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Environmental Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment - Part 2: Specification of environmental tests - Sub-part 0: Introduction

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**Environmental Engineering (EE);
Environmental conditions and environmental tests for
telecommunications equipment;
Part 2: Specification of environmental tests;
Sub-part 0: Introduction**

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Contents

Intellectual Property Rights	4
Foreword.....	4
Modal verbs terminology.....	5
1 Scope	6
2 References	6
2.1 Normative references	6
2.2 Informative references.....	6
3 Definition of terms, symbols and abbreviations.....	7
3.1 Terms.....	7
3.2 Symbols.....	7
3.3 Abbreviations	7
4 General	7
5 Users guide	8
5.1 Test specifications and the states of test item.....	8
5.1.0 General.....	8
5.1.1 In-use tests	8
5.1.2 Not in-use tests	9
5.2 Selection of tests and test severities	9
6 Topics on making a test programme	9
6.0 General	9
6.1 Environmental resistibility requirements.....	9
6.2 Test programme.....	10
6.3 Verification.....	11
Annex A (informative): Change History	12
History	13

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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Environmental Engineering (EE).

The present document is part 2, sub-part 0 of a multi-part deliverable covering environmental conditions and environmental tests for telecommunications equipment, as identified below:

Part 1: "Classification of environmental conditions";

Part 2: "Specification of environmental tests";

Sub-part 0: "Introduction";

Sub-part 1: "Storage";

Sub-part 2: "Transportation";

Sub-part 3: "Stationary use at weatherprotected locations";

Sub-part 4: "Stationary use at non-weatherprotected locations";

Sub-part 5: "Ground vehicle installations";

Sub-part 6: "Ship environments";

Sub-part 7: "Portable and non-stationary use";

Sub-part 8: "Stationary use at underground locations".

Part 1 specifies different standardized environmental classes covering climatic, biological, chemically and mechanically active substances, and mechanical conditions during storage, transportation and in use.

Part 2 specifies the test severities, test methods and performance criteria for the different environmental classes.

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Date of adoption of this EN:	9 August 2022
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 2023
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1 Scope

The present document specifies the test severities and methods for verification of the required resistibility for equipment which is to be stored, transported and used in the environments which characteristics are defined in ETSI EN 300 019-1 [2].

The purpose of the present document is to provide a general overview of ETSI EN 300 019-2 [3].

ETSI TR 100 035 [i.1] should be used in conjunction with ETSI EN 300 019 multi-parts deliverable [2] and [3]. It gives an introduction to the main concepts of environmental engineering, the purpose and use of environmental classes and the corresponding test philosophy.

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.

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

- [1] ETSI EN 300 019-1-0: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-0: Classification of environmental conditions; Introduction".
- [2] ETSI EN 300 019-1 (all sub-parts): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1: Classification of environmental conditions".
- [3] ETSI EN 300 019-2 (all sub-parts): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2: Specification of environmental tests".
- [4] Void.
- [5] IEC 60068-2 series: "Environmental testing".

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.

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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] ETSI TR 100 035: "Environmental Engineering (EE); Environmental engineering; Guidance and terminology".

- [i.2] IEC 60721-2-4: "Classification of environmental conditions - Part 2-4: Environmental conditions appearing in nature - Solar radiation and temperature".
- [i.3] IEC 60068-2-5: "Environmental testing - Part 2-5: Tests - Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 300 019-1-0 [1] and the following apply:

performance criterion: description of behaviour on an equipment to determine the effects of the applied tests on the equipment itself

test: series of stresses applied to an equipment, in accordance to specified methods, to verify the compliance to certain performance criteria

3.2 Symbols

Void.

3.3 Abbreviations

Void.

4 General

SIST EN 300 019-2-0 V2.2.1:2022

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The purpose of environmental testing is to verify that an equipment, under defined environmental conditions, can survive without irreversible failures and perform according to the defined performance criteria.

The tests defined in ETSI EN 300 019-2 [3] are not reliability tests or lifetime tests.

The severities of testing defined in sub-parts 1 to 8 of ETSI EN 300 019-2 [3] are closely correlated with the characteristic severities of the environmental classes specified in sub-parts 1 to 8 of ETSI EN 300 019-1 [2]. Furthermore, the definition of test severity has been made taking into account failure consequences, performance requirements and the test severities in IEC 60068-2 [5] test methods. In sub-parts 1 to 8 of ETSI EN 300 019-2 [3], the performance criteria are defined for each type of test and the tested equipment shall comply to these criteria.

Sub-parts 1 to 8 of ETSI EN 300 019-2 [3] define the test severities and test methods to verify the compliance of an equipment to a specific environmental class. In many cases these test conditions are different from those severities shown in sub-parts 1 to 8 of ETSI EN 300 019-1 [2] and for some environmental parameters no tests are recommended based on the justification provided in the sub-parts 1 to 8 of ETSI EN 300 019-2 [3]. Where test conditions are different from the environmental class severity, this is done in order to:

- produce the effect of the environment rather than attempt to reproduce the actual physical environmental conditions; and/or
- enable standard testing to IEC 60068-2 [5]; and/or
- recognize that the given characteristic severity relates to a condition with a very low probability of occurrence.

Where no test is specified:

- other specified tests are considered to be more severe and cover that parameter; and/or

- the environmental condition is not negatively impacting the functionality and/or the structure of an equipment and consequently does not require testing. However certain product specifications may require additional testing; and/or
- the environmental condition is a valid one, but no standard test method exists; and/or
- the environmental condition is considered when choosing components and materials.

The mechanical test severities given may deviate from the characteristic severities and may even be split into several alternative tests, taking into consideration equipment mass. This does not invalidate the verification because:

- depending on the equipment category, size, installation method and location inside the premises, the probable stresses are different within the class;
- usually only one combination of several existing complex mechanical stresses are given as a characteristic. Therefore, tests with different severities and methods can serve as verification and reveal the same failure mechanisms.

In meeting the test requirements defined in sub-parts 1 to 8 of ETSI EN 300 019-2 [3], the equipment shall be deemed to comply with the requirements of environmental classes defined in sub-parts 1 to 8 of ETSI EN 300 019-1 [2].

It is emphasized that performance criteria which apply to a specific equipment shall be included in the relevant product specification. In particular, if relevant, the distinction between normal and reduced performance and between intermittent function and cessation of function should be precisely defined.

The environmental classifications given in sub-parts 1 to 8 of ETSI EN 300 019-1 [2] and the test severities given in sub-parts 1 to 8 of ETSI EN 300 019-2 [3] do not cover any microenvironment caused by installing one equipment inside another, e.g. several sub-racks installed inside one miscellaneous rack. In such cases the applicable conditions shall be agreed between vendor and buyer.

In some cases, test severities have been chosen deviating from the IEC preferred values, e.g. in order to stay within the prescribed limits of a climatogram.

5 Users guide

5.1 Test specifications and the states of test item

5.1.0 General

The relevant environmental test programme shall specify whether the test item is powered-up and whether it is in-use during each phase of the tests.

Two states of test item are usually required. These are the equipment "not in-use" and "in-use" states where:

- "not in-use" is normally the condition applicable to storage and transportation (for which the test programme shall specify if the equipment is to be in its packaging or not);
- "in-use" is normally the condition of the equipment in its working environment (for which the test programme shall specify the equipment's performance criteria, heat dissipation, failure consequences, etc.).

5.1.1 In-use tests

The required performance before, during and after the test are defined in sub-parts 1 to 8 of ETSI EN 300 019-2 [3] and shall be specified in the product specification. Input and load conditions of the equipment shall be chosen to obtain full utilization of the equipment under test. The dissipation shall be maximized by selection of supply power and load conditions, except for the steady-state-low-temperature test, where it shall be minimized.

The tests shall be conducted in accordance with IEC 60068-2 series [5], unless otherwise stated in sub-parts 3 to 8 of ETSI EN 300 019-2 [3]. However, in all "in-use" tests, the performance criteria are those that the equipment under test shall remain in its operational state.