TETRA ASSOCIATION

ISCTI

TETRA Interoperability Certificate

Cassidian, Tetra System Rel 6.0, SwMI – Hytera, MT680, Terminal

Helsinki, February 2011

Latest Certified SwMI SW Release:	6.0	**Latest Certified Terminal SW Release:**	V1.01-R1132 CPS V1.01-R2156
Latest Certified SwMI HW Release:	M98F (DXTip)	**Latest Certified Terminal HW Release:**	HW-MT3.0

ISCTI (Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Cassidian, Tetra System Rel 6.0, 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).

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 this Certificate.

IOP test engineer

IOP test engineer

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Date of issue:

3 August 2011

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Certified features

Tetra Association TTR001-01:Core	
Registration	Certified
Group Management	Partial
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	-
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	-
TEI Query	-
Tetra Association TTR001-05:PD	
Context Management	Certified
Single Slot Packet Data	Partial
Multi Slot Packet Data	-
TEDS	-
Mixed band operation	-

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 (note x)	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
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 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	**Cassidian Helsinki February 2011**			
SwMI Type	Tetra System Rel 6.0			
SwMI HW Release	M98F (DXTip)			
SwMI SW Release	6.0			
Terminal Type	MT680			
Terminal HW Release	HW-MT3.0			
Terminal SW Release	V1.01-R1132 CPS V1.01-R2156			
TIP Specs and TIP Compliance Test Plans				
Core	TTR001-01 v5.1.1 IOP001-01 v2.6.4 TIC-RT001-01 v250			
SDS	TTR001-02 v2.0.1 IOP001-02 v2.0.0 TIC-RT001-02 v211			
DGNA	TTR001-03 v2.0.0 IOP001-03 v2.0.1 TIC-RT001-03 v218			

Auth	TTR001-04 v3.0.0 IOP001-04 v2.0.0 TIC-RT001-04 v222			
PD	TTR001-05 v3.0.0 IOP001-05 v3.0.2 TIC-RT001-05 v300			

Feature compliance report

Test Session	**Cassidian Helsinki February 2011**			
Core				
Registration	Spot 0_pass_of_4			
ITSI attach	Spot 0_pass_of_2			
SwMI initiated location updating	Spot 0_pass_of_1			
LA timer based Periodic location updating	Not Supported			
De-registration	Spot 0_pass_of_1			
Group Management	Spot Time_Limited 1_pass_of_15			
Single group attachment	Spot 0_pass_of_7			
Multiple group attachment	PASSED Spot 1_pass_of_6			
MS initiated group detachment	Spot 0_pass_of_2			
SwMI initiated group management	Time_Limited 0_pass_of_2			
Group call	PASSED Spot 3_pass_of_12			
Normal group call	PASSED Spot 1_pass_of_6			
Late entry	Spot 0_pass_of_1			

Priority Group scanning	PASSED Spot 1_pass_of_3			
Call setup modifications	Not Supported			
Resource Queuing based on Call Priority	Spot 0_pass_of_1			
Broadcast Call	PASSED Complete 1_pass_of_1			
Limited coverage notification	Not Supported			
Individual call	PASSED Spot 3_pass_of_12			
Simplex individual call	PASSED Spot 1_pass_of_4			
Duplex individual call	Spot 0_pass_of_2			
Call setup modifications	PASSED Spot 1_pass_of_4			
Resource Queuing based on Call Priority	PASSED Spot 1_pass_of_2			
Indication of imminent call disconnection	Not Supported			
Status messages	PASSED Spot 1_pass_of_4			
Individual addressed Status transfer	Spot 0_pass_of_1			
Group addressed Status transfer	PASSED Spot 1_pass_of_3			
Pre-emptive Priority Call	PASSED Spot 1_pass_of_5			
Pre-emption of Resources	PASSED Spot 1_pass_of_2			
Pre-emption of Busy Users	Spot 0_pass_of_3			
Emergency Call	PASSED Spot 1_pass_of_5			
Pre-emption of Resources	PASSED Spot 1_pass_of_2			
Pre-emption of Busy Users	Spot 0_pass_of_1			
Call setup modifications	Spot 0_pass_of_2			
Call disconnection by non-call owner	Not Supported			
Cell Re-selection	PASSED Spot 4_pass_of_15			
Undeclared	Spot 0_pass_of_1			
Unannounced	PASSED Spot 1_pass_of_3			
Announced - with Call Restoration	PASSED Spot 3_pass_of_11			

Announced - without Call Restoration	Not Supported			
Expedited	Not Supported			
PSTN interconnect	Spot 0_pass_of_6			
TETRA Originated Call	Spot 0_pass_of_2			
PSTN Originated Call	Spot 0_pass_of_1			
DTMF over-dial	Spot 0_pass_of_1			
Emergency Telephone Calls	Spot 0_pass_of_2			
MS-ISDN Numbering	PASSED Spot 1_pass_of_4			
MS ISDN - Voice Call	PASSED Spot 1_pass_of_2			
MS-ISDN Status	Spot 0_pass_of_2			
In Call Signalling	PASSED Spot 2_pass_of_8			
Slow Signalling on Traffic Channel (SACCH)	PASSED Spot 1_pass_of_4			
Fast Signalling on Traffic Channel (FACCH)	PASSED Spot 1_pass_of_4			
Subscriber Class Procedures	PASSED Spot 1_pass_of_2			
Cell Selection based on Subscriber Class	Spot 0_pass_of_1			
Subscriber Class Delivery during Location Update	PASSED Complete 1_pass_of_1			
Use of Preferred Subscriber Classes	Not Supported			
Common Secondary Control Channels	PASSED Spot 2_pass_of_7			
One C-SCCH per cell	Spot 0_pass_of_4			
Two C-SCCH per cell	PASSED Spot 2_pass_of_3			
Three C-SCCH per cell	PASSED Spot 1_pass_of_2			
BS Fallback Operation				
Switch to/from BS Fallback Operation	Not Supported			
Roaming with BS Fallback Operation	Not Supported			
Services with BS Fallback Operation	Not Supported			
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_9			
Individually Addressed	Spot 0_pass_of_1			
Group Addressed	PASSED Spot 1_pass_of_2			
Using MS-ISDN dialling	Spot 0_pass_of_4			
Using UCS2 coding scheme	PASSED Spot 1_pass_of_2			
Using 7-bit coding scheme	Spot 0_pass_of_2			
Store and Forward				
Individually Addressed	Not Supported			
Group Addressed	Not Supported			
Dynamic Group Number Assignment (DGNA)				
Support for individually addressed DGNA	PASSED Spot 2_pass_of_7			
Support for individually addressed DGNA assignment without attachment	Not Supported			
Support for individually addressed DGNA assignment with attachment as selected group	Not Supported			
Support for individually addressed DGNA assignment with attachment as scanned group	PASSED Spot 2_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	Spot 0_pass_of_3			

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_3			
Attach with authentication	PASSED Complete 1_pass_of_1			
Roaming with authentication	Spot 0_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				
Attach with authentication	Not Supported			
Roaming with authentication	Not Supported			
TEI Query				
TEI Query Operation	Not Supported			
TETRA Packet Data				
Context Management	PASSED Spot 2_pass_of_13			
Context Activation	PASSED Spot 1_pass_of_9			
User authentication	PASSED Spot 1_pass_of_4			
Single Slot Packet Data	Spot Time_Limited 2_pass_of_9			
Data Transfer	PASSED Spot 1_pass_of_6			
Cell re-selection	Time_Limited 1_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			

Annex A

TDT011_v110_Form_SoC_Hytera

TETRA MoU
IOP Testing and Certification

Statement of Commonality – 9st,May 2011

Reference Identifier	Software Release	Hardware Release
Hytera PT580H	MS: V1.01-R3189 CPS: V1.01-R0187 PD Application Ver. : V1.01-R0190	HW-PT4.0

The following products are equivalent with the reference for TETRA IOP testing purposes:

Product Identifier	Software Release	Hardware Release
Hytera MT680	MS: V1.01-R1338 CPS: V1.01-R0187 PD Application Ver. : V1.01-R0190	HW-MT3.0

We declare that the products behaviour is equivalent with the reference and they will reach same test results as the reference. We acknowledge the shared liability of the incurred cost should the results show otherwise.

We therefore request spot testing of the above mentioned products during the official IOP test session at **Hiomotie 32, 00380 Helsinki, Finland, 9st May 2011, Cassidian Oy** , where full testing of the reference will be performed.

Functionalities to be spot tested are listed in the relevant TIC-RT declaration.

For and on behalf of

Reference	Products
Hytera Communications Corporation Limited	Hytera Communications Corporation Limited

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Guidance information for the TETRA Certification body

The reference and the products are common in following terms
<Products are equal to the reference for the protocol stack, the radio application software and the hardware; differences are in the casing, the display and keypad, the RF hardware and the antenna>