

**SLOVENSKI STANDARD**  
**SIST ES 201 873-1 V4.10.1:2019**  
**01-september-2019**

---

**Metode za preskušanje in specificiranje (MTS) - 3. različica zapisa preskušanja in krmiljenja preskusov - 1. del: Jedrni jezik TTCN-3**

Methods for Testing and Specification (MTS) - The Testing and Test Control Notation version 3 - Part 1: TTCN-3 Core Language

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

**Ta slovenski standard je istoveten z:** [SIST ES 201 873-1 V4.10.1:2019](#) **ETSI ES 201 873-1 V4.10.1 (2018-05)**  
<https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019>

---

**ICS:**

33.040.01	Telekomunikacijski sistemi na splošno	Telecommunication systems in general
35.060	Jeziki, ki se uporabljajo v informacijski tehniki in tehnologiji	Languages used in information technology

**SIST ES 201 873-1 V4.10.1:2019** **en**

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ES 201 873-1 V4.10.1:2019](#)

<https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019>

# ETSI ES 201 873-1 V4.10.1 (2018-05)



## **Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1:TTCN-3 Core Language**

[SIST ES 201 873-1 V4.10.1:2019](https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019)  
<https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019>

---

Reference

RES/MTS-201873-1v4A1

---

Keywords

language, methodology, testing, TTCN-3

***ETSI***

650 Route des Lucioles  
 F-06921 Sophia Antipolis Cedex - FRANCE

---

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
 Association à but non lucratif enregistrée à la  
 Sous-Préfecture de Grasse (06) N° 7803/88

## iTeh STANDARD PREVIEW (standards.iteh.ai)

***Important notice***SIST ES 201 873-1 V4.10.1:2019

<https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd71fc916b2/SIST-ES-201-873-1-V4.1-2019>  
 The present document can be downloaded from:  
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.  
 Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:  
<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

***Copyright Notification***

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.  
 The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2018.  
 All rights reserved.

**DECT™, PLUGTESTS™, UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.  
**3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and  
 of the 3GPP Organizational Partners.

**oneM2M** logo is protected for the benefit of its Members.  
**GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

---

## Contents

Intellectual Property Rights .....	13
Foreword.....	13
Modal verbs terminology.....	13
1 Scope .....	14
2 References .....	14
2.1 Normative references .....	14
2.2 Informative references.....	15
3 Definitions and abbreviations.....	16
3.1 Definitions .....	16
3.2 Abbreviations .....	21
4 Introduction .....	22
4.0 General .....	22
4.1 The core language and presentation formats .....	23
4.2 Unanimity of the specification .....	24
4.3 Conformance .....	24
5 Basic language elements .....	24
5.0 General .....	24
5.1 Identifiers and keywords .....	25
5.2 Scope rules .....	26
5.2.0 General.....	26
5.2.1 Scope of formal parameters.....	28
5.2.2 Uniqueness of identifiers .....	28
5.3 Ordering of language elements.....	29
5.4 Parameterization.....	29
5.4.0 General..... <a href="https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-acd0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019">https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-acd0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019</a>	29
5.4.1 Formal parameters .....	30
5.4.1.0 General .....	30
5.4.1.1 Formal parameters of kind value.....	30
5.4.1.2 Formal parameters of kind template.....	33
5.4.2 Actual parameters .....	35
5.5 Cyclic Definitions.....	40
6 Types and values .....	41
6.0 General .....	41
6.1 Basic types and values.....	42
6.1.0 Simple basic types and values.....	42
6.1.1 Basic string types and values .....	43
6.1.1.0 General .....	43
6.1.1.1 Accessing individual string elements .....	45
6.1.2 Subtyping of basic types .....	46
6.1.2.0 General .....	46
6.1.2.1 Lists of templates .....	46
6.1.2.2 Lists of types .....	46
6.1.2.3 Ranges.....	47
6.1.2.4 String length restrictions .....	47
6.1.2.5 Pattern subtyping of character string types .....	48
6.1.2.6 Mixing subtyping mechanisms.....	48
6.1.2.6.1 Mixing patterns, lists and ranges .....	48
6.1.2.6.2 Using length restriction with other constraints .....	49
6.2 Structured types and values.....	49
6.2.0 General.....	49
6.2.1 Record type and values .....	51
6.2.1.0 General .....	51
6.2.1.1 Referencing fields of a record type .....	53

6.2.1.2	Optional elements in a record.....	55
6.2.1.3	Nested type definitions for field types .....	55
6.2.2	Set type and values .....	55
6.2.2.0	General.....	55
6.2.2.1	Referencing fields of a set type .....	56
6.2.2.2	Optional elements in a set .....	56
6.2.2.3	Nested type definition for field types .....	56
6.2.3	Records and sets of single types .....	56
6.2.3.0	General.....	56
6.2.3.1	Nested type definitions.....	59
6.2.3.2	Referencing elements of record of and set of types .....	59
6.2.4	Enumerated type and values .....	60
6.2.5	Unions.....	61
6.2.5.0	General.....	61
6.2.5.1	Referencing fields of a union type .....	63
6.2.5.2	Option and union.....	64
6.2.5.3	Nested type definition for field types .....	64
6.2.6	The anytype .....	64
6.2.7	Arrays .....	65
6.2.8	The default type .....	66
6.2.9	Communication port types.....	67
6.2.10	Component types .....	69
6.2.10.1	Component type definition.....	69
6.2.10.2	Reuse of component types .....	70
6.2.11	Component references .....	72
6.2.12	Addressing entities inside the SUT.....	74
6.2.13	Subtyping of structured types.....	76
6.2.13.0	General.....	76
6.2.13.1	Length subtyping of record ofs and set ofs .....	76
6.2.13.2	List subtyping of structured types and anytype .....	77
6.2.13.3	Subtyping of the iterated type of record ofs and set ofs .....	79
6.2.13.4	Mixing subtyping mechanisms <small>SIST ES 201 873-1 V4.10.1:2019</small> .....	81
6.2.14	The timer type <a href="https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019">https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019</a> .....	81
6.3	Type compatibility .....	81
6.3.0	General.....	81
6.3.1	Compatibility of non-structured types .....	81
6.3.2	Compatibility of structured types.....	83
6.3.2.0	General .....	83
6.3.2.1	Compatibility of enumerated types .....	83
6.3.2.2	Compatibility of record and record of types .....	83
6.3.2.3	Compatibility of set and set of types.....	85
6.3.2.4	Compatibility of union types.....	85
6.3.2.5	Compatibility of anytype types .....	86
6.3.2.6	Compatibility between sub-structures .....	87
6.3.3	Compatibility of component types.....	87
6.3.4	Type compatibility of communication and connection operations .....	88
6.3.5	Type conversion.....	88
6.3.6	Type compatibility of port types.....	89
6.3.7	Type compatibility of timer types.....	89
6.4	Type synonym.....	89
7	Expressions.....	89
7.0	General .....	89
7.1	Operators .....	90
7.1.0	General.....	90
7.1.1	Arithmetic operators .....	91
7.1.2	List operator.....	92
7.1.3	Relational operators .....	92
7.1.4	Logical operators .....	95
7.1.5	Bitwise operators .....	95
7.1.6	Shift operators.....	96
7.1.7	Rotate operators .....	97

7.2	Field references and list elements.....	98
7.3	Decoded field reference.....	98
8	Modules.....	99
8.0	General .....	99
8.1	Definition of a module .....	99
8.2	Module definitions part .....	100
8.2.0	General.....	100
8.2.1	Module parameters .....	101
8.2.2	Groups of definitions .....	102
8.2.3	Importing from modules .....	103
8.2.3.0	General .....	103
8.2.3.1	General format of import .....	103
8.2.3.2	Importing single definitions .....	110
8.2.3.3	Importing groups.....	111
8.2.3.4	Importing definitions of the same kind .....	112
8.2.3.5	Importing all definitions of a module.....	113
8.2.3.6	Import definitions from other TTCN-3 editions and from non-TTCN-3 modules.....	113
8.2.3.7	Importing of import statements from TTCN-3 modules .....	115
8.2.3.8	Compatibility of language specifications in imports .....	116
8.2.4	Definition of friend modules.....	117
8.2.5	Visibility of definitions .....	117
8.3	Module control part .....	119
9	Port types, component types and test configurations .....	119
9.0	General .....	119
9.1	Communication ports .....	120
9.2	Test system interface.....	122
10	Declaring constants .....	124
11	Declaring variables.....	124
11.0	General .....	124
11.1	Value variables.....	125
11.2	Template variables .....	126
12	Declaring timers .....	127
13	Declaring messages .....	128
14	Declaring procedure signatures .....	129
15	Declaring templates.....	130
15.0	General .....	130
15.1	Declaring message templates .....	131
15.2	Declaring signature templates .....	132
15.3	Global and local templates .....	134
15.4	In-line Templates.....	135
15.5	Modified templates .....	136
15.6	Referencing elements of templates or template fields .....	139
15.6.0	General.....	139
15.6.1	Referencing individual string elements.....	139
15.6.2	Referencing <b>record</b> and <b>set</b> fields.....	140
15.6.3	Referencing <b>record of</b> and <b>set of</b> elements .....	141
15.6.4	Referencing signature parameters.....	144
15.6.5	Referencing <b>union</b> alternatives.....	145
15.7	Template matching mechanisms .....	146
15.7.0	General.....	146
15.7.1	Specific values .....	147
15.7.2	Special symbols that can be used instead of values .....	148
15.7.3	Special symbols that can be used inside values .....	149
15.7.4	Special symbols which describe attributes of values .....	149
15.8	Template Restrictions .....	150
15.9	Match Operation.....	152

15.10	Valueof Operation .....	154
15.11	Concatenating templates of string and list types .....	154
16	Functions, altsteps and testcases .....	157
16.0	General .....	157
16.1	Functions .....	157
16.1.0	General.....	157
16.1.1	Invoking functions .....	160
16.1.2	Predefined functions .....	161
16.1.3	External functions .....	163
16.1.4	Invoking functions from specific places .....	164
16.2	Altsteps.....	165
16.2.0	General.....	165
16.2.1	Invoking altsteps .....	166
16.3	Test cases.....	168
17	Void.....	169
18	Overview of program statements and operations .....	169
19	Basic program statements.....	171
19.0	General .....	171
19.1	Assignments .....	172
19.2	The If-else statement .....	174
19.3	The Select statements .....	174
19.3.1	The Select case statement .....	174
19.3.2	The Select union statement .....	175
19.4	The For statement.....	176
19.5	The While statement.....	177
19.6	The Do-while statement .....	177
19.7	The Label statement .....	178
19.8	The Goto statement .....	178
19.9	The Stop execution statement.....	179
19.10	The Return statement.....	180
19.11	The Log statement.....	181
19.12	The Break statement .....	182
19.13	The Continue statement.....	183
19.14	Statement block .....	184
20	Statement and operations for alternative behaviours.....	184
20.0	General .....	184
20.1	The snapshot mechanism.....	185
20.2	The Alt statement .....	185
20.3	The Repeat statement .....	189
20.4	The Interleave statement .....	190
20.5	Default Handling .....	192
20.5.0	General.....	192
20.5.1	The default mechanism.....	193
20.5.2	The Activate operation.....	193
20.5.3	The Deactivate operation.....	194
21	Configuration Operations .....	195
21.0	General .....	195
21.1	Connection Operations .....	196
21.1.0	General.....	196
21.1.1	The Connect and Map operations .....	197
21.1.2	The Disconnect and Unmap operations .....	199
21.2	Test case operations.....	201
21.2.0	General.....	201
21.2.1	Test case stop operation .....	201
21.3	Test Component Operations .....	201
21.3.0	General.....	201
21.3.1	The Create operation.....	201
21.3.2	The Start test component operation .....	203

21.3.3	The Stop test behaviour operation .....	204
21.3.4	The Kill test component operation.....	205
21.3.5	The Alive operation .....	206
21.3.6	The Running operation .....	207
21.3.7	The Done operation .....	208
21.3.8	The Killed operation .....	210
21.3.9	Summary of the use of any and all with components .....	212
22	Communication operations.....	212
22.0	General .....	212
22.1	The communication mechanisms .....	213
22.1.0	General.....	213
22.1.1	Principles of message-based communication.....	213
22.1.2	Principles of procedure-based communication .....	214
22.1.3	Principles of unicast, multicast and broadcast communication.....	214
22.1.4	General format of communication operations .....	215
22.1.4.0	General .....	215
22.1.4.1	General format of the sending operations .....	215
22.1.4.2	General format of the receiving operations .....	216
22.2	Message-based communication.....	217
22.2.0	General.....	217
22.2.1	The Send operation .....	217
22.2.2	The Receive operation .....	218
22.2.3	The Trigger operation .....	222
22.3	Procedure-based communication.....	225
22.3.0	General.....	225
22.3.1	The Call operation.....	225
22.3.2	The Getcall operation.....	229
22.3.3	The Reply operation.....	232
22.3.4	The Getreply operation .....	233
22.3.5	The Raise operation .....	236
22.3.6	The Catch operation.....	237
22.4	The Check operation.....	240
22.5	Controlling communication ports.....	243
22.5.0	General.....	243
22.5.1	The Clear port operation .....	243
22.5.2	The Start port operation .....	243
22.5.3	The Stop port operation .....	244
22.5.4	The Halt port operation.....	244
22.5.5	The Checkstate port operation .....	245
22.6	Use of any and all with ports .....	247
23	Timer operations .....	247
23.0	General .....	247
23.1	The timer mechanism .....	247
23.2	The Start timer operation .....	248
23.3	The Stop timer operation .....	248
23.4	The Read timer operation .....	249
23.5	The Running timer operation .....	249
23.6	The Timeout operation .....	250
23.7	Summary of use of any and all with timers .....	251
24	Test verdict operations .....	252
24.0	General .....	252
24.1	The Verdict mechanism.....	252
24.2	The Setverdict operation .....	253
24.3	The Getverdict operation .....	254
25	External actions .....	254
26	Module control .....	255
26.0	General .....	255
26.1	The Execute statement.....	255
26.2	The Control part .....	257

27	Specifying attributes .....	259
27.0	General .....	259
27.1	The Attribute mechanism .....	259
27.1.0	General.....	259
27.1.1	Scope of attributes .....	260
27.1.2	Overwriting rules for attributes.....	261
27.1.2.0	General .....	261
27.1.2.1	Additional default overwriting rules for variant attributes .....	263
27.1.2.2	Overwriting rules for multiple encoding .....	264
27.1.3	Changing attributes of imported language elements .....	264
27.2	The With statement .....	265
27.3	Display attributes.....	266
27.4	Encoding attributes.....	266
27.5	Variant attributes .....	268
27.6	Extension attributes .....	270
27.7	Optional attributes .....	270
27.8	Retrieving attribute values.....	272
27.9	Dynamic configuration of encoding used by ports.....	273

<b>Annex A (normative):</b>	<b>BNF and static semantics .....</b>	<b>275</b>
-----------------------------	---------------------------------------	------------

A.1	TTCN-3 BNF .....	275
A.1.0	General .....	275
A.1.1	Conventions for the syntax description .....	275
A.1.2	Statement terminator symbols .....	275
A.1.3	Identifiers .....	275
A.1.4	Comments.....	276
A.1.5	TTCN-3 terminals <b>iTeh STANDARD PREVIEW</b> .....	276
A.1.5.0	General.....	276
A.1.5.1	Use of whitespaces and newlines.....	278
A.1.6	TTCN-3 syntax BNF productions .....	279
A.1.6.0	TTCN-3 module.....	279
A.1.6.1	Module definitions part <a href="https://standards.iteh.ai/catalog/standards/sist/43/a60816-11a7-49c5-acd0-8dd20cd910b5/sist-es-201-873-1-v4-10-1-2019">https://standards.iteh.ai/catalog/standards/sist/43/a60816-11a7-49c5-acd0-8dd20cd910b5/sist-es-201-873-1-v4-10-1-2019</a> .....	279
A.1.6.1.0	General.....	279
A.1.6.1.1	Typedef definitions .....	279
A.1.6.1.2	Constant definitions .....	281
A.1.6.1.3	Template definitions.....	281
A.1.6.1.4	Function definitions .....	283
A.1.6.1.5	Signature definitions .....	284
A.1.6.1.6	Testcase definitions .....	284
A.1.6.1.7	Altstep definitions .....	284
A.1.6.1.8	Import definitions.....	284
A.1.6.1.9	Group definitions .....	285
A.1.6.1.10	External function definitions .....	285
A.1.6.1.11	External constant definitions .....	285
A.1.6.1.12	Module parameter definitions .....	285
A.1.6.1.13	Friend module definitions .....	286
A.1.6.2	Control part.....	286
A.1.6.3	Local definitions .....	286
A.1.6.3.1	Variable instantiation .....	286
A.1.6.3.2	Timer instantiation .....	286
A.1.6.4	Operations.....	286
A.1.6.4.1	Component operations .....	286
A.1.6.4.2	Port operations .....	287
A.1.6.4.3	Timer operations .....	289
A.1.6.4.4	Testcase operation.....	289
A.1.6.5	Type .....	289
A.1.6.6	Value.....	290
A.1.6.7	Parameterization .....	291
A.1.6.8	Statements.....	291
A.1.6.8.1	With statement .....	291
A.1.6.8.2	Behaviour statements .....	292

A.1.6.8.3	Basic statements .....	293
A.1.6.9	Miscellaneous productions .....	295

## **Annex B (normative): Matching values ..... 296**

B.1	Template matching mechanisms .....	296
B.1.0	General .....	296
B.1.1	Matching specific values .....	296
B.1.2	Matching mechanisms instead of values .....	296
B.1.2.0	General.....	296
B.1.2.1	Template list .....	296
B.1.2.2	Complemented template list .....	297
B.1.2.3	Any value.....	298
B.1.2.4	Any value or none.....	299
B.1.2.5	Value range.....	300
B.1.2.6	SuperSet.....	300
B.1.2.7	SubSet .....	301
B.1.2.8	Omitting optional fields .....	303
B.1.2.9	Matching decoded content .....	303
B.1.2.10	Matching enumerated value with value list .....	305
B.1.3	Matching mechanisms inside values .....	305
B.1.3.0	General.....	305
B.1.3.1	Any element.....	305
B.1.3.1.0	General.....	305
B.1.3.1.1	Using single character wildcards.....	305
B.1.3.2	Any number of elements or no element .....	306
B.1.3.2.0	General.....	306
B.1.3.2.1	Using multiple character wildcards.....	306
B.1.3.3	Permutation.....	306
B.1.4	Matching attributes of values ..... ( <a href="https://standards.iteh.ai">standards.iteh.ai</a> )	308
B.1.4.0	General.....	308
B.1.4.1	Length restrictions .....	308
B.1.4.2	The IfPresent indicator.....	309
B.1.5	Matching character pattern ..... <a href="https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019">https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019</a>	310
B.1.5.0	General.....	310
B.1.5.1	Set expression .....	312
B.1.5.2	Reference expression .....	312
B.1.5.3	Match expression n times .....	314
B.1.5.4	Match a referenced character set.....	314
B.1.5.5	Type compatibility rules for patterns .....	315
B.1.5.6	Case insensitive pattern matching.....	315

## **Annex C (normative): Predefined TTCN-3 functions..... 316**

C.0	General exception handling procedures .....	316
C.1	Conversion functions.....	316
C.1.1	Integer to character .....	316
C.1.2	Integer to universal character .....	316
C.1.3	Integer to bitstring .....	316
C.1.4	Integer to enumerated .....	317
C.1.5	Integer to hexstring.....	317
C.1.6	Integer to octetstring.....	317
C.1.7	Integer to charstring.....	318
C.1.8	Integer to float .....	318
C.1.9	Float to integer .....	318
C.1.10	Character to integer .....	318
C.1.11	Character to octetstring .....	318
C.1.12	Universal character to integer.....	319
C.1.13	Bitstring to integer.....	319
C.1.14	Bitstring to hexstring .....	319
C.1.15	Bitstring to octetstring .....	320
C.1.16	Bitstring to charstring .....	320

C.1.17	Hexstring to integer .....	320
C.1.18	Hexstring to bitstring .....	320
C.1.19	Hexstring to octetstring .....	321
C.1.20	Hexstring to charstring .....	321
C.1.21	Octetstring to integer .....	321
C.1.22	Octetstring to bitstring .....	322
C.1.23	Octetstring to hexstring .....	322
C.1.24	Octetstring to character string .....	322
C.1.25	Octetstring to character string, version II .....	322
C.1.26	Charstring to integer .....	323
C.1.27	Character string to hexstring .....	323
C.1.28	Character string to octetstring .....	323
C.1.29	Character string to float .....	324
C.1.30	Enumerated to integer .....	324
C.1.31	Octetstring to universal character string .....	325
C.1.32	Universal character string to octetstring .....	325
C.1.33	Value or template to universal charstring .....	326
C.2	Length/size functions .....	327
C.2.1	Length of strings and lists .....	327
C.2.2	Number of elements in a structured value .....	328
C.3	Presence checking functions .....	329
C.3.1	The IsPresent function .....	329
C.3.2	The IsChosen function .....	330
C.3.3	The IsValue function .....	331
C.3.4	The IsBound function .....	333
C.3.5	Matching mechanism detection .....	334
C.4	String/list handling functions .....	335
C.4.1	The Regexp function .....	335
C.4.2	The Substring function .....	336
C.4.3	The Replace function .....	337
C.5	Codec functions .....	338
C.5.1	The encoding function .....	338
C.5.2	The decoding function .....	338
C.5.3	The encoding to universal charstring function .....	339
C.5.4	The decoding from universal charstring function .....	340
C.5.5	The encoding to octetstring function .....	341
C.5.6	The decoding from octetstring function .....	341
C.5.7	Retrieving the type of string encoding .....	342
C.5.8	Removing BOMs of UCS encoding schemes .....	342
C.6	Other functions .....	343
C.6.1	The random number generator function .....	343
C.6.2	The testcasename function .....	343
C.6.3	The hostId function .....	344
<b>Annex D (normative):</b>	<b>Preprocessing macros .....</b>	<b>345</b>
D.0	General .....	345
D.1	Preprocessing macro <code>_MODULE_</code> .....	345
D.2	Preprocessing macro <code>_FILE_</code> .....	345
D.3	Preprocessing macro <code>_BFILE_</code> .....	345
D.4	Preprocessing macro <code>_LINE_</code> .....	345
D.5	Preprocessing macro <code>_SCOPE_</code> .....	346
<b>Annex E (informative):</b>	<b>Library of Useful Types .....</b>	<b>348</b>
E.1	Limitations .....	348

E.2	Useful TTCN-3 types .....	348
E.2.1	Useful simple basic types .....	348
E.2.1.0	Signed and unsigned single byte integers .....	348
E.2.1.1	Signed and unsigned short integers.....	348
E.2.1.2	Signed and unsigned long integers .....	349
E.2.1.3	Signed and unsigned longlong integers .....	349
E.2.1.4	IEEE 754™ floats .....	349
E.2.2	Useful character string types .....	350
E.2.2.0	UTF-8 character string "utf8string" .....	350
E.2.2.1	BMP character string "bmpstring" .....	350
E.2.2.2	UTF-16 character string "utf16string" .....	350
E.2.2.3	ISO/IEC 10646 character string "iso8859string" .....	350
E.2.2.4	Status values for TTCN-3 objects.....	351
E.2.2.5	Template kinds of TTCN-3 objects .....	351
E.2.3	Useful structured types .....	351
E.2.3.0	Fixed-point decimal literal .....	351
E.2.4	Useful atomic string types .....	352
E.2.4.1	Single Recommendation ITU-T T.50 character type.....	352
E.2.4.2	Single universal character type .....	352
E.2.4.3	Single bit type .....	352
E.2.4.4	Single hex type .....	352
E.2.4.5	Single octet type .....	352
<b>Annex F (informative):</b>	<b>Operations on TTCN-3 active objects.....</b>	<b>353</b>
F.0	General .....	353
F.1	Test components.....	353
F.1.1	Test component references .....	353
F.1.2	Dynamic behaviour of PTCs .....	354
F.1.3	Dynamic behaviour of the MTC.....	356
F.2	Timers.....	356
F.3	Ports.....	357
F.3.0	General .....	357
F.3.1	Configuration Operations .....	357
F.3.2	Port Controlling Operations .....	358
F.3.3	Communication Operations.....	359
<b>Annex G (informative):</b>	<b>Deprecated language features.....</b>	<b>360</b>
G.1	Group style definition of module parameters .....	360
G.2	Recursive import .....	360
G.3	Using <b>a11</b> in port type definitions.....	360
G.4	sizeof for length of lists .....	360
G.5	sizeoftype predefined function .....	360
G.6	Mixed ports .....	360
G.7	External constants .....	361
G.8	Prefixing enumerated values .....	361
G.9	Record of/arrays not compatible to record; set of not compatible with set.....	361
G.10	The "UCS-2" predefined variant attribute string.....	361
G.11	Prefixing identifiers of local definitions with module identifiers.....	361
G.12	Matching expressions of incompatible types .....	361
G.13	Assignment of less restrictive templates to more restrictive templates.....	362

G.14 Mixing case and case else branches in select statements .....	362
<b>Annex H (informative):      Bibliography .....</b>	<b>363</b>
History .....	364

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST ES 201 873-1 V4.10.1:2019  
<https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019>

## Intellectual Property Rights

### Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

### Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

## Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Methods for Testing and Specification (MTS).  
**ITEN STANDARD PREVIEW**  
**(standards.iteh.ai)**

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

[SIST ES 201 873-1 V4.10.1:2019](#)

**Part 1: "TTCN-3 Core Language";** <https://standards.iteh.ai/catalog/standards/sist/43a60816-11a7-49e5-aed0-8dd20cd916b5/sist-es-201-873-1-v4-10-1-2019>

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

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

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" .

## 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](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.