DIN EN ISO 15118-8

ICS 43.120

Straßenfahrzeuge – Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation – Teil 8: Anforderungen an physikalische und Datenverbindungsschnittstelle für die drahtlose Kommunikation (ISO 15118-8:2018); Englische Fassung EN ISO 15118-8:2019, nur auf CD-ROM

Road vehicles –
Vehicle to grid communication interface –
Part 8: Physical layer and data link layer requirements for wireless communication (ISO 15118-8:2018);
English version EN ISO 15118-8:2019, only on CD-ROM

Véhicules routiers –
Interface de communication entre véhicule et réseau électrique –
Partie 8: Exigences relatives à la couche physique et à la couche de liaison entre les données pour la communication sans fil (ISO 15118-8:2018);
Version anglaise EN ISO 15118-8:2019, seulement en CD-ROM

Gesamtumfang 44 Seiten

DIN-Normenausschuss Automobiltechnik (NAAutomobil)

AVA Documents Document Sharing Hub

Full document details: DIN EN ISO 15118-8:2019-08

Nationales Vorwort

Der Text von ISO 15118-8:2018 wurde vom Technischen Komitee ISO/TC 22 „Road vehicles“ der Internationalen Organisation für Normung (ISO) erarbeitet und als EN ISO 15118-8:2019 durch das Technische Komitee CEN/TC 301 „Straßenfahrzeuge“ übernommen, dessen Sekretariat von AFNOR (Frankreich) gehalten wird.

Das zuständige deutsche Normungsgremium ist der Arbeitsausschuss NA 052-00-31 AA „Datenkommunikation“ des DIN-Normenausschusses Automobiltechnik (NAAutomobil).

Das Präsidium des DIN hat mit seinem Beschluss 1/2004 festgelegt, dass von dem in den Regeln der europäischen Normungsarbeit von CEN/CENELEC verankerten Grundsatz, wonach Europäische Normen in den drei offiziellen Sprachen Deutsch, Englisch und Französisch veröffentlicht werden, in begründeten Ausnahmefällen abgewichen und auf die deutsche Sprachfassung verzichtet werden kann.

Die Genehmigung dafür hat die DIN-Geschäftsleitung entsprechend ihren in Anlage 1 zu dem DIN-Rundschreiben A 5/2004 festgelegten Kriterien für die vorliegende Norm auf Antrag des NA 052 NAAutomobil als Ergebnis einer Einzelfallentscheidung erteilt, zumal bereits dieser Norm zugrunde liegende Papiere überwiegend in englischer Sprache auch von den deutschen Marktteilnehmern angewendet werden.

Um den Energieverbrauch von Fahrzeugen zu senken, werden Fahrzeuge mit elektrischem Teil- oder Komplettantrieb entwickelt. Um die Batterien dieser Fahrzeuge aufladen zu können, wird eine spezielle Lade-Infrastruktur benötigt.

Während verschiedene Teilaspekte in der Normung von Elektrofahrzeugen und Infrastruktur bei ISO und IEC bereits behandelt wurden, beschäftigt sich diese Normenreihe mit dem Informationsaustausch zwischen Elektrofahrzeug und Lade-Infrastruktur. Kommunikation ist für das effektive Aufladen von Fahrzeugen sowie die Entwicklung effizienter und komfortabler Abrechnungssysteme unabdingbar.

Dieser Teil der Normenreihe beschreibt Anforderungen an eine physikalische drahtlose Schnittstelle.

Documents
Document Sharing Hub

Full document details: DIN EN ISO 15118-8:2019-08

Nationaler Anhang NA
(informativ)

Begriffe

Die Benummerung der folgenden Begriffe und Abkürzungen ist identisch mit der Benummerung in der englischen Fassung.

Für die Anwendung dieses Dokuments gelten die Begriffe nach ISO 15118-1, ISO 15118-2 und die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

— IEC Electropedia: unter http://www.electropedia.org/

— ISO Online Browsing Platform: unter http://www.iso.org/obp

3.1
Zugriffspunkt
AP
(en: access point)
Gerät zur drahtlosen Kommunikation, welches dem Nutzer erlaubt, sich mit anderen drahtlosen oder kabelgebundenen Kommunikationsgeräten zu verbinden

Anmerkung 1 zum Begriff: Siehe IEEE Std 802.11™-2012.

3.2
Ladestation
CS
(en: charging site)
Bereich mit einer oder mehreren Elektrofahrzeug-Ladeeinrichtungen (en: electric vehicle supply equipment, EVSE), die durch eine Kommunikationssteuerung Ladeeinrichtung (en: supply equipment communication controller, SECC) gesteuert wird

3.3
Station
STA
(en: station)
logische Einheit, welche eine einzeln adressierbare Instanz einer Medium-Zugriffssteuerung und die Schnittstelle der physikalischen Schicht zum drahtlosen Medium ist und nicht als *Zugriffspunkt* (3.1) agiert

3.4
IEEE 80211.n
IEEE Std 802.11, in dem die Instanzen entweder HT APs oder HT STAs sind

Anmerkung 1 zum Begriff: Die Eigenschaften einer HT STA sind in IEEE Std 802.11-2012, 4.3.10, zusammengefasst. Ein HT AP ist ein Zugriffspunkt, welcher dieselben Eigenschaften wie eine HT STA implementiert.

AVA Documents Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

3.5
Schicht-2-Verbindungsaufbau
(en: layer 2 link establishment)
Verbindungsaufbau, der über einen erfolgreichen Verbindungs-/Anschlussprozess, wie in IEEE Std 802.11-2012, 10.3.5.2 und 10.3.5.3, beschrieben, angezeigt wird

3.6
Gebiet mit verfügbarem Dienst
(en: service available area)
beschränktes Gebiet um eine Ladestation herum, in dem die SECC einen Verbindungsdienst mit gesicherter Qualität bereitstellt

Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 15118-8

February 2019

ICS 43.120

English Version

Road vehicles — Vehicle to grid communication interface — Part 8: Physical layer and data link layer requirements for wireless communication (ISO 15118-8:2018)

Véhicules routiers — Interface de communication entre véhicule et réseau électrique — Partie 8: Exigences relatives à la couche physique et à la couche de liaison entre les données pour la communication sans fil (ISO 15118-8:2018)

Straßenfahrzeuge — Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation — Teil 8: Anforderungen an physikalische und Datenverbindungsschnittstelle für die drahtlose Kommunikation (ISO 15118-8:2018)

This European Standard was approved by CEN on 28 December 2018.

CEN 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 CEN 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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Documents
Document Sharing Hub

Full document details: DIN EN ISO 15118-8:2019-08

European foreword

The text of ISO 15118-8:2018 has been prepared by Technical Committee ISO/TC 22 "Road vehicles" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 15118-8:2019 by Technical Committee CEN/TC 301 "Road vehicles" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2019, and conflicting national standards shall be withdrawn at the latest by August 2019.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 15118-8:2018 has been approved by CEN as EN ISO 15118-8:2019 without any modification.

Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Abbreviated terms ... **2**
5 Conventions ... **3**
5.1 Definition of OSI based services ... 3
5.2 Requirement structure ... 3
6 System architecture ... **3**
7 Wireless communication requirements ... **4**
7.1 Overview ... 4
7.2 SECC requirements ... 5
7.2.1 General ... 5
7.2.2 WLAN technology ... 5
7.2.3 WLAN frequency and channel ... 6
7.2.4 SECC channel scanning and selection ... 8
7.2.5 Quality of service ... 9
7.2.6 Association support ... 10
7.2.7 Layer 2 interfaces ... 14
7.2.8 Pairing ... 14
7.3 EVCC requirements ... 15
7.3.1 General ... 15
7.3.2 WLAN technology ... 15
7.3.3 WLAN frequency and channel ... 15
7.3.4 Quality of service ... 16
7.3.5 Association support ... 16
7.3.6 Layer 2 interfaces ... 18
7.4 Security ... 19
Annex A (informative) **Mounting location of wireless communication module and antenna** ... **20**
Annex B (informative) **Interference scan and auto channel selection example** ... **24**
Annex C (informative) **Introduction of service available area** ... **27**
Annex D (informative) **National regulations in usage of U-NII bands** ... **29**
Bibliography ... **34**

© ISO 2018 – All rights reserved

Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared jointly by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*, and Technical Committee IEC/TC 69, *Electric road vehicles and electric industrial trucks*. The draft was circulated for voting to the national bodies of both ISO and IEC.

A list of all parts in the ISO 15118 series can be found on the ISO website.

© ISO 2018 – All rights reserved
Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

Introduction

The pending energy crisis and necessity to reduce greenhouse gas emissions has led the vehicle manufacturers to a very significant effort to reduce the energy consumption of their vehicles. They are presently developing vehicles partly or completely propelled by electric energy. Those vehicles will reduce the dependency on oil, improve the global energy efficiency and reduce the total CO_2 emissions for road transportation if the electricity is produced from renewable sources. To charge the batteries of such vehicles, specific charging infrastructure is required.

Much of the standardization work on dimensional and electrical specifications of the charging infrastructure and the vehicle interface is already treated in the relevant ISO or IEC groups. However, the question of information transfer between the EV and the EVSE has not been treated sufficiently.

Such communication is necessary for the optimization of energy resources and energy production systems so that vehicles can recharge in the most economic or most energy efficient way. It is also required to develop efficient and convenient billing systems in order to cover the resulting micro-payments. The necessary communication channel may serve in the future to contribute to the stabilization of the electrical grid, as well as to support additional information services required to operate electric vehicles efficiently and economically.

In ISO 15118-3, the messages exchanged between the vehicle and the infrastructure are transported by the cable used for power transfer. With the inception of wireless power transfer technologies and the tremendous development of wireless communication in our societies, the need for a wireless communication between vehicle and charging infrastructure becomes imperative. This is the main focus of this document. The relevant information on use-case definitions and network and application protocol requirements can be found in ISO 15118-1[1)] and ISO 15118-2[2)], respectively.

1) Under development. Stage at time of publication: ISO/DIS 15118-1:2018.

2) Under development. Stage at time of publication: ISO/CD 15118-2:2018.

© ISO 2018 – All rights reserved

Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

— This page is intentionally blank —

© ISO 2018 – All rights reserved
Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

Road vehicles — Vehicle to grid communication interface —

Part 8: Physical layer and data link layer requirements for wireless communication

1 Scope

This document specifies the requirements of the physical and data link layer of a wireless High Level Communication (HLC) between Electric Vehicles (EV) and the Electric Vehicle Supply Equipment (EVSE). The wireless communication technology is used as an alternative to the wired communication technology as defined in ISO 15118-3.

It covers the overall information exchange between all actors involved in the electrical energy exchange. ISO 15118 (all parts) are applicable for conductive charging as well as Wireless Power Transfer (WPT).

For conductive charging, only EVSEs compliant with "IEC 61851-1 modes 3 and 4" and supporting HLC are covered by this document. For WPT, charging sites according to IEC 61980 (all parts) and vehicles according to ISO/PAS 19363 are covered by 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.

ISO 15118-1, *Road vehicles — Vehicle to grid communication interface — Part 1: General information and use-case definition*

ISO 15118-2:2014, *Road vehicles — Vehicle-to-Grid Communication Interface — Part 2: Network and application protocol requirements*

ISO 15118-3:2015, *Road vehicles — Vehicle to grid communication interface — Part 3: Physical and data link layer requirements*

ISO/PAS 19363, *Electrically propelled road vehicles — Magnetic field wireless power transfer — Safety and interoperability requirements*

IEEE Std 802.11™-2012, IEEE *Standard for Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — specific requirements: Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15118-1, ISO 15118-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

© ISO 2018 – All rights reserved

Documents
Document Sharing Hub

Full document details: DIN EN ISO 15118-8:2019-08

3.1
access point
AP
wireless communication device that allows the user to connect to other wireless or wired communication devices

Note 1 to entry: See IEEE Std 802.11™-2012.

3.2
charging site
CS
area with one or more EVSEs controlled by one SECC

3.3
station
STA
logical entity that is a singly addressable instance of a medium access control and physical layer interface to the wireless medium which does not act as an *access point* (3.1)

3.4
IEEE 802.11n
IEEE Std 802.11 where the instances are HT APs or HT STAs

Note 1 to entry: The features of an HT STA are summarized in IEEE Std 802.11-2012, 4.3.10. An HT AP is an access point implementing the same set of features as an HT STA.

3.5
layer 2 link establishment
connection establishment indicated by a successful association/reassociation process as described in IEEE Std 802.11-2012, 10.3.5.2 and 10.3.5.3

3.6
service available area
restricted area around a charging station in which an SECC provides a connecting service with an ensured quality

4 Abbreviated terms

AP	Access Point
AWC	Automotive Wireless Communication
CS	Charging Site
DFS	Dynamic Frequency Selection
EDCA	Enhanced Distributed Channel Access
EID	Element Identifier
EMC	Electromagnetic Compatibility
ETT	Energy Transfer Type
EV	Electric Vehicle
EVCC	Electric Vehicle Communication Controller
EVSE	Electric Vehicle Supply Equipment

© ISO 2018 – All rights reserved
Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

HLC	High Level Communication
HLE	Higher Layer Entities
HT	High Throughput
ISM	Industrial, Scientific and Medical
MAC	Medium Access Control
SAP	Service Access Point
SECC	Supply Equipment Communication Controller
SSID	Service Set Identifier
TPC	Transmit Power Control
U-NII	Unlicensed National Information Infrastructure
VSE	Vendor Specific Element
WLAN	Wireless Local Area Network
WPT	Wireless Power Transfer

5 Conventions

5.1 Definition of OSI based services

This document is based on the OSI Service Conventions (see ISO/IEC 10731) for the individual layers specified in this document.

5.2 Requirement structure

Each individual requirement included in this document has a unique code, as follows:

"**[V2G8-XXX]** Requirement text"

— where "V2G8" represents this document,

— where XXX represents the individual requirement number, and

— where "requirement text" includes the actual text of the requirement.

EXAMPLE **[V2G8-999]** This shall be an example requirement.

6 System architecture

This document is organized along architectural lines, same as in ISO 15118-3 emphasizing the large-scale separation of the system into two parts: the MAC sub layer of the Data Link Layer and the Physical Layer. These layers are intended to correspond closely to the lowest layers of the ISO/IEC Model for Open Systems (see ISO/IEC 7498-1). Figure 1 shows the relationship of this document to the OSI reference model.

© ISO 2018 – All rights reserved

Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08

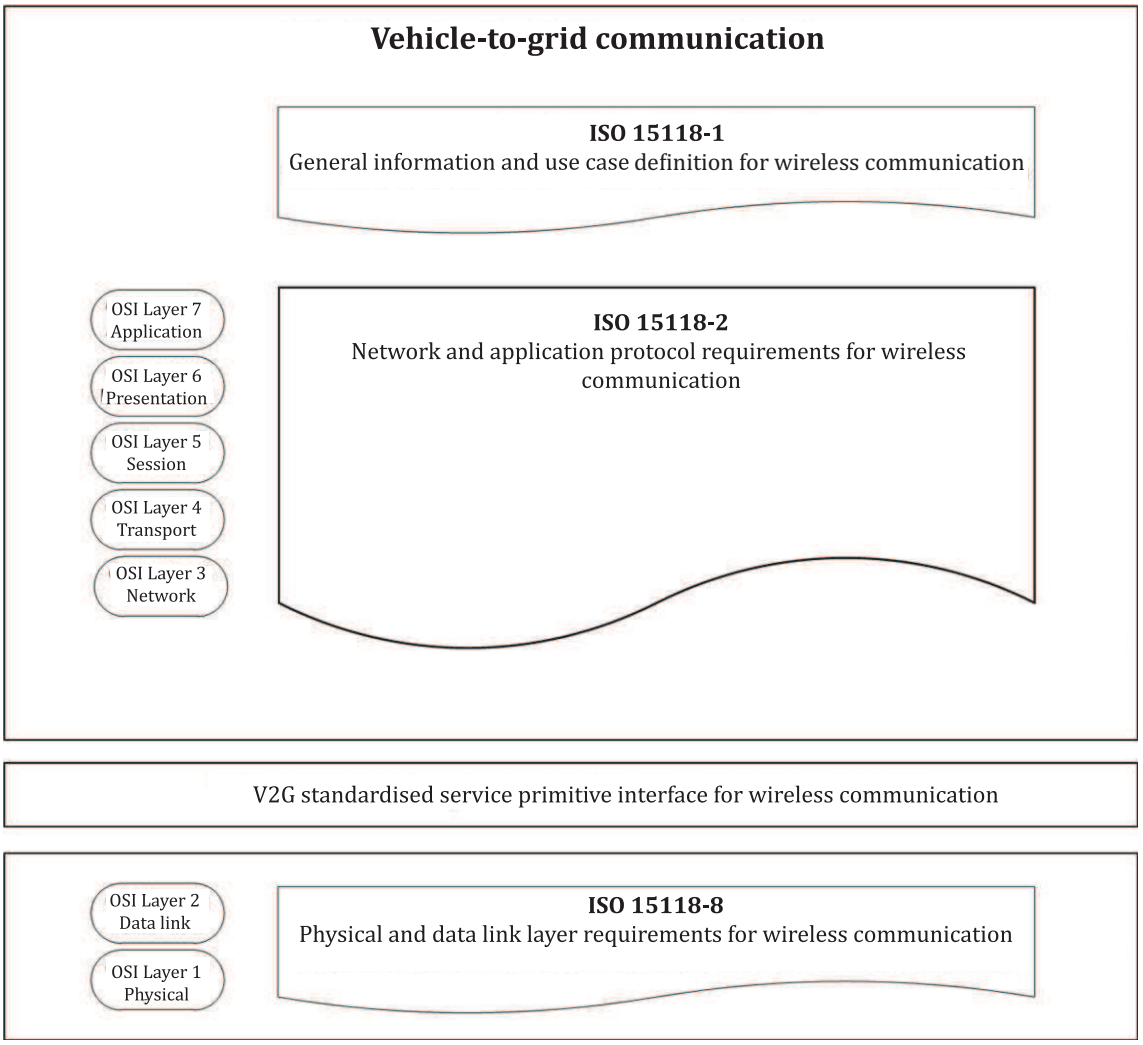

Figure 1 — Overview of ISO 15118-1, ISO 15118-2, and this document in the ISO/IEC OSI reference model

This document defines requirements applicable to layer 1 and 2, including the V2G Standardized Service Primitive Interface for wireless communication, according to the OSI layered architecture. Layers 3 to 7 are specified in ISO 15118-2.

This document covers both conductive charging and WPT use-cases using wireless communication. If not defined differently, requirements apply for both conductive charging and WPT.

7 Wireless communication requirements

7.1 Overview

This clause gives requirements for the wireless communication module on both the EVCC and the SECC side. EVCC and SECC make use of Wireless Local Area Network (WLAN) as specified in IEEE Std 802.11-2012 for wireless communication. More specifically, they implement the feature set of an HT STA or HT AP (which were originally specified in IEEE 802.11n-2009 and are thus commonly referred to as IEEE 802.11n), and operate in the 2,4 GHz and 5 GHz bands.

© ISO 2018 – All rights reserved
Documents
Document Sharing Hub
Full document details: DIN EN ISO 15118-8:2019-08