



**SLOVENSKI STANDARD**  
**SIST EN 50160:2011/A2:2019**

**01-november-2019**

---

**Značilnosti napetosti v javnih razdelilnih omrežjih - Dopnilo A2**

Voltage characteristics of electricity supplied by public electricity networks

Merkmale der Spannung in öffentlichen Elektrizitätsversorgungsnetzen

Caractéristiques de la tension fournie par les réseaux publics de distribution

Ta slovenski standard je istoveten z: **EN 50160:2010/A2:2019**

[SIST EN 50160:2011/A2:2019](https://standards.iteh.ai/catalog/standards/sist/a63bd732-bb93-4915-8d2b-d4776c9226fe/sist-en-50160-2011-a2-2019)

<https://standards.iteh.ai/catalog/standards/sist/a63bd732-bb93-4915-8d2b-d4776c9226fe/sist-en-50160-2011-a2-2019>

**ICS:**

29.240.01	Omrežja za prenos in distribucijo električne energije na splošno	Power transmission and distribution networks in general
-----------	--	---

**SIST EN 50160:2011/A2:2019**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 50160:2011/A2:2019

<https://standards.iteh.ai/catalog/standards/sist/a63bd732-bb93-4915-8d2b-d4776c9226fe/sist-en-50160-2011-a2-2019>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 50160:2010/A2**

September 2019

ICS 29.020

English Version

## Voltage characteristics of electricity supplied by public electricity networks

Caractéristiques de la tension fournie par les réseaux publics de distribution

Merkmale der Spannung in öffentlichen Elektrizitätsversorgungsnetzen

This amendment A2 modifies the European Standard EN 50160:2010; it was approved by CENELEC on 2019-03-25. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

(standards.iteh.ai)

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

EN 50160:2010/A2:2019 (E)

## European foreword

This document (EN 50160:2010/A2:2019) has been prepared by CLC/TC 8X "System aspects of electrical energy supply".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-03-20
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2022-09-20

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

The purpose of this document is to provide further development of the standard; that relating to:

- clarification concerning defined ranges of power frequency, for the purpose of this standard only;
- a first approach to include power quality issues concerning the frequency range 2 – 150 kHz.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 50160:2011/A2:2019

<https://standards.iteh.ai/catalog/standards/sist/a63bd732-bb93-4915-8d2b-d4776c9226fe/sist-en-50160-2011-a2-2019>

## 1 Modification to Clause 2

Modify the reference to EN 61000-4-30:2009 to:

EN 61000-4-30:2015 Electromagnetic compatibility (EMC) – Part 4-30: Testing and measurement techniques – Power quality measurement methods (IEC 61000-4-30:2015)

## 2 Modification to Clause 3

Add the following definitions and renumber the subsequent definitions:

### 3.10

#### **mains communicating system (MCS)**

electrical system using signals to transmit information on electricity supply systems, either on the public electricity distribution network or within installations of network users

### 3.18

#### **power quality**

characteristics of the electricity at a given point on an electrical system, evaluated against a set of reference technical parameters

Note 1 to entry: These parameters might, in some cases, relate to the compatibility between electricity supplied on a network and the loads connected to that network.

## 3 Modification to 4.1

Add a third bullet point after the first paragraph:

- other phenomena, i.e. phenomena occurring in the presence of mains communicating systems (MCS) and/or equipment using switch-mode technology connected to the grid.

## 4 Modification to 4.2.1

SIST EN 50160:2011/A2:2019

[https://standards.iteh.ai/catalog/standards/sist/a63bd732-bb93-4915-](https://standards.iteh.ai/catalog/standards/sist/a63bd732-bb93-4915-8d2b-d4776c9226fe/sist-en-50160-2011-a2-2019)

[8d2b-d4776c9226fe/sist-en-50160-2011-a2-2019](https://standards.iteh.ai/catalog/standards/sist/a63bd732-bb93-4915-8d2b-d4776c9226fe/sist-en-50160-2011-a2-2019)

Renumber the current NOTE as NOTE 2 and start with a new NOTE 1, which reads:

NOTE 1 This standard defines the frequency range for normal network conditions. During exceptional conditions wider frequency tolerances can apply temporarily in order to maintain the continuity of electricity supply.

## 5 Modification to 4.2.7

Delete 4.2.7 "Mains signaling voltage" and move it, with some modification, to a new subclause 4.4 "Mains communication voltage" (see Clause 6).

## 6 Addition of a new subclause 4.4

After 4.3.3 Transient overvoltages, add the following new subclause 4.4.

NOTE 1 The tables will need to be renumbered throughout the standard as the table in 4.4 is numbered "Table 4".

NOTE 2 With regard to the recent edition of the standard, which, for mains signalling voltages only, deals with the frequency range 0,1 – 95 kHz, the draft for items 4.4 and 5.4 "Other phenomena" proceeds in considering also the frequency range 0,1 – 2 kHz.

### 4.4 Other phenomena (see also Annex C)

#### 4.4.1 General

This subclause deals with phenomena which, due to their characteristics, have not been described in the previous subclauses.

Table 4 provides an overview of the situation concerning standardized PQ levels:

Table 4 — PQ standardization in the frequency range below 150 kHz<sup>a</sup>

Frequency range	Type of equipment	
	MCS	Others
0,1 – 2 kHz	Normative PQ levels (see item 4.4.2)	See Clauses 4 – 6 of the standard
2 – 9 kHz	Normative PQ levels (see item 4.4.2)	Under consideration <sup>a, c, d, e</sup>
9 – 95 kHz	Normative PQ levels (see item 4.4.2)	Under consideration <sup>a, c, d, e</sup>
95 – 150 kHz	Under consideration <sup>b, e</sup>	Under consideration <sup>a, c, d, e</sup>

<sup>a</sup> Compatibility levels for non-intentional emissions for the frequency range 2 – 30 kHz have been published with IEC 61000-2-2:2002/AMD1:2017.  
Compatibility levels for non-intentional emissions for the frequency range 30 -150 kHz have been published with IEC 61000-2-2:2002/AMD2:2018.

<sup>b</sup> Emission limits for MCS signals are defined in EN 50065-1.

<sup>c</sup> Design values for emissions from inverters are provided in IEC TS 62578.  
Emission limits are defined: for lighting equipment in EN 55015, for induction cookers in EN 55014-1.

<sup>d</sup> For the frequency range 2 – 150 kHz: Peak values of non-intentional emissions may exceed the in-band signal limits given in EN 50065-1.

<sup>e</sup> For the frequency range 2 – 150 kHz, immunity test specifications are provided in EN 61000-4-16 (common mode) and EN 61000-4-19 (differential mode).

#### 4.4.2 Mains communication voltages (standards.iteh.ai)

In some countries the public networks may be used by the network operators for the transmission of signals (see EN 50065-1). For 99 % of a day the 3 s mean value of signal voltages shall be less than or equal to the values given in Figure 1.

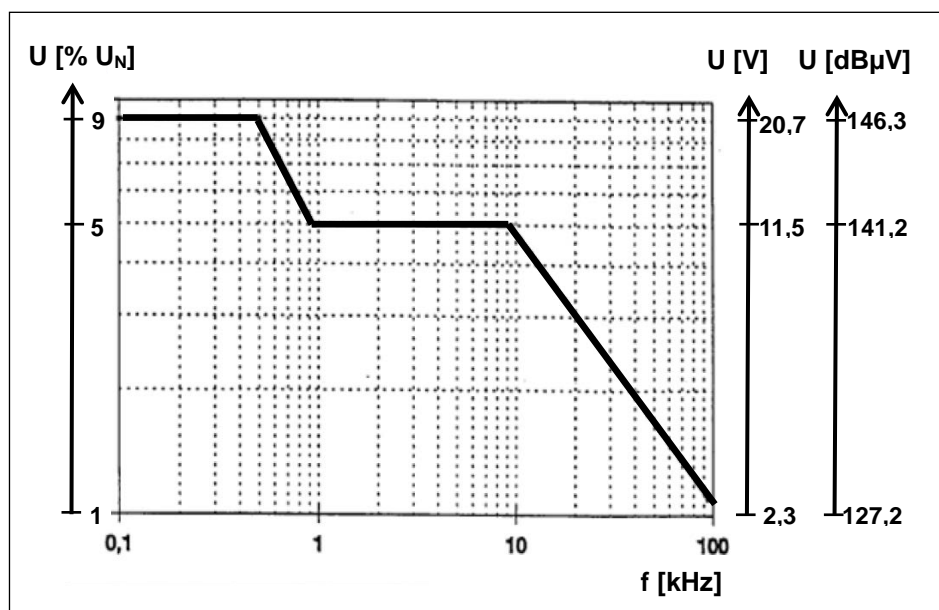


Figure 1 — Signal voltage levels in public LV networks

Mains communication with frequencies in the range from 95 kHz to 148,5 kHz may be used in installations of network users. Though the use of the public LV network is not permitted for the transmission of signals between network users, voltages of these frequencies up to 1,4 V r.m.s. in the public LV network have to be taken into account. Because of the possibility of mutual influences of neighboring network users' mains communicating systems (MCS), the network user may need to apply protection or appropriate mitigation measures for this MCS installation."

## 7 Addition of a new subclause 5.4, Other phenomena

Add the following new subclause 5.4 after 5.3.3 Transient overvoltages

### 5.4 Other phenomena (see also Annex C)

#### 5.4.1 General

This subclause deals with phenomena which, due to their characteristics, have not been described in the previous subclauses.

#### 5.4.2 Mains communication voltages

With regard to the given situation in medium voltages supply networks, PQ levels are provided for mains communication only.

In some countries the public networks may be used by the network operators for the transmission of signals. For 99 % of a day the 3 s mean value of signal voltages shall be less than or equal to the values given in Figure 2.

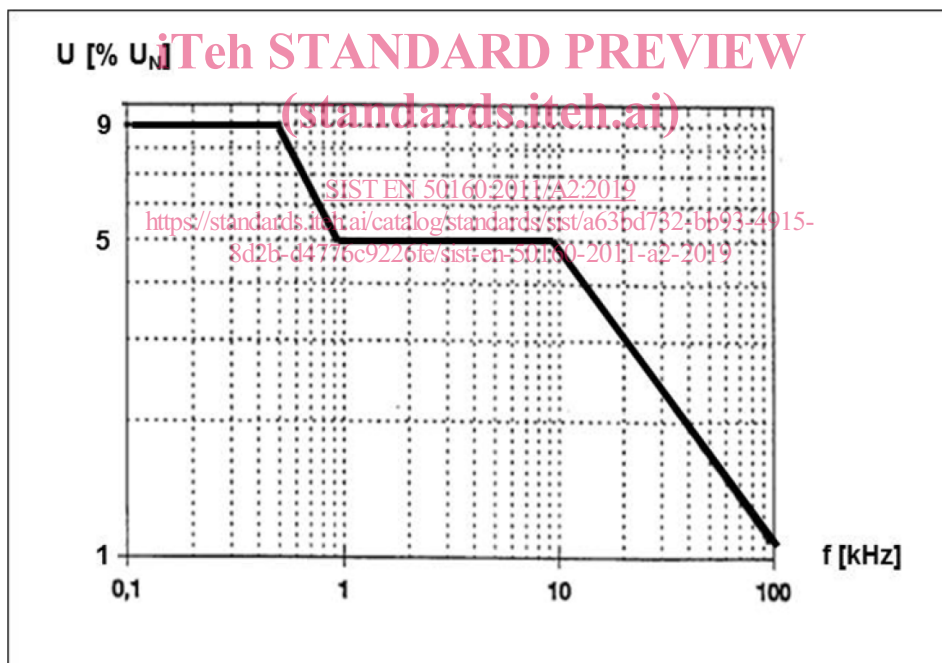


Figure 2 — Signal voltage levels in public MV networks

NOTE It is assumed that network users do not use the public MV network for signaling purposes.

## 8 Addition of Annex C

Add the following informative Annex C

### Annex C (informative) re item 4.4: Other phenomena

Additional information about the particular parameters of characteristics of the supply voltage in the presence of mains communicating systems and/or equipment using switch-mode technology connected to the network.

#### Behaviour over time of the level of supply voltage

It is to be distinguished between the following three aspects

- Due to
  - o variation of loads connected to a network
  - o some loads with switching technology

the impedance of the supply network is varying over time. Due to this variability of the grid impedance, the resulting voltages in the grid are varying in an unpredictable way.

- The level of voltages generated in the frequency range 2 – 150 kHz is dependent on the cumulative effect of such loads being connected to the grid at a given time.
- Switch mode technologies as well as the transmission of modulated signals cause intermittent high-frequency voltages. Related transients or pulses may have an effect on PQ.

More detailed information about immunity requirements in the frequency range 2 kHz – 150 kHz, are given in EN 61000-4-16 and EN 61000-4-19.

In order to comprehensively evaluate PQ related to voltage levels in the frequency range 2 –150 kHz, time domain measurement is recommended in addition to frequency domain measurement. Measurements should be made in accordance with EN 61000-4-30.

#### Duration

The duration of voltages in the frequency range 2 – 150 kHz generated by different loads can vary from a few ms to permanent, depending on

- the applied technology of equipment generating voltages in the frequency range 2 – 150 kHz
- which types of loads are connected to the grid at a given time

the duration of voltages generated by these loads in the frequency range 2 – 150 kHz can be from a few ms up to permanent.

#### Periodicity

Some periodicity of voltages in the frequency range 2 – 150 kHz generated by different loads may be given, depending on

- the applied technology of equipment generating voltages in the frequency range 2 – 150 kHz
- which types of loads are connected to the grid at a given time some periodicity of voltages generated by these loads in the frequency range 2 – 150 kHz may be given.