

File Type Specification



1 Device Description File – Recom Annex

2 V 0.10

3

4 Approved for first release:

5 Approved for second release:

6 Approved for final release:

7 San Ramon, CA, USA, 2016

8

9 Executive Summary

10

Ver.	Editor	Change	Date
0.1	TM	First Draft	Nov 28, 2016

11 Table of Contents

12	1. Introduction	3
13	1.1. Scope and Purpose	3
14	1.2. Acronyms and Abbreviations	3
15	1.3. Definitions.....	3
16	1.4. Conformance Levels	3
17	1.5. Changelog of the DDF	5
18	1.5.1. 1.2.....	5
19	1.5.2. 1.1.....	5
20	1.5.3. 1.0.....	Fehler! Textmarke nicht definiert.
21	1.6. References	Fehler! Textmarke nicht definiert.
22	1.6.1. EnOcean Alliance & EnOcean GmbH Documents...	Fehler! Textmarke nicht definiert.
23	2. Device Description File	5
24	2.1. Motivation	5

25 **1. Introduction**

26 **1.1. Scope and Purpose**

27 This document is intended for device manufacturer creating DDF (Device Description Files) and
28 Companies developing a DDF Parser. DDFs are part of the ReCom (Remote Commissioning
29 Specification) and are used to specify the ReCom features of the Device. Additionally the DDF
30 is used as an Electrical Datasheet and shall fully describe the capabilities of the device, e.g.
31 the used/supported EEP (EnOcean Equipment Profiles) and or GP (Generic Profiles), different
32 other Device Capabilities, the Hardware and Firmware Revision and a Description of the
33 Device. The DDFs is part of the simplification of integrating and commissioning in EnOcean
34 Devices inside of Buildings/Smart Homes and the Internet of the thing and is part of the new
35 Certification Program. The idea is that in the end each Device has its own ProductID for
36 identification and using this ProductID the installer using a Tool can load the self-describing
37 DDF for this Device and can plan/ install / commission in the Device into his EnOcean network
38 or even the full building network.

39 Chapter 1 mentions the general scope, acronyms, definitions contributors,
40 Chapter 2 describes the DDF format and changes in the Format over time.
41 Chapter 3 is an HowTo for writing a DDF.

42 **1.2. Acronyms and Abbreviations**

- 43 • DDF: Device Description File
- 44 • EEP: EnOcean Equipment Profiles
- 45 • GP: Generic Profiles
- 46 • ReCom: Remote Commissioning

47 **1.3. Definitions**

- 48 • **EURID:** EnOcean Unique Radio Identifier – Unique Device Address of each module.
49 This was called ChipID earlier.
- 50 • **BaseID:** Alternative Sender Address which can used. The Base ID can be modified
51 by a device and can be used to replace one module with another. Using Base ID as
52 base for sending, allows a device to use 128 different addresses for sending
53 telegrams.

54 **1.4. Conformance Levels**

55 **MUST:**

File Type Specification



56 This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute
57 requirement of the specification.

58 **MUST NOT:**

59 This phrase, or the phrase "SHALL NOT", means that something is prohibited by the
60 specification.

61 **SHOULD**

62 This word, or the word "RECOMMENDED", means that, in particular cases, there may be valid
63 reasons not to follow a point of the specification. However the full implications must be
64 understood and weighed before choosing a different course

65 **SHOULD NOT**

66 This phrase, or the phrase "NOT RECOMMENDED" means that, in particular cases, there may
67 be valid reasons where certain behavior is acceptable or even useful. However the full
68 implications must be understood and weighed before choosing to implement anything
69 described with this phrase.

70 **MAY**

71 This word, or the adjective "OPTIONAL", means that an item may or may not be implemented.
72 One vendor may choose to include the item because a particular marketplace requires it or
73 because the vendor feels that it enhances the product while another vendor may omit the
74 same item. In either case, both MUST be prepared to interoperate with each other, though
75 perhaps with reduced functionality.

76

77 2. Device Description File

78 2.1. Motivation

79 With the increasing complexity of use cases for Building automation/ Smart Homes and as Part
80 of the Internet of things it is necessary that Device Installation becomes easier. Due to the
81 limitation of the Energy Harvesting Devices and the EnOcean protocol, it is not possible that
82 devices are describing them completely over the air, compared to other protocols. The DDF is
83 a suggested solution to allow a device to describe itself completely. Each EnOcean Device,
84 which has a Product ID, will have a DDF describing all the necessary features of the Device to
85 Commission it into the network. The Product ID of a device can either be queried via ReCom or
86 can be scanned from the QR Code if the Device does not Support Bidirectional Communication.
87 All the information contained in the DDF allows an EnOcean network integrator to bind, and
88 configure all devices as needed.

89

90 The DDF uses a XML format for the description and a XSD is available for the validation of the
91 XML.

92 2.2. Changelog of the DDF

93 2.2.1. 1.1 – 29 November 2016

- 94 • ChipIDBased tag in TX has been renamed to EURID
- 95 • BaseIDBased tag in TX has been renamed to BaseID
- 96 • Properties type has been added to describe Device Property which are not
97 configurable
- 98 • Parameters renamed to ReComParameters
- 99 • LinkEntry type added for EEP/GP tag for supported profiles to inform if a LinkEntry is
100 used for the profile
- 101 • For ReComParameters the accessLevel (read/write or readWrite) and
102 recommendedUserLevel (admin/user) attribute has been added.
- 103 • Product_ID: enforcing to use the 6Byte product id (2Byte Manufacturer ID + 4 byte
104 Product Reference)
- 105 • LinkEntry Direction Ingoing renamed to Inbound and Outgoing to Outbound

106 2.2.2. 1.0 – 20 Juny 2016

107 Changes after the TWG Meeting:

- 108 • Tag SupportedRPC added for a list of RPC which are supported by the Device
- 109 • Param Type for ReCom Device Paramaters has been reworked:
 - 110 ○ Text type added.

- 111 ○ Flag type removed.
- 112 ○ Data type has been replaced with Scaled type, which uses the EEP way for
- 113 describing scaled parameters
- 114 ○ The device parameter can have a RPCWriteStartAddress and RPCWriteLength
- 115 attribute to use the RPC Write command to modify the parameters.
- 116 ○ Length of parameters uses bytes for length description

117 2.2.3. Version 0.9 – 18 February 2015

118 First revision of the DDF available to the TWG.

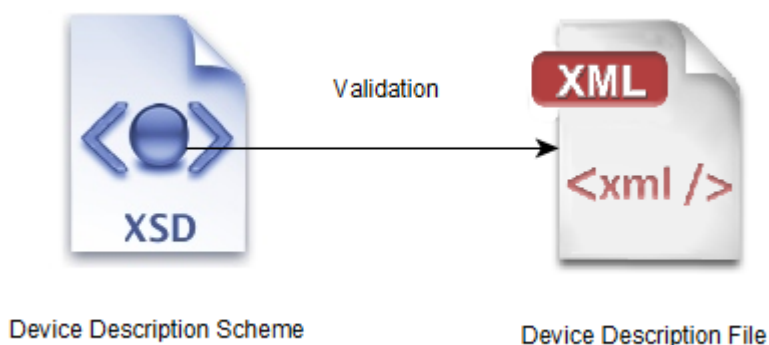
119 2.3. Example DDF available

120 In the ZIP folder 3 DDFs are available:

- 121 • Device_Description_File_ExamplePTM: A PTM device, which does not support any
- 122 ReCom and only describes the send Profile
- 123 • Device_Description_File_ExampleSTM: A bidirectional Sensor device which allows the
- 124 selection of the used profile Type via ReCom
- 125 • Device_Description_File_ExampleController: A complex Controller which support
- 126 different ReMan/ ReCom devices.

127 2.4. DDF structure

128 2.4.1. Overview



129

130 **Figure 1 XSD and XML**

131

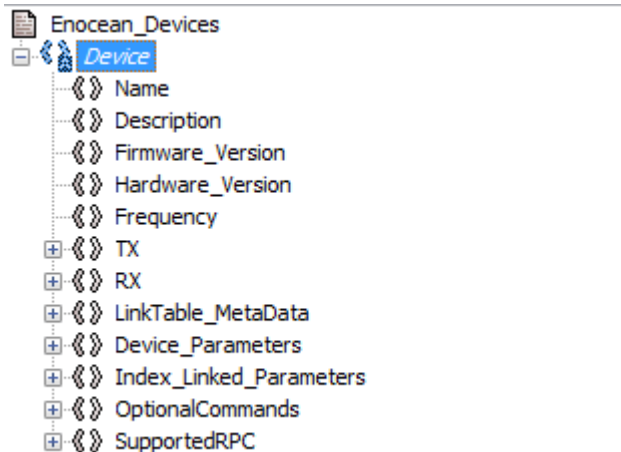
132 A DDF is XML file which can be validated using the ReCom_Device_Description_Schema.xsd

133

File Type Specification

134 2.4.2. Structure Overview

135 The root node of the DDF is EnOcean_Devices and contains a fixed attribute schemaVersion, to
136 inform the parser about the schema used.



137

138 **Figure 2 Root node and 1 and 2 Level Entries**

139

140 The root node consist out of a Device and for each Device the 6byte Product_ID attribute
141 needs to be added.

142 **Device Node (Required) : xs:string**

143 <Device Product_ID="0x0123456789AB">

144 **Name Node (Required) : xs:string**

145 The first mandatory child Node is the Name of the Device, a string.

146 **Description Node (Required) : xs:string**

147 The required Description node is a clear text string description of the product.

148 **Firmware Version Node (Required) : xs:string**

149 For each product reference the firmware version is fixed, and the used firmware version is
150 written here.

151 **Hardware Version Node (Required) : xs:string**

152 The product reference code is unique for each Hardware Version, which is reflected here.

153 **Frequency Node (Required) : FreqType**

154 The Frequency Node informs which valid EnOcean Radio Frequency is used. Currently these
155 are 315|868|902|928.

File Type Specification



156 ***TX Node (optional)***

157 The TX node informs which EEP and/or GP a Device is capable of Transmitting and if the Profile
158 is transmitted using the EURID or a BaseID. Additionally the LinkEntry attribute is used for each
159 Profile to inform if the used profile generated an outbound LinkEntry for a bidirectional Profile.
160 If no LinkEntry attribute is used for the EEP or GP profile the None attribute shall be used.

161 ***RX Node (optional)***

162 The RX node informs which EEP and/or GP a Device is capable of Receiving. Additionally the
163 LinkEntry attribute is used for each Profile to inform if the used profile generated an inbound
164 LinkEntry for a Profile. If no LinkEntry attribute is used for the EEP or GP profile (e.g. if the
165 profile is bidirectional outbound profile) the None attribute shall be used.

166 ***LinkTable_MetaData (optional)***

167 This optional node, informs if the Device supports an outbound and/or inbound LinkTable and
168 how many entries each Table can have.

169 ***DeviceParameters Node (optional)***

170 The DeviceParameters Node contains three optional child nodes: Properties,
171 RecomParameters and Applications.

172 Properties are non-changeable Device Parameters, like a Temperature Threshold or a non-
173 configurable Heartbeat of a Device.

174 RecomParameters are Device Parameters which can be read or/and written via ReCom and
175 change the device behavior.

176 Applications are recommended ReCom settings for typical Use Cases for a Device. For example
177 a Led Controller could contain Application Settings for Stand Alone use, use in an office, use for
178 a residential home.

179 ***Properties Node (optional)***

180 Each Property Node consist out of a Param node. Each param node has a Name Node, a
181 description node, a value node and an unit node.

182 ***RecomParameters Node (optional)***

183 The RecomParamaters node contains multiple param node. The ReCom parameter node can
184 contain an RPCWriteStartAddress and RPCWriteLength attribute, which describes if a RPC
185 write/read command can be used to read or write all parameters at once. Each param node
186 has an index attribute, an accessLevel attribute which can be read,write or readWrite and
187 describes if the parameter can be read and/or written. The recommendedUserLevel attribute
188 is a recommendation which sort of users shall be normally able to change this Parameter. This
189 can either be admin or user. An admin is user with deep technical understanding (e.g. the
190 EnOcean Network Manager or the electrician installing the system) and a user is someone
191 using the device at normal operation (e.g. the home owner who want to change a few

192 paramters).

193 Each param node contains a description and then can either contain the scaled, text, enum or
194 private node.

195 *Scaled Node*

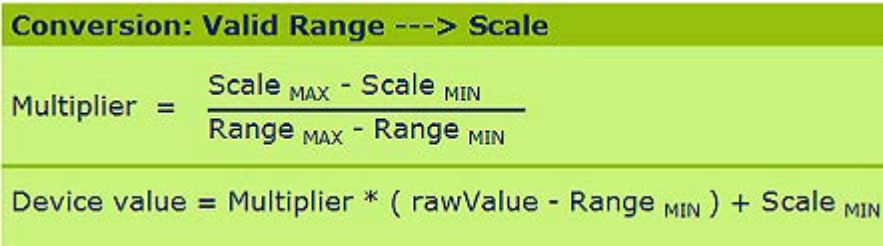
196 A scaled item, is a parameter which represent a rational number and is scaled to a rawValue.
197 The Length_In_Bytes describes how many bytes the parameter is using, the default_Value
198 node is the Out Of box value of this parameter. Range and Scale define how the conversion
199 between the raw and real value works. The Unit is the physical unit of the parameter.

200 ■ Range Min and Range Max.

201 The 'Range' represents the starting-point and the end-point of the respective data inside
202 the telegram coding.

203 ■ Scale Min and Scale Max.

204 The scale', represents the starting-point and the end-point of the respective real value



Conversion: Valid Range ---> Scale

$$\text{Multiplier} = \frac{\text{Scale}_{\text{MAX}} - \text{Scale}_{\text{MIN}}}{\text{Range}_{\text{MAX}} - \text{Range}_{\text{MIN}}}$$
$$\text{Device value} = \text{Multiplier} * (\text{rawValue} - \text{Range}_{\text{MIN}}) + \text{Scale}_{\text{MIN}}$$

205

206 **Figure 3 Conversion of scaled item**

207 *Text Node*

208 The text node only contains the Length_In_Bytes to describe how many bytes the Text can be.
209 The UTF8 encoding is used to store texts inside of the device. This parameter can be used e.g.
210 to store a Location of a device.

211 *Enum Node*

212 The enum Node is used to describe a enum. The Enum node contains the Default_Value, the
213 Length_In_Bytes and EnumList Node. The EnumList Node is a list of all available enums. Each
214 enum consist out of a description and the index of enum. A range of enums can be
215 compromised to a scaledEnum_Value, which uses the same rules as a scaled node for
216 conversion. The attribute indexMin and indexMax is the same as rangeMin and rangeMax.

217 This mixture can be e.g. used if certain Values have a special meaning and other Values
218 represent a physical unit. A typical example would be a configurable Wakeup time. 0 could be
219 described as no wakeup, 1-254 could be minutes and 255 random wake up time.

220 *Private Node*

221

222 The private node contains the Default_Value and Length_In_Bytes node.

File Type Specification



223 Application Node (optional)

224 An application Node consists out of different App node. Each app node starts with a
225 description and then a list of Parameters. Each param is referenced with the index attribute
226 and the ConfigValue is the rawValue of the parameter for this configuration

227 *Index_Linked_Parameters Node (optional)*

228 The index linked parameters consists first out of list of parameters using the param structure
229 like the ReComParameters Node. Afterwards the Links node follows, which consist out of
230 LinkEntry nodes. A link node describes which parameters can be modified for which type of
231 EEPs and if the parameters are available for the inbound or the outbound table. Afterwards
232 the Application node follows, which describes again recommended values for certain use
233 cases.

234 LinkEntry Node

235 The link Entry node first starts with a list of EEP Type, to inform for which EEP this link of
236 parameter is valid.

237 Then a list of param Nodes follow. Each node contains an attribute index, this is the index used
238 in the previous Parameters parm node list.

239 *OptionalCommands Node (optional)*

240 The OptionalCommand node can consist out of the ResetDevice/RadioLinkTest and
241 RepeaterFunctions node to list additional ReCom commands which are supported by the
242 device.

243 *SupportedRPC Node (optional)*

244 The supported RPC list different RPC which are supported. Each rpc node consist out of the
245 FunctionCode node and the ManufacturerID.

246

247