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Part 1: TTCN‑3 Core Language

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# Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Methods for Testing and Specification (MTS).

The present document is part 1 of a multi-part deliverable covering the Testing and Test Control Notation version 3, as identified below:

**Part 1: "TTCN‑3 Core Language";**

Part 2: "TTCN‑3 Tabular presentation Format (TFT)";

Part 3: "TTCN‑3 Graphical presentation Format (GFT)";

Part 4: "TTCN‑3 Operational Semantics";

Part 5: "TTCN‑3 Runtime Interface (TRI)";

Part 6: "TTCN‑3 Control Interface (TCI)";

Part 7: "Using ASN.1 with TTCN‑3";

Part 8: "The IDL to TTCN-3 Mapping";

Part 9: "Using XML schema with TTCN-3";

Part 10: "TTCN-3 Documentation Comment Specification";

Part 11: "Using JSON with TTCN-3".

NOTE: Part 2 of this multi-part deliverable is in status "historical" and is not maintained.

# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](https://portal.etsi.org/Services/editHelp%21/Howtostart/ETSIDraftingRules.aspx) (Verbal forms for the expression of provisions).

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# 1 Scope

The present document defines the Core Language of TTCN‑3. TTCN‑3 can be used for the specification of all types of reactive system tests over a variety of communication ports. Typical areas of application are protocol testing (including mobile and Internet protocols), service testing (including supplementary services), module testing, testing of CORBA® based platforms, APIs, etc. TTCN‑3 is not restricted to conformance testing and can be used for many other kinds of testing including interoperability, robustness, regression, system and integration testing. The specification of test suites for physical layer protocols is outside the scope of the present document.

TTCN‑3 is intended to be used for the specification of test suites which are independent of test methods, layers and protocols. In addition to the textual format defined in the present document, while GFT (ETSI ES 201 873‑3 [i.2]) defines a graphical presentation format for TTCN‑3. The specification of these formats is outside the scope of the present document.

While the design of TTCN‑3 has taken the eventual implementation of TTCN‑3 translators and compilers into consideration the means of realization of Executable Test Suites (ETS) from Abstract Test Suites (ATS) is outside the scope of the present document.

# 2 References

## 2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI ES 201 873-4: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 4: TTCN-3 Operational Semantics".

[2] ISO/IEC 10646 (2017): "Information technology -- Universal Coded Character Set (UCS)".

[3] Recommendation ITU-T X.292: "OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications - The Tree and Tabular Combined Notation (TTCN)".

NOTE: The corresponding ISO/IEC standard is ISO/IEC 9646-3: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 3: The Tree and Tabular Combined Notation (TTCN)".

[4] Recommendation ITU-T T.50: "International Reference Alphabet (IRA) (Formerly International Alphabet No. 5 or IA5) - Information technology - 7-bit coded character set for information interchange".

NOTE: The corresponding ISO/IEC standard is ISO/IEC 646: "Information technology -- ISO 7-bit coded character set for information interchange".

[5] Recommendation ITU-T X.290: "OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications - General concepts".

NOTE: The corresponding ISO/IEC standard is ISO/IEC 9646-1: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework; Part 1: General concepts".

[6] IEEE 754™: "IEEE Standard for Floating-Point Arithmetic".

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Void.

[i.2] ETSI ES 201 873-3: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 3: TTCN-3 Graphical presentation Format (GFT)".

[i.3] ETSI ES 201 873-5: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 5: TTCN-3 Runtime Interface (TRI)".

[i.4] ETSI ES 201 873-6: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 6: TTCN-3 Control Interface (TCI)".

[i.5] ETSI ES 201 873-7: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 7: Using ASN.1 with TTCN-3".

[i.6] ETSI ES 201 873-8: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 8: The IDL to TTCN-3 Mapping".

[i.7] ETSI ES 201 873-9: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 9: Using XML schema with TTCN-3".

[i.8] ETSI ES 201 873-10: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 10: TTCN-3 Documentation Comment Specification".

[i.9] Void.

[i.10] Object Management Group (OMG) (2001): "The Common Object Request Broker: Architecture and Specification - IDL Syntax and Semantics". Version 2.6, FORMAL/01-12-01.

[i.11] ETSI ES 202 781: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: Configuration and Deployment Support".

[i.12] ETSI ES 202 784: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: Advanced Parameterization".

[i.13] ETSI ES 202 785: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: Behaviour Types".

[i.14] ETSI ES 202 782: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: TTCN-3 Performance and Real Time Testing".

[i.15] Void.

[i.16] Void.

[i.17] ETSI ES 201 873-1 (V1.1.2): "Methods for Testing and Specification (MTS); The Tree and Tabular Combined Notation version 3; Part 1: TTCN-3 Core Language", 2001.

[i.18] ETSI ES 201 873-1 (V2.2.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2003.

[i.19] ETSI ES 201 873-1 (V3.1.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2005.

[i.20] ETSI ES 201 873-1 (V3.2.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2007.

[i.21] ETSI ES 201 873-1 (V3.3.2): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2008.

[i.22] ETSI ES 201 873-1 (V3.4.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2008.

[i.23] ETSI ES 201 873-1 (V4.1.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2009.

[i.24] ETSI ES 201 873-1 (V4.2.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2010.

[i.25] ETSI ES 201 873-1 (V4.3.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2011.

[i.26] ETSI ES 201 873-1 (V4.4.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2012.

[i.27] ETSI ES 201 873-1 (V4.5.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2013.

[i.28] ETSI ES 201 873-1 (V4.6.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2014.

[i.29] ETSI ES 201 873-1 (V4.7.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2015.

[i.30] ETSI ES 201 873-1 (V4.8.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2016.

[i.31] ETSI ES 201 873-1 (V4.9.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2017.

[i.32] ETSI ES 201 873-1 (V4.10.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2018.

[i.33] ETSI ES 201 873-1 (V4.11.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2019.

[i.34] ETSI ES 201 873-1 (V4.12.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language", 2020.

[i.xx] ETSI ES 202 786: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: Support of interfaces with continuous signals".

[i.yy] ETSI ES 203 022: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: Advanced Matching".

[i.zz] ETSI ES 203 790: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: Object-Oriented Features".

# 8 Modules

## 8.0 General

The principal building blocks of TTCN‑3 are modules. A module may define a fully executable test suite or just a library. A module may refer to the TTCN-3 language version and to package versions being used. A module contains definitions.

NOTE: The term test suite is synonymous with a complete set of TTCN‑3 modules containing test cases and a control function.

The transfer syntax of TTCN-3 modules shall be UTF-8, i.e. each character of the module shall be individually encoded and decoded according to the UCS Transformation Format 8 (UTF-8) as defined in annex R of ISO/IEC 10646 [2] and no characters not corresponding to any character of the module shall be present.

## 8.1 Definition of a module

A module is defined with the keyword **module**.

NOTE 1: The treatment of TTCN‑3 modules in files, repositories and alike is outside the scope of the present document.

***Syntactical Structure***

**module** *ModuleIdentifier* [ **language** *FreeText* { "," *FreeText* } ] "{"

 [ *ModuleDefinitionsPart* ]

"}"

***Semantic Description***

A TTCN‑3 module groups a set of (typically cohesive) TTCN‑3 definitions. TTCN‑3 modules have an explicit import interface to use definitions from other TTCN‑3 or non-TTCN‑3 modules. It is possible to hide definitions in a TTCN‑3 module (see clause 8.2.5). TTCN‑3 modules can be compiled/interpreted separately. They are reusable and parameterizable.

Module names are of the form of a TTCN‑3 identifier.

NOTE 2: The module identifier is the informal text name of the module.

In addition, a module specification can carry an optional attribute identified by the **language** keyword that identifies the edition of the TTCN‑3 language, in which the module is specified. The following language strings are to be used:

 "TTCN‑3:2001" - to be used with modules complying with V1.1.2 [i.17] of the present document.
 "TTCN‑3:2003" - to be used with modules complying with V2.2.1 [i.18] of the present document.
 "TTCN‑3:2005" - to be used with modules complying with V3.1.1 [i.19] of the present document.
 "TTCN‑3:2007" - to be used with modules complying with V3.2.1 [i.20] of the present document.
 "TTCN‑3:2008" - to be used with modules complying with V3.3.2 [i.21] of the present document.
 "TTCN‑3:2008 Amendment 1" - to be used with modules complying with V3.4.1 [i.22] of the present document.
 "TTCN‑3:2009" - to be used with modules complying with V4.1.1 [i.23] of the present document.
 "TTCN‑3:2010" - to be used with modules complying with V4.2.1 [i.24] of the present document.
 "TTCN‑3:2011" - to be used with modules complying with V4.3.1 [i.25] of the present document.
 "TTCN‑3:2012" - to be used with modules complying with V4.4.1 [i.26] of the present document.
 "TTCN‑3:2013" - to be used with modules complying with V4.5.1 [i.27] of the present document.
 "TTCN‑3:2014" - to be used with modules complying with V4.6.1 [i.28] of the present document.
 "TTCN‑3:2015" - to be used with modules complying with V4.7.1 [i.29] of the present document.
 "TTCN‑3:2016" - to be used with modules complying with V4.8.1 [i.30] of the present document.
 "TTCN‑3:2017" - to be used with modules complying with V4.9.1 [i.31] of the present document.
 "TTCN‑3:2018" - to be used with modules complying with V4.10.1 [i.32] of the present document.
 "TTCN‑3:2019" - to be used with modules complying with V4.11.1 [i.33] of the present document.
 "TTCN‑3:2020" - to be used with modules complying with V4.12.1 [i.34] of the present document.
 "TTCN‑3:2021" - to be used with modules complying with the present document.

Furthermore, the optional attribute identified by the **language** keyword may identify package versions being used by this module. The package tags are defined in ETSI ES 202 781 [i.11], ETSI ES 202 782 [i.14], ETSI ES 202 784 [i.12], ETSI ES 202 785 [i.13], ETSI ES 202 786 [i.xx], ETSI ES 203 022 [i.yy], and ETSI ES 203 790 [i.zz]. The language identifier and the package identifier are to be written as a comma-separated list.

***Restrictions***

In addition to the general static rules of TTCN-3 given in clause 5, the following restrictions apply:

1. At most one language string per module shall be given to define the core language version in which the module is defined.
2. Per extension package, at most one extension package string of that extension package shall be used by a module.

***Examples***

 **module** MyTestSuite **language** "TTCN‑3:2003"

 { … }