System Conformance Testing

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KNX Network, Transport, Application (Interface) Layer, Management Service Testing

3

Network Layer Tests

3

Summary

This document contains the Network Layer Test specifications.

Version 01.01.01 is a KNX Approved Standard.

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

Document Updates

Version	Date	Modifications
1.0	2001.13.03	Approved Standard
1.1	2009.02	Preparation for publication in V2.0 of the KNX Specifications
01.01.01	2013.10.24	Editorial updates for the publication of KNX Specifications 2.1.

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1 Introduction

The main functionality of the network layer is

- in the sending direction the setting of the routing counter and
- in the receiving direction the splitting of the service L_Data.ind/.con to N_Data_Individual.ind/.con, N_Data_Group.ind/.con and N_Data_broadcast.ind/.con respectively.

Black box tests use only the bus connection to the BDUT, Bus/PEI tests use the bus access and the PEI access to the BDUT.

2 Test Set-up

2.1 Hardware

The test set-up is depicted in the underneath figure and consists of:

- one Bus Device Under Test (BDUT)
- the KNX Interworking Test Tool, hereafter called EITT running on a PC, which is connected to the bus by an EDI (KNX data interface)
- when testing TP1 devices, a power supply module and choke will have to be added to the underneath test set-up
- when testing PL110 devices an additional artificial network 50 Ω / 50 µH + 5 Ω according CISPR 16 (Second Edition, Clause 8.2.1) shall be installed next to BDUT.

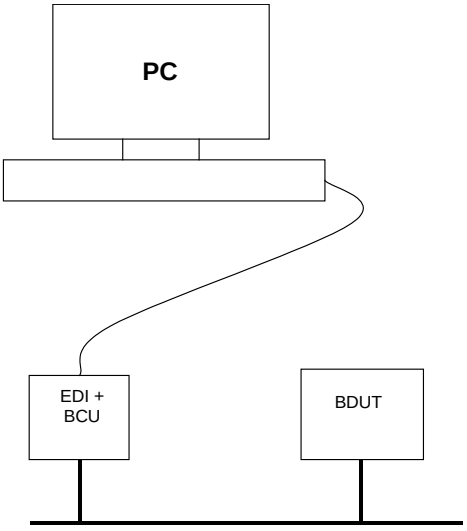

Figure 1: Test Set-up in case of a black-box test

2.2 Software used during Tests

2.2.1 Used KNX Software

During testing the only software tool used is the KNX Interworking Test Tool (EITT).

2.2.2 Used Application Software

Necessary application software is described with the tests.

2.2.3 Implementation of used Software in the Test Set-up

By means of EITT (in send mode) the BDUT is stimulated. By means of EITT (in receive mode) the reaction of the BDUT can be observed. In the latter mode it is moreover possible to check the time delay between the stimulus and the reply telegram, if the latter is actually transmitted.

2.2.3.1 Parameters to be set in the BDUT

Before carrying out the various tests or test steps, several values have to be set in the BDUT by means of EITT. These relate amongst others to:

- the physical address of the BDUT (in the executable test suites in this document physical address 1001h is used by default).
- the EDI shall have the following physical address: 10.15.254 (AFFEh) in case of twisted pair and 7.15.254 (7FFEh) when testing power line devices.
- when testing Powerline devices, the Domain Address 254 (FEh) shall be loaded into the BDUT and the EDI.
- specific data (e.g. the value of the routing counter, if possible), which has to be downloaded into a fixed memory area of the BDUT (see also PIXIT proforma as supplied by the manufacturer).

3 Test case 1: Black Box test

3.1 Group oriented communication

A Group object (GO) shall be present in the BDUT that is read- and transmit enabled. This GO shall be associated to a group address (1001h is used here as an example).

Send telegrams with Routing Count 6, 5, 4, 3, 2, 1, 0 to the BDUT.

IN BC AFFE 1001 81 00 00 :Group Value Read

IN BC AFFE 1001 91 00 00 :Group Value Read

IN BC AFFE 1001 A1 00 00 :Group Value Read

IN BC AFFE 1001 B1 00 00 :Group Value Read

IN BC AFFE 1001 C1 00 00 :Group Value Read

IN BC AFFE 1001 D1 00 00 :Group Value Read

IN BC AFFE 1001 E1 00 00 :Group Value Read

Acceptance: The BDUT shall answer with Routing Count 6 in all cases.

OUT BC 1001 1001 E2 00 40 00 :Value Response

Test Group Communication Routing Count 7

IN BC AFFE 1001 F1 00 00 :Group Value Read

Acceptance: The BDUT shall answer with Routing Count 7 (the BDUT may optionally answer with routing counter 6)

OUT BC 1001 1001 F2 00 40 00 :Value Response

3.2 Device oriented communication – connected

Send telegrams with Routing Count 6, 5, 4, 3, 2, 1, 0 to the BDUT.

IN BC AFFE 1001 60 80 :T-Connect(Addr=1001)

IN BC AFFE 1001 61 43 00 :MaskVersionRead()

…. (continue stimuli with other remaining values of routing counter)

Acceptance: The BDUT shall answer with Routing Count 6 in all cases.

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 63 43 40 00 20 :MaskVersionResponse(Type=00, Version=20)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

IN BC AFFE 1001 60 81 :T-Disconnect

Routing count 7

IN BC AFFE 1001 70 80 :T-Connect(Addr=01.00.001)

IN BC AFFE 1001 71 43 00 :MaskVersionRead()

Acceptance: The BDUT shall answer with Routing Count 7 (optionally routing counter 6)

OUT B0 1001 AFFE 70 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 73 43 40 00 20 :MaskVersionResponse(Type=00, Version=20)

IN B0 AFFE 1001 70 C2 :T-Ack(Seq=0)

IN BC AFFE 1001 70 81 :T-Disconnect

3.3 Device oriented communication – connectionless

Note: If the BDUT does not support the service PropertyRead the test shall be conducted with any other device oriented connectionless service.

Send telegrams with Routing Count 6, 5, 4, 3, 2, 1, 0 to the BDUT.

IN BC AFFE 1001 65 03 D5 00 01 10 01 :PropertyRead(Obj=00, Prop=01, Count=1, Start=001)

…. (continue stimuli with all other remaining values of routing counter)

Acceptance: The BDUT shall answer with Routing Count 6 in all cases

OUT BC 1001 AFFE 67 03 D6 00 01 10 01 00 00 :PropertyResponse(Obj=00, Prop=01, Count=1, Start=001, Data=00 00)

Routing count 7

IN BC AFFE 1001 75 03 D5 00 01 10 01 :PropertyRead(Obj=00, Prop=01, Count=1, Start=001)

Acceptance: The BDUT shall answer with Routing Count 7 (optionally routing counter 6)

OUT BC 1001 AFFE 77 03 D6 00 01 10 01 00 00 :PropertyResponse(Obj=00, Prop=01, Count=1, Start=001, Data=00 00)

3.4 Broadcast communication

Send telegrams with Routing Count 6, 5, 4, 3, 2, 1, 0 to the BDUT.

IN BC AFFE 0000 E1 01 00 :ReadPhysAddr()

…. (continue stimuli with all other remaining values of routing counter)

Acceptance: The BDUT shall answer with Routing Count 6 in all cases.

OUT BC 1001 0000 E1 01 40 :ReadPhysAddrResponse(Addr=01.00.001)

Routing count 7

IN BC AFFE 0000 F1 01 00 :ReadPhysAddr()

Acceptance: The BDUT shall answer with Routing Count 7 (optionally routing counter 6)

OUT BC 1001 0000 F1 01 40 :ReadPhysAddrResponse(Addr=01.00.001)

4 Test case 2: Bus/PEI test

See Volume 8/6/3

5 Test case 3: Testing of routing algorithm in routers

See TSS A of Volume 9