

INTERNATIONAL STANDARD

**Information technology – Home electronic system (HES) architecture –
Part 3-2: Communication layers – Transport, network and general parts of data
link layer for network based control of HES Class 1**

[ISO/IEC 14543-3-2:2006](https://standards.iso.org/standards/catalog/standards/sist/3ee171f9-9ad7-4830-9d56-96e7fd73d372/iso-iec-14543-3-2-2006)

<https://standards.iso.org/standards/catalog/standards/sist/3ee171f9-9ad7-4830-9d56-96e7fd73d372/iso-iec-14543-3-2-2006>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2006 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and definitions clause of IEC publications issued between 2002 and 2015. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

[ISO/IEC 14543-3-2:2006](http://www.iso.org/iso/iec/14543-3-2-2006)

<https://standards.iteh.ai/catalog/standards/sist/5ee171b9-9ad7-4830-9d56-96e7fd73d372/iso-iec-14543-3-2-2006>



ISO/IEC 14543-3-2

Edition 1.0 2006-09

INTERNATIONAL STANDARD

**Information technology – Home electronic system (HES) architecture –
Part 3-2: Communication layers – Transport, network and general parts of
data link layer for network based control of HES Class 1**

[ISO/IEC 14543-3-2:2006](https://standards.iteh.ai/catalog/standards/sist/3ee171f9-9ad7-4830-9d56-96e7fd73d372/iso-iec-14543-3-2-2006)

<https://standards.iteh.ai/catalog/standards/sist/3ee171f9-9ad7-4830-9d56-96e7fd73d372/iso-iec-14543-3-2-2006>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.240.67

ISBN 2-8318-8804-2

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references.....	7
3 Terms, definitions and abbreviations.....	7
3.1 Terms and definitions.....	7
3.2 Abbreviations.....	9
4 Conformance.....	9
5 Requirements for the physical layer and independent data link layer.....	9
5.1 Functions of the data link layer.....	9
5.2 Possible media and their impact on layer-2.....	10
5.3 Data link layer services.....	11
5.3.1 Data link layer modes.....	11
5.3.2 L_Data service.....	11
5.3.3 L_SystemBroadcast service.....	15
5.3.4 L_Poll_Data service and protocol.....	16
5.3.5 L_Busmon service.....	17
5.3.6 L_Service Information service.....	17
5.4 Data link layer protocol.....	18
5.4.1 Protocol.....	18
5.4.2 Recommendations for duplication prevention.....	18
5.5 Parameters of layer-2.....	18
5.6 Specific devices.....	19
5.6.1 Layer-2 of a bridge.....	19
5.6.2 Layer-2 of a router.....	19
6 Requirements for the network layer.....	19
6.1 Functions of the network layer.....	19
6.2 Network layer services and protocol.....	21
6.2.1 Network layer protocol data unit (NPDU).....	21
6.2.2 Network layer services.....	21
6.3 Parameters of the network layer.....	27
6.4 Network layer state machines.....	27
6.4.1 Overview.....	27
6.4.2 State machine of network layer for normal devices.....	27
6.4.3 State machine of network layer for bridges.....	27
6.4.4 State machine of network layer for routers.....	28
7 Requirements for the transport layer.....	30
7.1 Functionality of the transport layer.....	30
7.2 Transport layer Protocol Data Unit (TPDU).....	30
7.3 Overview communication modes.....	31
7.3.1 Point-to-multipoint, connection-less (multicast) communication mode.....	31
7.3.2 Point-to-domain, connection-less (broadcast) communication mode.....	32
7.3.3 Point-to-all-points, connection-less (SystemBroadcast) communication mode.....	32
7.3.4 Point-to-point, connection-less communication mode.....	32

7.3.5	Point-to-point, connection-oriented communication mode	32
7.3.6	Algorithm for the identifier of communication	33
7.4	Transport layer services	33
7.4.1	General	33
7.4.2	T_Data_Group service	33
7.4.3	T_Data_Tag_Group service	34
7.4.4	T_Data_Broadcast service	36
7.4.5	T_Data_SystemBroadcast service	37
7.4.6	T_Data_Individual service	38
7.4.7	T_Connect service	39
7.4.8	T_Disconnect service	40
7.4.9	T_Data_Connected service	41
7.5	Parameters of transport layer	42
7.6	State machine of connection-oriented communication mode	43
7.6.1	General	43
7.6.2	States	43
7.6.3	Required actions	44
7.6.4	Transition table of the connection oriented transport layer state machine	46
7.6.5	State diagrams	53
Annex A (informative)	Examples of transport layer connection oriented state machine state diagrams	54
A.1	Connect and disconnect	54
A.1.1	Connect from a remote device	54
A.1.2	Connect from a remote device during an existing connection	54
A.1.3	Disconnect from a remote device	55
A.1.4	Connect from the local user to an existing device	55
A.1.5	Connect from the local user to a non existing device	55
A.1.6	Connect from the local user during an existing connection	56
A.1.7	Disconnect from the local user	56
A.1.8	Disconnect from the local user without an existing connection	56
A.1.9	Connection timeout	57
A.2	Reception of data	57
A.2.1	Reception of a correct N_Data_Individual	57
A.2.2	Reception of a repeated N_Data_Individual	58
A.2.3	Reception of data N_Data_Individual with wrong sequence number	58
A.2.4	Reception of data N_Data_Individual with wrong source address	58
A.3	Transmission of data	59
A.3.1	T_DATA-Request from the local user	59
A.3.2	Reception of a T_ACK_PDU with wrong sequence number	59
A.3.3	Reception of T_ACK_PDU with wrong connection address	60
A.3.4	Reception of T_NACK_PDU with wrong sequence number	60
A.3.5	Reception of T_NACK_PDU with correct sequence number	60
A.3.6	Reception of T_NACK_PDU and maximum number of repetitions is reached	61
A.3.7	Reception of T_NACK_PDU with wrong connection address	61
Bibliography		62

Figure 1 – Individual address.....	8
Figure 2 – Group address.....	8
Figure 3 – Interaction of the data link layer.....	10
Figure 4 – Exchange of primitives for the L_Data-Service.....	11
Figure 5 – Frame_format Parameter.....	14
Figure 6 – Coding of Extended Frame Format.....	14
Figure 7 – Interaction of the network layer (not for Bridges or Routers).....	20
Figure 8 – General functionality of a router or a bridge.....	20
Figure 9 – Format of the NPDU (Example).....	21
Figure 10 – Interaction of the transport layer.....	30
Figure 11 – Format of the TPDU (Example).....	31
Figure 12 – Transport control field.....	31
Table 1 – Usage of priority.....	13
Table 2 – Actions of the connection oriented state machine.....	44
Table 3 – Transition table – Style 1.....	46
Table 4 – Transition table – Style 1-rationalized.....	48
Table 5 – Transition table – Style 2.....	50
Table 6 – Transition table – Style 3.....	52

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

Part 3-2: Communication layers – Transport, network and general parts of data link layer for network based control of HES Class 1

FOREWORD

- 1) ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards. Their preparation is entrusted to technical committees; any ISO and IEC National Committee interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.
- 2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.
- 3) The formal decisions or agreements of IEC or ISO 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 and ISO National Committees.
- 4) IEC, ISO or ISO/IEC Publications have the form of recommendations for international use and are accepted by IEC and ISO National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO or ISO/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.
- 5) In order to promote international uniformity, IEC and ISO National Committees undertake to apply IEC, ISO or ISO/IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO/IEC Publication and the corresponding national or regional publication should be clearly indicated in the latter.
<https://standards.iteh.ai/catalog/standards/sist/3ee171f9-9ad7-4830-9d56-30c107303718/iso-iec-14543-3-2-2006>
- 6) ISO or IEC provide no marking procedure to indicate their approval and cannot be rendered responsible for any equipment declared to be in conformity with an ISO/IEC Publication.
- 7) All users should ensure that they have the latest edition of this publication.
- 8) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC or ISO member bodies 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 of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.
- 9) 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.
- 10) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 14543-3-2 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This International Standard together with ISO/IEC 14543-3-1 cancels and replaces ISO/IEC TR 14543-3, published in 2000. It constitutes a complete revision of the principles outlined in ISO/IEC TR 14543-3 and provides the specifications essential for an international standard.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the title page.

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

INTRODUCTION

This standard specifies the Media independent requirements for the data link layer and the requirements for the network layer and the transport layer for Home Electronic Systems.

This standard provides the communication stack targeted for providing the services specified in ISO/IEC 14543-3-3 (EN 50090-3-2) "User Process" and ISO/IEC 14543-3-1 "Application Layer for networked based control of HES Class 1". It can be used as communication stack on the physical layers as specified in ISO/IEC 14543-3-5, ISO/IEC 14543-3-6 and ISO/IEC 14543-3-7 (EN 50090-5-x).

Currently, ISO/IEC 14543, *Information technology – Home Electronic System (HES) architecture*, consists of the following parts:

Part 2-1:	<i>Introduction and device modularity</i>
Part 3-1:	<i>Communication layers – Application layer for network based control of HES Class 1</i>
Part 3-2:	<i>Communication layers – Transport, network and general parts of data link layer for network based control of HES Class 1</i>
Part 3-3:	<i>User process for network based control of HES Class 1 (under consideration)</i>
Part 3-4:	<i>System management – Management procedures for network based control of HES Class 1 (under consideration)</i>
Part 3-5:	<i>Media and media dependent layers – Power line for network based control of HES Class 1 (under consideration)</i>
Part 3-6:	<i>Media and media dependent layers – Twisted pair for network based control of HES Class 1 (under consideration)</i>
Part 3-7:	<i>Media and media dependent layers – Radio frequency for network based control of HES Class 1 (under consideration)</i>
Part 4:	<i>Home and building automation in a mixed-use building (technical report)</i>
Part 5-1:	<i>Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Core protocol</i>
Part 5-2:	<i>Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Device certification</i>
	<i>Additional parts may be added later.</i>

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

Part 3-2: Communication layers – Transport, network and general parts of data link layer for network based control of HES Class 1

1 Scope

This part of ISO/IEC 14543 specifies the services and protocol in a physical layer independent way for the data link layer and for the network layer and the transport layer for usage in Home Electronic Systems.

2 Normative references

The following referenced documents are indispensable for the application 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/IEC 7498 (all parts), *Information technology – Open Systems Interconnection – Basic reference model*

ISO/IEC 14543-2-1, *Information technology – Home Electronic System (HES) Architecture – Part 2-1: Introduction and device modularity*

ISO/IEC 14543-3-1 *Information technology – Home Electronic System (HES) Architecture – Part 3-1: Communication layers – Application layer for network based control of HES Class 1*

NOTE 1 The provisions of the referenced specifications, as identified in this subclause, are valid within the context of this International Standard. The reference to a specification within this International Standard does not give it any further status within ISO/IEC; in particular, it does not give the referenced specification the status of an International Standard.

EN 50090-5 (all parts), *Home and Building Electronic Systems (HBES) – Part 5: Media and media dependent layers*

NOTE 2 Reference to EN 50090-5-x is to be considered as deleted as soon as ISO/IEC 14543-3-5, ISO/IEC 14543-3-6 and ISO/IEC 14543-3-7 are approved.

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this part the terms and definitions given in ISO/IEC 14543-2-1 and the following apply.

3.1.1

individual address

IA

unique identifier for every device in a network

NOTE The individual address is a 2-octet value that consists of an 8-bit subnetwork address and an 8-bit device address.

3.1.2**subnetwork address****SNA**

part of the individual address; consists of a 4-bit line address and a 4-bit area address, that specifies the subnetwork in which the device is mounted

3.1.3**area address**

part of the individual address that specifies the area in which the device is mounted

3.1.4**line address**

part of the individual address that specifies the line in which the device is mounted

3.1.5**device address**

unique identifier for every device in a subnetwork; the device address is an 8-bit value

NOTE Figure 1 shows the relationship between individual address, subnetwork address, area address, line address and device address.

Individual address															
Octet 0								Octet 1							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Area address				Line address				Device address							
Subnetwork address															

Figure 1 – Individual address

<https://standards.iteh.ai/catalog/standards/sist/3ee171f9-9ad7-4830-9d56-96e7fd73d372/iso-iec-14543-3-2-2006>

3.1.6**group address****GA**

2-octet value

NOTE Figure 2 shows the group address, consisting of main group and sub-group address.

Group address															
Octet 0								Octet 1							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Main group								Sub-group							

Figure 2 – Group address

3.1.7**datagram**

full sequence of elements (physical symbols) transporting a frame on the physical medium

3.1.8**frame**

sequence of octets exchanged between data link layers through the physical layer

3.2 Abbreviations

ACK	Acknowledge
APDU	Application layer Protocol Data Unit
con	confirmation
GA	Group Address
HES Class 1	refers to simple control and command.
HES Class 2	refers to Class 1 plus simple voice and stable picture transmission
HES Class 3	refers to Class 2 plus complex video transfers
IA	Individual Address
ind	indication
IACK	Immediate Acknowledge
LPDU	Link layer Protocol Data Unit
LSDU	Link layer Service Data Unit
NACK	Negative Acknowledge
NPDU	Network layer Protocol Data Unit
NSDU	Network layer Service Data Unit
PDU	Protocol Data Unit
req	request
SNA	Sub-Network Address
TSAP	Transport layer Service Access Point
TPDU	Transport layer Protocol Data Unit
UART	Universal Asynchronous Receiver Transmitter

4 Conformance

An entity of operational exchange conforming to this International Standard shall contain a physical layer and data link layer in accordance with the requirements of clause 5, a network layer in accordance with the requirements of clause 6 and a transport layer in accordance with the requirements of clause 7.

5 Requirements for the physical layer and independent data link layer

5.1 Functions of the data link layer

The data link layer (also called "Layer-2") is the layer between the data link layer user and the physical layer. The data link layer conforms to the definitions of the ISO/OSI model (ISO/IEC 7498) data link layer. It provides medium access control and logical link control.

The data link layer is concerned with reliable transport of single frames between two or more devices on the same subnetwork.

- When transmitting, it is responsible for
 - building up a complete frame from the information passed to it by the network layer,

- gaining access to the medium according to the particular medium access protocol in use, and
- transmitting the frame to the data link layer in the peer entity or entities, using the services of the physical layer.

If the transmission fails, the transmitting data link layer may decide to try again after a certain interval. In particular, if the remote device signals that its buffers are temporarily full, the data link layer will wait for a pre-determined time and then attempt to re-transmit the frame (flow control).

- When receiving, data link layer is responsible for
 - determining whether the frame is intact or corrupted,
 - deciding after destination address check to pass the frame to upper layers and
 - issuing positive or negative acknowledgements back to the transmitting data link layer.

The data link layer shall provide some means to prevent from service duplication (in case of repetitions because of corrupted acknowledgement frames).

The services provided include individual, group and broadcast addressing options.

The data link layer uses the services of the physical layer and provides services to the data link layer user (see Figure 3).

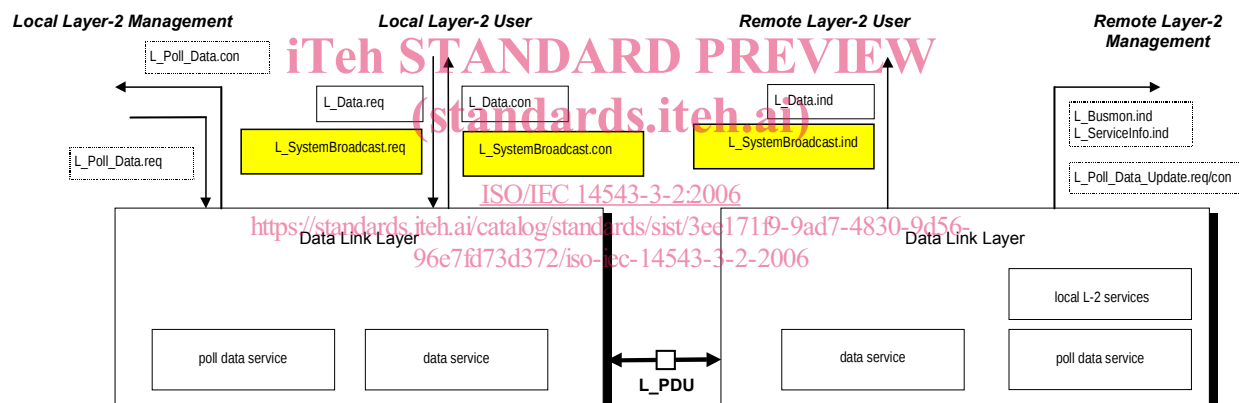


Figure 3 – Interaction of the data link layer

5.2 Possible media and their impact on layer-2

The data link layer is defined for the following media:

Twisted pair 0;
Twisted pair 1;
Powerline 110;
Powerline 132;
Radio-frequency.

Data link layer will also be defined for the following media:

Infra-red;
Ethernet.

The data link layer is open for new media in the future.

Each medium needs a dedicated medium access control and a logical link control that adapts to the medium access control. This clause focuses on medium independent features, for example on the provided service interface to network layer.

The physical layer dependent requirements are specified in ISO/IEC 14543-3-5, ISO/IEC 14543-5-6 and ISO/IEC 14543-3-7 (EN 50090-5 series).

5.3 Data link layer services

5.3.1 Data link layer modes

The data link layer mode defines which data link layer services shall be available to the data link layer user. There shall be 2 data link layer modes:

- 1) the normal mode;
- 2) the busmonitor mode.

In normal mode the remote L_Data service, the remote L_SystemBroadcast service, the remote L_Poll_Data service and the local L_Service_Information service shall be available to the data link layer user. In busmonitor mode only the local L_Busmon service shall be available. The data link layer mode is a parameter of layer-2.

The frame effectively sent on the physical medium link layer protocol data unit (LPDU) is medium dependent. Therefore, it is described in ISO/IEC 14543-3-5, ISO/IEC 14543-5-6 and ISO/IEC 14543-3-7 (EN 50090-5 series), respectively.

5.3.2 L_Data service

5.3.2.1 General

The L_Data service is a frame transfer service. It transmits a single link layer service data unit (LSDU) to data link layer of one or several devices connected to the same subnetwork. The destination address may be an individual address or a group address (multicast or broadcast). The service is acknowledged or not, depending on the quality of service requested.

There shall be three service primitives, as shown in Figure 4.

- a) L_Data.Req shall be used to transmit a frame.
- b) L_Data.Ind shall be used to receive a frame.
- c) L_Data.Con shall be used as a local primitive generated by the local layer-2 for its own client to indicate that it is satisfied with the transmission.

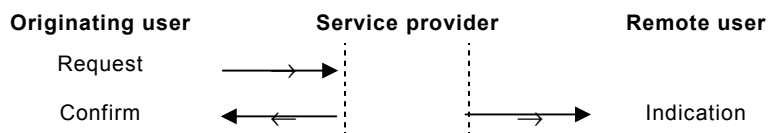


Figure 4 – Exchange of primitives for the L_Data-Service

If the local user of Layer-2 prepares an LSDU for the remote user it shall apply the L_Data.req primitive to pass the LSDU to the local layer-2. The local layer-2 shall accept the service request and try to send the LSDU to the remote layer-2 with the relevant frame format.

The local layer-2 shall pass an L_Data.con primitive to the local user that indicates either a correct or erroneous data transfer. Depending on whether an L2-acknowledgement is requested or not, this confirmation is related to the reception of the L2-acknowledgement or only to the transmission of the frame on the medium.

L_Data.req(source_address, destination_address, address_type, priority, octet_count, ack_request, frame_format, lsdu)

source_address: this parameter shall be used to indicate the source address of the requested frame; it shall be the individual address of the device that requests the service primitive

destination_address: this parameter shall be used to indicate the destination address of the requested frame; it shall be either an individual address or a group address

address_type: this parameter shall be used to indicate whether the destination_address of the requested frame is an individual address or a group address

priority: this parameter shall be used to indicate the priority that shall be used to transmit the requested frame; it shall be "system", "urgent", "normal" or "low"

octet_count: this parameter shall be used to indicate the length information of the requested frame

ack_request: this parameter shall be used to indicate whether a layer-2 acknowledge is mandatory or optional

frame_format: standard or extended frame format

lsdu: this parameter shall be used to contain the user data to be transferred by layer-2

iTech STANDARD PREVIEW
(standards.iteh.ai)

L_Data.con(destination_address, address_type, priority, frame_format, lsdu, l_status)

destination_address: this parameter shall be used to indicate the destination address of the transmitted frame; it shall be either an individual address or a group address
<https://standards.iteh.ai/catalog/standards/sist/3ee171f9-9ad7-4830-9d56-8674174372/iso-14543-3-2-2006>

address_type: this parameter shall be used to indicate whether the destination_address of the transmitted frame is an individual address or a group address

priority: this parameter shall be used to indicate the priority that has been used to transmit the transmitted frame; it shall be "system", "urgent", "normal" or "low"

lsdu: this parameter shall be used to indicate the length information of the transmitted frame

frame_format: standard or extended frame format

l_status: ok: the value of this parameter shall be used to indicate that the transmission of the frame has been successful

not_ok: the value of this parameter shall be used to indicate that the transmission of the frame did not succeed

L_Data.ind(source_address, destination_address, address_type, priority, ack_request, octet_count, frame_format, lsdu)

source_address: this parameter shall be used to indicate the source address of the received frame; it shall be the individual address of the device that has transmitted the service primitive

destination_address: this parameter shall be used to indicate the destination address of the received frame; it shall be either an individual address or a group address

address_type: this parameter shall be used to indicate whether the destination_address of the received frame is an individual address or a group address

priority:	this parameter shall be used to indicate the priority of the received frame; it shall be “system”, “urgent”, “normal” or “low”
ack_request:	this parameter shall be used to indicate whether a layer-2 acknowledge is mandatory or optional
octet_count:	this parameter shall be used to indicate the length information of the received frame
frame_format:	standard or extended frame format
lsdu:	this parameter shall be used to contain the user data that has been received by layer-2

5.3.2.2 Usage of priority

Table 1 – Usage of priority

Priority value	Priority	Usage
11	low	shall be used for long frames, burst traffic, etc.
01	normal	shall be used as the default for short frames
10	urgent	shall be used exclusively for urgent frames
00	system	shall be used for high priority, system configuration and management procedures

The usage conditions for these priorities, see Table 1, are specified in ISO/IEC 14543–3-1.

In a network, the frame traffic using urgent priority shall not exceed 5 % of the total traffic (integration period: 1 min maximum).

5.3.2.3 Octet count

This service parameter shall contain the number of octets of the transported application layer protocol data unit (APDU).

The Octet Count parameter shall be used on each medium to encode the LPDU length field as follows.

For standard frames, the length field shall contain the number of octets in the APDU coded in 4 bit.

For extended frames, the length field shall contain the number of octets in the APDU coded in 8 bit except the value FFh. The value FFh (255) is used as an escape-code.

The escape-code (“ESC”) shall be available for future high speed media to enable larger lengths.

5.3.2.4 Ack_request

This service parameter shall be used to indicate whether a link layer acknowledge is requested or not.

5.3.2.5 Frame_format

This parameter shall be used to select the Standard or Extended Frame Format for Data Link Layer and shall include information for the used extended frame type, see Figure 5.

If the frame_format parameter is 0 the Standard Frame Format shall be used. If this parameter is different from 0, it shall be used as the frame_format in the extended control field.