TETRA Interoperability Certificate

Trunked Mode Operation

Smart Route, Thunderbird-255, SwMI – Funktel, FT4, Terminal

Scottsdale, September 2018

Latest Certified SwMI SW Release:	v1.0	**Latest Certified Terminal SW Release:**	v0.2.1
Latest Certified SwMI HW Release:	v1.0	**Latest Certified Terminal HW Release:**	FT4_1c g

ISCTI (Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Smart Route, Thunderbird-255, SwMI and the Funktel, FT4, 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 fully witnessed multiple test session between Smart Route and Funktel on September 2018. 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	-
MS-ISDN Numbering	-
In Call Signalling	Certified
Subscriber Class Procedures	-
Common Secondary Control Channels	-
BS Fallback Operation	-
Energy Economy Mode	-
Transmit Inhibit	-
Mixed band operation	-
Tetra Association TTR001-02:SDS	
SDS Type 1, 2 or 3	-
SDS-TL	Certified
Store and Forward	-
Multipart SDS	-
Tetra Association TTR001-03:DGNA	
Support for individually addressed DGNA	Certified

Support for group addressed DGNA	-
Tolerance of unsupported DGNA functions	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' results depend on a set of sub-features, 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 blue background and the associated sub-features (or second level features) have a white background.

The outcome assigned to a 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 or sub-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 or sub-feature

The verdict associated to the feature or sub-feature gives also indication about the method used to

test that feature or sub-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 or sub-feature have been executed
Spot	Only a selection of the mandatory test cases associated to the feature or sub-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 or sub-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 (see the previous item) has been applied at this session on the verdicts from the referenced (previous) session where the spot testing method (see above) had been applied.
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 TCCA web site (https://tandcca.com/interoperability/interoperability-certificates-and-test-reports/).

The feature results are shown in the tables below.

Information on equipment under test and document references

Test Session Date/Place	**Smart Route, Scottsdale, September 2018**			
SwMI Type	Thunderbird-255			
SwMI HW Release	v1.0			
SwMI SW Release	v1.0			
Terminal Type	FT4			
Terminal HW Release	FT4_1c g			
Terminal SW Release	v0.2.1			
TIP Specs and TIP Compliance Test Plans				
Core	TTR001-01 v6.3.0 IOP001-01 v3.2.1 TIC-RT001-01 v273			
SDS	TTR001-02 v2.1.3 IOP001-02 v2.1.0 TIC-RT001-02 v222			

DGNA	TTR001-03 v2.0.0 IOP001-03 v2.0.1 TIC-RT001-03 v228			
LIP	TTR001-19 v1.1.0 IOP001-19 v1.1.0 TIC-RT001-19 v114			

Feature compliance report

Test Session	Smart Route Scottsdale September 2018			
Core - Fully Witnessed Testing				
Registration	PASSED Complete 6_pass_of_6			
Initial registration	PASSED Complete 3_pass_of_3			
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 Complete 17_pass_of_17			
Single group attachment	PASSED Complete 7_pass_of_7			
Multiple group attachment	PASSED Complete 6_pass_of_6			
MS initiated group detachment	PASSED Complete 2_pass_of_2			
SwMI initiated group detachment	PASSED Complete 3_pass_of_3			
SwMI initiated group attachment	PASSED Complete 3_pass_of_3			
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	Not Supported			

Resource Queuing based on Call Priority	PASSED Complete 1_pass_of_1			
Broadcast Call	PASSED Complete 2_pass_of_2			
Limited coverage notification	Not Supported			
Individual call	PASSED Complete 8_pass_of_8			
Simplex individual call	PASSED Complete 4_pass_of_4			
Duplex individual call	PASSED Complete 2_pass_of_2			
Call setup modifications	Not Supported			
Resource Queuing based on Call Priority	PASSED Complete 2_pass_of_2			
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 7_pass_of_7			
Pre-emption of Resources	PASSED Complete 2_pass_of_2			
Pre-emption of Busy Users	PASSED Complete 5_pass_of_5			
Emergency Call	PASSED Complete 3_pass_of_3			
Pre-emption of Resources	PASSED Complete 2_pass_of_2			
Pre-emption of Busy Users	PASSED Complete 1_pass_of_1			
Call setup modifications	Not Supported			
Call disconnection by non-call owner	Not Supported			
Cell Re-selection	PASSED Complete 15_pass_of_15			
Undeclared	PASSED Complete 1_pass_of_1			
Unannounced	PASSED Complete 3_pass_of_3			

Announced - with Call Restoration	PASSED Complete 11_pass_of_11			
Announced - without Call Restoration	Not Supported			
Expedited	Not Supported			
Graceful Service Degradation Mode (GSDM)	Not Supported			
PSTN interconnect				
TETRA Originated Call	Not Supported			
PSTN Originated Call	Not Supported			
DTMF over-dial	Not Supported			
Emergency Telephone Calls	Not Supported			
MS-ISDN Numbering				
MS ISDN - Voice Call	Not Supported			
MS-ISDN Status	Not Supported			
In Call Signalling	PASSED Complete 4_pass_of_4			
Slow Signalling on Traffic Channel (SACCH)	Not Supported			
Fast Signalling on Traffic Channel (FACCH)	PASSED Complete 4_pass_of_4			
Subscriber Class Procedures				
Cell Selection based on Subscriber Class	Not Supported			
Subscriber Class Delivery during Location Update	Not Supported			
Use of Subscriber Class Preference Levels	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				
Switch to/from BS Fallback Operation	Not Supported			
Roaming to avoid a cell in BS Fallback Operation	Not Supported			
Services with BS Fallback Operation	Not Supported			
Ignore a cell in Fallback Operation	Not Supported			
User selectable Fallback behaviour	Not Supported			
Energy Economy Mode				
Energy Economy Mode Operation	Not Supported			
Transmit Inhibit				
TXI Activation & De-Activation	Not Supported			

TXI Activation & De-Activation with TxI Status available to the Dispatcher	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			
SDS - Fully Witnessed Testing				
SDS Type 1, 2 or 3				
SDS Type 1	Not Supported			
SDS Type 2	Not Supported			
SDS Type 3	Not Supported			
SDS-TL	PASSED Complete 9_pass_of_9			
Individually Addressed	PASSED Complete 2_pass_of_2			
Group Addressed	PASSED Complete 3_pass_of_3			
Using MS-ISDN dialling	Not Supported			
SDS Reception	PASSED Complete 5_pass_of_5			
Using UCS2 coding scheme	PASSED Complete 2_pass_of_2			
Using 7-bit coding scheme	Not Supported			
Using 8-bit Latin 1 coding scheme	PASSED Complete 2_pass_of_2			
Using 8-bit Latin/Cyrillic coding scheme	Not Supported			
Using 8-bit Latin 9 coding scheme	Not Supported			
Store and Forward				
Individually Addressed	Not Supported			
Group Addressed	Not Supported			
Multipart SDS				
Multipart SDS	Not Supported			
DGNA - Fully Witnessed Testing				
Support for individually addressed DGNA	PASSED Complete 6_pass_of_6			
Support for individually addressed DGNA assignment without attachment	PASSED Complete 1_pass_of_1			

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	Not Supported			
Support for individually addressed assigment for pre-programmed group	Not Supported			
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	PASSED Complete 1_pass_of_1			
MS tolerance of unsupported individual addressed DGNA signalling	Not Supported			
MS tolerance of unsupported group addressed DGNA signalling	PASSED Complete 1_pass_of_1			
LIP - Fully Witnessed Testing				
Location Information Protocol	PASSED Complete 13_pass_of_13			
LIP over SDS	PASSED Complete 7_pass_of_7			
LIP over Packet Data	Not Supported			
Time based reporting	PASSED Complete 4_pass_of_4			
Distance based reporting - NOT TESTABLE	Not Supported			
Reporting using Short reports	PASSED Complete 1_pass_of_1			
Reporting using Long reports	PASSED Complete 1_pass_of_1			
Reporting Enable & Disable	PASSED Complete 2_pass_of_2			
User control of Reporting	Not Supported			
Temporary reporting control	PASSED Complete 1_pass_of_1			

Trigger modification	PASSED Complete 1_pass_of_1			
Control of Basic Location Parameters	Not Supported			
Immediate Location Reporting	PASSED Complete 1_pass_of_1			
Reporting Lifetimes	Not Supported			
Error Reporting using Long Reports	Not Supported			
Error Reporting using Short Reports	Not Supported			
Positioning on Individual Call Setup	Not Supported			