ETS 300 019-1-4

AMENDMENT pr A1

February 1997

Source: ETSI TC-EE Reference: RE/EE-01021-1-4

ICS: 33.020

Key words: Environment

This draft amendment A1, if approved, will modify the European Telecommunication Standard ETS 300 019-1-4 (1992)

Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions Stationary use at non-weatherprotected locations

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

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

Foreword

This draft amendment to ETS 300 019-1-4 (1992) has been produced by the Equipment Engineering (EE) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the One step Approval Procedure of the ETSI standards approval procedure.

Proposed transposition dates	
Date of latest announcement of this amendment (doa):	3 months after ETSI publication
Date of latest publication or endorsement of this amendment (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Amendments

Contents

Add:

5.6 Earthquake conditions

Clause 2

Add the following references:

[5] IEC 721-2-6: "Environmental conditions appearing in nature - Earthquake vibration and shock".

[6] IEC 68-3-3: "Environmental testing - Part 3: Background information - Subpart 3: Guidance. Seismic test methods for equipment".

Clause 4

In subclause 4.1 after the second sentence, add:

Seismic environment: **zone 4** as defined in IEC 721-2-6 [5]. Option zone 4 (modified Mercalli scale ≥ 9): if earthquake conditions are specified by the customer, the conditions stated in subclause 5.6 apply.

Clause 5

After the end of subclause 5.5, add a new subclause:

5.6 Earthquake conditions

The dynamic environment which an equipment experiences during an earthquake depends on several parameters including the intensity of the ground motion and the characteristics of the structures used to support and/or house the equipment itself.

The conditions hereafter stated refer only to equipment mounted at ground level or on structures of high rigidity. Earthquake conditions for equipment mounted on pylons, poles and any other non-rigid structures can differ significantly. For equipment mounted on top of buildings using a structure of high rigidity, the conditions and tests stated in parts 1-3 and 2-3 of the present ETS apply.

The most common used way to specify seismic conditions is through the definition of a Response Spectrum (RS).

A RS is the graphical representation of the maximum responses (i.e. acceleration), of an array of single degree-of-freedom oscillators as a function of oscillator frequency, in response to an applied transient base motion.

In other words the RS may be used to describe the motion that equipment is expected to experience at its mounting during a postulated seismic event.

To define an RS it is necessary to define the postulated base motion and the characteristics of the array of the single degree-of-freedom oscillators, including their damping ratio.

The high frequency asymptotic value of the acceleration of the response spectrum is normally called *Zero Period Acceleration* (ZPA) and represents the largest peak value of acceleration of the base motion.

In absence of a detailed knowledge of the possible seismic motion, the ZPA value can be obtained by the following formula (see IEC 68-3-3, ref. [6]):

$$ZPA = a_f = a_g \times K \times D \times G$$

where:

a_f *floor acceleration;*

a_g *ground acceleration* that depends on the intensity of the earthquake;

K *superelevation factor* that takes into account the amplification of the ground acceleration resulting from the vibrational behaviour of buildings and structures;

D *direction factor* that takes into consideration possible intensity differences of the seismic motion between the horizontal and vertical axes;

G *geometric factor*, normally specified among testing parameters when single axis excitation is used for testing to take into account the interaction, due to installation location, along the different axes of the equipment of simultaneous multi-directional input vibrations.

The parameter severities that shall be used for classes 3.1 to 3.5 are shown in table 6.

The severities have been chosen among those stated in IEC Publication 68-3-3 [6].

Table 6: Earthquake parameters for class 4.1

Parameters	Description	Severity
earthquake intensity	strong to very strong earthquakes (Richter scale magnitude > 7, Modified Mercalli intensity scale > IX)	a_g = 5 m/s^2
superelevation factor	mounting of equipment on rigid foundations or on structures of high rigidity	K = 1 (1)
direction factor	no intensity differences among axes	D_{xyz} = 1
geometric factor	single-axis excitation with no interaction with the other axes	G = 1

NOTE 1: If the equipment is not mounted on structures of high rigidity, i.e. pylons, poles, etc., the structure should be included in the test, or a corrected Response Spectrum should be determined selecting the appropriate K value from those reported in IEC Publication 68-3-3 [6].

The corresponding Response Spectrum, assuming a damping ratio of the single degree-of-freedom oscillators N = 2 %, is described in figure 3 and table 7.

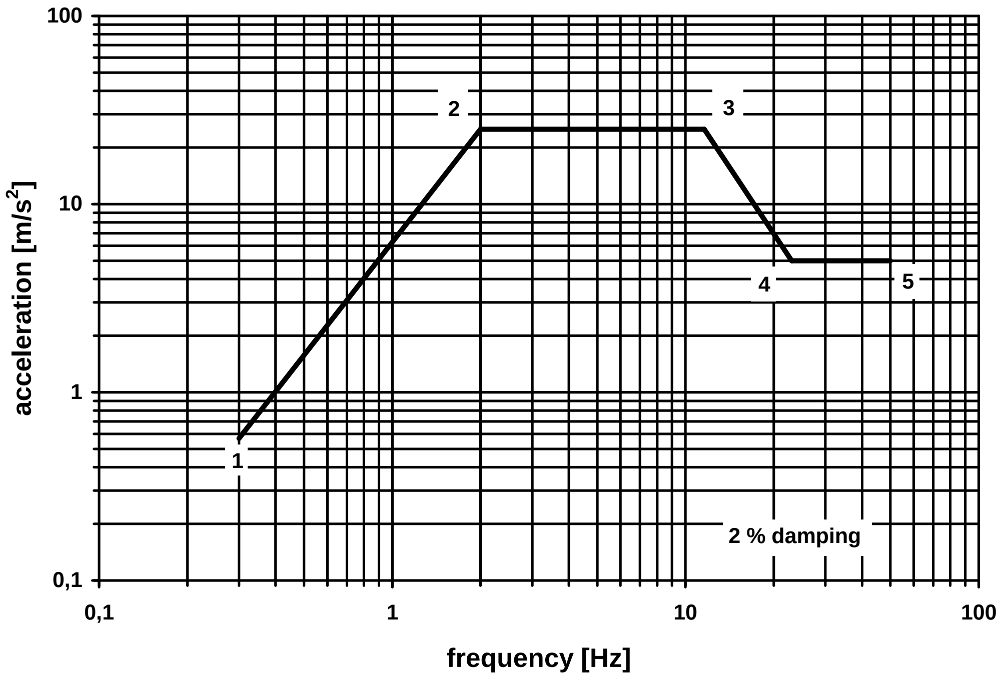

Figure 3: Earthquake Response Spectrum.

Table 7: Acceleration co-ordinates for the Response Spectrum

Co-ordinate point	Frequency [Hz]	Ground acceleration [m/s^2]
1	0,3	0,57
2	2,0	25
3	11,6	25
4	23,0	5
5	50,0	5

History

Document history	
February 1992	First Edition
February 1997	One step Approval Procedure OAP 9724: 1997-02-14 to 1997-06-13