SLOVENSKI STANDARD
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Okoljski inženiring (EE) - Okoljski pogoji in preskusi vplivov okolja na telekomunikacijsko opremo - 2-4. del: Specifikacija preskusov glede vplivov okolja - Stacionarna uporaba na lokacijah, ki niso zaščitene pred vremenskimi vplivi

Environmental Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment - Part 2-4: Specification of environmental tests - Stationary use at non-weatherprotected locations

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33.050.01	Telekomunikacijska terminalska oprema na splošno	Telecommunication terminal equipment in general

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Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-4: Specification of environmental tests; Stationary use at non-weatherprotected locations

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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 4 of a multi-part deliverable. Full details of the entire series can be found in part 2, sub-part 0 [i.1].

National transposition dates	
Date of adoption of this EN:	21 December 2015
Date of latest announcement of this EN (doa):	31 March 2016
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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).

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1 Scope

The present document specifies test methods and severities for verification of the required resistibility of equipment according to the relevant environmental class.

The tests defined in the present document apply to stationary use of equipment at non-weatherprotected locations covering the environmental conditions stated in ETSI EN 300 019-1-4 [1].

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 reference document (including any amendments) applies.

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

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

[1] ETSI EN 300 019-1-4: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weatherprotected locations".

[2] IEC 60068-2-1 (03-2007): "Environmental testing - Part 2-1: Tests - Test A: Cold".

[3] Void.

[4] Void.

[5] ANSI T1.0600329 (2008): "Network Equipment - Earthquake Resistance Standard".

[6] Void.

[7] IEC 60068-2-2 (07-2007): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".

[8] IEC 60068-2-14 (01-2009): "Environmental testing - Part 2-14: Tests - Test N: Change of temperature".

[9] IEC 60068-2-30 (08-2005): "Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)".

[10] IEC 60068-2-64 (04-2008): "Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance".

[11] IEC 60068-2-27 (02-2008): "Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock".

[12] IEC 60068-2-6 (12-2007): "Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)".

[13] IEC 60068-2-57 (11-1999): "Environmental testing - Part 2-57: Tests - Test Ff: Vibration - Time history method".

[14] Void.

[15] IEC 60068-2-18 (10-2000): "Environmental testing - Part 2-18: Tests - Test R and guidance: Water".

[16] IEC 60068-2-78 (08-2001): "Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state".

[17] IEC 60068-2-11 (01-1981): "Basic environmental testing procedures - Part 2-11: Tests - Test Ka: Salt mist".

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 reference 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 EN 300 019-2-0: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-0: Specification of environmental tests; Introduction".

[i.2] IEC 60068-2-68 (8-1994): "Environmental testing - Part 2: Tests - Test L: Dust and sand".

[i.3] IEC 60068-2 (all parts): "Environmental testing - Part 2: Tests".

3 Environmental test specifications

The detailed descriptions of the environmental conditions are given in clauses 4 and 5 of ETSI EN 300 019-1-4 [1].

ETSI EN 300 019-2-0 [i.1] forms a general overview of part 2 of this multi-part deliverable.

The equipment under test is assumed to be in its operational state throughout the test conditions described in the present document unless otherwise stated. The required performance before, during and after the test need to 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 heat dissipation shall be maximized, except for the steady state, low temperature test, where it shall be minimized.

3.1 Specification T 4.1: Non-weatherprotected locations, climatic tests

The specification in table 1 shall apply to Non-weatherprotected locations described in ETSI EN 300 019-1-4 [1].

Table 1: Test specification T 4.1: Stationary use at non-weatherprotected locations - climatic tests

Environmental parameter			Environmental Class 4.1	Environmental test specification T 4.1: Stationary use, Non-weatherprotected locations				
Type	**Parameter**	**Detail parameter**	**Characteristic severity**	**Test severity**	**Duration**	**Reference**	**Method**	**Notes**
Air temperature	Low	(°C)	-33	-33 or -45	16 h	IEC 60068-2-1 [2]	Ab/Ad/Ae: Cold	1
	High	(°C)	+40	+40 or +55	16 h	IEC 60068-2-2 [7]	Bb/Bd/Be: Dry heat	2
	Change	(°C) (°C/min)	 0,5	-10/+40 0,5	2 cycles t_1 = 3 h	IEC 60068-2-14 [8]	Nb: Change of temperature	3
Humidity	Relative	Low (%)	15	none				8
		high (%) (°C)	100	93 +30	10 d	IEC 60068-2-78 [16]	Cab: Damp heat steady state	4
		condensation (%) (°C)	yes	 90-100 +30	2 cycles	IEC 60068-2-30 [9]	Db: Damp heat, cyclic Variant 1	5
	Absolute	Low (g/m^3)	0,26	none				
		high (g/m^3)	25					6
Air	Pressure	Low (kPa) high (kPa)	70 106	none none				7 7
	Speed	(m/s)	50	none				8
Water	Rain	Intensity	6 mm/min	0,01 m^3/min 90 kPa	3 min/m^2 or 15 min	IEC 60068-2-18 [15]	Rb: Impacting water Method 1	9
		low temperature (°C)	+5	none				
	Other sources		splashing water					10
	Icing & frosting		yes	none				8
Radiation	Solar	(W/m^2)	1 120					11
	Heat	(W/m^2)	negligible					

Environmental parameter			Environmental Class 4.1	Environmental test specification T 4.1: Stationary use, Non-weatherprotected locations				
Type	**Parameter**	**Detail parameter**	**Characteristic severity**	**Test severity**	**Duration**	**Reference**	**Method**	**Notes**
Chemically active substances	Sulphur	SO_2 (mg/m^3)	0,3/1,0	none				12
		H_2S (mg/m^3)	0,1/0,5	none				12
	Chlorine	salt mist	sea and road salt	35 °C, 5 %NaCl solution	10d	IEC 60068-2-11 [17]	Ka: Salt mist	12
		Cl (mg/m^3)	0,1/0,3	none				12
		HCl (mg/m^3)	0,1/0,5	none				12
	Nitrogen	NO_x (mg/m^3)	0,5/1,0	none				12
		NH_3 (mg/m^3)	1,0/3,0	none				12
	Hydrogen fluoride HF	(mg/m^3)	0,01/0,03	none				12
	Ozone O_3	(mg/m^3)	0,05/0,1	none				12
Mechanically active substances	Dust	sedimentation ($mg/(m^2h)$)	20					13
		suspension (mg/m^3)	5					13
	Sand	(mg/m^3)	300					13
Flora and fauna	Micro organisms		mould, fungus, etc.	none				14
	Rodents, insects		rodents, etc.	none				14

Environmental parameter			Environmental Class 4.1	Environmental test specification T 4.1: Stationary use, Non-weatherprotected locations				
Type	**Parameter**	**Detail parameter**	**Characteristic severity**	**Test severity**	**Duration**	**Reference**	**Method**	**Notes**
NOTE 1: (Air temperature, low). The equipment under test shall remain operational throughout this test (without any damage or deterioration of performance, according to product specification). Two test temperatures are given, the lower test temperature applies if the equipment is protected against solar irradiation. The higher test temperature includes heat irradiation emitted from the equipment. If a cold start up test is performed, the characteristic severity should be used as a cold start up temperature, but it may be modified (within the class characteristic severity range) by the product specification. In this case, the cold start up test shall commence once low temperature stability is achieved.								
NOTE 2: (Air temperature, high). The equipment under test shall remain operational throughout this test (without any damage or deterioration of performance, according to product specification). Two test temperatures are given, the lower test temperature applies if the equipment is protected against solar radiation or the equipment is ventilated (natural or forced). The higher test temperature includes the heating effects of solar radiation. If a high temperature start up test is performed, the characteristic severity should be used as a high start up temperature, but it may be modified (within the class characteristic severity range) by the product specification. In this case, the high temperature start up test shall commence once high temperature stability is achieved.								
NOTE 3: (Air temperature, change). This test is intended for specimen with large thermal time constant. For equipment where the rapid change of temperature of the surface has a significant effect on internal components, the values of the change of temperature up to 5 °C/min can be applied (e.g. heat sinks).								
NOTE 4: (Humidity, relative high). IEC 60068-2-78 [16] Test Cab shall be used with test severities not higher than climatogram limits for this class.								
NOTE 5: (Condensation). IEC 60068-2-30 [9] Test Db shall be used with test severities not higher than climatogram limits for this class.								
NOTE 6: (Humidity, absolute, high). This effect is considered to be partly included in the damp heat test IEC 60068-2-78 [16] Test Cab.								
NOTE 7: (Air pressure, low and high). No test shall be used for normal applications, because the effect of air pressure is evaluated at the component level.								
NOTE 8: There is no IEC 60068-2 [i.3] series test for this parameter.								
NOTE 9: (Water, rain). IEC 60068-2-18 [15] Test Rb method 1 has been chosen even if it does not imitate normal rain. It is a simple hand held shower test, easy to perform and can demonstrate that the specimen design is adequately toleranced to survive this condition. The cooling effect of the low temperature of the rain is included in IEC 60068-2-14 [8] Test Nb. Two durations are given, whichever is the greatest should be chosen.								
NOTE 10: (Water, other sources). No test is recommended because the effect is already included in IEC 60068-2-18 [15] Test Rb.								
NOTE 11: (Radiation). The heating effect of solar radiation is included in the higher test temperature in IEC 60068-2-2 [7] Test Bb as described in note 2. Photochemical tests can be made separately for component and materials.								
NOTE 12: (Chemically active substances). Characteristic severities are mean/maximum values. The characteristic severities should be considered when designing the equipment and when choosing components and materials. No test is recommended in the present document, except for the mechanical enclosures, where the salt mist test is required to be performed. The execution of this test can be performed on the entire enclosure or subparts of the enclosure if the results are not affected.								
NOTE 13: (Mechanically active substances). The characteristic severities are much lower than the lowest test severity in IEC 60068-2-68 [i.2] Test L and therefore no test is recommended. This condition should be considered when designing the equipment and choosing components and materials.								
NOTE 14: (Flora and fauna). The characteristic severities should be considered when choosing components and materials.								