Telelaboratoriet

TETRA Terminal Interoperability Certificate

9 September 2002

Teltronic

Manufacturer	Terminal Type	Software/Hardware Release No.
Teltronic	MDT-400	March 2001: SW: 01.02.01 HW: 01.03 April 2002: SW: 02.02b18 HW: 00.03.00.01

Telelaboratoriet has witnessed that the Teltronic terminal is operating in accordance with

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

for the following features:

Features	Tested (Yes/No)
• Registation / de-registration	Yes
• Individual call	Yes
• Group management	Yes
• Group call	Yes
• Emergency call	Yes
• Cell re-selection	Yes
• Short data service	Yes
• PSTN interconnect	Yes

The tests have been performed on a number of infrastructures. Details concerning the used infrastructures and the dates when the testing were performed can be found on page 2 of the certificate.

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

Authorised IOP test engineer

Preben Raae Hansen

Telelaboratoriet, TDC Mobil A/S

Sven Lundbech

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.

Telelaboratoriet
TDC Mobil A/S
Telegade 2
DK 2630 Taastrup

Tlf. +45 43 34 55 01
Fax +45 43 71 59 02

E-mail: info@telelaboratoriet.dk Web-site: http://www.telelaboratoriet.dk

Information about the equipment used for testing

Testing during the March 2001 IOP test session:

The tests were performed using the following infrastructures

Manufacturer	Infrastructure	Software/Hardware Release No.	Dates of testing
Motorola	Dimetra R3.1.006	Ambassador switch: SW: q400 HW: BLN7022A39 Site controller: SW: R030330 HW: 0.1.4	19-22 March 2001
Nokia	NTS 2.1	SW: DXT64: W2.17-0 CD2, TBS400: TBCPGM 5.23-0 HW: DXT 64	19-22 March 2001
Marconi/OTE	System version 2.1.0	SW: TETRA_SCN_7_6_15 HW: SCN-T774-0117/01	23 and 26-28 March 2001
Simoco Digital Systems/Frequentis	SFT2000	SW: 1.2 HW: v1	27-29 March 2001

The tests were performed in low frequency band (380-400 MHz).

Testing during the April 2002 IOP test session:

The tests were performed using the following infrastructure

Manufacturer	Infrastructure	Software/Hardware Release No.	Dates of testing
Frequentis/Damm	Motorola Compact TETRA	SW: 1.1 HW: CTS200 (380-400MHz)	18 April 2002
		SW: 1.1 HW: CTS100 (410-430MHz)	

The tests were performed both in low frequency band (380-400 MHz) and in high frequency band (410-430 MHz).

Test Results

Table 1 Test results from the March 2001 IOP test session and Table 2 Test results from the April 2002 IOP test session:

The tables 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 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 terminal.

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 terminal indicated in the tables. 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: Tests performed during the March 2001 test session

Abbreviations:

-:	Not performed.	F:	Fail
N/A:	Not applicable	I:	Inconclusive
P:	Pass	NTA:	No test case available

Teltronic MDT-400 Terminal	Marconi/OTE System version 2.1.0	Motorola Dimetra R3.1.006	Nokia NTS 2.1	Simoco Digital Systems/ Frequentis SFT2000
6 Registration				
6.1 ITSI attach	-	-	-	-
6.2 ITSI attach including group attachment	N/A	N/A	N/A	N/A
6.3 Roaming location updating	-	P	P	-
6.4 De-registration	-	-	-	-
7 Individual call				
7.1 Call setup	P	(P)[1]	-	-
7.1 Call setup (Queuing)	P	-	-	-
7.1.1 Hook signalling (simplex)	P	-	-	-
7.1.1 Hook signalling (Duplex)	P[2]	N/A	-	-
7.1.2 Direct through-connect (Simplex)	P	N/A	-	-
7.1.2 Direct through-connect (Duplex)	N/A	N/A	-	N/A
7.1.3 Call setup Modifications				
7.1.3 (Duplex to Semi duplex)	-	N/A	-	N/A
7.1.3.2 Setup Modifications by called Party				
7.1.3.2.1 Direct to hook	-	-	-	N/A
7.2 Transmission control				
7.2.1 End of transmission	P	P	-	-
7.2.2 Request to transmit	P	P	-	-
7.2.3 Request for speech item	P	P	N/A	-
7.3 Call maintenance	NTA	NTA	NTA	NTA
7.4 Call disconnection	-	-	-	-
7.5 Emergency individual call	-	-	-	N/A
7.5.1 Emergency speech item request	-	N/A	-	N/A
7.5.2 Emergency individual call modification	-	N/A	N/A	N/A
8 Group management				
8.4 MS Attachment of the selected group	P	-	P	P
8.4 MS Attachment of the selected group (Rejection)	-	-	P	F[3]
8.4 MS Attachment of the Null group	P	-	-	-
8.4 MS Change of the selected group	P	-	P	P
8.5 Multiple group attachment	P	P	P	P
8.5 Multiple group attachment (Rejection)	P	F[4]	P	F[3]
8.6 MS initiated detachment	N/A	N/A	N/A	N/A
8.7 SwMI initiated group attachment detachment				
8.7.1 SwMI initiated detachment	N/A	N/A	-	N/A
8.7.2 SwMI initiated attachment	N/A	N/A	-	N/A
8.7.3 SwMI initiated group reporting	N/A	N/A	N/A	N/A
8.7.4 SwMI initiated registration with group report request	N/A	N/A	-	N/A

Teltronic MDT-400 Terminal	Marconi/OTE System version 2.1.0	Motorola Dimetra R3.1.006	Nokia NTS 2.1	Simoco Digital Systems/ Frequentis SFT2000
9 Group call				
9.1 Call setup	-	-	-	-
9.1 Call setup (Queuing)	P	-	-	-
9.1.1 Call setup modifications	NTA	NTA	NTA	N/A
9.2.1 End of transmission	P	-	-	-
9.2.2 Request to transmit	-	-	-	-
9.2.3 Request for speech item	P	-	N/A	-
9.3 Call disconnection	-	-	-	-
9.4 Late entry	-	-	-	-
9.5 Emergency group call	-	P	-	N/A
9.5 Emergency group call(Setup to busy group)	-	P	-	N/A
9.5.1 Emergency speech item request	-	P	-	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)	-	P[5]	-	P
10.2.1 (Queuing, group call)	-	-	P	N/A
10.2.1 (individual call)	N/A	-	-	-
10.2.1 (Queuing, individual call)	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)	-	-	N/A	N/A
10.2.2 (Pre-emption, group call)	-	-	N/A	N/A
10.2.2 (individual call, traffic)	-	-	P	P[5]
10.2.2 (individual call, inactivity)	-	-	-	-
10.2.2 (Queuing, individual call, traffic)	-	-	-	N/A
10.2.2 (Queuing, individual call, inactivity)	-	-	-	N/A
11 Short data service				
11.1 Status messages (to dispatcher)	P	-	-	-
11.1.2 Text messaging	-	-	-	-
12 Telephone call				
12.1 Gateway Addresses	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	-	P	-	-
12.2.3 MS Originated, Call Queued	-	P	-	P[2]
12.2.4 MS Terminated	-	P	-	-
12.3 Call Maintenance	NTA	NTA	NTA	NTA
12.4 DTMF Over-dial	-	F[6]	F[6]	N/A
12.5 Disconnect Causes	NTA	NTA	NTA	NTA
12.6 Emergency telephone call	NTA	N/A	NTA	N/A

Comments:

1) The call setup is modified correctly to hook setup by the SwMI. The 'Call Status' element is missing in D-CALL PROCEDING. Incorrect value in the transmission grant element in the D-SETUP PDU.
2) Wrong value in transmission request permission element in D-CONNECT PDU.
3) D-ATTACH/DEATTACH-GRP-ACK contained the value "All accepted" and not as expected "At least one attachment rejected".
4) When the MS attaches a group unknown to the SwMI it is accepted. However if the group is attached as the selected group the SwMI rejects the unknown group.
5) The test is performed with an MS continuously transmitting instead of a stationary unit (dispatcher).
6) The MS does not send U-INFO PDUs with DTMF tone start, only U-INFO PDUs with DTMF tone stop.

Table 2: Tests performed during the April 2002 test session

Abbreviations:

-:	Not performed.	F:	Fail
N/A:	Not applicable	I:	Inconclusive
P:	Pass	NTA:	No test case available

Teltronic MDT-400 Terminal	Frequentis/Damm Motorola Compact TETRA CTS200[1]	Frequentis/Damm Motorola Compact TETRA CTS100[2]
6 Registration		
6.1 ITSI attach	**P**	**P**
6.2 ITSI attach including group attachment	**N/A**	**N/A**
6.3 Roaming location updating	**N/A**	**N/A**
6.4 De-registration	**P**	**P**
7 Individual call		
7.1 Call setup	**P**	**P**
7.1 Call setup(Queuing)	**P**	**P**
7.1.1 Hook signalling (simplex)	**-**	**-**
7.1.1 Hook signalling (Duplex)	**P**	**P**
7.1.2 Direct through-connect (Simplex)	**N/A[3]**	**N/A[3]**
7.1.2 Direct through-connect (Duplex)	**-**	**-**
7.1.3 Call setup Modifications		
7.1.3 (Duplex to Semi duplex)	**N/A**	**N/A**
7.1.3.2 Setup Modifications 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**	**P**
7.2.3 Request for speech item	**P**	**P**
7.3 Call maintenance	**NTA**	**NTA**
7.4 Call disconnection	**P[4]**	**P[4]**
7.5 Emergency individual call	**N/A**	**N/A**
7.5.1 Emergency speech item request	**N/A**	**N/A**
7.5.2 Emergency individual call modification	**N/A**	**N/A**
8 Group management		
8.4 MS Attachment of the selected group	**P**	**P**
8.4 MS Attachment of the selected group (Rejection)	**P**	**P**
8.4 MS Attachment of the Null group	**P**	**P**
8.4 MS Change of the selected group	**P**	**P**
8.5 Multiple group attachment	**N/A**	**N/A**
8.5 Multiple group attachment (Rejection)	**N/A**	**N/A**
8.6 MS initiated detachment	**N/A**	**N/A**
8.7 SwMI initiated group attachment detachment		
8.7.1 SwMI initiated detachment	**N/A**	**N/A**
8.7.2 SwMI initiated attachment	**N/A**	**N/A**
8.7.3 SwMI initiated group reporting	**N/A**	**N/A**
8.7.4 SwMI initiated registration with group report request	**N/A**	**N/A**

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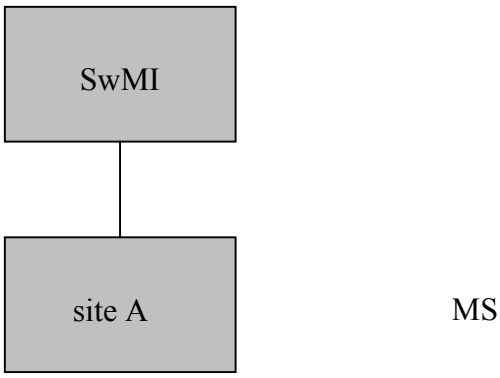
Teltronic MDT-400 Terminal	Frequentis/Damm Motorola Compact TETRA CTS200[1]	Frequentis/Damm Motorola Compact TETRA CTS100[2]
9 Group call		
9.1 Call setup	P	P
9.1 Call setup (Queuing)	P	P
9.1.1 Call setup modifications	NTA	NTA
9.2.1 End of transmission	P	P
9.2.2 Request to transmit	P	P
9.2.3 Request for speech item	P	P
9.3 Call disconnection	P	P
9.4 Late entry	P	P
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	N/A	N/A
10.2.1 Unannounced cell re-selection with call restoration		
10.2.1 (Group call)	N/A	N/A
10.2.1 (Queuing, group call)	N/A	N/A
10.2.1 (individual call)	N/A	N/A
10.2.1 (Queuing, individual call)	N/A	N/A
10.2.2 Announced cell re-selection without Preferred Neighbour Selected with call restoration		
10.2.2 (Group call)	N/A	N/A
10.2.2 (Queuing, group call)	N/A	N/A
10.2.2 (Pre-emption, group call)	N/A	N/A
10.2.2 (individual call, traffic)	N/A	N/A
10.2.2 (individual call, inactivity)	N/A	N/A
10.2.2 (Queuing, individual call, traffic)	N/A	N/A
10.2.2 (Queuing, individual call, inactivity)	N/A	N/A
11 Short data service		
11.1 Status messages (to dispatcher)	P	P
11.1.2 Text messaging	P[5]	P
12 Telephone call		
12.1 Gateway Addresses	NTA	NTA
12.2 Call Set-up	P	P
12.2.1 MS Originated, Late Through-Connect	P	P
12.2.2 MS Originated, Early Through-Connect	N/A	N/A
12.2.3 MS Originated, Call Queued	P	P
12.2.4 MS Terminated	P[6]	P[6]
12.3 Call Maintenance	NTA	NTA
12.4 DTMF Over-dial	N/A[7]	N/A[7]
12.5 Disconnect Causes	NTA	NTA
12.6 Emergency telephone call	NTA	NTA

Comments:

1) The terminal is tested in low frequency band (380-400 MHz).
2) The terminal is tested in high frequency band (410-430 MHz).
3) The SwMI modifies the call setup correctly to hook setup.
4) Among several call disconnection causes, only ‘User requested disconnect’ is tested.
5) Both delivery report and consumed report are exchanged between the Teltronic MS and the destination MS.
6) Incorrect value in the Transmission grant element in D-SETUP.
7) The SwMI does not support DTMF over-dial, however the SwMI shall respond D-INFO ‘DTMF not supported’ when a terminal sends DTMF digits.

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.