

TETRA Interoperability Certificate

Inter-System Interface (IP-based)

Damm Cellular Systems A/S, TetraFlex – SwMI A
Damm Cellular Systems A/S, TetraFlex – SwMI B

Test Session #188, hosted by Damm in Sønderborg, May, 2021
Remotely Witnessed Session

Latest Certified SwMI A SW Release:	V8.1	Latest Certified SwMI B SW Release:	V8.1
Latest Certified SwMI A HW Release:	TetraFlex	Latest Certified SwMI B HW Release:	TetraFlex

ISCTI (Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Damm Cellular Systems A/S TetraFlex SwMI A and the Damm Cellular Systems A/S TetraFlex SwMI B have been subject to interoperability testing for the "Certified" features listed on the second page of this certificate, in accordance with the TETRA Interoperability Profiles, TIP compliance Test Plan and the related TETRA interoperability requirement tables.

The table lists all the available TETRA interoperability profiles, and summarises 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 Cellular Systems A/S and Damm Cellular Systems A/S in May, 2021. **Certification Body was not present at the host lab during the session, but witnessed testing remotely.** Detailed test results are listed in the Test Report associated to this Certificate.

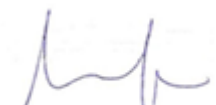
Details and explanation about the procedure used to provide verdicts are in the TIC process TPD001-01.

IOP Test engineer



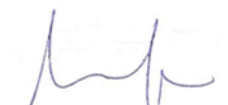
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Certified features

Tetra Association TTR003-01: IMM	
ISI Migration Service	Certified
Linked Group Attachment/Detachment Service	-
Tetra Association TTR003-02: IIC	
ISI Individual Call	Certified
Resource Allocation Policy	Certified
Routing Methods (for 3 SwMI configurations)	-
MS-ISDN	-
Queuing for resources in the Visited or Forward Switching SwMIs	-
Queing for resources in Originating SwMI, identical resource allocation	-
Queing for resources in the Originating SwMI, mixed resource allocation	-
Queing for resources in the Originating and Visited SwMI, identical resource allocation	-
Queing for resources in the Originating and Visited SwMI, mixed resource allocation	-
Tetra Association TTR003-03: ISD	
Individually addressed ISI Short Data Service	Certified
Group addressed ISI Short Data Service	Certified
Transmit Inhibit Status' status messages	-
Tetra Association TTR003-06: IGC2	
Normal ISI Group Call	Certified
Transmission control	Certified
Emergency Group Call	Certified
Abnormal Cases	Certified
Use of Linked Group Attachment	-

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 A and/or SwMI B 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 tables on the following page list HW and SW releases of SwMI A and SwMI B under test 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

SwMI A Manufacturer	Damm Cellular Systems A/S
SwMI A Model	TetraFlex
SwMI A HW Release	TetraFlex
SwMI A SW Release	V8.1
SwMI B Manufacturer	Damm Cellular Systems A/S
SwMI B Model	TetraFlex
SwMI B HW Release	TetraFlex
SwMI B SW Release	V8.1

Document references

IMM	TTR003-01 v3.0.0 IOP003-01 v2.0.0 TIC-RT003-01 v114
IIC	TTR003-02 v3.1.0 IOP003-02 v2.0.0 TIC-RT003-02 v119
ISD	TTR003-03 v3.1.0 IOP003-03 v2.0.2 TIC-RT003-03 v121
IGC2	TTR003-06 v3.0.0 IOP003-06-2 v2.0.0 TIC-RT003-06-2 v106

Feature compliance report

IMM - Remotely Fully Witnessed Testing	
ISI Migration Service	PASSED Complete 8_pass_of_8
ISI Migration Service without Authentication	PASSED Complete 4_pass_of_4
ISI Migration Service with Authentication	Not Supported
ISI Re-Authentication of Migrated MS	Not Supported
ISI Migration Service between two Foreign SwMIs	Not Supported
ISI Deregistration and return to Home SwMI	PASSED Complete 4_pass_of_4
Linked Group Attachment/Detachment Service	
Linked Group Attachment/Detachment	Not Supported

IIC - Remotely Fully Witnessed Testing	
ISI Individual Call	PASSED Complete 14_pass_of_14
ISI Individual Simplex Call	PASSED Complete 4_pass_of_4
ISI Individual Duplex Hook Call	PASSED Complete 8_pass_of_8
Handling of Call Establishment Failures	PASSED Complete 2_pass_of_2
Transmission Pause and Continue for Duplex Calls	Not Supported
Transmission Pause and Continue for Semi-Duplex Calls	Not Supported
Resource Allocation Policy	PASSED Complete 6_pass_of_6
Permanent Resource Allocation	PASSED Complete 6_pass_of_6
Temporary Resource Allocation	Not Supported
Mixed Resource Allocation	Not Supported
Routing Methods (for 3 SwMI configurations)	
ISI Individual Call using forward switching based on Called SwMI decision	Not Supported
ISI Individual Call using forward switching based on Calling SwMI decision	Not Supported
ISI Individual Call using re-routing	Not Supported
MS-ISDN	
MSISDN as CPI in PSTN originated calls over ISI	Not Supported
Queuing for resources in the Visited or Forward Switching SwMIs	
Queuing for resources in the Visited SwMI	Not Supported
Queuing for resources in the forward switching SwMI	Not Supported
Queing for resources in Originating SwMI, identical resource allocation	
Permanent resource allocation	Not Supported
Temporary resource allocation	Not Supported
Queing for resources in the Originating SwMI, mixed resource allocation	
No permission to release resources	Not Supported
Permission to release resources	Not Supported
Called SwMI permitted, Visited SwMI not permitted to release resources	Not Supported

Queing for resources in the Originating and Visited SwMI, identical resource allocation	
Permanent resource allocation	Not Supported
Temporary resource allocation	Not Supported
Queing for resources in the Originating and Visited SwMI, mixed resource allocation	
No permission to release resources, Visited SwMI supporting temporary resource allocation	Not Supported
No permission to release resources, Visited SwMI supporting permanent resource allocation	Not Supported
Permission to release resources	Not Supported
Called SwMI permitted, Visited SwMI not permitted to release resources	Not Supported
ISD - Remotely Fully Witnessed Testing	
Individually addressed ISI Short Data Service	PASSED Complete 32_pass_of_32
Individual Status message over ISI	PASSED Complete 16_pass_of_16
Individual SDS-TL message over ISI	PASSED Complete 16_pass_of_16
Individual Status message over ISI, forwarding to a third SwMI	Not Supported
Individual SDS-TL message over ISI, forwarding to a third SwMI	Not Supported
Individual SDS-TL message over ISI using MS-ISDN as CPI	Not Supported
Group addressed ISI Short Data Service	PASSED Complete 18_pass_of_18
Group addressed Status message over ISI	PASSED Complete 8_pass_of_8
Group addressed SDS message over ISI	PASSED Complete 10_pass_of_10
Group addressed SDS message over ISI, CSwMI using forward address and PSwMI accepting forward address	Not Supported
Transmit Inhibit Status' status messages	
Transmit Inhibit Status' status messages	Not Supported

IGC2 - Remotely Fully Witnessed Testing	
Normal ISI Group Call	PASSED Complete 6_pass_of_6
Normal ISI Group Call	PASSED Complete 4_pass_of_4
Delayed ISI Group Call Setup	Not Supported
Late Entry triggered by a timer	PASSED Complete 2_pass_of_2
Late Entry triggered by PTT	Not Supported
Transmission control	PASSED Complete 4_pass_of_4
Transmission queuing management	PASSED Complete 2_pass_of_2
Transmission pre-emption management	PASSED Complete 2_pass_of_2
Emergency Group Call	PASSED Complete 8_pass_of_8
Emergency Group Call	PASSED Complete 8_pass_of_8
Abnormal Cases	PASSED Complete 4_pass_of_4
Abnormal Cases	PASSED Complete 4_pass_of_4
Use of Linked Group Attachment	
Use of Linked Group Attachment	Not Supported