

## TETRA Interoperability Certificate

**Teltronic, NEBULA, SwMI –  
Hytera, MT680, Terminal**

Zaragoza, September 2012

Latest Certified SwMI SW Release:	12.20.50	Latest Certified Terminal SW Release:	V1.04 CPS:V1.04
Latest Certified SwMI HW Release:	12.20.18.23	Latest Certified Terminal HW Release:	HW-MT4.0

ISCTI (Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Teltronic, NEBULA SwMI and the Hytera, MT680, 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 Hytera 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.

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**Date of issue**

**4 March 2013**

**v 1**

## Certified features

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

<b>Tetra Association TTR001-03:DGNA</b>	
Support for individually addressed DGNA	-
Support for group addressed DGNA	-
Tolerance of unsupported DGNA functions	-
<b>Tetra Association TTR001-04:Auth</b>	
SwMI Initiated (non-mutual) Authentication	Certified
SwMI Initiated Authentication made Mutual by MS	Certified
TEI Query	-
<b>Tetra Association TTR001-05:PD</b>	
Context Management	-
Single Slot Packet Data	-
Multi Slot Packet Data	-
TEDS	-
Mixed band operation	-
<b>Tetra Association TTR001-09:AL</b>	
Ambience Listening	Certified
Interaction with Transmit Inhibit	-
<b>Tetra Association TTR001-11:AIE</b>	
Security Class 2 Air Interface Encryption	-
Security Class 3 Air Interface Encryption	-
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	-

<b>Tetra Association TTR001-13:ED</b>	
<b>Enable and temporary disable of an MS</b>	Certified
<b>Permanent disable of an MS</b>	Certified
<b>Tetra Association TTR001-19:LIP</b>	
<b>Location Information Protocol</b>	-

# 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
<b>Certified</b>	All required tests have been performed and passed
<b>Partial</b>	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
<b>Passed</b>	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.
<b>Incomplete</b>	Not all Mandated tests (as per TIC-RT indication) have been executed
<b>Failed</b>	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
<b>Complete</b>	All mandated tests associated to the feature have been executed
<b>Spot</b>	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
<b>Regression</b>	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
<b>Regression on spot</b>	The regression method has been applied on the verdicts based on the spot testing method
<b>Witnessed</b>	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
<b>Not supported</b>	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	<b>Teltronic, Zaragoza, September 2012</b>				
SwMI Type	NEBULA				
SwMI HW Release	12.20.18.23				
SwMI SW Release	12.20.50				
Terminal Type	MT680				
Terminal HW Release	HW-MT4.0				
Terminal SW Release	V1.04 CPS:V1.04				
TIP Specs and TIP Compliance Test Plans					
Core	TTR001-01	v5.1.1			
	IOP001-01	v2.6.4			
	TIC-RT001-01	v2.5.4			
SDS	TTR001-02	v2.0.1			
	IOP001-02	v2.0.0			
	TIC-RT001-02	v2.1.2			
DGNA	TTR001-03	v2.0.0			
	IOP001-03	v2.0.1			
	TIC-RT001-03	v2.2.1			

Auth	TTR001-04 v3.0.0 IOP001-04 v2.0.0 TIC-RT001-04 v2.2.3			
PD	TTR001-05 v3.0.0 IOP001-05 v3.0.5 TIC-RT001-05 v3.0.2			
AL	TTR001-09 v2.0.0 IOP001-09 v1.1.0 TIC-RT001-09 v1.2.2			
AIE	TTR001-11 v3.0.3 IOP001-11 v3.0.2 TIC-RT001-11 v3.2.0			
ED	TTR001-13 v2.0.0 IOP001-13 v1.0.0 TIC-RT001-13 v1.4.6			
LIP	TTR001-19 v1.0.0 IOP001-19 v1.0.0 TIC-RT001-19 v1.0.5			



# Feature compliance report

Test Session	Teltronic Zaragoza September 2012			
<b>Core</b>				
Registration	PASSED Spot 2_pass_of_4			
ITSI attach	PASSED Spot 1_pass_of_2			
SwMI initiated location updating	PASSED Complete 1_pass_of_1			
LA timer based Periodic location updating	Not Supported			
De-registration	Spot 0_pass_of_1			
Group Management	PASSED Spot 2_pass_of_11			
Single group attachment	PASSED Spot 1_pass_of_5			
Multiple group attachment	PASSED Spot 1_pass_of_4			
MS initiated group detachment	Spot 0_pass_of_2			
SwMI initiated group management	Not Supported			
Group call	PASSED Spot 3_pass_of_9			
Normal group call	PASSED Spot 1_pass_of_4			
Late entry	PASSED Complete 1_pass_of_1			
Priority Group scanning	Spot 0_pass_of_1			
Call setup modifications	Spot 0_pass_of_1			
Resource Queuing based on Call Priority	PASSED Spot 1_pass_of_2			
Broadcast Call	Not Supported			

Limited coverage notification	Not Supported			
Individual call	PASSED Spot 3_pass_of_14			
Simplex individual call	PASSED Spot 1_pass_of_4			
Duplex individual call	PASSED Spot 1_pass_of_2			
Call setup modifications	PASSED Spot 1_pass_of_4			
Resource Queuing based on Call Priority	Spot 0_pass_of_4			
Indication of imminent call disconnection	Not Supported			
Status messages	PASSED Spot 2_pass_of_4			
Individual addressed Status transfer	PASSED Complete 1_pass_of_1			
Group addressed Status transfer	PASSED Spot 1_pass_of_3			
Pre-emptive Priority Call	Spot 0_pass_of_7			
Pre-emption of Resources	Spot 0_pass_of_2			
Pre-emption of Busy Users	Spot 0_pass_of_5			
Emergency Call	Spot 0_pass_of_3			
Pre-emption of Resources	Spot 0_pass_of_2			
Pre-emption of Busy Users	Spot 0_pass_of_1			
Call setup modifications	Not Supported			
Call disconnection by non-call owner	Not Supported			
Cell Re-selection	PASSED Spot 2_pass_of_15			
Undeclared	Spot 0_pass_of_1			
Unannounced	Spot 0_pass_of_3			
Announced - with Call Restoration	PASSED Spot 2_pass_of_11			
Announced - without Call Restoration	Not Supported			
Expedited	Not Supported			

PSTN interconnect	PASSED Spot 2_pass_of_5			
TETRA Originated Call	PASSED Spot 1_pass_of_2			
PSTN Originated Call	Spot 0_pass_of_1			
DTMF over-dial	Spot 0_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	PASSED Spot 2_pass_of_7			
Slow Signalling on Traffic Channel (SACCH)	PASSED Spot 1_pass_of_4			
Fast Signalling on Traffic Channel (FACCH)	PASSED Spot 1_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	PASSED Spot 1_pass_of_7			
One C-SCCH per cell	PASSED Spot 1_pass_of_4			
Two C-SCCH per cell	Spot 0_pass_of_3			
Three C-SCCH per cell	Spot 0_pass_of_2			
BS Fallback Operation	Spot 0_pass_of_9			
Switch to/from BS Fallback Operation	Not Supported			
Roaming with BS Fallback Operation	Spot 0_pass_of_1			
Services with BS Fallback Operation	Spot 0_pass_of_8			
Energy Economy Mode				

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

Store and Forward				
Individually Addressed	Not Supported			
Group Addressed	Not Supported			
<b>Dynamic Group Number Assignment (DGNA)</b>				
Support for individually addressed DGNA	Spot Incomplete 0_pass_of_9			
Support for individually addressed DGNA assignment without attachment	Not Supported			
Support for individually addressed DGNA assignment with attachment as selected group	Spot Incomplete 0_pass_of_3			
Support for individually addressed DGNA assignment with attachment as scanned group	Spot Incomplete 0_pass_of_3			
Support for individually addressed DGNA assignment with rejected attachment	Spot 0_pass_of_1			
Support for individually addressed assignment for pre-programmed group	Spot 0_pass_of_3			
Support for group addressed DGNA	Spot Incomplete 0_pass_of_5			
Support for group addressed DGNA assignment	Spot 0_pass_of_2			
Management of 'group assignment lifetime'	Spot 0_pass_of_2			
Support for group addressed DGNA deassignment	Incomplete 0_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			
<b>Authentication</b>				
SwMI Initiated (non-mutual) Authentication	PASSED Spot 1_pass_of_3			
Attach with authentication	Spot 0_pass_of_1			
Roaming with authentication	PASSED Complete 1_pass_of_1			

SwMI rejects MS during authentication	Spot 0_pass_of_1			
MS rejects SwMI during authentication	Not Supported			
SwMI Initiated Authentication made Mutual by MS	Spot 0_pass_of_2			
Attach with authentication	Spot 0_pass_of_1			
Roaming with authentication	Spot 0_pass_of_1			
TEI Query				
TEI Query Operation	Not Supported			
<b>TETRA Packet Data</b>				
Context Management	Spot Incomplete 0_pass_of_9			
Context Activation	Spot Incomplete 0_pass_of_7			
User authentication	Spot Incomplete 0_pass_of_2			
Single Slot Packet Data	Spot Incomplete 0_pass_of_7			
Data Transfer	Spot Incomplete 0_pass_of_4			
Cell re-selection	Spot Incomplete 0_pass_of_3			
Multi Slot Packet Data				
Data Transfer	Not Supported			
TEDS				
TEDS with Context Activation	Not Supported			
TEDS Data Transmission	Not Supported			
TEDS Cell Reselection	Not Supported			
Mixed band operation				
Mixed band operation, inter-cell	Not Supported			
Mixed band operation, intra-cell	Not Supported			
Mixed band operation, Full	Not Supported			
<b>TETRA Ambience Listening (SS-AL)</b>				
Ambience Listening	PASSED Spot 1_pass_of_2			
SS-AL Call Setup	PASSED Complete 1_pass_of_1			
MS initiated SS-AL disconnection	Spot 0_pass_of_1			

No Indication to affected user	PASSED Spot 1_pass_of_2			
Interaction with Transmit Inhibit				
AL can override TxI	Not Supported			
AL cannot override TxI	Not Supported			
<b>Air Interface Encryption</b>				
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			
Packet Data with Class 2 Air Interface Encryption	Not Supported			
Security Class 3 Air Interface Encryption	Spot Incomplete 0_pass_of_15			
Location Updating and AI Signalling Protection	Spot Incomplete 0_pass_of_6			
DCK Forwarding at MS request	Spot Incomplete 0_pass_of_3			
DCK Forwarding by SwMI (without MS request)	Not Supported			
DCK Retrieval	Not Supported			
CCK provisioning during location updating	Spot Incomplete 0_pass_of_3			
Communications between parties using encryption	Spot 0_pass_of_2			

Communications between clear and encrypted parties	Incomplete 0_pass_of_2			
Communications between encrypted parties on a channel designated to operate in clear	Not Supported			
OTAR and Change of CCK	Spot 0_pass_of_4			
Packet Data with Class 3 Air Interface Encryption	Spot 0_pass_of_1			
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			
<b>Enable Disable</b>				
Enable and temporary disable of an MS	PASSED Spot 2_pass_of_6			
Enable and temporary disable of an MS without authentication	Spot 0_pass_of_2			
Enable and temporary disable of an MS with authentication	PASSED Spot 1_pass_of_2			
Registration of a temporary disabled MS	PASSED Spot 1_pass_of_2			
Rejection of applicable invalid enable/disable requests	Not Supported			
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	Spot 0_pass_of_2			
Permanent disable of an MS with authentication	Spot 0_pass_of_1			

Permanently Disabled MS cannot send air interface signalling	Spot 0_pass_of_1			
<b>LIP</b>				
Location Information Protocol	Spot Incomplete 0_pass_of_15			
LIP over SDS	Spot Incomplete 0_pass_of_8			
LIP over Packet Data	Not Supported			
Time based reporting	Spot Incomplete 0_pass_of_6			
Distance based reporting - NOT TESTABLE	Not Supported			
Reporting using Long reports	Incomplete 0_pass_of_1			
Reporting Enable & Disable	Spot 0_pass_of_2			
Temporary reporting control	Not Supported			
Trigger modification	Incomplete 0_pass_of_1			
Immediate Location Reporting	Incomplete 0_pass_of_1			
Reporting Lifetimes	Not Supported			
Error Reporting	Spot 0_pass_of_2			