>Emergency group call</b>					
Setup	2	2	2	2	0
Clearing	1	1	1	1	0
speech item request	1	1	1	1	0
<b>Emergency Individual call</b>					
Setup	2	2	0	2	2
Clearing	1	1	0	1	1
speech item request	1	1	0	1	0
<b>Cell re-selection</b>					
Unannounced	4	2	4	2	1
announced type 3	9	7	3	7	7

<sup>1</sup> 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 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.

**Table 2: Test performed on the 12<sup>th</sup>-13<sup>th</sup> September 2000**

Abbreviations:

-: Not performed.

F: Fail

N/A: Not applicable

I: Inconclusive

P: Pass

NTA: No test case available

Marconi SwMI	Marconi-OTE Puma-T1	Motorola MTM300	Nokia THR420	Simoco Digital Systems SRM1000	Clearstone CM9000P	Teltronic MDT-400
<b>6 Registration</b>						
6.1 ITSI attach	-	N/A	P	P	N/A	P
6.2 ITSI attach including group attachment	-	P	N/A	N/A	P	N/A
6.3 Roaming location updating	-	-	P	P	P	P
6.4 De-registration	-	-	-	-	P	P
<b>7 Individual call</b>						
7.1 Call setup	-	P	P	P	P	-
7.1 Call setup(Queuing)	-	P	-	-	P	-
7.1.1 Hook signalling (simplex)	-	P	P	P	-	-
7.1.1 Hook signalling (Duplex)	-	-	-	-	P	-
7.1.2 Direct through-connect (Simplex)	-	N/A	P	P	P	-
7.1.2 Direct through-connect (Duplex)	-	-	-	-	-	-
7.1.3 Call setup Modifications						
7.1.3 (Duplex to Semi duplex)	-	-	-	-	F <sup>1</sup>	-
7.1.3.2 Setup modification by called party						
7.1.3.2.1 Direct to hook	-	-	-	-	P	-
7.2 Transmission control						
7.2.1 End of transmission	-	P	P	P	P	-
7.2.2 Request to transmit	-	P	P	P	P	-
7.2.3 Request for speech item	-	-	P	-	P	-
7.3 Call maintenance	NTA	NTA	NTA	NTA	NTA	NTA
7.4 Call disconnection	-	-	-	-	-	-
7.5 Emergency individual call	-	-	-	-	-	-
7.5.1 Emergency speech item request	-	-	-	-	-	-
7.5.2 Emergency individual call modification	-	-	-	-	-	-
<b>8 Group management</b>						
8.4 MS Attachment of the selected group	-	-	-	-	P	-
8.4 MS Attachment of the selected group (Rejection)	-	-	-	-	P	-
8.4 MS Attachment of the Null group	-	-	-	-	P	-
8.4 MS Change of the selected group	-	-	-	-	P	-
8.5 Multiple group attachment	-	-	-	-	N/A	-
8.6 MS initiated detachment	-	-	-	-	-	-
8.7 SwMI initiated group attachment and detachment						
8.7.1 SwMI initiated detachment	N/A	N/A	N/A	N/A	N/A	N/A
8.7.2 SwMI initiated attachment	N/A	N/A	N/A	N/A	N/A	N/A
8.7.3 SwMI initiated group reporting	N/A	N/A	N/A	N/A	N/A	N/A
8.7.4 SwMI initiated registration with group report request	N/A	N/A	N/A	N/A	N/A	N/A

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.

Marconi SwMI	Marconi-OTE Puma-T1	Motorola MTM300	Nokia THR420	Simoco Digital Systems SRM1000	Clearstone CM9000P	Teltronic MDT-400
<b>9 Group call</b>						
9.1 Call setup	-	-	P	P	P	P
9.1 Call setup (Queuing)	-	-	-	-	P	-
9.1.1 Call setup modifications	NTA	NTA	NTA	NTA	NTA	NTA
9.2.1 End of transmission	-	-	P	P	P	P
9.2.2 Request to transmit	-	-	P	P	P	P
9.2.3 Request for speech item	-	-	P	-	P	-
9.3 Call disconnection	-	-	P	P	P	P
9.4 Late entry	-	-	-	-	P	P
9.5 Emergency group call	-	-	-	N/A	-	-
9.5 Emergency group call(Setup to busy group)	-	-	-	N/A	-	-
9.5.1 Emergency speech item request	-	-	-	N/A	-	-
9.5.2 Emergency group call modification	-	-	-	N/A	-	-
<b>10 Cell re-selection</b>						
10.1 Undeclared cell re-selection	-	-	-	P	P	-
10.2.1 Unannounced cell re-selection with call restoration						
10.2.1 (Group call)	-	-	-	P	-	-
10.2.1 (Queuing, group call)	-	-	-	-	-	-
10.2.1 (individual call)	N/A	-	N/A	N/A	N/A	N/A
10.2.1 (Queuing, individual call)	N/A	-	N/A	N/A	N/A	N/A
10.2.2 Announced cell re-selection without Preferred Neighbour Selected with call restoration						
10.2.2 (Group call)	-	-	-	P	-	-
10.2.2 (Queuing, group call)	-	-	F <sup>2</sup>	N/A	F <sup>3</sup>	-
10.2.2 (Pre-emption, group call)	-	-	-	-	-	-
10.2.2 (individual call, traffic)	-	-	-	-	-	-
10.2.2 (individual call, inactivity)	-	-	-	-	-	-
10.2.2 (Queuing, individual call, traffic)	-	-	F <sup>4</sup>	P	-	-
10.2.2 (Queuing, individual call, inactivity)	-	-	-	-	-	-
<b>11 Short data service</b>						
11.1 Status messages (to dispatcher)	-	-	-	-	P	-
11.1 Status messages (Text messaging)	-	-	-	-	-	-
<b>12 Telephone call</b>						
12.1 Gateway Addresses	NTA	NTA	NTA	NTA	NTA	NTA
12.2 Call Set-up	-	-	-	-	-	-
12.2.1 MS Originated, Late Through-Connect	-	-	-	-	-	-
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
12.4 DTMF Over-dial	-	-	-	-	-	-
12.5 Disconnect Causes	NTA	NTA	NTA	NTA	NTA	NTA
12.6 Emergency telephone call	NTA	NTA	NTA	NTA	NTA	NTA

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**Comments:**

- 1) Logs from SwMI and MS are missing. No U-plane established during IOP test session.
- 2) Problems with evaluating the signalling due to log file from SwMI being incomplete, reestablishment of audio following registration on new cell requires pressing PTT again.
- 3) In case of simplex operation the MS does not support utilising the direction of the traffic channel not used for traffic for signalling e.g. if uplink is used for traffic, downlink may be used for signalling (FACCH).
- 4) Signalling is OK, however reestablishment of audio following registration on new cell requires pressing PTT again.

**Table 3: Test performed during the period 23<sup>th</sup> and 26<sup>th</sup>-28<sup>th</sup> March 2001**

Abbreviations:

-: Not performed.

F: Fail

N/A: Not applicable

I: Inconclusive

P: Pass

NTA: No test case available

Marconi SwMI	Marconi-OTE Puma-T1	Motorola MTM300	Nokia THR420	Simoco Digital Systems SRM1000	Simoco Digital Systems SRP1000	Clearstone CM9000P	Teltronic MDT-400
<b>6 Registration</b>							
6.1 ITSI attach	-	N/A	-	-	-	-	-
6.2 ITSI attach including group attachment	-	-	N/A	N/A	N/A	-	N/A
6.3 Roaming location updating	-	P	-	-	-	-	-
6.4 De-registration	-	-	-	-	-	-	-
<b>7 Individual call</b>							
7.1 Call setup	-	P	-	-	-	-	P
7.1 Call setup(Queuing)	-	-	-	-	-	-	P
7.1.1 Hook signalling (simplex)	-	P	-	-	-	-	P
7.1.1 Hook signalling (Duplex)	-	-	-	-	-	-	P <sup>1</sup>
7.1.2 Direct through-connect (Simplex)	-	N/A	-	-	-	-	P
7.1.2 Direct through-connect (Duplex)	-	-	-	-	-	-	N/A
7.1.3 Call setup Modifications							
7.1.3 (Duplex to Semi duplex)	-	-	-	-	-	-	-
7.1.3.2 Setup modification by called party							
7.1.3.2.1 Direct to hook	-	-	-	-	-	-	-
7.2 Transmission control							
7.2.1 End of transmission	-	P	-	-	-	-	P
7.2.2 Request to transmit	-	-	-	-	-	-	P
7.2.3 Request for speech item	-	P	-	-	-	-	P
7.3 Call maintenance	NTA	NTA	NTA	NTA	NTA	NTA	NTA
7.4 Call disconnection	-	-	-	-	-	-	-
7.5 Emergency individual call	-	N/A	-	-	-	-	-
7.5.1 Emergency speech item request	-	N/A	-	-	-	-	-
7.5.2 Emergency individual call modification	-	N/A	-	-	-	-	-
<b>8 Group management</b>							
8.4 MS Attachment of the selected group	-	-	-	-	-	-	P
8.4 MS Attachment of the selected group (Rejection)	-	-	-	-	-	-	-
8.4 MS Attachment of the Null group	-	-	-	-	-	-	P
8.4 MS Change of the selected group	-	-	-	-	-	-	P
8.5 Multiple group attachment	-	N/A	P	P	P	-	P
8.5 Multiple group attachment (Rejection)	-	N/A	P	P	P	-	P
8.6 MS initiated detachment	-	-	-	-	-	-	N/A
8.7.1 SwMI initiated detachment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8.7.2 SwMI initiated attachment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8.7.3 SwMI initiated group reporting	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8.7.4 SwMI initiated registration with group report request	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Marconi SwMI	Marconi-OTE Puma-T1	Motorola MTM300	Nokia THR420	Simoco Digital Systems SRM1000	Simoco Digital Systems SRP1000	Cleartone CM9000P	Teltronic MDT-400
<b>9 Group call</b>							
9.1 Call setup	-	-	-	-	-	-	-
9.1 Call setup (Queuing)	-	-	-	-	-	-	P
9.1.1 Call setup modifications	NTA	NTA	NTA	NTA	NTA	NTA	NTA
9.2.1 End of transmission	-	P	-	-	-	-	P
9.2.2 Request to transmit	-	-	-	-	-	-	-
9.2.3 Request for speech item	-	P	-	-	-	-	P
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)	-	P	-	N/A	N/A	-	-
9.5.1 Emergency speech item request	-	P	-	N/A	N/A	-	-
9.5.2 Emergency group call modification	-	-	-	N/A	N/A	-	-
<b>10 Cell re-selection</b>							
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)	-	-	-	-	-	-	-
10.2.1 (individual call)	N/A	-	N/A	N/A	N/A	-	N/A
10.2.1 (Queuing, individual call)	N/A	-	N/A	N/A	N/A	-	N/A
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)	-	F <sup>2</sup>	-	N/A	N/A	-	-
10.2.2 (Pre-emption, group call)	-	-	-	-	-	-	-
10.2.2 (individual call, traffic)	-	-	-	-	-	-	-
10.2.2 (individual call, inactivity)	-	-	-	-	-	-	-
10.2.2 (Queuing, individual call, traffic)	-	-	-	-	-	-	-
10.2.2 (Queuing, individual call, inactivity)	-	-	-	-	-	-	-
<b>11 Short data service</b>							
11.1 Status messages (to dispatcher)	-	-	-	-	-	-	P
11.1 Status messages (Text messaging)	-	-	-	-	-	-	-
<b>12 Telephone call</b>							
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	-	P	-	-	-	-	-
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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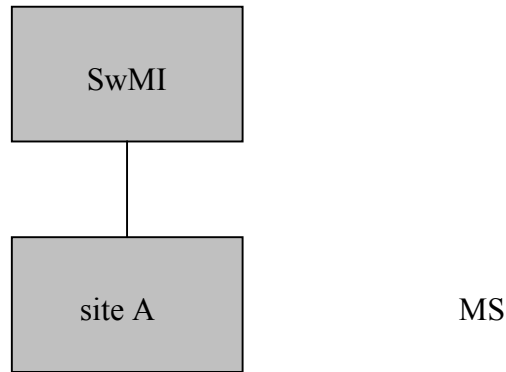


**Comments:**

- 1) The Transmission request permission element in D-CONNECT has a wrong value.
- 2) The log file from the SwMI is missing. During the test session it was observed that the SwMI sends D-NEW-CELL, but the PDU is not received by the MS.

### 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.

