



**BACnet[®] TESTING LABORATORIES
ADDENDA**

**Addendum CR1 to
BTL Test Package 23.0**

**Revision final
Revised 5/15/2023**

Approved by the BTL Working Group on March 30, 2023;
Approved by the BTL Working Group Voting Members on May 12, 2023;
Published on May 18, 2023.

[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-23.0 CR1-1: Update Conditionality for Test 9.11.1.9 [BTLWG-1231, CR-0518]	2
BTL-23.0 CR1-2: IPv6 Required to Support NM-BBMD-C [BTLWG-1408, CR-0549]	3
BTL-23.0 CR1-3: IPv4 Writability Requirements [BTLWG-1416, CR-0549]	5
BTL-23.0 CR1-4: MS/TP Writability Requirements [BTLWG-1417, CR-0549]	8

In the following document, language to be added to existing clauses within the BTL Test Package 23.0 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-23.0 CR1-1: Update Conditionality for Test 9.11.1.9 [BTLWG-1231, CR-0518]

Overview:

Test 9.11.1.9 only applies to properties with numeric datatype. BTL Test Plan should allow to skip the test if the IUT cannot have properties of numeric datatype, that support COVP. A change was decided already in CR-0518.

Changes:

Checklist Changes

None

Test Plan Changes

4.20 Data Sharing - Change Of Value Property - B

[Modify the DS COVP B Base Requirements]

4.20.1 Base Requirements

Base requirements must be met by any IUT claiming conformance to this BIBB.

BTL - 9.11.1.9 - Client-Supplied COV Increment	
Test Conditionality	Must be executed <i>if the IUT can be made to contain a property of numeric datatype with support for COVP.</i>
Test Directives	
Testing Hints	

Specified Test Changes

None

BTL-23.0 CR1-2: IPv6 Required to Support NM-BBMDC-B [BTLWG-1408, CR-0549]

Overview:

The Testplan requires NM-BBMDC-B BIBB for devices that support IPv6 and BBMD. NM-BBMDC-B BIBB is specifically for IPv4 BBMD devices. This proposal cleans up the IPv6 Checklist and Test plan.

Proposed Changes:

Checklist Changes

Data Link Layer - IPv6		
	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
	R	Supports configuration through Network Port object
	O	Supports DHCP
	BTL C³	Supports NM-BBMDC-B
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 is able to operate in BBMD mode.		

Test Plan Changes

9.8 Data Link Layer - ~~IPv6~~IPv6

[Modify Test Plan 1 9.8.1]

9.8.1 Base Requirements

Base requirements must be met by any IUT that can act, or can be made to act, as a BACnet/~~IPv6~~IPv6 device in a non-BBMD mode.

BTL - 12.X.1.1 - Execute Original-Unicast-NPDU		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	
BTL - 12.X.1.2 - Execute Virtual-Address-Resolution		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	
BTL - 7.3.2.X62.1.2 - Verify Network Configuration Through Network Port Object Test		
	Test Conditionality	Must be executed. If the device claims Protocol_Revision 16 or lower, this test shall be skipped.
	Test Directives	Execute this test at least once on each Network Port object that has Network_Type = IPV6 and contains configurable properties. Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	

[Modify Test Plan - 9.8.3]

9.8.3 Is Able to Operate in Foreign Mode

The IUT supports FOREIGN mode.

Verify Test Selection		
	Test Conditionality	<i>Must be executed.</i>
	Test Directives	<i>Execute test 7.3.2.X62.1.1 at least once for each Network Port object that has Network_Type = IPV6, Protocol_Level = BACNET APPLICATION, and supports FOREIGN Mode. This test shall be performed on the FD_BBMD_Address and FD_Subscription_Lifetime properties.</i>
	Testing Hints	
...		

[Modify Test Plan - 9.8.4]

9.8.4 Is Able to Operate in BBMD Mode

The IUT supports BBMD mode.

Verify Test Selection		
	Test Conditionality	<i>Must be executed.</i>
	Test Directives	<i>Execute test 7.3.2.X62.1.1 at least once for each Network Port object that has Network_Type = IPV6, Protocol_Level = BACNET APPLICATION, and supports BBMD mode. This test shall be performed on the BBMD_Broadcast_Distribution_Table and BBMD_Accept_FD_Registrations properties.</i>
	Testing Hints	
...		

[Modify Test Plan - 9.8.5]

9.8.5 Supports Configuration Through Network Port Object

The IUT supports full, or partial, configuration of the data link through the Network Port object. *Specifically, at least 1 property in the Network Port object which changes the behavior of the data link is writable.*

Verify Checklist		
	Test Conditionality	<i>Must be executed.</i>
	Test Directives	<i>Verify that the IUT claims support for DS-WP-B.</i>
	Testing Hints	
BTL - 7.3.2.X62.1.1 - Configure Network Through Network Port Object Test		
	Test Conditionality	<i>Must be executed</i>
	Test Directives	<i>Execute this test at least once on each Network Port object that has Network_Type = IPV6 and contains writable properties. Perform at least once. Repeat each time the network is reconfigured for a test.</i>
	Testing Hints	

Specified Test Changes

None

BTL-23.0 CR1-3: IPv4 Writability Requirements [BTLWG-1416, CR-0549]

Overview:

This proposed change highlights the writability requirements of the Network Port object and spells out exactly what properties are required to be writable in the NPO based on the Network_Type and Protocol_Level.

Proposed Changes:

Checklist Changes

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
	C ³ ^e	Supports configuration through Network Port object
	O	Is able to initiate broadcast messages
	O	Supports Network Port objects and DHCP
	O	Supports Network Address Translation in BBMD mode
	BTL-C ^{3d}	Supports NM-BBMD-C-B
¹ Required if the device does not support BBMD mode. ² Required if the device does not support Foreign mode. ³ This option is required if the IUT claims Protocol Revision 17 or higher. ^{4d} Required if the device is able to operate in BBMD mode		

Test Plan Changes

9.3 Data Link Layer - ~~IPv4~~IPv4

[Modify Test Plan - 9.3.1]

9.3.1 Base Requirements

Base requirements for all IPv4 devices. ~~There are no base requirements.~~

BTL - 7.3.2.X62.1.2 - Verify Network Configuration Through Network Port Object Test		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 17 or higher.
	Test Directives	Execute this test at least once on each Network Port object that has Network Type = IPV4 and contains configurable properties.
	Testing Hints	

[Modify Test Plan - 9.3.2]

9.3.2 Is Able to Operate in Normal Mode

IUT can act, or can be made to act, as a BACnet/IP device in a non-BBMD mode.

... BTL - 7.3.2.X62.1.2 - Verify Network Configuration Through Network Port Object Test		
	Test Conditionality	If the device claims Protocol_Revision 16 or lower, this test shall be skipped.
	Test Directives	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	

[Modify Test Plan - 9.3.3]

9.3.3 Is Able to Operate in Foreign Mode

The IUT can register as a foreign device with a BBMD.

The IUT supports a configurable BBMD Address to which it sends Register-Foreign-Device NPDU.

Verify Test Selection		
	Test Conditionality	<i>Must be executed if the IUT claims Protocol Revision 17 or higher.</i>
	Test Directives	<i>Execute test 7.3.2.X62.1.1 at least once for each Network Port object that has Network_Type = IPV4, Protocol_Level = BACNET_APPLICATION, and supports FOREIGN Mode. This test shall be performed on the FD BBMD Address and FD Subscription Lifetime properties.</i>
	Testing Hints	
...		

[Modify Test Plan - 9.3.4]

9.3.4 Is Able to Operate in BBMD Mode

The IUT acts, or can be made to act, as a BBMD device.

The IUT is capable of being configured for two-hop distribution. In this mode a BBMD sends forwards original BACnet/IP broadcasts to each peer BBMD instead of sending directed broadcasts to each IP subnet.

Two-Hop mode is required functionality and many of the base requirements tests are applied against BBMDs configured to operate in two-hop mode. Due to the coverage of this functionality in the other test plan areas, no two-hop specific tests are provided here.

The IUT supports a BDT with at least four entries.

Verify Test Selection		
	Test Conditionality	<i>Must be executed if the IUT claims Protocol Revision 17 or higher.</i>
	Test Directives	<i>Execute test 7.3.2.X62.1.1 at least once for each Network Port object that has Network_Type = IPV4, Protocol_Level = BACNET_APPLICATION, and supports BBMD mode. This test shall be performed on the BBMD Broadcast Distribution Table and BBMD Accept FD Registrations properties.</i>
	Testing Hints	
BTL - 14.2.1.2 - Execute Forwarded-NPDU (Two-hop Distribution)		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	
BTL - 14.2.2.2 - Execute Original-Broadcast-NPDU (Two-hop Distribution)		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	
135.1-2019 - 14.2.3 - Execute Original-Unicast-NPDU		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	
BTL - 14.1.X11 - Processing Forwarded-NPDU request initiated from different port		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	
BTL - 14.3.X1 - Write-BDT service is required to return Write-BDT-NAK		
	Test Conditionality	Must be executed in all devices claiming Protocol Revision >= 17.
	Test Directives	
	Testing Hints	
BTL - 7.3.2.X62.1.2 - Verify Network Configuration Through Network Port Object Test		

	Test Conditionality	If the device claims Protocol_Revision 16 or lower, this test shall be skipped.
	Test Directives	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	
...		

[Modify Test Plan 5 9.3.5]

9.3.5 Supports Configuration Through Network Port Object

The IUT supports full, or partial, configuration of the data link through the Network Port object. Specifically, at least 1 property in the Network Port object which changes the behavior of the data link is writable.

Verify Checklist		
	Test Conditionality	Must be executed.
	Test Directives	Verify that the IUT claims support for DS-WP-B.
	Testing Hints	
BTL - 7.3.2.X62.1.1 - Configure Network Through Network Port Object Test		
	Test Conditionality	Must be executed if Protocol_Revision is 17 or higher.
	Test Directives	Execute this test at least once on each Network Port object that has Network_Type = IPV4 and contains writable properties. Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	

Specified Test Changes

None.

BTL-23.0 CR1-4: MS/TP Writability Requirements [BTLWG-1417, CR-0549]

Overview:

This proposed change highlights the writability requirements of the Network Port object and spells out exactly what properties are required to be writable in the NPO based on the Network_Type and Protocol_Level.

Proposed Changes:

Checklist Changes

None

Test Plan Changes

9.1.1 Base Requirements

Base requirements for all MS/TP master devices.

...		
BTL - 7.3.2.X62.1.2 - Verify Network Configuration Through Network Port Object Test		
Test Conditionality	If the device claims Protocol_Revision 16 or lower, this test shall be skipped. Must be executed if the IUT claims Protocol_Revision 17 or higher and supports DS-WP-B.	
Test Directives	Execute this test at least once on each Network Port object that has Network_Type = MSTP and contains configurable properties. Perform at least once. Repeat each time the network is reconfigured for a test.	
Testing Hints		
...		

9.1.2 Supports Writable Max_Master Property

The IUT contains the Max_Master property and it is writable.

135.1-2019 - 12.1.3.10 - Max Master Test		
Test Conditionality	Must be executed if the IUT claims Protocol_Revision 16 or lower.	
Test Directives		
Testing Hints		
Verify Test Selection		
Test Conditionality	Must be executed if the IUT claims Protocol_Revision 17 or higher.	
Test Directives	Execute test 7.3.2.X62.1.1 at least once for each Network Port object that has Network_Type = MSTP and Protocol_Level = BACNET_APPLICATION. This test shall be performed on the Max_Master property.	
Testing Hints		

9.1.3 Supports Read Only Max_Master Property

The IUT contains the Max_Master property that is read-only.

135.1-2019 - 12.1.3.10 - Max Master Test		
Test Conditionality	Must be executed if the IUT claims Protocol_Revision 16 or lower. This test shall be skipped if the IUT claims Protocol_Revision 17 or higher.	
Test Directives		
Testing Hints		
Verify Checklist		
Test Conditionality	Must be executed if the IUT claims Protocol_Revision 17 or higher.	
Test Directives	Verify that the IUT does not claim support for DS-WP-B.	

	Testing Hints	
BTL-7.3.2.X62.1.X1 - Network Port Object Not Writable Property Test		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 17 or higher.
	Test Directives	Execute this test on each Network Port object that has Network Type = MSTP and Protocol Level = BACNET APPLICATION. This test shall be performed on the Max_Master property with a default value of 127.
	Testing Hints	

9.1.4 Contains Configurable Max_Info_Frames Property

The IUT contains a configurable Max_Info_Frames property.

135.1-2019 - 12.1.3.11 - Max_Info_Frames Test		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 16 or lower.
	Test Directives	
	Testing Hints	
Verify Test Selection		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 17 or higher.
	Test Directives	Execute test 7.3.2.X62.1.1 at least once for each Network Port object that has Network Type = MSTP and Protocol Level = BACNET APPLICATION. This test shall be performed on the Max_Info_Frames property.
	Testing Hints	

9.1.5 Contains Non-Configurable Max_Info_Frames Property

The IUT contains a non-configurable Max_Info_Frames property.

135.1-2019 - 12.1.3.11 - Max_Info_Frames Test		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 16 or lower.
	Test Directives	
	Testing Hints	
Verify Checklist		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 17 or higher.
	Test Directives	Verify that the IUT does not claim support for DS-WP-B.
	Testing Hints	
BTL-7.3.2.X62.1.X1 - Network Port Object Not Writable Property Test		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 17 or higher.
	Test Directives	Execute this test on each Network Port object that has Network Type = MSTP and Protocol Level = BACNET APPLICATION. This test shall be performed on the Max_Info_Frames property with a default value of 1.
	Testing Hints	

[Modify section 9.1.8 Supports Configuration through Network Port Object]

9.1.8 Supports Configuration Through Network Port Object

The IUT supports full, or partial, configuration of the data link through the Network Port object. Specifically, at least 1 property in the Network Port object which changes the behavior of the data link is writable.

Verify Checklist		
	Test Conditionality	Must be executed.
	Test Directives	Verify that the IUT claims support for DS-WP-B.
	Testing Hints	
BTL - 7.3.2.X62.1.1 - Configure Network Through Network Port Object Test		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision 17 or higher.
	Test Directives	Execute this test at least once on each Network Port object that has Network Type = MSTP and contains writable properties. Perform at least once. Repeat each time the network is reconfigured for a test.

Testing Hints	
----------------------	--

Specified Test Changes

[Add new test]

7.3.2.X62.1.X1 Network Port Object Not Writable Property Test

Reason for Change: New test for read-only NPO properties.

Purpose: This test verifies that writes to read-only properties of a Network Port object do not affect the Changes_Pending property and, if one is defined, contains the prescribed default value.

Test Concept: The properties of a Network Port object, NPO1, are written and rejected and the Changes_Pending is checked.

Configuration Requirements: P1 through PN are Network Port properties that are supported by the Network_Type and Protocol_Level and are not writable in the IUT.

Test Steps:

1. VERIFY Changes_Pending = FALSE
2. REPEAT P = P1 ... PN {
 - TRANSMIT WriteProperty-Request,
 - 'Object Identifier' = NPO1,
 - 'Property Identifier' = P,
 - 'Property Value' = (any valid value)
 - RECEIVE BACnet-Error-PDU
 - 'Error Class' = PROPERTY,
 - 'Error Code' = WRITE_ACCESS_DENIED
 - CHECK (P = prescribed default value)}
3. VERIFY Changes_Pending = FALSE