

TETRA Interoperability Certificate

Trunked Mode Operation

Motorola Solutions, DIMETRA X Core – SwMI
Motorola Solutions, TPG2200 – Terminal

Test Session #192, hosted by Motorola Solutions in Krakow, May 2023

| | | | |
|----------------------------------------------|--------------------------|--------------------------------------------|-----------|
| Latest Certified SwMI SW Release: | R9.2.0 | Latest Certified MS SW Release: | MR2022.4 |
| Latest Certified SwMI HW Release: | DIMETRA X Core R9.2.0 | Latest Certified MS HW Release: | PTPA512NE |

ISCTI (Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione) certifies, that the Motorola Solutions DIMETRA X Core SwMI and the Motorola Solutions TPG2200 Terminal 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 Motorola Solutions and Motorola Solutions in May 2023. 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



Head of the Procedure

Radio Office Manager

ISCTI - V.le America 201, 00144 Rome, Italy
Ph: +39 06 5444 6465, Fax: +39 06 5410904
e-mail: dgtdcsi.segreteria@mise.gov.it
Web: www.mise.gov.it

Date of Issue:
21 December 2023
v 1

Certified features

| Tetra Association TTR001-01: Core | |
|-------------------------------------------------|-----------|
| Registration | Certified |
| Group Management | Certified |
| Group call | - |
| Individual call | - |
| Status messages | Certified |
| Pre-emptive Priority Call | - |
| Emergency Call | - |
| Cell Re-selection | Certified |
| PSTN interconnect | - |
| MS-ISDN Numbering | - |
| In Call Signalling | - |
| Subscriber Class Procedures | Certified |
| Common Secondary Control Channels | Certified |
| BS Fallback Operation | Certified |
| Energy Economy Mode | Certified |
| Transmit Inhibit | Certified |
| Mixed band operation | - |
| Tetra Association TTR001-02: SDS | |
| SDS Type 1, 2 or 3 | - |
| SDS-TL | Certified |
| Store and Forward | Certified |
| Multipart SDS | - |
| Tetra Association TTR001-04: AUTH | |
| SwMI Initiated (non-mutual) Authentication | Certified |
| SwMI Initiated Authentication made Mutual by MS | Certified |
| TEI Query using "Authentication downlink" | - |
| HW, SW version, TEI and/or Model number | - |

| Tetra Association TTR001-11: AIE | |
|---------------------------------------------------------------------|-----------|
| Security Class 2 Air Interface Encryption | Certified |
| Security Class 3 Air Interface Encryption | Certified |
| Security Class 3G Air Interface Encryption | - |
| Management of CMG and GSKO | Certified |
| Key Status demand | Certified |
| Change of Security Class for Fallback operation | Certified |
| Change of Security Class (other than for Fallback operation) | Certified |
| Key Management for Secure Direct Mode Operation | Certified |
| Tetra Association TTR001-13: ED | |
| Enable and temporary disable of an MS | Certified |
| Permanent disable of an MS | Certified |
| Tetra Association TTR001-21: CallOut | |
| Full Callout | Certified |
| Simple Callout | Certified |
| Interaction with other services and events | Certified |
| Callout Test and Callout Availability | Certified |
| Callout Text and Callout Pre-Coded Status | Certified |
| Storage of Callout Information | Certified |
| Graceful Service Degradation Mode (GSDM) | 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 tables on the following page list HW and SW releases of SwMI and Terminal 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 Manufacturer | Motorola Solutions |
| SwMI Model | DIMETRA X Core |
| SwMI HW Release | DIMETRA X Core R9.2.0 |
| SwMI SW Release | R9.2.0 |
| MS Manufacturer | Motorola Solutions |
| MS Model | TPG2200 |
| MS HW Release | PTPA512NE |
| MS SW Release | MR2022.4 |

Document references

| | |
|----------------|-----------------------------------------------------------|
| Core | TTR001-01 v6.4.0 IOP001-01 v3.4.0 TIC-RT001-01 v279 |
| SDS | TTR001-02 v2.1.3 IOP001-02 v2.2.0 TIC-RT001-02 v225 |
| AUTH | TTR001-04 v3.2.0 IOP001-04 v2.1.0 TIC-RT001-04 v234 |
| AIE | TTR001-11 v3.2.0 IOP001-11 v3.2.0 TIC-RT001-11 v337 |
| ED | TTR001-13 v2.1.0 IOP001-13 v1.0.0 TIC-RT001-13 v153 |
| CallOut | TTR001-21 v2.1.1 IOP001-21 v2.4.0 TIC-RT001-21 v119 |

Feature compliance report

| Core - Fully Witnessed Testing | |
|-------------------------------------------|--------------------------------|
| Registration | PASSED Complete 5_pass_of_5 |
| Initial registration | 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 Complete 3_pass_of_3 |
| Single group attachment | PASSED Complete 2_pass_of_2 |
| Multiple group attachment | Not Supported |
| MS initiated group detachment | PASSED Complete 1_pass_of_1 |
| SwMI initiated group detachment | Not Supported |
| SwMI initiated group attachment | Not Supported |
| Group call | |
| Normal group call | Not Supported |
| Late entry | Not Supported |
| Priority Group scanning | Not Supported |
| Call setup modifications | Not Supported |
| Resource Queuing based on Call Priority | Not Supported |
| Broadcast Call | Not Supported |
| Limited coverage notification | Not Supported |

| | |
|-------------------------------------------|--------------------------------|
| Individual call | |
| Simplex individual call | Not Supported |
| Duplex individual call | Not Supported |
| Call setup modifications | Not Supported |
| Resource Queuing based on Call Priority | Not Supported |
| Indication of imminent call disconnection | Not Supported |
| Status messages | PASSED Complete 1_pass_of_1 |
| Individual addressed Status transfer | PASSED Complete 1_pass_of_1 |
| Group addressed Status transfer | Not Supported |
| Pre-emptive Priority Call | |
| Pre-emption of Resources | Not Supported |
| Pre-emption of Busy Users | Not Supported |
| Emergency Call | |
| Pre-emption of Resources | Not Supported |
| Pre-emption of Busy Users | Not Supported |
| Call setup modifications | Not Supported |
| Call disconnection by non-call owner | Not Supported |
| Cell Re-selection | PASSED Complete 4_pass_of_4 |
| Undeclared | PASSED Complete 1_pass_of_1 |
| Unannounced | Not Supported |
| Announced - with Call Restoration | Not Supported |

| | |
|--------------------------------------------------|--------------------------------|
| Announced - without Call Restoration | Not Supported |
| Expedited | Not Supported |
| Graceful Service Degradation Mode (GSDM) | PASSED Complete 3_pass_of_3 |
| Single-site operation | 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 | |
| Slow Signalling on Traffic Channel (SACCH) | Not Supported |
| Fast Signalling on Traffic Channel (FACCH) | Not Supported |
| Subscriber Class Procedures | PASSED Complete 5_pass_of_5 |
| Cell Selection based on Subscriber Class | PASSED Complete 2_pass_of_2 |
| Subscriber Class Delivery during Location Update | Not Supported |
| Use of Subscriber Class Preference Levels | PASSED Complete 3_pass_of_3 |
| Common Secondary Control Channels | PASSED Complete 7_pass_of_7 |
| One C-SCCH per cell | PASSED Complete 5_pass_of_5 |
| Two C-SCCH per cell | PASSED Complete 2_pass_of_2 |

| | |
|----------------------------------------------------------------------------|--------------------------------|
| Three C-SCCH per cell | PASSED Complete 2_pass_of_2 |
| BS Fallback Operation | PASSED Complete 6_pass_of_6 |
| Switch to/from BS Fallback Operation | PASSED Complete 2_pass_of_2 |
| Roaming to avoid a cell in BS Fallback Operation | PASSED Complete 2_pass_of_2 |
| Roaming to and from a cell in BS Fallback operation offering some services | Not Supported |
| Services with BS Fallback Operation | PASSED Complete 1_pass_of_1 |
| Ignore a cell in Fallback Operation | PASSED Complete 1_pass_of_1 |
| User selectable Fallback behaviour | Not Supported |
| Energy Economy Mode | PASSED Complete 3_pass_of_3 |
| Energy Economy Mode Operation | PASSED Complete 3_pass_of_3 |
| Transmit Inhibit | PASSED Complete 7_pass_of_7 |
| TXI Activation & De-Activation | PASSED Complete 3_pass_of_3 |
| TXI Activation & De-Activation with TxI Status available to the Dispatcher | PASSED Complete 3_pass_of_3 |
| Receipt of group addressed service during TXI | PASSED Complete 1_pass_of_1 |
| 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 12_pass_of_12 |
| Individually Addressed | PASSED Complete 3_pass_of_3 |
| Group Addressed | PASSED Complete 1_pass_of_1 |
| Using MS-ISDN dialling | Not Supported |
| SDS Reception | PASSED Complete 6_pass_of_6 |
| Using UCS2 coding scheme | PASSED Complete 2_pass_of_2 |
| Using 7-bit coding scheme | PASSED Complete 2_pass_of_2 |
| 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 | PASSED Complete 2_pass_of_2 |
| Store and Forward | PASSED Complete 3_pass_of_3 |
| Individually Addressed | PASSED Complete 3_pass_of_3 |
| Group Addressed | Not Supported |
| Multipart SDS | |
| Multipart SDS | Not Supported |
| Auth - Fully Witnessed Testing | |
| SwMI Initiated (non-mutual) Authentication | PASSED Complete 3_pass_of_3 |
| Attach with authentication | PASSED Complete 1_pass_of_1 |

| | |
|--------------------------------------------------------------------------------------|----------------------------------|
| Roaming with authentication | PASSED Complete 1_pass_of_1 |
| 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 | PASSED Complete 2_pass_of_2 |
| Attach with authentication | PASSED Complete 1_pass_of_1 |
| Roaming with authentication | PASSED Complete 1_pass_of_1 |
| TEI Query using "Authentication downlink" | |
| TEI Query using "Authentication downlink" Operation | Not Supported |
| HW, SW version, TEI and/or Model number | |
| Transfer of HW, SW version, TEI and/or Model number | Not Supported |
| AIE - Fully Witnessed Testing | |
| Security Class 2 Air Interface Encryption | PASSED Complete 10_pass_of_10 |
| Location Updating and AI Signalling Protection | PASSED Complete 5_pass_of_5 |
| TM-SCK provisioning during location updating | PASSED Complete 2_pass_of_2 |
| 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 of TM-SCK | PASSED Complete 2_pass_of_2 |
| Change of TM-SCK | PASSED Complete 4_pass_of_4 |
| Packet Data with Class 2 Air Interface Encryption | PASSED Complete 1_pass_of_1 |
| Tolerance of SwMI not supporting SCK-OTAR | Not Supported |

| | |
|--------------------------------------------------------------------------------------|--------------------------------|
| Security Class 3 Air Interface Encryption | PASSED Complete 6_pass_of_6 |
| Clear Location Updating and AI Signalling Protection | PASSED Complete 2_pass_of_2 |
| Encrypted Location Updating and AI Signalling Protection | PASSED Complete 2_pass_of_2 |
| DCK Forwarding at MS request | Not Supported |
| DCK Forwarding by SwMI (without MS request) | Not Supported |
| DCK Retrieval | PASSED Complete 2_pass_of_2 |
| CCK provisioning during location updating | PASSED Complete 2_pass_of_2 |
| 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 of CCK | Not Supported |
| Change of CCK | PASSED Complete 1_pass_of_1 |
| Packet Data with Class 3 Air Interface Encryption | PASSED Complete 1_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 of GCK | Not Supported |
| Change of GCK | Not Supported |

| | |
|-------------------------------------------------------------------|--------------------------------|
| Management of CMG and GSKO | PASSED Complete 5_pass_of_5 |
| OTAR and change of CMG and GSKO | PASSED Complete 5_pass_of_5 |
| Key Status demand | PASSED Complete 3_pass_of_3 |
| SCK Key Status demand | PASSED Complete 2_pass_of_2 |
| GCK Key Status demand | Not Supported |
| GSKO Key Status demand | PASSED Complete 1_pass_of_1 |
| Change of Security Class for Fallback operation | PASSED Complete 6_pass_of_6 |
| Seamless change to Security Class 2 for BS Fallback operation | PASSED Complete 5_pass_of_5 |
| Non-seamless change to Security Class 2 for BS Fallback operation | Not Supported |
| Provisioning of TM-SCK for fallback to Security Class 2 operation | PASSED Complete 1_pass_of_1 |
| Change to Security Class 1 for BS Fallback operation | Not Supported |
| Change of Security Class (other than for Fallback operation) | PASSED Complete 2_pass_of_2 |
| Change between Security Class 3 and Security Class 3G | Not Supported |
| Change between Security Class 2 and Security Class 3 | PASSED Complete 2_pass_of_2 |
| Change from Security Class 3G to Security Class 2 | Not Supported |
| Key Management for Secure Direct Mode Operation | PASSED Complete 3_pass_of_3 |
| OTAR of DM-SCK | PASSED Complete 3_pass_of_3 |
| Change of DM-SCK | PASSED Complete 2_pass_of_2 |

| ED - Fully Witnessed Testing | |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Enable and temporary disable of an MS | PASSED Complete 8_pass_of_8 |
| Enable and temporary disable of an MS without authentication | PASSED Complete 2_pass_of_2 |
| Enable and temporary disable of an MS with authentication | Not Supported |
| Registration of a temporary disabled MS | PASSED Complete 2_pass_of_2 |
| Rejection of applicable invalid enable/disable requests | PASSED Complete 3_pass_of_3 |
| 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 Complete 1_pass_of_1 |
| Permanent disable of an MS | PASSED Complete 2_pass_of_2 |
| Permanent disable of an MS with authentication | PASSED Complete 1_pass_of_1 |
| Permanently Disabled MS cannot send air interface signalling | PASSED Complete 1_pass_of_1 |
| Callout - Fully Witnessed Testing | |
| Full Callout | PASSED Complete 11_pass_of_11 |
| Individually Addressed Full Callout with request for Terminal Receipt message and with request for User Receipt message | PASSED Complete 2_pass_of_2 |
| Group Addressed Full Callout without request for Terminal Receipt message and without request for User Receipt message | PASSED Complete 2_pass_of_2 |
| Using current selected group during Full Callout | PASSED Complete 1_pass_of_1 |
| Full Callout with immediate change to Callout Group | PASSED Complete 2_pass_of_2 |
| Full Callout with change to Callout Group on non-rejecting user response | PASSED Complete 1_pass_of_1 |

| | |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Full Callout with rejecting User Receipt message | PASSED Complete 1_pass_of_1 |
| Full Callout with timeout for User Receipt message | PASSED Complete 1_pass_of_1 |
| Callout Incident Information messages | PASSED Complete 2_pass_of_2 |
| Group Call to Callout Group | Not Supported |
| End of Full Callout | PASSED Complete 3_pass_of_3 |
| Simple Callout | PASSED Complete 6_pass_of_6 |
| Individually Addressed Callout with request for Terminal Receipt message and with request for User Receipt message | PASSED Complete 1_pass_of_1 |
| Individually Addressed Callout with request for Terminal Receipt message and without request for User Receipt message | PASSED Complete 1_pass_of_1 |
| Group Addressed Callout without request for Terminal Receipt message and without request for User Receipt message | PASSED Complete 1_pass_of_1 |
| Group Addressed Callout without request for Terminal Receipt message and with request for User Receipt message | PASSED Complete 1_pass_of_1 |
| Simple Callout with rejecting User Receipt message | PASSED Complete 1_pass_of_1 |
| Simple Callout with timeout for User Receipt message | PASSED Complete 1_pass_of_1 |
| Interaction with other services and events | PASSED Complete 17_pass_of_17 |
| Interaction with previous Callout | PASSED Complete 2_pass_of_2 |
| Interaction with emergency call | Not Supported |
| Interaction with non-emergency call | Not Supported |
| Interaction with data and status | PASSED Complete 13_pass_of_13 |

| | |
|----------------------------------------------------------------|----------------------------------|
| Interaction with local services | Not Supported |
| Manual exit | PASSED Complete 2_pass_of_2 |
| Callout Test and Callout Availability | PASSED Complete 4_pass_of_4 |
| Callout Test | PASSED Complete 2_pass_of_2 |
| Callout Availability | PASSED Complete 2_pass_of_2 |
| Callout Availability request | PASSED Complete 1_pass_of_1 |
| Callout Text and Callout Pre-Coded Status | PASSED Complete 12_pass_of_12 |
| Callout Text | PASSED Complete 3_pass_of_3 |
| Concatenated Callout Text using Callout Specific Concatenation | PASSED Complete 2_pass_of_2 |
| Concatenated Callout Text using mSDS | Not Supported |
| Callout Pre-Coded Status | PASSED Complete 7_pass_of_7 |
| Storage of Callout Information | PASSED Complete 2_pass_of_2 |
| Viewing Callout information from previous Callout(s) | PASSED Complete 1_pass_of_1 |
| Deletion of Callout information from previous Callout(s) | PASSED Complete 1_pass_of_1 |
| Graceful Service Degradation Mode (GSDM) | PASSED Complete 2_pass_of_2 |
| Graceful Service Degradation Mode (GSDM) | PASSED Complete 2_pass_of_2 |