# BACnet® TESTING LABORATORIES ADDENDA

# Addendum cr1 to BTL Test Package 26.0

**Revision final**
**Revised 9/5/2025**

Approved by the BTL Working Group on September 4, 2025
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**[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.



In the following document, language to be added to existing clauses within the BTL Test Package 26.0 is indicated through the use of *italics*, while deletions are indicated by ~~strikethrough~~. 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-26.0 cr1-1: Improve Notes to Tester for Test 9.16.2.3 [BTLWG-847, CR-0365]**

**Overview:**

In response to CR-0365 the BTL-WG agreed to improve the tests Notes to Tester to not direct testers to pick instances of objects the IUT does not support.

**Changes:**

# Checklist Changes

None

# Test Plan Changes

[In section 8.22.2, change reference for 135.1-2023 - 9.16.2.3 to BTL - 9.16.2.3]
[In section 8.22.3, change reference for 135.1-2023 - 9.16.2.8 to BTL - 9.16.2.8]

# Specified Test Changes

For Test 135.1-2023 - 9.16.2.3 and 9.16.2.8, the note to the tester will be replaced with a configuration requirement.

### 9.16.2.3 Attempting to Create an Object with an Object Identifier That is Not Creatable by Specifying the Object Identifier

Purpose: To verify the correct execution of the CreateObject service request when the 'Object Specifier' parameter conveys an object identifier for an object type that is not dynamically creatable in the IUT.

Test Steps:

1. TRANSMIT CreateObject-Request,
   'Object Identifier' = (any ~~object identifier having a~~ supported object type for which dynamic creation *using the CreateObject service* is not supported)
2. RECEIVE CreateObject-Error,
   Error Class = OBJECT,
   Error Code = DYNAMIC_CREATION_NOT_SUPPORTED
   'First Failed Element Number' = 0
3. VERIFY (the IUT's Device object),
   Object_List = (any object list that does not contain the object specified in step 1)

~~Notes to tester: If the IUT limits the instances that can be created, this shall be taken into account when selecting an object identifier in step 1.~~

### 9.16.2.8 Attempting to Create a non-Supported Object Type (by Object Identifier)

Purpose: To verify the correct execution of the CreateObject service request when the 'Object Specifier' parameter conveys an object identifier for an object type that is not supported in the IUT.

~~Notes to Tester: If the IUT limits the instances that can be created, this shall be taken into account when selecting an object identifier in step 1.~~

Test Steps:
1. TRANSMIT CreateObject-Request,
   'Object Specifier' = (any object identifier having an unsupported object type)

2. IF (Protocol_Revision >= 10) THEN
    RECEIVE CreateObject-Error,
        'Error Class' = OBJECT,
        'Error Code' = UNSUPPORTED_OBJECT_TYPE
        'First Failed Element Number' = 0
    ELSE
    RECEIVE CreateObject-Error,
        'Error Class' = (any valid error class),
        'Error Code' = (any valid error code)
        'First Failed Element Number' = 0
3. VERIFY (the IUT's Device object, Object_List = (any object list that does not contain the object specified in step 1)

**BTL-26.0 cr1-2: B-SC Checklist for Pre-PR24 And Routing Fixes [BTLWG-1729, CR-0581]**

**Overview:**

Contradiction in Footnote 7 and 9 for Supports writable Network_Number property if PR <24.
Other issues with PR<24 and NPOs.
Added ability in the Test Plan to test with a proprietary NPO if PR<24.

**Changes:**

# Checklist Changes

| **Data Link Layer - Secure Connect** | | |
|---|---|---|
| | R | Base Requirements |
| | C[1] | Is able to operate as a node without a local hub function |
| | C[1] | Is able to operate as a hub |
| | O | Supports direct connections |
| | O[2] | Is able to accept direct connections |
| | O[2] | Is able to initiate direct connections |
| | C[3] | Supports the Network Port object |
| | C[4] | Contains a Network Port object with a Proprietary Network_Type |
| | C[5] | Supports DM-TS-B |
| | C[5] | Supports DM-UTC-B |
| | C[5] | Supports Time Synchronization by Some Other Method |
| | C[6] | Supports B/SC over IPv4 |
| | C[6] | Supports B/SC over IPv6 |
| | O[7] | Supports configurable Out_Of_Service property |
| | C[7,8] | Supports hierarchical Network Port objects |
| | C[7,8] | Supports Non-hierarchical Network Port objects |
| | C[7,9] | Supports writable Network_Number property |
| | O[7] | Supports the Routing_Table property |
| | O[7] | Supports the Network Port Object Command property |
| | O[7,10] | Supports the DISCARD_CHANGES command |
| | O[7,10] | Supports the RESTART_PORT command |
| | O[~~7~~,10,*11*] | Supports the GENERATE_CSR_FILE command |
| | O[~~7~~,10,*11*] | Supports the VALIDATE_CHANGES command |

[1] At least one of these options must be supported.
[2] At least one of these options must be supported if the device supports direct connections.
[3] Required if the IUT claims Protocol_Revision 24 or higher.
[4] Required if the IUT claims a Protocol_Revision greater than 16 and less than 24.
[5] At least one of these options must be supported.
[6] At least one of these options must be supported.
[7] Protocol_Revision ~~24~~*17* or higher must be claimed.
[8] At least one of these options must be supported.
[9] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate.
[10] At least one of these options is required if the Network Port object Command property is supported.
*[11] Protocol_Revision 24 or higher must be claimed.*

# Test Plan Changes

## 9.9.14 Supports Configurable Out_Of_Service Property

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary* and contains a writable or configurable Out_Of_Service property.

| **BTL - 7.3.1.1.X5 - Out_Of_Service, Status_Flags, Reliability and Command Property Test** | | |
|---|---|---|
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |

## 9.9.15 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary*, Protocol_Level = BACNET_APPLICATION and supports a set of Network Port objects which form a hierarchy of Network Port objects.

| **Verify EPICS** | | |
|---|---|---|
| | **Test Conditionality** | Must be executed if the IUT claims Protocol_Revision >= 24. |
| | **Test Directives** | Verify that each Network Port object *with Network Type = SECURE_CONNECT* contains only required and optional properties based on its Network_Type and Protocol_Level. |
| | **Testing Hints** | |
| **BTL - 7.3.2.46.4.1 - Valid Hierarchy Test** | | |
| | **Test Conditionality** | Must be executed *if the IUT claims Protocol_Revision >= 24.* |
| | **Test Directives** | Verify the hierarchy of NPOs contain a single NPO at Protocol_Level = BACNET_APPLICATION and Network_Type = SECURE_CONNECT. This NPO references one or more NPOs at Protocol_Level = PROTOCOL and Network_Type = IPV4 or IPV6. Each NPO at Protocol_Level = PROTOCOL references a NPO at Protocol_Level = PHYSICAL and Network_Type = ETHERNET. Alternatively, the NPO at Protocol_Level = BACNET_APPLICATION and Network_Type = SECURE_CONNECT may reference NPOs at Protocol_Level = PROTOCOL or PHYSICAL with a standard or proprietary Network_Type. The final NPO must be at Protocol_Level = PHYSICAL. |
| | **Testing Hints** | |

## 9.9.16 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary*, Protocol_Level = BACNET_APPLICATION, and supports non-hierarchical Network Port objects.

| **Verify EPICS** | | |
|---|---|---|
| | **Test Conditionality** | Must be executed *if the IUT claims Protocol_Revision >= 24*. |
| | **Test Directives** | Verify IUT contains only Network Port objects with *Network Type = SECURE_CONNECT and* Protocol_Level equal to BACNET_APPLICATION for this Network_Type. |
| | **Testing Hints** | |
| ~~**Verify EPICS**~~ | | |
| | ~~**Test Conditionality**~~ | ~~Must be executed if the IUT claims Protocol_Revision < 24.~~ |
| | ~~**Test Directives**~~ | ~~Verify the Reference_Port is absent or equal to 4194303.~~ |
| | ~~**Testing Hints**~~ | |
| **Verify EPICS** | | |
| | **Test Conditionality** | Must be executed if the IUT claims Protocol_Revision >= 24. |

| | | |
|---|---|---|
| | **Test Directives** | Verify the Reference_Port is absent *in each Network Port object Network Port objects with Network Type = SECURE_CONNECT*. |
| | **Testing Hints** | |
| **Verify EPICS** | | |
| | **Test Conditionality** | Must be executed *if the IUT claims Protocol_Revision >= 24*. |
| | **Test Directives** | Verify the Additional_Reference_Ports property is absent *in each Network Port object Network Port objects with Network Type = SECURE_CONNECT*. |
| | **Testing Hints** | |
| **Verify EPICS** | | |
| | **Test Conditionality** | Must be executed if the IUT claims Protocol_Revision >= 24. |
| | **Test Directives** | Verify if the IUT claims Protocol_Revision >= 24contains all required properties based on its Network_Type. |
| | **Testing Hints** | |
| **Verify EPICS** | | |
| | **Test Conditionality** | Must be executed if the IUT claims Protocol_Revision >= 24. |
| | **Test Directives** | Verify each Network Port object Network Port objects *with Network Type = SECURE_CONNECT* contains only valid optional properties based on its Network_Type. |
| | **Testing Hints** | |

## 9.9.17 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary* and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

| **135.1-2023 - 7.3.2.46.2 - Network-Number-Is Updates Network_Number_Quality Test** | | |
|---|---|---|
| | **Test Conditionality** | For IUTs which do not accept a value of zero in their Network_Number property, this test shall be skipped. |
| | **Test Directives** | |
| | **Testing Hints** | |

## 9.9.18 Supports the Routing_Table Property

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary* and Protocol_Level = BACNET_APPLICATION that contains the Routing_Table property.

| **135.1-2023 - 7.3.2.46.6 - Routing_Table Test** | | |
|---|---|---|
| | **Test Conditionality** | If the IUT only supports 1 entry in its routing table, then this test shall be skipped. |
| | **Test Directives** | |
| | **Testing Hints** | |

## 9.9.19 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary*, Protocol_Level = BACNET_APPLICATION, and supports the Command property.

| **135.1-2023 - 7.3.2.46.3.1 - IDLE Command Rejected** | | |
|---|---|---|
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **BTL - 7.3.2.46.3.9 - No Commands if Changes_Pending Test** | | |
| | **Test Conditionality** | Must be executed if the Network Port object supports DISCARD_CHANGES and at least 1 other non-IDLE command. |
| | **Test Directives** | |
| | **Testing Hints** | |

| BTL - 7.3.2.46.3.2.X2 - DISCARD_CHANGES Command Failure Test | | |
|---|---|---|
| | **Test Conditionality** | Must be executed if the Network Port object does not support the DISCARD_CHANGES command. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **135.1-2023 - 7.3.2.46.3.3.2 - RENEW_FD_REGISTRATION Command Failure Test** | | |
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **135.1-2023 - 7.3.2.46.3.4.2 - RESTART_SLAVE_DISCOVERY Command Failure Test** | | |
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **135.1-2023 - 7.3.2.46.3.5.2 - RENEW_DHCP Command Failure Test** | | |
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **135.1-2023 - 7.3.2.46.3.6.2 - RESTART_AUTONEGOTIATION Command Failure Test** | | |
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **135.1-2023 - 7.3.2.46.3.7.2 - DISCONNECT Command Failure Test** | | |
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **135.1-2023 - 7.3.2.46.3.8.2 - RESTART_PORT Command Failure Test** | | |
| | **Test Conditionality** | Must be executed if the Network Port object does not support the RESTART_PORT command. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **BTL - 7.3.2.46.3.X.2 - GENERATE_CSR_FILE Command Failure Test** | | |
| | **Test Conditionality** | Must be executed if the Network Port object does not support the GENERATE_CSR_FILE command. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **BTL - 7.3.2.46.3.X.4 - VALIDATE_CHANGES Command Failure Test** | | |
| | **Test Conditionality** | Must be executed if the Network Port object does not support the VALIDATE_CHANGES command. |
| | **Test Directives** | |
| | **Testing Hints** | |

## 9.9.20 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary*, Protocol_Level = BACNET_APPLICATION and supports the DISCARD_CHANGES command.

| BTL - 7.3.2.46.3.2.X1 - DISCARD_CHANGES Command Test | | |
|---|---|---|
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |
| **BTL - 7.3.2.46.3.2.X3 - DISCARD_CHANGES Command With File Object References Test** | | |
| | **Test Conditionality** | Must be executed *if the IUT claims Protocol_Revision >= 24*. |
| | **Test Directives** | Repeat this test by writing to the File object referenced in the Operational_Certificate_File property and each of the File objects |

| | | |
|---|---|---|
| | | referenced in the Issuer_Certificate_Files property of each Network Port object where the Network_Type = SECURE_CONNECT. |
| | **Testing Hints** | |

## 9.9.21 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = SECURE_CONNECT *or proprietary*, Protocol_Level = BACNET_APPLICATION and supports the RESTART_PORT command.

| **135.1-2023 - 7.3.2.46.3.8.1 - RESTART_PORT Command Test** | | |
|---|---|---|
| | **Test Conditionality** | Must be executed. |
| | **Test Directives** | |
| | **Testing Hints** | |

# Specified Test Changes

**None**

**BTL-26.0 cr1-3: Forward Address Resolution DVA Value [BTLWG-1718, CR-0580]**

**Overview:**

Improve documentation for BBMD Testing per CR-0580.

**Changes:**

# Checklist Changes

None

# Test Plan Changes

[In Test Plan Clause 9.8.4, change reference for 135.1-2025 - 12.4.4.1.4 to BTL - 12.4.4.1.4]

# Specified Test Changes

[Update 12.4.4 and add new Figure]

**12.4.4 BBMD Tests**

*This group of tests verifies that a B/IPv6 device that is configured as a BACnet Broadcast Management Device (BBMD) will correctly process incoming B/IPv6 messages that pertain to BBMDs. Only devices that are configured to support BBMD functionality shall execute these tests.*

*Configuration Requirements: The IUT's Network Port object that represents the B/IPv6 port under test shall be configured as follows:*

- *BACnet_IPv6_Mode is BBMD*
- *BACnet_IPv6_Multicast_Address is FF02::BAC0 (Link Local Multicast Address)*
- *BBMD_Broadcast_Distribution_Table shall contain:*

| ***B/IPv6-address*** |
|---|
| *BBMD1* |
| *BBMD2* |
| *BBMD3* |

*Unless otherwise specified, the TD shall operate as BBMD1.*

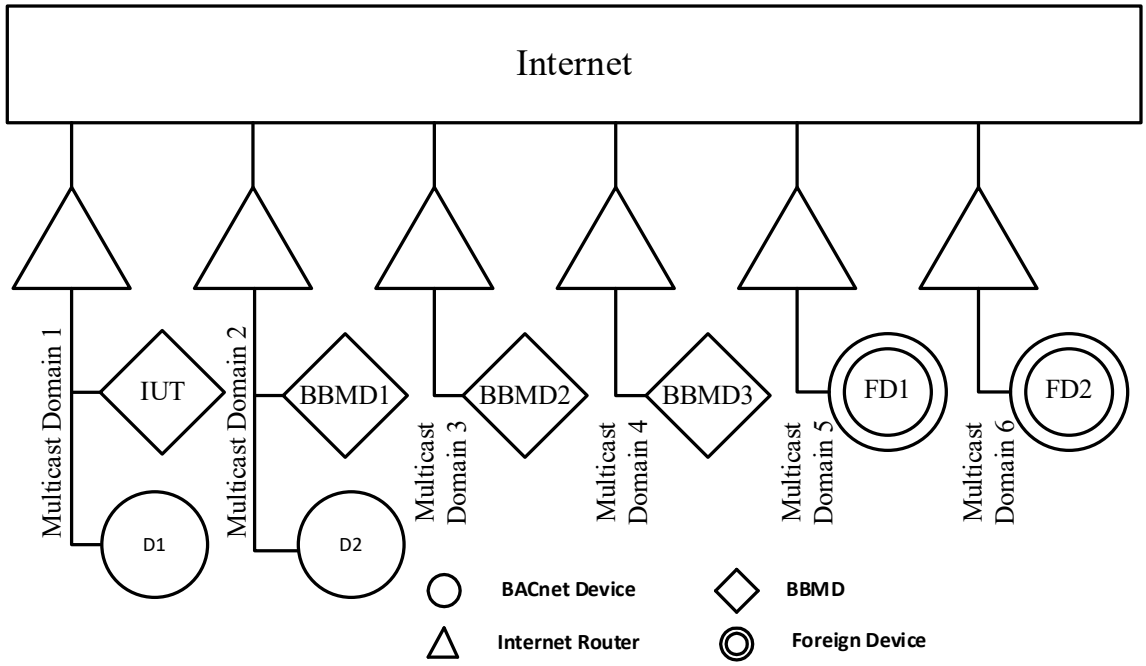


***Figure 12-x Logical network configuration for BBMD tests***

**12.4.4.1 Positive Tests**

~~This group of tests verifies that a B/IPv6 device that is configured as a BACnet Broadcast Management Device (BBMD) will correctly process incoming B/IPv6 messages that pertain to BBMDs. Only devices that are configured to support BBMD functionality shall execute these tests.~~

~~Configuration Requirements: The IUT's Network Port object that represents the B/IPv6 port under test shall be configured as follows:~~

- ~~BACnet_IPv6_Mode is BBMD~~
- ~~BACnet_IPv6_Multicast_Address is FF02::BAC0 (Link Local Multicast Address)~~
- ~~BBMD_Broadcast_Distribution_Table shall contain:~~

| ~~**bbmd-address**~~ |
|---|
| ~~BBMD1~~ |
| ~~BBMD2~~ |
| ~~BBMD3~~ |

~~For purposes of these tests, TD shall be operating as BBMD1.~~

[Modify 12.4.4.1.4]

**12.4.4.1.4 Forwarded-Address-Resolution**

Reason for Change: Fix the destination address in the last step. Add Test Concept and update Configuration Requirements.

Purpose: To verify that the IUT, configured as a BBMD, will process a Forwarded-Address-Resolution request when the target virtual address is not the virtual address of the IUT.

*Test Concept: FD1 shall initiate an Address-Resolution request for FD2. BBMD1 (TD) shall forward the request as a Forwarded-Address-Resolution request to the IUT. The IUT shall forward the request to FD2 and as a local multicast request.*

Configuration Requirements: The TD shall operate as BBMD1 and *shall be* listed in the IUTs Broadcast Distribution Table. *FD1 shall be registered as a foreign device with the TD. FD2 shall be registered as a foreign device with the IUT.*

*Notes to Tester: For Step 1 to occur, the TD must receive an Address-Resolution request from FD1 requesting the address of FD2. See below.*

*RECEIVE*
*DA = TD -- (BBMD1),*
*SA = FD1,*
*Address-Resolution,*
*Source-Virtual-Address = FD1,*
*Target-Virtual-Address = FD2*

Notes to Tester: ~~The execution of step 7 is not significant but is shown here in order to demonstrate the completion of the BVLC.~~ The order of the messages *initiated* ~~transmitted~~ by the IUT is not significant. *After step 3, the FD2 would transmit an Address-Resolution-ACK to complete the BVLC transaction, but it is not part of the test. See below.*

*TRANSMIT*
*DA = FD1,*
*SA = FD2,*
*Address-Resolution-ACK,*
*Source-Virtual-Address = FD2,*
*Destination-Virtual-Address = FD1*

Test Steps:

1. TRANSMIT
   DA = IUT,
   SA = TD,
   Forwarded-Address-Resolution,
   Original-Source-Virtual-Address = FD1,
   Target-Virtual-Address = FD2
   Original-Source-B/IPv6-Address = FD1
2. RECEIVE
   DA = B/IPv6 Link Local Multicast Address,
   SA = IUT,
   Forwarded-Address-Resolution,
   Original-Source-Virtual-Address = FD1,
   Target-Virtual-Address = FD2,
   Original-Source-B/IPv6-Address = FD1
3. RECEIVE
   DA = FD2,
   SA = IUT,
   Forwarded-Address-Resolution,
   Original-Source-Virtual-Address = FD1,
   Target-Virtual-Address = FD2,
   Original-Source-B/IPv6-Address = FD1
~~4. TRANSMIT~~
~~DA = TD,~~
~~SA = FD2,~~
~~Address-Resolution-ACK,~~
~~Source-Virtual-Address = FD2,~~
~~Destination-Virtual-Address = TD~~