TETRA Interoperability Certificate

Damm, TetraFlex, SwMI –
Hytera Communications Co. ltd, MT680, Terminal

Sønderborg, February 2013

Latest Certified SwMI SW Release:	Rel. 7.6	**Latest Certified Terminal SW Release:**	V1.04 CPS:V1.04
Latest Certified SwMI HW Release:	TetraFlex	**Latest Certified Terminal HW Release:**	HW-MT4.0

ISCTI (Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Damm, TetraFlex, 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 Damm and Hytera on February 2013. 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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v 1

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	Certified
In Call Signalling	Certified
Subscriber Class Procedures	Certified
Common Secondary Control Channels	Certified
BS Fallback Operation	Certified
Energy Economy Mode	-
Transmit Inhibit	-
Mixed band operation	-
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	-
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	-
TEDS	-
Mixed band operation	-
Tetra Association TTR001-09:AL	
Ambience Listening	Certified
Interaction with Transmit Inhibit	-
Tetra Association TTR001-10:E2EE	
E2EE Voice Call	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 TTR001-19:LIP	
Location Information Protocol	Certified
Tetra Association TTR001-20:CF	
Call Forwarding Unconditional	Certified
Call Forwarding Conditional	Certified
Call Forwarding Information Displayed	-

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 light blue 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 TIP heading lines in the Feature Compliance Report indicate whether each TIP is partially or fully witnessed by the Certification Body. Additionally, for a partially-witnessed TIP, the number of witnessed test cases that passed is shown for each the feature and sub-feature. There may have been some un-witnessed passed tests and they will 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	**Damm, Sønderborg, February 2013**			
SwMI Type	TetraFlex			
SwMI HW Release	TetraFlex			
SwMI SW Release	Rel. 7.6			
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 v6.0.0 IOP001-01 v3.0.0 TIC-RT001-01 v254			
SDS	TTR001-02 v2.1.1 IOP001-02 v2.0.0 TIC-RT001-02 v212			

DGNA	TTR001-03 v2.0.0 IOP001-03 v2.0.1 TIC-RT001-03 v221			
Auth	TTR001-04 v3.0.0 IOP001-04 v2.0.0 TIC-RT001-04 v223			
PD	TTR001-05 v3.0.0 IOP001-05 v3.0.5 TIC-RT001-05 v302			
AL	TTR001-09 v2.0.0 IOP001-09 v1.1.0 TIC-RT001-09 v122			
E2EE	TTR001-10 v2.0.0 IOP001-10 v1.1.4 TIC-RT001-10 v122			
AIE	TTR001-11 v3.0.3 IOP001-11 v3.0.2 TIC-RT001-11 v321			
ED	TTR001-13 v2.0.0 IOP001-13 v1.0.0 TIC-RT001-13 v146			
LIP	TTR001-19 v1.0.0 IOP001-19 v1.0.0 TIC-RT001-19 v105			
CF	TTR001-20 v1.0.1 IOP001-20 v1.0.0 TIC-RT001-20 v107			

Feature compliance report

Test Session	Damm Sønderborg February 2013			
Core				
Registration	PASSED Complete 5_pass_of_5			
ITSI attach	PASSED Complete 2_pass_of_2			
SwMI initiated location updating	PASSED Complete 2_pass_of_2			
LA timer based Periodic location updating	Not Supported			
De-registration	PASSED Complete 1_pass_of_1			
Group Management	PASSED Spot 1_pass_of_16			
Single group attachment	PASSED Spot 1_pass_of_7			
Multiple group attachment	Spot 0_pass_of_6			
MS initiated group detachment	Spot 0_pass_of_2			
SwMI initiated group management	Spot 0_pass_of_3			
Group call	PASSED Spot 1_pass_of_11			
Normal group call	PASSED Spot 1_pass_of_3			
Late entry	Spot 0_pass_of_1			
Priority Group scanning	Spot 0_pass_of_3			
Call setup modifications	Spot 0_pass_of_1			
Resource Queuing based on Call Priority	Spot 0_pass_of_2			

Broadcast Call	Spot 0_pass_of_1			
Limited coverage notification	Not Supported			
Individual call	PASSED Spot 4_pass_of_14			
Simplex individual call	PASSED Spot 3_pass_of_4			
Duplex individual call	PASSED Spot 1_pass_of_2			
Call setup modifications	Spot 0_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 3_pass_of_4			
Individual addressed Status transfer	PASSED Complete 1_pass_of_1			
Group addressed Status transfer	PASSED Spot 2_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	PASSED Spot 1_pass_of_4			
Pre-emption of Resources	Spot 0_pass_of_2			
Pre-emption of Busy Users	Spot 0_pass_of_1			
Call setup modifications	PASSED Complete 1_pass_of_1			
Call disconnection by non-call owner	Not Supported			
Cell Re-selection	PASSED Spot 1_pass_of_15			
Undeclared	PASSED Complete 1_pass_of_1			
Unannounced	Spot 0_pass_of_3			
Announced - with Call Restoration	Spot 0_pass_of_11			
Announced - without Call Restoration	Not Supported			

Expedited	Not Supported			
PSTN interconnect	PASSED Spot 4_pass_of_6			
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	Spot 0_pass_of_2			
MS-ISDN Numbering	PASSED Spot 1_pass_of_4			
MS ISDN - Voice Call	Spot 0_pass_of_2			
MS-ISDN Status	PASSED Spot 1_pass_of_2			
In Call Signalling	PASSED Spot 2_pass_of_8			
Slow Signalling on Traffic Channel (SACCH)	PASSED Spot 2_pass_of_4			
Fast Signalling on Traffic Channel (FACCH)	Spot 0_pass_of_4			
Subscriber Class Procedures	PASSED Spot 1_pass_of_7			
Cell Selection based on Subscriber Class	PASSED Spot 1_pass_of_4			
Subscriber Class Delivery during Location Update	Spot 0_pass_of_1			
Use of Preferred Subscriber Classes	Spot 0_pass_of_2			
Common Secondary Control Channels	PASSED Spot 1_pass_of_7			
One C-SCCH per cell	Spot 0_pass_of_4			
Two C-SCCH per cell	PASSED Spot 1_pass_of_3			
Three C-SCCH per cell	Spot 0_pass_of_2			
BS Fallback Operation	PASSED Spot 2_pass_of_12			
Switch to/from BS Fallback Operation	PASSED Spot 1_pass_of_2			
Roaming with BS Fallback Operation	Spot 0_pass_of_2			
Services with BS Fallback Operation	PASSED Spot 1_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			
Short Data Service (SDS)				
SDS Type 1, 2 or 3	Spot 0_pass_of_3			
SDS Type 1	Spot 0_pass_of_1			
SDS Type 2	Spot 0_pass_of_1			
SDS Type 3	Spot 0_pass_of_1			
SDS-TL	PASSED Spot 2_pass_of_7			
Individually Addressed	PASSED Complete 1_pass_of_1			
Group Addressed	Spot 0_pass_of_2			
Using MS-ISDN dialling	PASSED Spot 1_pass_of_2			
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			

Dynamic Group Number Assignment (DGNA)				
Support for individually addressed DGNA	PASSED Spot 3_pass_of_14			
Support for individually addressed DGNA assignment without attachment	Spot 0_pass_of_4			
Support for individually addressed DGNA assignment with attachment as selected group	PASSED Spot 1_pass_of_3			
Support for individually addressed DGNA assignment with attachment as scanned group	PASSED Spot 1_pass_of_4			
Support for individually addressed DGNA assignment with rejected attachment	Spot 0_pass_of_1			
Support for individually addressed assigment for pre-programmed group	PASSED Spot 2_pass_of_5			
Support for group addressed DGNA				
Support for group addressed DGNA assignment	Not Supported			
Management of 'group assignment lifetime'	Not Supported			
Support for group addressed DGNA deassignment	Not Supported			
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 Spot 1_pass_of_2			
Attach with authentication	Spot 0_pass_of_1			
Roaming with authentication	Not Supported			
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	Spot 0_pass_of_1			
Attach with authentication	Spot 0_pass_of_1			
Roaming with authentication	Not Supported			
TEI Query				
TEI Query Operation	Not Supported			
TETRA Packet Data				
Context Management	PASSED Spot 1_pass_of_7			
Context Activation	PASSED Spot 1_pass_of_7			
User authentication	Not Supported			
Single Slot Packet Data	PASSED Spot 3_pass_of_9			
Data Transfer	PASSED Spot 1_pass_of_6			
Cell re-selection	PASSED Spot 2_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			
TETRA Ambience Listening (SS-AL)				
Ambience Listening	PASSED Complete 2_pass_of_2			
SS-AL Call Setup	PASSED Complete 1_pass_of_1			
MS initiated SS-AL disconnection	PASSED Complete 1_pass_of_1			
No Indication to affected user	PASSED Complete 2_pass_of_2			
Interaction with Transmit Inhibit				
AL can override TxI	Not Supported			
AL cannot override TxI	Not Supported			
End to End Encryption				
E2EE Voice Call	PASSED Spot 2_pass_of_6			
Individual (P2P) call	PASSED Spot 2_pass_of_4			
Group (P2MP) call	Spot_0_pass_of_2			
Clear Voice Override (CVO): Acceptance	Not Supported			
Clear Voice Override (CVO): User Initiated	Not Supported			
Clear Voice Override (CVO): Automatic	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			
Packet Data with Class 2 Air Interface Encryption	Not Supported			
Security Class 3 Air Interface Encryption	PASSED Spot 4_pass_of_16			
Location Updating and AI Signalling Protection	PASSED Spot 2_pass_of_6			
DCK Forwarding at MS request	Not Supported			
DCK Forwarding by SwMI (without MS request)	Not Supported			
DCK Retrieval	PASSED Spot 1_pass_of_3			
CCK provisioning during location updating	PASSED Spot 1_pass_of_3			
Communications between parties using encryption	Spot 0_pass_of_2			
Communications between clear and encrypted parties	PASSED Spot 2_pass_of_3			
Communications between encrypted parties on a channel designated to operate in clear	Spot 0_pass_of_2			
OTAR and Change of CCK	Spot 0_pass_of_3			
Packet Data with Class 3 Air Interface Encryption	Not Supported			

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	Not Supported			

and Security Class 3				
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			
Enable Disable				
Enable and temporary disable of an MS	PASSED Spot 4_pass_of_17			
Enable and temporary disable of an MS without authentication	PASSED Spot 2_pass_of_6			
Enable and temporary disable of an MS with authentication	Spot 0_pass_of_6			
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	PASSED Spot 1_pass_of_3			
Permanent disable of an MS	Spot 0_pass_of_4			
Permanent disable of an MS with authentication	Spot 0_pass_of_3			
Permanently Disabled MS cannot send air interface signalling	Spot 0_pass_of_1			
LIP				
Location Information Protocol	PASSED Spot 3_pass_of_9			
LIP over SDS	PASSED Spot 2_pass_of_5			
LIP over Packet Data	Not Supported			

Time based reporting	PASSED Spot 1_pass_of_4			
Distance based reporting - NOT TESTABLE	Not Supported			
Reporting using Long reports	Spot_0_pass_of_1			
Reporting Enable & Disable	Not Supported			
Temporary reporting control	Not Supported			
Trigger modification	Not Supported			
Immediate Location Reporting	PASSED Complete 1_pass_of_1			
Reporting Lifetimes	Not Supported			
Error Reporting	Spot_0_pass_of_2			
Call Forwarding				
Call Forwarding Unconditional	Spot_0_pass_of_1			
Call Forwarding Unconditional Individual Call	Spot_0_pass_of_1			
Call Forwarding Unconditional SDS	Not Supported			
Call Forwarding Unconditional Status	Not Supported			
Call Forwarding Conditional	PASSED Spot 2_pass_of_3			
Call Forwarding Conditional Individual Call	PASSED Spot 2_pass_of_3			
Call Forwarding Information Displayed				
Call Forwarding Information Displayed	Spot_0_pass_of_1			