TETRA ASSOCIATION

ISCTI

TETRA Interoperability Certificate

Teltronic, NEBULA, SwMI –
Cleartone, CM5000, Terminal

Zaragoza, March 2010

Latest Certified SwMI SW Release:	09.15.50	**Latest Certified Terminal SW Release:**	MR01.XXX.036
Latest Certified SwMI HW Release:	09.15.13.18	**Latest Certified Terminal HW Release:**	1.0

ISCOM (Istituto Superiore della Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Teltronic, NEBULA, SwMI and the Teltronic, CM-5000, terminal have been subject to interoperability testing for the "certified" features listed on the second page of this certificate. In accordance with the TETRA Interoperability Profiles, TIP compliance Test Plan and the related TETRA interoperability requirement tables.
The table lists all the available TETRA interoperability profiles, and summarises the main functionalities of every profile according to the TETRA interoperability requirement tables.
A feature is "**Certified**" when it has been successfully tested during the last test session with one of the testing method described in the TETRA process document part 1 (TPD001).
A breakdown into the feature details is given in the Feature Compliance Overview section of this certificate.
Detailed test results and explanation about the procedure used to provide verdicts are listed in the Test Report associated to the Certificate.

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Date of issue:
20 July 2010

Certified features

Tetra Association TTR001-01:Core	
Registration	Certified
Group Management	Certified
Group call	Certified
Individual call	Certified
Status messages	Certified
Pre-emptive Priority Call	Certified
Emergency Call	Certified
Cell Re-selection	Certified
PSTN interconnect	Certified
MS-ISDN Numbering	-
In Call Signalling	Partial
Subscriber Class Procedures	-
Common Secondary Control Channels	-
BS Fallback Operation	Certified
Energy Economy Mode	-
Transmit Inhibit	Certified
Tetra Association TTR001-02:SDS	
SDS Type 1, 2 or 3	Partial
SDS-TL	Certified
Store and Forward	-
Tetra Association TTR001-03:DGNA	
Support for individually addressed DGNA	Partial
Support for group addressed DGNA	Certified
Tolerance of unsupported DGNA functions	-

Tetra Association TTR001-04:Auth	
SwMI Initiated (non-mutual) Authentication	Certified
SwMI Initiated Authentication made Mutual by MS	Certified
TEI Query	-
Tetra Association TTR001-05:PD	
Context Management	Partial
Single Slot Packet Data	Partial
Multi Slot Packet Data	Partial
Tetra Association TTR001-09:AL	
Ambience Listening	Certified
Interaction with Transmit Inhibit	-
Tetra Association TTR001-11:AIE	
Security Class 2 Air Interface Encryption	-
Security Class 3 Air Interface Encryption	Partial
Security Class 3G Air Interface Encryption	-
Change of CMG and GSKO	-
Key Status demand	-
Change of Security Class for Fallback operation	-
Change of Security Class (other than for Fallback operation)	-
Key Management for Secure Direct Mode Operation	-
Tetra Association TTR001-12:SI	
MS initiated Service Interaction	Certified
SwMI initiated Service Interaction	Partial
Tetra Association TTR001-13:ED	
Enable and temporary disable of an MS	Certified
Permanent disable of an MS	Certified

Feature Compliance Overview

The first pages of this certificate provide an indication about the main interoperable TETRA features for each TIP specification (as described in the TIC-RT). The main interoperable TETRA features result depend on a set of sub-feature, the verdicts associated to each sub-feature are directly derived from the analysis of the performed test cases.
The results associated to each feature and sub-feature are shown in the "Feature compliance report" table below. The main features are indicated with grey background and the associated sub-features (or second level features) have white background.

The verdict assigned to a sub-feature as shown on page 2, is derived by the Feature compliance report tables.

Verdict	Definition
Certified	All required tests have been performed and passed
Partial	Not all the required tests have been performed but none have failed
–	Feature cannot be certified e.g. it is not supported by at least one product, no tests were performed, or some tests were performed but at least one failed

The verdict assigned to a sub feature is the result of an analysis of the test case results listed in the Test Report. The verdict assigned to each sub-feature is derived from one or several test case results or test steps result, the TETRA Interoperability requirement tables (TIC-RTs) indicate the link between sub-features and test cases for the certified set of equipment capabilities (see Test Report)

Verdict	Definition
Passed (notex)	All mandated tests or steps of tests linked to this functionality (as per TIC-RT indication) are compliant with the TIP specification relevant to this feature. A note can be associated to this result, if further clarification on the behaviour of the equipment is needed
Time_limited	Not all Mandated tests (as per TIC-RT indication) have been executed (ran out of time)

The verdict associated to the feature gives also indication about the method used to test that feature. The allowed testing Methods are listed in the table below, a complete description of the procedures and constraints associated to each of them can be found in the "TPD001 TETRA Interoperability Certification

Process Description" document.

Testing Method	Description
Complete	All mandated tests associated to the feature have been executed
Spot	Only a selection of the mandatory test cases associated to the feature has been executed during the test session. These tests are a subset of the tests performed on an equivalent software which has been "completely" tested against the same functionality on a different equipment, see manufacturer declaration in annex A
Regression	Only a selection of the mandatory test cases associated to the feature has been executed during the test session. These tests are a subset of the tests performed on a previous version of the same software which has been "completely" tested in a previous test session against the same functionality, see manufacturer definition in annex A
Regression on spot	The regression method has been applied on the verdicts based on the spot testing method

Depending on equipment capabilities declared by the manufacturer, some features or sub features cannot be tested. The following table describes meaning of the used abbreviation

Indication	Definition
SwMI-nr MS-nr	The SwMI and MS do not support the minimum features required to verify these items.
SwMI-nr	The SwMI does not support the minimum features required to verify these items.
MS-nr	The MS does not support the minimum features required to verify these items.

ISCOM has made every effort to ensure that every result has been correctly evaluated in accordance with the relevant TIPs, Test Plans and TIC-RTs. ISCOM has no liability for the test results, or towards the manufacturers,

The table on the following page lists HW and SW releases of SwMI and Terminal under test in the last four test sessions and the used TIP specifications, Test Plans and TIC-RTs

This Certificate and Certificates from previous test sessions are available on the TETRA Association web site
(http://www.tetra-association.com/tetramou.aspx?&id=2636).

The feature results are shown in the tables below

Information on equipment under test and document references

Test Session Date/Place	**Teltronic, Zaragoza, March 2010**			
SwMI Type	NEBULA			
SwMI HW Release	09.15.13.18			
SwMI SW Release	09.15.50			
Terminal Type	CM5000			
Terminal HW Release	1			
Terminal SW Release	MR01.XXX.036			
TIP Specs and TIP Compliance Test Plans				
Core	TTR001-01 v5.1.1 IOP001-01 v2.6.0 TIC-RT001-01 v242			
SDS	TTR001-02 v2.1.0 IOP001-02 v2.0.0 TIC-RT001-02 v210			
DGNA	TTR001-03 v2.0.0 IOP001-03 v2.0.1 TIC-RT001-03 v216			
Auth	TTR001-04 v3.0.0 IOP001-04 v2.0.0 TIC-RT001-04 v219			

PD	TTR001-05 v3.0.0 IOP001-05 v2.0.0 TIC-RT001-05 v226			
AL	TTR001-09 v2.0.0 IOP001-09 v1.1.0 TIC-RT001-09 v118			
AIE	TTR001-11 v3.0.0 IOP001-11 v3.0.0 TIC-RT001-11 v3015			
SI	TTR001-12 v1.0.0 IOP001-12 v1.0.0 TIC-RT001-12 v119			
ED	TTR001-13 v2.0.0 IOP001-13 v1.0.0 TIC-RT001-13 v140			

Feature compliance report

Test Session	Teltronic, Zaragoza, March 2010			
Core				
Registration	PASSED Complete 4_pass_of_4			
ITSI attach	PASSED Complete 2_pass_of_2			
SwMI initiated location updating	PASSED Complete 1_pass_of_1			
LA timer based Periodic location updating	Not Supported			
De-registration	PASSED Complete 1_pass_of_1			
Group Management	PASSED Complete 9_pass_of_9			
Single group attachment	PASSED Complete 5_pass_of_5			
Multiple group attachment	PASSED Complete 4_pass_of_4			
MS initiated group detachment	Not Supported			
SwMI initiated group management	Not Supported			
Group call	PASSED Complete 11_pass_of_11			
Normal group call	PASSED Complete 4_pass_of_4			
Late entry	PASSED Complete 1_pass_of_1			
Priority Group scanning	PASSED Complete 3_pass_of_3			

Call setup modifications	PASSED Complete 1_pass_of_1			
Resource Queuing based on Call Priority	PASSED Complete 2_pass_of_2			
Broadcast Call	Not Supported			
Limited coverage notification	Not Supported			
Individual call	PASSED Complete 14_pass_of_14			
Simplex individual call	PASSED Complete 4_pass_of_4			
Duplex individual call	PASSED Complete 2_pass_of_2			
Call setup modifications	PASSED Complete 4_pass_of_4			
Resource Queuing based on Call Priority	PASSED Complete 4_pass_of_4			
Indication of imminent call disconnection	Not Supported			
Status messages	PASSED Complete 4_pass_of_4			
Individual addressed Status transfer	PASSED Complete 1_pass_of_1			
Group addressed Status transfer	PASSED Complete 3_pass_of_3			
Pre-emptive Priority Call	PASSED Complete 4_pass_of_4			
Pre-emption of Resources	PASSED Complete 2_pass_of_2			
Pre-emption of Busy Users	PASSED Complete 2_pass_of_2			
Emergency Call	PASSED Complete 2_pass_of_2			
Pre-emption of Resources	PASSED Complete 1_pass_of_1			
Pre-emption of Busy Users	PASSED Complete 1_pass_of_1			

Call setup modifications	Not Supported			
Cell Re-selection	PASSED Complete 17_pass_of_17			
Undeclared	PASSED Complete 1_pass_of_1			
Unannounced	PASSED Complete 7_pass_of_7			
Announced - with Call Restoration	PASSED Complete 9_pass_of_9			
Announced - without Call Restoration	Not Supported			
PSTN interconnect	PASSED Complete 5_pass_of_5			
TETRA Originated Call	PASSED Complete 2_pass_of_2			
PSTN Originated Call	PASSED Complete 1_pass_of_1			
DTMF over-dial	PASSED Complete 1_pass_of_1			
Emergency Telephone Calls	PASSED Complete 1_pass_of_1			
MS-ISDN Numbering				
MS ISDN - Voice Call	Not Supported			
MS-ISDN Status	Not Supported			
In Call Signalling	Time_Limited 2_pass_of_7			
Slow Signalling on Traffic Channel (SACCH)	Time_Limited 0_pass_of_4			
Fast Signalling on Traffic Channel (FACCH)	Time_Limited 2_pass_of_3			
Subscriber Class Procedures				
Cell Selection based on Subscriber Class	Not Supported			
Subscriber Class Delivery during Location Update	Not Supported			
Use of Preferred Subscriber Classes	Not Supported			
Common Secondary Control Channels				

One C-SCCH per cell	Not Supported			
Two C-SCCH per cell	Not Supported			
Three C-SCCH per cell	Not Supported			
BS Fallback Operation	PASSED Complete 8_pass_of_8			
Switch to/from BS Fallback Operation	Not Supported			
Roaming with BS Fallback Operation	PASSED Complete 1_pass_of_1			
Services with BS Fallback Operation	PASSED Complete 7_pass_of_7			
Energy Economy Mode				
Energy Economy Mode Operation	Not Supported			
Transmit Inhibit	PASSED Complete 6_pass_of_6			
TXI Activation & De-Activation without Status message	PASSED Complete 4_pass_of_4			
TXI Activation & De-Activation with Status message	PASSED Complete 1_pass_of_1			
Receipt of group addressed service during TXI	PASSED Complete 1_pass_of_1			
Short Data Service (SDS)				
SDS Type 1, 2 or 3	Time_Limited 0_pass_of_3			
SDS Type 1	Time_Limited 0_pass_of_1			
SDS Type 2	Time_Limited 0_pass_of_1			
SDS Type 3	Time_Limited 0_pass_of_1			
SDS-TL	PASSED Complete 5_pass_of_5			
Individually Addressed	PASSED Complete 1_pass_of_1			
Group Addressed	PASSED Complete 2_pass_of_2			

Using MS-ISDN dialling	Not Supported			
Using UCS2 coding scheme	PASSED Complete 2_pass_of_2			
Using 7-bit coding scheme	Not Supported			
Store and Forward				
Individually Addressed	Not Supported			
Group Addressed	Not Supported			
Dynamic Group Number Assignment (DGNA)				
Support for individually addressed DGNA	Time_Limited 6_pass_of_7			
Support for individually addressed DGNA assignment without attachment	Not Supported			
Support for individually addressed DGNA assignment with attachment as selected group	PASSED Complete 3_pass_of_3			
Support for individually addressed DGNA assignment with attachment as scanned group	PASSED Complete 2_pass_of_2			
Support for individually addressed DGNA assignment with rejected attachment	Time_Limited 0_pass_of_1			
Support for individually addressed assignment for pre-programmed group	PASSED Complete 2_pass_of_2			
Support for group addressed DGNA	PASSED Complete 5_pass_of_5			
Support for group addressed DGNA assignment	PASSED Complete 2_pass_of_2			
Management of 'group assignment lifetime'	PASSED Complete 2_pass_of_2			
Support for group addressed DGNA deassignment	PASSED Complete 1_pass_of_1			
Tolerance of unsupported DGNA functions				
MS tolerance of unsupported individual addressed DGNA signalling	Not Supported			
MS tolerance of unsupported group addressed DGNA signalling	Not Supported			

Authentication				
SwMI Initiated (non-mutual) Authentication	PASSED Complete 3_pass_of_3			
Attach with authentication	PASSED Complete 1_pass_of_1			
Roaming with authentication	PASSED Complete 1_pass_of_1			
SwMI rejects MS during authentication	PASSED Complete 1_pass_of_1			
MS rejects SwMI during authentication	Not Supported			
SwMI Initiated Authentication made Mutual by MS	PASSED Complete 2_pass_of_2			
Attach with authentication	PASSED Complete 1_pass_of_1			
Roaming with authentication	PASSED Complete 1_pass_of_1			
TEI Query				
TEI Query Operation	Not Supported			
TETRA Packet Data				
Context Management	Time_Limited 7_pass_of_9			
Context Activation	Time_Limited 5_pass_of_7			
User authentication	PASSED Complete 2_pass_of_2			
Single Slot Packet Data	Time_Limited 9_pass_of_10			
Data Transfer	Time_Limited 6_pass_of_7			
Cell re-selection	PASSED Complete 3_pass_of_3			
Multi Slot Packet Data	Time_Limited 0_pass_of_2			
Data Transfer	Time_Limited 0_pass_of_2			

TETRA Ambience Listening (SS-AL)				
Ambience Listening	PASSED Complete 3_pass_of_3			
SS-AL Call Setup	PASSED Complete 2_pass_of_2			
MS initiated SS-AL disconnection	PASSED Complete 1_pass_of_1			
No Indication to affected user	PASSED Complete 3_pass_of_3			
Interaction with Transmit Inhibit				
AL can override TxI	Not Supported			
AL cannot override TxI	Not Supported			
Air Interface Encryption				
Security Class 2 Air Interface Encryption				
Location Updating and AI Signalling Protection	Not Supported			
TM-SCK provisioning during location updating	Not Supported			
Communications between parties using encryption	Not Supported			
Communications between clear and encrypted parties	Not Supported			
Communications between encrypted parties on a channel designated to operate in clear	Not Supported			
OTAR and Change of TM-SCK	Not Supported			
Security Class 3 Air Interface Encryption	Time_Limited 12_pass_of_21			
Location Updating and AI Signalling Protection	Time_Limited 4_pass_of_13			
DCK Forwarding at MS request	Time_Limited 1_pass_of_6			
DCK Forwarding by SwMI (without MS request)	Not Supported			
DCK Retrieval	Not Supported			
CCK provisioning during location updating	Time_Limited 3_pass_of_7			

Communications between parties using encryption	PASSED Complete 2_pass_of_2			
Communications between clear and encrypted parties	PASSED Complete 2_pass_of_2			
Communications between encrypted parties on a channel designated to operate in clear	Not Supported			
OTAR and Change of CCK	PASSED Complete 4_pass_of_4			
Security Class 3G Air Interface Encryption				
GCK Key Association setting	Not Supported			
Communications between parties using encryption	Not Supported			
Communications between clear and encrypted parties	Not Supported			
OTAR and Change of GCK	Not Supported			
Change of CMG and GSKO				
OTAR and change of CMG and GSKO	Not Supported			
Key Status demand				
SCK Key Status demand	Not Supported			
GCK Key Status demand	Not Supported			
GSKO Key Status demand	Not Supported			
Change of Security Class for Fallback operation				
Seamless change to Security Class 2 for BS Fallback operation	Not Supported			
Non-seamless change to Security Class 2 for BS Fallback operation	Not Supported			
Provisioning of TM-SCK for fallback to Security Class 2 operation	Not Supported			
Change to Security Class 1 for BS Fallback operation	Not Supported			
Change of Security Class (other than for Fallback operation)				
Change between Security Class 3 and Security Class 3G	Not Supported			
Change between Security Class 2 and Security Class 3	Not Supported			

Change from Security Class 3G to Security Class 2	Not Supported			
Key Management for Secure Direct Mode Operation				
OTAR and change of DM-SCK	Not Supported			
Service Interaction				
MS initiated Service Interaction	PASSED Complete 5_pass_of_5			
MS initiated Circuit Mode Call during another Circuit Mode Call	PASSED Complete 3_pass_of_3			
MS initiated Circuit Mode Call during Packet Mode Transfer	PASSED Complete 2_pass_of_2			
MS initiated Packet Mode Transfer during Circuit Mode Call	Not Supported			
SwMI initiated Service Interaction	Time_Limited 4_pass_of_8			
SwMI initiated Circuit Mode Call during another Circuit Mode Call	Time_Limited 3_pass_of_6			
SwMI initiated Circuit Mode Call during Packet Mode Transfer	Time_Limited 1_pass_of_2			
SwMI initiated Packet Mode Transfer during Circuit Mode Call	Not Supported			
Enable/Disable				
Enable and temporary disable of an MS	PASSED Complete 7_pass_of_7			
Enable and temporary disable of an MS without authentication	PASSED Complete 2_pass_of_2			
Enable and temporary disable of an MS with authentication	PASSED Complete 2_pass_of_2			
Registration of a temporary disabled MS	PASSED Complete 2_pass_of_2			
Rejection of applicable invalid enable/disable requests	PASSED Complete 1_pass_of_1			
Removable SIMs do not affect the subscriber or equipment that has been enabled/disabled	Not Supported			
Disabling of an MS during a call or while on the PDCH	Not Supported			
Permanent disable of an MS	PASSED Complete 2_pass_of_2			

Permanent disable of an MS with authentication	PASSED Complete 1_pass_of_1			
Permanently Disabled MS cannot send air interface signalling	PASSED Complete 1_pass_of_1			