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TETRA V+D

TETRA Interoperability Certification Requirement Table (TIC-RT)

Guide to Use During the Certification Process

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When both pieces of equipment under test are of the same type, each is given a suffix, e.g. for ISI testing – SwMI-A, SwMI-B. 5

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Scope

This document outlines the procedure for the use of a TETRA Interoperability Certification Requirement Table during the Testing and Certification process.

References

[Ref. 1] TPD001 – TETRA Memorandum of Understanding (TETRA MoU);
TETRA Interoperability Certification Process Description

[Ref. 2] TPD002 – TETRA Memorandum of Understanding (TETRA MoU) Association;
Main Processes of the TETRA MoU Association Technical Forum

[Ref. 3] Not used

[Ref. 4] WG-UG001 – TETRA Interoperability Certification Requirement Table (TIC-RT) Guide to Use during Certificate Creation and Data Entry

[Ref. 5] TDT004 – File Name Conventions for TF Documents

[Ref. 6] TIC-RT Pro-forma (blank Spreadsheet)

[Ref. 7] WG-UG003 – TETRA Interoperability Certification Requirement Table (TIC-RT) Reviewers' Guide

[Ref. 8] WG-UG008 – TETRA Interoperability Certification Requirement Table (TIC-RT) Guide to DMO Test Session Tool

Notation

When the two pieces of equipment under test are different, each piece is denoted by its general type, e.g. for AIE or Core testing : SwMI, MS.

When both pieces of equipment under test are of the same type, each is given a suffix, e.g. for ISI testing – SwMI-A, SwMI-B.

Abbreviations & Definitions

Certification Body	The organisation with responsibility for certification of equipment to show compliance with the IOP requirements.
Certified Feature	A feature of the equipment being tested that has been agreed, by the TIP-WG & TF, as a major testable operational facility.
Certified Item	Certified Feature
CTC-RT	Compliance Testing and Certification Requirement Table – an obsolete name for the TIC-RT.
IOP	Inter-operability (of TETRA equipment)
MS	Mobile Station
SwMI	Switching Management Infrastructure (the TETRA network)
TETRA	**Te**rrestrial **T**runked **Ra**dio system
TIC-RT	TETRA Inter-Operability Certification Requirement Table
TIP	TETRA Inter-operability Profile

1 Introduction

The TIP Certification process verifies the interoperability of two pieces of equipment. This equipment consists of a pair of items – e.g. a SwMI and an MS, either from the same manufacturer, or from different manufacturers. The certification is specifically for the combined operation of a specific version/issue of each of the two pieces of equipment working together.

The TIC-RT tool is an Excel workbook, with a number of interrelated worksheets, and a number of MACROs. This tool is used to record the Certification Test Results for the Equipment being certified. The tool then produces a Certified Items sheet, showing whether each of the Certified Features has been tested sufficiently to be certified by the Certification Body.

As defined in [Ref. 1], the TIC-RTs shall be distributed by the Certification Body to the manufacturers, as required for the certification process. Details of how these are prepared are given in §4.1. The subsequent use of the TIC-RTs during a test session are detailed in §4 & §5

As data is entered into the TIC-RT, the filenaming conventions defined in [Ref. 5] should be followed, and the TIC-RT History sheet should be updated with change information – for guidance on how details are to be recorded, please see §4.8.

The tool also performs the selection of which tests are to be performed, using as the basis of this selection the declarations made for the two pieces of equipment under test. These declarations define which of the various optional behaviours, described in the IOP documents, are relevant to each piece of equipment being tested.

Figure 1 shows the relationship between the four major worksheets for certification of a SwMI & MS. A similar scheme is used when testing with two MSs (DMO) or two SwMIs (ISI).

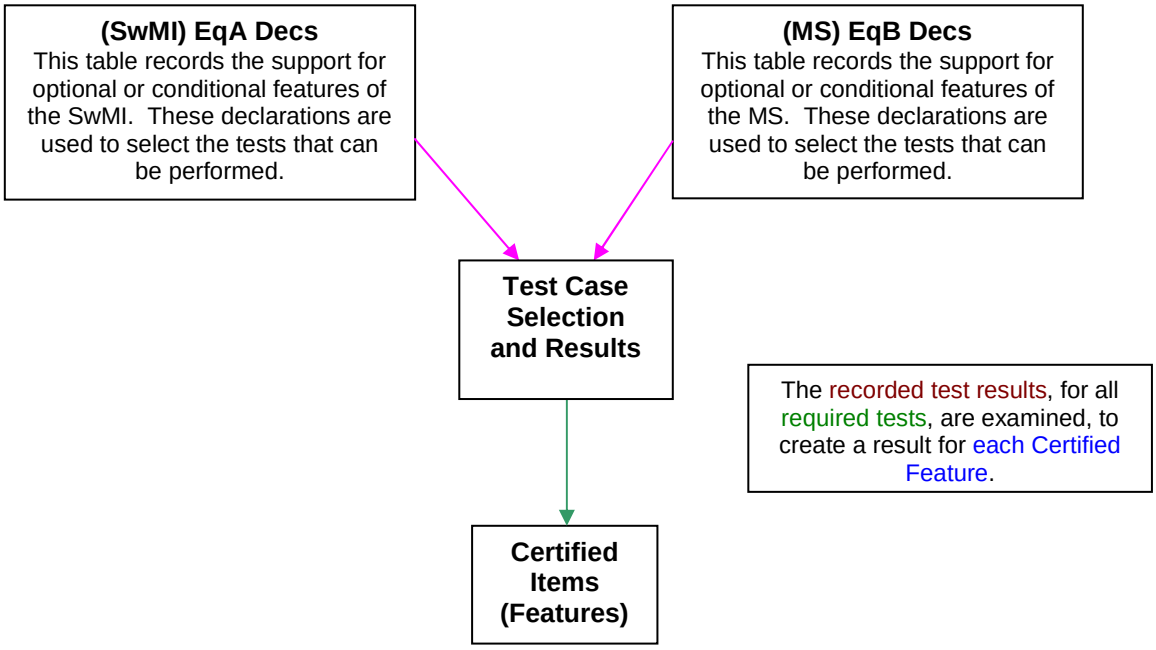


Figure 1 Worksheet relationship for SwMI – MS testing

The tool is used following the analysis of the TIP, Test Spec and other documents, relating to the topic to be certified with the aid of the tool. From this analysis, data is entered into the tool, preparing it for use in the analysis of TETRA product performance, and compliance testing results. This document describes the use of the tool during that Compliance Testing process.

The MS supplier provides the information for the MS Declarations worksheet. The SwMI supplier provides the information for the SwMI Declarations worksheet. The tool then selects the required tests based on these declarations, using predefined, but hidden, rules.

Selected tests are then run and the results are recorded on the Test Case Selection and Result worksheet by the Certification Body. For each Certifiable feature, the TIC-RT calculates an overall testing result from the results recorded for all the feature's associated tests (see 4.7.2.2 Result).

A rudimentary knowledge of Excel is required during the use of the tool, as the complex tasks required have been hidden from the user in the formulae and MACROs of the tool. Where actions related to the tool are described, standard Excel terminology is used, e.g. worksheet, cell, column, row.

2 Objective

To take the reader through the steps needed to use a TIC-RT during an IOP test session, This will cover how to fill in the declarations and test results in the TIC-RT, and to assist in the interpretation of the results generated by the TIC-RT.

3 General Information

3.1 Editing Modes

The TIC-RT tool can be set into one of five modes, which are used for the various phases of use. Only the Test & Result Entry Mode is relevant to the testing process, and the Test Result Extraction Mode is only relevant to the certificate creation process.

3.1.1 Test & Result Entry Mode

This mode should be used during the Compliance Testing Process. This mode is enabled by pressing the macro-button 'Password Protect for Test / Result Entry Mode and for Document Review'. In this mode, only the required worksheets are visible, these being-

- Intro & DocRefs
- DOC-HISTORY
- Equipment A (e.g. SwMI) Declarations
- Equipment B (e.g. MS) Declarations
- Test Case Selection and Results
- Certified Items
- Feature-Tests

If any other worksheets are visible, then the macro-button 'Password Protect for Test / Result Entry Mode and for Document Review' should be pressed prior to any data entry.

This is the most restrictive mode, which protects the majority of the cells in the TIC-RT tool.

Once this mode is enabled, only the cells used to fill in the two equipments (e.g. SwMI & MS) declarations, the Test Results and Comments and the document history are available for editing. All other cells are locked, preventing inadvertent changes to the tool.

Note, the "Feature-Test" sheet is visible, solely for review.

3.1.2 Creation / Data Entry Mode

See [Ref. 4] for more information on this mode.

3.1.3 Tool Development Mode (Password Protected)

See [Ref. 4] for more information on this mode.

3.1.4 Test & Result Entry Mode and for Document Review (Password Protected)

See [Ref. 4] for more information on this mode.

Note: this mode is used for (a) review by the TF and (b) declaration before, and result entry during, a specific test session.

More information about the review of TIC-RTs can be found in [Ref. 7]

3.1.5 Test Result Extraction Mode (Password Protected)

This mode displays the data required to create the Interoperability Certificate from the Results entered during Test & Result Entry Mode

4 Using the TIC-RT during Testing

During a testing session, the TIC-RT should be filled in from information supplied by the equipment manufacturers (see [Ref. 1]), and from data gathered during the testing process (test results).

The TIC-RT should be in Test & Result Entry Mode – see 3.1.1.

See also 5 Using the WIDE TIC-RT During Testing if required.

As the 'import / export' feature will be widely used (see §4.5.1 & §4.5.2) the test session specific 'master' has to be made available before any data is entered. The creation of this is covered in §4.1 .

For information: The tasks for creating the test session specific master TIC-RT (see §4.1) and the using of Test Result Extraction (see §7) need to be done using Excel-2003; these tasks are only undertaken by the CB. The activities undertaken by a manufacturer (before or during a test session) can be undertaken using either Excel-2003 or Excel-2007 – though please be aware of extra actions needed (in §4.5.1) if you are using Excel-2007.

4.1 Creating a Test Session specific Master document

The processes surrounding the use of the exporting and importing of the data (and not distributing the large TIC-RTs themselves) relies on the engineers using only the correct files. The processes rely on the documents filenames to provide the engineer with the information to ensure he is using the correct files. To ensure that the export feature generates the correct filenames a number of test session specific fields need to be set correctly.

In the sheet "Doc History" the cell for the "Session Date" (i.e. E2) must be set to reflect the intended start month of the test session

In the sheet "Doc History" all details about the history of the creation of this TIC-RT is to be deleted [1]. This is to be replaced by a statement that the TIC-RT is being prepared for the specific test session.

In the sheet "EqADecs" the cell for the version of the declarations (i.e. cell F8) is to be set to '0'

In the sheet "EqBDecs" the cell for the version of the declarations (i.e. cell F8) is to be set to '0'

In the sheet Test Case Selection and Results" the cell for the version of the results (i.e. cell D9) is to be set to '0'

The responsibility for setting these data lies with the CB, as they are the body that can provide the 'master' TIC-RT to all parties [2]..

The test specific Master TIC-RT is saved with a filename that reflects the session (and in line with the FileNaming Convention) – see §10.1.

The test session specific TIC-RT is distributed to all those that request it. Note: the Equipment A (e.g. SwMI) supplier should advise the Equipment B (e.g. MS) suppliers that request their TIC-RTs that they should get the master TIC-RT from the CB.

4.2 General on Data Entry

A number of sheets have columns of data that must be entered from a small range of options (e.g. Pass/Fail or Yes/No). To fill in such an entry on one of the sheets, click on the cell to be filled in, and note that a small 'drop-box' button appears at the bottom right of the cell.

A text box with help information also appears, and it may 'get in the way'. If this happens, the help box can be moved out of the way with the mouse (drag & drop).

4.2.1 Method 1 – Drop box selection

Click on the drop-box button, and a list of valid entries is shown. Click on the entry that is required. The selected entry is placed in the cell.

---

[1] if someone does want to see the history of the creation of the document they can get this by downloading the empty TIC-RT from the TETRA Association website

[2] *the alternative is for all participants to make these changes before they touch the TIC-RT, but it is felt this is open to error*

4.2.2 Method 2 – Manual entry

Type in the required entry – Note that the entries are case sensitive, and the entry must be entered exactly as shown in the drop-down selection box.

4.2.3 Method 3 – Using AutoComplete

See 8.1 AutoComplete. If an entry is to be repeated (i.e. 'Passed' entered in many result cells), then once one or more cells have this entry showing, just typing the first letter of the entry will cause the full entry to be shown (highlighted as if selected). Pressing the 'Enter/Return' key will accept the entry as shown.

4.3 Greyed out cells

If a cell contains data, but should be blank, the cell will appear with a **Grey background and red text**. If this happens, the entry should be removed by selecting the cell, and then pressing the 'Delete' key.

In some cases, a test result will have been obtained for a test that subsequently becomes 'inapplicable' (greyed out), because one or more of the declarations are changed. In this case, the Certification Body should be consulted to confirm whether the result should be deleted, or whether the result should be retained in the greyed out cell.

Any result in a greyed out cell will have no effect on the calculated result entries on the 'Certified Items' worksheet.

4.4 Transferring Declarations and Test Results

When preparing for a test session, each company fills in the declarations for their specific equipment(s). In the case of a SwMI being tested with multiple radios, the process document (TPD001) mandates that the SwMI Manufacturer is to supply the declarations for the SwMI to all the participating MS Manufacturers. The MS Manufactures can then fill in their declarations, and supply the combined information (the SwMI declarations and their MS declarations) back to the SwMI Manufacturer (and to the CB). To reduce the amount of data being passed around, there are Buttons in the TIC-RT to export the declarations in a format that can be easily sent by e-mail. For more information on these macro-buttons, see below:-

4.5 SwMI & MS Declaration Worksheets (EqADecs, EqBDecs)

Note: this does not apply when using a WIDE-TIC-RT – see §5 for that aspect.

The Manufacturer's Name and the Equipment Type and Version number should be filled in at the top of these sheets. This data will automatically be shown on the other worksheets of the TIC-RT.

The 'Support' column should be filled in with data supplied by the manufacturer for the equipment under test. A blank cell in this column is treated as a 'NO'.

An entry of 'Yes' declares that the equipment can perform the described functionality, and that all tests that rely on this functionality should be selected for the test session (and also any tests that rely on the non-support of the functionality will be de-selected).

An entry of 'No' declares that the equipment cannot perform the described functionality, and so any tests that rely on this functionality will be de-selected for the test session (and also any tests that rely on the non-support of the functionality will be selected).

An entry of 'Mismatch' is used to signify that while the equipment can perform the required functionality, when tested, the combination of the two equipments cannot perform the tests, indicating a mismatch between the two implementations of the functionality. So while the manufacturer does not declare that their equipment can not perform the functionality, they are declaring that the combination of equipment being tested cannot pass the tests, and so any tests that rely on this functionality should not be selected for the testing session.

See 8.1 AutoComplete.

There is a Button on these sheets that will clear all the 'Support' cells.

4.5.1 Exporting Equipment (e.g. SwMI & MS) Declarations

In order to transfer the Declarations of the Equipment A (e.g. SwMI, or the main piece of equipment being used in the Test Session) to all the participating manufacturers, there is a button that will export these declarations and the document history into a small Excel file. The filename of this exported declarations file is automatically constructed from a number of locations in the TIC-RT, see 10.2.1 & 10.2.2. Care should be taken to ensure that the data required to create the file names for the 'export' files has been filled in (i.e. the product name and the version of the declarations). Also see §4.8

When the Equipment A (e.g. SwMI) supplier is exporting their declarations they will use the button "Export EqA support entries" on the sheet "EqADecs"

When the Equipment B (e.g. MS) supplier is exporting their declarations they will use the button "Export A&B support entries" on the sheet "EqBDecs"

***Note**: if the files are exported from Excel-2007 they must be manually converted to Excel-2003 before being distributed. This is done by opening the export file in Excel-2007 (and accepting the warning about the mismatched extension) and then '**Save As**" > "**Excel 97-2003 workbook**". You will be prompted that a file of the same name exists, and you must accept this.*

4.5.2 Importing Equipment (e.g. SwMI & MS) Declarations

It is possible to import either the Main Equipment declarations, or the Declarations for a Main Equipment and the Equipment being certified against it (in both cases also the document history).

When the Equipment B(e.g. MS) supplier is importing the Equipment A (e.g. SwMI's) declarations they will use the button "Import EqA support entries" on the sheet "EqADecs"

When the CB importing the Equipment declarations they will use the button "Import A&B support entries" on the sheet "EqBDecs"

If all the information that is required to create the Export File name is consistent with the equivalent information that was present at the time the Export was performed, then the file will be imported. If the data is not consistent, then the user will be asked to select an Export file, and the selected file will be imported. Care should be taken to ensure that the selected file is for the appropriate sheet. See 10.2.1 & 10.2.2 for a description of the name formats used in exporting from each of the declarations sheets.

4.6 Test Case Selection and Results Worksheet

When both Declaration Worksheets have been completed, the Test Case Selection and Results Worksheet will show which Tests, selected with reference to the equipment declarations, should be run during the test session3. (Tests that should not be run are shown Greyed out; all others should have a result entered in the 'Result' column). See the Certified Items Worksheet to see which tests relate to each of the certifiable features.

Please refer to §6 for details about how changes to declarations (which are discovered **during** a test session) are dealt with.

4.6.1 Result column

The results (Passed/Failed etc.) for all applicable tests[3] should be filled in by the Certification Body. The result may be marked as one of the following:

- **Passed** : The test has Passed.
- **Failed** : Any applicable test marked as Failed will cause the associated feature to fail certification.
- **Regr-nr** : 'Not tested due to regression testing' This result may only be used if this is allowed by the test procedures for the test session, as agreed with the Certification Body.
- **Spot-nr** : 'Not tested due to spot testing' This result may only be used if this is allowed by the test procedures for the test session, as agreed with the Certification Body.

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[3] A test for which all necessary SwMI and MS declarations are set correctly. These tests are shown with the 'Test#' and 'Test Title' in black text on a white background on the 'Test Case Selection and Results' worksheet.

- **Test-nr** : 'The test has not been executed for a 'commented' reason.. If tests are marked 'Test-nr' then the associated features will not be certified.
- **Option-ns** : 'Not run as optional test not selected' This result may only be used where one of the other tests associated with the group of tests has been performed (see §4.6.4).

If some of the cells on this worksheet appear to have only partial text in them, click on the 'Adjust Row Height' button. This will allow all the text to be seen.

There is a Button on this sheet that will clear all the Result cells.

4.6.2 Status column

This column gives information on the requirement to run the test. If the column contains 'M', the test is mandatory. If the column contains an entry like "O.1" this identifies the test as part of an 'Optional Group'. See 4.6.4 below.

If the column contains SwMI-nr and/or MS-nr (or their equivalent), this means the test is not required, because of declarations made for the Equipments (e.g. SwMI and/or MS respectively).

4.6.3 Comments and Notes

During testing, comments can be made on the Result column, in the 'Comment on Test Result' column. To add to a previous comment, double click at the required insertion position. A new line can be added by ALT+ENTER.

4.6.4 Optional Tests

In some cases, it is not necessary to perform all the tests associated with a feature. These tests are classed as optional, and will be agreed with the Certification Body. Normally, a group of tests will be classed as optional if any one of them is a sufficient test of the feature being certified.

Optional tests are signified by the inclusion of a common 'Optional Group Identifier' in the Status column on the Test Case Selection & Results sheet.

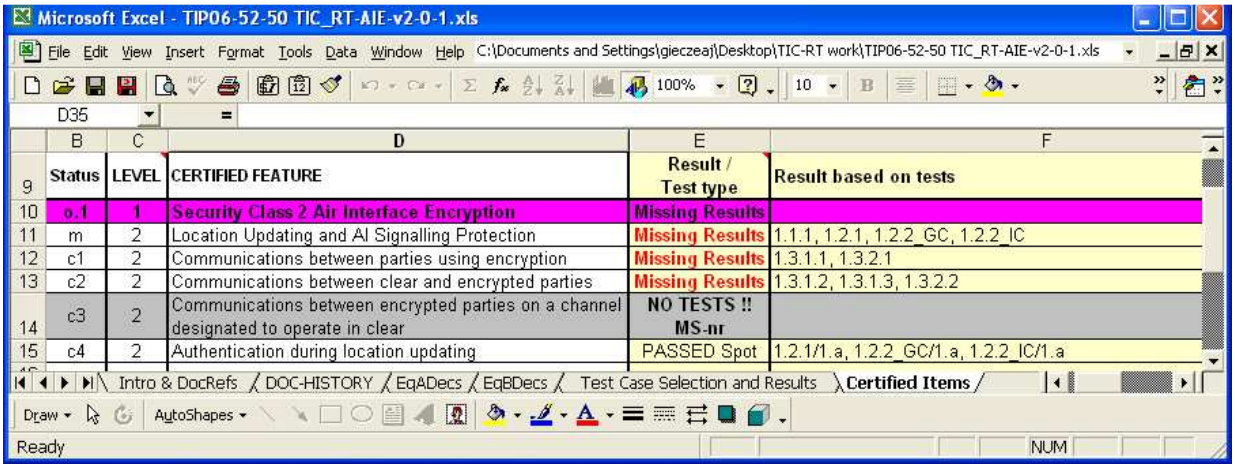
Where a group of tests have been designated as optional, then the results for those tests that have been performed should be recorded in the Results column for the test. The other tests in the optional group should be marked as 'Option-ns' ('Not run as optional test not selected'). This will allow the TIC-RT tool to correctly assess the certification state of the features being tested.

4.6.4.1 Optional Tests Example

During the tests of AIE, the tests for the 'Authentication during location updating' Certified Feature has three tests specified, but two of these tests are such that either one of these tests is sufficient to test the Certified Feature. To reduce unnecessary testing, the Certification Body can agree to allow any one of these tests to be a sufficient verification of the Feature. These tests are therefore classed by the Certification Body as 'Optional'. If any one test is passed, the others can be marked as 'Option-ns'.

The TIC-RT tool is not capable of determining the outcome of optional test groups, so it is the responsibility of the Certification Body to ensure that all Certified Features that have optional tests included in their test plan are correctly tested.

As can be seen in the screen-captures of the TIC-RT for AIE, tests 1.2.1/1.a, 1.2.2_GC/1.a & 1.2.2_IC/1.a are defined for the 'Authentication during location updating' Certified Feature.



Microsoft Excel - TIP06-52-50 TIC_RT-AIE-v2-0-1.xls

File Edit View Insert Format Tools Data Window Help C:\Documents and Settings\gieczeaj\Desktop\TIC-RT work\TIP06-52-50 TIC_RT-AIE-v2-0-1.xls

D35 =

	B	C	D	E	F
9	Status	LEVEL	CERTIFIED FEATURE	Result / Test type	Result based on tests
10	o.1	1	Security Class 2 Air Interface Encryption	Missing Results	
11	m	2	Location Updating and AI Signalling Protection	Missing Results	1.1.1, 1.2.1, 1.2.2_GC, 1.2.2_IC
12	c1	2	Communications between parties using encryption	Missing Results	1.3.1.1, 1.3.2.1
13	c2	2	Communications between clear and encrypted parties	Missing Results	1.3.1.2, 1.3.1.3, 1.3.2.2
14	c3	2	Communications between encrypted parties on a channel designated to operate in clear	NO TESTS !! MS-nr	
15	c4	2	Authentication during location updating	PASSED Spot	1.2.1/1.a, 1.2.2_GC/1.a, 1.2.2_IC/1.a

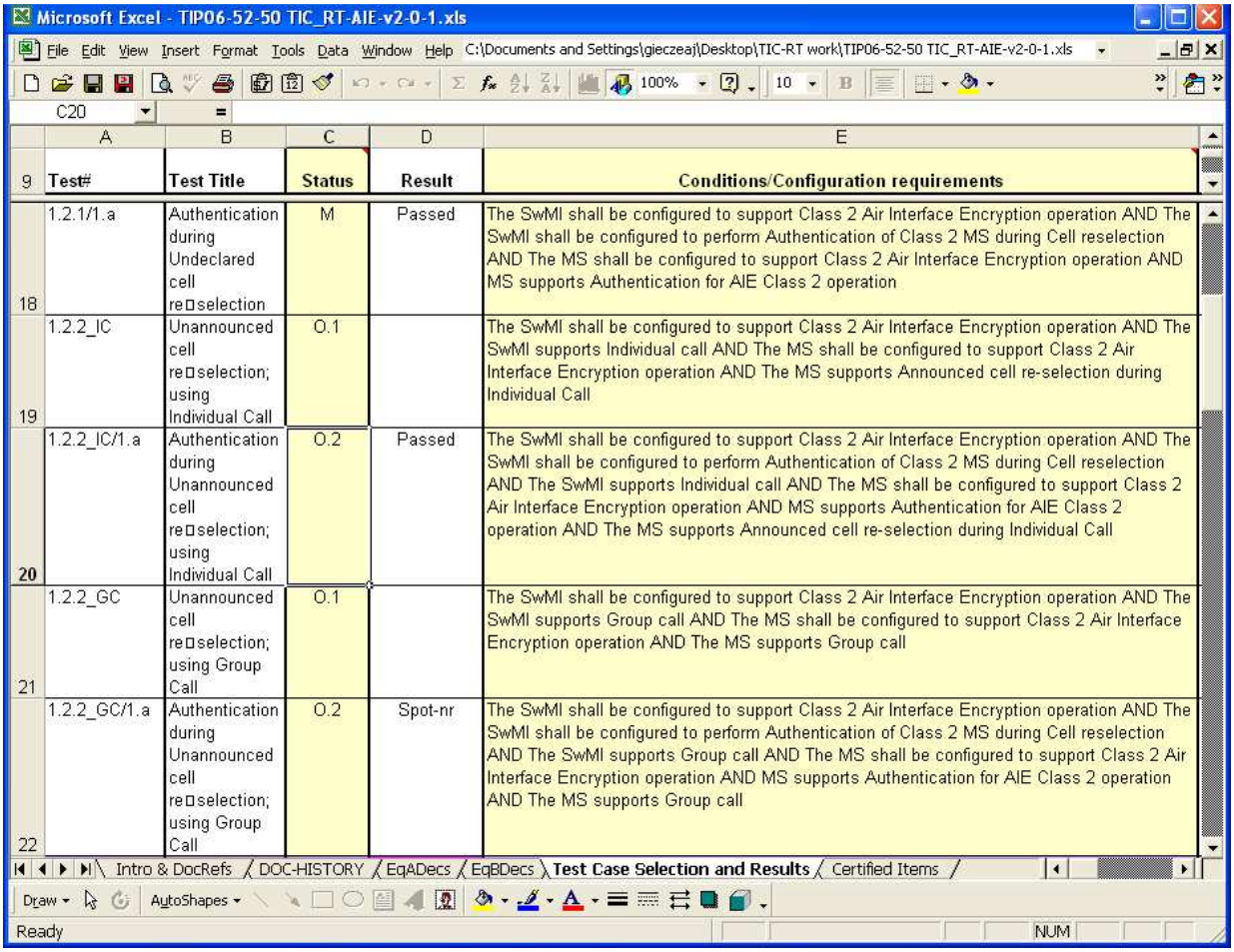
Intro & DocRefs / DOC-HISTORY / EqADecs / EqBDecs / Test Case Selection and Results / Certified Items /

Draw AutoShapes

Ready NUM

Examination of the Test Case Selection & Results sheet shown below will show that tests 1.2.2_GC/1.a & 1.2.2_IC/1.a are marked as “O.2” in the Status column. This signifies that the two tests are an ‘Optional Tests Group’, and that any one test in the group is sufficient to test the Certified Feature.

Assuming that these tests have been classed as ‘Optional’ by the Certification body, the Feature will be classed as PASSED if, as in the Test Case Selection & Results sheet shown below, one of the optional tests is marked as PASSED, and the other(s) are marked as Spot-nr.



Microsoft Excel - TIP06-52-50 TIC_RT-AIE-v2-0-1.xls

File Edit View Insert Format Tools Data Window Help C:\Documents and Settings\gieczeaj\Desktop\TIC-RT work\TIP06-52-50 TIC_RT-AIE-v2-0-1.xls

C20 =

	A	B	C	D	E
9	Test#	Test Title	Status	Result	Conditions/Configuration requirements
18	1.2.1/1.a	Authentication during Undeclared cell re□selection	M	Passed	The SwMI shall be configured to support Class 2 Air Interface Encryption operation AND The SwMI shall be configured to perform Authentication of Class 2 MS during Cell reselection AND The MS shall be configured to support Class 2 Air Interface Encryption operation AND MS supports Authentication for AIE Class 2 operation
19	1.2.2_IC	Unannounced cell re□selection; using Individual Call	O.1		The SwMI shall be configured to support Class 2 Air Interface Encryption operation AND The SwMI supports Individual call AND The MS shall be configured to support Class 2 Air Interface Encryption operation AND The MS supports Announced cell re-selection during Individual Call
20	1.2.2_IC/1.a	Authentication during Unannounced cell re□selection; using Individual Call	O.2	Passed	The SwMI shall be configured to support Class 2 Air Interface Encryption operation AND The SwMI shall be configured to perform Authentication of Class 2 MS during Cell reselection AND The SwMI supports Individual call AND The MS shall be configured to support Class 2 Air Interface Encryption operation AND MS supports Authentication for AIE Class 2 operation AND The MS supports Announced cell re-selection during Individual Call
21	1.2.2_GC	Unannounced cell re□selection; using Group Call	O.1		The SwMI shall be configured to support Class 2 Air Interface Encryption operation AND The SwMI supports Group call AND The MS shall be configured to support Class 2 Air Interface Encryption operation AND The MS supports Group call
22	1.2.2_GC/1.a	Authentication during Unannounced cell re□selection; using Group Call	O.2	Spot-nr	The SwMI shall be configured to support Class 2 Air Interface Encryption operation AND The SwMI shall be configured to perform Authentication of Class 2 MS during Cell reselection AND The SwMI supports Group call AND The MS shall be configured to support Class 2 Air Interface Encryption operation AND MS supports Authentication for AIE Class 2 operation AND The MS supports Group call

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Draw AutoShapes

Ready NUM

It is the responsibility of the Certification Body to ensure that any features with a result of ‘PASSED Spot’ are manually verified, to ensure compliance with the agreed testing plan.

In a number of cases, the tests can be split into a number of options, under a ‘super-test’ (e.g. AIE test 2.1.1 has been split into “2.1.1_ AuthNotMu”, “2.1.1_AuthMut” and “2.1.1_ IgnoreMut”). Here the sub-tests can be run independently, and the verdict for test 2.1.1 is entered (by the CB) as the verdict for the chosen test that was run.

4.6.5 Exporting Test Results

In order to transfer the Results of a Test Session to all the participating manufacturers, there is a button that will export these results, as well as all the associated declarations and the document history into a small Excel file. The filename of this exported declarations file is automatically constructed from a number of locations in the TIC-RT, see 10.2.3. Care should be taken to ensure that the data required to create these file names has been filled in (i.e. the version number of results being saved is correct). Also see §4.8

When the CB is exporting the test results they will use the button “Export All data” on the sheet “Test Case Selection and Results”

4.6.6 Importing Test Results

It is possible to import the Test Results (together with the associated declarations and the document history) related to a Main Equipment and one specific Equipment being certified against it.

When the participants of the test session import the test results they will use the button “Import All data” on the sheet “Test Case Selection and Results”

If all the information that is required to create the Import File name is consistent with the equivalent information that was present at the time the Export was performed, then the file will be imported. If the data is not consistent, then the user will be asked to select an Export file, and the selected file will be imported. Care should be taken to ensure that the selected file is an Exported Results file. See 10.2.3 for a description of the name formats used in exporting from the Results sheet.

4.7 Certified Items Worksheet

When all the results have been entered, the Certified Items Worksheet will show the final status of testing for each of the Certified Items (features).

If some of the cells on this worksheet appear to have only partial text in them, click on the ‘Adjust Row Height’ button. This will allow all the text to be seen.

4.7.1 Result based on tests

This column shows all the applicable tests3 for the Level 2 Feature. The tests shown in this column will change as the declarations are changed. To find the complete list of possible tests from which the applicable tests are selected, it is necessary to examine the ‘Feature-Tests’ worksheet. While that sheet is visible (for use during a TF review) the full details of this worksheet can be found in [Ref. 4].

4.7.2 Result/Test Type Column

4.7.2.1 Test Type

Where appropriate, a test type is shown in the cell associated with a Level 1 or Level 2 Certified Feature. If more than one Test Type is applicable to a feature, then more than one of these test types may be shown. The test type can be one of the following –

- **Complete** This means that for the associated feature, all of the applicable tests have been given a test result, and that none have been recorded as not run due to regression, spot testing , No_Equipment or time limitations.
- **Regression** This means that for the associated feature, one or more of the applicable tests have been given a test result of ‘Not tested because of Regression Testing’.
- **Spot** This means that for the associated feature, one or more of the applicable tests have been given a test result of ‘Not tested because of Spot Testing’. See also 4.6.4.
- **Incomplete** Not all Mandated tests (as per TIC-RT indication) have been executed

4.7.2.2 Result

For each Certifiable Feature, a Test Result may be shown. The result may not be shown if the test procedure was not completed due to a lack of time. The results can be one of the following –

- **Passed** This signifies that all the applicable tests have been given a result, and that none of these results indicated a Fail, and that none of the results indicated that a test was not run due to lack of testing time.
- **Failed** This signifies that at least one of the applicable tests have been given a 'Fail' result.
- **No Tests** This signifies that there are no applicable tests for the associated feature. This may be because no tests have been specified for the feature, or because all of the tests that are associated with the feature have been made inapplicable, because of the various declarations that were made for the equipment under test.
- **Missing Results** This signifies that one or more of the results for the applicable tests have not yet been filled in.

4.7.2.3 Coverage

Each certified item will also have a statement of the test coverage, of the form "x pass of y".

4.7.3 Comments on Test Result

This column should not be used.

While it is possible to add, during testing, comments on the results for the certified (sub-)feature (in the 'Comment on Test Result' column) the data will not be exported and it will not be included in the Certificate. Given that the column has not been used in any test session in the past, it is almost certain that this column will be removed (hidden) in a new version of the template.

FYI: To add to a previous comment, double click at the required insertion position. A new line can be added by ALT+ENTER.

4.8 DOC-HISTORY worksheet

Whenever the TIC-RT is updated (whether prior to, during, or after a test session) the details of what has been changed should be recorded in "DOC-HISTORY" worksheet.

Note: as advised in §1, the filename of the TIC-RT is to be updated in line with [Ref. 5] to reflect the details included in it.

The following details are recommended to be recorded.

In the column "**Version**" a simplified reference to the documents filename should be recorded. So when the Equipment A details are first added the entry would be "A1", and when the Equipment B details are subsequently added the entry would be "A1:B1". As a further example, a third iteration of the results would be assigned the entry "A1:B1:CB3"

The "**Date"** column should indicate the date the file was provided.

A short form of your initial should be added in the "**Editor"** column.

Details of the changes made should be recorded in the **"Description"** column. This will be particularly useful during the post-test-session phase, so review comments, and any responses, can be included here (or alternatively a reference can be made to any emails or documents that they are provided in).

5 Using the WIDE TIC-RT During Testing

Use of the Wide TIC-RT is similar to the use of the Standard TIC-RT described in Para 4 above. The Wide TIC-RT is used in cases where both equipments in a test are of the same basic type (e.g. in DMO, both equipments under test are Mobile Stations).

1. Copy each MS's Declarations onto the MultiDecs sheet
2. Set the Model field on the EqADecs sheet to the Model being Tested – The model for which this is the TIC-RT – There will be one TIC-RT per model under test.
3. Clear the Model field on the EqBDecs sheet (select the field and press the 'Delete' key, or select a blank line from the dropdown menu).
4. On the Test Case Selection & Results sheet, put in the test results – Where an 'other MS' cannot perform the test, leave the result blank.
5. When all tests have been performed, set the EqBDecs Model field to each of the MS models in turn, recording the resultant Certified Items output for Certification purposes. The Certified Items sheet is not valid unless both EqADecs & EqBDecs Models are filled in.
6. You will note, that when a model is defined on the EqBDecs sheet, the Test Case Selection & Results sheet changes to grey out the tests that are not required for the EqA + EqB combination of Declarations.
7. When the EqB Model field is blank, the greyed out tests are defined by the EqA Decs only.

Note: the export/import capabilities described in §4 are **not** used in the Wide TIC-RT.

Please refer to §6 for details about how changes to declarations (which are discovered **during** a test session) are dealt with.

5.1 Filling in Test Results

In use, one Wide TIC-RT will be assigned to each model of Equipment being tested.

Note: please be aware that this section is for information only, as there is now a "DMO test session tool" (i.e. [Ref. 8]) which handles the transfer of the results (from a session specific spreadsheet) into the TIC-RT.

For example, the TIC-RT for MS1 will have a Results Column for each of the other MSs involved in the test session. See Figure 2 – WIDE TIC-RT Results Sheets. It will also have a Results column for tests between 2 examples of MS1. Each of the other MSs in the test will have a similar Results Layout.

Each column represents the results of a test with 2 Equipments. MSA = the MS defined on the EqA Sheet, and MSB as ALL the other MSs, one column of results for each of these.

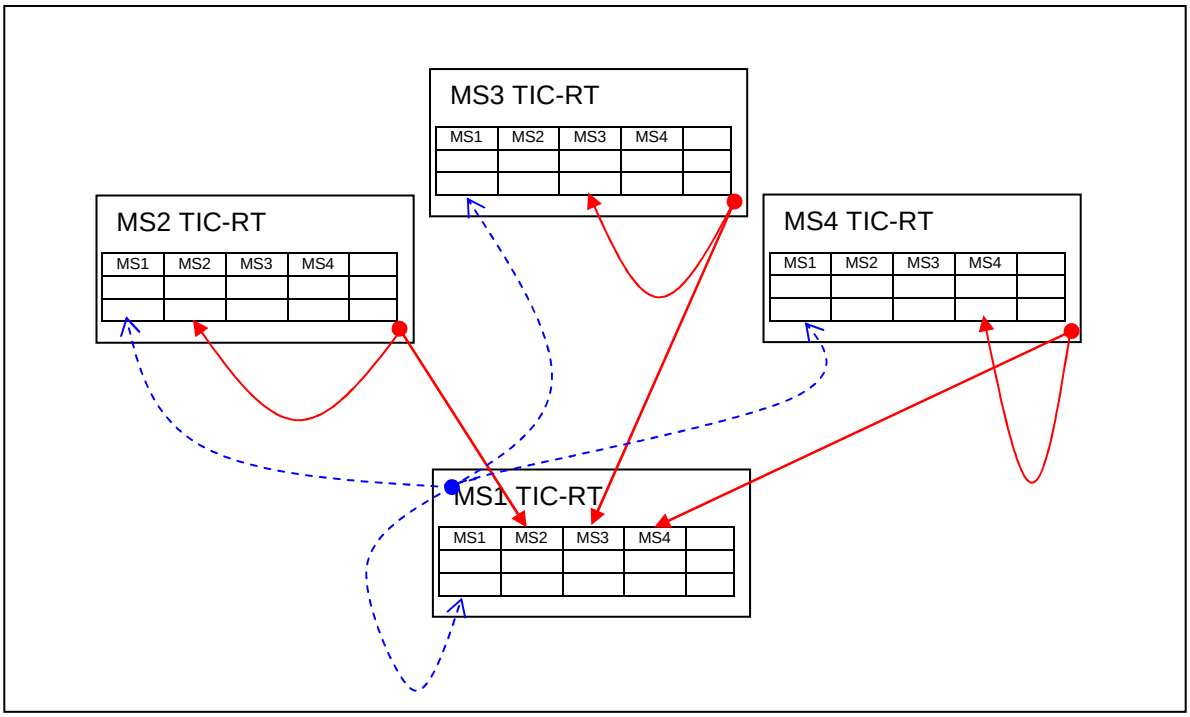


Figure 2 – WIDE TIC-RT Results Sheets

During testing of e.g. individual call, when MS1 calls MS2 (successfully), the operator responsible for the MS1 TIC-RT will mark the test of "MSA calls MSB" as passed in the column for MS2. Conversely, the operator responsible for MS2's TIC-RT will mark the "MSB calls MSA" test as passed in the column for MS1. Each mobile will call each other mobile involved in the test session, and after each test, both MS's TIC-RTs will have a test result filled in.

In the case of a group call, MS1 could call a group including ALL the other MSs, and MS1 could fill in ALL the result columns for the "MSA calls MSB" (Group Call), whereas all the other TIC-RTs would fill in the one column for "MSB calls MSA" (group call) relating to the results for MS1.

In some test cases, not all of the manufacturer's equipments will be capable of performing the required tests. In this case, the result in that manufacturer's column should be left blank.

In some cases, a test only uses one Equipment (e.g. MSA). In this case, the result should be entered in ALL the columns, as the 'other equipment' (MSB) is irrelevant to the test, and so the result is valid for all the 'other equipments'.

If a test only uses the 'other equipment' (MSB), then the result should be entered on a PER EQUIPMENT basis, the results for each equipment being entered in the column for that equipment.

5.1.1 Importing and Exporting the Results.

It has been decided not to use this function during testing using WIDE TIC-RT

5.2 Filling in the Equipment Declarations

In preparation for the Test Session, each manufacturer will provide a set of equipment declarations for each model of equipment they are submitting at the test session. These would be provided on a manufacturer specific TIC-RT. Before the testing can begin, these different TIC-RTs would be amalgamated into a combined TIC-RT, in which all the manufacturer's declarations would appear in the MultiDecs worksheet of a Wide TIC-RT. In the case of a test session with more than 16 models under test, multiple WIDE TIC-RTs would be created, with a maximum of 15 model's declarations in each, leaving the first column empty, to allow an operator to add the Declarations for the model they are responsible for, if it does not already appear on the TIC-RT. Each model's operator would then be responsible for completing the results on multiple TIC-RTs, all of which would have the operator's model filees in on the EqADecs sheet. This amalgamated TIC-RT would be supplied to each manufacturer for

Result recording. The amalgamated TIC-RT would be customised by the operator by entering the Equipment identity in the EqADecs worksheet.

5.2.1 Assistance during Equipment Declaration Completion

While completing the declarations on the MultiDecs worksheet, the Equipment identity (e.g. T3-Ex) should be filled in at the top of one column. Then on the EqADecs sheet, the Model should be entered at the top of the sheet, using the drop-down menu. When these 2 fields match, then the cells holding the Equipment Declarations on the MultiDecs sheet will be colour coded to assist in completion of the declarations. For more information about the reason for a warning colour, change to the MsADecs worksheet, where further information is displayed.

If a manufacturer is providing declarations for more than one model of equipment, these can be completed in as many columns on the MultiDecs sheet as are required. For each model being completed, it is necessary to match the Model type on the MsADecs sheet with the Model Type shown in the column heading.

5.2.2 Importing and Exporting the Declarations.

It has been decided not to use this function during testing using WIDE TIC-RT

6 Handling changes to Declarations

In general it is not allowed to change the declarations in TIC-RTs after the test session has started. In order to avoid human errors (e.g. due to typing errors or not fully understanding all the implications) the means of identifying the affected tests (before distributing them to the manufacturers and to the CB) is by adjusting the declaration in the suppliers' own copy of the TIC-RT and viewing the impact on the "Test Case Selection and Results" sheet.

If a supplier thinks that a change is needed he has to inform the CB, then the CB has to confirm either the change is acceptable or not. If it is, the supplier needs to inform the CB of

a) the changed declaration,

b) the tests that are now supported and

c) the test(s) that are no longer supported.

For information: Details of which terminals support each of the different tests are identified solely by a shading (or not) of the row and/or column. Therefore it is fully acceptable for the result of a test to be entered in a 'grey' cell (and to leave a non-grey cell empty).

As the TIC-RTs will show the shading of tests based on the initial declarations, it is the responsibility of the supplier to make the declaration change to ensure that all supported tests have indeed been performed.

The supplier is responsible for providing the details of the changed declaration to all other participants at the test session and to the CB. The other participants may wish to update their private copy of the TIC-RT to reflect this correction.

The CB is responsible to check that all the participants receive the necessary information about changes.

In the current state of testing procedures for test session, the final result depends on how all the TIC-RT declarations, provided from suppliers at the beginning of the session, have been established. This means that, if during the test session one or more changes to declarations occur, an update will be needed of all the TIC-RTs affected by the changes in order to create new TIC-RT declaration(s) allowing all results to come back correctly to the TIC-RTs at the end of session.

Therefore participants must choose

- whether to briefly interrupt the test session to give time to the participants to create the new TIC-RTs in order for them to use it for the remainder of the test session
- or to go on with the test session using the documents as suggested above and update all the documents taking the changes into account only at the end of the test session. In this case the manufacturers should take the risk that the results and the relevant certified items are not according to their expectations. Updated TIC-RT declarations have to be used by CB during the session and during certificate preparation.

The manufacturers shall be aware that changes to TIC-RT declarations may delay the certificates if they are resulting in discussion about test results and certified items.

7 Using Test Result Extraction Mode

The Test Result Extraction Mode can be selected by pressing the appropriate button on the Intro & DocRefs worksheet. If the Workbook has previously been in Test & Result Entry Mode then it will be necessary to release the password protection – see [Ref. 4].

Once selected, the Test Result Extraction Mode displays a subset of the information in the TIC-RT, in a layout that is suitable for cutting & pasting into the Interoperability Certificate.

7.1 Getting the Certification Results for a Test Session using the WIDE TIC-RT

After the test session is complete, the Certification results can be extracted on a per pair of equipments basis. The second Equipment is filled in on the EqBDecs worksheet (See NOTE below), and the Certified Items worksheet will show the Certification results.

NOTE: There is a ‘Select Next ‘Other’ Equipment’ button on the Certified Items Worksheet and the Test Case Selection and Results Worksheet that cycles through the defined equipments, so the ‘Other Equipment’ can be changed by pressing either of these buttons.

The equipment will be consecutively set to each of the other equipment models on the TIC-RT, and the Certification results recorded.

The list of tests shown on the Certified Items sheet will be the set of tests applicable to the 2 Equipments under test, with reference to both the equipment’s Declarations.

8 EXCEL options

8.1 AutoComplete

When filling in the 'results' column, or the 'support' columns, either make use of the drop-down selection box, or, if the required response has been entered at least once before in the column, type in the first letter of the required response and the AutoComplete facility of EXCEL will insert the full text.

If the AutoComplete facility is not enabled, it can be switched on by selecting:

TOOLS/OPTIONS/EDIT/Enable AutoComplete for cell values.

8.2 Calculation (Automatic or Manual)

If the Calculation setting is set to Manual, then the spreadsheet will not be updated each time new data is entered. The user must press [F9] to recalculate the values throughout the tool.

If the Calculation setting is Automatic, then the whole spreadsheet is recalculated every time a new piece of data is entered. In order for the colour coding to work as an aid to data entry, the setting should be set to Automatic. This has the drawback of making data entry a bit slower (the tool recalculates each time a value is added), but makes it easier to see where data is missing, or where the data is wrong, or significant.

The Calculation setting is set on the

TOOLS/OPTIONS/CALCULATION selection screen.

8.3 Buttons

There are a number of buttons throughout the tool, used to hide or show data, or to perform complex actions on the worksheets. These buttons run 'Macros', so when the workbook is opened, Macros must be enabled if the buttons are to be used. If the user prefers not to have Macros enabled then the individual steps required to perform the required actions are detailed in [Ref. 4].

Several of the buttons are not visible during the Testing and Certification process, because of the Test & Result Entry Mode being selected.

If any unknown problems are encountered with the TIC-RT tool, then a description of the problem should be sent, in the first instance, to the secretary of the TIP working group (tfsec@tetra-association.com), for onward transmission to the tool's developers. By passing problems through the working group, other users of the tool will be made aware of problems.

8.4 Known Problems

- Comment boxes (used to describe the contents of some of the columns) can sometimes change size, and have to be resized in order to allow the user to read their contents. If this problem arises, select 'View/Comments'. This will cause all of the comment boxes to become visible. Then click on the required box, to select it. The box can then be resized as required.
- Buttons and Check-boxes. Depending on the zoom value being used, the text in these icons sometimes does not fit. These icons can be resized, or the zoom value can be changed back to 100%.
- Cell text. Depending on the zoom value being used, the text in cells sometimes does not fit. The columns can be resized, or the zoom value can be changed back to 100%.

9 Colour Coding

Colour Key	Meaning
Black on White	Cells which are to be filled in by the creator of the Workbook, or by the subsequent users.
Black on Pale Yellow	Cells which are automatically filled in by the workbook, from the data supplied by the creator and the subsequent users
White on Blue	Declaration Title
Black on Grey	Cells that should be left BLANK – Entry is not required. See 4.3 Greyed out cells
Red on Grey	Cells that should be left BLANK – Entry should not be present. See 4.3 Greyed out cells.
Black on Pink	Title Lines
Black on Pale Purple	Sub-title lines

Table 1 Key to the use of colours in the Workbook.

Throughout the tool, cells are coloured to signify the operations that can be performed on them. The key is shown here, and on the Introduction sheet within the tool.

As data is entered into the tool, colour coding is used to give the user information about the data that is being entered. This is described below, for each worksheet, where the colour coding is different (or additional) to the key in Table 1 –

9.1 CERTIFIED ITEMS WORKSHEET

Black text on Pink. This is used to highlight level 1 features.

Black text on Grey. This is used to highlight untested features.

Red text on Pale Yellow. This is used to highlight features with tests that have not passed.

9.2 EQUIPMENT DECLARATIONS WORKSHEETS

Red text on Yellow. This is used in the 'Support' and 'Optionality and Conditions' columns to show where an entry must be changed in order for the support declarations to be compliant with the Status column.

Red text on Yellow. This is used in the 'Preconditional MANDATORY Declarations' and the 'Preconditional OPTIONAL Declarations' to highlight an entry that cannot be found in the 'Item' column on the worksheet.

Red text on White. This highlights the negative declarations (the 'NO' entries).

9.3 TEST CASE SELECTION AND RESULTS WORKSHEET

Black text on Pink. This is used to highlight Headings (test entries that are titles for a group of subordinate tests.

Black text on Pale Violet. This is used to highlight Sub-Headings (test entries that are titles for a group of subordinate tests.

White text on Grey. This is used to highlight tests that cannot be performed because of the declarations made for the equipments (e.g. SwMI and/or MS).

Red text on Pale Yellow. This is used to highlight tests that have been declared as 'Failed'.

10 File Naming Conventions

The file names used in the creation of Declaration & Result export files are described below. The names are based on those defined in Reference [Ref. 5].

The constituent parts used to make up the names are as defined in clauses 2 & 4.1 of Reference [Ref 5]

10.1 Blank TIC-RTs

These use the naming convention defined in Reference [Ref 5] eg.

TIC-RT<aaa>**–**<bb>[–<c>]**_v**<ddd>**_**<eeee>**.**<fff>

e.g. TIC-RT001-01_v231_Core.xls

As detailed in §4.1, the TIC-RT to be used for a specific test session will have a filename of the format

TIC-RT<aaa>**–**<bb>[–<c>]**_v**<ddd>**_**<eeee>_<mm><yy>_<EqA>**_v0.xls**

e.g. TIC-RT001-01_v231_Core_1107_Elettra_v0.xls

10.2 Exported Declaration & Results Files

These exported files relate to a specific version of the BLANK TIC-RT, and so use this document's name as the basis of the exported file's name.

The exported file's names are automatically generated from information found within the workbook, as follows:-

Name Field	Worksheet	Cell
TIC-RT<aaa>**–**<bb>[–<c>]	DOC-HISTORY	D2
<ddd>	DOC-HISTORY	A2
<eeee>	Intro & DocRefs	B1
<yy><mm>	DOC-HISTORY	E2
<EqA>	EqADecs	D3
<Av>	EqADecs	F8
<EqB>	EqBDecs	D3
<Bv>	EqBDecs	F8
<Cv>	Test Case Selection and Results	D9

It is expected that manufacturers shall maintain a 'filled in' version of the TIC-RT, and so the suggested name for this document must be allowed. To prevent naming clashes with the exported files, these exported files have had a suffix of '_exp' added to the format specified in Reference [5}. The exported files use :

10.2.1 Equipment A (e.g. SwMI) Declaration Files

These use :

<filename of TICRT>_<yy><mm>_<EqA>**_v**<Av>**_exp.xls**

e.g. TIC-RT001-01_v231_Core_1107_Elettra_v2_exp.xls

10.2.2 Equipment A & B (e.g. SwMI & MS) Declaration Files

These use :

<filename of TICRT>_<yy><mm>_<EqA>**_v**<Av>_<EqB>**_v**<Bv>**_exp.xls**

e.g. TIC-RT001-01_v231_Core_1107_Elettra_v2_PumaT3Ex_v2_exp.xls

10.2.3 Results Files

These files relate to a specific set of Declarations for each of the equipments being tested, so they record not only the results, but also the declarations that were active during the testing. As such, the name reflects the equipments' names and declaration versions, as well as the version of the results.

These use :

<filename of TICRT>_<yy><mm>_<EqA>_**v**<Av>_<EqB>_**v**<Bv>_**CB_v**<Cv>_**exp.xls**

e.g. TIC-RT001-01_v231_Core_1107_Elettra_v2_PumaT3Ex_v2_CB_v1_exp.xls

History

Document history		
Date	**Version**	**Comment**
04 January 2005	Version 0.0.1	Document created from version 0.0.2 of [Ref. 4]. Further explanation added.
06 January 2005	Version 0.0.2	Modified after internal review.
06 September 2006	Version 1.0.0	Information on Optional Tests added.
08 November 2006	Version 1.1.0	Refs to docs to explain the supply of the TIC-RT itself, and for the naming conventions to be used while using the TIC-RT.
23 February 2007	Version 1.2.0	Added info about the new test result value 'No_Equipment'. [Ref. 6] Ver. 2.2.0 – 23-Feb-07
09 March 2007	Version 1.3.0	Added instructions for the use of the WIDE TIC-RT.
18 June 2007	Version 1.4.0	Added info about the Test Result Extraction Mode.
31 August 2007	Version 1.4.1	Incorporate changes from TIP07-57-35 TIC-RT-Test-User-Guide-1-2-1.doc. Incorporate changes from Gunvor.Tind's e-mail: results 'by the certification body'
7 September 2007	Version 1.4.2	Add description of the 'Select Next Other Equipment' button.
16 November 2007	Version 1.4.3	Editorially update to align it to the template
04 February 2010	Version 1.4.4	Add information about the Declaration and Results export and import functions. Added new sections 4.3, 4.4.1, 4.4,2, 4.5.5, 4.5.6 and 9.2 and 5.1.1, 5.1.2, 9 & 9.1,
5 March 2010	1.4.5	Added many process related details of how to use the export/import capabilities for a specific test session (based on *TIP09-69-101, though some items altered based on discussions at TIP70)*
24 August 2010	1.4.6	Accommodated discussions at TMO71 (and all key comments in document TIP10-71-112). Some tidying up of old comments; and some minor editorials.
17 September 2010	1.4.7	Editorial corrections, as agreed at TMO73

27 February 2012	1.4.8	Updated to reflect the new results in the 'template' – so added (in §4.6.1) new test result of "**Test_nr**" (replacing "Time-nr" and "Equip-nr") and also added (in 4.7.2.1) the 'Test Type' of "**Incomplete**" (replacing "No_Equipment " and "Time_Limited") Clarified (in 4.7.3) that "Comment on Test Result" entries are not exported and so should not be used'.. Introduced new §6 to reflect details in **Action VD78 N49.** Note: cross-references to this new clause are added in §4.6 and §5.
	1.4.9	Withdrawn
13 April 2012	1.5.0	Accommodated the (editorial) comments in TMO82-200
13 April 2012	1.5.1	Added details (in §4) about the version of Excel (2003 or 2007) that can be used and (in §4.5.1) about special handling of exporting data when using Excel 2007.
24 April 2012	1.5.2	Updated T&CCA contact details (page 1) Minor editorial changes (in §4 & §4.5.1)