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Foreword

This ETSI Technical Report (ETR) has been produced by the Methods for Testing and Specification (MTS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

Introduction

This ETR is intended to identify general quality criteria to be met by ETSI testing standards. As these criteria are designed to be generally applicable, they need to be adapted for each set of test specifications to be produced.

Thus, criteria are provided for checking compliance with the standard conformance testing methodology (ISO 9646 [1 to 8] and ETS 300 406 [9]), but not for checking that the test specifications accurately reflect the relevant protocol and/or profile specifications.

These quality criteria are common to the production of ETSI testing standards. Quality criteria concerning a specific standard, taking into account it's specific features should be defined in the quality plan concerning that standard.

The quality review tables contained in this ETR have been harmonized, where relevant, with the related tables of the ETG 042 [14]. However, EWOS deals mainly with Open Systems Interconnection (OSI) related domains whereas ETSI deals with telecommunication protocols. Consequently, there are differences in content between EWOS and ETSI documents. These differences have been limited to the specific fields of application of EWOS and ETSI. A table provided in annex A indicates the relationship between ETSI and EWOS quality criteria.

The quality review tables are contained in clause 4 and with the exception of table 1, contain 7 columns:

1) the Item column which identifies the item. The item identification comprises two parts - the table number and the item number itself;
2) the quality criterion column containing the description, in prose, of the item;
3) the reference column indicates the reference(s) standard(s) in which this item is defined as well as the clause in the reference standard;
4) the status column provides the status of the item in the reference standard:

   - M = Mandatory;
   - O = Optional (each occurrence of the O status is followed by a reference number);
   - C = Conditional (each occurrence of the C status is followed by a reference number);
   - P = Prohibited;
   - NA = Not Applicable.

5) the importance column contains a value between 1 and 4, with 1 corresponding to the most important criterion and 4 to the least important.

The importance column has been added for pragmatic reasons, in order to help the quality reviewer in establishing priorities among the items. It's aim is not to contradict the content of the column status but to help the reviewer to establish a hierarchy between items and to prioritize possible activities of improvement deemed necessary after review.

The role of the status column is to recall what is or is not allowed by ISO 9646 and ETS 300 406 [9]. The role of the importance column is to provide the reviewer with information which helps to assess the quality of the standard.

In some cases, minor discrepancies may appear between the content of the status column and the content of the importance column. This is due to the fact that the status is directly derived from the requirements of ISO 9646 [1 to 8] which has been designed for OSI protocols, while the importance

column takes the ETSI specific needs into account. In this context, ETSI specific needs have to be understood as needs related to the specific constraints of testing telecommunication protocols.

1   Scope

The objective of this ETR is to provide a basis for evaluating the quality of the component parts of a testing standard.

This ETR may be used either for the evaluation of the quality of an input (i.e. Conformance Testing Services test suite submitted to ETSI) or for the evaluation of the quality of a testing standard produced internally by ETSI.

This ETR may be used by the team in charge of the development of the test suite as well as by a quality review team external to the development team.

The aim of this ETR is not to be self contained but to be used in conjunction with related ETSI documents:

-    the basic definitions are contained in ETS 300 406 [9] and are not duplicated here;
-    the guidance related to Protocol Implementation Conformance Statement (PICS) and Implementation Conformance Statement (ICS) is provided in ETR 212 [12];
-    the guidance related to test purposes is provided in ETR 266 [13];
-    the guidance related to Tree and Tabular Combined Notation (TTCN) is provided in ETR 141 [11].

Use of this ETR should not contradict the references listed in clause 2, it's purpose is to provide quality criteria that reflect the provisions contained in those references.

The tables in this document have been designed to be applicable to any (tele)communications protocol.

Testing of physical aspects, such as "layer 1", analogue measurements, Electromagnetic Compatibility, etc. is not covered by this ETR. However, part of the methodology may be still be applied, e.g. the concepts of Implementation Conformance Statement (ICS), Implementation eXtra Information for Testing (IXIT), Test Purposes (TPs), and Test Suite Structure (TSS). In this case, a relevant selection of the criteria contained in this ETR can be made.

2   References

For the purposes of this ETR, the following references apply:

[1]   ISO/IEC 9646-1 Edition 2 (1994) (including draft addenda 1 and 2 when published): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[2]   ISO/IEC 9646-2 Edition 2 (1994) (including draft addenda 1 and 2 when published): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract test suite specification".

[3]   ISO/IEC 9646-3 (1992): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

[4]   ISO/IEC 9646-4 Edition 2 (1994): (including draft addenda 1 and 2 when published): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realisation".

[5]   ISO/IEC 9646-5 Edition 2 (1994): (including draft addenda 1 and 2 when published): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[6]   ISO/IEC 9646-6 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".

[7]   ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[8]   ISO/IEC 9646-3 Amendment 1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation. Amendment 1: TTCN Extensions (concurrent TTCN)".

[9]   ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[10]   CEN/CENELEC: IR part 3: "Rules for the drafting and presentation of European Standards (PNE Rules) September 1991".

[11]   ETR 141 (1994): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications The Tree and Tabular Combined Notation (TTCN) style guide".

[12]   ETR 212 (1995): "Methods for Testing and Specification (MTS); Implementation Conformance Statement (ICS) pro forma style guide".

[13]   ETR 266 (1996): "Methods for Testing and Specification (MTS); Test Purpose style guide".

[14]   ETG 042 (1994): "General Quality Assurance Plan for the Protocol and Protocol Profile Test Specification Production Process".

3   Abbreviations

For the purposes of this ETR, the following abbreviations apply:

ASP	Abstract Service Primitive
ATC	Abstract Test Case
ATM	Abstract Test Method
ATS	Abstract Test Suite
C	Conditional (in a status column)
CTP	Combined Test Purpose
ETG	EWOS Technical Guide
GR	GRaphical form of TTCN
ICS	Implementation Conformance Statement
IUT	Implementation Under Test
IXIT	Implementation eXtra Information for Testing
M	Mandatory (in a status column)
MOT	Means Of Testing
MP	Machine Processable form of TTCN
MPyT	Multi-Party Testing
NA	Not Applicable (in a status column)
O	Optional (in a status column)
OSI	Open Systems Interconnection
P	Prohibited (in a status column)
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PTS	Profile Test Specification
RL	Requirements List
SCS	System Conformance Statement
SCTR	System Conformance Test Report
SUT	System Under Test
TC	Test Case
TCP	Test Coordination Procedure

TMP	Test Management Protocol
TP	Test Purpose
TSO	Test Suite Operation
TSS	Test Suite Structure
TTCN	Tree and Tabular Combined Notation
XRL	eXtra Requirements List

4 Quality review tables

4.1 Overview: inventory of the components

NOTE: The inventory of components is based on ISO/IEC 9646-1 Edition 2 [1], table 1 (subclause 7.3).

Table 1: Inventory of the protocol conformance testing specification components

Item	Protocol conformance testing specification component	Reference	Status	Support	Subclause	Page
1	Test Suite Structure	[1], 7.3	M		4.3	
2	Test Purposes	[1], 7.3	M		4.4	
3	Combined Test Purposes	[1], 7.3	O		4.5	
4	Abstract Test Method	[1], 7.3	M		4.6	
5	Untestable test purposes list	[1], 7.3	C.1		4.7	
6	Abstract Test Suite (ATS) conventions	[1], 7.3	M		4.8	
7	ATS	[1], 7.3	M		4.9	
8	Protocol Conformance Test Report (PCTR) pro forma	[1], 7.3	M		4.10	
9	Partial Protocol Implementation eXtra Information for Testing (PIXIT) pro forma	[1], 7.3	M		4.11	
10	Test Management Protocol (TMP)	[1], 7.3	C.2		4.12	
11	TMP implementation statement pro forma	[1], 7.3	C.2		4.13	

Status:

- C.1: M if the chosen Abstract Test Method (ATM) forbids the derivation of some test purposes;
- C.2: M if co-ordinated ATM,; NA for other ATM.

4.2 Packaging quality

4.2.1 Structure of the documents

The criteria of this subclause apply to the physical quality of documents. It is assumed that the reviewed documents have been produced to become standards.

Table 2: Quality of the structure of the documents

Item	Quality criterion	Reference	Status	Support	Import	Comment
1	Are Test Suite Structure (TSS), Test Purposes (TP), and Combined Test Purposes (CTP) (if they exist) grouped in the same document?	[1], 10.1.1.1	M		4	
2	Is the document containing TSS, TP, and CTP (if the latter exists), separated from the other components of the conformance testing specification?	[1], 10.1.1.1, [2], 10.1	M		3	
3	Are ATM, Untestable Test Purposes, ATS Conventions, and ATS grouped in the same document?	[1], 10.1.1.1	M		4	
4	Is the document containing ATM, Untestable Test Purposes, ATS Conventions, and ATS separate from the other components of the conformance testing specification (e.g. TSS, TP)?	[9], 10.1.1.1	M		3	
5	Is the PCTR pro forma in a normative annex to the ATS specification?	[9], 10.1.1.1	O.1		3	
6	Is the PCTR pro forma in an independent document?	[9], 10.1.1.1	O.1		3	
7	Does the PCTR pro forma contain a copyright release clause?	[9], 10.1.1.1, [9], 10.1.4	M		2	
8	Is the partial PIXIT pro forma in a normative annex to the ATS specification?	[9], 10.1.1.1	O.2		3	
9	Is the partial PIXIT pro forma in an independent document?	[9], 10.1.1.1	O.2		3	
10	Does the partial PIXIT pro forma contain a copyright release clause?	[9], 10.1.1.1, [9], 10.1.4	M		2	
11	Is the TMP in a normative annex?	[9], 10.1.1.1	C.3		2	
12	Is the TMP implementation statement pro forma in the same document as the TMP?	[9], 10.1.1.1	C.4		2	

Status:

- O.1: mutually exclusive;
- O.2: mutually exclusive;
- C.3: M if the ATM is co-ordinated, NA otherwise;
- C.4: O if the ATM is co-ordinated, NA otherwise.

4.2.2 Editorial quality

For each deliverable identified in table 1, physical editorial quality criteria applied in ETSI should be respected.

NOTE: This ETR does not contain a review table for editorial quality; it is assumed that regular review tables and checklists used by ETSI for standards in general can be applied. However, some checklists used in ETSI are based on the use of specific software word processor packages. These checklists should not be used for documents produced with other software packages, e.g. with TTCN dedicated tools.

Table 3: Editorial quality criteria

Item	Quality criterion	Reference	Status	Support for each deliverable									
				D.1	D.2	D.3	D.4	D.5	D.6	D.7	D.8	D.9	D.10
1	Are ETSI rules for edition and use of English language (PNE rules in particular) respected?	[10]	M										
2	Does the deliverable exhibit a document reference?	[10]	M										
3	Does the deliverable exhibit an ETSI work item reference?		O										
4	Does the deliverable exhibit a title?	[10]	M										
5	Does the deliverable exhibit its source?		M										
6	Does the deliverable exhibit a version number?	[10]	M										
7	Does the deliverable exhibit a creation date?	[10]	M										
8	Does the deliverable contain a history box?		M										
9	Does the deliverable contain a distribution list?		O										
10	Is English the only language used in the deliverable (with the exception of formal notations or programming languages)?		M										

4.3   Test suite structure quality

4.3.1   Form

Table 4: Quality of the form of the TSS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is the TSS description provided? (see note)	[9], 7.4.1 [2], 10.2	M		1	
2	Is a graphical representation of the TSS provided?	[9], 7.4.1 [2], 10.2	O		2	
3	Explanation for how the TPs are derived from or relate to the protocol specification?	[2], 10.1.3			2	
4	Does the TSS & TP include a compliance clause as specified in ISO/IEC 9646-2?	[2], 10.5	M		4	
5	Are the TSS & TP naming conventions documented?	[9], 7.4.1.1.5	M		1	
6	Do all the groups have full names?	[9], 7.4.1.1.5	M		2	
7	Do all the groups have abbreviated names?	[9], 7.4.1.1.5	M		2	
8	Do the pre-defined groupings (generally levels 3 and 4) related to the nature of the tests and to the functional aspects tested follow the recommended naming convention?	[9], 7.4.1.1.5	O		4	
9	Is the TSS & TP available in paper form?	[9], 10.1.1.1	M		1	
10	Is the TSS & TP available in electronic form?		O		3	
11	Is the electronic form unstructured (e.g. ASCII text)?		C.5		3	
12	Is the electronic form structured (e.g. text processor)?		C.5		4	
NOTE:	A description of TP naming conventions, even if it implicitly suggests a hierarchical structure, does not constitute a TSS description.					

Status:

-    C.5: O if the TSS & TP is available in electronic form, NA otherwise.

4.3.2   Content

Table 5: Quality of the content of the TSS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is the TSS independent of the ATM?	[9], 7.4.1 [2], 10.3.6	M		1	
2	Is the TSS structured as a tree (with the possibility that a TP belongs to more than one test group)?	[9], 7.4.1.1.1 [2], 10.2.1	O		2	
3	Does the TSS contain groups related to the "major functions", or "roles" of the base specification (generally the 2nd level of the TSS)?	[9], 7.4.1.1.1 [2], 10.2.1	O		3	
4	Does the TSS contain groups related to the "nature" of the tests (generally the 3rd level of the TSS)?	[9], 7.4.1.1.1 [2], 10.2.1	O		3	
5	Does the TSS contain groups related to the "functional aspects" tested (generally the 4th level of the TSS)?	[9], 7.4.1.1.1 [2], 10.2.1	O		3	
6	Does the TSS contain a group of basic interconnection tests?	[9], 7.4.1.1.1 [2], 10.2.3	O		3	
7	Does the TSS contain a group of capability tests?	[9], 7.4.1.1.1 [2], 10.2.1	M		1	
8	Does the TSS contain a group of valid behaviour tests?	[9], 7.4.1.1.1 [2], 10.2.1	M		1	
9	Does the TSS contain a group of invalid behaviour tests?	[9], 7.4.1.1.1 [2], 10.2.1	M		1	
10	Does the TSS contain a group of inopportune behaviour tests?	[9], 7.4.1.1.3 [2], 10.2.1	M		1	
11	Does the TSS contain a group of tests focusing on the use of parameters?	[9], 7.4.1.1.4 [2], 10.2.1	M		3	

(continued)

Table 5 (concluded): Quality of the content of the TSS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
12	Does the TSS contain a group of tests focusing on parameter combinations?	[9], 7.4.1.1.4 [2], 10.2.1	O		3	
13	Does the TSS contain a group of tests focusing on the use of timers?	[9], 7.4.1.1.4 [2], 10.2.1	M		3	
14	Does the TSS contain a group of tests focusing on encoding?	[9], 7.4.1.1.4 [2], 10.2.1	O		3	
15	Does the TSS contain one or more groups of tests focusing on combinations of related requirements from more than one protocol?	[2], 10.2.1	O		3	
16	Does the TSS contain one or more groups of tests focusing on Protocol Data Units (PDUs) sent by the Implementation Under Test (IUT)?	[2], 10.2.1	O		3	
17	Does the TSS contain one or more groups of tests focusing on PDUs received by the IUT?	[2], 10.2.1	O		3	
18	Does the TSS contain one or more groups of tests focusing on interaction between PDUs sent and PDUs received by the IUT?	[2], 10.2.1	O		3	
19	Does the TSS contain one or more groups of tests specific for multi-party behaviour?	[2], 10.2.1	O		3	

4.3.3 Production, validation and approval

Table 6: Quality of the validation and approval status of the TSS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has the TSS been reviewed in a relevant standardization committee?	[9], 10.2.4.1	O		3	
2	Has the TSS been approved in a relevant standardization committee?	[9], 10.2.4.1	O		3	

4.4 Test purposes quality

4.4.1 Form

Table 7: Quality of the form of the TP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Are the TPs designated by the same numbering/referencing scheme as the TSS?	[9], 7.4.1.2 [2], 10.2	M		1	
2	Are test group objectives defined and documented?	[2], 10.3.1	O		1	
3	Is the TP production method documented (see note)?	[13], 4.3	O		3	
4	Are some aspects common to several TPs factored out (for instance, a common description of "how to bring the IUT in state x", or "how to check that the IUT is in state x")?		O		3	
5	Is the relation between TPs and the Conformance Requirements in the reference specification clearly documented?	[9], 7.4.1.2 [2], 10.1.3	M		2	
6	Does each TP specify unambiguously explicit and exhaustive checks?	[9], 7.4.1.2 [2], 10.2	O		2	
7	Does each TP contain a reference to the subclause in the reference specification where the Conformance Requirement is expressed?	[9], 7.4.1.2 [13], 4.2.2	O		1	
8	When a TP belongs to more than one test group, is reference used instead of replication?	[9], 7.4.1.1.1 [2], 10.2.1	M		3	
9	Are TPs for different invalid parameter values combined with other test purposes of valid or invalid values?	[9], 7.4.1.3.2 [2], 10.3.2	M		1	
10	Are combined TPs referencing the TP covering the individual Conformance Requirements?	[9], 7.4.1.3.2 [2], 10.3.3	M		2	
11	Are the individual TPs referencing the combined TP in which they are combined?	[9], 7.4.1.3.2 [2], 10.3.3	M		2	
12	Does each TP contain selection criteria , based on references to the applicable ICS or IXIT questions?	[13], 4.2.3	O		3	

NOTE: For instance, a gradual approach like the refinement of test group objectives, cf. [2], 10.3.1. Other TP production methods can have been used, which deserve to be documented. For instance, a gradual approach reflecting more the functional aspects and the structure of the standard than the TSS.

4.4.2   Content

Table 8: Quality of the content of the TP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is a list of basic interconnection tests provided?	[2], 10.2.3	O		2	
2	Are the basic interconnection tests selected from capability and/or valid behaviour, without any additional test being specified?	[2], 10.2.3	M		3	
3	Are all the TPs based on a conformance requirement concerning the external behaviour of the IUT?	[9], 7.4.1.2	M		1	
4	Do all the TPs specify the IUT expected behaviour?	[9], 7.4.1.2	M		1	
5	Do all the TPs specify the initial conditions (e.g. the state) of the IUT before the test is to be run?	[9], 7.4.1.2 [13], 4.2.4	M		1	
6	Do all the TPs that contain a state check specify how the state check will be performed and externally observed?	[9], 7.4.1.2 [13], 4.2.5, 4.2.6	M		1	
7	Are all the TPs focusing on a set of conformance requirements or dealing with profile-specific aspects, specified as Combined Test Purposes?	[9], 7.4.1.2	M		3	
8	Is the testing of state transitions limited to valid transitions and conceivable inopportune situations?	[9], 7.4.1.1.3	O		3	
9	Are each elementary TPs focused on a single conformance requirement or on a set of related conformance requirement?	[9], 9.2 [2], 10.3.4			3	
10	Are all the TPs within the bounds of the profile (see note)?	[9], 9.2 [2], 10.4			3	
NOTE:	This question is only relevant when this pro forma is used in the context of a test specification built for a profile. A case often encountered is a "test specification for a base specification, limited to the use within a profile". See ETS 300 406 [9], 9.2, "case c)".					

Table 9: Subjective criteria to evaluate the coverage

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Size: are the number of tests reasonable with respect to the protocol complexity?	[9], D.3	O		2	
2	Homogeneity: are all aspects of the protocol covered by the same density of TPs?		O		3	
3	Minimal coverage: are all basic capabilities covered by at least a TP?	[9], D.3 [2], 10.4	O		4	
4	PICS reference: are all mandatory items in the PICS covered by a TP?	[9], D.3 [2], 10.4	O		4	
5	PICS reference: are all optional items in the PICS covered by a TP?	[9], D.3 [2], 10.4	O		4	
6	"State table" trap: is there a good balance between the TPs related to transition between states, and the other groups, such as encoding, parameters, timers?	[9], 7.4.1.1.2	O		3	
7	Is there at least one TP per relevant capability (see note)?	[2], 10.4	O		4	
8	Is there at least one TP per relevant PDU type and each major variation of each such type, using "normal" or default values for each parameter (see note)?	[2], 10.4	O		4	
9	Is there at least one TP per relevant state/event combination (see note)?	[2], 10.4	O		4	
10	Is there at least one TP concerned with the expiration of each defined timer (see note)?	[2], 10.4	O		4	
11	Is there at least one TP for each relevant kind of encoding variation per relevant PDU type (see note)?	[2], 10.4	O		4	

(continued)

Table 9 (concluded): Subjective criteria to evaluate the coverage

Item	Quality criterion	Reference	Status	Support	Import.	Comment
12	Are there, for each relevant integer parameter, TPs concerned with the boundary values and one randomly selected mid-range value (see note)?	[2], 10.4	O		4	
13	Are there, for each relevant bitwise parameter, TPs for as many values as practical, but not less than all the "normal" or common values (see note)?	[2], 10.4	O		4	
14	Is there, for other relevant parameters, at least one TP concerned with a value different from what is considered "normal" or default in other test groups (see note)?	[2], 10.4	O		4	
15	Are there, for each relevant integer parameter, TPs concerned with invalid values adjacent to the allowed boundary values, plus one other randomly selected invalid value? (see note).	[2], 10.4	O		4	
16	Are there, for each relevant bitwise parameter, TPs for as many invalid values as practical (see note)?	[2], 10.4	O		4	
17	Is there, for all other relevant types of parameters, at least one TP per parameter with syntactically or semantically invalid value (see note)?	[2], 10.4	O		4	
18	Is there at least one TP for each important combination of specific parameter values (see note)?	[2], 10.4	O		4	
19	Is there at least one TP per set of interrelated parameters (see note)?	[2], 10.4	O		4	

NOTE: These criteria are copied from ISO/IEC 9646-2 [2], subclause 10.4. However, they should only be used as a guide to explore the different aspects of the coverage of a reference standard by test purposes. They should not be followed literally. They contain terms such as "relevant", "major", "normal", "important", "practical", "common", which do not have any precise meaning. In some cases, a too conscientious application of these criteria should be discouraged, since it may lead to increase the number of tests without increasing the actual coverage.

4.4.3   Production, validation and appraisal

Table 10: Quality of the validation and approval status of the TP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has the TP been produced manually?	[2], 10.3.1	O.3		3	
2	Has the TP been produced automatically from a formal description of the base specification?	[2], 10.3.1	O.3		3	
3	Has the TP been reviewed in a relevant standardization committee?	[9], 10.2.4.1	O		3	
4	Has the TP been approved in a relevant standardization committee?	[9], 10.2.4.1	O		3	

Status:

-    O.3: mutually exclusive.

4.5   Untestable test purposes quality

4.5.1   Form

Table 11: Quality of the form of the untestable TP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is the untestable test purpose list exhaustive (i.e. does the TP derived in the ATS plus the untestable test purpose list cover the TP list)?	[2], 12.3.3	M		2	
2	Is there, for each test purpose or test group listed, a reason specifying why it is untestable with the chosen ATM?	[2], 12.3.3	M		2	

4.5.2   Content

Table 12: Quality of the content of the untestable TP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is the reason for which the test purpose is not realised consistent with the base specification?	[2], 12.3.3	M		1	
2	Is the reason for which the test purpose is not realised consistent with the ATM description or definition?	[2], 12.3.3	M		1	

4.5.3   Production, validation and appraisal

Table 13: Quality of the validation and approval status of the untestable TP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has the untestable test purpose list been reviewed in a relevant standardization commitee?	[9], 10.2.4.1	O		3	
2	Has the untestable test purpose list been approved in a relevant standardization committee?	[9], 10.2.4.1	O		4	

4.6   ATS conventions quality

4.6.1   Form

Table 14: Quality of the form of the ATS conventions

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Are the naming conventions documented?	[9], 7.4.3	M		1	

4.6.2   Content

Table 15: Quality of the content of the ATS conventions

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Does the ATS provide a description of the strategy used for structuring the constraints?	[9], 7.4.3	O		2	
2	Does the ATS provide a description of the strategy for use of base constraints?	[9], 7.4.3	M		2	
3	Does the ATS provide a description of the strategy for use of parameters?	[9], 7.4.3	O		3	
4	Does the ATS provide a description of the strategy for use of Boolean expressions?	[9], 7.4.3	O		3	
5	Does the ATS provide a description of the strategy for use of Test Steps?	[9], 7.4.3	O		3	
6	Does the ATS provide a description of the strategy for use of defaults?	[9], 7.4.3	O		3	
7	Does the ATS provide a clear statement of whether implicit or explicit encoding is used?	[9], 7.4.3	O		2	
8	Does the ATS provide the description of the strategy concerning the use of ASN.1?	[9], 7.4.3	O		2	

Table 16: Subjective criteria concerning the content of the ATS conventions

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Are naming conventions used well structured?		O		4	
2	Are naming conventions used readable enough?		O		4	
3	Are naming conventions used self explanatory?	[9], 7.4.3	O		4	

4.7   ATS Quality

4.7.1   Form

Table 17: Quality of the form of the ATS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is the Abstract Test Case (ATC) designated by the same numbering/referencing scheme as the TP?	[9], 7.4.1.1.5 [11], 6.3.7	M		1	
2	Does the ATS follow the naming conventions?	[11], 6.2	M		1	
3	If the ATC numbering/referencing scheme is different from the TP one, is mapping provided between ATC identifier and TP or combined TP identifier?	[9], 7.4.1.1.5 [11], 6.3.7	M		1	
4	Does the ATS contain a reference to the related TSS & TP?	[3], 9.2	M		1	
5	Does the ATS contain the names and version numbers of the used base specification(s)?	[3], 9.2	M		1	
6	Does the ATS contain an adequate ICS pro forma reference?	[2], 14.1	M		1	
7	Does the ATS contain the adequate partial Implementation eXtra Information for Testing (IXIT) pro forma reference?	[2], 14.1	M		1	
8	Does the ATS identify whether single-party or multi-party testing is used?	[3], 9.2	M		2	
9	Does the ATS identify the ATM used?	[3], 9.2	M		2	
10	Does the ATS reference the TMP specification and the TMP implementation statement to be used?	[2], 14.1	C.8		1	
11	Does the ATS reference the relevant technical corrigenda (or ITU-T equivalent) to be used?	[3], 9.2	C.9		2	
12	Is the ATS defined using the International Standard (IS) version of TTCN?	[9], 7.4.4	M		1	
13	Is the ATS defined using an other version of TTCN?	[9], 7.4.4	P		1	
14	Is the ATS defined using the concurrent extension of TTCN defined in DAM-1?	[9], 7.4.4	O		1	
15	Is the ATS defined using the concurrent extension of TTCN defined in AM-1?	[9], 7.4.4	O		1	

(continued)

Table 17 (concluded): Quality of the form of the ATS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
16	Is the ATS defined using a non-standardized concurrent extension of TTCN?	[9], 7.4.4	P		1	
17	Is the ATS available in both GR and MP form?	[9], 10.1.3	M		1	
18	Is the TTCN GR version available in paper form?	[9], 10.1.3	M		1	
19	Is the TTCN GR version available in electronic form?	[9], 10.1.3	O		3	
20	Is the TTCN MP version available in paper form?	[9], 10.1.3	O		3	
21	Is the TTCN MP version available in electronic form?	[9], 10.1.3	M		1	
22	Is the TTCN GR version produced on the basis of the MP version?	[9], 10.1.3	O.4		3	
23	Is the TTCN MP version produced on the basis of the GR version?	[9], 10.1.3	O.4		3	
24	Is the TTCN GR version produced, available in an unstructured format (e.g. plain ASCII)?	[9], 10.1.3	O.5		3	
25	Is the TTCN GR version produced, available in a structured format (e.g. text processor)?		O.5		3	
26	Is the notation used for Test Suite Operation (TSO) documented?	[11], 8	M		2	
27	Are examples provided for TSO?	[11], 8	O		2	
28	Are all the objects declared used in the ATS?	[11],10.4 to 10.9	O		3	

Status:

- C.8: M if the ATM is co-ordinated, NA otherwise;
- C.9: M if technical corrigenda applicable, NA otherwise;
- O.4: mutually exclusive;
- O.5: mutually exclusive.

4.7.2   Content

Table 18: Quality of the content of the ATS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Does one Test Case (TC) per TP exist, defined in the TSS & TP and not qualified as non testable?	[2], 10.2	M		1	
2	Does each TC achieve the related TP?	[2], 10.2	M		1	
3	Does the ATS use Point of Control and Observation (PCO) as defined for the ATM(s) entitled in the test suite structure table?	[2], 11.3 [2], 11.6	M		1	
4	Are the defined Abstract Service Primitives (ASP)s consistent with the base specification?	[3], 10.10	M		1	
5	Are the defined PDUs consistent with the base specification?	[3], 10.11	M		1	
6	Is the sequence of exchanged PDUs consistent with the base specification?		M		1	
7	Is any verdict based on the ability of the System Under Test (SUT) to exhibit any ASP or parameter of an ASP?		P		1	
8	Are IMPLICIT SEND events used?		O		1	
9	Are verdicts always assigned?	[11], 12.4	M		1	
10	Are final verdicts assigned in test steps?	[11], 12.4	P		1	
11	Are any FAIL verdicts assigned in test steps (Except in case of protocol error or violation)?	[11], 12.4	P		1	
12	Is the PASS verdict for an ATC based on a combined TP assigned only if the TPs which make up the combined one have been satisfied?	[11], 12.4	M		1	
13	Is there assignment of preliminary verdicts?	[11], 12.4	P (see note)		2	
14	Does the ATS make use of GOTOs and labels?	[11], 15.5	P (see note)		2	
15	Are timers used to handle IUT inactivity?	[11], 15.4	M		2	
16	Are all the alternative paths for TSO fully specified?	[11], 8	M		2	
17	Does TSO return a value in any circumstance?	[11], 8	M		2	
18	Are error situations covered by TSO definition?	[11], 8	M		2	
19	Are the abstract selection rules expressed via Boolean expressions?	[3], 10.5	M		2	

NOTE: P but may be tolerated when strong technical constraints preclude any other alternative.

Table 19: Subjective criteria concerning the content of the ATS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Are the comments clear and self explanatory?	[11], 15.3	O		4	
2	Are there enough comments in the ATS?	[11], 15.3	O		4	
3	Are the comments accurate enough?	[11], 15.3	O		4	
4	Is the TTCN used, simple enough?	[9], D.3	O		4	
5	Are the Boolean expressions used in the selection expressions too complex?	[9], D.3	O		4	

4.7.3 Production, validation and appraisal

Table 20: Quality of the validation and approval status of the ATS

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has a TTCN Machine Processable (MP) version been produced using a TTCN editing tool?	[9], 10.1.3	M		3	
2	Has a TTCN MP version been produced using an other editing tool?	[9], 10.1.3	P		3	
3	Has a TTCN GRaphical (GR) version been produced using a TTCN editing tool?	[9], 10.1.3	M		3	
4	Has a TTCN GR version been produced using a word processing system?	[9], 10.1.3	P		3	
5	Has the ATS been syntactically verified via the TTCN tool?	[9], 10.2.4.2	M		1	
6	Has the ATS been semantically verified via the TTCN tool?	[9], 10.2.4.2	O		3	
7	Has the ATS been at least partially implemented?	[9], 10.2.4.2	M		3	
8	Has the ATS been totally implemented?	[9], 10.2.4.2	M		1	

4.8   PCTR pro forma quality

4.8.1   Form

Table 21: Quality of the form of the PCTR pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Does the PCTR pro forma exhibit the following information on every page: - name of the test laboratory; - PCTR number; - page number and total number of pages?	[5], B3	M		1	
2	Does the PCTR pro forma exhibit the mandatory requirements defined in ISO 9646? [1 to 8]	[5], B3	M		1	
3	Does the PCTR pro forma exhibit a copyright release clause?	[5], B3	M		1	

4.8.2   Content

Table 22: Quality of the content of the PCTR Pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Does the PCTR pro forma include, at least the following parts: - conformance status summary; - static conformance summary section; - static conformance review report section; - dynamic conformance summary section; - test campaign report section; - observation section?		M		1	
2	Does the PCTR identification part include, at least the following: - PCTR Number; - PCTR Date; - test laboratory identification; - test laboratory accreditation status; - test laboratory accreditation reference; - accreditation authority; - test laboratory manager identification; - test laboratory manager signature?	[5], B3.1.1	M		1	
3	Does the IUT identification part include, at least the following: - IUT name; - IUT Version; - PCTR Date; - relevant ICS reference; - relevant profile Requirement List (RL), profile specific ICS reference when applicable?	[5], B3.1.2	M		1	
4	Does the testing environment identification part include, at least the following: - reference to ATS specification; - ATM identification or reference to ATM specification; - relevant IXIT reference; - relevant eXtra Requirement List (XRL) profile, IXIT profile reference when applicable; - Means Of Testing (MOT) identification?	[5], B3.1.3	M		1	

4.8.3   Production, validation and appraisal

Table 23: Quality of the validation and approval status of the PCTR pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has the PCTR pro forma been reviewed by a relevant standardization committee?		O		3	
2	Has the PCTR Pro forma been approved by a relevant standardization committee?		O		3	

4.9   System Conformance Test Report (SCTR) pro forma quality

NOTE: Although it contains some "mandatory" criteria, this section is only applicable when a System Conformance Test Report (SCTR) pro forma is effectively produced, i.e. generally in the context of profile testing.

4.9.1   Form

Table 24: Quality of the form of the SCTR pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Does the SCTR pro forma exhibit on every page the following information: - name of the test laboratory; - SCTR number; - page number and total number of pages?	[5], A3	M		1	
2	Does the SCTR pro forma exhibits the mandatory requirements defined in ISO 9646 [1 to 8]?	[5], A3	M		1	
3	Does the SCTR pro forma exhibit a copyright release clause?	[5], A3	M		1	

4.9.2   Content

Table 25: Quality of the content of the SCTR pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Does the SCTR identification part include the following: - SCTR number; - SCTR date; - test laboratory manager identification; - test laboratory manager signature?	[5], A3.1.1	M		1	
2	Does the SCTR identification part include the test laboratory identification?	[5], A3.1.2	M		1	
3	Does the SCTR identification part include the client identification?	[5], A3.1.3	M		1	
4	Does the SCTR identification part include the following: - SUT name; - SUT version; - Supplier name; - Period of testing; - System Conformance Statement (SCS) identification?	[5], A3.1.4	M		1	
5	Does the SCTR identification part include one of the following: - date of receipt of SUT; - location of SUT for testing?	[5], A3.1.4	0.6 0.6		1	
6	Does the SCTR identification part include the following: - profile identification; - profile version; - Profile Test Specification (PTS) Summary reference; - PTS Summary reference; - profile ICS; - profile IXIT?	[5], A3.1.5	C.10		1	
7	Does the SCTR identification part include record of agreement information?	[5], A3.1.8	M		1	

(continued)

Table 25 (concluded): Quality of the content of the SCTR pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
8	Does the system report summary part include the following: - test laboratory accreditation status; - test laboratory accreditation reference; - implementation identifier; - IUT definition reference; - protocol(s) specification(s); - information object(s) specification(s); - ICS(s); - IXIT(s); - PCTR number; - PCTR date; - ATS specification; - ATM identification or reference to ATM specification; - MOT identification; - static conformance errors; - dynamic conformance errors; - number of test cases run; - number of passed test cases; - number of inconclusive test cases; - number of failed test cases?	[5], A3.2	M		1	
9	Does the system report summary part include observations?	[5], A3.2	O		3	

Status:

- 0.6: mutually exclusive;
- C.10: M if profile testing, NA otherwise.

4.9.3 Production, validation and appraisal

Table 26: Quality of the validation and approval status of the SCTR pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has SCTR pro forma been reviewed in a relevant standardization committee?		O		3	
2	Has SCTR pro forma been approved in a relevant standardization committee?		O		3	

4.10   TMP quality

4.10.1   Form

Table 27: Quality of the form of the TMP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is the TMP specified in a separate document?	[2], 11.3.4	M		3	
2	Is the TMP standardized?	[2], 11.3.4	M		1	

4.10.2   Content

Table 28: Quality of the content of the TMP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Are the TMP PDUs defined in ASN.1?		O		3	
2	Are the encoding rules clearly defined?		M		1	
3	Does the TMP specification refer to the ASP of the underlying service?	[2], 11.3.4	O		2	
4	Are all the TMP PDU and TMP PDU parameters defined?	[2], 13	M		1	
5	Are verdicts assigned on the conformance of the IUT to the TMP specification?	[2], 13	P		1	

4.10.3   Production, validation and appraisal

Table 29: Quality of the validation and approval status of the TMP

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has the TMP specification been reviewed in a relevant standardization committee?		O		3	
2	Has the TMP specification been approved in a relevant standardization committee?		O		3	

4.11 Test Coordination Procedure (TCP) quality

4.11.1 Content

Table 30: Quality of the content of the Test Coordination Procedure (TCP)

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is there any constraint on the upper service boundary of the IUT?	[2], 11.3	C.11		3	
2	If a PCO is used for the IUT, are test events at that PCO specified in accordance with the definition of the reference specifications?	[2], 11.3	M		3	
3	Does the Test Coordination Procedure (TCP) include provision for passing to the LT events controlled at the IUT which need to be logged?	[2], 11.3	M		3	
4	Are Test Coordination Procedure (TCP) requirements specified in the ATS?	[2], 11.3	C.12		3	
5	Does the ATS specify an IUT interface?	[2], 11.3	C.13		3	
6	Are TCP requirements specified in each test case?	[2], 11.3	C.14		3	
7	Are TCP specified between LTCF and each LT in each test case?	[2], 11.3	C.14		3	
8	Are the TCP specified between LT an UT in accordance with the one defined in SPyT ATM?	[2], 11.3	C.15		3	

Status:

- C.11: NA for co-ordinated method, M otherwise;
- C.12: M for distributed method, NA otherwise;
- C.13: NA for co-ordinated method, P otherwise;
- C.14: M if MPyT context, not applicable otherwise;
- C.15: O if MPyT context, not applicable otherwise.

4.12   ICS pro forma quality

4.12.1   Form

Table 31: Quality of the form of the ICS pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Are the publication options defined in [7] for ICS pro forma respected?	[7], 8.2.1	M		1	
2	Is the ICS pro forma annexed to the reference standard?	[7], 8.2.1	O.7 (see note)		1	
3	Is the ICS pro forma part of a multi-part ICS specification?	[7], 8.2.1	O.7		1	
4	Is the ICS pro forma a distinct specification?	[7], 8.2.1	O.7		1	
5	Is the introduction consistent with the introduction clause defined in [7] subclause 8.2.2?	[7], 8.2.2	M		1	
6	Is the scope consistent with the scope clause defined in [7] subclause 8.2.3?	[7], 8.2.3	M		1	
7	Are the normative references defined in [7] subclause 8.2.4 for ICS pro forma provided?	[7], 8.2.4	M		1	
8	Does the definition clause include the relevant definitions of [1]?	[7], 8.2.5	M		1	
9	Is there any conformance clause equivalent to this defined in [7] subclause 8.2.6.1?	[7], 8.2.6.1	M		1	
10	Is there any conformance clause equivalent to this defined in [7] subclause 8.2.6.2?	[7], 8.2.6.2	M		1	
11	Is there a copyright release clause including the text defined in [7] subclause 8.2.7?	[7], 8.2.7	M		1	
12	Does the pro forma exhibit the note concerning the global statement of conformance as defined in [7] subclause 8.3.7.2?	[7], 8.3.7.2	M		1	
13	Is the pro forma based on the electronic version of the ICS template as recommended in [12] subclause 12?	[12], 12	M		1	
NOTE:	This option is allowed but strongly discouraged by the ETSI ICS Style Guide.					

Status:

-    O.7: it is mandatory to select one of these options.

4.12.2   Structure and content of the ICS pro forma itself

Table 32: Quality of the structure and the content of the ICS pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Does the ICS pro forma include an instruction (guidance) section?	[7], 8.3.3	M		1	
2	Does the instruction section include a part describing the purpose and the structure of the pro forma?	[7], 8.3.3			2	
3	Is the description of the purpose and structure of the pro forma well structured?	[7], 8.3.3			1	
4	Does the instruction section include a part defining the symbols and abbreviations used in the pro forma?	[7], 8.3.3			1	
5	Is the definition of the symbols and abbreviations complete and accurate?	[7], 8.3.3			3	
6	Does the instruction section include a part providing actual instructions to fill in the pro forma?	[7], 8.3.3			4	
7	Are the instructions clear and unambiguous enough?	[7], 8.3.3			1	
8	Is it explicitly indicated in the instruction section that the supplier needs to complete only the subclauses for the roles implemented?	[12], 8.5			1	
9	Does the ICS pro forma include a section identifying the implementation?	[7], 8.3.4	M	3		
10	Does the identification section contain at least the following information: - implementation identification; - system identification; - system supplier; - contact person?	[7], 8.3.4	M	4		
11	Is there a reference specification identification section?	[7], 8.3.5	M	1		
12	Are the status indications in the status column consistent with the reference specification?	[7], [12], 8.2	M	1		
13	When an explanation is provided with a table, does this explanatory text appear before the table?	[12], 9	M	3		
NOTE:	Optional but strongly encouraged.					

Status:

- C.16: M if the pro forma includes an instruction section, not applicable otherwise;
- C.17: M if the reference specification contains roles, not applicable otherwise;
- C.18: M in case of PICS not applicable otherwise.

4.12.3 Form of the ICS pro forma tables

Table 33: Quality of the form of the ICS pro forma table

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Are the ICS pro forma tables structured in a hierarchical manner?	[7], 8.3.6	M		1	
2	Is there one question per row?	[7], 8.3.7.3	O (see note)		1	
3	Is there a pre-printed column giving the item number?	[7], 8.3.7.3	M		1	
4	Is the item numbering system flat (i.e. 1,2,3 etc.)?	[12],9.1	M		1	
5	Is there a pre-printed column giving the item name?	[7], 8.3.7.3	M		1	
6	Is the item name column header meaningful?	[12],9.1	M		1	
7	Is the status column pre-printed?	[7], 8.3.7.3	M		1	
8	Is there a reference column referring to static conformance requirement?	[12],9.1	M		1	
8	Does the reference column refer to the status column?	[12],9.1	M		1	
9	Is there a support column?	[7], 8.3.7.3	M		1	
10	Is the allowed values column pre-printed?	[7], 8.3.7.3	O		3	
11	Is there a mnemonic column?	[12], 9.1	P		1	
13	Are mnemonics used to refer to an item?	[12], 9.1	P		1	
14	Are items referenced using mnemonics?	[12], 9.1	P		1	
15	Are the standard status values (m, o, c, x, N/A) defined in the ETSI ICS style guide used?	[7], 9.2.1 [12], 8.2	M		1	
16	Are there any additional values used for status?	[12],8.2	P		1	
17	Is the o.<integer> notation used for mutually exclusive and/or selectable options?	[7], 9.2.1 [12],8.2	M		1	
18	Is the c.<integer> notation used for the status of items depending on other optional or conditional items?	[7], 9.2.1 [12],8.2	M		1	
19	Are there any additional values used for support?	[12],9.1	P		1	
20	Are the tick boxes used?	[12],9.1	P		1	

4.12.4   Content of the ICS pro forma tables

Table 34: Quality of the content of the ICS pro forma table

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Is there one item for each major capability identified in the protocol specification?	[7], 8.3.7.3	M		1	
2	Is there at least one item per PDU identified in the protocol specification?	[7], 8.3.7.3	C.18		1	
3	Does it reproduce dynamic requirements?	[7], 8.3.7.3	P		2	
4	Is there a mapping from the ICS pro forma to the static conformance requirements?	[7], 8.3.7.3	M		1	
5	Is there a table identifying the different roles to be implemented?	[7], 8.3.7.3 [12],8.5	C.17		1	
6	Is there a subclause for each different role identified in the protocol specification?	[12],8.5	C.17		1	
7	Is it explicitly indicated at the beginning of each subclause that the supplier needs to complete only the subclauses for the roles implemented?	[12],8.5	C.17		1	
8	Are there separated status and support columns for PDU sent and received?	[7], 8.3.7.3	O		4	
9	Is there a question asking whether or not all mandatory capabilities are implemented?	[7], 8.3.7.2	M		1	

4.12.5   Production, validation and appraisal

Table 35: Quality of the validation and approval status of the PICS pro forma

Item	Quality criterion	Reference	Status	Support	Import.	Comment
1	Has the ICS pro forma been reviewed in a relevant standardization committee?		O		3	
2	Has the ICS pro forma been approved in a relevant standardization committee?		O		3	

Annex A: Relationship between ETSI and EWOS criteria

ETG 042 [A.1], produced by EWOS, contains quality review tables for conformance testing specifications of OSI implementations. Full harmonisation with ETG 042 [A.1] was not possible (see introduction of this ETR). Annex A identifies the relations, when they exist, between the ETSI and EWOS documents.

The table below indicates the relationship between ETSI criteria (in this ETR) and EWOS criteria (in ETG 042 [14]). The EWOS criteria are identified by their Item number. The ETSI criteria are identified by a number composed of two parts: the table number and the item number in the table.

ETSI Reference	EWOS Reference
2.2	TC02-01a
3.3	CG01-01
3.5	CG01-02
3.6	CG01-03
3.7	CG01-04
3.9	CG01-07
3.10	CG01-08
3.11	CG03-01
4.1	TC02-01a
4.3	TC02-01d
4.4	TC02-05a
4.8	TC02-05a
4.9	CG04-01

ETSI Reference	EWOS Reference
9.13	TC02-07g
9.14	TC02-07h
9.15	TC02-07i
9.16	TC02-07j
9.17	TC02-07k
9.18	TC02-07l
9.19	TC02-07m
9.20	TC02-07f
11.1	TC06b-01a
11.2	TC06b-01b
12.1	TC06b-01c
12.2	TC06b-01c
14.1	TC03d-01b

ETSI Reference	EWOS Reference
4;10	CG04-02
5.1	TC02-01a
5.2	TC02-01b
5.3	TC02-02e
5.7	TC02-02a
5.8	TC02-02b
5.9 - 5.10	TC02-02c
5.11	TC02-02n
5.12	TC02-02o
5.13	TC02-02l
5.14	TC02-02m
5.15	TC02-02p
5.16	TC02-02d

ETSI Reference	EWOS Reference
16.1	TC03d-02b
16.2	TC03d-02d
16.3	TC03d-02b
17.1	TC02-03g
17.2	TC03d-01a
17.4	TC03c-02o
17.5	TC03c-02b
17.6	TC03c-02e
17.7	TC03c-02d
17.8	TC03c-02f
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5.17	TC02-02f
5.18	TC02-02g
5.19	TC02-02q
7.1	TC02-04h
7.2	TC02-03b
7.5	TC02-01c
7.6	TC02-04c
7.7	TC02-04g
7.8	TC02-04a
7.9	TC02-03c
7.10	TC02-03d
7.11	TC02-03f
8.4	TC02-04e

ETSI Reference	EWOS Reference
17.12	CG03c-01a
17.14	CG03c-01b
17.15	CG03c-01c
17.18	CG03-01
17.19	CG03-01
17.20	CG03-01
17.21	CG03-01
17.24	CG02-02c
17.25	CG02-02c
17.26	TC03c-03a
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17.28	TC03c-03f
18.1	TC03c-01a

ETSI Reference	EWOS Reference
8.5	TC02-04b
8.6	TC02-04b
8.7	TC02-04f
8.9	TC02-03a
8.10	TC02-08a
9.4	TC02-02h
9.5	TC02-02i
9.7	TC02-07a
9.8	TC02-07b
9.9	TC02-07c
9.10	TC02-07d
9.11	TC02-07e
9.12	TC02-07f

ETSI Reference	EWOS Reference
18.2	TC03c-09d
18.3	TC03c-11v
18.4	TC03c-09a
18.5	TC03c-09b
18.6	TC03c-09c
18.7	TC07b-01g
18.8	TC03c-11w
18.10	TC03c-06b
18.12	TC03c-06d
18.15	TC03c-05a
18.16	TC03c-03c
18.17	TC03c-03d
18.18	TC03c-10c

ETSI Reference	EWOS Reference
19.1	TC03c-04b
19.2	TC03c-04
19.3	TC03c-04c
19.4	TC03c-07d
19.5	TC03c-07e
20.1	CG02-01a
20.2	CG02-01b
20.3	CG02-02a
20.4	CG02-02b
20.6	CG03-02b
20.7	TC03h-01a
20.8	TC03h-01b
21.1	TC04b-08

ETSI Reference	EWOS Reference
21.3	TC04b-08
27.1	TC07b-01j
27.2	TC07b-01j
28.1	TC07b-01b
28.2	TC07b-01c
28.3	TC07b-01d
28.4	TC07b-01e
28.5	TC07b-01h
30.1	TC07a-01b
30.2	TC07a-01d
30.3	TC07a-01f
30.4	TC07a-01i
30.5	TC07a-01j

ETSI Reference	EWOS Reference
30.6	TC07a-01n
30.7	TC07a-01o
30.8	TC07a-01p
32.2	TC01-03a
32.3	TC01-03b
32.5	TC01-03c
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32.10	TC01-04e
32.11	TC01-04f
32.12	TC01-04g
32.15	TC01-05a
32.16	TC01-05b

ETSI Reference	EWOS Reference
32.17	TC01-05d
32.19	TC01-07a
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33.2	TC01-10a
330.3	TC01-10b
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History

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