



BACnet[®] TESTING LABORATORIES ADDENDA

Addendum PR13-PR18 to BTL Test Package 18.1

**Revision v3
Revised 10/8/2021**

Approved by the BTL Working Group on September 23, 2021.
Approved by the BTL Working Group Voting Members on October 12, 2021.
Published on October 22, 2021.

[This foreword and the “Overview” on the following pages are not part of this Test Package. They are merely informative and do not contain requirements necessary for conformance to the Test Package.]

FOREWORD

The purpose of this addendum is to present current changes being made to the BTL Test Package. These modifications are the result of change proposals made pursuant to the continuous maintenance procedures and of deliberations within the BTL-WG Committee. The changes are summarized below.

BTL-18.1-pr13-pr18-1: Decoding BACnet Property States [BTLWG-570]2

BTL-18.1-pr13-pr18-2: NM-FDR-A Testing [BTLWG-633]6

BTL-18.1-pr13-pr18-3: DS-VSI-B Testing [BTLWG-1108, CR-0498].....9

In the following document, language to be added to existing clauses within the BTL Test Package 18.1 is indicated through the use of *italics*, while deletions are indicated by ~~strike through~~. Where entirely new subclauses are proposed to be added, plain type is used throughout

In contrast, changes to BTL Specified Tests also contain a **yellow** highlight to indicate the changes made by this addendum. When this addendum is applied, all highlighting will be removed. Change markings on tests will remain to indicate the difference between the new test and an existing 135.1 test. If a test being modified has never existed in 135.1, the applied result should not contain any change markings. When this is the case, square brackets will be used to describe the changes required for this test.

Each addendum can stand independently unless specifically noted via dependency within the addendum. If multiple addenda change the same test or section, each future released addendum that changes the same test or section will note in square brackets whether or not those changes are reflected.

BTL-18.1-pr13-pr18-1: Decoding BACnet Property States [BTLWG-570]**Overview:**

135-2012aw-1 at PR_16 and later have specified context-tag values in the BACnetPropertyStates datatype greater than 14. These use an additional octet of extension encoding, vs the long-existing context-tag values 14 and lower.

135-2012ax-3 further extended the specification of BACnetPropertyStates using the [63] extended-value context-tag, for tag values greater than 254.

extended-value [63] Unsigned32,

These are used in the 'Event Values' parameter in event notifications.

This work-item adds a test to ensure that IUTs which process event notifications properly decode BACnetPropertyStates values across the whole range.

Changes:

Checklist Changes

None

Test Plan Changes

[In BTL Test Plan, add an entry to Alarm and Event Management – Notification – A Base Requirements.]

. . .		
BTL - 9.4.X2 - Decoding BACnetPropertyStates in 'Event Values'		
	Test Conditionality	If Protocol Revision < 16 this test shall be skipped.
	Test Directives	
	Testing Hints	
BTL - 9.5.X2 - Decoding BACnetPropertyStates in 'Event Values'		
	Test Conditionality	If Protocol Revision < 16 this test shall be skipped.
	Test Directives	
	Testing Hints	

Test Changes

[In BTL Specified Tests, append to 9.4 ensuring the successful decoding of the BACnetPropertyStates datatype.]

9.4.X2 Decoding BACnetPropertyStates in 'Event Values'

Reason for Change: Added in a test for receiving a BACnetPropertyStates value which is encoded using an extended-value.

Purpose: To verify that the IUT is correctly accepting 'Event Values' which contain BACnetPropertyStates values across the full value range of context tags ensuring proper decoding of the various forms of the production.

Test Concept: Send 3 ConfirmedEventNotifications to the IUT conveying a CHANGE_OF_STATE event. After each notification verify that the IUT accepts and processes the notification. The first notification is sent with a new-state, NS1, having a context tag value in the range 0 .. 62. The second notification is sent with a new-state, NS2, having a context tag value in the range 64 .. 253 (a vendor proprietary discrete datatype). The third notification is sent with a new-state, NS3, having a context tag value 254 (a standard discrete datatype) or greater and encoded with a context tag of 63 (the extended-value choice) using the special encoding rules defined in the comment at the end of the BACnetPropertyStates production in clause 21.

Test Steps:

-- new-state with a tag value in the range 15 .. 62

1. TRANSMIT ConfirmedEventNotification-Request,
 - 'Process Identifier' = (any valid process identifier),
 - 'Initiating Device Identifier' = TD,
 - 'Event Object Identifier' = (any valid value),
 - 'Time Stamp' = (any valid time stamp),
 - 'Notification Class' = (any valid value),
 - 'Priority' = (any valid value),
 - 'Event Type' = CHANGE_OF_STATE,
 - 'Message Text' = (optional, any valid message text),
 - 'Notify Type' = ALARM | EVENT,
 - 'AckRequired' = TRUE | FALSE,
 - 'From State' = (any valid normal or offnormal value),
 - 'To State' = (any valid normal or offnormal value),
 - 'Event Values' = (NS1, (T,F,?,?))
2. RECEIVE BACnet-SimpleACK-PDU
3. CHECK (that the IUT has utilized the value conveyed, correctly decoded)

-- new-state with a tag value in the range 64 .. 253

4. TRANSMIT ConfirmedEventNotification-Request,
 - 'Process Identifier' = (any valid process identifier),
 - 'Initiating Device Identifier' = TD,
 - 'Event Object Identifier' = (any valid value),
 - 'Time Stamp' = (any valid time stamp),
 - 'Notification Class' = (any valid value),
 - 'Priority' = (any valid value),
 - 'Event Type' = CHANGE_OF_STATE,
 - 'Message Text' = (optional, any valid message text),
 - 'Notify Type' = ALARM | EVENT,
 - 'AckRequired' = TRUE | FALSE,
 - 'From State' = (any valid normal or offnormal value),
 - 'To State' = (any valid normal or offnormal value),
 - 'Event Values' = (NS2, (T,F,?,?))
5. RECEIVE BACnet-SimpleACK-PDU
6. CHECK (that the IUT has correctly decoded the value by examining exposed actions related to the receipt of the event notification, if there are utilized the value conveyed, correctly decoded)

-- new-state with a tag value greater than 254,

7. TRANSMIT ConfirmedEventNotification-Request,
 - 'Process Identifier' = (any valid process identifier),
 - 'Initiating Device Identifier' = TD,
 - 'Event Object Identifier' = (any valid value),
 - 'Time Stamp' = (any valid time stamp),
 - 'Notification Class' = (any valid value),
 - 'Priority' = (any valid value),
 - 'Event Type' = CHANGE_OF_STATE,
 - 'Message Text' = (optional, any valid message text),
 - 'Notify Type' = ALARM | EVENT,
 - 'AckRequired' = TRUE | FALSE,
 - 'From State' = (any valid normal or offnormal value),
 - 'To State' = (any valid normal or offnormal value),
 - 'Event Values' = (NS3, (T,F,?,?))
8. RECEIVE BACnet-SimpleACK-PDU
9. CHECK (that the IUT has correctly decoded the value by examining exposed actions related to the receipt of the event notification, if there are any)

[In BTL Specified Tests, append to 9.5 ensuring the successful decoding of the BACnetPropertyStates datatype.]

9.5.X2 Decoding BACnetPropertyStates in 'Event Values'

Reason for Change: Added in a test for receiving a BACnetPropertyStates value which is encoded using an extended-value.

Purpose: To verify that the IUT is correctly accepting 'Event Values' which contain BACnetPropertyStates values across the full value range of context tags ensuring proper decoding of the various forms of the production.

Test Concept: Send 3 UnconfirmedEventNotifications to the IUT conveying a CHANGE_OF_STATE event. After each notification verify that the IUT accepts and processes the notification. The first notification is sent with a new-state, NS1, having a context tag value in the range 0 .. 62. The second notification is sent with a new-state, NS2, having a context tag value in the range 64 .. 253 (a vendor proprietary discrete datatype). The third notification is sent with a new-state, NS3, having a context tag value 254 (a standard discrete datatype) or greater and encoded with a context tag of 63 (the extended-value choice) using the special encoding rules defined in the comment at the end of the BACnetPropertyStates production in clause 21.

Test Steps:

-- new-state with a tag value in the range 15 .. 62

1. TRANSMIT UnconfirmedEventNotification-Request,
 - 'Process Identifier' = (any valid process identifier),
 - 'Initiating Device Identifier' = TD,
 - 'Event Object Identifier' = (any valid value),
 - 'Time Stamp' = (any valid time stamp),
 - 'Notification Class' = (any valid value),
 - 'Priority' = (any valid value),
 - 'Event Type' = CHANGE_OF_STATE,
 - 'Message Text' = (optional, any valid message text),
 - 'Notify Type' = ALARM | EVENT,
 - 'AckRequired' = TRUE | FALSE,
 - 'From State' = (any valid normal or offnormal value),
 - 'To State' = (any valid normal or offnormal value),
 - 'Event Values' = (NS1, (T,F,?,?))
2. CHECK (that the IUT has correctly decoded the value by examining exposed actions related to the receipt of the event notification, if there are any)

-- new-state with a tag value in the range 64 .. 253

3. TRANSMIT UnconfirmedEventNotification-Request,
 - 'Process Identifier' = (any valid process identifier),
 - 'Initiating Device Identifier' = TD,
 - 'Event Object Identifier' = (any valid value),
 - 'Time Stamp' = (any valid time stamp),
 - 'Notification Class' = (any valid value),
 - 'Priority' = (any valid value),
 - 'Event Type' = CHANGE_OF_STATE,
 - 'Message Text' = (optional, any valid message text),
 - 'Notify Type' = ALARM | EVENT,
 - 'AckRequired' = TRUE | FALSE,
 - 'From State' = (any valid normal or offnormal value),
 - 'To State' = (any valid normal or offnormal value),
 - 'Event Values' = (NS2, (T,F,?,?))
4. CHECK (that the IUT has correctly decoded the value by examining exposed actions related to the receipt of the event notification, if there are any)

-- new-state with a tag value greater than 254,

5. TRANSMIT UnconfirmedEventNotification-Request,
 - 'Process Identifier' = (any valid process identifier),
 - 'Initiating Device Identifier' = TD,
 - 'Event Object Identifier' = (any valid value),
 - 'Time Stamp' = (any valid time stamp),
 - 'Notification Class' = (any valid value),
 - 'Priority' = (any valid value),

'Event Type' = CHANGE_OF_STATE,
'Message Text' = (optional, any valid message text),
'Notify Type' = ALARM | EVENT,
'AckRequired' = TRUE | FALSE,
'From State' = (any valid normal or offnormal value),
'To State' = (any valid normal or offnormal value),
'Event Values' = (NS3, (T,F,?,?))

9. CHECK (that the IUT has correctly decoded the value by examining exposed actions related to the receipt of the event notification, if there are any)

BTL-18.1-pr13-pr18-2: NM-FDR-A Testing [BTLWG-633]**Overview:**

In TP 18 the testing of foreign devices is duplicated between NM-FDR-A and B/IP non-BBMD testing.

This proposal consolidates all B/IP testing under a single Data Link section similar to B/IPv6.

Changes:

Checklist Changes

[Delete sections BACnet/IP - Annex J - non-BBMD Functionality, and BACnet/IP - Annex J - BBMD, and replace with the following]

Data Link Layer - IPv4		
	R	Base Requirements
	C ¹	Is able to operate in Normal mode
	C ¹	Is able to operate in Foreign mode
	C ²	Is able to operate in BBMD mode
	O	Supports configuration through Network Port object
	O	Is able to initiate broadcast messages
	O	Supports Network Port objects and DHCP
	BTL-C ³	Supports a BDT with at least four entries
	C ³	Supports 2-hop mode
	O	Supports Network Address Translation in BBMD mode
¹ Required if the device does not support BBMD mode. ² Required if the device does not support Foreign mode. ³ Required if the device supports BBMD mode.		

[Remove NM-FDR-A content for the move of content into Data Link - IPv4]

Network Management - Foreign Device Registration - A		
	R	Base Requirements
	BTL-R	Supports configurable BBMD Address
	O	Supports a mode where it transmits a broadcast at startup
	O	Supports configurable Time to Live

Test Plan Changes

-- Changes for 9.3 BACnet/IP - Annex J - non-BBMD Functionality

[Rename 9.3 BACnet/IP - Annex J - non-BBMD Functionality to 9.3 Data Link Layer - IPv4]

[Move Test Plan entries from 9.3.1 Base Requirements into new section 9.3.2 Is Able to Operate in Normal Mode]

[Move Test Plan entries from old 9.3.2 Is Able to Register as a Foreign Device into new section 9.3.3 Is Able to Operate in Foreign Mode]

[Move Test Plan entries from old 9.3.3 Is Able to Initiate Original-Broadcast-NPDU into new 9.3.6 Is Able to Initiate Broadcast Messages and modify test conditionality]

	Test Conditionality	Must be executed. <i>If the IUT does not support Foreign mode, this test shall be skipped.</i>
--	----------------------------	-----------------------------------------------------------------------------------------------------------

[Test Plan IPv4 non-BBMD section 9.3.4 Supports Configuration Through Network Port Object is duplicated by the move of 9.4.8 into 9.3.5 so it is dropped]

[Move Test Plan entries from old 9.3.4 Supports Configuration Through Network Port Object into new 9.3.5 Supports Configuration Through Network Port Object]

[Move Test Plan entries from old 9.3.5 Supports Network Port Objects and DHCP into new 9.3.7 Supports Network Port Objects and DHCP]

-- Changes for 9.4 BACnet/IP - Annex J - BBMD

[Move Test Plan entries from 9.4.1 Base Requirements into new 9.3.4 Is Able to Operate in BBMD Mode]

[Move Test Plan entries from 9.4.2 Supports a BDT with at Least Four Entries into new 9.3.4 Is Able to Operate in BBMD Mode]

[Move Test Plan entries from 9.4.3 Registration by a Foreign Device is Supported into new 9.3.4 Is Able to Operate in BBMD Mode]

[Move Test Plan entries from 9.4.4 Supports 2-hop Mode into new 9.3.4 Is Able to Operate in BBMD Mode]

[Drop Test Plan IPv4 BBMD section 9.4.5 Supports 1-hop Mode]

[Move Test Plan entries from 9.4.6 BBMD Supports Network Address Translation into new 9.3.9 Supports Network Address Translation in BBMD Mode]

[Move Test Plan entries from 9.4.7 Is Able to Initiate Original-Broadcast-NPDU into new 9.3.6 Is Able to Initiate Broadcast Messages and modify the Test Conditionality for each entry]

	Test Conditionality	Must be executed. <i>If the IUT does not support BBMD mode then this test shall be skipped.</i>
--	----------------------------	------------------------------------------------------------------------------------------------------------

[Drop Test Plan entries IPv4 BBMD section 9.4.8 Supports Configuration Through Network Port as it is duplicated by the move of 9.3.4 into 9.3.5]

[Drop Test Plan entries IPv4 BBMD section 9.4.9 Supports Network Port Objects and DHCP as it is duplicated by the move of 9.3.5 into 9.3.5]

[Delete section 9.4 and renumber following sections]

-- Changes for 10.8 Network Management - Foreign Device Registration - A

[Move Test Plan entries from 10.8.1 Base Requirements into new 9.3.3 Is Able to Operate in Foreign Mode]

[Move Test Plan entries from 10.8.2 Supports configurable BBMD Address into new 9.3.3 Is Able to Operate in Foreign Mode]

[Move Test Plan entries from 10.8.3 Supports a Mode Where it Transmits a Broadcast at Startup into new 9.3.3 Is Able to Operate in Foreign Mode and modify Test Conditionality]

	Test Conditionality	Must be executed. <i>If the IUT never transmits a broadcast at startup, this test shall be skipped.</i>
--	----------------------------	--------------------------------------------------------------------------------------------------------------------

[Move Test Plan entries from 10.8.4 Supports Configurable Time-to-Live into new 9.3.3 Is Able to Operate in Foreign Mode, and modify Test Conditionality]

	Test Conditionality	Must be executed. <i>If Time-to-Live is not configurable, this test shall be skipped.</i>
--	----------------------------	------------------------------------------------------------------------------------------------------

[Replace all Test Plan entries in 10.8.1 Base Requirements with the following single entry]

Verify Checklist		
	Test Conditionality	<i>Must be executed.</i>
	Test Directives	<i>Verify that NM-FDR-A is claimed.</i>
	Testing Hints	

[Delete NM-FDR-A Test Plan sections 10.8.2, 10.8.3, 10.8.4]

BTL Specified Test Changes

[Move 14.8.1 into BTL Specified Tests and modify]

14.8.1 Registering as a Foreign Device

Reason for Change: add in check that lifetime is within the range required by NM-FDR-A

Dependencies: None

BACnet Reference Clause: J.5.2

Purpose: This test case verifies that the IUT can register as a foreign device with a BBMD.

Test Concept: The IUT is caused to register as a foreign device with the TD.

Configuration Requirements: The IUT is configured to register as a foreign device with the TD.

Test Steps:

1. RECEIVE DESTINATION = TD, SOURCE = IUT,
Register-Foreign-Device,
'Time-to-Live' = (any value between 30 seconds and 9 hours)
2. TRANSMIT DESTINATION = IUT, SOURCE = TD,
BVLC-Result,
'Result Code' = Successful completion

BTL-18.1-pr13-pr18-3: DS-VSI-B Testing [BTLWG-1108, CR-0498]**Overview:**

The DS-VSI-B was not filled out with testing requirements when value source testing was added to the test package.

Most of the requirements are included in the testing added to the object types. The only requirements of the BIBB that are not covered are completeness of the implementation.

Changes:

BTL Checklist Changes

[Modify Data Sharing - Value Source Information - B section]

Data Sharing - Value Source Information - B		
	R ^{1,2}	Base Requirements
¹ Contact BTL for interim tests for this BIBB.		
² Protocol Revision 17 or higher must be claimed.		

BTL Test Plan Changes

[Modify section 4.24 Data Sharing - Value Source Information - B section]

4.24 Data Sharing - Value Source Information - B**4.24.1 Base Requirements**

~~Contact BTL for interim tests for this BIBB.~~

Base requirements must be met by any IUT that supports value source information in one or more of its objects.

Verify Checklist		
	Test Conditionality	Must be executed.
	Test Directives	Verify that all commandable objects claim the "Supports the Value Source Mechanism", or that at least 1 non-commandable object type claims support if the IUT does not support commandable objects.
	Testing Hints	
Verify EPICS		
	Test Conditionality	Must be executed.
	Test Directives	Verify that all instances of commandable objects contain the value source properties.
	Testing Hints	