

© Copyright SEK. Reproduction in any form without permission is prohibited.

Multimedia – System för signalering med synligt ljus

Visible light beacon system for multimedia applications

Som svensk standard gäller europastandarden EN 62943:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62943:2017.

Nationellt förord

Europastandarden EN 62943:2017

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 62943, First edition, 2017 - Visible light beacon system for multimedia applications**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 33.160.60; 35.100.10

Denna standard är fastställd av SEK Svensk Elstandard, som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English Version

**Visible light beacon system for multimedia applications
(IEC 62943:2017)**

Système de balise de lumière visible pour applications
multimédias
(IEC 62943:2017)

Signalsystem mit sichtbarem Licht für Multimedia-
Anwendungen
(IEC 62943:2017)

This European Standard was approved by CENELEC on 2017-04-11. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard 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 European Standard 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, 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: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 100/2850/FDIS, future edition 1 of IEC 62943, prepared by IEC/TC 100 "Audio, video and multimedia systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62943:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-01-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-04-11

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.

Endorsement notice

The text of the International Standard IEC 62943:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 62471	NOTE	Harmonized as EN 62471.
-----------	------	-------------------------

CONTENTS

FOREWORD.....	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 System outline	7
4.1 Interface points and protocol rules	7
4.2 Functions	9
5 Physical layer	9
5.1 Wavelength.....	9
5.2 Data rate.....	9
5.3 Data transmission system	9
5.4 Spurious	10
6 Frame layer	10
6.1 Single frame transmission.....	10
6.1.1 Frame structure	10
6.1.2 Preamble (PRE).....	10
6.1.3 ID length (IDLEN)	11
6.1.4 ID type (IDTYPE).....	11
6.1.5 CRC	11
6.2 Multiple frames transmission.....	11
6.2.1 Frame structure	11
6.2.2 Preamble (PRE).....	12
6.2.3 Sequence number (SEQNO).....	13
6.2.4 Partition type (PTYPE).....	13
6.2.5 BODY	14
6.2.6 CRC	14
6.3 Idle pattern	15
7 Measurement method	15
Annex A (normative) Code management concerning frame type, ID and DATA	16
Annex B (informative) Background, application examples, and safety	17
B.1 General.....	17
B.2 Background of this standard.....	17
B.3 Application examples	17
B.3.1 General	17
B.3.2 Multimedia applications utilizing positional information	17
B.3.3 Application in public spaces.....	17
B.3.4 Cooperation with other services.....	18
B.3.5 Application to setting of equipment	18
B.3.6 Application to AV and multimedia devices.....	18
B.3.7 Application to entertainment	18
B.4 Safety	18
Annex C (informative) Purpose, justification, possible applications, and installation examples	19
C.1 Purpose	19
C.2 Justification	19
C.3 Possible applications	19

C.3.1	General	19
C.3.2	Visible light beacon system for multimedia devices receiving location-dependent advertisement multimedia information from digital signage	19
C.3.3	Visible light beacon system for guiding and navigation system	20
C.3.4	Visible light beacon system for multimedia devices receiving multimedia information from a TV backlight	20
C.4	Installation examples	21
C.4.1	General	21
C.4.2	Visible light beacon system for indoor navigation for the visually impaired (february 2012)	21
C.4.3	Visible light beacon system for indoor smartphone users (april 2013)	21
Bibliography		23
Figure 1 – Visible light beacon system for multimedia applications		7
Figure 2 – Visible light beacon system for multimedia applications: structure and interface point		8
Figure 3 – I-4PPM signal waveform		9
Figure 4 – I-4PPM Slot and Symbol		10
Figure 5 – Frame structure for single frame transmission		10
Figure 6 – Preamble for single frame transmission		11
Figure 7 – Frame structure for a multiple frames transmission		12
Figure 8 – Body field in Single frame compatible mode		14
Figure C.1 – Visible light beacon system for multimedia devices receiving location-dependent advertisement multimedia information from digital signage		19
Figure C.2 – Visible light beacon system for guiding and navigation system		20
Figure C.3 – Visible light beacon system for multimedia devices receiving multimedia information from a TV backlight		20
Figure C.4 – Visible light beacon system for indoor navigation for the visually impaired		21
Figure C.5 – Visible light beacon system for indoor smartphone users		22
Table 1 – ID length		11
Table 2 – Length of CRC and generator polynomial		11
Table 3 – Possible length of concatenated data		12
Table 4 – Preambles for multiple frames transmission		13
Table 5 – Sequence number		13
Table 6 – Partition type		14
Table 7 – Field composition for each length of ID/DATA in Single frame compatible mode		14

INTERNATIONAL ELECTROTECHNICAL COMMISSION

VISIBLE LIGHT BEACON SYSTEM FOR MULTIMEDIA APPLICATIONS

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62943 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

FDIS	Report on voting
100/2850/FDIS	100/2857/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

VISIBLE LIGHT BEACON SYSTEM FOR MULTIMEDIA APPLICATIONS

1 Scope

This International Standard aims at establishing a unified standard concerning the lower communication layer common to multimedia applications, and does not deal with the upper communication layer which depends upon individual applications.

This document specifies a unidirectional visible light communication protocol using visible light, named "visible light beacon system for multimedia applications". This document does not specify the type of receivers. Dimming can be done by such methods as pulse width control or amplitude control, but the dimming is out of the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

There are no normative references in this document.