



**NSAI**  
Standards

Irish Standard  
I.S. EN 50463-4:2017

## Railway applications - Energy measurement on board trains - Part 4: Communication

I.S. EN 50463-4:2017

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

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## National Foreword

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**EUROPÄISCHE NORM**

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**Railway applications - Energy measurement on board trains -  
Part 4: Communication**

Applications ferroviaires - Mesure d'énergie à bord des  
trains - Partie 4 : Communication

Bahnanwendungen - Energiemessung auf Bahnfahrzeugen  
- Teil 4: Kommunikation

This European Standard was approved by CENELEC on 2017-05-08. 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.

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Europäisches Komitee für Elektrotechnische Normung

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## **Contents**

	Page
<b>European foreword.....</b>	<b>9</b>
<b>Introduction.....</b>	<b>10</b>
<b>1 Scope .....</b>	<b>13</b>
<b>2 Normative references .....</b>	<b>13</b>
<b>3 Terms, definitions and abbreviations .....</b>	<b>14</b>
3.1 Terms and definitions .....	14
3.2 Abbreviations .....	19
<b>4 Requirements .....</b>	<b>20</b>
4.1 General .....	20
4.2 Communication between functions of the EMS.....	20
4.2.1 General .....	20
4.2.2 Communication protocols stack.....	22
4.2.3 Communication security.....	23
4.2.4 VMF/CMF to ECF Interface (VEI) .....	24
4.2.5 EMF to DHS interface (EMDI) .....	24
4.2.6 Maintenance/testing interfaces (DSI and ESI).....	24
4.2.7 DHS to location function .....	25
4.2.8 DHS to UTC source .....	25
4.2.9 DHS to Consist Network digital interface (CNI) .....	25
4.3 Communication between the EMS and ground.....	25
4.3.1 General .....	25
4.3.2 EMS set-up .....	26
4.3.3 Application services (service layer) .....	28
4.3.4 Data structures (data layer) .....	30
4.3.5 Message mechanism (message layer).....	83
4.3.6 Application protocols for supporting the message mechanism .....	94
4.3.7 Communication architecture .....	100
4.3.8 XML schema version control .....	103
4.3.9 Security .....	104
4.4 Access security.....	104
<b>5 Conformity assessment.....</b>	<b>104</b>
5.1 General .....	104
5.1.1 Introduction .....	104
5.1.2 Applicability .....	104
5.1.3 Methodology .....	105
5.2 PICS and PIXIT .....	105
5.2.1 General .....	105
5.2.2 PICS .....	105
5.2.3 PIXIT .....	105
5.3 Design review .....	106
5.4 Type test procedure.....	106
5.4.1 General .....	106
5.4.2 Testing the communication .....	106
5.4.3 Testing the on board interfaces .....	106
5.4.4 Testing the on board to ground interface.....	107
<b>Annex A (informative) VEI–VMF/CMF to ECF interface implementation example.....</b>	<b>109</b>
A.1 General .....	109
A.2 Payload format .....	109
A.3 Encryption.....	110

<b>Annex B (informative) PICS structure and instruction.....</b>	<b>111</b>
B.1 Structure .....	111
B.2 Instructions for completing the PICS pro-forma .....	111
B.2.1 PICS table structure .....	111
B.2.2 Abbreviations used in PICS .....	111
B.2.3 Ref. column.....	112
B.2.4 Subclause column.....	112
B.2.5 Capability column.....	112
B.2.6 Requirement column.....	112
B.2.7 Implementation column.....	112
B.2.8 Parameter values column .....	113
B.3 PICS pro-forma examples .....	113
B.3.1 Identification of PICS .....	113
B.3.2 Identification of the implementation under assessment.....	113
B.3.3 Identification of the IUA supplier .....	114
B.3.4 Identification of the standards.....	115
B.3.5 Global statement of conformity .....	115
B.3.6 Level of conformity .....	115
<b>Annex C (informative) Access rights .....</b>	<b>116</b>
<b>Annex D (normative) XML schemas of the message mechanism .....</b>	<b>117</b>
D.1 General .....	117
D.2 Message.xsd .....	117
<b>Annex E (normative) XML schemas of the mandatory data structures .....</b>	<b>119</b>
E.1 General .....	119
E.2 50463_BaseType.xsd.....	119
E.3 CEBDBlock.xsd .....	119
E.4 EventSet.xsd .....	121
E.5 Heartbeat.xsd .....	122
<b>Annex F (normative) XML schemas of the optional data structures .....</b>	<b>124</b>
F.1 General .....	124
F.2 50463_BaseTypes_Extension.xsd .....	124
F.3 ReadingBlock.xsd.....	124
F.4 CommunicationConfig.xsd.....	125
F.5 ChangeCommunicationConfig.xsd .....	127
F.6 AssetData.xsd .....	132
F.7 State.xsd .....	137
<b>Annex G (informative) On board to ground communication XML examples.....</b>	<b>142</b>
G.1 General .....	142
G.2 Examples of data structures .....	142
G.2.1 CEBDBlock .....	142
G.2.2 EventSet .....	144
G.2.3 Heartbeat .....	145
G.2.4 ReadingBlock .....	146
G.2.5 CommunicationConfig.....	146
G.2.6 ChangeCommunicationConfig .....	150
G.2.7 AssetData .....	154
G.2.8 State.....	154
G.3 Examples of application services .....	158
G.3.1 AutomaticTransferCEBDBlocks.....	159
G.3.2 AutomaticTransferEvents .....	159
G.3.3 AutomaticTransferHeartbeat.....	159
G.3.4 PeriodicTransferState .....	160
G.3.5 RequestCEBDBlocks .....	160
G.3.6 RequestAssetData .....	160
G.3.7 RequestEvents .....	161

## EN 50463-4:2017 (E)

G.3.8 ChangeCommunicationConfig .....	162
<b>Annex ZZ (informative) Relationship between this European Standard and the Essential Requirements of Directive 2008/57/EC .....</b>	<b>164</b>
<b>Bibliography.....</b>	<b>165</b>

### Figures

<b>Figure 1 — EMS functional structure and dataflow diagram .....</b>	<b>12</b>
<b>Figure 2 — Example of energy index value .....</b>	<b>16</b>
<b>Figure 3 — EMS block diagram and interface .....</b>	<b>21</b>
<b>Figure 4 — Communication components (example) .....</b>	<b>27</b>
<b>Figure 5 — Consumption point operational states .....</b>	<b>27</b>
<b>Figure 6 — Maintenance Commissioning states .....</b>	<b>28</b>
<b>Figure 7 — CEBDBlock structure .....</b>	<b>31</b>
<b>Figure 8 — EventSet structure .....</b>	<b>34</b>
<b>Figure 9 — Heartbeat structure.....</b>	<b>41</b>
<b>Figure 10 — ReadingBlock structure .....</b>	<b>42</b>
<b>Figure 11 — CommunicationConfig structure.....</b>	<b>48</b>
<b>Figure 12 — ChangeCommunicationConfig structure .....</b>	<b>59</b>
<b>Figure 13 — AssetData structure.....</b>	<b>67</b>
<b>Figure 14 — State structure .....</b>	<b>76</b>
<b>Figure 15 — Case of request from DCS to EMS .....</b>	<b>84</b>
<b>Figure 16 — Case of events from EMS to DCS.....</b>	<b>84</b>
<b>Figure 17 — RequestMessage structure .....</b>	<b>85</b>
<b>Figure 18 — ResponseMessage structure .....</b>	<b>85</b>
<b>Figure 19 — EventMessage structure .....</b>	<b>85</b>
<b>Figure 20 — Header structure .....</b>	<b>85</b>
<b>Figure 21 — Request structure .....</b>	<b>87</b>
<b>Figure 22 — Reply structure .....</b>	<b>87</b>
<b>Figure 23 — Payload structure .....</b>	<b>88</b>
<b>Figure 24 — HTTP request.....</b>	<b>96</b>
<b>Figure 25 — Successful HTTP response .....</b>	<b>96</b>
<b>Figure 26 — Example of procedure for the transmission of a RequestMessage using FTP with mailbox .....</b>	<b>99</b>
<b>Figure 27 — Example of procedure for the transmission of a ResponseMessage using FTP with mailbox .....</b>	<b>99</b>
<b>Figure 28 — Example of procedure for the transmission of an EventMessage using FTP with mailbox .....</b>	<b>100</b>
<b>Figure 29 — Communication architecture options between the EMS and a user on ground .....</b>	<b>101</b>
<b>Figure 30 — Dedicated wireless connection .....</b>	<b>102</b>
<b>Figure 31 — Test bench for on board interface .....</b>	<b>106</b>
<b>Figure 32 — On board to ground test bench 1 .....</b>	<b>108</b>
<b>Figure 33 — On board to ground test bench 2 .....</b>	<b>108</b>
<b>Figure A.1 — Payload format .....</b>	<b>109</b>

### Tables

<b>Table 1 — List of permitted protocol stacks.....</b>	<b>22</b>
---	-----------

Table 2 — Types of user access rights .....	29
Table 3 — XML schema of each data structure.....	30
Table 4 — Definition of CEBDBlock elements.....	32
Table 5 — Definition of EMSType elements (CEBDBlock) .....	32
Table 6 — Definition of CEBDType elements (CEBDBlock).....	33
Table 7 — Definition of ChannelType elements (CEBDBlock).....	33
Table 8 — Definition of EnergyType elements (CEBDBlock).....	33
Table 9 — Definition of EventSet elements .....	34
Table 10 — Definition of EMSType elements (EventSet).....	34
Table 11 — Definition of EventType elements (EventSet).....	35
Table 12 — Definition of EventDescriptionType elements.....	35
Table 13 — Variables for defining events .....	35
Table 14 — Value of variables for defining events .....	36
Table 15 — Hardware and software alarms .....	36
Table 16 — User management events.....	37
Table 17 — Measurement alarms.....	38
Table 18 — Synchronization alarms and events.....	38
Table 19 — Communication events.....	39
Table 20 — Configuration events .....	40
Table 21 — Definition of Heartbeat elements .....	41
Table 22 — Definition of ReadingBlock elements.....	43
Table 23 — Definition of EMSType elements (ReadingBlock) .....	43
Table 24 — Definition of ReadingType elements (ReadingBlock).....	44
Table 25 — Definition of ChannelType elements (ReadingBlock).....	44
Table 26 — Definition of EnergyType elements (ReadingBlock).....	45
Table 27 — Definition of Reactive4QType elements (ReadingBlock) .....	45
Table 28 — Definition of IndexEnergy elements (ReadingBlock) .....	45
Table 29 — Definition of CurrentType elements (ReadingBlock).....	45
Table 30 — Definition of VoltageType elements (ReadingBlock).....	46
Table 31 — Definition of MinimumVoltageType elements (ReadingBlock).....	46
Table 32 — Definition of EnhancedLocationType elements (ReadingBlock) .....	46
Table 33 — Definition of SpeedType elements (ReadingBlock) .....	47
Table 34 — Definition of TemperatureType elements (ReadingBlock) .....	47
Table 35 — Definition of InternalLoadType elements (ReadingBlock) .....	47
Table 36 — Value examples for kind in InternalLoadType (ReadingBlock) .....	47
Table 37 — Definition of CommunicationConfig elements .....	49
Table 38 — Definition of UserType elements (CommunicationConfig) .....	50
Table 39 — Definition of UserMessageHeaderType elements (CommunicationConfig).....	50
Table 40 — Definition of ServiceType (CommunicationConfig) .....	51
Table 41 — Definition of RequestType elements (CommunicationConfig) .....	51
Table 42 — Definition of AutomaticTransferType elements (CommunicationConfig) .....	52
Table 43 — Definition of ChangeType elements (CommunicationConfig) .....	52
Table 44 — Definition of ProtocolType elements (CommunicationConfig) .....	52
Table 45 — Definition of FTPMailboxType elements (CommunicationConfig).....	53
Table 46 — Definition of HTTPType elements (CommunicationConfig).....	53
Table 47 — Definition of DataGenerationType elements (CommunicationConfig) .....	54

**EN 50463-4:2017 (E)**

Table 48 — Definition of CEBDBlockConfigType elements (CommunicationConfig).....	54
Table 49 — Definition of Heartbeat elements (CommunicationConfig) .....	54
Table 50 — Definition of ReadingBlockConfigType elements (CommunicationConfig).....	54
Table 51 — Definition of EventConfigType elements (CommunicationConfig) .....	55
Table 52 — Definition of LogType elements (CommunicationConfig) .....	55
Table 53 — Definition of EMSStateConfigType elements (CommunicationConfig) .....	55
Table 54 — Definition of SignatureParameterType elements (CommunicationConfig).....	55
Table 55 — Definition of MessageGenerationType elements (CommunicationConfig).....	56
Table 56 — Definition of EMSMessageHeaderType elements (CommunicationConfig).....	56
Table 57 — Definition of DedicatedWirelessConnection elements (CommunicationConfig) .....	56
Table 58 — Definition of MobileType elements (CommunicationConfig).....	57
Table 59 — Definition of IPv4Type elements (CommunicationConfig).....	57
Table 60 — Definition of IPv6Type elements (CommunicationConfig).....	57
Table 61 — Definition of APNType elements (CommunicationConfig) .....	58
Table 62 — Definition of TelephoneNumberType elements (CommunicationConfig) .....	58
Table 63 — Definition of WIFIType elements (CommunicationConfig) .....	58
Table 64 — Definition of EN 61375DedicatedConnectionType elements (CommunicationConfig).....	58
Table 65 — Definition of EN 61375SharedConnectionType elements (CommunicationConfig).....	58
Table 66 — Definition of ChangeCommunicationConfig elements.....	60
Table 67 — Definition of UserType elements (ChangeCommunicationConfig).....	61
Table 68 — Definition of UserMessageHeaderType elements (ChangeCommunicationConfig).....	61
Table 69 — Definition of ServiceType (ChangeCommunicationConfig).....	61
Table 70 — Definition of RequestType elements (ChangeCommunicationConfig).....	62
Table 71 — Definition of AutomaticTransferType elements (ChangeCommunicationConfig).....	62
Table 72 — Definition of ChangeType elements (ChangeCommunicationConfig).....	62
Table 73 — Definition of ProtocolType elements (ChangeCommunicationConfig) .....	62
Table 74 — Definition of FTPMailboxType elements (ChangeCommunicationConfig).....	62
Table 75 — Definition of HTTPType elements (ChangeCommunicationConfig) .....	63
Table 76 — Definition of DataGenerationType elements (ChangeCommunicationConfig) .....	63
Table 77 — Definition of CEBDBlockConfigType elements (ChangeCommunicationConfig) .....	63
Table 78 — Definition of Heartbeat elements (CommunicationConfig) .....	63
Table 79 — Definition of ReadingBlockConfigType elements (ChangeCommunicationConfig).....	63
Table 80 — Definition of EventConfigType elements (ChangeCommunicationConfig).....	64
Table 81 — Definition of EMSStateConfigType elements (ChangeCommunicationConfig).....	64
Table 82 — Definition of SignatureParameterType elements (ChangeCommunicationConfig).....	64
Table 83 — Definition of MessageGenerationType elements (ChangeCommunicationConfig).....	64
Table 84 — Definition of EMSMessageHeaderType elements (ChangeCommunicationConfig).....	64
Table 85 — Definition of DedicatedWirelessConnection elements (ChangeCommunicationConfig).....	64
Table 86 — Definition of MobileType elements (ChangeCommunicationConfig) .....	65
Table 87 — Definition of IPv4Type elements (ChangeCommunicationConfig) .....	65

Table 88 — Definition of IPv6Type elements (ChangeCommunicationConfig) .....	65
Table 89 — Definition of APNType elements (ChangeCommunicationConfig) .....	66
Table 90 — Definition of TelephoneNumberType elements (ChangeCommunicationConfig) .....	66
Table 91 — Definition of WIFIType elements (ChangeCommunicationConfig) .....	66
Table 92 — Definition of EN 61375DedicatedConnection elements (ChangeCommunicationConfig).....	66
Table 93 — Definition of EN 61375SharedConnectionType elements (ChangeCommunicationConfig).....	66
Table 94 — Definition of AssetData elements .....	68
Table 95 — Definition of EndDeviceInfoType elements (AssetData) .....	69
Table 96 — Definition of AssetModelType elements (AssetData).....	69
Table 97 — Definition of HardwareVersionType elements (AssetData) .....	69
Table 98 — Definition of SoftwareVersionType elements (AssetData).....	70
Table 99 — Definition of LifeCycleType elements (AssetData) .....	70
Table 100 — Definition of AcceptanceTestType elements (AssetData) .....	70
Table 101 — Definition of SensorType elements (AssetData).....	71
Table 102 — Definition of MeterType elements (AssetData).....	71
Table 103 — Definition of DeviceType elements (AssetData).....	72
Table 104 — Definition of SealType elements (AssetData).....	72
Table 105 — Definition of TractionUnitType elements (AssetData).....	72
Table 106 — Definition of TractionSystemDataType elements (AssetData) .....	73
Table 107 — Definition of VehicleType elements (AssetData).....	73
Table 108 — Definition of PhysicalPositionType elements (AssetData) .....	73
Table 109 — Definition of EMFType elements (AssetData).....	73
Table 110 — Definition of ECFType elements (AssetData) .....	74
Table 111 — Definition of CMFType elements (AssetData) .....	74
Table 112 — Definition of VMFType elements (AssetData).....	75
Table 113 — Definition of FunctionType elements (AssetData) .....	75
Table 114 — Definition of State elements .....	77
Table 115 — Definition of SensorType elements (State).....	77
Table 116 — Definition of MeterType elements (State) .....	77
Table 117 — Definition of DeviceType elements (State) .....	78
Table 118 — Definition of EMFType elements (State) .....	78
Table 119 — Definition of ECFType elements (State) .....	78
Table 120 — Definition of CMFType elements (State) .....	79
Table 121 — Definition of VMFType elements (State) .....	79
Table 122 — Definition of FunctionType elements (State) .....	79
Table 123 — Definition of ActiveType elements .....	80
Table 124 — Definition of ReactiveType elements .....	80
Table 125 — Definition of CPIDType .....	80
Table 126 — Definition of DateTimeIntervalType .....	80
Table 127 — Definition of LocationType elements .....	80
Table 128 — Definition of simple types.....	81
Table 129 — Definition of BasicTemperatureType elements .....	82
Table 130 — Definition of BasicSpeedType elements.....	82
Table 131 — Definition of ActivePowerType elements.....	82
Table 132 — Additional simple types .....	82

**EN 50463-4:2017 (E)**

Table 133 — Digital signature parameters .....	83
Table 134 — Definition of Header elements .....	86
Table 135 — Definition of User elements .....	87
Table 136 — Definition of Request elements .....	87
Table 137 — Definition of Reply elements .....	88
Table 138 — Definition of ErrorType elements .....	88
Table 139 — Definition of Payload elements .....	89
Table 140 — Mapping of the service RequestCEDBBlocks .....	89
Table 141 — Mapping of the service AutomaticTransferCEDBBlocks .....	90
Table 142 — Mapping of the service RequestEvents .....	90
Table 143 — Mapping of the service AutomaticTransferEvents .....	91
Table 144 — Mapping of the service AutomaticTransferHeartbeat .....	91
Table 145 — Mapping of the service ReaquestReadingBlocks .....	91
Table 146 — Mapping of the service AutomaticTransferReadingBlocks .....	92
Table 147 — Mapping of the service RequestCommunicationConfig .....	92
Table 148 — Mapping of the service AutomaticTransferCommunicationConfig .....	92
Table 149 — Mapping of the service RequestAssetData .....	93
Table 150 — Mapping of the service AutomaticTransferCommunicationConfig .....	93
Table 151 — Mapping of the service RequestState .....	93
Table 152 — Mapping of the service PeriodicTransferState .....	94
Table 153 — Mapping of the service ChangeCommunicationConfig .....	94
Table 154 — HTTP parameters .....	97
Table B.1 — PICS table format .....	111
Table B.2 — PICS identification table .....	113
Table B.3 — IUA identification table .....	114
Table B.4 — IUA supplier identification table .....	114
Table B.5 — Applicable standards identification table .....	115
Table B.6 — Global statement table .....	115
Table B.7 — Level of conformity .....	115
Table ZZ.1 — Correspondence between this European Standard, the TSI “Locomotives and Passenger Rolling Stock” (REGULATION (EU) No 1302/2014 of 18 November 2014) and Directive 2008/57/EC amended by Directive 2011/18/EU .....	164
Table ZZ.2 — Correspondence between this European Standard, the TSI “Energy” (REGULATION (EU) No 1301/2014 of 18 November 2014) and Directive 2008/57/EC amended by Directive 2011/18/EU .....	164

## **European foreword**

This document (EN 50463-4:2017) has been prepared by CLC/TC 9X “Electrical and electronic applications for railways”.

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) 2018-04-06
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2020-10-06

This document supersedes EN 50463-4:2012.

EN 50463-4 includes the following significant technical changes with respect to EN 50463-4:2012:

- general replacement of the text of 4.3 with new complete protocols for data transfer between EMS and DCS to make it interoperable (Clause 4);
- introduction of link to the EN 61375 Communication standard series (Clause 4);
- introduction of the normative Annexes D to F containing the XML schemas to detail the requirements of Clause 4.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

This document is Part 4 of the EN 50463 series which consists of the following parts, under the common title *Railway applications — Energy measurement on board trains*:

- *Part 1: General;*
- *Part 2: Energy measuring;*
- *Part 3: Data handling;*
- *Part 4: Communication;*
- *Part 5: Conformity assessment.*

This series of European Standards follows the functional guidelines description in EN ISO/IEC 17000:2004, Annex A “Principles of conformity assessment”, tailored to the Energy Measurement System (EMS).

The requirements for Energy Measurement Systems in the relevant Technical Specifications for Interoperability are supported by this series of European Standards.

## **EN 50463-4:2017 (E)**

### **Introduction**

The Energy Measurement System provides measurement and data suitable for billing and may also be used for energy management, e.g. energy saving.

This series of European Standards uses the functional approach to describe the Energy Measurement System and on-ground Data Collecting System. These functions are implemented in one or more physical devices. The user of this series of standards is free to choose the physical implementation arrangements.

#### **a) Structure and main contents of the EN 50463 series:**

This series of European Standards is divided into five parts. The titles and brief descriptions of each part are given below:

##### **1) EN 50463-1 — General:**

The scope of EN 50463-1 is the Energy Measurement System (EMS).

EN 50463-1 provides system level requirements for the complete EMS and common requirements for all devices implementing one or more functions of the EMS.

##### **2) EN 50463-2 — Energy measuring:**

The scope of EN 50463-2 is the Energy Measurement Function (EMF).

The EMF provides measurement of the consumed and regenerated active energy of a railway traction unit. If the traction unit is designed for use on AC traction systems the EMF also provides measurement of reactive energy. The EMF provides the measured quantities via an interface to the Data Handling System.

The EMF consists of the three functions: Voltage Measurement Function, Current Measurement Function and Energy Calculation Function. For each of these functions, accuracy classes are specified and associated reference conditions are defined. EN 50463-2 also defines all specific requirements for all functions of the EMF.

The Voltage Measurement Function measures the voltage of the Contact Line system and the Current Measurement Function measures the current taken from and returned to the Contact Line system. These functions provide signal inputs to the Energy Calculation Function.

The Energy Calculation Function inputs the signals from the Current and Voltage Measurement Functions and calculates a set of values representing the consumed and regenerated energies. These values are transferred to the Data Handling System and are used in the creation of Compiled Energy Billing Data (CEBD).

The standard has been developed taking into account that in some applications the EMF may be subjected to legal metrological control. All relevant metrological aspects are covered in EN 50463-2.

EN 50463-2 also defines the conformity assessment of the EMF.

##### **3) EN 50463-3 — Data handling:**

The scope of EN 50463-3 is the Data Handling System (DHS) and the associated requirements of Data Collecting System (DCS).

The on board DHS receives, produces and stores data, ready for transmission to any authorized receiver of data on board or on ground. The main goal of the DHS is to produce Compiled Energy Billing Data and transfer it on an interoperable basis to an on-ground Data Collecting System (DCS). The DHS can support other functionality on board or on-ground with data, as long as this does not conflict with the main goal.

The DCS on-ground receives Compiled Energy Billing Data and transfer it to settlement system.

EN 50463-3 also defines the conformity assessment of the DHS and for the transfer of CEBD to an on-ground Data Collecting System (DCS).

**4) EN 50463-4 — Communication:**

The scope of EN 50463-4 is the communication services.

This part of EN 50463 gives requirements and guidance regarding the data communication between the functions implemented within EMS as well as between such functions and other on board units where data are exchanged using a communications protocol stack over a dedicated physical interface or a shared network.

It includes the on board to ground communication service and covers the requirements necessary to support data transfer between DHS and DCS including the transfer of CEBD on an interoperable basis.

EN 50463-4 also defines the conformity assessment of the communications services.

**5) EN 50463-5 — Conformity assessment:**

The scope of EN 50463-5 is the conformity assessment procedures for the EMS.

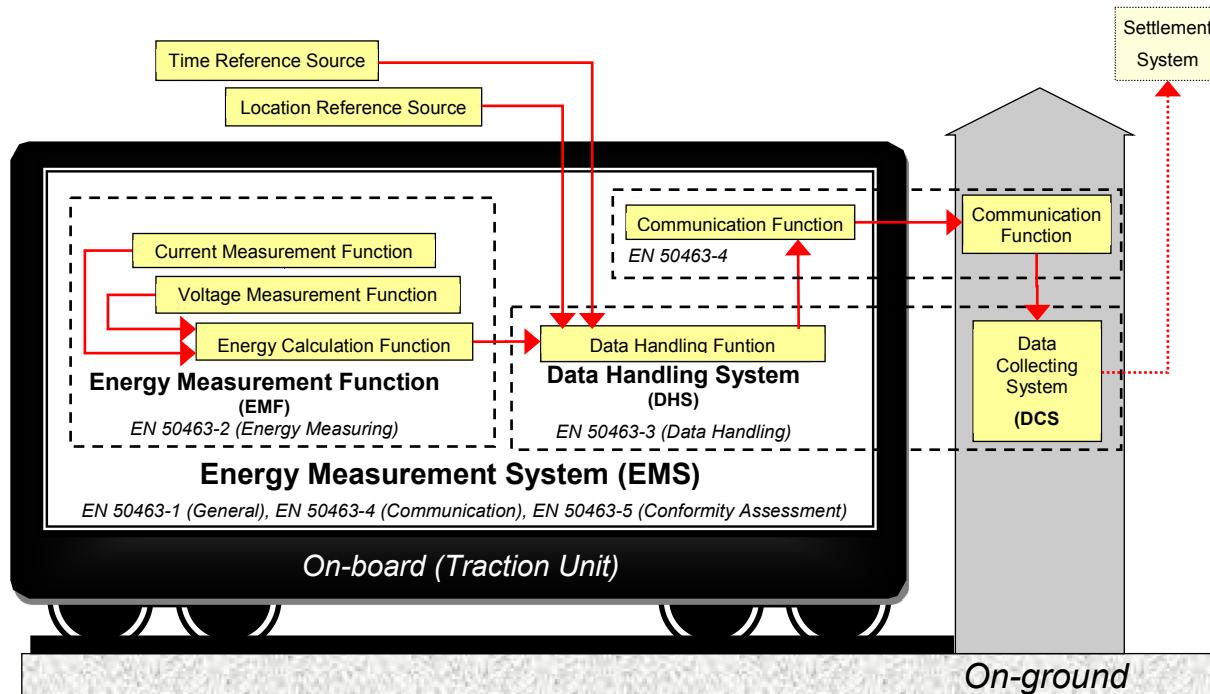
EN 50463-5 also covers re-verification procedures and conformity assessment in the event of the replacement of a device of the EMS.

**b) EMS functional structure and dataflow:**

Figure 1 illustrates the functional structure of the EMS, the main sub-functions and the structure of the dataflow and is informative only. Only the main interfaces required by this standard are displayed by arrows.

Since the communication function is distributed throughout the EMS, it has been widely omitted for clarity, except for the train to ground communication. Not all interfaces are shown.

**EN 50463-4:2017 (E)**



**Figure 1 — EMS functional structure and dataflow diagram**

## **1 Scope**

This European Standard applies to the on board and on board to ground communication services, i.e. it covers the data communication using digital interfaces:

- a) between functions implemented within the EMS;
- b) between EMS function and other on board subsystems;
- c) between EMS and ground communication services.

The on board data communication services of the EMS cover the data exchange between functions of the EMS and the data exchange between EMS and other on board units, where data are exchanged using a communications protocol stack over a dedicated physical interface or a shared communication network.

The on board to ground communication services cover the wireless data communication between the DHS and the on ground server.

Furthermore, this document includes conformity assessment requirements.

## **2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50463-1:2017, *Railway applications — Energy measurement on board trains — Part 1: General*

EN 50463-2:2017, *Railway applications — Energy measurement on board trains — Part 2: Energy measuring*

EN 50463-3:2017, *Railway applications — Energy measurement on board trains — Part 3: Data handling*

EN 50463-5:2017, *Railway applications — Energy measurement on board trains — Part 5: Conformity assessment*

EN 60870-5 (all parts), *Telecontrol equipment and systems — Part 5: Transmission protocols (IEC 60870-5 series)*

EN 61158-2:2014, *Industrial communication networks — Fieldbus specifications — Part 2: Physical layer specification and service definition (IEC 61158-2:2014)*

EN 61375-1:2012, *Electronic railway equipment — Train communication network (TCN) — Part 1: General architecture (IEC 61375-1:2012)*

prEN 61375-2-6:2016, *Electronic railway equipment — Train communication network — Part 2-6: On-board to ground communication (IEC 61375-2-6:201X)*

EN 61375-3-1:2012, *Electronic railway equipment — Train communication network (TCN) — Part 3-1: Multifunction Vehicle Bus (MVB) (IEC 61375-3-1:2012)*

EN 61375-3-3:2012, *Electronic railway equipment — Train communication network (TCN) — Part 3-3: CANopen Consist Network (CCN) (IEC 61375-3-3:2012)*

EN 61375-3-4:2014, *Electronic railway equipment — Train communication network (TCN) — Part 3-4: Ethernet Consist Network (ECN) (IEC 61375-3-4:2014)*



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