# Profiles

6

Summary

This volume contains a collection of Profiles that specify the behaviour of KNX devices in order to ensure Interworking.

Version 01.13.02 is a KNX Approved Standard.

This document is part of the KNX Specifications v2.1.

# Document updates

| Version | Date | Modifications |
|---|---|---|
| 1.6 | 2002.01.04 | Inclusion of comments from FV. |
| 1.7 | 2004.07.26 | Integration of S22 “Radio Frequency” after KSG commenting phase. |
| | 2005.09.08 | Integration of PID_SERVICE_CONTROL<br>Update of references to integrated Supplement 6 → Chapter 3/5/2 and Chapter 3/5/3. |
| 1.7 | 2006.10.02 | • **AN089 “Mask 0705”.** |
| 1.7 | 2006.10.0 | Integration of AN059 “Mask 0025”. |
| 1.7 | 2006.11.02 | Completed integration from Supplement 5 “Implementation Independent Resources”.<br>Trial integration of KSG376. Restructuring of aspects of Interface Objects and Properties. |
| 1.7 | 2006.12.21 | Added PID_MGT_DESCRIPTOR_01.<br>“LTE-Mode” replaced by “LTE TP1"<br>Extended, reviewed and updated the introduction. |
| 1.7 | 2007.01.12 | • **S22 “KNX Radio Frequency”**<br>• **AN045 “A_DeviceDescriptor_InfoReport”**<br>For both documents: integration of requirements on RF for S-Mode interface: support of Services, Management Procedures. |
| 1.7 | 2007.01.15 | • **AN038 “Function Services”**<br>Added Function Service. |
| 1.7 | 2007.05.14 | • **S09 “Subnetwork Address Management”**<br>Feature “Subnetwork Address Assignment” specified according the integration of S09, in clauses 6.4.7 etc. |
| 1.7 | 2007.07.19 | – Removed the previously introduced Profile “PB-Mode unidirectional sender” according “Compilation_Comments KTB0464.doc”<br>– Renamed “Transport Layer – Device oriented” to “Transport Layer – connection oriented”.<br>– Reformulated existing “Transport Layer – connectionless” to “Transport Layer – connection oriented minimal” in 4.1.3<br>– Introduced “Transport Layer – connectionless” as in S22. |
| 1.7 | 2007.08.31 | • **AN029 “DPS on TP1”**<br>Introduced 8 “Special Profiles” to store such Profiles. |
| 1.7 | 2007.10.25 | • **AN031 “Coupler Resources”** integrated. |
| 1.7 | 2008.01.14 | Profile “LTE Mode” |
| 1.7 | 2008.01.17 | • **AN044 “RF Specification Complements”** |
| 1.7 | 2008.04.30 | • **AN032 “Easy Resources”**<br>• **AN069 “Easy Resources for mask 0701h Controller Mode”** |
| 1.7 | 2008.05.06 | • **AN068 “Unload IA for Easy Modes”** |
| 1.7 | 2008.05.08 | • **AN075 “Mask 091Ah specification”** |
| 1.7 | 2008.05.09 | • **AN076 “Localisation Easy Actuators”** |
| 1.7 | 2008.06.12 | PID_DEVICE_DECRIPTOR in KNXnet/IP Parameter Object : editorial correction towards PID_DEVICE_DESCRIPTOR |
| 1.7 | 2008.08.04 | • **AN090 “Discovery of long frame range”** |
| 1.7 | 2008.08.05 | • **AN091 "Telegram rate limitation for System B"** |
| 1.7 | 2008.08.05 | • **AN094 “DD0 for devices with and without direct bus connection”** |
| 1.7 | 2008.09.05 | • **AN106 "Phasing out TP0"**<br>• **AN107 "Phasing out LT-R"**<br>• **AN108 "Phasing out LT-S"**<br>• **AN109 "Phasing out PL132"**<br>• **AN110 "Phasing out A-Mode"** |
| 1.7 | 2008.12.02 | PID_DEVICE_DESCRIPTOR made mandaory in Device Object (PID = 83) and optional in the KNXnet/IP Parameter Object (PID = 77) |
| 1.7 | 2008.12.04 | • **AN070 “USB adaptations”** integration started. |
| 1.7 | 2009.04.15 | Preparation for inclusion in the KNX Specifications v2.0. |

 

| Version | Date | Modifications |
|---|---|---|
| 1.8 | 2009.06.26 | Update of the KNX RF requirements for KNX RF 1.1. |
| 1.8.01 | 2009.10.12 | Editorial update. |
| 1.9.00 | 2009.10.21 | – Splitting off of Interfaces and Couplers in an own clause.<br>– Removal of the E-Mode Profile “Merge”.<br>– Added indication about pro forma support of authorization from AN041.<br>– Added “SNA Server” as explicit feature for Couplers |
| 1.9.03 | 2010.07.23 | – **AN117 “KNX IP Communication Medium”** integrated. |
| 1.9.04 | 2010.07.28 | – **Correction of LTE Profiles** |
| 1.9.05 | 2010.07.29 | – **Reference to AN142 removed.** |
| 1.9.06 | 2010.08.24 | – Reduced Interface Objects and Full Interface Objects are now exclusive. |
| 1.9.07 | 2010.10.22 | • **AN127 “Master Reset”** integrated. |
| 1.10.00 | 2011.01.03 | • **AN115 “Mask 5705h”** integrated.<br>• Editorial corrections |
| 01.11.00 | 2012.09.11 | • Revision of the integration of AN127 “Master Reset” according the updated AN127 “Master Reset” v05. |
| 01.11.01 | 2013.03.19 | • Accepted all changes in the document.<br>• Modified the access levels to PID_HARDWARE_TYPE as concluded in the KSG meeting of 2013.03.05-06. |
| 0.11.02 | 2013.06.12 | • Run State Machines no longer mandatory for mask 0912h and 091Ah. Done also for other Profiles.<br>• Access levels for PID_HARDWARE_TYPE for 5705h set to 3/1, in line with other appearances. Copied for mask 091Ah. Added to the Device Object for Interfaces and Couplers (A.3.12). |
| 01.12.01 | 2013.10.18 | • **AN151 “cEMI AddInfo for KNX RF Multi and new Properties”** integrated. |
| 01.13.02 | 2013.10.28 | • Editorial updates for the publication of KNX Specifications 2.1. |

## References


[01] Chapter 3/2/2 “Twisted Pair 1 ” v1.1 AS of 2008.12.19
[02] Chapter 3/2/3 “Powerline 110” V1.1 AS of 2008.12.16
[03] Chapter 3/2/5 “Communication Medium RF” v0.3 DV of 2004.12.22
[04] Chapter 3/2/6 “Communication Medium IP” v1.0.00 AS of 2010.07.23
[05] Chapter 3/3/1 “Physical Layer General” v1.1 AS of 2008.12.19
[06] Chapter 3/3/2 “Data Link Layer General” v1.1 AS of 2008.12.19
[07] Chapter 3/3/3 “Network Layer” v1.1 AS of 2008.12.22
[08] Chapter 3/3/4 “Transport Layer” v1.1 AS of 2008.12.22
[09] Chapter 3/3/7 “Application Layer” v1.1 AS of 2008.12.24
[10] Chapter 3/4/1 “Application Interface Layer” v1.1 AS of 2009.01.05
[11] Chapter 3/5/1 “Resources” v1.2 AS of 2009.03.31
[12] Chapter 3/5/2 “Management Procedures” V1.4 AS of 2009.01.14
[13] Chapter 3/5/3 “Configuration Procedures” v1.0 AS of 2009.02.06
[14] Chapter 3/6/2 “Physical External Interface” v1.1 AS of 2009.02.09
[15] Chapter 3/6/3 “External Message Interface”
[16] Chapter 3/8/1 “Overview” (KNXnet/IP) v1.4 AS of 2009.06.29
[17] Chapter 3/8/2 “Core” (KNXnet/IP)
[18] Chapter 3/8/3 “Device Management” (KNXnet/IP)
[19] Chapter 3/8/4 “Tunnelling” (KNXnet/IP)
[20] Chapter 3/8/5 “Routing” (KNXnet/IP)
[21] Volume 7 “Application Descriptions”
[22] Chapter 8/2/2 “TP1 Physical and Link Layer Tests”
[23] Chapter 8/2/3 “PL110 Physical and Link Layer Tests” V1.0 AS of 2002.02.05
[24] Chapter 8/2/5 “Radio Frequency” v1.0 RfV of 2003.12.03
[25] Chapter 8/3/3 “Network Layer Tests” v1.0 AS of 2002.02.05
[26] Chapter 8/3/4 “Transport Layer Tests” v1.0 AS of 2002.02.05
[27] Chapter 8/3/7 “Application (Interface) Layer Testing – Network Management Server/Client Testing” v1.0 AS of 2002.02.05
[28] Part 8/7 “Interworking Tests” v1.1 FV of 2003.10.15


 

[29] Part 9/2 “Basic and System Components and Devices” v1.1 RfV of 2009.06.20
[30] Part 9/3 “Couplers” v1.1 AS of 2009.06.19
[31] Part 10/1 “Logical Tag Extended” v1.1 AS

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# Contents

 

# 1 Introduction

## 1.1 Goals of Profiles

This Volume 6 “Profiles” contains a collection of KNX Profile that fix the behaviour of KNX devices in order to ensure Interworking. This includes two main aspects:

1. Interworking during normal operation of a device (runtime Interworking), and
2. Interworking during system configuration (configuration Interworking).

A further prerequisite for Interworking is the communication medium: two devices can interwork if they either share a common physical medium or if several physical media are connected by an adequate Coupler (gateway, Bridge or Router). It is the intention of the KNX system to provide a common runtime Interworking, but there are several classes of devices with different types of configuration Interworking.

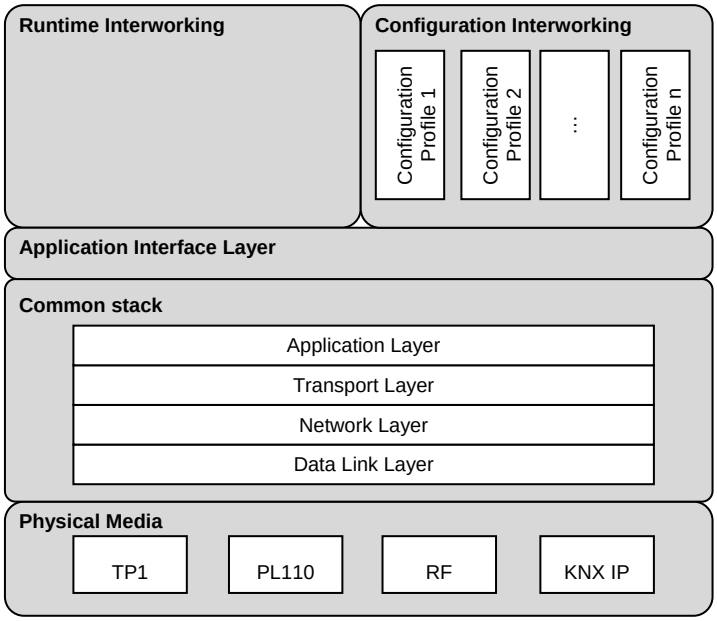


**Figure 1 - Structure of Profiles**

Figure 1 above explains this structure. On the basis of several Physical Media all devices share a common KNX communication stack and a common Application Interface Layer. This Application Interface Layer serves for interfacing applications and allows for a common Runtime Interworking as well as for interfacing towards management operations and allows for a Configuration Interworking.

The KNX Configuration Interworking allows a KNX device to be configured according one or multiple Configuration Profiles. A Configuration Profile specifies

- how a KNX device will be configured; this is specified in [13], and
- the minimal device requirements to allow for this; this is specified in *this* document.

It is the objective of the Configuration Profile to provide a list of minimum requirements to ensure proper operation of a device inside a Configuration Mode. A Configuration Profiles belongs to one of the two Configuration Modes: S-Mode or E-Mode.

Profile deviations from those currently defined Profiles will result in new Profiles.

EXAMPLE If a manufacturer builds a device that can be downloaded by the ETS like a BCU 1, but that has no PEI, a new Profile would have to be proposed. For standardisation of new Profiles, association members shall apply to the KNX Association’s Technical Board (KTB) which will call the System Group (KSG).

Device Profiles have to be limited in number in order not to increase too much the support effort by tools, training, or marketing. Furthermore Profiles have to be exact in order to guarantee interoperability between a device and the ETS and in order to control diversity.

Several Profiles may be combined in a single device. Such devices shall then comply with the requirements of all involved Profiles. For certification the manufacturer shall declare on which Profile(s) the device is based.

This Volume is structured as follows: the first clauses contain Profiles that define common features of all devices. These are the Profiles of the lower layers for the various physical media, and the Profile describing runtime Interworking to be supported by all devices. Only some parts of the runtime mechanisms are specific to certain Profiles, e.g. fast polling.

In clauses 4 through 5 only the Management Server part of the management is described, Management Client Profiles are included in §7. Server Profiles apply for bus devices, whereas clients apply for configuration tools or devices acting as such.

## 1.2 S-Mode Configuration Profiles

S-Mode Configuration Profiles are specified for

- end devices, and
- system components (Couplers, etc.).

These S-Mode Profiles thus allow a manufacturer to build a device that has a Runtime Interworking with all other KNX devices and has Configuration Interworking, this is, the device can act as a Management Server that can be recognised and properly configured by the common S-Mode Management Client, ETS.

There exist multiple S-Mode Configuration Profiles. These shall be identified and named according the value of the device's Device Descriptor and possibly its Management Descriptor. Table 1 gives an overview of the S-Mode Configuration Profiles. (This overview may be incomplete: newer S-Mode Configuration Profiles may have been designed and other S-Mode Configuration Profiles may have been outphased. It is recommended to contact KNX Association prior to the development according any of these Profiles.)

**Table 1 – Overview S-Mode Configuration Profiles (informative)**

| Profile Class | S-Mode Configuration Profiles | Profile Collection Name |
|---|---|---|
| System 1 | 0010h, 0011h, 0012h | BCU 1 |
| | 0013h | |
| | 1012h, 1013h | |
| | 3012h | |
| | 4012h | |
| System 2 | 0020h, 0021h | BCU 2 |
| | 0025h | |
| System 300 | 0300h | |
| | 2300h | |
| System 7 | 0700h, 0701h | BIM M112 |
| | 0705h | |
| | 5705h | |
| System B | 07B0h | |
| | 17B0h | |
| Coupler | 0910h, 0911h | |
| | 0912h | |
| | 1900h | |
| KNXnet/IP Router | 091Ah | |

## 1.3 E-Mode Configuration Profiles

For E-Mode configuration Profile are specified as listed in Table 2.

**Table 2 – Overview E-Mode Configuration Profiles (informative)**

| Configuration Profile | Note |
|---|---|
| Ctrl-Mode fixed DMA | - |
| Ctrl-Mode reloc. DMA | - |
| Ctrl-Mode Controller | The Profiles for the Controller itself. |
| PB-Mode | |
| LTE-Mode | |

## 1.4 Conventions and abbreviations

A Profile includes is a set of features that a device shall contain. However some features are conditional, this means they are only required if a certain condition is fulfilled. The related condition is expressed in this case. Features are described in feature tables which refer to items defined in Volume 3 "System Specifications". Where applicable also references to Volume 8 "System Conformance Tests" are given.

Additional features may be included in the devices and declared for certification; a manufacturer is allowed to add features to a device which are not required by the Profile. Therefore no features are explicitly declared as optional.

| Symbol | Definition |
|---|---|
| M | Mandatory |
| C | Conditions |
| …$^{n}$ | conditions are specified under note “n” |
| O | Optional |
| X | Not allowed |
| n/a | not applicable |
| ? | not yet defined |
| - | not available |

# 2 Profile: Operation

## 2.1 Aims

This Profile describes the features of a device necessary for operation. The aim is to guarantee runtime Interworking between all devices in the system. The main components for this objective are the support of group oriented (multicast) communication.

## 2.2 Common Profile

These Profiles refer to all devices in all Configuration Modes on all media. Medium dependent features are described in clause 3.

| Feature | all end devices | Routers | Bridges | RF bidirectional end device | RF uni-directional sender | RF retransmitter | RF-TP1 Media coupler |
|---|---|---|---|---|---|---|---|
| 1 Medium dependent Layers | Profile of one medium M | Profile of one medium M | Profile of one medium M | KNX RF medium M | KNX RF medium M | KNX RF medium M | KNX RF and KNX TP1 M |
| 2 Physical Layer General | M | M | M | - | - | - | - |
| 3 Link Layer general | M | M | M | - | - | - | - |
| 4 Link Layer - Router | - | M | - | - | - | - | - |
| 5 Link Layer - Bridge | - | - | M | - | - | - | - |
| 6 Network Layer general | M | M | M | M | M | - | - |
| 7 Network Layer - Router | - | M | - | - | - | - | - |
| 8 Network Layer – Bridge | - | - | M | - | - | - | - |
| 9 Network Layer RF Retransmitter | - | - | - | - | - | M | - |
| 10 Network Layer RF Media Coupler | - | - | - | - | - | - | M |
| 11 Transport Layer – multicast | M | - | - | M | M | - | - |
| 12 Transport Layer – connection oriented minimal | M | M | M | M | M | - | - |
| 13 AL – Group Object services | M | - | - | M | - | - | - |
| 14 AL – Property Value Services | - | - | - | M | M | | |
| 15 AL – Function Property Services | - | - | - | M | - | - | - |
| 16 AIL – GO | M | - | - | M | - | - | - |
| 17 AIL – IO | - | - | - | M | - | - | - |
| 18 AIL – Function Properties | - | - | - | M | - | - | - |
| 19 AIL – GO indirection | - | - | - | M | - | - | - |
| 20 Application Interface Layer for unidirectional devices | - | - | - | - | M | - | - |

### 2.2.1 Medium dependent Layers

The Profiles defined in clause 3 “Medium dependent layers” of this document apply.

### 2.2.2 Physical Layer - general

| | Specification | Test |
|---|---|---|
| | • **General** | |
| [05] | (contains no requirement) | none. |

### 2.2.3 Data Link Layer - general

| | Specification | Test |
|---|---|---|
| | • **General** | |
| [06] | - §1.1 “Functions of the Data Link Layer”<br>- §1.2 “Possible Media and their Impact on Layer-2”<br>- §1.3 “Objective” | tested with medium specific tests |
| | • **Individual address /Group Address** | |
| [06] | - §1.4 “Definitions” | tested with medium specific tests |
| | • **Data Link Layer Protocol** | |
| [06] | - §3 “Data Link Layer Protocols” | tested with medium specific tests |
| | • **Parameters** | |
| [06] | - §4 “Parameters of Layer-2” (except TP1 Fast Polling) | tested with medium specific tests |

### 2.2.4 Data Link Layer - Router

| | Specification | Test |
|---|---|---|
| [06] | - §6.2 “The Layer-2 of a Router” | tested with medium specific tests |

### 2.2.5 Data Link Layer - Bridge

| | Specification | Test |
|---|---|---|
| [06] | - §6.1 “The Layer-2 of the TP1-Bridge and the TP1 Repeater” | tested with medium specific tests |

### 2.2.6 Network Layer - general

| Specification | Test |
|---|---|
| • **General** | |
| [07] - §1 “Overview” | [25] |
| • **NPDU** | |
| [07] - §2.1 “NPDU” | [25] - §3 (Black Box Tests) 1)<br>- All end devices<br>- Routers<br>- Bridge<br>[24] - RF bidirectional end device<br>- RF unidirectional sender |
| • **Parameters** | |
| [07] - §2.3 “Parameters of Network Layer”<br>- hop_count: preferred value: 6. | - §3(Black Box Tests) 1)<br>- All end devices<br>- Routers<br>- Bridge<br>[24] - RF bidirectional end device<br>- RF unidirectional sender |
| • **state machine** | |
| [07] - §2.4.1 | [25] - §3 (Black Box Tests) 1)<br>- All end devices<br>- Routers<br>- Bridge<br>[24] - RF bidirectional end device<br>- RF unidirectional sender |

### 2.2.7 Network Layer – Router

| Specification | Test |
|---|---|
| [07] - §2.4.3 “State Machine of Network Layer for Routers” | [25] - §5 “Test case 3: Testing of routing algorithm in routers” |

### 2.2.8 Network Layer – Bridge

| Specification | Test |
|---|---|
| [07] - §2.4.2 “State Machine of Network Layer for Bridges” | [25] - §5 “Test case 3: Testing of routing algorithm in routers” |

### 2.2.9 Network Layer- RF Retransmitter

| Specification | Test |
|---|---|
| [03] - §5.5.1 “History List”<br>- §5.5.2 “RF Repeat Counter”<br>- §5.5.3 “Filtering” | [24] - §3 |

1) System 1 or BCU 1 devices in test 3.4 (broadcast communication) may answer with routing count = 0...6.

### 2.2.10 Network Layer-RF-TP1 Media Coupler

| Specification | Test |
|---|---|
| [03] - §5.5.4 “Retransmitter Flowchart”<br>- §5.6 “The Layer-2 of an RF-TP Media Coupler” | |

### 2.2.11 Transport Layer–multicast

| Specification | Test |
|---|---|
| • **TPDU** | |
| [08] - §1.2 “Point-to-Multipoint, Connectionless (Multicast) Communication Mode”<br>- §3.1 “T_Data_Group Service” | [26] - All end devices<br>- Routers<br>- Bridge<br>[24]<br>- RF bidirectional end device<br>- RF unidirectional sender |

### 2.2.12 Transport Layer–connection oriented minimal

In case the connection-oriented TL is not implemented (if it is optional in a Profile) a T_Disconnect-PDU shall be sent on reception of a T_Connect-PDU.

### 2.2.13 Application Layer – Group Oriented

| Specification | Test |
|---|---|
| • **APDU** | |
| [09] - §2 “APDU”<br>o A_GroupValue_Read-PDU<br>o A_GroupValue_Response-PDU<br>o A_GroupValue_Write-PDU | [28] - All end devices<br>- Routers<br>- Bridge<br>[24]<br>- RF bidirectional end device |
| • **Data length** | |
| [09] data must be coded as indicated in §3.1 “Application Layer Services on Multicast Communication Mode” | [28] - All end devices<br>- Routers<br>- Bridge<br>[24]<br>- RF bidirectional end device |
| • **Connection Codes** | |
| Datapoint Types shall comply with Connection Codes used. | 8/?/? (Testing of Connection Codes)<br>-<br>[24]<br>- RF bidirectional end device |

### 2.2.14 Application Layer – Property Value Services

| Specification | Test |
|---|---|
| • **APDU** | |
| [09] - §2 “APDU”<br>- §3.4.3.1 “A_PropertyValue_Read-service”<br>- §3.4.3.2 “A_PropertyValue_Write-service” | |

### 2.2.15 Application Layer – Function Services

| Specification | Test |
|---|---|
| • **APDU** | |
| [09] - §2 “APDU”<br>- §3.4.5 “Function Property Services” | |

### 2.2.16 Application Interface Layer – Group Objects

| Specification | Test |
|---|---|
| • **Group Objects** | |
| [10] - §3 “Group Object Server” | [27] - §1.3 “Group Object Tests”<br>- all end devices<br>[24] -<br>- RF bidirectional end device |

### 2.2.17 Application Interface Layer – Interface Objects

| Specification | Test |
|---|---|
| • **Interface Objects** | |
| [10] - §4 “Interface Object Server” | |

### 2.2.18 Application Interface Layer – Function Properties

| Specification | Test |
|---|---|
| • **Function Properties** | |
| [10] - §4.4.2 “Function Properties” | |

### 2.2.19 Application Layer Interface Layer – Group Objects indirection

| Specification | Test |
|---|---|
| • **Group Object Indirection** | |
| [10] - §3.4 “Group Object Indirection – Group Object Handles and PID-OBJECT_-VALUE (PID = 62)<br>[11] - §4.3.13 “PID_OBJECT_VALUE (PID = 62)” | |

### 2.2.20 Application Interface Layer for unidirectional devices

| | Specification | Test |
|---|---|---|
| | • **APDU** | |
| [09] | - §2 “APDU”<br>- §3.1.3 “A_GroupValue_Write-service”: Server side only | [28] |
| | • **Data length** | |
| [09] | - §3.1 “Application Layer services on Multicast Communication Mode”: data shall be encoded as indicated in this referred clause. | [28] |
| | • **Connection Codes** | |
| | - Datapoint Types shall comply with Connection Codes used. | [28] |
| | • **Application Interface Layer for unidirectional devices** | |
| [10] | - §3.3.4 “Writing the Group Object Value” | |

## 2.3 Specific parts

These Profiles describe runtime mechanisms that are not relevant for all devices.

| Feature | System 1 | System 2 | BCU 1 | BCU 2 | BIM M112 | Mask 5705h | Coupler | Ctrl-Mode | PB-Mode | LTE TP1 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Link Layer – polling | - | - | - | M | - | - | - | - | - | - |
| 2 Detection of Usage of own Individual Address | - | - | - | M | - | - | - | - | - | - |
| 3 Extended Group Object Flags | - | M | - | M | M | M | - | - | - | - |

### 2.3.1 Link Layer – polling

| | Specification | Test |
|---|---|---|
| | • **Frame Formats** | |
| [01] | - §2.2.6 “L_Poll_Data Frame” | [22] polling tests (Tests 9.1.2.7, 9.1.2.8, 9.1.2.9, 9.2.7, 9.2.8) |
| | • **Parameters** | |
| [01] | - §2.7 “Parameters of Data Link Layer” | [22] polling tests (Tests 9.1.2.7, 9.1.2.8, 9.1.2.9, 9.2.7, 9.2.8) |
| | • **Behaviour on Configuration Faults** | |
| [01] | - §2.8 “Reflections on the system behaviour in case of L_Poll_Data configuration faults” | [22] polling tests in (Tests 9.1.2.7, 9.1.2.8, 9.1.2.9, 9.2.7, 9.2.8) |

### 2.3.2 Detection of Usage of own Individual Address

| Specification | Test |
|---|---|
| • **A_ServiceInformation_Indication_Write Service** | |
| Not allowed for new implementations . | [27] - §2.23 for existing implementations. |
| • **PID_DEVICE_CONTROL (see A.2.5)** | |
| [11] - §4.2.14 “PID_DEVICE_CONTROL (PID = 14)” | |

### 2.3.3 Extended Group Object Flags

| Specification | Test |
|---|---|
| • **configuration flags: update on read response (1 bit)** | |
| [10] - §3.3.2 “Reading the Group Object Value ” (Update Enable) | [27] - §1.3 (Group Object Tests) |

# 3 Medium dependent layers

## 3.1 Goal

This Profile describes the requirements on a device in order to guarantee compliance with one of the standard communication media of the system. Compliance with one of these Profiles is a prerequisite for both runtime and configuration Interworking.

## 3.2 TP1 medium dependent layers

| Feature | All TP1 Profiles | LTE TP1 Devices | TP1 Coupler |
|---|---|---|---|
| 1 Physical Layer | M-TP64 or M-TP256 | M-TP64 or M-TP256 | M-TP64 or M-TP256 |
| 2 Data Link Layer | M | M | M |
| 3 Extended Frames | O | M | M |
| 4 APDU-length | ≥ 15 | ≥ 15 | ≥ 55 [a] |

[a] TP1 Couplers shall support the Routing of L_Data_Extended frames and all Extended Frame Formats.

### 3.2.1 Physical Layer

| Specification | Test |
|---|---|
| • **General requirements for analogue bus signals** | |
| [01] - §1.1 “General requirements for analog bus signals” | [22] |
| • **Medium attachment unit** | |
| [01] - §1.2 “Medium Attachment Unit (MAU)”<br>- §1.4 “Services of the Physical Layer type TP1”<br>- §1.5 “Behaviour of the Physical Layer type TP1 entity” | [22] - §4<br>- §5<br>- §6<br>- §7<br>- §8 |
| • **Topology** | |
| [01] - §1.3 “Topology” | [22] - §4<br>- §5<br>- §6<br>- §7<br>- §8 |
| • **TP64** | |
| [01] - as in [01] | [22] - §4<br>- §5<br>- §6<br>- §7<br>- §8 |
| • **TP256** | |
| [01] - as in [01] | [22] - §4<br>- §5<br>- §6<br>- §7<br>- §8<br>- especially requirements of §5.1.4, 6.1.3 fig. 32, 6.2.3 fig. 35, 6.3.3 fig. 37, 6.4.3 fig. 40 |

### 3.2.2 Data Link Layer

| | Specification | | Test | |
|---|---|---|---|---|
| | • **Frame Formats** | | | |
| [01] | - §2.2.2 “Control Field”<br>- §2.2.4 “L_Data_Standard Frame”<br>- §2.2.7 “Acknowledge Frame” | [22] | §9 [2)] | |
| | • **Medium access control** | | | |
| [01] | - §2.3 “Medium Access Control” | [22] | §9 [2)] | |
| | • **Data Link Layer Protocol** | | | |
| [01] | - §2.5 “Data Link Layer protocol” | [22] | §9 [2)] | |
| | • **State Machine of LL** | | | |
| [01] | - §2.6 “State machine of Data Link Layer” | [22] | §9 [2)] | |
| | • **Parameters** | | | |
| [01] | - §2.7 “Parameters of Data Link Layer”<br>- except polling<br>- nak_retry and busy_retry may be optionally fixed to a value of 3. | [22] | §9 (except polling) [2)] | |

### 3.2.3 Extended Frames

| | Specification | | Test |
|---|---|---|---|
| [01] | - §2.2.5 “L_Data_Extended Frame” | [22] | |

## 3.3 PL110 medium dependent layers

| Feature | all PL110 Profiles | LTE PL110 Devices |
|---|---|---|
| 1 Physical Layer | M | M |
| 2 Data Link Layer | M | M |
| 3 Extended Frames | O | M |
| 4 APDU-length | ≥ 15 | ≥ 15 |

[2)] System 1 or BCU 1 devices in test 9.2.1.1 may accept also control bytes 8Xh and Axh, where X=0h, 4h, 8h, or Ch.

 

### 3.3.1 Physical Layer

| Specification | | Test | |
|---|---|---|---|
| | • **General requirements for analogue bus signals** | | |
| [02] | - §1.1 “Transmission Medium” | [23] | - §3 “General Requirements” |
| | • **Medium attachment unit** | | |
| [02] | - §1.2 “Medium Attachment Unit” | [23] | - §3 “General Requirements” |
| | • **Topology** | | |
| [02] | - §1.3 “Installation Topology” | [23] | - §4 “RF-impedance”<br>- §5 “Receiver Sensitivity””<br>- §6 “Carrier-frequency precision test”<br>- §8 “Power Test” |
| | • **PL110** | | |
| [02] | All requirements. | [23] | |

### 3.3.2 Data Link Layer

| Specification | | Test | |
|---|---|---|---|
| | • **Frame Formats** | | |
| [02] | - §2.3.2 “L_Data_Standard frame format”<br>- §2.3.5 “Acknowledge frame” | [23] | - §9 “Link Layer Tests” |
| | • **Medium access control** | | |
| [02] | - §2.4.2 “Medium Access Control” | [23] | - §9 “Link Layer Tests” |
| | • **Data Link Layer Protocol** | | |
| [02] | - §2.4 “Data Link Layer protocol” | [23] | - §9 “Link Layer Tests” |
| | • **State Machine of LL** | | |
| [02] | - §2.8 “State Machine of Layer-2” | [23] | - §9 “Link Layer Tests” |
| | • **Parameters** | | |
| [02] | - §2.6 “Parameters of Layer-2" | [23] | - §9 “Link Layer Tests” |

### 3.3.3 Extended Frames

| Specification | | Test | |
|---|---|---|---|
| [02] | - §2.3.4 “L_Data_Extended frame format” | [23] | |

## 3.4 RF medium dependent layers

| | RF bidirectional end device | RF unidirectional sender | RF retransmitter | RF TP media coupler | LTE RF BD | LTE RF Tx |
|---|---|---|---|---|---|---|
| 1. Physical Layer Sender | | M | | | | M |
| 2. Physical Layer Transceiver | M | | M | M | M | |
| 3. Link Layer | M | M | M | M | M | M |
| 4. LTE frame format | | | | | M | M |
| 5. Extended LTE Group Addresses and frame acceptance | | | | | M | M |
| 6. Link Layer-Retransmitter | | | M | | | |
| 7. Link Layer-Media Coupler | | | | M | | |
| 8. Local Services Metering | | | | | | |
| 9. KNX Serial Number | M | M | M | M | M | M |
| 10. APDU-length | ≥ 15 | ≥ 15 | ≥ 15 | ≥ 15 | ≥ 15 | ≥ 15 |

### 3.4.1 Physical Layer Sender

| | Specification | Test |
|---|---|---|
| [03] | - §5.1 “Physical Layer for KNX RF Ready and BiBat”<br>- §5.2 “Datagram structure for RF Ready and BiBat” | |

### 3.4.2 Physical Layer Transceiver

| | Specification | Test |
|---|---|---|
| [03] | - §5.1 “Physical Layer for KNX RF Ready and BiBat”<br>- §5.2 “Datagram structure for RF Ready and BiBat” | |

### 3.4.3 Link Layer

| | Specification | Test |
|---|---|---|
| | • **Frame format** | |
| [03] | - §5.1.2 “Datagram structure for RF Ready and BiBat | |
| | • **Medium Access Control** | |
| [03] | - §5.1.3 “Medium access” | |
| | • **Addressing** | |
| [03] | §6.1.4.2 “Duplication prevention” | |

### 3.4.4 LTE frame format

| | Specification | Test |
|---|---|---|
| [03] | - §6.1.2.4 “First block”<br>- §6.1.2.6 “Second block for LTE Extended Datagrams” | |

### 3.4.5 Extended LTE Group Addresses and frame acceptance

| | Specification | Test |
|---|---|---|
| [03] | - §6.1.5.3.1 “Additional Frame acceptance criteria for LTE Extended Datagrams” | |

### 3.4.6 Link Layer-Retransmitter

| | Specification | Test |
|---|---|---|
| [03] | - §6.2.2 “The Layer-2 of an RF Retransmitter” | |

### 3.4.7 Link Layer-Media Coupler

| | Specification | Test |
|---|---|---|
| [03] | - §6.1.6 “The Layer-2 of an RF-TP Media Coupler” | |

### 3.4.8 Local Services Metering

| | Specification | Test |
|---|---|---|
| [15] | - §2 “Message format” – code for L_Meter.ind<br>- §3.3.3.5 “L_Meter.ind” | |

### 3.4.9 KNX Serial Number

| | Specification | Test |
|---|---|---|
| [11] | - §4.15.1 “Abstract Resource definition”<br>- §4.15.2 “KNX Serial Number – Realisation Type 1” | |

## 3.5 KNX IP

### 3.5.1 Profiles

| | Feature | Mash 5705h |
|---|---|---|
| 1 | Physical Layer | M |
| 2 | Data Link Layer | M |
| 3 | IP Protocols | M |
| 4 | KNXnet/IP services families | M |

### 3.5.2 Physical Layer

| | Specification | Test |
|---|---|---|
| | • **IP communication medium** | |
| [04] | - §1 “Specification of the KNX IP Communication Medium”<br>- §2 “Datagram service” | |

### 3.5.3 Data Link Layer

| | Specification | Test |
|---|---|---|
| | • **Frame format** | |
| [04] | - §4.1 “Frame format” | |
| | • **Medium Access control** | |
| [04] | - §4.2 “Medium Access Control” | |
| | • **Data Link Layer services and protocol** | |
| [04] | - §4.3 “Data Link Layer services and protocol” | |

### 3.5.4 IP Protocols

| | Feature | Mask 5705h |
|---|---|---|
| 1 | ARP | M |
| 2 | RARP | O |
| 3 | Fixed IP Address | M |
| 4 | Auto Configuration | |
| | a) BOOTP client [3] | M |
| | b) DHCP client [3] | M |
| | c) Auto-IP | O |
| 5 | UDP | M |
| 6 | TCP | O |
| 7 | ICMP | M |
| 8 | IGMP | M |

### 3.5.5 KNXnet/IP services families

| | Feature | Mask 5705h |
|---|---|---|
| 1 | Core | M |
| 2 | Device Management [4] | |
| | a) Version 1 (cEMI Property Access) | M |
| | b) Version 2 (cEMI Transport Layer) | O |
| 3 | Tunnelling | O |
| 4 | Routing | |
| | a) Routing Frames | M [5] |
| | b) Coupler Functions | X |
| 5 | Remote Logging | n/a |
| 6 | Remote Config. | n/a |
| 7 | Object Server | n/a |

[3] BOOTP/DHCP: Either one shall be implemented by a KNX IP device.

[4] Mask 5705h devices use the routing message codes to communicate on the IP medium but do not implement the coupling service of a KNXnet/IP Router.

[5] See [18] clause 4.2.5 “Configuration Message” for details.

# 4 Configuration & Management (S-Mode, Server)

These Profiles describe the requirements on a S-Mode device, which are relevant for configuration as a Management Server accessed only via the bus. The objective is to guarantee Interworking with the configuration tool (ETS).

## 4.1 Communication

| | Feature | System 1 | System 2 | BCU 1 | BCU 2 | BIM M112 | Mask 5705h | System 300 | System B | System 300 | RF Unidirectional | RF bidirectional |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TL - broadcast | M | M | M | M | M | M | M | M | M | M | M |
| 2 | TL - connection oriented | M | M | M | M | M | M | M | M | M | O | O |
| 3 | TL - connection oriented minimal | X | X | X | X | X | C [b] | X | X | X | C | C |
| 4 | TL - connectionless | M | M | M | M | M | M | M | M | M | M | M |

[a] "TL - connection oriented" and "TL - connection oriented minimal" exclude each other. If the "TL – connection oriented" is not implemented then at least the "TL - connection oriented minimal" shall be implemented.

[b] Mandatory for the Additional Individual Addresses if KNXnet/IP Tunnelling is implemented.

### 4.1.1 TL - broadcast

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives.<br>- §1.3 "Point-to-all-Points Connectionless (Broadcast) Communication Mode"<br>- §2 "TPDU"<br>- §3.4 "T_Data_Broadcast"<br>- §4 "Parameters of Transport Layer" | |

### 4.1.2 TL - connection oriented

- BCU 1
- System 1

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives:<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”<br>- §2 “TPDU”<br>- §3.7 “T_Connect service”<br>- §3.8 “T_Disconnect service”<br>- §3.9 “T_Data_Connected service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.2 “Style 2” | [26] 6) |

- BCU 2
- System 2

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives.<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”<br>- §2 “TPDU”<br>- §3.7 “T_Connect service”<br>- §3.8 “T_Disconnect service”<br>- §3.9 “T_Data_Connected service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.1 “Style 1” | [26] |

6) BCU 1 or System 1 devices may react as follows:
Sequence 3: DUT goes to CLOSED, sends T_Disconnect.ind to the user and T_Disconnect on the bus.
Sequence 12: DUT sends no T_Disconnect.ind and remains in OPEN_IDLE.
Sequence 15: DUT remains in OPEN_IDLE and sends T_Disconnect.ind.
Sequence 16: DUT sends also T_Disconnect.ind after leaving OPEN_WAIT.
Sequence 32: DUT remains in OPEN_WAIT.
Sequence 37: DUT goes to CLOSED and sends T_Disconnect.ind to the user and Disconnect on the bus.

 

- BIM M112
- System B
- Mask 5705h

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives.<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”<br>- §2 “TPDU”<br>- §3.7 “T_Connect service”<br>- §3.8 “T_Disconnect service”<br>- §3.9 “T_Data_Connected service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.3 “Style 3” | [26] |

### 4.1.3 TL - connection oriented minimal

In case the connection oriented TL is not implemented (if it is optional in a Profile) a T_Disconnect-PDU shall be sent on reception of a T_Connect-PDU.

| | |
|---|---|
| In case the connection oriented TL is not implemented (if it is optional in a Profile) a T_Disconnect-PDU shall be sent on reception of a T_Connect-PDU. | |

### 4.1.4 TL - connectionless

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives:<br>- §1.5 “Point-to-point connectionless Communication Mode”<br>- §2 “TPDU”<br>- §3.6 “T_Data_Individual” | [26] |

## 4.2 Device Management

In this clause all general requirements on a device concerning the mechanisms used for access by the Management Client are described.

| Feature | System 1 | BCU 1 | System 2 | BCU 2 | BIM M112 | | | | System 300 | System B | Unidirectional RF | Bidirectional RF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mask 0700h | mask 0701h | mask 0705h | mask 5705h | | | | |
| 1 Direct memory Access | M | M | M | M | M | | M | M | | M | - | - |
| 2 DMA on User Memory | | M | | M | M | | M | M | | M | - | - |
| 3 Verify mode [7] | - [7] | - [7] | M | M | M | | M | M | | M | - | - |
| 4 Interface Object Handling [8] | O | O | M | M | O | M | M | M | M | M | O | M |
| 5 Reduced Interface Objects | C a[a] | - | - | - | - | | - | - | | X | - | M |
| 6 Function Properties | ? | ? | ? | ? | ? | ? | ? | ? | O | ? | O | ? |
| 7 Load and Run State Machines | | | | | | | | | | | | |
| Load State Machine | | | | | | | | | | | | |
| a. Realisation Type 1 | | | M | M | O | M | M | M | M | M | M | |
| b. Realisation Type 2 | | | - | - | M | M | O | O | X | O | O | |
| Run State Machine | | | | | | | | | | | | |
| a. Realisation Type 1 | | | M | M | O | M | M | M | M | M | M | |
| b. Realisation Type 2 | | | - | - | M | M | O | O | X | O | O | |
| 8 Hardware Specific Parameters | - | M | - | M | - | | O | n/a | X | X | - | - |
| 9 RAM cleared | - | M | - | M | M | | M | M | X | O | - | - |
| 10 User EEPROM | - | M | - | M | M | | M | M | X | M | - | - |
| 11 Restart | | | | | | | | | | | | |
| a. connectionless | O | O | O | O | O | O | O | O | O | O | n/a | M |
| b. connection-oriented | M | M | M | M | M | M | M | M | M | M | n/a | M |
| c. Master Reset | O | O | O | O | O | O | O | O | O | O | O | O |
| 12 Authorization [9] | O | O | M | M | M | M | M | M | O | M | | |
| nr of access levels | O | O | 4 | 4 | 16 | 16 | 16 | 16 | O | 4 | | |
| 13 Memory Control Table | - | - | - | - | - | - | O | O | - | O | - | - |

[a] Mandatory of the KNX Serial Number is implemented.

7) If Verify Mode is not implemented, it shall always be off.

8) Please refer to Annex A for the specification of mandatory and optional Interface Objects, Properties and Property fields.

9) The support of the A_Authorize- and the A_Keywrite-service does not imply that the device itself has access protected areas. If this is not the case, a device shall always allow – regardless of the attributed keys – access to the highest level (0), including when receiving an illegal key ('illegal' in this sense meaning another key than any of the keys entered in the key table).

### 4.2.1 Direct Memory Access

| Specification | Test |
|---|---|
| [12] - §3.2.1 “DMP_Connect_RCo”<br>- §3.3.2 “DMP_Disconnect_RCo”<br>- §3.18.2 “DMP_MemRead_RCo”<br>- §3.16.2 “DMP_MemWrite_RCo” | [27] - §2 “Network Management Server Tests” [10] corresponding tests |

### 4.2.2 DMA on user memory

| Specification | Test |
|---|---|
| [12] - §3.19 “DM_UserMemWrite” | [27] - §2 “Network Management Server Tests” [10] corresponding tests |

### 4.2.3 Verify Mode (for A_Memory_Write)

| Specification | Test |
|---|---|
| [11] - §4.2.14.7 "Verify Mode Control" management server part. | [27] - §2 ”Network Management Server Tests” Tests 7.1 to 7.7 [10] |

### 4.2.4 Interface Object Handling

Please refer to Annex A for the specification of mandatory and optional Interface Objects, Properties and Property fields.

| Specification | Test |
|---|---|
| [12] - §3.22.2 “DMP_InterfaceObjectWrite_R”<br>- §3.24.2 “DM_InterfaceObjectRead_R”<br>- §3.23.2 “DMP_InterfaceObjectVerify_R”<br>- §3.25.2 “DM_InterfaceObjectScan_R” | [27] - §2 “Network Management Server Tests” corresponding tests |
| [10] - §4 “Interface Object Server” | [27] - §2 “Network Management Server Tests” corresponding tests |

### 4.2.5 Reduced Interface Objects

| Specification | Test |
|---|---|
| [12] - §3.22.2 “DMP_ReducedInterfaceObject-Write_R”<br>- §3.24.3 “DMP_ReducedInterfaceObject-Read_R”<br>- §3.25.3 “DMP_ReducedInterfaceObject-Scan_R” | [27] - §2 “Network Management Server Tests” corresponding tests |
| [10] - §4.1 “Common structure”<br>- §4.3.2 “Reduced Interface Object” | [27] - §2 “Network Management Server Tests” corresponding tests |

[10] For BCU 1 or System 1 devices the tests 2.6.4 (Memory_Read - Illegal Length), 2.7.3 (Memory_Write - Illegal Length), and 2.8.2 (ADC_Read – Incorrect channel number) are irrelevant.

### 4.2.6 Function Properties

| Specification | Test |
|---|---|
| [09] - §2 “APDU”<br>- §3.4.1 “Introduction”<br>- §3.4.5 “Function Property Services” | |
| [10] - §4.1 “Common structure”<br>- §4.2 “Minimal requirements of Interface Objects”<br>- §4.4.2 “Function Properties” | |
| [12] - §3.26 “DM_FunctionProperty_Write_R” | |

### 4.2.7 Load - and Run State Machines

#### 4.2.7.1 Load State Machine

| a) Realisation Type 1 - Property based | |
|---|---|
| **Specification** | **Test** |
| [11] records | |
| [12] - §3.27.3 “DMP_LoadStateMachineWrite_-Rco_IO”<br>- §3.28.3 “DM_LoadStateMachineVerify_-R_IO”<br>- §3.29.3 “DMP_LoadStateMachineRead_-R_IO” | [27] - §2 “Network Management Tests” corresponding tests |
| **b) Realisation Type 2 – Memory mapped** | |
| **Specification** | **Test** |
| [11] records | |
| [12] - §3.27.2 “DMP_LoadStateMachineWrite_Rco_Mem”<br>- §3.28.2 “DMP_LoadStateMachineVerify_Rco_Mem”<br>- §3.29.2 “DMP_LoadStateMachineRead_Rco_Mem” | [27] - §2 “Network Management Tests” corresponding tests |

#### 4.2.7.2 Run State Machine

| a) Realisation Type 1 - Property based | |
|---|---|
| **Specification** | **Test** |
| [11] - records | |
| [12] - §3.30.3 “DMP_RunStateMachineWrite_-R_IO”<br>- §3.31.3 “DMP_RunStateMachineVerify_-R_IO”<br>- §3.32.3 “DMP_RunStateMachineRead_-R_IO” | [27] - §2 “Network Management Tests” corresponding tests |

| b) Realisation Type 2 – Memory mapped | |
|---|---|
| **Specification** | **Test** |
| [11] records | |
| [12] - §3.30.2 “DMP_RunStateMachineWrite_Rco_Mem”<br>- §3.31.2 “DMP_RunStateMachineVerify_Rco_Mem”<br>- §3.32.2 “DMP_RunStateMachineRead_Rco_Mem” | [27] - §2 “Network Management Tests” corresponding tests |

### 4.2.8 Hardware specific Parameters

| Specification | Test |
|---|---|
| • **0100h (RW)** | |
| [11] - §4.18 “OptionReg” | |

### 4.2.9 RAM cleared

This is the RAM to be cleared by the Management Client during download of an application program.

| a) System 1, BCU 1 | |
|---|---|
| **Specification** | **Test** |
| • **RAM**<br>[11] - 00CEh to 00DFh | |
| **b) System 2, BCU 2** | |
| **Specification** | **Test** |
| • **Zero page RAM**<br>[11] - 00BDh to 00DFh | |
| • **High RAM**<br>[11] - 0972h to 0989h | |
| **c) BIM M112** | |
| **Specification** | **Test** |
| • **RAM**<br>[11] - Resources from 0700h | |

### 4.2.10 User EEPROM

This part of the EEPROM can be used by an application program.

| **a) System 1** | |
|---|---|
| **Specification** | **Test** |
| [11] - Memory range for configuration parameters starting at 0119h.<br>- Upper limit depending on application needs | |
| **b) BCU 1** | |
| **Specification** | **Test** |
| [11] - 0119h to01FEh max | |
| **c) System 2** | |
| **Specification** | **Test** |
| [11] - Memory range is manufacturer specific | |
| **d) BCU 2** | |
| **Specification** | **Test** |
| [11] - 0119h to 046Fh | |
| **e) BIM M112** | |
| **Specification** | **Test** |
| [11] - from 4000h to CFFFh | |
| **f) System B** | |
| **Specification** | **Test** |
| [11] - memory allocation mechanisms for<br>- Device Object<br>- Address table object<br>- Association table object<br>- Group Object Table Interface Object<br>- Application object (1)<br>- Application object 2<br>- The memory range is implementation specific; for the mechanisms see System B Configuration Procedures in [13]. | |

### 4.2.11 Restart

#### 4.2.11.1 Restart connectionless

| **Specification** | **Test** |
|---|---|
| [12] - §3.7.2 DM_Restart_RCl | |

#### 4.2.11.2 Restart connection-oriented

| **Specification** | **Test** |
|---|---|
| [12] - §3.2.1 DMP_Connect_RCo<br>- §3.7.3 DM_Restart_RCo | - §2.9.1 “Send Restart” |

#### 4.2.11.3 Master Reset

| | Specification | Test |
|---|---|---|
| [11] | - §4.9.1 “Group Address Table” – “default state”<br>- §4.10.1 “Group Object Association Table” – “default state” | To be completed. |
| [12] | - §3.7.2 “DM_Restart_RCl” – master reset<br>- §3.7.3 “DM_Restart_RCo” – master reset | To be completed. |

### 4.2.12 Authorization

| | Specification | Test |
|---|---|---|
| | • **Management Procedures** | |
| [12] | - §3.5.1 “DM_Authorize_RCo”<br>- §3.5.2 “DM_Authorize2_RCo”<br>- §3.6 “DM_SetKey” | |

### 4.2.13 Memory Control Table

| | Specification | Test |
|---|---|---|
| | • **PID_MCB_TABLE** | |
| [11] | - §4.2.27 “PID_MCB_TABLE” (PID = 27) as read-only. | |

## 4.3 Device Identification

| Feature | System 1 | System 2 | BCU 1 | BCU 2 | BIM M112 | Mask 5705h | System 300 | System B | RF Unidirectional | RF Bidirectional |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Device Descriptor Service - connection oriented | M | M | M | M | M | M | M | M | O | O |
| 2 Device Descriptor Service - connectionless | - | - | - | - | - | O | O | M | M | M |
| 3 Device Descriptor Type 0 | M | M | M | M | M | M | M | M | M | M |
| 4 Device Descriptor Type 2 | - | - | - | - | - | O | O | O | M | M |
| 5 Device Descriptor InfoReport | - | - | - | - | - | - | - | O | M | M |
| 6 Management Descriptor 1 | O | O | O | O | O | O | M | O | O | O |
| 7 Identification of hardware | - | M [11)] | - | - | M [12)] | M | O | O | - | - |
| 8 Identification of Application | - | - | - | - | - | O | - | M | | |

11) This is mandatory for all implementations of BCU 2 not based on the Motorola HC05 platform and for which no application compatibility can be guaranteed to BCU 1 and BCU 2.

12) This is mandatory for all implementations of BIM M112, except for mask versions 0700h and 0701h, for which this is optional.
New implementations of BIM M112 should not use mask 0700h or mask 0701h. Implementations of mask 0701h should foresee functionality to avoid execution of an incompatible application.

13) Implies connection-oriented TL and Application Layer services for accessing the Device Descriptor.

### 4.3.1 Device Descriptor Service - connection oriented

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 “A_DeviceDescriptor_Read-service” | [27] - §2.5.1 “Read Mask-version” (Network Management Tests) |

### 4.3.2 Device Descriptor Service - connectionless

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 “A_DeviceDescriptor_Read-service” | [27] - §2.5.1 “Read Mask-version” (Network Management Tests) |
| [12] - §3.2.2 “DMP_Connect_RCl” | |

### 4.3.3 Device Descriptor Type 0

| Specification | Test |
|---|---|
| [11] - §4.1.2 “Device Descriptor Type 0” | [27] - §2.5.1 “Read Mask-version” (Network Management Tests) |

### 4.3.4 Device Descriptor Type 2

| Specification | Test |
|---|---|
| [11] - §4.1.3 “Device Descriptor Type 2” | [27] - §2.5.3 “Read DD Type2, connection-oriented”<br>- §2.5.4 “Read DD Type2 , connectionless (if supported” |

### 4.3.5 Device Descriptor InfoReport

| Specification | Test |
|---|---|
| [09] - §3.3.2 “A_DeviceDescriptor_InfoReport-service | |
| [12] - §3.2.5 “DM_DeviceDescriptor_-InfoReport” | |

### 4.3.6 Management Descriptor 1

| Specification | Test |
|---|---|
| • **Management Descriptor 1** | |
| [11] - §4.3.23 “PID_MGT_DESCRIPTOR (PID = 72)” | |
| [12] - §3.4.2 “DM_Identify_R” | |

### 4.3.7 Identification of the hardware

| Specification | Test |
|---|---|
| [12] - §3.4.3 “DM_Identify_RCo2” | |

### 4.3.8 Identification of Application

| Specification | Test |
|---|---|
| [09] - §3.5.6.5 "A_UserManufacturerInfo_-Read_service" | |

## 4.4 Device Individualisation

In this clause all requirements on a device for device individualisation and assignment of the Individual Address are described.

| Feature | System 1 | System 2 | BCU 1 | BCU 2 | BIM M112 | Mask 5705h | System 300 | System B | RF Unidirectioanl | RF Bidirectional |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Programming Mode | | | | | | | | | | |
| 1.a Connection oriented | M | M | M | M | M | M | M | M | | O |
| 1.b Connectionless | - | - | - | - | - | - | O | O | | M |
| 2 KNX Serial Number | | | | | | | | | | |
| a client initiated | - | M | - | M | M | M | M | M | | - |
| b server initiated | - | - | - | - | - | - | - | O | M | M |
| 3 Domain Address Assignment | C* | C* | C* | C* | C* | n/a | C* | C* | | M |
| 4 Local Assignment | - | - | - | - | - | n/a | | n/a | | |
| 5 Distributed Address Assignment | - | - | - | - | - | n/a | | n/a | | |
| 6 Default Individual Address | - | - | - | - | - | - | | n/a | M | - |

* mandatory on open media

## 4.4.1 Programming Mode

### 4.4.1.1 connection oriented

| **a) Realisation Type 1 - Property based**<br>• System B | |
|---|---|
| **Specification** | **Test** |
| [12] - §2.2 “NM_IndividualAddress_Read”<br>- §2.3 “NM_IndividualAddress_Write” 13) | |
| **Programming Mode Control**<br>• via HMI: device selection and indication of Programming Mode<br>• via bus:<br>[11] - §4.3.5 “PID_PROGMODE”<br>[12] - §3.22.2 “DMP_InterfaceObjectWrite_R”<br>- §3.23.2 “DMP_InterfaceObjectVerify_R”<br>- §3.24.2 “DMP_InterfaceObjectRead_R” | |
| **b) Realisation Type 2 – Memory mapped**<br>• System 1<br>• System 2<br>• BCU 1<br>• BCU 2<br>• BIM M112 | |
| **Specification** | **Test** |
| [12] - §2.2 “NM_IndividualAddress_Read”<br>- §2.3 “NM_IndividualAddress_Write” 14) | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |
| **Programming Mode Control**<br>• via HMI: device selection and indication of Programming Mode<br>• via bus:<br>[11] - §4.19.3 “Programming Mode – Realisation Type 2”<br>[12] - §3.13.2 “DMP_ProgModeSwitch_RCo” | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |

### 4.4.1.2 Programming Mode – connectionless

| **Specification** | **Test** |
|---|---|
| [12] - §2.10 “NM_DomainAnd-IndividualAddress_Write2”<br>- §2.2 “NM_IndividualAddress_Read” | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |
| **Programming Mode Control**<br>• via HMI: device selection and indication of Programming Mode<br>[12] - §3.13.2 “DMP_ProgModeSwitch_RCo”<br>[11] - §4.19.3 “Programming Mode – Realisation Type 2” | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |

13) Implies connection-oriented TL and Application Layer services for accessing the Device Descriptor.

14) Implies connection-oriented TL and Application Layer services for accessing the Device Descriptor.

### 4.4.2 KNX Serial Number

#### 4.4.2.1 Client initiated

| Specification | Test |
|---|---|
| [12] - §2.4 “NM_IndividualAddress_Serial-Number_Read”<br>- §2.5 “NM_IndividualAddress_Serial-Number_Write” | [27] - §2.16 “Testing of A_IndividualAddress-SerialNumber_Write-Service : Server Test”<br>- §2.17 “Testing of A_IndividualAddress-SerialNumber_Read-Service : Server Test” |

#### 4.4.2.2 Server initiated

| Specification | Test |
|---|---|
| [12] - §2.6 “NM_IndividualAddress_Serial-Number_Write2 | [27] - §2.16 “Testing of A_IndividualAddress-SerialNumber_Write-Service : Server Test” |

### 4.4.3 Domain Address Assignment

| Specification | Test |
|---|---|
| [12] - §2.7 “NM_DomainAddress_Read”<br>- §2.12 “NM_DomainAddress_Scan” | [27] |

### 4.4.4 Default Individual Address

| Specification | Test |
|---|---|
| [11] - §3.3 “Individual Address”<br>- Subnetwork Address, value according to the medium.<br>- Device Address, fixed value FFh | |

## 4.5 Device Linking

In this clause all requirements on a device for linking of Group Objects are described. This includes the configuration of Address - and Association Tables.

| Feature | System 1 | System 2 | BCU 1 | BCU 2 | BIM M112 | Mask 5705h | System 300 | System B | RF Unidirectional | RF Bidirectional |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Address Table | M | M | M | M | M | M | M | M | - | - |
| 2 Association Table | M | M | M | M | M | M | M | M | - | - |
| 3 Linking via Properties | - | - | - | - | - | n/a | - | n/a | n/a | M |
| 4 Direct Link | - | - | - | - | - | n/a | - | n/a | M | - |

### 4.5.1 Group Address Table

| | |
|---|---|
| **a) Group Address Table – Realisation Type 1**<br>• Mask 0010h, 0011h, 0012h<br>• Mask 0020h in compatibility mode , 0021h in compatibility mode | |
| **Specification** | **Test** |
| [11] - §4.9.2 “Group Address Table – Realisation Type 1” | |
| **b) Group Address Table – Realisation Type 2**<br>• Mask 0020h, 0021h | |
| **Specification** | **Test** |
| [11] - §4.9.3 “Group Address Table – Realisation Type 2” | |
| **c) Group Address Table – Realisation Type 4**<br>• Mask 1012h, 1013h | |
| **Specification** | **Test** |
| [11] - §4.9.4 “Group Address Table – Realisation Type 4” | |
| **d) Group Address Table – Realisation Type 6**<br>• System 300 | |
| **Specification** | **Test** |
| [11] - §4.9.6 “Group Address Table – Realisation Type 6” | |
| **e) Group Address Table – Realisation Type 7**<br>• System B | |
| **Specification** | **Test** |
| [11] - §4.9.7 “Group Address Table – Realisation Type 7” | |
| **f) Group Address Table – Realisation Type 8**<br>• Mask 5705h | |
| **Specification** | **Test** |
| [11] - §4.9.8 “Group Address Table – Realisation Type 8” | |

### 4.5.2 Association Table

| | | |
|---|---|---|
| **a) Group Object Association Table – Realisation Type 1**<br>• Mask 0010h, 0011h, 0012h<br>• Mask 0020h in compatibility mode , 0021h in compatibility mode<br>• Mask 1012h, 1013h | | |
| | **Specification** | **Test** |
| [11] | - §4.10.2 “Group Object Association Table – Realisation Type 1” | |
| **b) Group Object Association Table – Realisation Type 2**<br>• Mask 0020h, 0021h | | |
| | **Specification** | **Test** |
| [11] | - §4.10.3 “Group Object Assocation Table – Realisation Type 2” | |
| **c) Group Object Association Table – Realisation Type 6**<br>• System 300<br>• System B | | |
| | **Specification** | **Test** |
| [11] | - §4.10.4 “Group Object Association Table – Realisation Type 6” | |
| **d) Group Address Table – Realisation Type 8**<br>• Mask 5705h | | |
| | **Specification** | **Test** |
| [11] | - §4.10.5 “Group Object Association Table – Realisation Type 8” | |

### 4.5.3 Linking via Properties

| | **Specification** | **Test** |
|---|---|---|
| [13] | - §2.5 “RF bidirectional devices” (S-Mode) | |

### 4.5.4 Direct Link

| | **Specification** | **Test** |
|---|---|---|
| [13] | - §2.5 “RF unidirectional devices” (S-Mode) | |

## 4.6 Application Handling

In this clause all requirements necessary for an application program to be able to run on a target device are listed.

| | System 1 | System 2 | BCU 1 | BCU 2 | BIM M112 | Mask 5705h | System 300 | Sysyem B | RF Unidirectioanl | RF Bidirectional |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Group Object Table | M | M | M | M | M | M | M | M | - | - |
| 2 Application Program & Parameters | - | - | M | M | M | M | M | O | - | - |
| 3 Application Specific Parameters | M | M | M | M | M | M | M | M | - | - |
| 4 Application Programming Interface (API) | - | - | M | M | M | O | | O | - | - |
| 5 Functional Parameters | | | | | | n/a | | n/a | | |
| • unidirectional | | | | | | n/a | | n/a | M | - |
| • bidirectional | - | - | - | - | - | n/a | | n/a | - | M - |

### 4.6.1 Group Object Table

| | | |
|---|---|---|
| **a) Group Object Table – Realisation Type 1**<br>• Mask 0010h, 0011h, 0012h<br>• Mask 0020h in compatibility mode , 0021h in compatibility mode<br>• Mask 1012h, 1013h | | |
| | **Specification** | **Test** |
| [11] | - §4.11.2 “Group Object Table – Realisation Type 1” | |
| **b) Group Object Table – Realisation Type 2**<br>• Mask 0020h, 0021h | | |
| | **Specification** | **Test** |
| [11] | - §4.11.3 “Group Object Table – Realisation Type 2” | |
| **c) Group Object Table – Realisation Type 6**<br>• System 300 | | |
| | **Specification** | **Test** |
| [11] | - §4.11.4 “Group Object Table – Realisation Type 6” | |
| **d) Group Object Table – Realisation Type 7**<br>• System B | | |
| | **Specification** | **Test** |
| [11] | - §4.15.5 “Group Object Table – Realisation Type 7” | |

### 4.6.2 Application Program and Parameters

| Feature | | Specification | Test |
|---|---|---|---|
| - pointer to user initialisation routine<br>- user initialisation routine<br>- pointer to user program<br>- user program<br>- pointer to user save routine<br>- user save routine | [11] | The specification of these features is not available. Please contact KNX Association. | |

### 4.6.3 Application specific system parameters

| | Specification | Test |
|---|---|---|
| - User software manufacturer ID<br>- device type (manufacturer specific)<br>- user software version<br>- CheckLim: EEPROM check limit<br>- PEI type expected by user software<br>- PortADDR: Port A Direction Bit Setting<br>- RunError: Run Time Error Flags<br>- RouteCnt: Routing-count constant<br>- MxRstCnt:<br>- ConfigDes: Configuration Descriptor<br>- ADChannels: 1 (bus voltage) and 4 (PEI type) are mandatory | [11] The specification of these features is not available. Please contact KNX Association. | |

#### 4.6.3.1 For System 300

| Feature | Specification | Test |
|---|---|---|
| • **Device Object**<br>- PID_MANUFACTURER_ID<br>- Device Type<br>- Application Version | [11] | Application Layer Tests, System B Test specification |

#### 4.6.3.2 For System B

| Feature | Specification | Test |
|---|---|---|
| - User software manufacturer ID<br>- device type (manufacturer specific)<br>- user software version<br>- PEI type expected by user software<br>- RouteCnt: Routing-count constant<br>- MxRstCnt:<br>- ADChannels:<br>  - 1 (bus voltage) and<br>  - 4 (PEI type)<br>are mandatory | [11] | Application Layer Tests, System B Test specification |

### 4.6.4 Application Programming Interface (API)

- BCU 1: All API functions in Chapter 3/6/1 (Mask versions 0012h, 1013h, 3012h, 4012h). For mask versions 3012h and 4012h, references to mask version 0012h apply.
- BCU 2: All API functions in Chapter 3/6/1 (Mask versions 0020h, 0021h).
- BIM M112: all API functions in Chapter 3/6/1 (Mask version 0701h).

### 4.6.5 Functional Parameters

#### 4.6.5.1 Functional Parameters – Bidirectional devices

| | Specification | Test |
|---|---|---|
| | • **Function Property** | |
| [11] | - §4.3.16 Property PID_PARAMETER (PID = 65) | |
| | • **Parameter access via Function Properties** | |
| [13] | - §2.4.4 “Parameter access”. | |

## 4.7 Profiles for devices with and without direct bus connection

### 4.7.1 Purpose, motivation and scope

There exist KNX devices that do not have a direct connection to KNX, but use a KNX interface device instead. A popular example for this category of devices is a computer running visualisation software. Amongst other KNXnet/IP allows for many devices that do not have a bus connector on their own; they communicate with the KNX system via an IP interface using KNXnet/IP Tunnelling.

To do so, these devices have to get information about the bus system setup like Group Addresses, Datapoint Types, device name, etc.

Furthermore the bus system itself must be configured to provide the necessary data to these devices, i.e. the Filter Tables of the Couplers must be set so that the needed telegrams can reach these devices.

- The setup of the Filter Tables can be done by using the dummy database entry. The configuration of the devices themselves is usually done by external tools either accessing the ETS database directly or by parsing files with project information exported from ETS. This procedure has some disadvantages like possibly inconsistent data between ETS database and the externally used data, difficult documentation and data storage of the project as the data are not concentrated in one place. The usage of dummy devices leads to usage of Individual Addresses that are not really used, they do not represent one physical device with documented functionality but are mere placeholders for the Filter Table generation.
- The usage of a plug-in as extension for the ETS can only partly solve the problem as it is not possible to import and export this plug-in together with the other project data.

Therefore the dedicated development of database entries for these devices without direct bus access is the best possibility to document the functionality and save all data in one project. This prevents the needs for dummy devices.

As devices that access the bus via interfaces have no own Individual Address and the data are not transferred via the bus either, in clause 4.7.2 a Device Descriptor Type 0 for devices without direct bus connection is specified.

NOTE Though the device does not have an Individual Address, the ETS database entry based on this Profile may contain an Individual Address, which is used for ETS-internal purposes.

In addition also a Device Descriptor Type 0 is specified for devices with a direct bus connection, which do have a Individual Address only. In clause 4.7.3 a Device Descriptor Type 0 for this class of devices is specified.

### 4.7.2 Device with no direct bus connection

Device Descriptor Type 0 for the usage with devices with the following features:

- No own Individual Address.
- Individual Address cannot be downloaded.
- Has Application Program (to be able to specify Group Objects, number of Group Objects not limited).
- Application Program cannot be downloaded.

The Device Descriptor Type 0 for this Profile shall have the value 0AFDh.

The Device Descriptor Type 0 with value 0AFDh shall not be used in devices directly connected to the bus.

### 4.7.3 Device with direct bus connection

Device Descriptor Type 0 for the usage with devices with the following features:

- Has own Individual Address.
- Individual Address can be downloaded.
- Has no Application Program.
- Application program can not be downloaded.

The Device Descriptor Type 0 for this Profile shall have the value 0AFEh.

The Device Descriptor Type 0 with value 0AFEh shall not be used in devices directly connected to the bus.

A device with this Profile shall support the following Management Procedures (please refer to [12] for the specifications):

- §2.3 “NM_IndividualAddress_Write”
- §2.9 “NM_DomainAndIndividualAddress_Write” (only if device is on an open medium)
- §3.2.1 “DMP_Connect_Rco” (optional)
- §3.2.2 “DMP_Connect_RCl”
- §3.7.2 “DM_Restart_RCl”
- §3.7.3 “DM_Restart_RCo” (optional)

The device shall support Programming Mode and a means on the HMI to set the device into Programming Mode.

A device with DD0 0AFEh shall at minimum support the minimal connection-oriented TL (T_Disconnect-PDU on any connection-oriented frame on its IA).

 

# 5 Configuration and Management – S-Mode – Couplers

## 5.1 General requirements

### 5.1.1 Coupler models

In this clause 5.1, the correct use terms is important. Please consult [06] for the “Overview of the KNX Coupler models”.

### 5.1.2 Masks 0910h and 0911h

These Profiles shall not be used for new developments of Couplers: their implementation shall be exclusively used for reassessment of existing implementations of Couplers with mask 0910h and 0911h.

## 5.2 Communication

### 5.2.1 Overview

| Feature | Coupler | mask 0910h | mask 0911h | mask 0912h | KNXnet/IP Router | mask 091Ah |
|---|---|---|---|---|---|---|
| 1 TL - broadcast | M | M | M | M | M | M |
| 2 TL - connection oriented | M | M | M | M | M | M |
| 3 TL - connection oriented minimal | X | X | X | X | X | X |
| 4 TL - connectionless | M | M | M | M | M | M |

[a] “TL - connection oriented” and “TL - connection oriented minimal” exclude each other. If the “TL – connection oriented” is not implemented then at least the “TL - connection oriented minimal” shall be implemented.

### 5.2.2 TL - broadcast

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives.<br>- §1.3 “Point-to-all-Points Connectionless (Broadcast) Communication Mode”<br>- §2 “TPDU”<br>- §3.4 “T_Data_Broadcast”<br>- §4 “Parameters of Transport Layer” | |

### 5.2.3 TL - connection oriented

| | | |
|---|---|---|
| • Coupler<br>• mask 091Ah | | |
| | **Specification** | **Test** |
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives:<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”<br>- §2 “TPDU”<br>- §3.7 “T_Connect service”<br>- §3.8 “T_Disconnect service”<br>- §3.9 “T_Data_Connected service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.2 “Style 2” | [26] |
| • mask 091Ah | | |
| | **Specification** | **Test** |
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives.<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”<br>- §2 “TPDU”<br>- §3.7 “T_Connect service”<br>- §3.8 “T_Disconnect service”<br>- §3.9 “T_Data_Connected service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.1 “Style 1” | [26] |

### 5.2.4 TL - connection oriented minimal

This feature is not allowed for any Coupler Profile.

### 5.2.5 TL - connectionless

| | **Specification** | **Test** |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives:<br>- §1.5 “Point-to-point connectionless Communication Mode”<br>- §2 “TPDU”<br>- §3.6 “T_Data_Individual” | [26] |

## 5.3 Device Management

### 5.3.1 Overview

In this clause all general requirements on a device concerning the mechanisms used for access by the Management Client are described.

| Feature | Coupler | mask 0910h | mask 0911h | mask 0912h | KNXnet/IP Router | mask 091Ah |
|---|---|---|---|---|---|---|
| 1 Direct memory Access | M | M | M | M | M | M |
| 2 Coupler services | M | M | M | M | M | M |
| 3 Verify Mode [15)] | O | O [15)] | O [15)] | O [15)] | M | M |
| 4 Interface Object Handling [16)] | O | O | O | M | M | M |
| 5 Reduced Interface Objects | X | X | X | X | X | X |
| 6 Function Properties | O | O | O | O | M | M |
| 7 Load and Run State Machines | | | | | | |
| Load State Machine | | | | | | |
| a. Realisation Type 1 | O | O | O | M [a] | M | M |
| b. Realisation Type 2 | O | O | O | X | O | O |
| Run State Machine | | | | | | |
| a. Realisation Type 1 | O | O | O | O | O | O |
| b. Realisation Type 2 | O | O | O | O | O | O |
| 8 Restart | | | | | | |
| a. connectionless | O | O | O | O | M | M |
| b. connection-oriented | M | M | M | M | M | M |
| c. Master Reset | O | O | O | O | O | O |
| 9 Authorization [17)] | O | O | O | M | M | M |
| nr of access levels | n/a | n/a | n/a | 4 | 4 | 4 |

[a] The Load State Machine transition table allows an optional transition from state “Loaded” to “Error” in case of an event “Load Completed”. This is not allowed for mask version 0912h Couplers. Mask 0912h shall stay in state “Loaded” in case of an error.

15) If Verify Mode is not implemented, it shall always be off.

16) Please refer to Annex A for the specification of mandatory and optional Interface Objects, Properties and Property fields.

17) The support of the A_Authorize- and the A_Keywrite-service does not imply that the device itself has access protected areas. If this is not the case, a device shall always allow – regardless of the attributed keys – access to the highest level (0), including when receiving an illegal key (‘illegal’ in this sense meaning another key than any of the keys entered in the key table).

### 5.3.2 Direct Memory Access

| Specification | Test |
|---|---|
| [12] - §3.2.1 “DMP_Connect_RCo”<br>- §3.3.2 “DMP_Disconnect_RCo”<br>- §3.18.2 “DMP_MemRead_RCo”<br>- §3.16.2 “DMP_MemWrite_RCo” | [27] - §2 “Network Management Server Tests” corresponding tests |

### 5.3.3 Coupler services

| Specification | Test |
|---|---|
| [12] - §3.34 “DM_LCSlaveMemWrite”<br>- §3.35 "DM_LCSlaveMemVerify”<br>- §3.36 “DM_LCSlaveMemRead”<br>- §3.37 “DM_LCExtMemWrite”<br>- §3.38 “DM_LCExtMemVerify”<br>- §3.39 “DM_LCExtMemRead”<br>- §3.40 “DM_LCExtMemOpen”<br>- §3.41 “DM_LCRouteTableStateWrite”<br>- §3.42 “DM_LCRouteTableStateVerify”<br>- §3.43 “DM_LCRouteTableStateRead” | |

### 5.3.4 Verify Mode (for A_Memory_Write)

| Specification | Test |
|---|---|
| [11] - §4.2.14.7 "Verify Mode Control" management server part. | [27] - §2 ”Network Management Server Tests” Tests 7.1 to 7.7 [10)] |

### 5.3.5 Interface Object Handling

Please refer to Annex A for the specification of mandatory and optional Interface Objects, Properties and Property fields.

| Specification | Test |
|---|---|
| [12] - §3.22.2 “DMP_InterfaceObjectWrite_R”<br>- §3.24.2 “DM_InterfaceObjectRead_R”<br>- §3.23.2 “DMP_InterfaceObjectVerify_R”<br>- §3.25.2 “DM_InterfaceObjectScan_R” | [27] - §2 “Network Management Server Tests” corresponding tests |
| [10] - §4 “Interface Object Server” | [27] - §2 “Network Management Server Tests” corresponding tests |

### 5.3.6 Reduced Interface Objects

| Specification | Test |
|---|---|
| [12] - §3.22.2 “DMP_ReducedInterfaceObject-Write_R”<br>- §3.24.3 “DMP_ReducedInterfaceObject-Read_R”<br>- §3.25.3 “DMP_ReducedInterfaceObject-Scan_R” | [27] - §2 “Network Management Server Tests” corresponding tests |
| [10] - §4.1 “Common structure”<br>- §4.3.2 “Reduced Interface Object” | [27] - §2 “Network Management Server Tests” corresponding tests |

### 5.3.7 Function Properties

| Specification | Test |
|---|---|
| [09] - §2 “APDU”<br>- §3.4.1 “Introduction”<br>- §3.4.5 “Function Property Services” | |
| [10] - §4.1 “Common structure”<br>- §4.2 “Minimal requirements of Interface Objects”<br>- §4.4.2 “Function Properties” | |
| [12] - §3.26 “DM_FunctionProperty_Write_R” | |

### 5.3.8 Load - and Run State Machines

#### 5.3.8.1 Load State Machine

| a) Realisation Type 1 - Property based | |
|---|---|
| **Specification** | **Test** |
| [11] - records | |
| [12] - §3.27.3 “DMP_LoadStateMachineWrite_-Rco_IO”<br>- §3.28.3 “DM_LoadStateMachineVerify_R_IO”<br>- §3.29.3 “DMP_LoadStateMachineRead_-R_IO” | [27] - §2 “Network Management Tests” corresponding tests |
| **b) Realisation Type 2 – Memory mapped** | |
| **Specification** | **Test** |
| [11] records | |
| [12] - §3.27.2 “DMP_LoadStateMachineWrite_Rco_Mem”<br>- §3.28.2 “DMP_LoadStateMachineVerify_Rco_Mem”<br>- §3.29.2 “DMP_LoadStateMachineRead_Rco_Mem” | [27] - §2 “Network Management Tests” corresponding tests |

#### 5.3.8.2 Run State Machine

| a) Realisation Type 1 - Property based | |
|---|---|
| **Specification** | **Test** |
| [11] records | |
| [12] - §3.30.3 “DMP_RunStateMachineWrite_R_IO”<br>- §3.31.3 “DMP_RunStateMachineVerify_R_IO”<br>- §3.32.3 “DMP_RunStateMachineRead_R_IO” | [27] - §2 “Network Management Tests” corresponding tests |

| b) Realisation Type 2 – Memory mapped | | | |
|---|---|---|---|
| | **Specification** | | **Test** |
| [11] | records | | |
| [12] | - §3.30.2 “DMP_RunStateMachineWrite_Rco_Mem”<br>- §3.31.2 “DMP_RunStateMachineVerify_Rco_Mem”<br>- §3.32.2 “DMP_RunStateMachineRead_Rco_Mem” | [27] | - §2 “Network Management Tests” corresponding tests |

## 5.3.9 Restart

### 5.3.9.1 Restart connectionless

| | Specification | Test |
|---|---|---|
| [12] | - §3.7.2 DM_Restart_RCl | |

### 5.3.9.2 Restart connection-oriented

| | Specification | Test |
|---|---|---|
| [12] | - §3.2.1 DMP_Connect_RCo<br>- §3.7.3 DM_Restart_RCo | - §2.9.1 “Send Restart” |

### 5.3.9.3 Master Reset

| | Specification | Test |
|---|---|---|
| [12] | - §3.7.2 “DM_Restart_RCl” – master reset<br>- §3.7.3 “DM_Restart_RCo” – master reset | |

## 5.3.10 Authorization

| | Specification | Test |
|---|---|---|
| | • **Management Procedures** | |
| [12] | - §3.5.1 “DM_Authorize_RCo”<br>- §3.5.2 “DM_Authorize2_RCo”<br>- §3.6 “DM_SetKey” | |

## 5.4 Device Identification

| Feature | Coupler | mask 0910h | mask 0911h | mask 0912h | KNXnet/IP Router | mask 091Ah |
|---|---|---|---|---|---|---|
| 1 Device Descriptor Service - connection oriented | M | M | M | M | M | M |
| 2 Device Descriptor Service - connectionless | O | O | O | O | O | O |
| 3 Device Descriptor Type 0 | M | M | M | M | M | M |

### 5.4.1 Device Descriptor Service - connection oriented

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 “A_DeviceDescriptor_Read-service” | [27] - §2.5.1 “Read Mask-version” (Network Management Tests) |

### 5.4.2 Device Descriptor Service - connectionless

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 “A_DeviceDescriptor_Read-service” | [27] - §2.5.1 “Read Mask-version” (Network Management Tests) |
| [12] - §3.2.2 “DMP_Connect_RCl” | |

### 5.4.3 Device Descriptor Type 0

| Specification | Test |
|---|---|
| [11] - §4.1.2 “Device Descriptor Type 0” | [27] - §2.5.1 “Read Mask-version” (Network Management Tests) |

## 5.5 Device Individualisation

In this clause all requirements on a device for device individualisation and assignment of the Individual Address are described.

| Feature | Coupler | mask 0910h | mask 0911h | mask 0912h | KNXnet/IP Router | mask 091Ah |
|---|---|---|---|---|---|---|
| 1 Programming Mode | | | | | | |
| 1.a Connection oriented | M | M | M | M | M | M |
| 1.b Connectionless | O | O | O | O | O | O |
| 2 KNX Serial Number | | | | | | |
| a client initiated | O | O | O | O | M | M |
| b server initiated | O | O | O | O | O | O |
| 3 Domain Address Assignment | C* | C* | C* | C* | O | O |
| 4 Distributed Address Assignment | X | X | X | X | X | X |
| 5 Default Individual Address | O | O | O | O | M | M |
| 6 SNA Server | O | O | O | M | M | M |

* mandatory on open media

### 5.5.1 Programming Mode

#### 5.5.1.1 connection oriented

| Specification | Test |
|---|---|
| [12] - §2.2 “NM_IndividualAddress_Read”<br>- §2.3 “NM_IndividualAddress_Write” 18) | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |
| **Programming Mode Control**<br>• via HMI: device selection and indication of Programming Mode<br>• via bus:<br>[11] - §4.19.3 “Programming Mode – Realisation Type 2”<br>[12] - §3.13.2 “DMP_ProgModeSwitch_RCo” | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |

18) Implies connection-oriented TL and Application Layer services for accessing the Device Descriptor.

#### 5.5.1.2 Programming Mode – connectionless

| Specification | Test |
|---|---|
| [12] - §2.10 “NM_DomainAnd-IndividualAddress_Write2”<br>- §2.2 “NM_IndividualAddress_Read” | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |
| **Programming Mode Control**<br>• via HMI: device selection and indication of Programming Mode<br>[12] - §3.13.2 “DMP_ProgModeSwitch_RCo”<br>[11] - §4.19.3 “Programming Mode – Realisation Type 2” | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |

### 5.5.2 KNX Serial Number

#### 5.5.2.1 Client initiated

| Specification | Test |
|---|---|
| [12] - §2.4 “NM_IndividualAddress_Serial-Number_Read”<br>- §2.5 “NM_IndividualAddress_Serial-Number_Write” | [27] - §2.16 “Testing of A_IndividualAddress-SerialNumber_Write-Service : Server Test”<br>- §2.17 “Testing of A_IndividualAddress-SerialNumber_Read-Service : Server Test” |

#### 5.5.2.2 Server initiated

| Specification | Test |
|---|---|
| [12] - §2.6 “NM_IndividualAddress_Serial-Number_Write2 | [27] - §2.16 “Testing of A_IndividualAddress-SerialNumber_Write-Service : Server Test” |

### 5.5.3 Domain Address Assignment

| Specification | Test |
|---|---|
| [12] - §2.7 “NM_DomainAddress_Read”<br>- §2.12 “NM_DomainAddress_Scan” | [27] |

### 5.5.4 Distributed Address Assignment

This feature is not allowed for any Coupler Profile.

### 5.5.5 Default Individual Address

| Specification | Test |
|---|---|
| [11] - §3.3 “Individual Address”<br>- Subnetwork Address, value according to the medium.<br>- Device Address, fixed value FFh | |

### 5.5.6 SNA Server

| | Specification | Test |
|---|---|---|
| [11] | • **Device Object**<br>- PID_SUBNET_ADDR: see A.3.12<br>• **Router Object**<br>- PID_COUPL_SERV_CONTRO: see A.3.13 | |
| [12] | - §2.18 General Procedure "NM_NetworkParameter_Read_R"<br>- §2.17.1 "NM_NetworkParameter_Write_R" | |
| [13] | - §1.3.3 "SNA read" – Management Server side support<br>- §1.3.4 "SNA update on IA change"<br>- §1.3.5 "SNA update on power-up" (optional)<br>- §1.3.6 "SNA heartbeat" | |

## 5.6 Device Linking

| Feature | Coupler | mask 0910h | mask 0911h | mask 0912h | KNXnet/IP Router | mask 091Ah |
|---|---|---|---|---|---|---|
| 1 Filter Table | M | M | M | M | M | M |

### 5.6.1 Filter Table

| | Specification | Test |
|---|---|---|
| [11] | The specification of the Coupler Filter Table is not available. Please contact KNX Association. | |

## 5.7 Application Handling

This feature is no standard feature of any of the approved Coupler Profiles.

## 5.8 KNXnet/IP

### 5.8.1 Profile: operation

This Profile specifies the device features necessary for operation. The aim is to guarantee runtime Interworking between all devices in the project. The main component for this objective is the support of point-to-multipoint connectionless (multicast) communication.

#### 5.8.1.1 Common Profile for KNXnet/IP devices

| Feature | KNXnet/IP Router | mask 091Ah |
|---|---|---|
| 1 IP communication | M | M |
| 2 Medium dependent Layers | M | M |
| 3 Router Profile | M | M |
| 4 KNXnet/IP Tunneling | M | M |
| 5 KNXnet/IP Routing | M | M |

5.8.1.1.1 Internet Protocol communication

| | Specification | Test |
|---|---|---|
| | • **Internet Protocols** | |
| [16] | - §3 “Mandatory and optional implementation of IP protocols” - device class B | Manufacturer declaration |
| | • **Medium attachment unit** | |
| [16] | None | Manufacturer declaration |
| | • **Power supply requirements** | |
| [16] | None | Manufacturer declaration |

5.8.1.1.2 Medium dependent layers

The Profile of the medium TP1 as specified in clause 3.2 “TP1 medium dependent layers” shall apply.

5.8.1.1.3 Router Profile

The Router Profile as specified in clause 2.2 shall apply.

5.8.1.1.4 KNXnet/IP Tunnelling

| | Specification | Test |
|---|---|---|
| | • **KNXnet/IP Core** | |
| [17] | All requirements. | Test spec underlying the validation tool |
| | • **KNXnet/IP Device Management** | |
| [18] | All requirements. | Test spec underlying the validation tool |
| | • **KNXnet/IP Tunnelling** | |
| [19] | All requirements. | Test spec underlying the validation tool |

5.8.1.1.5 KNXnet/IP Routing

| | Specification | Test |
|---|---|---|
| | • **KNXnet/IP Core** | |
| [17] | All requirements. | Test spec underlying the validation tool |
| | • **KNXnet/IP Device Management** | |
| [18] | All requirements. | Test spec underlying the validation tool |
| | • **KNXnet/IP Routing** | |
| [20] | All requirements. | Test spec underlying the validation tool |

## 5.8.2 Profile: KNXnet/IP Device Management

This Profile specifies the requirements on a KNXnet/IP Router that are relevant for configuration as a Management Server accessed via the KNXnet/IP protocol. The objective is to guarantee Interworking with the configuration tool (ETS).

### 5.8.2.1 Configuration and Management

| Feature | KNXnet/IP Router | mask 091Ah |
|---|---|---|
| 1 IP communication | M | M |
| 2 Router Profile | M | M |
| 3 Memory Independent Router Profile | M | M |

5.8.2.1.1 IP Communication

| | Specification | Test |
|---|---|---|
| | • **KNXnet/IP Core** | |
| [17] | All requirements. | Test spec underlying the validation tool |
| | • **KNXnet/IP Device Management** | |
| [18] | All requirements. | Test spec underlying the validation tool |

5.8.2.1.2 Router Profile

| Specification | Test |
|---|---|
| • **Router Profile**<br>- Profile “TP1 Coupler” as specified in §3.2.<br>- Profile “Coupler” as specified in §5. | |

5.8.2.1.3 Memory Independent Router Profile

All mandatory Interface Objects and Properties of mask 091Ah as specified in clause A.3 in this document.

# 6 Configuration & Management (E-Mode)

These Profiles describe the requirements on an E-Mode device that are relevant for configuration as a Management Server accessed only via the bus. The objective is to guarantee Interworking with the configuration tool (ETS), configuration Interworking inside a single Configuration Mode mode and configuration coexistence between the Configuration Modes.

## 6.1 Communication

| Feature | Ctrl-Mode fixed DMA | Ctrl-Mode reloc DMA | PB-Mode | LTE TP1 |
|---|---|---|---|---|
| 1 TL - broadcast | M | M | M | M |
| 2 TL - connection oriented | M | M | - | - |
| 3 TL - connectionless | - | - | M | M |
| 4 TL - Extended | - | - | - | M |

In case the connection oriented TL is not implemented (if it is optional in a Profile) a T_Disconnect-PDU shall be sent on reception of a T_Connect-PDU.

### 6.1.1 TL - broadcast

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives.<br>- §1.3 “Point-to-point, Connectionless (Broadcast) Communication Mode<br>- §2 “TPDU”<br>- §3.4 “T_Data_Broadcast-service” | |

### 6.1.2 TL - connection oriented

| | Ctrl-Mode Fixed DMA | |
|---|---|---|
| | **Specification** | **Test** |
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives:<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”<br>- §2 “TPDU”<br>- §3.7 “T_Connect service”<br>- §3.8 “T_Disconnect service”<br>- §3.9 “T_Data_Connected service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.2 “Style 2” | [26] |
| | **Ctrl-Mode reloc DMA** | |
| | **Specification** | **Test** |
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives.<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”<br>- §2 “TPDU”<br>- §3.7 “T_Connect service”<br>- §3.8 “T_Disconnect service”<br>- §3.9 “T_Data_Connected service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.1 “Style 1” | [26] |

### 6.1.3 TL - connectionless

| | Specification | Test |
|---|---|---|
| [08] | All features of the following clauses are mandatory except for the coding of the internal service primitives:<br>- §1.5 “Point-to-point connectionless Communication Mode”<br>- §2 “TPDU”<br>- §3.6 “T_Data_Individual” | [26] |

### 6.1.4 TL - extended

| | Specification | Test |
|---|---|---|
| [08] | - §3.3 “T_Data_Tag_Group” | |

## 6.2 Device Management

In this clause all general requirements on a device concerning the mechanisms used for access by the Management Client are described.

| | Ctrl-Mode Fixed DMA | Ctrl-Mode reloc. DMA | PB-Mode | LTE TP1 | LTE RF BD | LTE RF Tx |
|---|---|---|---|---|---|---|
| 1 Direct Memory Access | M | M | - | - | | |
| 2 Verify Mode | - | - | - | - | | |
| 3 Interface Object Handling [19)] | - | C [a)] | - | M | O | - |
| 4 Reduced Interface Objects | - | C [a)] | - | X | C [b)] | - |
| 5 Load and Run State Machines | - | M | - | - | | |
| 6 Hardware Specific Parameters | - | - | - | - | | |
| 7 RAM (cleared) | - | - | - | - | | |
| 8 User EEPROM | M | M | - | - | | |
| 9 Restart | | | | | | |
| a. connectionless | O | O | O | M | M | - |
| b. connection-oriented | M | M | - | M | | |
| c. Master Reset | O | O | O | O | O | O |
| 10 Authorization [20)] | - | - | - | - | - | - |
| nr of access levels | - | - | - | - | - | - |

[a] conditional, one choice per column mandatory.
[b] If Interface Object Handling (Full Interface Objects) are not supported then Reduced Interface Objects shall be supported.

### 6.2.1 Direct Memory Access

| Specification | Test |
|---|---|
| [12] - §3.2.1 “DMP_Connect_RCo”<br>- §3.3.2 “DMP_Disconnect_RCo”<br>- §3.18.2 “DMP_MemRead_RCo”<br>- §3.16.2 “DMP_MemWrite_RCo” | [27] - §2 “Network Management Server Tests” [21)] corresponding tests |

[19)] Please refer to Annex A for the specification of mandatory and optional Interface Objects, Properties and Property fields.

[20)] The support of the A_Authorize- and the A_Keywrite-service does not imply that the device itself has access protected areas. If this is not the case, a device shall always allow – regardless of the attributed keys – access to the highest level (0), including when receiving an illegal key (‘illegal’ in this sense meaning another key than any of the keys entered in the key table).[21)] For BCU 1 or System 1 devices the tests 2.6.4 (Memory_Read - Illegal Length), 2.7.3 (Memory_Write - Illegal Length), and 2.8.2 (ADC_Read – Incorrect channel number) are irrelevant.

[21)] For BCU 1 or System 1 devices the tests 2.6.4 (Memory_Read - Illegal Length), 2.7.3 (Memory_Write - Illegal Length), and 2.8.2 (ADC_Read – Incorrect channel number) are irrelevant.

 

### 6.2.2 Verify Mode

n/a

### 6.2.3 Interface Object handling

Please refer to Annex A for the specification of mandatory and optional Interface Objects, Properties and Property fields.

| Specification | | Test | |
|---|---|---|---|
| [12] | - §3.22.2 “DMP_InterfaceObjectWrite_R”<br>- §3.24.2 “DM_InterfaceObjectRead_R” | [27] | - §2 “Network Management Server Tests” corresponding tests |
| [10] | - §4 “Interface Object Server” | [27] | - §2 “Network Management Server Tests” corresponding tests |

### 6.2.4 Reduced Interface Objects

| Specification | | Test | |
|---|---|---|---|
| [12] | - §3.22.2 “DMP_ReducedInterfaceObject-Write_R”<br>- §3.24.3 “DMP_ReducedInterfaceObject-Read_R” | [27] | - §2 “Network Management Server Tests” corresponding tests |
| [10] | - §4.1 “Common structure”<br>- §4.3.2 “Reduced Interface Object” | [27] | - §2 “Network Management Server Tests” corresponding tests |
| [11] | - §4.3.1 “General requirements” (Device Object)<br>- §4.2.1 “PID_OBJECT_TYPE”<br>- §4.2.11 “PID_SERIAL_NUMBER” | [27] | - §1.4 “System Interface Objects” |
| a) With PID_SERIAL_NUMBER (PID = 11) in the Device Object the AL services A_IndividualAddressSerial-Number_Read (in full, this is, A_IndividualAddressSerialNumber_Read-PDU as well as A_IndividualAddress-SerialNumber_Response-PDU) and A_IndividualAddressSerialNumber_Write shall be supported, as required in Chapter 3/5/1 “Resources” §4.7.1.3. | | | |

### 6.2.5 Load - and Run State Machines

| Specification | | Test | |
|---|---|---|---|
| [11] | - records | | |
| [12] | - §3.27.3 “DMP_LoadStateMachineWrite_-Rco_IO”<br>- §3.28.3 “DM_LoadStateMachineVerify_-R_IO” a)<br>- §3.29.3 “DMP_LoadStateMachineRead_-R_IO”<br>- §3.30.3 “DMP_RunStateMachineWrite_-R_IO”<br>- §3.31.3 “DMP_RunStateMachineVerify_-R_IO”<br>- §3.32.3 “DMP_RunStateMachineRead_-R_IO” | [27] | - §2 “Network Management Tests” corresponding tests |
| a) Load State command can be restricted to “Start loading” and “Load complete” for devices with fixed application program | | | |

The Load Controls and the Run Controls that shall be supported are specified in §A.2.6.1.

### 6.2.6 Hardware related Specific Parameters

n/a

### 6.2.7 RAM (cleared)

n/a

### 6.2.8 User EEPROM

| a) Ctrl-Mode Fixed DMA | | |
|---|---|---|
| | **Specification** | **Test** |
| [11] | - Memory range for configuration parameters starting at 0119h.<br>- Upper limit depending on application needs | |
| **a) Ctrl-Mode relocatable DMA** | | |
| | **Specification** | **Test** |
| [11] | - Memory range is manufacturer specific | |

### 6.2.9 Restart

#### 6.2.9.1 Restart connectionless

| | Specification | Test |
|---|---|---|
| [12] | - §3.7.2 DM_Restart_RCl | |

#### 6.2.9.2 Restart Connection-oriented

| | Specification | Test |
|---|---|---|
| [12] | - §3.2.1 DMP_Connect_RCo<br>- §3.7.3 DM_Restart_RCo | - §2.9.1 “Send Restart” |

#### 6.2.9.3 Master Reset

| | Specification | Test |
|---|---|---|
| [11] | - §4.8 “Group Address Table” – “default state”<br>- §4.9 “Group Object Association Table” – “default state”<br>- application reset to default application<br>- application parameters reset to their default value | To be completed. |
| [12] | - §3.7.2 “DM_Restart_RCl” – master reset<br>- §3.7.3 “DM_Restart_RCo” – master reset | To be completed. |

### 6.2.10 Authorization

Authorization is not mandatory for any of the existing E-Mode Profiles.

## 6.3 Device Identification

| | Ctrl-Mode Fixed DMA | Easy Ctrl. reloc. DMA | PB-Mode | LTE TP1 | LTE RF BD | LTE RF Tx |
|---|---|---|---|---|---|---|
| 1 Device Descriptor Service – connection oriented | M | M | O | O | O | O |
| 2 Device Descriptor Service – connectionless | O | O | M | M | M | M |
| 3 Device Descriptor Type 0 | M | M | O | O | O | O |
| 4 Device Descriptor Type 2 | M | M | M | O | M | M |
| 5 Device Descriptor InfoReport | M [22)] | M [22)] | M [22)] | O | M [22)] | M [22)] |

### 6.3.1 Device Descriptor Service – connection oriented

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 "A_DeviceDescriptor_Read-service" | [27] - §2.5.1 "Read Mask-version" (Network Management Tests) |
| [12] - §3.2.1 "DMP_Connect_RCo | |

### 6.3.2 Device Descriptor Service – connectionless

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 "A_DeviceDescriptor_Read-service" | [27] - §2.5.1 "Read Mask-version" (Network Management Tests) |
| [12] - §3.2.2 "DMP_Connect_RCl | |

### 6.3.3 Device Descriptor Type 0

| Specification | Test |
|---|---|
| [11] • §4.1.2 "Device Descriptor Type 0" | [27] - §2.5.1 "Read Mask-version" (Network Management Tests) |

### 6.3.4 Device Descriptor Type 2

| Specification | Test |
|---|---|
| [11] - §4.1.3 "Device Descriptor Type 2" | [27] - §2.5.3 "Read DD Type2, connection-oriented"<br>- §2.5.4 "Read DD Type2 , connectionless (if supported" |

22) Mandatory for RF implementations.

23) Implies connection-oriented TL and Application Layer services for accessing the Device Descriptor.

### 6.3.5 Device Descriptor InfoReport

| Specification | | | Test |
|---|---|---|---|
| [09] | - | §3.3.2 “A_DeviceDescriptor_InfoReport-service | |
| [12] | - | §3.2.5 “DM_DeviceDescriptor_-InfoReport” | |

## 6.4 Device Individualisation

In this clause all requirements on a device for device individualisation and assignment of the Individual Address are described.

| | | Ctrl-Mode Fixed DMA | Easy Ctrl. reloc. DMA | PB-Mode | LTE TP1 | LTE RF BD | LTE RF Tx |
|---|---|---|---|---|---|---|---|
| 1 | Programming Mode control | | | | | | |
| | 1.1 Realisation Type 1 (Property) | O | O | O | M | M | C h) |
| | 1.2 Realisation Type 2 (memory mapped) | C h) | C h) | C | O | O | O |
| | DoA assignment | | | | | | |
| 2 | DoA assignment via Programming Mode | C d) | C d) | C d) | C d) | C g) | - |
| 3 | DoA Assignment via KNX Serial Number | O | O | O | O | C g) | - |
| | IA assignment | | | | | | |
| 4 | SNA | O | O | O | O | O | O |
| 5 | IA assignment via Programming Mode | C c) | C c) | C a) | C c) | C f) | O |
| 6 | IA assignment via KNX Serial Number | C c) | C c) | O | C c) | C f) | O |
| 7 | IA Local Assignment | O | O | O | C c) | C f) | - |
| 8 | Default IA | O | O | O | O | O | M |
| 9 | Distributed Address Assignment (DAA) | O | O | C b) | O | O | O |
| | Localisation | | | | | | |
| 10 | Localisation via Programming Mode | C e) | C e) | C e) | C e) | O | O |
| 11 | Localisation via localisation channel | C e) | C e) | C e) | C e) | O | O |
| 12 | Localisation via localisation flag L | C e) | C e) | C e) | C e) | O | O |
| 13 | Localisation via Localisation Flag LA | O | O | O | O | O | O |

a Mandatory for bidirectional RF devices.

b Not mandatory for bidirectional RF devices.

c It is mandatory to implement at least one of the features
- “Programming Mode”, or
- “KNX Serial Number” or
- “Local Assignment”.

If the Property “KNX Serial Number” (PID_SERIAL_NUMBER = 11) in the Device Object is implemented then the AL-services A_IndividualAddressSerialNumber_Read (in full, this is A_IndividualAddressSerialNumber_Read-PDU as well as A_IndividualAddressSerialNumber_Response-PDU) and A_IndividualAddressSerialNumber_Write shall be supported too.

| | Ctrl-Mode Fixed DMA | Easy Ctrl. reloc. DMA | PB-Mode | LTE TP1 | LTE RF BD | LTE RF Tx |
|---|---|---|---|---|---|---|
| d Mandatory on open media. | | | | | | |
| e It is mandatory to support at least one of the features<br>- "Localisation via Programming Mode", or<br>- "Localisation via localisation Channel" or<br>- "Localisation via Localisation Flag L". | | | | | | |
| f At least one of these three methods shall be applied. | | | | | | |
| g At least one of these two methods shall be applied. | | | | | | |
| h If Programming Mode is required for the assignment of DoA or IA for localisation, then the Programming Mode Control (activation, deactivation) shall be realised in this way. | | | | | | |

## 6.4.1 Programming Mode control

### 6.4.1.1 Realisation Type 1 (Property)

| Specification | Test |
|---|---|
| [11] - §4.3.5 "PID_PROGMODE" | |

### 6.4.1.2 Realisation Type 2 (memory mapped)

| Specification | Test |
|---|---|
| [11] - §4.1.7.3 "Programming Mode – Realisation Type 2" | |

## 6.4.2 DoA assignment

### 6.4.2.1 DoA assignment via Programming Mode

| Specification | Test |
|---|---|
| [12] - §2.7 "NM_DomainAddress_Read"<br>- §2.9 "NM_DomainAndIndividual-Address_Write"<br>- §2.12 "NM_DomainAddress_Scan" | [27] |

### 6.4.2.2 DoA assignment via KNX Serial Number

| Specification | Test |
|---|---|
| [12] - §2.11 "NM_DomainAnd-IndividualAddress_Write3" | [27] |

### 6.4.3 IA assignment via Programming Mode

| Specification | Test |
|---|---|
| [12] - §2.2 “NM_IndividualAddress_Read”<br>- §2.3 “NM_IndividualAddress_Write” 23) | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |
| • **Programming Mode Control**<br>via HMI: device selection and indication of Programming Mode | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |

### 6.4.4 IA assignment via KNX Serial Number

| Specification | Test |
|---|---|
| [11] - §4.2.11 “PID_SERIAL_NUMBER” Mandatory if full or reduced Interface Objects are supported (see 6.2). | |
| [12] - §2.4 “NM_IndividualAddress_Serial-Number_Read”<br>- §2.5 “NM_IndividualAddress_Serial-Number_Write” | [27] - §2.16 “Testing of A_IndividualAddress-SerialNumber_Write-Service : Server Test”<br>- §2.17 “Testing of A_IndAddress-SerialNumber_Read-Service : Server Test” |

### 6.4.5 IA Local assignment

| Specification | Test |
|---|---|
| [11] - §3.3 “Individual Addresses” - Medium dependent default Subnetwork Address | |

### 6.4.6 Distributed Address Assignment (DAA)

| Specification | Test |
|---|---|
| [12] - §2.16 “NM_IndividualAddress_Check”: Management Servers side support and Management Client side support<br>or<br>- §2.17.2 “NM_IndividualAddress_-Check_LocalSubnetwork”: Management Servers side support and Management Client side support | |

23) Implies connection-oriented TL and Application Layer services for accessing the Device Descriptor.

### 6.4.7 Subnetwork Address Assignment (SNA)

| Specification | Test |
|---|---|
| [11] - §3.3 “Individual Addresses” - Medium dependent default Subnetwork Address | |
| [12] **Subnetwork Address Update**<br>- §2.17.1 “NM_NetworkParameter_Write” – Management Server (device) side support for PID_SUBNET_ADDR in the Device Object<br>**IA report through SN**<br>- §2.15.2 “NM_IndividualAddress_-SerialNumber_Report” | |

### 6.4.8 Localisation via Programming Mode

| Specification | Test |
|---|---|
| [12] - §2.2 “NM_IndividualAddress_Read”<br>- §2.3 “NM_IndividualAddress_Write” | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |
| • **Programming Mode Control**<br>via HMI: device selection and indication of Programming Mode | [27] - §2.3 “Testing of A_IndividualAddress-_Read-service – Server Test” |

### 6.4.9 Localisation via Localisation Channel

| Specification | Test |
|---|---|
| [13] - §4.2.1.3.1 “Definition and use”<br>- §4.2.1.3.5 “Procedure through Localisation Channels” | |

### 6.4.10 Localisation via Localisation Flag L

| Specification | Test |
|---|---|
| [13] - §4.2.1.3.1 “Definition and use”<br>- §4.2.1.3.5 “Localisation via Localisation Flag L (default procedure)” | |

### 6.4.11 Localisation via Localisation Flag LA

| Specification | Test |
|---|---|
| [13] - §4.2.1.3.1 “Definition and use”<br>- §4.2.1.3.2 “Localisation Group Addresses”<br>- §4.2.1.3.6 “Localisation via Localisation Flag LA” | |

 

## 6.5 Device Linking

In this clause all requirements on a device for linking of Group Objects are described. This includes the configuration of Address - and Association Tables. Note that in this part of Volume 6 only the Management Server part is described.

| | | Ctrl-Mode Fixed DMA | Easy Ctrl reloc DMA | PB-Mode | LTE TP1 | LTE RF BD | LTE RF Tx |
|---|---|---|---|---|---|---|---|
| 1 | Address Table fixed | M | X | - | - | | |
| 2 | Address table relocatable | X | M | - | - | | |
| 3 | Association Table | M | X | - | - | | |
| 4 | Assoc table relocatable | X | M | - | - | | |
| 5 | Group Object Table Relocatable | X | C c) | | | | |
| 6 | Filter Table | - | - | - | - | | |
| 7 | Link management services | O | O | - | - | | |
| 8 | GA Check | M | M | - | - | | |
| 9 | Direct Link | - | - | M | - | | |
| 10 | Address table Property based | - | - | - | M | | |
| 11 | Association table Property based | - | - | - | n/a | | |
| 12 | Logical Tag extended linking | - | - | - | M | | |
| 13 | Linking via KNX Serial Number | | | | | M a) | M |
| 14 | Linking via Domain Address | | | | | M | - |
| 15 | Linking via LTE logical tags local assignment | | | | | O | O |
| 16 | Linking via LTE logical tags remote assignment | | | | | M | - |
| 17 | Property based KNX Serial NumberTable | | | | | M b) | - |
| 18 | Distribution of KNX Serial NumberTable | | | | | O | - |

a Implementation is mandatory if the product has the ability to interwork with transmit-only devices.

b Implementation of the KNX Serial Number Table is mandatory in bidirectional devices if the product has the ability to interwork with transmit-only devices.

c Mandatory for implementations based on mask 0701h.

### 6.5.1 Group Address Table fixed

| Specification | Test |
|---|---|
| [11] - §4.9.9 "Group Address Table – E-Mode Realisation Type 1"<br>o Group Address Table Length<br>o Group Addresses<br>o Memory access<br>o Sorting<br>o Group Address Table pointer fixed at 0116h | |

### 6.5.2 Group Address Table relocatable

| Specification | Test |
|---|---|
| [11] - §4.9.10 "Group Address Table – E-Mode Realisation Type 2"<br>o Group Address Table Length<br>o Group Addresses<br>o Memory access<br>o Sorting<br>- §4.9.10.2 "Location" (PID_TABLE_REFERENCE) | |

### 6.5.3 Association Table fixed

| Specification | Test |
|---|---|
| [11] - §4.10.6 "Group Object Association Table – E-Mode Realisation Type 1"<br>o Association Table Length<br>o Associations<br>o Memory access<br>o Structure<br>- §4.10.6.2 "Location"<br>o Pointer to Association Table<br>o Access | |

### 6.5.4 Association Table relocatable

#### 6.5.4.1 In combination with masks 0020h and 0021h

| Specification | Test |
|---|---|
| [11] - §4.10.7 "Group Object Association Table – E-Mode Realisation Type 2"<br>o Association Table length<br>o Associations<br>o Memory access<br>o Structure<br>- §4.10.7.2 "Location"<br>o pointer to association table<br>o access | |

#### 6.5.4.2 In combination with mask 0701h

| Specification | Test |
|---|---|
| [11] - §4.10.8 "Group Object Association Table – E-Mode Realisation Type 3"]<br>o Association Table length<br>o Associations<br>o Memory access<br>o Structure<br>- §4.10.8.2 "Location"<br>o pointer to association table<br>o access | |

### 6.5.5 Group Object Table Relocatable

| Specification | Test |
|---|---|
| [11] - §4.11.8 "Group Object Table – E-Mode Realisation Type 3"<br>o Group Object Table length<br>o Memory access<br>o Structure<br>- §4.11.8.2 "Location"<br>o pointer to Group Object Table<br>o access | |

### 6.5.6 Routing Table

n/a

### 6.5.7 Link management services

| Specification | Test |
|---|---|
| [09] - §3.3.4 “Link Services”<br>These services shall be active if the device has a unique Individual Address. | |
| [12] - §3.33 “Procedures with Link Services”<br>o DM_GroupObjectLink_Read_RCl<br>o DM_GroupObjectLink_Write_RCl<br>The device shall support the Management Server side of these procedures. | |

### 6.5.8 GA Check

| Specification | Test |
|---|---|
| [12] - §2.18.2 “NM_GroupAddress_Scan” | |

### 6.5.9 Direct Link

| Specification | Test |
|---|---|
| [13] - §3 “Push Button Mode” | |

### 6.5.10 Address table Property based

| Specification | Test |
|---|---|
| [11] - §4.9.6 “Group Address Table – Realisation Type 6” | |

### 6.5.11 Association table Property based

| Specification | Test |
|---|---|
| [11] - §4.10.4 “Group Object Association Table – Realisation Type 6” | |

### 6.5.12 Logical Tag Extended linking

| | Specification | Test |
|---|---|---|
| [31] | - All clauses | |

### 6.5.13 Linking via KNX Serial Number

| | Specification | Test |
|---|---|---|
| [31] | - §8.7 “LTE linking procedures for RF transmit-only devices” | |

### 6.5.14 Linking via Domain Address

| | Specification | Test |
|---|---|---|
| | - See 6.4 of this document for the DoA assignment. | |
| [31] | - §8.8 “LTE linking procedures for RF bidirectional devices” | |

### 6.5.15 Linking via LTE logical tags local assignment

| | Specification | Test |
|---|---|---|
| [31] | All of the following:<br>- §6.7.2 “Bidirectional devices”<br>- §6.7.3.1 “Transmit-only devices”<br>- §6.7.3.2 “Receive-only devices”<br>- §8.7 “LTE linking procedures for RF transmit-only devices”<br>- §8.8 “LTE linking procedures for RF bidirectional devices” | |

### 6.5.16 Linking via LTE logical tags remote assignment

| | Specification | Test |
|---|---|---|
| [31] | o Property based Logical Tags<br>All of the following:<br>- §6.7.2 “Bidirectional devices”<br>- §8.8 “LTE linking procedures for RF bidirectional devices” | |

### 6.5.17 Property based KNX Serial NumberTable

| | Specification | Test |
|---|---|---|
| [11] | - §4.3.30 “PID_SERIAL_NR_TABLE” | |

### 6.5.18 Distribution of KNX Serial NumberTable

| | Specification | Test |
|---|---|---|
| [31] | - §8.9 “Distribution of KNX Serial Number Table in the Domain” | |

## 6.6 Application handling

In E-Mode no Application Program is downloaded into an end device. Only adjustment of Parameters is foreseen.

In order to enable a download, a device can be accessed additionally as in S-Mode for this purpose.

| | Ctrl-Mode Fixed DMA | Easy Ctrl reloc DMA | PB-Mode | LTE TP1 | RF unidirectional sender |
|---|---|---|---|---|---|
| 1 Group Object Table | O | O | O | n/a | |
| 2 Application Program and Parameters | O | O | O | O | |
| 3 Application Specific Parameters | O | O | O | O | |
| 4 Application Programming Interface (API) | O | O | O | O | |
| 5 Functional Parameters general [b] | M | M | M | O | |
| 6 Functional Parameters set locally [b] | O [a] | O [a] | O | | |
| 7 Functional Parameters fixed DMA [b] | M [a] | O | O | | |
| 8 Functional Parameters reloc DMA [b] | O | M [a] | O | | |
| 9 Functional Parameters red. IO [b] | O [a] | O [a] | O | M | |
| 10 Functional Parameters via direct link [b] | O | O | M [a] [c] | O | |
| 11 Functional Parameters via Properties | O | O | O | M | O |
| 12 Property based Group Object Table | O | O | O | n/a | |

[a] If set locally, there shall be read access to these parameters. A write access may be rejected.

[b] Features 5 to 10 are only mandatory, if a device implements E-Mode Channels with functional parameters defined.

[c] Unidirectional devices compliant with the PB-Mode *may* send the current state of parameters within the link procedure as described in §5.4.3.9 “Link Procedure for unidirectional devices” in [13].

### 6.6.1 Group Object Table

n/a

### 6.6.2 Application Program and Parameters

n/a

### 6.6.3 Application Specific Parameters

n/a

### 6.6.4 API

n/a

### 6.6.5 Functional parameters general

| | Specification | Test |
|---|---|---|
| [13] | - Appendix 5 “Structures for Parameters” | |

### 6.6.6 Functional parameters set locally

| | Specification | Test |
|---|---|---|
| [13] | - Parameter setting locally via HMI. | |

### 6.6.7 Functional parameters fixed DMA

| | Specification | Test |
|---|---|---|
| | • **Parameter read and setting** | |
| [11] | - §4.12.2 “Parameter Block Table – E-Mode Realisation Type 1 (PaBT – Easy 1)” | |
| | • **Parameter location** | |
| [11] | - §4.11.6 “Group Object Table – E-Mode Realisation Type 1 (GrOT – Easy 1)” | |
| | - §4.12.2.2 “Location” | |

### 6.6.8 Functional parameters relocatable DMA

#### 6.6.8.1 In combination with masks 0020h and 0021h

| | Specification | Test |
|---|---|---|
| | • **Parameter read and setting** | |
| [11] | - §4.12.3 “Parameter Block Table – E-Mode Realisation Type 2 (PaBT – Easy 2)” | |
| | • **Parameter location** | |
| [11] | - §4.11.7 “Group Object Table – E-Mode Realisation Type 2 (GrOT – Easy 2)” | |
| | - §4.4.3.2 “Location” (PaBT – Easy 2) | |

#### 6.6.8.2 In combination with masks 0701h

| | Specification | Test |
|---|---|---|
| | • **Parameter read and setting** | |
| [11] | - §4.12.4 “Parameter Block Table – E-Mode Realisation Type 3” | |
| | • **Parameter location** | |
| [11] | - §4.12.4.2 “Location” | |

### 6.6.9 Functional parameters reduced IO

| | Specification | Test |
|---|---|---|
| | • **Parameter read and setting: handled by "reduced Interface Objects"** | |
| [10] | - §4.1 "Common structure"<br>- §4.3.2 "Reduce Interface Object"<br>- §4.3.3 "Error handling" | |

### 6.6.10 Functional parameters via direct link

| | Specification | Test |
|---|---|---|
| [11] | - §4.3.10.2.6 "PID_CONFIG_LINK(Set_-Channel_Param, Flags, Parameter index, Value)"<br>- §4.3.10.2.7 "PID_CONFIG_LINK-(Channel_Param_Response, Flags, Parameter Index, Value)" | |
| [13] | - §3.4.4.4 "Link procedure for adding or deleting a link in bidirectional devices"<br>- §3.4.4.6 "Link procedure for deleting a link" | |

### 6.6.11 Functional parameters via Properties

| | Specification | Test |
|---|---|---|
| [11] | - §4.13.2 "Application Program – Realisation Type 6 " | |

### 6.6.12 Property Based Group Object Table

| | Specification | Test |
|---|---|---|
| [11] | - §4.11.4 "Group Object Table – Realisation Type 6". | |

## 6.7 Runtime communication

### 6.7.1 LTE runtime interworking

| | LTE RF BD | LTE RF Tx |
|---|---|---|
| 1. LTE runtime messages | M | M |
| 2. Redistribution of messages in the Domain | O | - |

#### 6.7.1.1 LTE runtime messages

| | Specification | Test |
|---|---|---|
| [31] | - §6.7.1 "General"<br>- §6.7.2 "Bidirectional devices"<br>- §6.7.3 "Unidirectional devices" | |

#### 6.7.1.2 Redistribution of messages in the Domain

| Specification | | | Test |
|---|---|---|---|
| [31] | - | §6.7.4 “Redistribution of LTE messages from transmit-only devices in the Domain” | |

### 6.7.2 S-Mode Interface

| | LTE RF BD | LTE RF Tx |
|---|---|---|
| 1. Standard Group Objects and Group Object Indirection | M | NA |

#### 6.7.2.1 Standard Group Objects and Group Object Indirection

| Specification | | | Test |
|---|---|---|---|
| [10] | - | §3.1 “Overview” | |
| | - | §3.2 “General Data Structure of the Group Object Table”” | |
| | - | §3.3 “Group Object value transfers” | |
| | - | §3.4 “Group Objects Indirection – Group Object Handles and PID_OBJECT_VALUE” | |

# 7 Local device access

Here all features of a device relevant for local access via the PEI will be described. This will contain supported PEI types and the external message interface (EMI).

## 7.1 Interface to OSI-layers

| | BCU 1 | BCU 2 | System 1 | System 2 | BIM M112 | Coupler | Ctrl-Mode | PB-Mode |
|---|---|---|---|---|---|---|---|---|
| 1. Data Link Layer | M | M | - | - | M | - | - | - |
| 2. Network Layer | - | M | - | - | M | - | - | - |
| 3. Transport Layer | M | M | - | - | M | - | - | - |
| 4. Application Layer | M | M | - | - | - | - | - | - |

EMI related to polling are mandatory only if the polling service is provided

### 7.1.1 Data Link Layer

| | Specification | Test |
|---|---|---|
| | **BCU 1, Sys BIM M112** | |
| [06] | - §2.2 “L_Data service”<br>- §2.3 “L_SystemBroadcast”<br>- §2.4 “L_Poll_Data-service and protocol” | 8/6/3-3 (Testing of EMI-IMI: link layer) |
| [15] | - §3.3.4 “Data Link Layer EMI”<br>all EMI messages except L_Busmon.ind | |
| | **BCU 2** | |
| [06] | - §2.2 “L_Data service”<br>- §2.3 “L_SystemBroadcast”<br>- §2.4 “L_Poll_Data-service and protocol”<br>- §2.5 “L_Busmon Service” | 8/6/3-3 (Testing of EMI-IMI: link layer) |
| [15] | - §3.3.4 “Data Link Layer EMI”<br>all EMI messages except L_Busmon.ind | |

### 7.1.2 Network Layer

| | Specification | Test |
|---|---|---|
| [07] | - §2.2 “Network Layer Services” | - 8/3/3-4 (Bus/PEI tests), 8/6/3-4 (Testing of EMI-IMI: network layer) |
| [15] | - §3.3.5 “Network Layer EMI” | - 8/3/3-4 (Bus/PEI tests), 8/6/3-4 (Testing of EMI-IMI: network layer) |

### 7.1.3 Transport Layer

| | Specification | Test |
|---|---|---|
| [08] | - §3.1 “General requirements”<br>- §3.2 “T_Data_Group Service”<br>- §3.6 “T_Data_Individual”<br>- §3.7 “T_Connect Service”<br>- §3.8 “T_Disconnect Service”<br>- §3.9 “T_Data_Connected Service” | 8/6/3-5 (Testing of EMI-IMI: transport layer)[24] |
| [15] | - §3.3.6 “Transport Layer EMI”<br>All EMI messages are mandatory except the following:<br>- T_Data_Broadcast.req, and<br>- T_Data_Broadcast.con and<br>- T_Data_Broadcast.ind<br>On implementations on open media the following messages are additionally mandatory<br>- T_Data_SystemBroadcast.req,<br>- T_Data_SystemBroadcast.con and<br>- T_Data_SystemBroadcast.req. | |

### 7.1.4 Application Layer

| | Specification | Test |
|---|---|---|
| [09] | The AL-services for which an EMI-message is required are mandatory. | |
| [15] | - §3.3.7 “Application Layer EMI”<br>All EMI messages are mandatory. | |

## 7.2 Physical External Interface (PEI)

| | BCU 1 | BCU 2 | System 1 | System 2 | BIM M112 | LC |
|---|---|---|---|---|---|---|
| 1. PEI | M | M | - | - | - | - |

### 7.2.1 PEI

| | Specification | Test |
|---|---|---|
| [14] | Please refer to the document. | |

[24] BCU 1 or System 1 devices may show the following behaviour:
5.1.2 Step 2: BCU 1 sends no T_Disconnect.ind
5.1.2 Step 3: BCU 1 sends no T_Connect.ind
5.4.2 Step 2: BCU 1 sends frames on the bus.

## 7.2.2 cEMI Profiles

### 7.2.2.1 Overview

#### 7.2.2.1.1 Introduction

For a cEMI Server, the Profiles as described in the following clauses are defined.

#### 7.2.2.1.2 Profile 1: Asynchronous RF only

This shall be a cEMI Server that supports only asynchronous RF communication (no BiBat features).

#### 7.2.2.1.3 Profile 2: Asynchronous RF and BiBat Master/Slave mode

This shall be a cEMI Server that supports asynchronous RF communication and supports BiBat Master/Slave timeslot mechanisms. The actual BiBat Master or Slave mode can se selected via PID_RF_MODE_SELECT.

NOTE

In BiBat mode the cEMI Server usually operates as a **BiBat Master**.

Use cases:

- Runtime communication, the cEMI Server is e.g. part of a central unit.
- Product development; emulation of a BiBat Master device; testing.
- Certification tests for BiBat Slaves

Use cases for a cEMI Server which operates as **BiBat Slave**:

- product development; emulation of a BiBat Slave device; testing and
- certification tests for BiBat Master.

Although BiBat Master mode is more common for a cEMI Server, both modes are mandatory in this Profile in order to reduce the number of different Profiles and implementations.

### 7.2.2.2 cEMI Profiles definitions

7.2.2.2.1 cEMI Profiles features

| Feature | cEMI Server RF asynch | | cEMI Server asynch & BiBat |
|---|---|---|---|
| | RF Ready device | RF Multi device | |
| 1. cEMI Additional Information Type 02h | M | M | M |
| 2. cEMI Additional Information Type 07h | O | O | M |
| 3. cEMI Additional Information Type 08h | X | M | X |
| 4. cEMI Additional Information Type 09h | X | M | X |
| 5. cEMI Additional Information Type 0Ah | X | M | X |
| 6. cEMI Additional Information Type FEh | O | O | X |
| 7. Asynchronous RF communication | M | M | M |
| 8. Synchronous RF communication, Activated L_Data features according to selected BiBat Master/Slave mode | O | O | M |
| 9. L_Data.req for BiBat Fast_ACK frame | O | O | O |
| 10. L_Data.ind for BiBat Fast_ACK frame | O | O | O |
| 11. L_Raw Services | M | M | M |
| 12. RF Mode discovery and selection | M | M | M |
| 13. Filtering Mode discovery and selection | M | M | M |
| 14. BiBat Master cEMI Client/server synchronisation | O | O | M |
| 15. Support of RF DoA | M | M | M |
| 16. BiBat management Properties | O | O | M |

7.2.2.2.2 cEMI Additional Information Type 02h

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.4.3.1 “Overview”<br>- §4.1.4.3.2 “RF medium information” | |

7.2.2.2.3 cEMI Additional Information Type 07h

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.4.3.1 “Overview”<br>- §4.1.4.3.4 “AddInfo-type 07h: BiBat information” | |

7.2.2.2.4 cEMI Additional Information Type 08h

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.4.3.1 “Overview”<br>- §4.1.4.3.5 “AddInfoType 08h: RF Multi information” | |

7.2.2.2.5 cEMI Additional Information Type 09h

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.4.3.1 “Overview”<br>- §4.1.4.3.6 “AddInfoType 09h: Preamble and postamble” | |

7.2.2.2.6 cEMI Additional Information Type 0Ah

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.4.3.1 “Overview”<br>- §4.1.4.3.7 “AddInfoType 0Ah: RF Fast Ack information” | |

7.2.2.2.7 cEMI Additional Information Type FEh

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.4.3.1 “Overview”<br>- §4.1.4.3.8 “AddInfoType FEh: Manufacturer specific data” | |

7.2.2.2.8 Asynchronous RF communication

| | Specification | Test |
|---|---|---|
| [03] | Please refer to the document. | |
| [15] | - §4.1.5.4 “L_Data services for KNX RF asynchronous frames” | |

7.2.2.2.9 Synchronous RF communication, Activated L_Data features according to selected BiBat Master/Slave mode

| | Specification | Test |
|---|---|---|
| [03] | - Please refer to the document. | |
| [15] | - §4.1.5.5 Mapping of L_Data ervices for BiBat RF frames” | |

7.2.2.2.10 L_Data.req for BiBat Fast_ACK frame

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.5.5.14 “L_Data.req for BiBat Fast_ACK frame” | |

7.2.2.2.11 L_Data.ind for BiBat Fast_ACK frame

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.5.5.16 “L_Data.ind for BiBat Fast_ACK frame” | |

7.2.2.2.12 L_Raw Services

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.5.7.7 “L_Raw services on RF | |

7.2.2.2.13 RF Mode discovery and selection

| | Specification | Test |
|---|---|---|
| [11] | - §4.6.8 “PID_RF_MODE_SELECT”<br>- §4.6.9 “PID_RF_MODE_SUPPORT” | |

7.2.2.2.14 Filtering Mode discovery and selection

| | Specification | Test |
|---|---|---|
| [11] | - §4.6.10 “PID_RF_FILTERING_MODE_-SELECT”<br>- §4.6.11 “PID_RF_FILTERING_MODE_-SUPPORT” | |

7.2.2.2.15 BiBat Master cEMI Client/server synchronisation

| | Specification | Test |
|---|---|---|
| [15] | - §4.1.5.5.2 “L_Data.req for BiBat synchronous data frames” | |
| [11] | - §4.6.8 PID_BIBAT_NEXTBLOCK | |

7.2.2.2.16 Support of RF DoA

| | Specification | Test |
|---|---|---|
| [11] | - §4.3.32 PID_RF_DOMAIN_ADDRESS | |

7.2.2.2.17 BiBat management Properties

| | Specification | Test |
|---|---|---|
| [11] | - §4.3.25 PID_RECEIVE_BLOCK_TABLE<br>- §4.3.26 PID_RANDOM_PAUSE_TABLE<br>- §4.3.27 PID_RECEIVE_BLOCK_NR<br>- §4.3.30 PID_SERIAL_NR_TABLE<br>- §4.3.31 PID_BIBAT_MASTER_ADDRESS | |

 

# 8 Special Profiles

## 8.1 TP1 DPSU Profiles

Two TP1 DPSU Profiles are currently defined:

- DPSU_1: DPSU is part of a communicating device supporting Property based management.
- DPSU_2: Stand-alone DPSU device (not communicating, no microcontroller) or part of a communicating device that does not support Property based management.

“Communicating device” requires that the devices has implemented:

- one of the Common Profiles for TP1 (see 2.2 in this document), and
- one or more of the Configuration & Management Profiles (see clause 4, clause 5 and clause 6).

| | DPSU_1 | DPSU_2 |
|---|---|---|
| 1. DPSU Physical | M | M |
| 2. DPSU Management 1 | M | - |
| 3. DPSU Management 2 | - | M |

### 8.1.1 DPSU Physical

| Specification | Test |
|---|---|
| [30] - §6.3 “Communication requirements”<br>- §6.4 “Integrated TP Choke”<br>- §6.5 “Electrical Safety”<br>- §6.6 “Environmental conditions”<br>- §6.7 “EMC”<br>- §6.8 “Mechanical, Dimensions, Constructional Features”<br>- §6.9 “Electrical Features”<br>- §6.11 “Functional Safety”<br>- §6.12 “Interfaces, Connectors” | [30] - §2.10 “Testing” |

### 8.1.2 DPSU Management 1

| Specification | Test |
|---|---|
| • **Property based management** | |
| [11] - §4.3.18 “PID_PSU_TYPE (PID = 67)”<br>- §4.3.19 “PID_PSU_STATUS (PID = 68)”<br>- §4.3.20 “PID_PSU_ENABLE (PID = 69)” | |

### 8.1.3 DPSU Management 2

| Specification | Test |
|---|---|
| • **DPSU Type** | |
| [30] The nominal DPSU power supply current shall be stated in the datasheet and product database of the device. | |
| • **DPSU Status** | |
| [30] - §6.8 The current on /off status of the DPSU shall be visible on the device e.g. by means of an LED or similar | |
| • **DPSU Enable** | |
| [30] - §2.3 requirement 4 Possibility to switch off resp. to unlink the DPSU from the bus by local HMI of the device, e.g. by an electronic (parameter) or a mechanical switch | |

## 8.2 KNX USB Interface

### 8.2.1 Level 1 USB discovery and management

| | KNX USB data interface device |
|---|---|
| 1. idVendor | M |
| 2. iManufacturer | M |
| 3. MS-Windows inf-File | M |

#### 8.2.1.1 idVendor

| Specification | Test |
|---|---|
| [30] - §3.5.2 “Level 1: USB” - idVendor | |

#### 8.2.1.2 iManufacturer

| Specification | Test |
|---|---|
| [30] - §3.5.2 “Level 1: USB” - iManufacturer | |

#### 8.2.1.3 MS-Windows inf-File

| Specification | Test |
|---|---|
| [30] - §3.5.2 “Level 1: USB” – Ms-Windows inf-files | |

### 8.2.2 Level 2 bus access server discovery and management

| Feature | Supported EMI (§0) | | |
|---|---|---|---|
| | EMI1 | EMI2 | cEMI |
| 1. Device Feature Get & Response | M | M | M |
| 2. Device Feature Set | C*) | C*) | C*) |
| 3. Feature 01: Supported EMI Type | M | M | M |
| 4. Feature 02: Host Device Device Descriptor Type 0 | M | M | NA **) |
| 5. Feature 03: Bus Connection Status | M | M | M |
| 6. Feature 04: KNX Manufacturer Code | M | M | M |
| 7. Feature 05: Active EMI Type | C***) | C***) | C***) |

*) At least one EMI Type shall be implemented.

**) Feature is not available (not allowed) for Bus Access Server with only cEMI interface.

***) This feature is mandatory if more than one EMI type is supported.

#### 8.2.2.1 Device Feature Get

| | Specification | Test |
|---|---|---|
| [30] | - §3.5.3 “Level 2: bus access server”<br>- §3.5.3.2 “Device feature services” | |

#### 8.2.2.2 Device Feature Set

| | Specification | Test |
|---|---|---|
| [30] | - §3.5.3 “Level 2: bus access server”<br>- §3.5.3.2 “Device feature services” | |

#### 8.2.2.3 Feature 01: EMI type

| | Specification | Test |
|---|---|---|
| [30] | - §3.5.3 “Level 2: bus access server”<br>- §3.5.3.3 “Device features”<br>- §3.5.3.3.2 “Feature Supported EMI type”” | |

#### 8.2.2.4 Feature 02: Host Device Device Descriptor Type 0

| | Specification | Test |
|---|---|---|
| [30] | - §3.5.3 “Level 2: bus access server”<br>- §3.5.3.3 “Device features”<br>- §3.5.3.3.3 “Host Device Descriptor Type 0” | |

#### 8.2.2.5 Feature 03: Bus Connection Status

| | Specification | Test |
|---|---|---|
| [30] | - §3.5.3 “Level 2: bus access server”<br>- §3.5.3.3 “Device features”<br>- §3.5.3.3.4 “Bus connection status” | |

#### 8.2.2.6 Feature 04: KNX Manufacturer Code

| Specification | | Test |
|---|---|---|
| [30] | - §3.5.3 “Level 2: bus access server”<br>- §3.5.3.3 “Device features”<br>- §3.5.3.3.5 “KNX manufacturer code” | |

#### 8.2.2.7 Feature 05: Active EMI Type

| Specification | | Test |
|---|---|---|
| [30] | - §3.5.3 “Level 2: bus access server”<br>- §3.5.3.3 “Device features”<br>- §3.5.3.3.6 “Active EMI-type” | |

### 8.2.3 Level 3 EMI: protocol and device management

#### 8.2.3.1 General

| Feature | KNX USB data interface device |
|---|---|
| 1. EMI1 | C *) |
| 2. EMI2 | C *) |
| 3. cEMI | C *) |

*) At least one EMI Type shall be implemented.
It’s strongly recommended that future devices use only cEMI.

##### 8.2.3.1.1 EMI1

| Specification | | Test |
|---|---|---|
| [15] | - §2 “Message format” – EMI1 specifications<br>- §3 “EMI1 and EMI2” – EMI1 specifications | |

##### 8.2.3.1.2 EMI2

| Specification | | Test |
|---|---|---|
| [15] | - §2 “Message format” – EMI2 specifications<br>- §3 “EMI1 and EMI2” – EMI2 specifications | |

##### 8.2.3.1.3 cEMI

| Specification | | Test |
|---|---|---|
| [15] | - §4 “cEMI” | |

### 8.2.3.2 EMI1 – details on EMI protocol and local device management

EMI1 supposes

- the support of EMI1 as specified in [15] (including layer access management), and
- a local device management model according BCU 1, as specified in [12] (procedures indicated with LEmi1).

### 8.2.3.3 EMI2 – details on EMI protocol and local device management

EMI2 supposes

- the support of EMI2 as specified in [15] (including layer access management), and
- a local device management model according BCU 2, as specified in [12] (procedures indicated with LEmi2).

### 8.2.3.4 Common EMI – details on EMI protocol and local device management

| | Type 1 [25] |
|---|---|
| 1. L_Data Services | M |
| 1.1 Non-selective L2-acknowledge for multicast messages | O [26] |
| 2. L_Poll_Data Service | O |
| 3. L_Raw Services: | |
| 3.1 L_Raw.req/con | O |
| 3.2 L_Raw.ind | O |
| 3.3 L_Busmon.ind | M |
| 4. Transport Layer Interface | O |
| 5. LL Messages Additional Information: | |
| 5.1 PL-Media Information | C [27] |
| 5.2 RF-Media Information | C [28] |
| 5.3 Busmonitor Status Info (§4.1.5.7.6 in [15]) | M |
| 5.3.1 frame error flag | O |
| 5.3.2 bit error flag | O |
| 5.3.3 parity error flag | O |
| 5.3.4 Lost-flag | M |
| 5.3.5 sequence number | M |
| 5.4 Timestamp Relative | C [29] |
| 5.4.1 Time Stamp Relative | C1 |
| 5.4.2 Extended Time Stamp Relative | C1 |
| 5.5 Time Delay, until sending | O |

[25] Column “Type 1” shows the minimal (M) and optional (O) requirements for a KNX Bus Access Server in a KNX USB Interface supporting the cEMI External Message.

[26] This means that for multicast communication, there is no Group Address Table evaluation for frame acknowledgement. Multicast messages are acknowledges regardless of the Destination Address but still according the other frame acknowledgement conditions (frame correctness, ack_request flag, …)

[27] Mandatory if the KNX USB Bus Access Device is an interface to PL media; not applicable for an interface device to/from twisted pair media.

[28] Mandatory if the KNX USB Bus Access Device is an interface to the RF media; not applicable for an interface device to/from twisted pair media.

[29] This Additional Information Field is mandatory for the L_Busmon.ind service.

 

| | Type 1 [25)] |
|---|---|
| 6. Local Device Management Services: | |
| 6.1 M_PropRead | M |
| 6.2 M_PropWrite | C [30)] |
| 6.3 M_PropInd | O |
| 6.4 M_Reset.req | M |
| 6.5 M_Reset.ind | M |
| 7. Device Object: | |
| 7.1 Property 1: PID_OBJECT_TYPE | M |
| 7.2 Property 2: PID_OBJECT_NAME | O |
| 7.3 Property 8: PID_SERVICE_CONTROL | O |
| 7.4 Property 9: PID_FIRMWARE_REVISION | O |
| 7.5 Property 11: PID_SERIAL_NUMBER | O |
| 7.6 Property 12: PID_MANUFACTURER_ID | M |
| 7.7 Property 14: PID_DEVICE_CONTROL | O |
| 7.8 Property 15: PID_ORDER_INFO | O |
| 7.9 Property 16: PID_PEI_TYPE | O |
| 7.10 Property 17: PID_PORT_CONFIGURATION | O |
| 7.11 Property 18: PID_POLL_GROUP_SETTINGS | O |
| 7.12 Property 19: PID_MANUFACTURER_DATA | O |
| 7.13 Property 21: PID_DESCRIPTION | O |
| 7.14 Property 25: PID_VERSION | O |
| 7.15 Property 51: PID_ROUTING_COUNT | O |
| 7.16 Property 52: PID_MAX_RETRY_COUNT | O |
| 7.17 Property 53: PID_ERROR_FLAGS | O |
| 7.18 Property 54: PID_PROGMODE | O |
| 7.19 Property 55: PID_PRODUCT_ID | O |
| 7.20 Property 56: PID_MAX_APDULENGTH | O |
| 7.21 Property 57: PID_SUBNET_ADDR | O |
| 7.22 Property 58: PID_DEVICE_ADDR | O |
| 7.23 Property 70: PID_DOMAIN_ADDRES | O |
| 7.24 Property 71: PID_IO_LIST | C [31)] |
| 8. cEMI Server Object | M |
| 8.1 Property 1: PID_OBJECT_TYPE | M |
| 8.2 Property 2: PID_OBJECT_NAME | O |
| 8.2 Property 51: PID_MEDIUM_TYPE | M |
| 8.3 Property 52: PID_COMM_MODE | M |
| 8.4 Property 53: PID_MEDIUM_AVAILABILITY | O |
| 8.5 Property 54: PID_ADD_INFO_TYPES | O |
| 8.6 Property 56: PID_TRANSP_ENABLE | O |
| 9. Router Object | O |
| 10. LTE Address Filter Table Object | O |
| 11. … | |

8.2.3.4.1 L_Data services

| Specification | Test |
|---|---|
| [15] - §4.1.5.3 “L_Data services” | |

[30)] Mandatory if any cEMI server management feature is changeable from cEMI client; else not applicable.

[31)] Mandatory if cEMI server has more Interface Objects than the Device and the cEMI Server Object.

8.2.3.4.2 L_Poll_Data service

| Specification | Test |
|---|---|
| [15] - §4.1.5.6 “L_Poll_Data service” | |

8.2.3.4.3 L_Raw services

| Specification | Test |
|---|---|
| [15] - §4.1.5.7 “L_Raw service” | |

8.2.3.4.4 Transport Layer interface

| Specification | Test |
|---|---|
| [15] - §4.1.6 “Transport Layer messages” | |

8.2.3.4.5 LL messages additional information

| Specification | Test |
|---|---|
| [15] - §4.1.4.3 “Additional information” | |

8.2.3.4.6 Local device management services

| Specification | Test |
|---|---|
| [15] - §4.1.7 “Services for local device management” | |

8.2.3.4.7 Device Object

| Specification | Test |
|---|---|
| [11] - §4.3 “Device Object” a) | |
| [15] - §4.2.2.2 “Device Object” a) | |
| a) This is the specification of the Properties in the Device Object. For the mandatory and optional Properties for the Device Object in the cEMI Server, please refer to 8.2.3.4. | |

8.2.3.4.8 cEMI Server Object

| Specification | Test |
|---|---|
| [11] - §4.6 “cEMI Server Object” a) | |
| [15] - §4.2.2.4 “cEMI Server Object” a) | |
| a) This is the specification of the Properties in the cEMI Server Object. For the mandatory and optional Properties for the cEMI Server Object in the cEMI Server, please refer to 8.2.3.4. | |

8.2.3.4.9 Router Object

| Specification | Test |
|---|---|
| [11] - §4.4 “Router Object” | |
| [15] - §4.2.2.5 “Address Filtering” | |

8.2.3.4.10 LTE Routing Table Object

| Specification | Test |
|---|---|
| [11] - §4.5 “LTE Address Routing Table Object” | |
| [15] - §4.2.2.5 “Address Filtering” | |

# 9 Management Client

In this clause all features of a device required for usage as a Management Client will be described.

## 9.1 System tool

Existing BCUs provide a Managemebt Client implementation up to the Transport Layer. The Application Layer must be located in an external device connected via the PEI.

## 9.2 Easy configurators (Ctrl-Mode)

Easy configurators probably are located in an end device with an HMI, but can also be an easy configuration software on a e.g. PC connected via EMI to a BCU.

For all variants appear the same requirements.

### 9.2.1 Communication

#### 9.2.1.1 Overview

| | Easy Controller |
|---|---|
| 1. Medium dependent layers | |
| 2. Physical Layer general | M |
| 3. Data Link Layer general | M |
| 4. Network Layer general | M |
| 5. Application Layer – Group oriented | M |

#### 9.2.1.2 Medium dependent layers

Profiles defined in clause 3 (Profile of Medium dependent Layers) of this Volume 6 “Profiles” shall apply.

#### 9.2.1.3 Physical Layer general

| | Specification | Test |
|---|---|---|
| [05] | Contains no requirements. | None. |

#### 9.2.1.4 Data Link Layer general

| | Specification | Test |
|---|---|---|
| | • **General** | |
| [06] | - §1.1 “Functions of the Data Link Layer”<br>- §1.2 “Possible media and their impact on Layer-2”<br>- §1.3 “Objective” | tested with medium specific tests |
| | • **Individual Address / Group Address** | |
| [11] | - §1.4 “Definitions” | tested with medium specific tests |
| | • **Data Link Layer Protocol** | |
| [11] | - §3 “Data Link Layer Protocols” | tested with medium specific tests |
| | • **Parameters** | tested with medium specific tests |
| [11] | - §4 “Parameter of Layer-2” (except polling) | |

#### 9.2.1.5 Network Layer

| Specification | | Test | | |
|---|---|---|---|---|
| • **General** | | | | |
| [07] | - §1 “Overview” | | | |
| • **NPDU** | | | | |
| [07] | - §2.1 “NPDU” | [25] | - | §3 (Black Box Tests) [32)]<br>- All end devices<br>- Routers<br>- Bridge |
| | | [24] | | - RF bidirectional end device<br>- RF unidirectional sender |
| • **Parameters** | | | | |
| [07] | - §2.3 “Parameters of Network Layer”: hop_count, preferred value: 6. | | - | §3(Black Box Tests) 1)<br>- All end devices<br>- Routers<br>- Bridge |
| | | [24] | | - RF bidirectional end device<br>- RF unidirectional sender |
| • **state machine** | | | | |
| [07] | - §2.4.1 “State machine of Network Layer for normal devices” | [25] | - | §3(Black Box Tests) 1)<br>- All end devices<br>- Routers<br>- Bridge |
| | | [24] | | - RF bidirectional end device<br>- RF unidirectional sender |

### 9.2.2 Transport Layer–multicast

| Specification | | Test | | |
|---|---|---|---|---|
| • **TPDU** | | | | |
| [08] | - §1.2 “Point-to-multipoint connectionless communication mode”<br>- §3.2 “T_Data_Group-service” | [26] | - | Transport Layer Tests – multicast |

### 9.2.3 Transport Layer –connection oriented

#### 9.2.3.1 Overview

| | Easy Controller |
|---|---|
| 1. Transport Layer – broadcast | M |
| 2. Transport Layer – connection-oriented | M |
| 3. Transport Layer – connectionless | - |

[32)] System 1 or BCU 1 devices in test 3.4 (broadcast communication) may answer with routing count = 0...6.

### 9.2.3.2 Transport Layer – broadcast

| | Specification | Test |
|---|---|---|
| [08] | All requirements from the below are mandatory except for the coding of the internal service primitives.<br>- §1.3 “Point-to-point, Connectionless (Broadcast) Communication Mode<br>- §2 “TPDU”<br>- §3.4 “T_Data_Broadcast-service” | |

### 9.2.3.3 Transport Layer – connection oriented

| | Specification | Test |
|---|---|---|
| [08] | All requirements from the below are mandatory except for the coding of the internal service primitives.<br>- §1.6 “Point-to-Point, Connection-Oriented Communication Mode”“<br>- §2 “TPDU”<br>- §3.7 “T_Connect Service”<br>- §3.8 “T_Disconnect Service”<br>- §3.9 “T_Data_Connected Service”<br>- §4 “Parameters of Transport Layer”<br>- §5.1 “States”<br>- §5.2 “Actions”<br>- §5.3.1 “Style 1” | |

### 9.2.3.4 Transport Layer – connectionless

| | Specification | Test |
|---|---|---|
| [08] | All requirements from the below are mandatory except for the coding of the internal service primitives.<br>- §1.5 “Point-to-Point, Connectionless Communication Mode”<br>- §2 “**TPDU**”<br>- §3.6 “T_Data_Individual” | |

#### 9.2.3.5 Application Layer – Group Oriented

| Specification | Test |
|---|---|
| [09] • **APDU**<br>- §2 “APDU”<br>- §3.1.2 “A_GroupValue_Read-service”<br>- §3.1.3 “A_GroupValue_Write-service”<br>All service primitives shall be supported.<br>• **Data length**<br>- §3.1 “Application Layer Services on Multicast Communication Mode”: data shall be encoded as specified in this clause. | [28] - All end devices<br>- Routers<br>- Bridge<br>[24] - RF bidirectional end device<br><br>[28] - All end devices<br>- Routers<br>- Bridge<br>[24] - RF bidirectional end device |
| • **Connection Codes**<br>Datapoint Types shall comply with the used Connection Codes. | 8/?/? Testing of Connection Codes)<br>[24] - RF bidirectional end device |

### 9.2.4 Individual address client

| | Easy Controller |
|---|---|
| 1. IA Programming Mode client | M |
| 2. IA Serial Number client | M |
| 3. IA Check Layer-7 | M |
| 4. IA unload | M [a)] |
| [a)] Not mandatory if the function for resetting devices to factory state is not provided. | |

* One of the possibilities is mandatory.

#### 9.2.4.1 IA Programming Mode client

| Specification | Test |
|---|---|
| [11] • **Address range, SNA**<br>- §3.3 “Individual Addresses” | |
| [12] • **Address setting**<br>- §2.2 “NM_IndividualAddress_Read”<br>- §2.3 “NM_IndividualAddress_Write” | |

#### 9.2.4.2 IA serial number client

| Specification | Test |
|---|---|
| [11] • **Address range, SNA**<br>- §3.3 “Individual Addresses” | |
| [12] • **Address setting**<br>- §2.4 “NM_IndividualAddress_Serial-Number_Read”<br>- §2.5 “NM_IndividualAddress_Serial-Number_Write” | |
| [13] - §4.3 “Network Configuration Procedures”. | |

#### 9.2.4.3 IA Check Layer-7

| Specification | Test |
|---|---|
| [12] - §2.16 “NM_IndividualAddress_Check” | |

#### 9.2.4.4 IA unload

| Specification | Test |
|---|---|
| [11] • **Activation of Programming Mode**<br>- §4.19.3.4 “Usage by the Management Client” (Programming Mode Realisation Type 2) | |

### 9.2.5 Group Address check client

| | Easy Controller |
|---|---|
| 1. Group Address check | M |

#### 9.2.5.1 Group Address check

| Specification | Test |
|---|---|
| [11] • **Group Address range**<br>- §3.4 “Group Addresses” | |
| [12] • **Group Address check**<br>- §2.18.2 “NM_GroupAddress_Scan” | |

### 9.2.6 Device identification client

| | Easy Controller |
|---|---|
| 1. Device Descriptor Service – connection oriented client | M |
| 2. Device Descriptor Service – connectionless client | - |
| 3. Device Descriptor Type 0 client | M |
| 4. Device Descriptor Type 2 client | M |

#### 9.2.6.1 Device Descriptor Service – connection oriented client

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 “A_DeviceDescriptor_Read Service” | [27] §5 (Network Management Tests) |

#### 9.2.6.2 Device Descriptor Service – connectionless client

| Specification | Test |
|---|---|
| [09] - §3.4.2.1 “A_DeviceDescriptor_Read Service” | |

#### 9.2.6.3 Device Descriptor Type 0 client

| Specification | Test |
|---|---|
| [11] - §4.1.2 “Device Descriptor Type 0” | [27] - §5 (Network Management Tests) |

#### 9.2.6.4 Device Descriptor Type 2 client

| Specification | Test |
|---|---|
| [11] - §4.1.3 “Device Descriptor Type 2” | |

### 9.2.7 Link client

| | Easy Controller |
|---|---|
| 1. Connection rules | M |
| 2. Standardised link information | M |
| 3. Link Management Client | - |
| 4. Fixed DMA link client | M |
| 5. Relocatable DMA link client | M |
| 6. Group Address range | M |

#### 9.2.7.1 Connection rules

| Specification | Test |
|---|---|
| [11] • **Group Address range**<br>- §3.4 “Group Addresses”: range [C000h to DFFFh] is mandatory | |
| [13] • **Generation of linking information**<br>- 6.2 “Appendix 2: Connection Rules” | |
| [21] • **Calculation of links**<br>- E-Mode Channel Code specifications (various Chapters) | |

#### 9.2.7.2 Standardised link information

| Specification | Test |
|---|---|
| [21] • **Knowledge about connection information of the channels to be linked**<br>- E-Mode Channel Code specification (various Chapters) | |

#### 9.2.7.3 Link Management Client

| Specification | Test |
|---|---|
| [12] • **Downloading links**<br>- §3.33 “Procedures with Link Services” | |

#### 9.2.7.4 Fixed DMA link client

| | Specification | Test |
|---|---|---|
| [11] | • **Location of tables**<br>- §4.9.9.2 “Location” (GrAT – Easy 1)<br>- §4.10.6.2 “Location” (GrOAT – Easy 1) | |
| [11] | • **Writing and reading links**<br>- §4.9.9.1 “Format” (GrAT – Easy 1)<br>- §4.9.9.5 “Usage by the Management Client” (GrAT – Easy 1)<br>- §4.10.6.1 “Format” (GrOAT – Easy 1)<br>- §4.10.6.5 “Usage by Management Client” (GrOAT – Easy 1) | |

#### 9.2.7.5 Relocatable DMA link client

#### 9.2.7.6 In combination with masks 0020h and 0021h

| | Specification | Test |
|---|---|---|
| [11] | • **Location of tables**<br>- §4.10.7.2 “Location” (GrOAT – Easy 2)<br>- §4.10.8.2 “Location” (GrOAT – Easy 3) | |
| [11] | • **Writing and reading links**<br>- §4.10.7.1 “Format” (GrOAT – Easy 2)<br>- §4.10.7.5 “Usage by the Management Client” (GrOAT – Easy 2)<br>- §4.9.9.1 “Format” (GrAT – Easy 2)<br>- §4.9.9.5 “Usage by the Management Client” (GrAT – Easy 2) | |

#### 9.2.7.7 In combination with masks 0701h

| | Specification | Test |
|---|---|---|
| [11] | • **Location of tables**<br>- §4.10.8.2 “Location” (GrOAT – Easy 3)<br>- §4.10.7.2 “Location” (GrOAT – Easy 2) | |
| [11] | • **Writing and reading links**<br>- §4.9.2.1 “Format” (GrAT)<br>- §4.9.9.5 “Usage by the Management Client” (GrAT – Easy 2)<br>- §4.10.3.1 “Format”<br>- §4.10.8.5 “Usage by the Management Client” (GrOAT – Easy 3) | |

#### 9.2.7.8 Group Address range

| | Specification | Test |
|---|---|---|
| [11] | - §3.4 “Group Addresses”: range [C000h to DFFFh] is mandatory | |

## 9.2.8 Parameter client

| | Easy Controller |
|---|---|
| 1. Parameter blocks and location client | M |
| 2. Standardised parameters | M |
| 3. Reduced IO Parameter client | - |
| 4. Fixed DMA parameter client | M |
| 5. Relocatable DMA parameter client | M |

### 9.2.8.1 Parameter blocks and location client

| Specification | Test |
|---|---|
| [13] - §6.5 “Appendix 5: Structures for Parameters” | |
| [21] - E-Mode Channel Code specification (various Chapters) | |

### 9.2.8.2 Standardised parameters

| Specification | Test |
|---|---|
| [21] • **Knowledge about parameters of the channels to be connected**<br>- E-Mode Channel Code specification (various Chapters) a) | |

a) Parameters must only be known, if they are relevant for linking, e. g. adjustable parameters. Al others are optional, but when used then in the standardised formats.

### 9.2.8.3 Reduced IO parameter client

| Specification | Test |
|---|---|
| [12] • **Downloading parameter**<br>- §3.22.2 “DMP_ReducedInterfaceObject-Write_R”<br>- §3.24.3 “DMP_ReducedInterfaceObject-Read_R”<br>- §3.25.3 “DMP_ReducedInterfaceObject-Scan_R” | [27] - §2 “Network Management Server Tests” corresponding tests |
| [10] - §4.1 “Common structure”<br>- §4.3.2 “Reduced Interface Object” | [27] - §2 “Network Management Server Tests” corresponding tests |

 

#### 9.2.8.4 Fixed DMA parameter client

| Specification | Test |
|---|---|
| [11] • **Location of parameter blocks**<br>- §4.11.6 “Group Object Table – E-Mode Realisation Type 1 (GrOT – Easy 1)”<br>- §4.12.2.2 “Location” (PaBT – Easy 1) | |
| [11] • **Writing and reading parameters**<br>- §4.12.2 “Parameter Block Table – E-Mode Realisation Type 1 (PaBT – Easy 1)” | |

#### 9.2.8.5 Relocatable DMA parameter client

#### 9.2.8.6 In combination with masks 0020h and 0021h

| Specification | Test |
|---|---|
| [11] • **Location of parameter blocks**<br>- §4.11.6 “Group Object Table – E-Mode Realisation Type 1”<br>- §4.12.2.2 “Location” (PaBT – Easy 1) | |
| [11] • **Writing and reading parameters**<br>- §4.12.2 “Parameter Block Table - Easy Realisation Type 1 (PaBT – Easy 1)” | |

#### 9.2.8.7 In combination with masks 0701h

| Specification | Test |
|---|---|
| [11] • **Location of parameter blocks**<br>- §4.12.4.2 “Location” (PaBT – Easy 3) | |
| [11] • **Writing and reading parameters**<br>- §4.12.4.1 “Format” (PaBT – Easy 3)<br>- §4.21.4.4 “Usage by the Management Client” (PaBT – Easy 3) | |

### 9.2.9 Localisation

| | Easy Controller |
|---|---|
| 1. Localisation via Programming button | O |
| 2. Localisation via Localisation channel | O |
| 3. Localisation via Localisation flag L | M |

#### 9.2.9.1 Localisation via Programming Button

| Specification | Test |
|---|---|
| [12] - §2.2 “NM_IndividualAddress_Read”<br>- §2.3 “NM_IndividualAddress_Write” | [27] - 2.3 (Network Management Tests) |
| **Programming Mode Control**<br>• via HMI: device selection and indication of Programming Mode | [27] - 2.3 (Network Management Tests) |

### 9.2.9.2 Localisation via Localisation Channel

| | Specification | Test |
|---|---|---|
| [13] | - §4.2.1.3.1 “Definition and use” (Ctrl-Mode localisation)<br>- §4.2.1.3.5 “Procedure through Localisation Channels” (Ctrl-Mode localisation) | |

### 9.2.9.3 Localisation via Localisation Flag L

| | Specification | Test |
|---|---|---|
| [13] | - §4.2.1.3.1 “Definition and use” (Ctrl-Mode localisation)<br>- §4.2.1.3.5 “Procedure through Localisation Flag L (default procedure)” (Ctrl-Mode localisation) | |

 

# Annex A
(normative)

# Interface Objects and Properties in Profiles

## A.1 General requirements

### A.1.1 Minimal required Interface Objects and Properties

Please refer to [10] clause “Minimal requirements for Interface Objects” for general requirements on mandatory Interface Objects and Properties.

In the specification below, any Interface Object or any Property in an Interface Object that is not listed is optional.

EXAMPLE In the list of Interface Objects for S-Mode End-devices, the following Interface Objects are not listed, because they are not mandatory (thus optional) in any Profile.

| | |
|---|---|
| 6 | Router Object |
| 7 | LTE Address Filter Table Object |
| 8 | cEMI Server Object |
| 10 | Polling Master |
| 11 | KNXnet/IP Parameter Object |

### A.1.2 Legend

#### A.1.2.1 Data Properties

In the following, the access levels are noted as “read access level”/”write access level”. “m” denotes the read access level; n denotes the write access level.

EXAMPLE 3/0 means a read access level equal to 3 and a write access level equal to 0.

NOTE 1 The access levels to Interface Objects are specified in [10].

NOTE 2 This AN uses the access levels from 0 to 3. For the relation to access levels 0 to 15 as used in certain Profiles, please refer to [10].

**Table 3 – Legend for Data Properties**

| Symbol | Property existence | read access level | | write access level | | | | Interpetation |
|---|---|---|---|---|---|---|---|---|
| | | recom-mended | level 0, 1, 2 or 3 allowed? | recom-mended | read only allowed? | level 0 or 1 allowed? | level 2 or 3 allowed? | |
| **x** | not allowed | n/a | n/a | n/a | n/a | n/a | n/a | It is not allowed to implement this Property as Data Property. |
| **m/x** | mandatory | m | YES | read only | YES | YES | NO | The Property is mandatory. m is the recommended default read access level. The Property shall be read-only; the Property may be writeable, but only with the access levels 0 or 1. |
| **m/(n)** | mandatory | m | YES | read only | YES | YES | YES | The Property is mandatory. m is the recommended default read access level. The Property may be read-only. If the Property is writeable, then the recommended write access level is n. |
| **m/n** | mandatory | m | YES | n | NO | YES | YES | The Property is mandatory. m is the recommended default read access level and n is the recommended default write access level. |
| **(m/n)** | optional | m | YES | n | NO | YES | YES | The Property is optional. If it is implemented, then m is the recommened default read access level and n is the recommended default write access level. |
| **(m/x)** | optional | m | YES | read only | YES | YES | NO | The Property is optional. If it is implemented, then m is the recommended default read access level. The Property shall be read-only; the Property may be writeable, but only with the access levels 0 or 1. |
| **(m/(n))** | optional | m | YES | read only | YES | YES | YES | The Property is optional. If it is implemented, then m is the recommended default read access level. The Property may be writable with the recommended default access level n, but may be read-only as well. |

### A.1.2.2 Network Parameter Properties

**Table 4 – Legend for Network Parameter Properties**

| Symbol | Description |
|---|---|
| x | It is not allowed to implement this Property as Network Parameter Property. |
| R | The Property value shall be readable via A_NetworkParameter_Read |
| W | The Property value shall be writeable via A_NetworkParameter_Write |
| T | The Property value shall be transmitted using A_NetworkParameter_Write |

If a symbol is not present, then it shall not be possible to access the Network Parameter Property via the service use that it stands for.

EXAMPLE "T" stands for transmission of the Property Value through an A_NetworkParameter_Write. If in the specification tables below "T" is not listed for a Property, then it is not allowed to transmit this Property Value using the A_NetworkParameter_Write-service.

### A.1.2.3 Function Properties

**Table 5 – Legend for Function Properties**

| Symbol | Description |
|---|---|
| x | It is not allowed to implement this Property as Function Property. |
| O | It is optional to implement this Function Property. |
| M | It is mandatory to implement this Function Property. |

### A.1.2.4 A_GroupPropValue_Read, A_GroupPropValue_Write, A_GroupPropValue_InfoReport

This Appendix solely specifies Properties in System Interface Objects. The above services are only used for runtime communication and do not access system Properties.

### A.1.2.5 "Local" access ways

The specifications below solely concern "remote access", this means accessing the Property from the field bus communication medium. Properties may however also be accessed:

- in the KNXnet/IP Tunneling Server from the KNXnet/IP side, or
- in the device hosting an EMI access (EMI 1, EMI 2 or cEMI) through this EMI interface.

If there are specific permissions or restrictions concerning this local access, then this will be specified as well.

**Table 6 – Specification style for local access (EXAMPLE)**

| Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h | mask 2010h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 57 PID_SUBNET_ADDR | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x |
| | Network | O | O | O | M | M | M | O | O | O | O | O | O | O | O |
| | Local | O | O | O | M | M | M | O | O | O | O | M | M | M | O |

### A.1.2.6 Dedicated services

Some (part of) data in a KNX device may be accessible through Property Values and via dedicated services.

EXAMPLE 1 PID_SUBNET_ADDR, PID_DEVICE_ADDR via A_IndividualAddress_Write.

EXAMPLE 2 PID_DOMAIN_ADDRESS via A_DomainAddress_Write

EXAMPLE 3 PID_SERIAL_NUMBER in A_IndividualAddress_SerialNumber_Write

Regardless of the access way and the access rights, the functionality of these services for this data shall be maintained as specified in [09] without restriction.

## A.2 S-Mode Profiles – End Devices

### A.2.3 General

**Access levels for mask 0020h, 0021h and 0701h**

For the Data Properties of these masks, the indicated access level is the implemented access level. This is still the recommended access level, though it may deviate from a possible more appropriate access level.

## A.2.4 Interface Objects

S-Mode Profiles → End-devices → Interface Objects

| Interface Object | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h | mask 2010h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 Device Object | M | M | M | M | M | M | M | O | M | M | M | M | M | M |
| 1 Addresstable Object | M | M | M | M | M | M | M | O | M | M | M | M | M | O |
| 2 Association Table Object | M | M | M | M | M | M | M | O | M | M | M | M | M | O |
| 3 Applicationprogram Object | M | M | M | M | M | M | M | O | M | M | M | M | M | O |
| 9 Group Object Table Object | O | O | O | O | M | M | M | O | O | O | M | M | M | O |

## A.2.5 Device Object

S-Mode Profiles → End-devices → Device Object

| | Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h | mask 2010h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 15/x | 3/x | 3/x | 3/x | 3/x | 3/x |
| 2 | PID_OBJECT_NAME | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 8 | PID_SERVICE_CONTROL [33)] | Data | (3/3) | 3/0 | 3/0 | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (15/1) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 9 | PID_FIRMWARE_REVISION | Data | (3/x) | 3/x | 3/x | 3/x | (3/x) | (3/x) | (3/x) | (3/x) | (15/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 11 | PID_SERIAL_NUMBER [34)] | Data | 3/x | 3/x | 3/0 | 3/(3) | (3/x) | (3/x) | (3/x) | (3/x) | 15/x | 3/x | 3/x | 3/x | 3/x | (3/x) |
| 12 | PID_MANUFACTURER_ID | Data | (3/x) | 3/x | 3/0 | 3/(3) | 3/x | 3/x | 3/x | 3/x | 15/x | 3/(1) | 3/x | 3/x | 3/x | (3/x) |
| 14 | PID_DEVICE_CONTROL | Data | 3/3 | 3/0 | 3/0 | 3/3 | (3/3) | (3/3) | (3/3) | 3/3 | 15/1 | 3/3 | 3/3 | 3/3 | 3/3 | (3/3) |
| 15 | PID_ORDER_INFO | Data | (3/3) | 3/x | 3/0 | (3/3) | (3/x) | (3/x) | (3/x) | (3/3) | (15/x) | (3/3) | 3/x | 3/x | 3/x | (3/3) |
| 16 | PID_PEI_TYPE [35)] | Data | (3/x) | 3/x | 3/x | 3/3 | (3/x) | (3/x) | (3/x) | (3/3) | (15/x) | (3/3) | 3/x | 3/x | 3/x | (3/3) |
| 17 | PID_PORT_CONFIGURATION | Data | (3/3) | 3/0 | 3/0 | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 18 | PID_POLL_GROUP_SETTINGS [36)] | Data | (3/3) | 3/0 | 3/0 | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 19 | PID_MANUFACTURER_DATA | Data | (3/3) | 3/x | 3/0 | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (15/x) | (3/3) | (3/x) | (3/x) | (3/x) | (3/3) |
| 21 | PID_DESCRIPTION | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 25 | PID_VERSION | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/x) | (3/x) | (3/x) | (3/3) | (3/3) | (3/3) | 3/x | 3/x | 3/x | (3/3) |
| 51 | PID_ROUTING_COUNT | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 | 3/3 | (3/3) |

33) PID_SERVICE_CONTROL is a bitfield of which not all fields have to be supported. For the specification of which Profile shall support which field, please refer to A.2.5.1.

34) The optional support of PID_SERIAL_NUMBER is only allowed if the AL services A_IndividualAdressSerialNumber_Write, _Read and _Response are supported too.

35) PID_PEI_TYPE is mandatory for devices with PEI and supporting Properties.

36) PID_POLL_GROUP_SETTINGS is mandatory for all devices that support Fast Polling.

36) PID_POLL_GROUP_SETTINGS is mandatory for all devices that support Fast Polling.

| Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h | mask 2010h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 52 PID_MAX_RETRY_COUNT | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 | 3/3 | (3/3) |
| 53 PID_ERROR_FLAGS | Data | (3/3) | (3/3) | (3/3) | 3/3 | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 54 PID_PROG_MODE | Data | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 | 3/3 | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 | 3/3 | (3/3) |
| 55 PID_PRODUCT_ID | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 56 PID_MAX_APDU_LENGTH [37)] | Data | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] | 3/x[37] |
| 57 PID_SUBNET_ADDR [38)] | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | 3/0[39] | 3/0[39] | 3/0[39] | (3/x) |
| | NwPar | x | x | x | x | W | W | W | x | x | x | x | x | x | x |
| 58 PID_DEVICE_ADDR | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | 3/0[39] | 3/0[39] | 3/0[39] | (3/x) |
| 62 PID_OBJECT_VALUE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 63 PID_OBJECTLINK | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 65 PID_PARAMETER | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 66 PID_OBJECT_ADDRESS | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 70 PID_DOMAIN_ADDRESS [40)] | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 | (3/3) | 3/3 | (3/3) |
| 72 PID_MGT_DESCRIPTOR_01 | Data | (3/x) | (3/x) | (3/x) | (3/x) | 3/x | 3/x | 3/x | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 73 PID_PL110_PARAM | Data | X | X | X | X | X | X | X | X | X | X | 3/3[41] | 3/3[41] | 3/3[41] | X |
| 75 PID_RECEIVE_BLOCK_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3)[42] |
| 76 PID_RANDOM_PAUSE_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3)[42] |

37) PID_MAX_APDU_LENGTH is mandatory for devices that support long frames.

38) This property shall not be writeable from the bus side with A_PropertyValue_Write. It may be writeable from the bus side through A_NetworkParameter_Write.

39) Mandatory for devices with an External Message Interface. Not allowed for devices without External Message Interface.

40) Mandatory for devices on open media with an EMI1 or EMI2 message interface.

41) PID_PL110_PARAM is mandatory for PL110 devices. It is not allowed on devices on any other communication medium.

42) Mandatory in BiBat Slave.

| Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h | mask 2010h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77 PID_RECEIVE_BLOCK_NR | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3)[42] |
| 78 PID_HARDWARE_TYPE | Data | (3/1) | (3/1) | (3/1) | 3/(1) | (3/1) | (3/1) | (3/1) | (3/1) | (3/1) | 3/1 | (3/1) | (3/1) | (3/1) | (3/1) |
| 79 PID_RETRANSMITTER_NUMBER | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3)[43] |
| 80 PID_SERIAL_NR_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3)[43] |
| 81 PID_BIBATMASTER_ADDRESS | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3)[42] |
| 85 PID_GROUP_TELEGR_RATE_LIMITATION_TIME_BASE [44)] | | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) |
| 86 PID_GROUP_TELEGR_RATE_LIMITATION_NO_OF_TELEGR [44)] | | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) | (3/(3)) |

43) Mandatory in BiBat Retransmitter.

44) Group telegram rate limitation functionality via Properties is an optional feature for devices. But if implemented both Properties “group telegram rate limitation time base” and “group telegram rate limitation number of telegrams” must be implemented.

### A.2.5.1 PID_SERVICE_CONTROL (PID = 8)

S-Mode Profiles → End-devices → Device Object → PID_SERVICE_CONTROL

| | | System 2 | | | | Suystem 3.0 | | BIM M112 | | System B | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | BCU 2 | | ? | | | | | | | | |
| Bit# | Bit function | | mask 0020h | mask 0021h | mask 0025h | mask 0300h | mask 2300h | mask 0700h | mask 0701h | mask 07B0h | mask 17B0h | mask 2010h | mask 2110h |
| 00 | User Stopped_ServiceInfo Enable | O | M | M | M | M | M | O | O | O | O | O | O |
| 01 | OwnIndividual AddressReceived_ServiceInfo Enable | O | M | M | M | M | M | O | O | O | O | O | O |
| 02 | IndividualAddress_Write Enable | O | M | M | M | M | M | O | O | M | M | O | O |
| 03 | Reserved | O | O | O | O | O | O | O | O | O | O | O | O |
| 04 | Reserved | O | O | O | O | O | O | O | O | O | O | O | O |
| 05 | Reserved | O | O | O | O | O | O | O | O | O | O | O | O |
| 06 | Reserved | O | O | O | O | O | O | O | O | O | O | O | O |
| 07 | Reserved | O | O | O | O | O | O | O | O | O | O | O | O |
| 08 | Application Interface Layer Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |
| 09 | Link Layer Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |
| 10 | Network Layer Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |
| 11 | Transport Layer Group Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |
| 12 | Switch Service-Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |
| 13 | Transport Layer Connection Oriented Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |
| 14 | Application Layer Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |
| 15 | Management Services on EMI Disable | O | M | M | M | O | O | O | O | O | O | O | O |

### A.2.5.2 PID_ERROR_FLAGS (PID = 53)

S-Mode Profiles → End-devices → Device Object → PID_ERROR_FLAGS

| | | Suystem 300 | |
|---|---|---|---|
| Bit# | Bit function | mask 0300h | mask 2300h |
| 0 | System 1 | M | M |
| 1 | App | M | M |
| 2 | EEPROM | M | M |
| 3 | Stack | M | M |
| 4 | Table Error | M | M |
| 5 | Trans | M | M |
| 6 | System 2 | M | M |
| 7 | System 3 | x | x |

Bits that are not supported shall have the default value as specified in [11].

## A.2.6 Group Address Table Object (Object Type = 1)

S-Mode Profiles → End-devices → Group Address Table Object

| | Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 15/x | 3/x | 3/x | 3/x | 3/x |
| 2 | PID_OBJECT_NAME | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 5 | PID_LOAD_STATE_CONTROL | Data | 3/3 | 3/1 | 3/1 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 15/2 | 3/3 | 3/(3) | 3/(3) | 3/(3) |
| 7 | PID_TABLE_REFERENCE | Data | 3/x | 3/x | 3/x | 3/x | x | x | x | 3/3 | 15/x | 3/3 | 3/x | 3/x | 3/x |
| 23 | PID_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 | 3/3 | (3/3) | (3/3) | (3/3) | 3/(3) | 3/(3) | 3/(3) |
| 27 | PID_MCB_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/x) | (3/3) | (3/3) | (3/3) |
| 28 | PID_ERROR_CODE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 53 | PID_GROUP_RESPONDER_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/3[45] | 3/3[45] | 3/3[45] |

[45] This Property is mandatory for PL110 devices. For all other media, this Property shall not be implemented.

### A.2.6.1 PID_LOAD_STATE_CONTROL (PID = 5)

**Table 7 – Required Load Controls**

| | | | System 2 | | | | Syystem 300 | | System 7 | | | System B | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | BCU 2 | | | | | BIM M112 | | | | | | |
| **Load Control** | **Sub-type** | **Description** | | mask 0020h | mask 0021h | mask 0025h | mask 0300h | mask 2300h | mask 0700h | mask 0701h | mask 0705h | mask 07B0h | mask 17B0h | mask 2010h | mask 2110h |
| 00h | | No operation | ? | ? | ? | ? | ? | ? | O | O | O | ? | ? | ? | ? |
| 01h | | Start Loading | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 02h | | Load Completed | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 03h | | Additional Load Controls | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| | 00h | Absolute Code/Data Allocation | M | M | M | M | M [46)] | M [46)] | O | M | M | O | O | O | O |
| | 01h | Absolute Stack Allocation | | | | | M [46)] | M [46)] | | | | | | | |
| | **02h** | **Segment Control Record** | M | M | M | M | M [46)] | M [46)] | O | M | M | O | O | O | O |
| | **03h** | **Task Pointer Record** | M | M | M | M | M [46)] | M [46)] | O | M | M | O | O | O | O |
| | **04h** | **Task Control Record-1** | M | M | M | M | M [46)] | M [46)] | O | M | M | O | O | O | O |
| | **05h** | **Task Control Record-2** | M | M | M | M | M [46)] | M [46)] | O | M | M | O | O | O | O |
| | 0Ah | Relative Allocation | ? | ? | ? | ? | M | ? | ? | ? | ? | ? | ? | ? | ? |
| | 0Bh | Data Relative Allocation | ? | ? | ? | ? | ? | ? | ? | ? | ? | M | M | ? | ? |
| 04h | | Unload | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |

[46)] The Additional Load Controls are only required if Additional Data shall be downloaded.

NOTE Table 7 specifies globally for the device which Load Controls shall be supported. Which Load Controls shall be supported for the management of a specific Resource is specified in the (Realisation Type of) the Resource in [11].

### A.2.6.2 PID_LOAD_STATE_CONTROL (PID = 5)

Please refer to A.2.6.1.

## A.2.7 Association Table Object (Object Type = 2)

S-Mode Profiles → End-devices → Association Table Object

| Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 15/x | 3/x | 3/x | 3/x | 3/x |
| 2 PID_OBJECT°NAME | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 5 PID_LOAD_STATE_CONTROL | Data | 3/3 | 3/1 | 3/1 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 15/2 | 3/3 | 3/(3) | 3/(3) | 3/(3) |
| 7 PID_TABLE_REFERENCE | Data | 3/x | 3/x | 3/x | 3/x | (3/3) | (3/3) | (3/3) | 3/3 | 15/x | 3/3 | 3/x | 3/x | 3/x |
| 23 PID_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 | 3/3 | (3/3) | (3/3) | (3/3) | 3/(3) | 3/(3) | 3/(3) |
| 27 PID_MCB_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 28 PID_ERROR_CODE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/x) | (3/x) | (3/x) |

### A.2.7.1 PID_LOAD_STATE_CONTROL (PID = 5)

Please refer to A.2.6.1.

## A.2.8 Applicationprogram Object (Object Type = 3)

S-Mode Profiles → End-devices → Application Object

| Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B [47] | mask 07B0h | mask 17B0h | mask 2010h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x | 15/x | 3/x | 3/x | 3/x | 3/x | (3/x) |
| 2 PID_OBJECT_NAME | Data | (3/3) | (3/0) | (3/0) | (3/3) | (3/(3)) | (3/(3)) | (3/(3)) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 5 PID_LOAD_STATE_CONTROL | Data | 3/3 | 3/0 | 3/0 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 15/1 | 3/3 | 3/3 | 3/3 | 3/3 | (3/3) |
| 6 PID_RUN_STATE_CONTROL | Data | 3/3 | 3/0 | 3/0 | 3/3 | 3/3[48] | 3/3[48] | 3/3[48] | 3/3 | 15/1 | 3/3 | (3/3) | (3/3) | (3/3) | (3/3) |
| 7 PID_TABLE_REFERENCE | Data | 3/x | 3/x | 3/x | 3/x | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | 3/x | 3/x | 3/x | (3/x) |
| 13 PID_PROGRAM_VERSION | Data | (3/3) | 3/(x) | 3/(0) | 3/(3) | 3/(3) | 3/(3) | 3/(3) | 3/(3) | 15/x | 3/(3) | 3/3 | 3/3 | 3/3 | (3/3) |
| 16 PID_PEI_TYPE | Data | (3/3) | 3/(0) | 3/(0) | 3/(3) | (3/(3)) | (3/(3)) | (3/(3)) | 3/(3) | 15/(1) | 3/(3) | 3/3 | 3/3 | 3/3 | (3/3) |
| 27 PID_MCB_TABLE | Data | (3/3) | (3/0) | (3/0) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 28 PID_ERROR_CODE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 51 PID_PARAM_REFERENCE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x)[49] | (3/x)[49] | (3/x)[49] | (3/x) | (3/x) | (3/x) | (3/x) |

### A.2.8.1 PID_LOAD_STATE_CONTROL (PID = 5)

Please refer to A.2.6.1.

[47] System B foresees two Application Programs; this table is valid for the Interface Objects of Application Program 1 and Application Program 2.

[48] May be read-only for devices without loadable application (executable code)

[49] Only mandatory for system 7 Easy Controller implementations

### A.2.8.2 PID_RUN_STATE_CONTROL (PID = 6)

| | | System 2 | | | | Suystem 300 | | BIM M112 | | System B | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | BCU 2 | | ? | | | | | | | | |
| **Run Control** | **Description** | | mask 0020h | mask 0021h | mask 0025h | mask 0300h | mask 2300h | mask 0700h | mask 0701h | mask 07B0h | mask 17B0h | mask 2010h | mask 2110h |
| 00h | No operation | ? | ? | ? | ? | ? | ? | O | O | O | ? | ? | ? |
| 01h | Restart | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 02h | Stop | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |

## A.2.9 Interfaceprogram Object (Object Type = 4)

S-Mode Profiles → End-devices → Interfaceprogram Object

| | Property | | System 2 | mask 0020h | mask 0021h | mask 0025h | System 300 | mask 0300h | mask 2300h | System 7 | mask 0701h | mask 0705h | System B | mask 07B0h | mask 17B0h | mask 2010h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (15/x) | (3/x) | 3/x | 3/x | 3/x | (3/x) |
| 5 | PID_LOAD_STATE_CONTROL | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (15/1) | (3/3) | 3/(3) | 3/(3) | 3/(3) | (3/3) |
| 6 | PID_RUN_STATE_CONTROL | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (15/1) | (3/3) | 3/(3) | 3/(3) | 3/(3) | (3/3) |
| 7 | PID_TABLE_REFERENCE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | 3/x | 3/x | 3/x | (3/x) |
| 13 | PID_PROGRAM_VERSION | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (15/x) | (3/3) | 3/3 | 3/3 | 3/3 | (3/3) |
| 16 | PID_PEI_TYPE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/(3) | 3/(3) | 3/(3) | (3/3) |
| 27 | PID_MCB_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 28 | PID_ERROR_CODE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |

### A.2.9.1 PID_LOAD_STATE_CONTROL (PID = 5)

Please refer to A.2.6.1.

### A.2.9.2 PID_RUN_STATE_CONTROL (PID = 6)

Please refer to A.2.8.2.

## A.2.10 Group Object Table Object (Object Type = 9)

S-Mode Profiles → End-devices → Group Object Table Object

| Property | | System 300 | mask 0300h | mask 2300h | System B | mask 07B0h | mask 17B0h |
|---|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x |
| 2 PID_OBJECT_NAME | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 5 PID_LOAD_STATE_CONTROL | Data | 3/(3) | 3/(3) | 3/(3) | 3/(3) | 3/(3) | 3/(3) |
| 7 PID_TABLE_REFERENCE | Data | x | x | x | 3/x | 3/x | 3/x |
| 23 PID_TABLE | Data | x | x | x | 3/(3) | 3/(3) | 3/(3) |
| 27 PID_MCB_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 28 PID_ERROR_CODE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 51 PID_GRP_OBJTABLE | Data | 3/3 | 3/3 | 3/3 | (3/3) | (3/3) | (3/3) |
| 52 PID_EXT_GRPOBJREFERENCE | Data | 3/(3) | 3/(3) | 3/(3) | (3/3) | (3/3) | (3/3) |

## A.3 S-Mode Profiles – Interfaces and Couplers

### A.3.11 Interface Objects

S-Mode Profiles → Interface and Couplers → Interface Objects

| Interface Object | mask 0912h | mask 1900h | mask 091Ah | RF retransmitter | RF media coupler | **cEMI server** | cEMI server on TP | cEMI server RF asynchr. | cEMI server asynch. & BiBat |
|---|---|---|---|---|---|---|---|---|---|
| 0 Device Object | M | O | M | ? | ? | O | M | M | M |
| 1 Addresstable Object | O | O | O | ? | ? | O | O | O | O |
| 2 Associationtable Object | O | O | O | ? | ? | O | O | O | O |
| 3 Applicationprogram Object | O | O | O | ? | ? | O | O | O | O |
| 4 Interfaceprogram Object | O | O | O | ? | ? | O | O | O | O |
| 6 Router Object | M | O | M | ? | ? | O | O | O | O |
| 7 LTE Address Routing Table Object | M | O | M | ? | ? | O | O | O | O |
| 8 cEMI Server Object | O | O | O | ? | ? | M | M | M | M |
| 9 Group Object Table Object | O | O | O | ? | ? | O | O | O | O |
| 10 Polling Master | O | O | O | ? | ? | O | O | O | O |
| 11 KNXnet/IP Parameter Object [50] | O | O | M | O | O | O | O | O | O |

[50)] The KNXnet/IP Parameter Object is mandatory if there is a KNXnet/IP interface.

## A.3.12 Device Object (Object Type = 0)

S-Mode Profiles → Interface and Couplers → Device Object

| | Property | | mask 0912h | mask 091Ah | cEMI server on TP | cEMI server RF asynchr. | cEMI server asynch. & BiBat |
|---|---|---|---|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x |
| 8 | PID_SERVICE_CONTROL [51] | Data | (3/0) | (3/0) | (3/0) | (3/0) | (3/0) |
| 9 | PID_FIRMWARE_REVISION | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 11 | PID_SERIAL_NUMBER [52] | Data | 3/(0) | 3/(0) | (3/0) | (3/0) | (3/0) |
| 12 | PID_MANUFACTURER_ID | Data | 3/(0) | 3/0 | 3/0 | 3/0 | 3/0 |
| 14 | PID_DEVICE_CONTROL [53] | Data | 3/0 | 3/0 | (3/0) | (3/0) | (3/0) |
| 15 | PID_ORDER_INFO | Data | (3/(0)) | (3/0) | (3/0) | (3/0) | (3/0) |
| 19 | PID_MANUFACTURER_DATA | Data | (3/0) | (3/0) | (3/0) | (3/0) | (3/0) |
| 51 | PID_ROUTING_COUNT | Data | 3/0 | 3/0 | (3/0) | (3/0) | (3/0) |
| 53 | PID_ERROR_FLAGS | Data | (3/0) | (3/0) | (3/0) | (3/0) | (3/0) |
| 54 | PID_PROGMODE | Data | (3/0) | (3/0) | (3/0) | (3/0) | (3/0) |
| 56 | PID_MAX_APDU_LENGTH [54]) | Data | 3/x[54] | 3/x[54] | 3/x[54] | 3/x[54] | 3/x[54] |

51) PID_SERVICE_CONTROL is a bit field of which not all fields have to be supported. For the specification of which Profile shall support which field, please refer to A.3.12.1.

52) The implementation of PID_SERIAL_NUMBER is subject to the conditions specified for the KNX Serial Number in Chapter 3/5/1 “Resources”.

53) PID_DEVICE_CONTROL is a bit field of which not all fields have to be supported. For the specification of which Profile shall support which field, please refer to A.3.12.2.

54) This Property is mandatory for implementations provided after December 2006.

| Property | | mask 0912h | mask 091Ah | cEMI server on TP | cEMI server RF asynchr. | cEMI server asynch. & BiBat |
|---|---|---|---|---|---|---|
| 57 PID_SUBNET_ADDR | Data | (3/x) | (3/x) | (3/x)[55] | (3/x)[55] | (3/x)[55] |
| | NwPar | RW | RW | (RW) | (RW) | (RW) |
| 58 PID_DEVICE_ADDR | Data | (3/x) | 3/x | (3/x)[55] | (3/x)[55] | (3/x)[55] |
| | NwPar | RW | RW | (RW) | (RW) | (RW) |
| 71 PID_IO_LIST | Data | (3/0) | 3/0 | (3/0)[56] | (3/0)[56] | (3/0)[56] |
| 75 PID_RECEIVE_BLOCK_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 76 PID_RANDOM_PAUSE_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 77 PID_RECEIVE_BLOCK_NR | Data | (3/x) | (3/x) | (3/x) | (3/x) | 3/x |
| 78 PID_HARDWARE_TYPE | Data | (3/1) | (3/1) | (3/1) | (3/1) | (3/1) |
| 80 PID_SERIAL_NR_TABLE | Data | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 81 PID_BIBAT_MASTER_ADDRESS | Data | (3/3) | (3/3) | (3/3) | (3/3) | 3/3 |
| 82 PID_RF_DOMAIN_ADDRESS [57] | Data | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 |
| 83 PID_DEVICE_DESCRIPTOR | Data | (3/0) | 3/0 | (3/0) | (3/0) | (3/0) |

55) This Property is mandatory for a cEMI Server with an own Individual Address, this is, on media with a time critical L2-ACK as TP1.

56) This Property is mandatory if the cEMI server has more Interface Objects than only Device Object and the cEMI Server Object.

57) PID_RF_DOMAIN_ADDRESS is mandatory if the cEMI server supports the RF medium.

### A.3.12.1 PID_SERVICE_CONTROL (PID = 8)

S-Mode Profiles → Interface and Couplers → Device Object → PID_SERVICE_CONTROL

| Bit# | Bit function | mask 0912h | mask 091Ah | cEMI server on TP | cEMI server RF asynchr. | cEMI server asynch. & BiBat |
|---|---|---|---|---|---|---|
| 00 | User Stopped_ServiceInfo Enable | X | X | | | |
| 01 | OwnIndividual AddressReceived_ServiceInfo Enable | M | M | | | |
| 02 | IndividualAddress_Write Enable | M | M | | | |
| 03 | Reserved | X | X | | | |
| 04 | Reserved | X | X | | | |
| 05 | Reserved | X | X | | | |
| 06 | Reserved | X | X | | | |
| 07 | Reserved | X | X | | | |
| 08 | Application Interface Layer Services on EMI Disable | X | X | | | |
| 09 | Link Layer Services on EMI Disable | X | X | | | |
| 10 | Network Layer Services on EMI Disable | X | X | | | |
| 11 | Transport Layer Group Services on EMI Disable | X | X | | | |
| 12 | Switch Service-Services on EMI Disable | X | X | | | |
| 13 | Transport Layer Connection Oriented Services on EMI Disable | X | X | | | |
| 14 | Application Layer Services on EMI Disable | X | X | | | |
| 15 | Management Services on EMI Disable | X | X | | | |

### A.3.12.2 PID_DEVICE_CONTROL (PID = 14)

S-Mode Profiles → Interface and Couplers → Device Object → PID_DEVICE_CONTROL

| Bit# Bit function | mask 0912h | mask 1900h | mask 091Ah |
|---|---|---|---|
| 0User stopped | x | | x |
| 1Individual Address duplication | M | | M |
| 2Verify Mode On | M | | M |
| 3Safe State On | x | | x |
| 4reserved | x | | x |
| 5reserved | x | | x |
| 6reserved | x | | x |
| 7reserved | x | | x |

Bits that are not supported shall have the default value as specified in [11].

### A.3.12.3 PID_ERROR_FLAGS (PID = 53)

S-Mode Profiles → Interface and Couplers → Device Object → PID_ERROR_FLAGS

| Bit# | Bit function | mask 0912h | mask 1900h | mask 091Ah |
|---|---|---|---|---|
| 0 | System 1 | M | | M |
| 1 | App | M | | M |
| 2 | EEPROM | M | | M |
| 3 | Stack | M | | M |
| 4 | Table Error | x | | x |
| 5 | Trans | M | | M |
| 6 | System 2 | M | | M |
| 7 | System 3 | M | | M |

Bits that are not supported shall have the default value as specified in [11].

## A.3.13 Router Object (Object Type = 6)

*S-Mode Profiles → Interface and Couplers → Router Object*

| Property | | mask 0912h | mask 091Ah | cEMI server on TP | cEMI server RF asynchr. | cEMI server asynch. & BiBat |
|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | ? | ? | ? |
| | NwPar | R | R | ? | ? | ? |
| 5 PID_LOAD_STATE_CONTROL | Data | 3/0 | 3/0 | ? | ? | ? |
| 51 PID_LINE_STATUS | Data | 3/x | 3/x | ? | ? | ? |
| | NwPar | RT | RT | ? | ? | ? |
| 52 PID_MAIN_LCCONFIG | Data | 3/2 | (3/0) | ? | ? | ? |
| 53 PID_SUB_LCCONFIG | Data | 3/2 | (3/0) | ? | ? | ? |
| 54 PID_MAIN_LCGRPCONFIG | Data | 3/2 | (3/0) | ? | ? | ? |
| 55 PID_SUB_LCGRPCONFIG | Data | 3/2 | (3/0) | ? | ? | ? |
| 56 PID_ROUTETABLE_CONTROL | Data | 3/2 | (3/0) | ? | ? | ? |
| 57 PID_COUPL_SERV_CONTROL | Data | 3/0 | 3/0 | ? | ? | ? |
| 58 PID_MAX_APDU_LENGTH [58)] | Data | 3/x | 3/x | 3/x | 3/x | 3/x |
| 59 PID_L2_COUPLER_TYPE [59)] | Data | 3/3 | x | x | x | x |

58) This Property is mandatory for implementations provided after December 2006.

59) The Property PID_L2_COUPLER_TYPE is mandatory for new implementations starting from October 2008.

60) For a cEMI server working on Data Link Layer, the Properties are only visible through the External Message Interface but not from the bus.

## A.3.14 LTE Address Routing Table Object (Object Type = 0007h)

S-Mode Profiles → Couplers and Interfaces → LTE Address Routing Table Object

| | Property | | mask 0912h | mask 091Ah |
|---|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x | 3/x |
| 5 | PID_LOAD_STATE_CONTROL | Data | 3/0 | 3/0 |
| 51 | PID_LTE_ROUTESELECT | Data | 3/0 | 3/0 |
| 52 | PID_LTE_ROUTETABLE | Data | 3/0 | 3/0 |

## A.3.15 cEMI Server Object (Object Type = 8)

S-Mode Profiles → Interface and Couplers → cEMI Server Object

| | Property | | mask 0912h | mask 091Ah | cEMI server on TP [60] | cEMI server RF asynchr. | cEMI server asynch. & BiBat |
|---|---|---|---|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x |
| 51 | PID_MEDIUM_TYPE | Data | (3/x) | 3/x | 3/x | 3/x | 3/x |
| 52 | PID_COMM_MODE | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 53 | PID_MEDIUM_AVAILABILITY | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 54 | PID_ADD_INFO_TYPES | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 55 | PID_TIME_BASE | Data | (3/x) | (3/x) | (3/x)[61] | (3/x)[61] | (3/x)[61] |
| 56 | PID_TRANSP_ENABLE | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 59 | PID_BIBAT_NEXTBLOCK | Data | (3/x) | (3/x) | x | x | 3/x[62] |
| 60 | PID_RF_MODE_SELECT | Data | (3/3) | (3/3) | (3/3) | 3/(3) | 3/(3) |
| 61 | PID_RF_MODE_SUPPORT | Data | (3/3) | (3/3) | (3/3) | 3/x | 3/x |
| 62 | PID_RF_FILTERING_MODE_SELECT | Data | (3/3) | (3/3) | (3/3) | 3/3 | 3/3 |
| 63 | PID_RF_FILTERING_MODE_SUPPORT | Data | (3/3) | (3/3) | (3/3) | 3/x | 3/x |

[60] For a cEMI server working on Data Link Layer, the Properties are only visible through the External Message Interface but not from the bus.

[61]) PID_TIME_BASE is mandatory if the Extended Relative Timestamp is supported.

[62] PID_BIBABAT_NEXTBLOCK is mandatory if the cEMI Server is a BiBat Master. If not, it is not allowed to implement this Property.

## A.3.16 KNXnet/IP Parameter Object (Object Type = 11)

S-Mode Profiles → Interface and Couplers → KNXnet/IP Parameter Object

| PID | Property | mask 091Ah |
|---|---|---|
| 1 | PID_OBJECT_TYPE | M |
| 51 | PID_PROJECT_INSTALLATION_ID | M |
| 52 | PID_KNX_INDIVIDUAL_ADDRESS | M |
| 53 | PID_ADDITIONAL_INDIVIDUAL_ADDRESSES | M |
| 55 | PID_IP_ASSIGNMENT_METHOD | M |
| 57 | PID_CURRENT_IP_ADDRESS | M |
| 58 | PID_CURRENT_SUBNET_MASK | M |
| 59 | PID_CURRENT_DEFAULT_GATEWAY | M |
| 60 | PID_IP_ADDRESS | M |
| 61 | PID_SUBNET_MASK | M |
| 62 | PID_DEFAULT_GATEWAY | M |
| 64 | PID_MAC_ADDRESS | M |
| 65 | PID_SYSTEM_SETUP_MULTICAST_ADDRESS | M |
| 66 | PID_ROUTING_MULTICAST_ADDRESS | M |
| 67 | PID_TTL | M |
| 68 | PID_EIBNETIP_DEVICE_CAPABILITIES | M |
| 69 | PID_EIBNETIP_DEVICE_STATE | M |
| 70 | PID_EIBNETIP_ROUTING_CAPABILITIES | M |
| 72 | PID_QUEUE_OVERFLOW_TO_IP | M |
| 73 | PID_QUEUE_OVERFLOW_TO_KNX | M |
| 74 | PID_MSG_TRANSMIT_TO_IP | M |
| 75 | PID_MSG_TRANSMIT_TO_KNX | M |
| 76 | PID_FRIENDLY_NAME | M |
| 77 | PID_DEVICE_DESCRIPTOR | O |

## A.3.17 RF Medium Object (Object Type = 19)

*S-Mode Profiles → Interface and Couplers → RF Medium Object*

| PID | Property | cEMI Server RF asynch | |
|---|---|---|---|
| | | RF Ready device | RF Ready device |
| 1 | PID_OBJECT_TYPE | M | M |
| 70 | PID_TRANSMISSION_MODE | X | O |
| 71 | PID_RECEPTION_MODE | X | O |
| 72 | PID_TEST_SIGNAL | X | O |
| 73 | PID_FAST_ACK | X | O |
| 74 | PID_FAST_ACK_ACTIVATE | X | O |

# A.4 E-Mode Profiles

## A.4.18 Interface Objects

E-Mode Profiles → Interface Objects

| | Inteface Object | Easy Ctrl. fixed DMA | Easy Ctrl. reloc. DMA | Easy Supervisor | Easy Controller | PB-Mode | Easy LTE |
|---|---|---|---|---|---|---|---|
| 0 | Device Object | O | M | O | O | M | O |
| 1 | Addresstable Object | O | M | O | O | O | M[63] |
| 2 | Associationtable Object | O | M | O | O | O | X[64] |
| 3 | Applicationprogram Object | O | M | O | O | O | O |

63) There shall be one Address Table objects for each LTE logical tag types that is supported.

64) LTE communication mechanisms do not need an (S-Mode) Association Table. This only affects the LTE-part of the Easy LTE-device, for the S-Mode interface of an LTE-Mode device, the correspondig S-Mode Profile (System 300) applies.

## A.4.19 Device Object

E-Mode Profiles → Device Object

| Property | | Easy Ctrl. fixed DMA | Easy Ctrl. reloc. DMA | Easy Supervisor | Easy Controller | PB-Mode | Easy LTE |
|---|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x |
| 11 PID_SERIAL_NUMBER | Data | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) | (3/x) |
| 56 PID_MAX_APDU_LENGTH | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x |
| 101 PID_CHANNEL_01_PARAM | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| … … | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |
| 132 PID_CHANNEL_32_PARAM | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) |

## A.4.20 Group Address Table Object

E-Mode Profiles → Group Address Table Object

| Property | | Easy Ctrl. fixed DMA | Easy Ctrl. reloc. DMA | Easy Supervisor | Easy Controller | PB-Mode | Easy LTE |
|---|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | 3/x |
| 5 PID_LOAD_STATE_CONTROL | Data | (3/3) | 3/3 | (3/3) | (3/3) | (3/3) | (3/(3)) |
| 7 PID_TABLE_REFERENCE | Data | (3/3) | 3/3 | (3/3) | (3/3) | (3/3) | x |
| 51 PID_EXT_FRAMEFORMAT | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/(3) |
| 52 PID_ADDRTAB1 | Data | (3/3) | (3/3) | (3/3) | (3/3) | (3/3) | 3/(3) |

## A.4.21 Association Table Object

E-Mode Profiles → Association Table Object

| Property | | Easy Ctrl. fixed DMA | Easy Ctrl. reloc. DMA | Easy Supervisor | Easy Controller | PB-Mode | Easy LTE |
|---|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x | 3/x | n.a. |
| 5 PID_LOAD_STATE_CONTROL | Data | (3/3) | 3/3 | (3/3) | (3/3) | (3/3) | n.a. |
| 7 PID_TABLE_REFERENCE | Data | (3/3) | 3/3 | (3/3) | (3/3) | (3/3) | n.a. |

## A.4.22 Applicationprogram Object

E-Mode Profiles → Applicationprogram Object

| Property | | Easy Ctrl. fixed DMA | Easy Ctrl. reloc. DMA | Easy Supervisor | Easy Controller | PB-Mode | Easy LTE [65] |
|---|---|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x[66] | 3/x | 3/x | 3/x | (3/x)[66] | 3/x |
| 5 PID_LOAD_STATE_CONTROL | Data | (3/3) | 3/3 | (3/3) | (3/3) | (3/3) | (3/3) |
| 6 PID_RUN_STATE_CONTROL | Data | (3/3) | 3/3 | (3/3) | (3/3) | (3/3) | (3/3) |
| 7 PID_TABLE_REFERENCE | Data | (3/3) | 3/3 | (3/3) | (3/3) | (3/3) | x |
| 51 PID_PARAM_REFERENCE | Data | (3/3) | C[66] | (3/3) | (3/3) | (3/3) | (3/3) |

[65] The Applicationprogram Object of an Easy LTE device is common with the Applicationprogram Object of the S-Mode part of such a device (System 300). So, the stronger requirements of the two Profiles apply.

# A.5 KNXnet/IP and KNX IP Profiles

## A.5.23 Interface Objects

KNXnet/IP – and KNX IP Profiles → Interface Objects

| Interface Object | **All KNXnet/IP devices** | mask 091Ah | **All KNX IP devices** | mask 5705h |
|---|---|---|---|---|
| 0 Device Object | M | M | ? | M |
| 1 Addresstable Object | M | ? | ? | M |
| 2 Associationtable Object | M | ? | ? | M |
| 3 Applicationprogram Object | M | ? | ? | M |
| 4 Interfaceprogram Object | O | ? | ? | O |
| 9 Group Object Table Object | O | ? | ? | O |
| 11 KNXnet/IP Parameter Object [67)] | M | M | ? | M |

[66)] Only mandatory for system 7 Easy Controller implementations

[67)] The KNXnet/IP Parameter Object is mandatory if there is a KNXnet/IP interface.

## A.5.24 Device Object

KNXnet/IP – and KNX IP Profiles → Device Object

| Property | | All KNXnet/IP devices | mask 091Ah | All KNX IP devices | mask 5705h |
|---|---|---|---|---|---|
| 1 PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x |
| | Local | ? | ? | ? | M |
| 2 PID_OBJECT_NAME | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 8 PID_SERVICE_CONTROL | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 9 PID_FIRMWARE_REVISION | Data | ? | ? | ? | (3/x) |
| | Local | ? | ? | ? | O |
| 11 PID_SERIAL_NUMBER | Data | ? | ? | ? | 3/x |
| | Local | ? | ? | ? | M |
| 12 PID_MANUFACTURER_ID | Data | ? | ? | ? | 3/(1) |
| | Local | ? | ? | ? | M |
| 14 PID_DEVICE_CONTROL | Data | ? | ? | ? | 3/3 |
| | Local | ? | ? | ? | M |
| 15 PID_ORDER_INFO | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 16 PID_PEI_TYPE | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 17 PID_PORT_CONFIGURATION | Data | ? | ? | ? | (3/3 |
| | Local | ? | ? | ? | O |
| 18 PID_POLL_GROUP_SETTINGS | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 19 PID_MANUFACTURER_DATA | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 21 PID_DESCRIPTION | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |

| Property | | All KNXnet/IP devices | mask 091Ah | All KNX IP devices | mask 5705h |
|---|---|---|---|---|---|
| 25 PID_VERSION | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 51 PID_ROUTING_COUNT | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 52 PID_MAX_RETRY_COUNT | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 53 PID_ERROR_FLAGS | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 54 PID_PROG_MODE | Data | ? | ? | ? | 3/3 |
| | Local | ? | ? | ? | M |
| 55 PID_PRODUCT_ID | Data | ? | ? | ? | (3/x) |
| | Local | ? | ? | ? | O |
| 56 PID_MAX_APDU_LENGTH | Data | ? | ? | ? | 3/x |
| | Local | ? | ? | ? | M |
| 57 PID_SUBNET_ADDR | Data | ? | ? | ? | 3/x |
| | Local | ? | ? | ? | M |
| 58 PID_DEVICE_ADDR | Data | ? | ? | ? | 3/x |
| | Local | ? | ? | ? | M |
| 62 PID_OBJECT_VALUE | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 63 PID_OBJECTLINK | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 65 PID_PARAMETER | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 66 PID_OBJECT_ADDRESS | Data | ? | ? | ? | (3/3) |
| | Local | ? | ? | ? | O |
| 70 PID_DOMAIN_ADDRESS | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 72 PID_MGT_DESCRIPTOR_01 | Data | ? | ? | ? | X |

| Property | | All KNXnet/IP devices | mask 091Ah | All KNX IP devices | mask 5705h |
|---|---|---|---|---|---|
| | Local | ? | ? | ? | X |
| 73 PID_PL110_PARAM | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 75 PID_RECEIVE_BLOCK_TABLE | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 76 PID_RANDOM_PAUSE_TABLE | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 77 PID_RECEIVE_BLOCK_NR | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 78 PID_HARDWARE_TYPE | Data | ? | (3/1) | ? | 3/1 |
| | Local | ? | ? | ? | M |
| 79 PID_RETRANSMITTER_NUMBER | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 80 PID_SERIAL_NR_TABLE | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 81 PID_BIBATMASTER_ADDRESS | Data | ? | ? | ? | X |
| | Local | ? | ? | ? | X |
| 83 PID_DEVICE_DESCRIPTOR [68)] | Data | 3/0 | 3/0 | 3/0 | 3/x |
| | Local | ? | ? | ? | M |

[68)] PID_DEVICE_DESCRIPTOR (PID = 83) is mandatory in all KNXnet/IP devices (e.g. KNXnet/IP Tunneling Server, KNXnet/IP Router…) and KNX IP devices.

## A.5.25 Group Address Table Object (Object Type = 1)

KNXnet/IP – and KNX IP Profiles → Group Address Table Object

| | Property | | mask 5705h |
|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x |
| | | Local | M |
| 2 | PID_OBJECT_NAME | Data | (3/3) |
| | | Local | O |
| 5 | PID_LOAD_STATE_CONTROL | Data | 3/3 |
| | | Local | M |
| 7 | PID_TABLE_REFERENCE | Data | 3/3 |
| | | Local | M |
| 23 | PID_TABLE | Data | (3/3) |
| | | Local | O |
| 27 | PID_MCB_TABLE | Local | (3/x) |
| | | Data | O |
| 28 | PID_ERROR_CODE | Local | (3/x) |
| | | Data | O |
| 53 | PID_GROUP_RESPONDER_TABLE | Local | X |
| | | Data | X |

### A.5.25.1 PID_LOAD_STATE_CONTROL (PID = 5)

| Load Control | Subtype | Description | mask 5705h |
|---|---|---|---|
| 00h | | No Operation | O |
| 01h | | Start Loading | M |
| 02h | | Load Completed | M |
| 03h | | Additional Load Controls | |
| | 00h | Absolute Code/Data Allocation | M |
| | 01h | Absolute Stack Allocation | M |
| | 02h | Segment Control Record | M |
| | 03h | Task Pointer Record | M |
| | 04h | Task Control Record-1 | M |
| | 05h | Task Control Record-2 | M |
| | 0A | Relative Allocation | n/a |
| | 0B | Large Relative Allocation | n/a |
| 04h | | Unload | M |

#### 9.2.9.3.1 Group Object Association Table Object

KNXnet/IP – and KNX IP Profiles → Group Object Association Table Object

| | Property | | mask 5705h |
|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x |
| | | Local | M |
| 2 | PID_OBJECT_NAME | Data | (3/3) |
| | | Local | O |
| 5 | PID_LOAD_STATE_CONTROL | Data | 3/3 |
| | | Local | M |
| 7 | PID_TABLE_REFERENCE | Data | 3/3 |
| | | Local | M |
| 23 | PID_TABLE | Data | (3/3) |
| | | Local | O |
| 27 | PID_MCB_TABLE | Data | (3/3) |
| | | Local | O |
| 28 | PID_ERROR_CODE | Data | (3/3) |
| | | Local | O |

## A.5.26 KNXnet/IP Parameter Object

*KNXnet/IP – and KNX IP Profiles → KNXnet/IP Parameter Object*

| | Property | | 1 All KNXnet/IP devices [69] | 1.1 Devices supporting KNXnet/IP Routing | 2 All KNX IP devices [70] | 2.1 mask 5705h |
|---|---|---|---|---|---|---|
| 1 | PID_OBJECT_TYPE | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |
| 2 | PID_OBJECT_NAME | Data | (3/3) | (3/3) | (3/3) | (3/3) |
| | | Local | ? | ? | ? | O |
| 51 | PID_PROJECT_INSTALLATION_ID | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 52 | PID_KNX_INDIVIDUAL_ADDRESS | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 53 | PID_ADDITIONAL_INDIVIDUAL_ADDRESSES [71] | Data | (3/3) [71] | (3/3) [71] | (3/3) [71] | (3/3) [71] |
| | | Local | ? | ? | ? | O |
| 54 | PID_CURRENT_IP_ASSIGNMENT_METHOD | Data | (3/x) | (3/x) | (3/x) | (3/x) |
| | | Local | ? | ? | ? | O |
| 55 | PID_IP_ASSIGNMENT_METHOD | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 56 | PID_IP_CAPABILITIES | Data | (3/x) | (3/x) | (3/x) | 3/x |
| | | Local | ? | ? | ? | M |
| 57 | PID_CURRENT_IP_ADDRESS | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |

69) This column specifies general requirements for all KNXnet/IP devices. It specifies the minimal requirements to which any existing or future KNXnet/IP Device Profile shall comply. Specific details with possible additional requirements for real KNXnet/IP Devices are specified in the next columns.

70) This column specifies general requirements for all KNX IP devices. It specifies the minimal requirements to which any existing or future KNX IP Device Profile shall comply. Specific details with possible additional requirements for real KNX IP Devices are specified in the next columns.

71) PID_ADDITIONAL_INDIVIDUAL_ADDRESSES is mandatory for devices implementing KNXnet/IP Tunneling and KNXnet/IP Routing.

| | Property | | 1 All KNXnet/IP devices [69] | 1.1 Devices supporting KNXnet/IP Routing | 2 All KNX IP devices [70] | 2.1 mask 5705h |
|---|---|---|---|---|---|---|
| 58 | PID_CURRENT_SUBNET_MASK | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |
| 59 | PID_CURRENT_DEFAULT_GATEWAY | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |
| 60 | PID_IP_ADDRESS | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 61 | PID_SUBNET_MASK | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 62 | PID_DEFAULT_GATEWAY | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 63 | PID_DHCP_BOOTP_SERVER | Data | (3/x) | (3/x) | (3/x) | (3/x) |
| | | Local | ? | ? | ? | O |
| 64 | PID_MAC_ADDRESS | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |
| 65 | PID_SYSTEM_SETUP_MULTICAST_ADDRESS | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |
| 66 | PID_ROUTING_MULTICAST_ADDRESS | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 67 | PID_TTL | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 68 | PID_KNXNETIP_DEVICE_CAPABILITIES | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |
| 69 | PID_KNXNETIP_DEVICE_STATE | Data | 3/x | 3/x | 3/x | 3/x |
| | | Local | ? | ? | ? | M |
| 70 | PID_KNXNETIP_ROUTING_CAPABILITIES | Data | (3/x) | 3/x | (3/x) | X |
| | | Local | ? | ? | ? | X |

| | Property | | 1 All KNXnet/IP devices [69] | 1.1 Devices supporting KNXnet/IP Routing | 2 All KNX IP devices [70] | 2.1 mask 5705h |
|---|---|---|---|---|---|---|
| 71 | PID_PRIORITY_FIFO_ENABLED [72] | Data | (3/3) [72] | (3/3) [72] | (3/3) [72] | X |
| | | Local | ? | ? | ? | X |
| 72 | PID_QUEUE_OVERFLOW_TO_IP | Data | (3/x) | 3/x | (3/x) | (3/x) |
| | | Local | ? | ? | ? | O |
| 73 | PID_QUEUE_OVERFLOW_TO_KNX | Data | (3/x) | 3/x | (3/x) | X |
| | | Local | ? | ? | ? | X |
| 74 | PID_MSG_TRANSMIT_TO_IP | Data | (3/x) | 3/x | (3/x) | X |
| | | Local | ? | ? | ? | O |
| 75 | PID_MSG_TRANSMIT_TO_KNX | Data | (3/x) | 3/x | (3/x) | (3/x) |
| | | Local | ? | ? | ? | O |
| 76 | PID_FRIENDLY_NAME | Data | 3/3 | 3/3 | 3/3 | 3/3 |
| | | Local | ? | ? | ? | M |
| 78 | PID_ROUTING_BUSY_WAIT_TIME [73] | Data | 3/1 | 3/1 | ? | ? |
| | | Local | ? | ? | ? | ? |

[72] PID_PRIORITY_FIFO_ENABLED shall be implemented by devices implementing priority FIFO as described in [19] clause “Forwarding rules”.

[73] PID_ROUTING_BUSY_WAIT_TIME is mandatory for devices implementing KNXnet/IP or KNX IP. Implementations of masks 091Ah and 5705h may not have this Property.