

TETRA Interoperability Certificate

**Teltronic, NEBULA, SwMI –
Teltronic, TRM-300, Terminal**

Zaragoza, September 2012

Latest Certified SwMI SW Release:	12.20.50	Latest Certified Terminal SW Release:	V09
Latest Certified SwMI HW Release:	12.20.18.23	Latest Certified Terminal HW Release:	CCP 30.03

ISCTI (Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Teltronic, NEBULA, SwMI and the Teltronic, TRM-300, terminal have been subject to interoperability testing for the "certified" features listed on second page of this certificate, in accordance with the TETRA Interoperability Profiles, TIP compliance Test Plan and related TETRA interoperability requirement tables.

The table lists all the available TETRA interoperability profiles, and summarizes 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 (TPD001-01).

A breakdown into the feature details is given in the Feature Compliance Overview section of this certificate.

This certificate has been issued following a multiple test session between Teltronic and Teltronic on September 2012. Detailed test results are listed in the Test Report associated to this Certificate. Details and explanation about the procedure used to provide verdicts are in the TIC process TPD001-01.

IOP test engineer



Massimo Proietti

Radio Office Manager

Giuseppe Pierri



ISCTI - V.le America 201, 00144 Rome, Italy
Ph.: +39 06 5444 2663, Fax: +39 06 5410904
e-mail: tetra_ctc.iscom@mise.gov.it
Web: www.mise.gov.it

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v 1

Certified features

Tetra Association TTR001-01:Core	
Registration	Certified
Group Management	Certified
Group call	-
Individual call	-
Status messages	Certified
Pre-emptive Priority Call	-
Emergency Call	-
Cell Re-selection	Certified
PSTN interconnect	-
MS-ISDN Numbering	-
In Call Signalling	-
Subscriber Class Procedures	-
Common Secondary Control Channels	Certified
BS Fallback Operation	Certified
Energy Economy Mode	-
Transmit Inhibit	Certified
Mixed band operation	Certified
Tetra Association TTR001-02:SDS	
SDS Type 1, 2 or 3	Certified
SDS-TL	Certified
Store and Forward	-

Tetra Association TTR001-03:DGNA	
Support for individually addressed DGNA	Certified
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	Certified
Single Slot Packet Data	Certified
Multi Slot Packet Data	Certified
TEDS	-
Mixed band operation	Certified
Tetra Association TTR001-11:AIE	
Security Class 2 Air Interface Encryption	-
Security Class 3 Air Interface Encryption	Certified
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 TTR001-13:ED	
Enable and temporary disable of an MS	Certified
Permanent disable of an MS	Certified
Tetra Association TTR001-14:TKD	
Delivery of Authentication Data	Certified

Delivery of SCK	-
Delivery method	Certified
Tetra Association TTR001-19:LIP	
Location Information Protocol	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 outcomes 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 outcome assigned to a sub-feature as shown on page 2, is derived by the Feature compliance report tables.

Outcome	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 outcome is derived from the verdict assigned to a sub feature which 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	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.
Incomplete	Not all Mandated tests (as per TIC-RT indication) have been executed
Failed	At least one of mandated test or steps of tests linked to this functionality failed to match the TIP specification relevant to this feature.

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 "TPD001-01 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 the associated Test Report
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 the associated Test Report
Regression on spot	The regression method has been applied on the verdicts based on the spot testing method
Witnessed	The CB has witnessed that the identified number of tests were successfully passed. Other tests have been found to be successful based on the log file evaluation.

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
Not supported	The SwMI and/or MS do not support the minimum features required to verify these items

ISCTI has made every effort to ensure that every result has been correctly evaluated in accordance with the relevant TIPs, Test Plans and TIC-RTs. ISCTI 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 + Critical Communications Association web site (<http://www.tandcca.com/interop/page/12476>).

The feature results are shown in the tables below.

Information on equipment under test and document references

Test Session Date/Place	Teltronic, Zaragoza, September 2012		Teltronic, Zaragoza, March 2010			
SwMI Type	NEBULA		NEBULA			
SwMI HW Release	12.20.18.23		09.15.13.18			
SwMI SW Release	12.20.50		09.15.50			
Terminal Type	TRM-300		TRM-300			
Terminal HW Release	CCP 30.03		CCP 30.03			
Terminal SW Release	V09		V7			
TIP Specs and TIP Compliance Test Plans						
Core	TTR001-01	v6.0.0	TTR001-01	v5.1.1		
	IOP001-01	v3.0.0	IOP001-01	v2.6.0		
	TIC-RT001-01	v2.5.4	TIC-RT001-01	v2.4.2		
SDS	TTR001-02	v2.1.1	TTR001-02	v2.1.0		
	IOP001-02	v2.0.0	IOP001-02	v2.0.0		
	TIC-RT001-02	v2.1.2	TIC-RT001-02	v2.1.0		
DGNA	TTR001-03	v2.0.0	TTR001-03	v2.0.0		
	IOP001-03	v2.0.1	IOP001-03	v2.0.1		
	TIC-RT001-03	v2.2.1	TIC-RT001-03	v2.1.6		

Auth	TTR001-04	v3.0.0	TTR001-04	v3.0.0		
	IOP001-04	v2.0.0	IOP001-04	v2.0.0		
	TIC-RT001-04	v2.2.3	TIC-RT001-04	v2.1.9		
PD	TTR001-05	v3.0.0	TTR001-05	v3.0.0		
	IOP001-05	v3.0.5	IOP001-05	v2.0.0		
	TIC-RT001-05	v3.0.2	TIC-RT001-05	v2.2.5		
AIE	TTR001-11	v3.0.3	TTR001-11	v3.0.0		
	IOP001-11	v3.0.2	IOP001-11	v3.0.0		
	TIC-RT001-11	v3.2.0	TIC-RT001-11	v3.0.15		
ED	TTR001-13	v2.0.0	TTR001-13	v2.0.0		
	IOP001-13	v1.0.0	IOP001-13	v1.0.0		
	TIC-RT001-13	v1.4.6	TIC-RT001-13	v1.4.0		
TKD	TTR001-14	v1.0.3	Not tested			
	IOP001-14	v1.0.0				
	TIC-RT001-14	v1.1.6				
LIP	TTR001-19	v1.0.0	Not tested			
	IOP001-19	v1.0.0				
	TIC-RT001-19	v1.0.5				

Feature compliance report

Test Session	Teltronic Zaragoza September 2012	Teltronic, Zaragoza, March 2010		
Core				
Registration	PASSED Spot 2_pass_of_3	PASSED Spot 1_pass_of_3		
ITSI attach	PASSED Complete 1_pass_of_1	Spot 0_pass_of_1		
SwMI initiated location updating	Spot 0_pass_of_1	PASSED Complete 1_pass_of_1		
LA timer based Periodic location updating	Not Supported	Not Supported		
De-registration	PASSED Complete 1_pass_of_1	Spot 0_pass_of_1		
Group Management	PASSED Spot 1_pass_of_8	PASSED Spot 3_pass_of_8		
Single group attachment	Spot 0_pass_of_2	PASSED Spot 1_pass_of_2		
Multiple group attachment	PASSED Spot 1_pass_of_4	PASSED Spot 1_pass_of_4		
MS initiated group detachment	Spot 0_pass_of_2	PASSED Spot 1_pass_of_2		
SwMI initiated group management	Not Supported	Not Supported		
Group call				
Normal group call	Not Supported	Not Supported		
Late entry	Not Supported	Not Supported		
Priority Group scanning	Not Supported	Not Supported		
Call setup modifications	Not Supported	Not Supported		
Resource Queuing based on Call Priority	Not Supported	Not Supported		
Broadcast Call	Not Supported	Not Supported		

Limited coverage notification	Not Supported	Not Supported		
Individual call				
Simplex individual call	Not Supported	Not Supported		
Duplex individual call	Not Supported	Not Supported		
Call setup modifications	Not Supported	Not Supported		
Resource Queuing based on Call Priority	Not Supported	Not Supported		
Indication of imminent call disconnection	Not Supported	Not Supported		
Status messages	PASSED Spot 1_pass_of_4	PASSED Spot 1_pass_of_4		
Individual addressed Status transfer	Spot 0_pass_of_1	Spot 0_pass_of_1		
Group addressed Status transfer	PASSED Spot 1_pass_of_3	PASSED Spot 1_pass_of_3		
Pre-emptive Priority Call				
Pre-emption of Resources	Not Supported	Not Supported		
Pre-emption of Busy Users	Not Supported	Not Supported		
Emergency Call				
Pre-emption of Resources	Not Supported	Not Supported		
Pre-emption of Busy Users	Not Supported	Not Supported		
Call setup modifications	Not Supported	Not Supported		
Call disconnection by non-call owner	Not Supported	N/A		
Cell Re-selection	Spot 0_pass_of_1	PASSED Complete 1_pass_of_1		
Undeclared	Spot 0_pass_of_1	PASSED Complete 1_pass_of_1		
Unannounced	Not Supported	Not Supported		
Announced - with Call Restoration	Not Supported	Not Supported		
Announced - without Call Restoration	Not Supported	Not Supported		
Expedited	Not Supported	N/A		

PSTN interconnect				
TETRA Originated Call	Not Supported	Not Supported		
PSTN Originated Call	Not Supported	Not Supported		
DTMF over-dial	Not Supported	Not Supported		
Emergency Telephone Calls	Not Supported	Not Supported		
MS-ISDN Numbering				
MS ISDN - Voice Call	Not Supported	Not Supported		
MS-ISDN Status	Not Supported	Not Supported		
In Call Signalling				
Slow Signalling on Traffic Channel (SACCH)	Not Supported	Not Supported		
Fast Signalling on Traffic Channel (FACCH)	Not Supported	Not Supported		
Subscriber Class Procedures				
Cell Selection based on Subscriber Class	Not Supported	Not Supported		
Subscriber Class Delivery during Location Update	Not Supported	Not Supported		
Use of Preferred Subscriber Classes	Not Supported	Not Supported		
Common Secondary Control Channels	PASSED Spot 1_pass_of_7	PASSED Spot 2_pass_of_7		
One C-SCCH per cell	Spot 0_pass_of_4	PASSED Spot 1_pass_of_4		
Two C-SCCH per cell	Spot 0_pass_of_3	PASSED Spot 1_pass_of_3		
Three C-SCCH per cell	PASSED Spot 1_pass_of_2	Spot 0_pass_of_2		
BS Fallback Operation	PASSED Spot 1_pass_of_4	PASSED Spot 2_pass_of_4		
Switch to/from BS Fallback Operation	Not Supported	Not Supported		
Roaming with BS Fallback Operation	Spot 0_pass_of_1	PASSED Complete 1_pass_of_1		
Services with BS Fallback Operation	PASSED Spot 1_pass_of_3	PASSED Spot 1_pass_of_3		
Energy Economy Mode				

Energy Economy Mode Operation	Not Supported	Not Supported		
Transmit Inhibit	PASSED Spot 1_pass_of_7	PASSED Spot 3_pass_of_5		
TXI Activation & De-Activation without Status message	Spot 0_pass_of_2	Complete		
TXI Activation & De-Activation with Status message	PASSED Spot 1_pass_of_3	PASSED Complete 3_pass_of_3		
Receipt of group addressed service during TXI	Spot 0_pass_of_2	Spot 0_pass_of_2		
Mixed band operation	Spot 0_pass_of_1			
Mixed band operation, inter-cell	Spot 0_pass_of_1	N/A		
Mixed band operation, intra-cell	Not Supported	N/A		
Mixed band operation, Full	Spot 0_pass_of_1	N/A		
Short Data Service (SDS)				
SDS Type 1, 2 or 3	PASSED Spot 1_pass_of_3	Spot 0_pass_of_3		
SDS Type 1	Spot 0_pass_of_1	Spot 0_pass_of_1		
SDS Type 2	Spot 0_pass_of_1	Spot 0_pass_of_1		
SDS Type 3	PASSED Complete 1_pass_of_1	Spot 0_pass_of_1		
SDS-TL	PASSED Spot 2_pass_of_5	PASSED Spot 2_pass_of_5		
Individually Addressed	PASSED Complete 1_pass_of_1	PASSED Complete 1_pass_of_1		
Group Addressed	Spot 0_pass_of_2	PASSED Spot 1_pass_of_2		
Using MS-ISDN dialling	Not Supported	Not Supported		
Using UCS2 coding scheme	PASSED Spot 1_pass_of_2	Spot 0_pass_of_2		
Using 7-bit coding scheme	Not Supported	Not Supported		
Store and Forward				
Individually Addressed	Not Supported	Not Supported		
Group Addressed	Not Supported	Not Supported		

Dynamic Group Number Assignment (DGNA)				
Support for individually addressed DGNA	PASSED Spot 2_pass_of_7	PASSED Spot 1_pass_of_6		
Support for individually addressed DGNA assignment without attachment	Not Supported	Not Supported		
Support for individually addressed DGNA assignment with attachment as selected group	PASSED Spot 1_pass_of_3	PASSED Spot 1_pass_of_3		
Support for individually addressed DGNA assignment with attachment as scanned group	PASSED Spot 1_pass_of_3	Spot 0_pass_of_2		
Support for individually addressed DGNA assignment with rejected attachment	Spot 0_pass_of_1	Spot 0_pass_of_1		
Support for individually addressed assignment for pre-programmed group	Not Supported	Not Supported		
Support for group addressed DGNA	PASSED Spot 1_pass_of_5	PASSED Spot 1_pass_of_5		
Support for group addressed DGNA assignment	PASSED Spot 1_pass_of_2	Spot 0_pass_of_2		
Management of 'group assignment lifetime'	Spot 0_pass_of_2	PASSED Spot 1_pass_of_2		
Support for group addressed DGNA deassignment	Spot 0_pass_of_1	Spot 0_pass_of_1		
Tolerance of unsupported DGNA functions				
MS tolerance of unsupported individual addressed DGNA signalling	Not Supported	Not Supported		
MS tolerance of unsupported group addressed DGNA signalling	Not Supported	Not Supported		
Authentication				
SwMI Initiated (non-mutual) Authentication	PASSED Complete 3_pass_of_3	PASSED Spot 1_pass_of_3		
Attach with authentication	PASSED Complete 1_pass_of_1	Spot 0_pass_of_1		

Roaming with authentication	PASSED Complete 1_pass_of_1	PASSED Complete 1_pass_of_1		
SwMI rejects MS during authentication	PASSED Complete 1_pass_of_1	Spot 0_pass_of_1		
MS rejects SwMI during authentication	Not Supported	Not Supported		
SwMI Initiated Authentication made Mutual by MS	Spot 0_pass_of_2	Spot 0_pass_of_2		
Attach with authentication	Spot 0_pass_of_1	Spot 0_pass_of_1		
Roaming with authentication	Spot 0_pass_of_1	Spot 0_pass_of_1		
TEI Query				
TEI Query Operation	Not Supported	Not Supported		
TETRA Packet Data				
Context Management	PASSED Spot 3_pass_of_9	PASSED Spot 2_pass_of_9		
Context Activation	PASSED Spot 2_pass_of_7	PASSED Spot 1_pass_of_7		
User authentication	PASSED Spot 1_pass_of_2	PASSED Spot 1_pass_of_2		
Single Slot Packet Data	PASSED Spot 3_pass_of_10	PASSED Spot 2_pass_of_10		
Data Transfer	PASSED Spot 2_pass_of_7	PASSED Spot 1_pass_of_7		
Cell re-selection	PASSED Spot 1_pass_of_3	PASSED Spot 1_pass_of_3		
Multi Slot Packet Data	Spot 0_pass_of_2	Spot 0_pass_of_2		
Data Transfer	Spot 0_pass_of_2	Spot 0_pass_of_2		
TEDS				
TEDS with Context Activation	Not Supported	N/A		
TEDS Data Transmission	Not Supported	N/A		
TEDS Cell Reselection	Not Supported	N/A		
Mixed band operation	PASSED Spot 1_pass_of_2			

Mixed band operation, inter-cell	PASSED Spot 1_pass_of_2	N/A		
Mixed band operation, intra-cell	PASSED Spot 1_pass_of_2	N/A		
Mixed band operation, Full	PASSED Spot 1_pass_of_2	N/A		
Air Interface Encryption				
Security Class 2 Air Interface Encryption				
Location Updating and AI Signalling Protection	Not Supported	Not Supported		
TM-SCK provisioning during location updating	Not Supported	Not Supported		
Communications between parties using encryption	Not Supported	Not Supported		
Communications between clear and encrypted parties	Not Supported	Not Supported		
Communications between encrypted parties on a channel designated to operate in clear	Not Supported	Not Supported		
OTAR and Change of TM-SCK	Not Supported	Not Supported		
Packet Data with Class 2 Air Interface Encryption	Not Supported	N/A		
Security Class 3 Air Interface Encryption	PASSED Spot 3_pass_of_8	PASSED Spot 4_pass_of_6		
Location Updating and AI Signalling Protection	PASSED Spot 1_pass_of_5	PASSED Spot 3_pass_of_5		
DCK Forwarding at MS request	Spot 0_pass_of_2	PASSED Spot 1_pass_of_2		
DCK Forwarding by SwMI (without MS request)	Not Supported	Not Supported		
DCK Retrieval	Not Supported	Not Supported		
CCK provisioning during location updating	PASSED Spot 1_pass_of_3	PASSED Spot 2_pass_of_3		

Communications between parties using encryption	Not Supported	Not Supported		
Communications between clear and encrypted parties	Not Supported	Not Supported		
Communications between encrypted parties on a channel designated to operate in clear	Not Supported	Not Supported		
OTAR and Change of CCK	PASSED Complete 1_pass_of_1	PASSED Complete 1_pass_of_1		
Packet Data with Class 3 Air Interface Encryption	PASSED Spot 1_pass_of_2	N/A		
Security Class 3G Air Interface Encryption				
GCK Key Association setting	Not Supported	Not Supported		
Communications between parties using encryption	Not Supported	Not Supported		
Communications between clear and encrypted parties	Not Supported	Not Supported		
OTAR and Change of GCK	Not Supported	Not Supported		
Change of CMG and GSKO				
OTAR and change of CMG and GSKO	Not Supported	Not Supported		
Key Status demand				
SCK Key Status demand	Not Supported	Not Supported		
GCK Key Status demand	Not Supported	Not Supported		
GSKO Key Status demand	Not Supported	Not Supported		
Change of Security Class for Fallback operation				
Seamless change to Security Class 2 for BS Fallback operation	Not Supported	Not Supported		

Non-seamless change to Security Class 2 for BS Fallback operation	Not Supported	Not Supported		
Provisioning of TM-SCK for fallback to Security Class 2 operation	Not Supported	Not Supported		
Change to Security Class 1 for BS Fallback operation	Not Supported	Not Supported		
Change of Security Class (other than for Fallback operation)				
Change between Security Class 3 and Security Class 3G	Not Supported	Not Supported		
Change between Security Class 2 and Security Class 3	Not Supported	Not Supported		
Change from Security Class 3G to Security Class 2	Not Supported	Not Supported		
Key Management for Secure Direct Mode Operation				
OTAR and change of DM-SCK	Not Supported	Not Supported		
Enable Disable				
Enable and temporary disable of an MS	PASSED Spot 2_pass_of_6	PASSED Spot 3_pass_of_6		
Enable and temporary disable of an MS without authentication	PASSED Complete 2_pass_of_2	Spot 0_pass_of_2		
Enable and temporary disable of an MS with authentication	Spot 0_pass_of_2	PASSED Complete 2_pass_of_2		
Registration of a temporary disabled MS	Spot 0_pass_of_2	PASSED Spot 1_pass_of_2		
Rejection of applicable invalid enable/disable requests	Not Supported	Not Supported		
Removable SIMs do not affect the subscriber or equipment that has been enabled/disabled	Not Supported	Not Supported		
Disabling of an MS during a call or while on the PDCH	Not Supported	Not Supported		

Permanent disable of an MS	PASSED Spot 1_pass_of_2	Spot 0_pass_of_2		
Permanent disable of an MS with authentication	PASSED Complete 1_pass_of_1	Spot 0_pass_of_1		
Permanently Disabled MS cannot send air interface signalling	Spot 0_pass_of_1	Spot 0_pass_of_1		
Key Delivery				
Delivery of Authentication Data	PASSED Complete 1_pass_of_1			
Authentication Key Delivery	PASSED Complete 1_pass_of_1	N/A		
ITSI Delivery	Not Supported	N/A		
Delivery of SCK				
SCK Delivery to SCK delivery	Not Supported	N/A		
SCK Delivery to SwMI	Not Supported	N/A		
SCK Delivery to SCK loading	Not Supported	N/A		
Delivery method	PASSED Complete 1_pass_of_1			
Plain text on physical media	PASSED Complete 1_pass_of_1	N/A		
Encrypted text on physical media	Not Supported	N/A		
Electronic transfer	Not Supported	N/A		
LIP				
Location Information Protocol	PASSED Spot 3_pass_of_12			
LIP over SDS	PASSED Spot 2_pass_of_7	N/A		
LIP over Packet Data	Not Supported	N/A		
Time based reporting	PASSED Spot 2_pass_of_3	N/A		
Distance based reporting - NOT TESTABLE	Not Supported	N/A		
Reporting using Long reports	Not Supported	N/A		

Reporting Enable & Disable	Spot 0_pass_of_2	N/A		
Temporary reporting control	Spot 0_pass_of_1	N/A		
Trigger modification	Not Supported	N/A		
Immediate Location Reporting	Spot 0_pass_of_1	N/A		
Reporting Lifetimes	Not Supported	N/A		
Error Reporting	PASSED Complete 1_pass_of_1	N/A		