

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

BASIC EMC PUBLICATION  
PUBLICATION FONDAMENTALE EN CEM

AMENDMENT 2  
AMENDEMENT 2

**iTeh STANDARD PREVIEW**  
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**Electromagnetic compatibility (EMC) –  
Part 2-2: Environment – Compatibility levels for lowfrequency conducted  
disturbances and signalling in public low-voltage power supply systems**

**Compatibilité électromagnétique (CEM) –  
Partie 2-2: Environnement – Niveaux de compatibilité pour les perturbations  
conduites à basse fréquence et la transmission des signaux sur les réseaux  
publics d'alimentation basse tension**





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## FOREWORD

This amendment has been prepared by subcommittee 77A: EMC – Low frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

The text of this amendment is based on the following documents:

CDV	Report on voting
77A/980/CDV	77A/992/RVC

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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## 1 Scope and object

*Renumber the existing note, as modified by Amendment 1, into NOTE 1.*

*After the existing note, add the following new note:*

NOTE 2 The measurement methods of disturbance levels are outside the scope of this document.

## 4.2 Voltage fluctuations and flicker

*Add, after Figure 1, the following new text:*

In some cases, it is necessary to use the numerical values for points on the curves in Figure 1. These values are given in Table E.1.

### 4.12.3 Frequency range from 30 kHz to 150 kHz

*Replace the existing text, as modified by Amendment 1, with the following new text and Table:*

The compatibility levels for voltage distortion in differential mode from 30 kHz to 150 kHz are given in Table 4.

**Table 4 – Compatibility levels for voltage distortion  
in differential mode from 30 kHz to 150 kHz<sup>a</sup>**

Frequency range kHz	Compatibility levels dB(μV)
30 to 50 <sup>b</sup>	122 to 119 <sup>c</sup>
50 <sup>b</sup> to 150	113 to 89 <sup>c</sup>

<sup>a</sup> For EMC coordination in the setting of emission limits for unsymmetrical voltage distortion, see 4.12.1.

<sup>b</sup> At the transition frequency, the lower level applies.

<sup>c</sup> The level decreases linearly with the logarithm of the frequency in the ranges 30 kHz to 50 kHz and 50 kHz to 150 kHz.

Annex D has been prepared in order to provide the basis for the definition of compatibility levels in the frequency range from 30 kHz to 150 kHz.

*Add the following new Annexes D and E:*

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## Annex D (informative)

### Basis for the definition of the compatibility levels for voltage distortion in differential mode from 30 kHz to 150 kHz

#### D.1 General

A number of electromagnetic interference cases due to disturbances in the frequency range from 2 kHz to 150 kHz have been collected by IEC and CENELEC. Consequently, it was decided to start the maintenance of IEC 61000-2-2 mainly to define compatibility levels in this frequency range, from which associated emission limits and immunity requirements can be derived.

#### D.2 Compatibility levels

The compatibility levels for voltage distortion in differential mode from 30 kHz to 150 kHz are reference levels for coordination in the setting of emission limits and immunity levels, in order to improve EMC (including long-term degradation) for equipment such as MCSs, static electricity meters, clocks, filter capacitors, etc, supplied by public low voltage power supply systems, against disturbances generated by equipment such as switching power converters, switch mode power supplies, photovoltaic inverters, etc. Several additional parameters other than the disturbance level can have an impact on EMC in this frequency range, such as impedance behaviour of the mains and attenuation effects, global voltage spectrum and time behaviour of conducted emissions, as well as the expected amount of equipment supplied by public low voltage power supply systems (see the note in 4.12.1).

In particular, MCSs cannot work properly when the levels of disturbance are too high. Today, in 2017, emission limits for the frequency range from 30 kHz to 150 kHz are defined only for a few types of equipment. When defining emission limits in this range, CISPR 15 limits should be considered, when possible. Their use would allow a better design of the MCS network leading to a better operation; in the majority of cases, harmful interferences could be better managed and solved at reasonable cost. Additionally, tests have shown that the performance of multicarrier MCSs depends not only on the amplitude but also on the shape and the number of spectral lines of disturbances: a few lines are expected to be less harmful than a large number.

In other respects, the definition of a very low compatibility level curve for non-intentional emissions is not reasonable due to the estimated high cost for making all equipment compliant with emission limits consistent with this compatibility level curve.

The proposed compatibility level curve is the result of the efforts made by the different parties to reach a compromise, after years of intense discussions and studies within IEC SC77A, also taking into account investigation results from CENELEC SC205A. This compatibility level curve represents the best currently achievable compromise supported by all stakeholders, giving for the first time a reference level for setting emission limits for non-intentional emissions in the frequency range from 30 kHz to 150 kHz.

**Annex E**  
 (normative)

**Numerical values corresponding to Figure 1**

**Table E.1 – Relative voltage fluctuation  $\Delta V/V$  for  $P_{st} = 1,0$  corresponding to Figure 1**

Fluctuation rate ( $r$ ) changes per minute	Voltage fluctuation %		Fluctuation rate ( $r$ ) changes per minute	Voltage fluctuation %	
	120 V lamp 60 Hz system	230 V lamp 50 Hz System		120 V lamp 60 Hz system	230 V lamp 50 Hz system
0,1	8,54	7,33	176	0,74	0,64
0,2	5,27	4,51	273	0,65	0,56
0,4	4,10	3,51	375	0,59	0,50
0,6	3,66	3,17	480	0,56	0,47
1	3,181	2,715	585	0,50	0,42
2	2,564	2,191	682	0,45	0,37
3	2,25	1,93	796	0,39	0,32
5	1,90	1,63	1 020	0,35	0,28
7	1,694	1,450	1 055	0,35	0,276
10	1,50	1,28	1 200	0,37	0,29
22	1,18	1,02	1 390	0,44	0,33
39	1,040	0,894	1 620	0,548	0,407
48	1,00	0,86	2 400	1,05	0,78
68	0,94	0,81	2 875	1,50	1,04
110	0,844	0,722	4 000	n/a	2,343
			4 800	4,837	n/a

NOTE 1 Two consecutive voltage changes (one positive and one negative) constitute one “cycle”, i.e. two voltage changes per second correspond to a 1 Hz fluctuation.

NOTE 2 The lines with 3 digits behind the decimal comma are used in Table 5 of IEC 61000-4-15 where they are specified for calibration purposes, and are therefore given with higher resolution.

NOTE 3 The lines for 4 000 changes per minute and 4 800 changes per minute on the above table, which are not in Figure 1, are given only because they are used in Table 5 of IEC 61000-4-15.

**Bibliography**

Add the following new reference:

CISPR 15, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*

## AVANT-PROPOS

Le présent amendement a été établi par le sous-comité 77A: CEM – Phénomènes basse fréquence, du comité d'études 77 de l'IEC: Compatibilité électromagnétique.

Le texte de cet amendement est issu des documents suivants:

CDV	Rapport de vote
77A/980/CDV	77A/992/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cet amendement.

Le comité a décidé que le contenu de cet amendement et de la publication de base ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

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### 1 Domaine d'application et objet

*Renommer la note existante, modifiée par l'Amendement 1, en NOTE 1.*

*Après la note existante, ajouter la nouvelle note suivante:*

NOTE 2 Les méthodes de mesure des niveaux de perturbations n'entrent pas dans le domaine d'application du présent document.

### 4.2 Fluctuations de tension et flicker

*Ajouter, après la Figure 1, le nouveau texte suivant:*

Dans certains cas, il est nécessaire d'utiliser les valeurs numériques pour les points situés sur les courbes de la Figure 1. Ces valeurs sont données dans le Tableau E.1.

#### 4.12.3 Bande de fréquences de 30 kHz à 150 kHz

*Remplacer le texte existant, modifié par l'Amendement 1, par le nouveau texte et le nouveau tableau suivants:*



Le Tableau 4 fournit les niveaux de compatibilité pour les distorsions de tension en mode différentiel de 30 kHz à 150 kHz.

**Tableau 4 – Niveaux de compatibilité pour les distorsions de tension en mode différentiel de 30 kHz à 150 kHz<sup>a</sup>**

Bande de fréquences kHz	Niveaux de compatibilité dB(μV)
30 à 50 <sup>b</sup>	122 à 119 <sup>c</sup>
50 <sup>b</sup> à 150	113 à 89 <sup>c</sup>

<sup>a</sup> Pour la coordination CEM lors de la définition des limites d'émission pour les distorsions de tension dissymétriques, voir 4.12.1.

<sup>b</sup> Le niveau inférieur s'applique à la fréquence de transition.

<sup>c</sup> Le niveau décroît linéairement avec le logarithme de la fréquence dans les bandes comprises entre 30 kHz et 50 kHz et entre 50 kHz et 150 kHz.

L'Annexe D a été établie afin de servir de base pour la définition des niveaux de compatibilité dans la bande de fréquences de 30 kHz à 150 kHz.

*Ajouter les nouvelles Annexes D et E suivantes:*

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