



SLOVENSKI STANDARD
SIST ES 202 663 V1.1.0:2011
01-junij-2011

Inteligentni transportni sistemi (ITS) - Evropski standard za profil fizične plasti in plasti krmiljenja dostopa do medija inteligentnih transportnih sistemov, ki obratujejo v frekvenčnem pasu 5 GHz

Intelligent Transport Systems (ITS) - European profile standard for the physical and medium access control layer of Intelligent Transport Systems operating in the 5 GHz frequency band

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST ES 202 663 V1.1.0:2011](https://standards.iteh.ai/catalog/standards/sist/f5af483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011)
<https://standards.iteh.ai/catalog/standards/sist/f5af483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011>

Ta slovenski standard je istoveten z: ES 202 663 Version 1.1.0

ICS:

35.100.10	Fizični sloj	Physical layer
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade

SIST ES 202 663 V1.1.0:2011 **en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST ES 202 663 V1.1.0:2011](#)

<https://standards.iteh.ai/catalog/standards/sist/f5af483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011>

ETSI ES 202 663 V1.1.0 (2010-01)

ETSI Standard

**Intelligent Transport Systems (ITS);
European profile standard for the physical and
medium access control layer of
Intelligent Transport Systems operating
in the 5 GHz frequency band**

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

[SIST ES 202 663 V1.1.0:2011](https://standards.iteh.ai/catalog/standards/sist/ffa4d483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011)

<https://standards.iteh.ai/catalog/standards/sist/ffa4d483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011>



Reference

DES/ITS-0040015

Keywords

ITS, layer 1, layer 2, MAC, profile**ETSI**

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

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

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST ES 202 663 V1.1.0:2011<https://standards.iteh.ai/catalog/standards/sist/faf483-95fe-47da-92b1-d44937b302f2/sist-es-202-663-v1-1-0-2011>**Important notice**

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2010.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

LTE™ is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	5
Foreword.....	5
Introduction	5
1 Scope	6
2 References	7
2.1 Normative references	7
2.2 Informative references.....	8
3 Definitions, symbols and abbreviations	9
3.1 Definitions	9
3.2 Symbols.....	9
3.3 Abbreviations	9
4 General requirements	9
4.1 ITS station reference architecture.....	9
4.2 ITS-G5 mode of operation.....	10
4.3 Operations in ITS-G5C	11
4.4 Distributed congestion control	11
4.5 Quality of service based on user priority.....	11
5 Physical layer	12
5.1 General requirements	12
5.2 Frequency allocation	12
5.3 Channel allocation.....	13
5.4 Transmit power control	14
5.5 Receiver performance.....	14
6 Medium access control sub-layer	15
6.1 General requirements	15
6.2 Frame format	15
6.3 MAC header	15
6.3.1 Header structure.....	15
6.3.2 Frame control field.....	16
6.3.2.1 Structure.....	16
6.3.2.2 Type and subtype	16
6.3.2.3 To DS and From DS.....	16
6.3.2.4 Fragmentation	16
6.3.2.5 Power management	16
6.3.2.6 Protected frame	16
6.3.3 Address fields	17
6.3.4 QoS control field.....	17
6.4 MAC addressing.....	17
6.5 Quality of service	17
6.6 Dynamic frequency selection	18
7 Management.....	18
7.1 General requirements	18
7.2 Management information base	18
7.2 Management service access points	18
7.3 Regulatory domain	18
7.4 Power management	19
8 Conformance and test methods	19
Annex A (normative): Parameters.....	20
A.1 IEEE802dot11-MIB attribute values.....	20

A.2	ITS-G5 specific MIB attribute types	20
A.3	ITS-G5 specific MIB attributes.....	21
Annex B (normative): ASN.1 modules		22
B.1	Modules	22
B.1.1	IEEE 802.11	22
B.1.2	ES 202 663	22
Annex C (informative): MAC data services		23
C.1	Semantics of the data service primitives	23
C.2	MA-UNITDATA.request	23
C.3	MA-UNITDATA.indication.....	23
C.4	MA-UNITDATA.confirm.....	24
Annex D (informative): Management SAP		25
D.1	General	25
D.2	MLME-SAP	25
Annex E (informative): Bibliography.....		26
History		27

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ES 202 663 V1.1.0:2011](https://standards.iteh.ai/catalog/standards/sist/f5af483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011)

<https://standards.iteh.ai/catalog/standards/sist/f5af483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011>

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Intelligent Transport System (ITS).

Introduction

Intelligent Transport Systems (ITS) are being developed in all regions by standard institutes, industry initiatives and research activities.

The present document provides the European profile standard for communications in the 5 GHz band. The work is based on the published IEEE standard 802.11 [3] and on developments at IEEE on the amendment 802.11p [i.5].

The functionality specified in the present document is named "ITS-G5" and distinguishes several frequency ranges. It covers the physical layer and parts of the data link layer, i.e. the medium access control sub-layer and extensions to handle parameters of these layers to be used on a per-MSDU basis, including the related management.

<https://standards.iteh.ai/catalog/standards/sist/faf483-95fe-47da-92b1-d44937b30eb2/sist-es-202-663-v1-1-0-2011>

1 Scope

The present document specifies the European profile in line with [i.10] of the physical and medium access control sub-layer of 5 GHz intelligent transport systems (ITS) using IEEE 802.11 [3] as the base standard. It covers the frequency ranges:

- ITS-G5A: Operation of ITS-G5 in European ITS frequency bands dedicated to ITS for safety related applications in the frequency range 5,875 GHz to 5,905 GHz.
- ITS-G5B: Operation in European ITS frequency bands dedicated to ITS non- safety applications in the frequency range 5,855 GHz to 5,875 GHz.
- ITS-G5C: Operation of ITS applications in the frequency range 5,470 GHz to 5,725 GHz.

One of the additionally selected functionalities being an essential part of the present document is "communication outside the context of a BSS" as currently being developed by IEEE 802.11 Task Group p [3].

Communication outside the context of a BSS enables exchange of data frames between stations that are not members of a BSS. This type of communication allows for immediate exchange of data frames, avoiding the latency associated with the establishment of a BSS.

The present document covers the following IEEE 802.11 [3] services:

- spectrum management services (DFS, uniform spreading) for ITS-G5C;
- transmit power control;
- traffic differentiation and QoS support;
- selected MAC data services: DCF, EDCA, fragmentation/de-fragmentation (the latter only for ITS-G5C);
- selected MAC control services: ACK, RTS, CTS;
- selected MAC management services: selected action frames (spectrum management action frames);
- OFDM PHY.

The profile excludes the following IEEE 802.11 [3] features:

- association services;
- access control and data confidentiality services;
- higher-layer timer synchronization;
- selected MAC data services, i.e. PCF, HCF HCCA;
- selected MAC control services, i.e. PS-Poll, CF-End, CF-End + CF-Ack, Block Ack Request/Block Ack;
- selected MAC management services, i.e. beacon, ATIM, disassociation, association request/response, re-association request/response, probe request/response, authentication, de-authentication, selected action (measurement request/report);
- power management services.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI EN 302 571 (V1.1.1): "Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5 855 MHz to 5 925 MHz frequency band; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".
 - [2] ETSI EN 301 893 (V1.5.1): "Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".
 - [3] IEEE 802.11:2007: "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".
- NOTE: Amendments to this standard are considered in [i.1] and [i.2] which are essential to understand the sources from which some of the functionality in the present document is derived.
- [4] IEEE Std 802-2001: "IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture".
 - [5] ANSI/IEEE Std 802.2:1998: "Information technology -- Telecommunications and information exchange between systems -- Local and metropolitan area networks -- Specific requirements -- Part 2: Logical Link control".
 - [6] ISO/IEC 7498-1:1994: "Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model".
 - [7] ITU-T Recommendation X.691 (2002): "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".
 - [8] IEEE P802.11k (2008): "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 Amendment 1: Radio Resource Measurement of Wireless LANs".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.3] ETSI TR 102 654 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Co-location and Co-existence Considerations regarding Dedicated Short Range Communication (DSRC) transmission equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range and other potential sources of interference".
- [i.4] ETSI EN 300 674 (all parts): "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Technical characteristics and test methods for Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band".
- [i.5] IEEE P802.11pTM/D8.0:2009: "Draft 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; Amendment 7: Wireless Access in Vehicular Environments".
- [i.6] ECC/DEC/(08)01: "ECC Decision of 14 March 2008 on the harmonised use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS)".
- [i.7] ECC/REC/(08)01: "ECC Recommendation (08)01 on the use of the band 5855-5875 MHz for Intelligent Transport Systems (ITS)".
- [i.8] ERC/DEC(99)23: "ERC Decision of 29 November 1999 on the harmonised frequency bands to be designated for the introduction of High Performance Radio Local Area Networks (HIPERLANs)".
- [i.9] ECC/DEC(02)01: "ECC Decision of 15 March 2002 on the frequency bands to be designated for the coordinated introduction of Road Transport and Traffic Telematic Systems".
- [i.10] ETSI ETS 300 406 (edition 1): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [i.11] Commission Decision 2005/513/EC of 11 July 2005 on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs).
- [i.12] Commission Decision 2007/90/EC of 12 February 2007 amending Decision 2005/513/EC on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs).
- [i.13] Commission Decision 2008/671/EC of 5 August 2008 on the harmonised use of radio spectrum in the 5 875-5 905 MHz frequency band for safety-related applications of Intelligent Transport Systems (ITS).
- [i.14] ETSI TS 102 687 (V1.1.1): "Intelligent Transport Systems (ITS); Transmitter Power Control Mechanism for Intelligent Transport Systems operating in the 5 GHz range".
- [i.15] ETSI TS 102 723-3: "Intelligent Transport Systems; OSI cross-layer topics; Part 3: Interface between management entity and access layer".
- [i.16] ETSI TS 102 665 (V1.1.1): "Intelligent Transport Systems (ITS); Vehicular Communications; Architecture".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [1], [2], [3], [4], [5], [6], [7], [8], [i.17] and the following apply:

ITS-G5: set of protocols and parameters as specified in the present document

ITS-G5 Control Channel: physical channel as defined in clause 5.3

ITS-G5 Service Channel: any other physical channel than the ITS-G5 Control Channel as defined in clause 5.3

ITS-G5 STA: device that contains an ITS-G5

3.2 Symbols

For the purposes of the present document, the following symbols apply:

'00101100'b notation used for numeric values presented in binary numeral system

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in [1], [2], [3], [4], [5], [6], [7], [8], [i.18] and the following apply:

DCC Decentralized Congestion Control
 G5CC ITS-G5 Control Channel
 G5SC ITS-G5 Service Channel
 ITS-G5A Frequency band ranging from 5,875 GHz to 5,905 GHz

NOTE: Dedicated to ITS for safety related applications.

ITS-G5B Frequency band ranging from 5,855 GHz to 5,875 GHz

NOTE: Dedicated to ITS non-safety applications.

ITS-G5C Frequency band ranging from 5,470 GHz to 5,725 GHz

NOTE: Used for ITS applications.

4 General requirements

4.1 ITS station reference architecture

Figure 1 shows the part of the ITS AL that is covered by the present document. It is based on the OSI layered communications model with a detailed view of the ITS Access Technology layer. The mapping between the ITS-G5 elements specified in the present document and the ITS AL model is shown in figure 1.