



BACnet[®] TESTING LABORATORIES

INTERIM TEST SPECIFICATION

To Be Used with Test Package 26.0
Version 3
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Foreward

The purpose of this document is to define interim tests and other test package changes made to support testing of a device that supports functionality currently not covered in the released BTL Test Package. This document shall be applied and used with BTL Test Package 26.0.

Vendors who are planning to submit a device for testing and who implement Protocol_Revision 27 and higher, or which contain functionality not covered by the Official Test Package, should use this Interim Test document.

Please note that if the device contains functionality not yet covered by the official Test Package, nor by the Interim Tests document, development of new tests may be required for your device. Please contact the BTL Manager before submitting your device for testing to ensure you are aware of all tests that will need to be applied to your device.

The changes in this document are for interim use only and may or may not be used as documented here when the final changes are applied to the next Test Package revision. Devices tested using this interim test document shall be recalled for updated testing when the next revision of test package is released that includes the topics covered here.

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135.1-2023 or any part of the Test Package 26.0 are indicated through the use of *italics*, while deletions are indicated by ~~striketrough~~. Where entirely new sections are proposed to be added, plain type is used throughout.

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BTL Test Plan Changes

This section of the document contains interim changes to the BTL Test Plan document to support testing of products with functionality outside the scope of the official test plan.

This section is ordered the same as the BTL Checklist and BTL Test Plan documents to allow easy navigation of the material.

All test changes can be found in the next major section.

4.6 Data Sharing - WriteProperty - B

JIRA BTLWG-1746

4.6.1 Base Requirements

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

...		
BTL - 9.22.1.X3 - Writing NULL to Non-commandable Properties		
	Test Conditionality	If the IUT claims Protocol_Revision 20, or prior, this test shall be skipped. If the IUT does not contain any writable non-commandable <i>Present_Value</i> properties, this test shall be skipped.
	Test Directives	Repeat the test for a selection of writable non-commandable, non-Present_Value properties which do not support the value NULL. Repeat the test for each object type with a writable non-commandable Present_Value supported by the IUT which does not support the value NULL.
	Testing Hints	

9.3 Data Link Layer - IPv4

JIRA BTLWG-1729

9.3.2 Is Able to Operate in Normal Mode

...		
135.1-2023 - 12.3.1.9 - Original-Unicast-NPDU		
	Test Conditionality	Must be executed.
	Test Directives	<i>Repeat this test twice, once with the source UDP port equal to the destination UDP port and once with a different source UDP port.</i>
	Testing Hints	
...		

9.3.3 Is Able to Operate in Foreign Mode

...		
135.1-2023 - 12.3.1.9 - Original-Unicast-NPDU		
	Test Conditionality	Must be executed.

	Test Directives	Repeat this test twice, once with the source UDP port equal to the destination UDP port and once with a different source UDP port.
	Testing Hints	
...		

9.3.4 Is Able to Operate in BBMD Mode

...		
135.1-2023 - 12.3.2.3 - Execute Original-Unicast-NPDU		
	Test Conditionality	Must be executed.
	Test Directives	Repeat this test twice, once with the source UDP port equal to the destination UDP port and once with a different source UDP port.
	Testing Hints	
...		

9.9 Data Link Layer - Secure Connect

JIRA BTLWG-1729

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 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.
	Test Directives	Verify the hierarchy of NPOs contain a single NPO at Protocol_Level = BACNET_APPLICATION and Network_Type = SECURE_CONNECT <i>or proprietary</i> . This NPO references one or more NPOs at Protocol_Level = PROTOCOL and Network_Type = IPV4 or IPV6. Each NPO at Protocol_Level = PROTOCOL <i>may reference</i> references a NPO at Protocol_Level = PHYSICAL and Network_Type = ETHERNET. Alternatively, the NPO at Protocol_Level = BACNET_APPLICATION and Network_Type = SECURE_CONNECT

		<i>or proprietary</i> 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.
	Test Directives	Verify IUT contains only Network Port objects with 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.
	Testing Hints	
Verify EPICS		
	Test Conditionality	Must be executed.
	Test Directives	Verify the Additional_Reference_Ports property is absent.
	Testing Hints	
Verify EPICS		
	Test Conditionality	Must be executed if the IUT claims Protocol_Revision >= 24.
	Test Directives	Verify each Network Port object contains 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 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		
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	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 <i>if the IUT claims Protocol_Revision >= 24.</i>
	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	

9.10 Data Link Layer - Virtual Network

JIRA BTLWG-1683

9.10.1 Base Requirements

~~Contact BTL for Interim Tests for this functionality.~~ There are no base requirements for this section.

9.10.2 Supports GW-VN-B

The IUT supports GW-VN-B.

Verify Checklist		
	Test Conditionality	Must be executed.
	Test Directives	Verify that the IUT claims support for GW-VN-B.
	Testing Hints	

9.10.3 Supports the Network Port Object

The IUT contains a Network Port object with Network Type = VIRTUAL.

Verify Checklist		
	Test Conditionality	Must be executed.
	Test Directives	Verify that the IUT claims support for DS-WP-B.
	Testing Hints	
135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test		
	Test Conditionality	Must be executed.
	Test Directives	Execute this test at least once on each Network Port object that has Network_Type = VIRTUAL and contains writable properties. Execute test 7.3.2.46.1.1 at least once with ReinitializeDevice WARMSTART and at least once with ACTIVATE_CHANGES.
	Testing Hints	
BTL - 7.3.2.46.1.3 - Network Port Non-Volatility Properties Test		
	Test Conditionality	Must be executed if any writable properties are supported for which the values are required for proper operation of the network.
	Test Directives	
	Testing Hints	
135.1-2023 - 7.3.2.46.1.4 - Network Port Configuration Conflict Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.10.4 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = VIRTUAL 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	

9.10.5 Supports Configurable Out_Of_Service Property

The IUT contains a Network Port object with Network Type = VIRTUAL 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	

9.10.6 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = VIRTUAL, 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 hierarchical Network Port object contains only required and optional properties based on its Network_Type and Protocol_Level.

	Testing Hints	
BTL - 7.3.2.46.X.Y - Valid Hierarchy Chain - Virtual Test		
	Test Conditionality	Must be executed.
	Test Directives	Repeat this test on all Network Port objects with Protocol_Level = BACNET_APPLICATION, Network_Type = VIRTUAL, and Reference_Port <> 4194303.
	Testing Hints	
BTL - 7.3.2.46.4.2 - Properties in Referenced Network Port Reflected in Top Network Port Object		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision < 24.
	Test Directives	
	Testing Hints	
135.1-2023 - 7.3.2.46.4.3 - Changes Reflected in Top Network Port Object		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision < 24 and supports writable properties in its Network Port hierarchies.
	Test Directives	
	Testing Hints	
135.1-2023 - 7.3.2.46.4.4 - Changes Reflected in Lower Network Port Objects		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision < 24 and supports writable properties in its Network Port hierarchies.
	Test Directives	
	Testing Hints	

9.10.7 Supports Non-hierarchical Network Port Objects

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

Verify EPICS		
	Test Conditionality	Must be executed.
	Test Directives	Verify IUT contains non-hierarchical Network Port objects with 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 for all non-hierarchical Network Port objects of 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 for all non-hierarchical Network Port objects of this Network_Type.
	Testing Hints	
Verify EPICS		
	Test Conditionality	Must be executed.
	Test Directives	Verify the Additional_Reference_Ports property is absent for all non-hierarchical Network Port objects of this Network_Type.
	Testing Hints	
Verify EPICS		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision >= 24.
	Test Directives	Verify each non-hierarchical Network Port object contains all required properties for this Network_Type.
	Testing Hints	

Verify EPICS		
	Test Conditionality	Must be executed if the IUT claims Protocol Revision \geq 24.
	Test Directives	Verify each non-hierarchical Network Port object contains only valid optional properties for this Network Type.
	Testing Hints	

9.10.8 Supports the Routing_Table Property

The IUT contains a Network Port object with Network Type = VIRTUAL 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	

9.10.9 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = VIRTUAL 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 if the Network Port object does not support the RENEW_FD_REGISTRATION command.
	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 if the Network Port object does not support the RESTART_SLAVE_DISCOVERY command.
	Test Directives	
	Testing Hints	
135.1-2023 - 7.3.2.46.3.5.2 - RENEW_DHCP Command Failure Test		
	Test Conditionality	Must be executed if the Network Port object does not support the RENEW_DHCP command.
	Test Directives	
	Testing Hints	
135.1-2023 - 7.3.2.46.3.6.2 - RESTART_AUTONEGOTIATION Command Failure Test		
	Test Conditionality	Must be executed if the Network Port object does not support the RESTART_AUTONEGOTIATION command.
	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	

9.10.10 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = VIRTUAL 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	

9.10.11 Supports the RENEW_FD_REGISTRATION Command

The IUT contains a Network Port object with Network Type = VIRTUAL, Protocol_Level = BACNET_APPLICATION, and supports the RENEW_FD_REGISTRATION command.

135.1-2023 - 7.3.2.46.3.3.1 - RENEW_FD_REGISTRATION Command Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.10.12 Supports the RESTART_SLAVE_DISCOVERY Command

The IUT contains a Network Port object with Network Type = VIRTUAL and Protocol_Level = BACNET_APPLICATION and supports the RESTART_SLAVE_DISCOVERY command.

135.1-2023 - 7.3.2.46.3.4.1 - RESTART_SLAVE_DISCOVERY Command Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.10.13 Supports the RENEW_DHCP Command

The IUT contains a Network Port object with Network Type = VIRTUAL, Protocol_Level = BACNET_APPLICATION or PROTOCOL, and supports the RENEW_DHCP command.

135.1-2023 - 7.3.2.46.3.5.1 - RENEW_DHCP Command Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.10.14 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = VIRTUAL, Protocol_Level = BACNET_APPLICATION or PHYSICAL and supports the RESTART_AUTONEGOTIATION command.

135.1-2023 - 7.3.2.46.3.6.1 - RESTART_AUTONEGOTIATION Command Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.10.15 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = VIRTUAL 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	

9.10.16 Supports the GENERATE_CSR_FILE Command

The IUT contains a Network Port object with Network Type = VIRTUAL, Protocol_Level = BACNET_APPLICATION, and supports the GENERATE_CSR_FILE Command.

BTL - 7.3.2.46.3.X.1 - GENERATE_CSR_FILE Command Test		
	Test Conditionality	Must be executed if the IUT supports the GENERATE_CSR_FILE command.
	Test Directives	
	Testing Hints	

9.10.17 Supports the VALIDATE_CHANGES Command

The IUT contains a Network Port object with Network Type = VIRTUAL and supports the VALIDATE_CHANGES command.

BTL - 7.3.2.46.3.X.3 - VALIDATE_CHANGES Command Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

BTL Specified Tests Changes

This section contains all of the new and changed tests required by the interim test BTL Checklist and BTL Test Plan changes.

BTLWG-1683

[Add Test 7.3.2.46.X.Y]

7.3.2.46.X Valid Hierarchy Tests

7.3.2.46.X.Y Valid Hierarchy Chain - Virtual Test

Reason for Change: Explicit test for this data link.

Purpose: To verify that a hierarchical chain of BACnet network port objects in the IUT is organized in a valid hierarchy of protocol levels.

Test Concept: Starting with a hierarchical Network Port object (NP_APP) and Network_Type which represents a configured application layer port (BACNET_APPLICATION), verify this port contains valid Network_Type, Protocol_Level, and Reference_Port. Visit each Network Port object in the hierarchy ensuring that the Network_Type, Protocol_Level, and Reference_Port are valid. Using the Additional_Reference_Ports property, visit each Network Port object in the hierarchy ensuring that the Network_Type, Protocol_Level, Reference_Port, and Additional_Reference_Ports are valid.

Notes to Tester: NPOs of this Network_Type are excluded from this test if they are at Protocol_Level = PROTOCOL and they are not referenced by another NPO. NPOs of this Network_Type are also excluded from this test if they are at Protocol_Level = PHYSICAL and they are not referenced by another NPO.

Test Steps:

-- Verify Protocol_Level = BACNET_APPLICATION

1. VERIFY NP_APP, Protocol_Level = BACNET_APPLICATION
2. VERIFY NP_APP, Network_Type = VIRTUAL
3. RP = READ NP_APP, Reference_Port
4. VERIFY RP <> 4194303

-- Check the rest of the chain

5. WHILE (RP <> 4194303)
 - {
 - 6. NPx = (Network Port, RP)
 - 7. VERIFY NPx, Protocol_Level <> (NON_BACNET_APPLICATION OR BACNET_APPLICATION)
-- check that if PHYSICAL level it is the last NPO
 - 8. IF (NPx, Protocol_Level == PHYSICAL) THEN
 - 9. VERIFY NPx, Reference_Port = 4194303
 - 10. RP = READ NPx, Reference_Port
 - }
 - either the NPO is at PROTOCOL and does not reference another NPO or it is PHYSICAL

11. IF (Protocol_Revision >= 24 and NP_APP, Additional_Reference_Ports is present) THEN {
12. REPEAT ARP = (for each entry in NP_APP, Additional_Reference_Ports) DO {
13. NPx = (Network Port, ARP)
14. VERIFY NPx, Protocol_Level <> (NON_BACNET_APPLICATION or BACNET_APPLICATION)
-- check that if PHYSICAL level it is the last NPO
15. IF (NPx, Protocol_Level == PHYSICAL) THEN

```

16.         IF (NPx, Additional_Reference_Ports is present) THEN
17.             VERIFY NPx, Additional_Reference_Ports = (empty list)
            -- Check the rest of the chain
18.         RP = READ NPx, Reference_Port
19.         WHILE (RP <> 4194303)
            {
20.             NPx = (Network Port, RP)
21.             VERIFY NPx, Protocol_Level <> (NON_BACNET_APPLICATION
                or BACNET_APPLICATION)
                -- check that if PHYSICAL level it is the last NPO
22.             IF (NPx, Protocol_Level == PHYSICAL) THEN
23.                 VERIFY NPx, Reference_Port = 4194303
24.                 RP = READ NPx, Reference_Port
            }
        }
    }

```

BTLWG-1729

None

BTLWG-1733

None

BTLWG-1746

9.22.1.X3 Writing NULL to Non-commandable Properties

Reason for Change: The standard was changed in PR21 to require that devices not return errors when a **Relinquish NULL** is written to **writable** non-commandable **Present_Value** properties and no test exists for this functionality.

Purpose: This test case verifies that the IUT returns a Result(+) when an attempt is made to relinquish a **writable** non-commandable **Present_Value** property.

Test Concept: Write NULL, **at a priority**, to a writable non-commandable **Present_Value** property, P1 in object O1, and verify the IUT returns a Result(+) and does not modify the property.

Test Configuration: **None. P1 shall be a property for which NULL is not an accepted value.**

Test Steps:

1. READ X = (O1), P1
2. TRANSMIT WriteProperty-Request,
 - 'Object Identifier' = O1,
 - 'Property Identifier' = P1,
 - 'Property Value' = NULL
 - 'Priority' = (any valid value)**
3. RECEIVE BACnet-SimpleACK-PDU

4. VERIFY (O1), P1 = X

BTLWG-1760

None

Version	Date	Author	Change
1.0	2024-12-20	Michael Osborne	• Initial Release. Supports Test Package 26.0.
2.0	2025-03-24	Michael Osborne	• BTLWG-1683 - Add Virtual Data Link to the Test Package
3.0	2025-07-24	Michael Osborne	<ul style="list-style-type: none"> • BTLWG-1729 - B/SC Checklist for pre-PR24 NPOs Does not Allow routing • BTLWG-1733 - Test for src port <> dst port • BRLWG-1746 – Relinquish non-commandable properties • BTLWG-1760 – PR 27 to 30 Checklist Items