BACnet® TESTING LABORATORIES ADDENDA

Addendum imp4 to BTL Test Package 23.3

Revision final
Revised 10/21/2024

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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 23.3 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-23.3 imp4-1: Move NPO Items to Each DLL [BTLWG-1572]

Overview:

The Network Port object has unique functionality based on its data link and protocol level. Using the Objects section of the Checklist does not allow the vendor to select the actual functionality contained in each NPO.

Proposed Changes:

- Move most of the tests from the Network Port object clause to the Data Link Layer clauses.
- For clarity and ease of integration, include moving of the Interim Tests in the Network Port object clause to the DLL clauses.
- Changed Supports configurable Out_Of_Service property from S to O.
- Removed Checklist and Test Plan subclauses for Zigbee, ARCNET, and LonTalk. Added ' Contact BTL for interim tests for this functionality '

Changes:

Checklist Changes

3 Objects

…		
Network Port Object		
	R[1]	Base Requirements
	~~C~~[2]	~~Supports writable Network_Number property~~
	~~S~~	~~Supports configurable Out_Of_Service property~~
	~~O~~	~~Supports hierarchical Network Port objects~~
	~~O~~	~~Supports the Command property~~
	~~O~~[3]	~~Supports the DISCARD_CHANGES command~~
	~~O~~[3]	~~Supports the RENEW_FD_REGISTRATION command~~
	~~O~~[3]	~~Supports the RESTART_SLAVE_DISCOVERY command~~
	~~O~~[3]	~~Supports the RENEW_DHCP command~~
	~~O~~[3]	~~Supports the RESTART_AUTONEGOTIATION command~~
	~~O~~[3]	~~Supports the DISCONNECT command~~
	~~O~~[3]	~~Supports the RESTART_PORT command~~
	~~O~~	~~Supports the Routing_Table property~~
[1] Support for Network Port objects is required for IUTs claiming Protocol_Revision 17 or higher.~~[2]~~ ~~Support for writable Network_Number properties is required in routers and other devices that need to know the network number in order to operate.~~ [3] ~~At least one of these options is required if the Command property is supported.~~		
…		

9 Data Link Layer

Support	Listing	Option
Data Link Layer - MS/TP - Master Node		
	R	Base Requirements
	C[1]	Supports writable Max_Master property
	C[1]	Supports read only Max_Master property

Support	Listing	Option
	C[2]	Contains configurable Max_Info_Frames property
	C[2]	Contains non-configurable Max_Info_Frames property
	O	Is a BACnet router
	C[3,4]	Supports extended MS/TP frames (over 501 octets)
	~~C[5]~~	~~Supports configuration through Network Port object~~
	C[5]	Supports the Network Port object
	O[6]	Supports configurable Out_Of_Service property
	C[7]	Supports hierarchical Network Port objects
	C[7]	Supports Non-hierarchical Network Port objects
	C[6,8]	Supports writable Network_Number property
	O[6]	Supports the Routing_Table property
	O[6]	Supports the Network Port object Command property
	O[6,9]	Supports the DISCARD_CHANGES command
	O[6,9]	Supports the RESTART_SLAVE_DISCOVERY command
	O[6,9]	Supports the RESTART_AUTONEGOTIATION command
	O[6,9]	Supports the RESTART_PORT command
	O[9,10]	Supports the VALIDATE_CHANGES command
	[1] Exactly one of these options is required in order to claim conformance to this BIBB. [2] Exactly one of these options is required in order to claim conformance to this BIBB. [3] Protocol_Revision 16 or higher must be claimed. [4] Required if the IUT is a router and claims Protocol_Revision 16 or higher. [5] Required if the IUT claims Protocol_Revision 17 or higher. [6] Protocol_Revision 17 or higher must be claimed. [7] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. [8] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [9] At least one of these options is required if the Network Port object Command property is supported. [10] Protocol_Revision 24 or higher must be claimed.	
Data Link Layer - MS/TP - Slave Node		
	R	Base Requirements
	~~O~~	~~Supports configuration through Network Port object~~
	O[1]	Supports extended MS/TP frames (over 501 octets)
	C[2]	Supports the Network Port object
	O[3]	Supports configurable Out_Of_Service property
	C[4]	Supports hierarchical Network Port objects
	C[4]	Supports Non-hierarchical Network Port objects
	O[3]	Supports the Network Port object Command property
	O[3,5]	Supports the DISCARD_CHANGES command
	O[3,5]	Supports the RESTART_AUTONEGOTIATION command
	O[3,5]	Supports the RESTART_PORT command
	O[5,6]	Supports the VALIDATE_CHANGES command
	[1] Protocol_Revision 16 or higher must be claimed. [2] Required if the IUT claims Protocol_Revision 17 or higher. [3] Protocol_Revision 17 or higher must be claimed. [4] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. [5] At least one of these options is required if the Network Port object Command property is supported. [6] Protocol_Revision 24 or higher must be claimed.	
Data Link Layer - IPv4		
	R	Base Requirements

Support	Listing	Option
	C[1]	Is able to operate in Normal mode
	C[1]	Is able to operate in Foreign mode
	C[1]	Is able to operate in BBMD mode
	~~C[2]~~	~~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[3]	Supports NM-BBMDC-B
	C[2]	Supports the Network Port object
	O[4]	Supports configurable Out_Of_Service property
	C[5]	Supports hierarchical Network Port objects
	C[5]	Supports Non-hierarchical Network Port objects
	C[4,6]	Supports writable Network_Number property
	O[4]	Supports the Routing_Table property
	O[4]	Supports the Network Port Object Command property
	O[4,7]	Supports the DISCARD_CHANGES command
	O[4,7]	Supports the RENEW_FD_REGISTRATION command
	O[4,7]	Supports the RENEW_DHCP command
	O[4,7]	Supports the RESTART_AUTONEGOTIATION command
	O[4,7]	Supports the RESTART_PORT command
	O[7,8]	Supports the VALIDATE_CHANGES command
[1] Either BBMD or both Normal and Foreign modes are required. [2] Required if the IUT claims Protocol_Revision 17 or higher. [3] Required if the IUT is able to operate in BBMD mode [4] Protocol_Revision 17 or higher must be claimed. [5] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. [6] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [7] At least one of these options is required if the Network Port object Command property is supported. [8] Protocol_Revision 24 or higher must be claimed.		
Data Link Layer - ZigBee		
	R	Base Requirements
	~~O~~	~~Supports configuration through Network Port object~~
	C[1]	Supports the Network Port object
	O[2]	Supports configurable Out_Of_Service property
	C[3]	Supports hierarchical Network Port objects
	C[3]	Supports Non-hierarchical Network Port objects
	C[2,4]	Supports writable Network_Number property
	O	Supports the Routing_Table property
	O	Supports the Network Port Object Command property
	O[2,5]	Supports the DISCARD_CHANGES command
	O[2,5]	Supports the RESTART_AUTONEGOTIATION command
	O[2,5]	Supports the RESTART_PORT command
	O[5,6]	Supports the VALIDATE_CHANGES command

Support	Listing	Option
		[1] Required if the IUT claims Protocol_Revision 17 or higher. [2] Protocol_Revision 17 or higher must be claimed. [3] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. [4] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [5] At least one of these options is required if the Network Port object Command property is supported. [6] Protocol_Revision 24 or higher must be claimed.
Data Link Layer - Ethernet		
	R	Base Requirements
	~~O~~	~~Supports configuration through Network Port object~~
	C[1]	Supports the Network Port object
	O[2]	Supports configurable Out_Of_Service property
	C[3]	Supports hierarchical Network Port objects
	C[3]	Supports Non-hierarchical Network Port objects
	C[2,4]	Supports writable Network_Number property
	O	Supports the Routing_Table property
	O	Supports the Network Port Object Command property
	O[2,5]	Supports the DISCARD_CHANGES command
	O[2,5]	Supports the RESTART_AUTONEGOTIATION command
	O[2,5]	Supports the RESTART_PORT command
	O[5,6]	Supports the VALIDATE_CHANGES command
		[1] Required if the IUT claims Protocol_Revision 17 or higher. [2] Protocol_Revision 17 or higher must be claimed. [3] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. [4] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [5] At least one of these options is required if the Network Port object Command property is supported. [6] Protocol_Revision 24 or higher must be claimed.
Data Link Layer - ARCNET		
	R	Base Requirements
	~~O~~	~~Supports configuration through Network Port object~~
	C[1]	Supports the Network Port object
	O[2]	Supports configurable Out_Of_Service property
	C[3]	Supports hierarchical Network Port objects
	C[3]	Supports Non-hierarchical Network Port objects
	C[2,4]	Supports writable Network_Number property
	O	Supports the Routing_Table property
	O	Supports the Network Port Object Command property
	O[2,5]	Supports the DISCARD_CHANGES command
	O[2,5]	Supports the RESTART_AUTONEGOTIATION command
	O[2,5]	Supports the RESTART_PORT command
	O[5,6]	Supports the VALIDATE_CHANGES command

Support	Listing	Option
	[1] Required if the IUT claims Protocol_Revision 17 or higher. [2] Protocol_Revision 17 or higher must be claimed. [3] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. [4] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [5] At least one of these options is required if the Network Port object Command property is supported. [6] Protocol_Revision 24 or higher must be claimed.	
Data Link Layer - LonTalk		
	R	Base Requirements
	~~O~~	~~Supports configuration through Network Port object~~
	C[1]	Supports the Network Port object
	O[2]	Supports configurable Out_Of_Service property
	C[3]	Supports hierarchical Network Port objects
	C[3]	Supports Non-hierarchical Network Port objects
	C[2,4]	Supports writable Network_Number property
	O	Supports the Routing_Table property
	O	Supports the Network Port Object Command property
	O[2,5]	Supports the DISCARD_CHANGES command
	O[2,5]	Supports the RESTART_AUTONEGOTIATION command
	O[2,5]	Supports the RESTART_PORT command
	O[5,6]	Supports the VALIDATE_CHANGES command
	[1] Required if the IUT claims Protocol_Revision 17 or higher. [2] Protocol_Revision 17 or higher must be claimed. [3] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. [4] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [5] At least one of these options is required if the Network Port object Command property is supported. [6] Protocol_Revision 24 or higher must be claimed.	
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[1]	Is able to operate in BBMD mode
	~~R~~	~~Supports configuration through Network Port object~~
	O	Supports DHCP
	R	Supports the Network Port object
	O	Supports configurable Out_Of_Service property
	C[2]	Supports hierarchical Network Port objects
	C[2]	Supports Non-hierarchical Network Port objects
	C[3]	Supports writable Network_Number property
	O	Supports the Routing_Table property
	O	Supports the Network Port Object Command property
	O[4]	Supports the DISCARD_CHANGES command
	O[4]	Supports the RENEW_FD_REGISTRATION command
	O[4]	Supports the RENEW_DHCP command
	O[4]	Supports the RESTART_AUTONEGOTIATION command
	O[4]	Supports the RESTART_PORT command
	O[4,5]	Supports the VALIDATE_CHANGES command

Support	Listing	Option
		[1] Either BBMD or both Normal and Foreign modes are required. [2] At least one of these options is required. [3] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [4] At least one of these options is required if the Network Port object Command property is supported. [5] Protocol_Revision 24 or higher must be claimed.
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
	~~O~~	~~Supports configuration through Network Port object~~
	~~C[3,4]~~	~~Supports Data Attributes as of Protocol_Revision 25~~
	C[3]	Supports the Network Port object
	O[4]	Supports configurable Out_Of_Service property
	C[5]	Supports hierarchical Network Port objects
	C[5]	Supports Non-hierarchical Network Port objects
	C[4,6]	Supports writable Network_Number property
	O[4]	Supports the Routing_Table property
	O[4]	Supports the Network Port Object Command property
	O[4,7]	Supports the DISCARD_CHANGES command
	O[4,7]	Supports the RESTART_PORT command
	O[4,7]	Supports the GENERATE_CSR_FILE command
	O[7,8]	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 IUT supports direct connections. [3] Required if the IUT claims Protocol_Revision 17 or higher. [4] Protocol_Revision 17 or higher must be claimed. [5] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher. ~~[3] Required if the IUT claims Protocol_Revision 25 or higher.~~ ~~[4] Contact BTL for interim tests for this functionality.~~ [6] Support for writable Network_Number properties is required in routers and other IUTs that need to know the network number in order to operate. [7] At least one of these options is required if the Network Port object Command property is supported. [8] Protocol_Revision 24 or higher must be claimed.
Data Link Layer - Virtual Network		
	R[1]	Base Requirements
		[1] Contact BTL for interim tests for this functionality
Data Link Layer - B/IP PAD (Annex H)		
	R[1]	Base Requirements
		[1] Contact BTL for interim tests for this functionality
Data Link Layer - Proprietary		
	R	Base Requirements
	C[1]	Supports the Network Port object
	O[2]	Supports configurable Out_Of_Service property
	C[3]	Supports hierarchical Network Port objects
	C[3]	Supports Non-hierarchical Network Port objects

Support	Listing	Option
	O[2]	Supports the Network Port object Command property
	O[2,4]	Supports the DISCARD_CHANGES command
	O[2,4]	Supports the RESTART_PORT command
	O[4,5]	Supports the VALIDATE_CHANGES command

[1] Required if the IUT claims Protocol_Revision 17 or higher.
[2] Protocol_Revision 17 or higher must be claimed.
[3] At least one of these options is required if the IUT claims Protocol_Revision 17 or higher.
[4] At least one of these options is required if the Network Port object Command property is supported.
[5] Protocol_Revision 24 or higher must be claimed.

Test Plan Changes

[Remove sections from 3.56.1, Network Port Object to be put into data link layer sections.]

3.56 Network Port Object

3.56.1 Base Requirements

Base requirements must be met by any IUT that can contain Network Port objects.

~~135.1-2023 - 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~~	~~If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.~~
	~~Test Directives~~	
	~~Testing Hints~~	~~Note that almost all Network Port objects have mandated writable properties, so take care to verify that an IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.~~
~~135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance~~		
	~~Test Conditionality~~	~~Must be executed~~
	~~Test Directives~~	
	~~Testing Hints~~	
~~135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance~~		
	~~Test Conditionality~~	~~If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.~~
	~~Test Directives~~	
	~~Testing Hints~~	
BTL - 7.3.2.46.5 - APDU_Length Test		
	Test Conditionality	Must be executed.
	Test Directives	If the IUT supports data links with different allowable APDU lengths, run this test at least twice where the calculated maximum APDU length would be different.
	Testing Hints	

~~3.56.2 Supports Writable Network_Number Property~~

~~The Network_Number property in Network Port objects contained in the IUT is writable.~~

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

3.56.3 Supports Configurable Out_Of_Service Property

The Out_Of_Service property in Network Port objects contained in the IUT are either writable or can be modified by any other means.

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	

3.56.4 Supports Hierarchical Network Port Objects

The IUT contains, or can be made to contain, a set of Network Port objects which form a hierarchy of protocols.

135.1-2023 - 7.3.2.46.4.1 - Valid Hierarchy Test		
	Test Conditionality	Must be executed.
	Test Directives	Repeat for each supported Network_Type at the BACNET_APPLICATION level.
	Testing Hints	
135.1-2023 - 7.3.2.46.4.2 - Properties in Referenced Network Port Reflected in Top Network Port Object		
	Test Conditionality	Must be executed.
	Test Directives	Repeat for each supported Network_Type at the BACNET_APPLICATION level.
	Testing Hints	The test is written such that it tests all configured BACNET_APPLICATION Network Port objects so configuring the IUT to contain an example of each will allow the test to be run fewer times.
135.1-2023 - 7.3.2.46.4.3 - Changes Reflected in Top Network Port Object		
	Test Conditionality	Test shall be skipped if the IUT does not support any writable properties in its Network Port hierarchies.
	Test Directives	Repeat for each supported Network_Type at the BACNET_APPLICATION level.
	Testing Hints	The test is written such that it tests all configured BACNET_APPLICATION Network Port objects so configuring the IUT to contain an example of each will allow the test to be run fewer times.
135.1-2023 - 7.3.2.46.4.4 - Changes Reflected in Lower Network Port Objects		
	Test Conditionality	Test shall be skipped if the IUT does not support any writable properties in its Network Port hierarchies.
	Test Directives	Repeat for each supported Network_Type at the BACNET_APPLICATION level.
	Testing Hints	The test is written such that it tests all configured BACNET_APPLICATION Network Port objects so configuring the IUT to contain an example of each will allow the test to be run fewer times.

3.56.5 Supports the Command Property

The IUT support the Command property in Network Port objects.

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

3.56.6 Supports the DISCARD_CHANGES Command

The IUT supports the DISCARD_CHANGES command in Network Port objects.

135.1-2023 - 7.3.2.46.3.2 - DISCARD_CHANGES Command Test		
	Test Conditionality	Must be executed if the IUT supports the DISCARD_CHANGES command.
	Test Directives	
	Testing Hints	

3.56.7 Supports the RENEW_FD_REGISTRATION Command

The IUT supports the RENEW_FD_REGISTRATION command in Network Port objects.

135.1-2023 - 7.3.2.46.3.3.1 - RENEW_FD_REGISTRATION Command Test		
	Test Conditionality	Must be executed if the IUT supports the RENEW_FD_REGISTRATION command and BACnet/IP or BACnet/Ipv6.
	Test Directives	Repeat for BACnet/IP and BACnet/Ipv6, if supported.
	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 IUT supports a Network Port object for which RENEW_FD_REGISTRATION is not applicable or not supported.
	Test Directives	
	Testing Hints	

3.56.8 Supports the RESTART_SLAVE_DISCOVERY Command

The IUT supports the RESTART_SLAVE_DISCOVERY command in Network Port objects.

135.1-2023 - 7.3.2.46.3.4.1 - RESTART_SLAVE_DISCOVERY Command Test		
	Test Conditionality	Must be executed if the IUT supports the RESTART_SLAVE_DISCOVERY 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 IUT supports a Network Port object for which RESTART_SLAVE_DISCOVERY is not applicable or not supported.
	Test Directives	
	Testing Hints	

3.56.9 Supports the RENEW_DHCP Command

The IUT supports the RENEW_DHCP command in Network Port Objects.

135.1-2023 - 7.3.2.46.3.5.1 - RENEW_DHCP Command Test		
	Test Conditionality	Must be executed if the IUT supports the RENEW_DHCP 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 IUT supports a Network Port object for which RENEW_DHCP is not applicable or not supported.
	Test Directives	

	Testing Hints	

3.56.10 Supports the RESTART_AUTONEGOTIATION Command

The IUT supports the RESTART_AUTONEGOTIATION command in Network Port objects.

135.1-2023 - 7.3.2.46.3.6.1 - RESTART_AUTONEGOTIATION Command Test		
	Test Conditionality	Must be executed if the IUT supports the RESTART_AUTONEGOTIATION 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 IUT supports a Network Port object for which RESTART_AUTONEGOTIATION is not applicable or not supported.
	Test Directives	
	Testing Hints	

3.56.11 Supports the DISCONNECT Command

The IUT supports the DISCONNECT command in Network Port objects.

135.1-2023 - 7.3.2.46.3.7.1 - DISCONNECT Command Test		
	Test Conditionality	Must be executed if the IUT supports the DISCONNECT command.
	Test Directives	
	Testing Hints	
135.1-2023 - 7.3.2.46.3.7.2 - DISCONNECT Command Failure Test		
	Test Conditionality	Must be executed if the IUT supports a Network Port object for which DISCONNECT is not applicable or not supported.
	Test Directives	
	Testing Hints	

3.56.12 Supports the RESTART_PORT Command

The IUT supports the RESTART_PORT command in Network Port objects.

135.1-2023 - 7.3.2.46.3.8.1 - RESTART_PORT Command Test		
	Test Conditionality	Must be executed if the IUT supports the RESTART_PORT command.
	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 IUT supports a Network Port object for which RESTART_PORT is not supported.
	Test Directives	
	Testing Hints	

3.56.13 Supports the Routing_Table Property

The IUT supports the Routing_Table property in Network Port objects.

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	

[Add network port object selections to each datalink as shown below. Note the original 'Supports configuration through Network Port object' is being removed from each section.]

9 Data Link Layer

9.1 Data Link Layer - MS/TP - Master Node

~~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.~~

~~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 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.~~
	~~Testing Hints~~	

9.1.8 Supports the Network Port Object

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

135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test		
	Test Conditionality	Must be executed if the IUT supports DS-WP-B.
	Test Directives	Execute this test at least once on each Network Port object that has Network_Type = MSTP and contains writable properties.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	
135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.1.9 Supports Configurable Out_Of_Service Property

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.1.10 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = MSTP, 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 = MSTP that references a NPO at Protocol_Level = PROTOCOL and Network_Type = MSTP. This NPO references a NPO at Protocol_Level = PHYSICAL and Network_Type = SERIAL.
	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	

9.1.11 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = MSTP, 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	

9.1.12 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = MSTP and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

***BTL~~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	

9.1.13 Supports the Routing_Table Property

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

9.1.14 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	
135.1-2023 - 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 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.
	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.
	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	

9.1.15 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.1.16 Supports the RESTART_SLAVE_DISCOVERY Command

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

9.1.17 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = MSTP and Protocol_Level = BACNET_APPLICATION or Network Type = SERIAL and Protocol_Level = 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	

9.1.18 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.1.19 Supports the VALIDATE_CHANGES Command

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.2Data Link Layer - MS/TP - Slave Node

~~9.2.2 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.~~

~~135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test~~		
	~~**Test Conditionality**~~	~~Must be executed.~~
	~~**Test Directives**~~	~~Perform at least once.~~ ~~Repeat each time the network is reconfigured for a test.~~
	~~**Testing Hints**~~	

9.2.2 Supports Extended MS/TP Frames (over 501 octets)

The IUT can transmit and receive messages with an NPDU > 501 octets

135.1-2023 - 12.1.3.20 - Frame Type Based on Transmitted NPDU Size		
	Test Conditionality	Must be executed
	Test Directives	Execute the test such that the transmitted NPDU sizes are near the 501 octet boundary.
	Testing Hints	

9.2.3 Supports the Network Port Object

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

135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test		
	Test Conditionality	Must be executed if the IUT support DS-WP-B
	Test Directives	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	
135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.2.4 Supports Configurable Out_Of_Service Property

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.2.5 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = MSTP, 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 = MSTP that references a NPO at Protocol_Level = PROTOCOL and Network_Type = MSTP. This NPO references a NPO at Protocol_Level = PHYSICAL and Network_Type = SERIAL.
	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	

9.2.6 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = MSTP, 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	

9.2.7 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	
135.1-2023 - 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 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.
	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	

9.2.8 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.2.9 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = MSTP and Protocol_Level = BACNET_APPLICATION or Network Type = SERIAL and Protocol_Level = 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	

9.2.10 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.2.11 Supports the VALIDATE_CHANGES Command

The IUT contains a Network Port object with Network Type = MSTP or SERIAL 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	

9.3Data Link Layer - IPv4

~~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.~~

~~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 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.~~
	~~Testing Hints~~	

9.3.5 Is Able to Initiate Broadcast Messages

The IUT can issue a broadcast on its own local subnet or through a BBMD.

135.1-2023 - 12.3.9.1 - Distribute-Broadcast-To-Network		
	Test Conditionality	If the IUT does not support Foreign mode, this test shall be skipped.
	Test Directives	
	Testing Hints	
135.1-2023 - 12.3.9.3 - Original-Broadcast-NPDU		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.3.6 Supports Network Port Objects and DHCP

The IUT can participate in DHCP and reports its status in the Network Port Object.

135.1-2023 - 7.3.2.46.7.1 - Basic IPv4 DHCP Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.3.7 Supports Network Address Translation in BBMD Mode

The IUT is capable of operating behind a router providing Network Address Translation as described in Standard 135 Clause J.7.5.

135.1-2023 - 12.3.7.1.2 - Broadcast Message from Directly Connected IP Subnet (Two-hop Distribution)		
	Test Conditionality	Must be executed.
	Test Directives	Internet Routers and the IUT shall be configured for NAT.
	Testing Hints	
135.1-2023 - 12.3.7.2.2 - Broadcast Message Forwarded by a Peer BBMD (Two-hop Distribution)		
	Test Conditionality	Must be executed.
	Test Directives	Internet Routers and the IUT shall be configured for NAT.
	Testing Hints	
135.1-2023 - 12.3.7.3.2 - Broadcast Message From a Foreign Device (Two-hop Distribution)		
	Test Conditionality	Must be executed.
	Test Directives	Internet Routers and the IUT shall be configured for NAT.
	Testing Hints	

9.3.8 Supports NM-BBMDC-B

The IUT claims support for NM-BBMDC-B

Verify Checklist		
	Test Conditionality	Must be executed.
	Test Directives	Verify the IUT claims support for NM-BBMDC-B
	Testing Hints	

9.3.9 Supports the Network Port Object

The IUT contains a Network Port object with Network Type = IPV4.

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 = IPV4 and contains writable properties.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	

135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.3.10 Supports Configurable Out_Of_Service Property

The IUT contains a Network Port object with Network Type = IPV4 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	

9.3.11 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = IPV4, 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 = IPV4 that references a NPO at Protocol_Level = PROTOCOL and Network_Type = IPV4. This NPO references a NPO at Protocol_Level = PHYSICAL and Network_Type = ETHERNET. Alternatively, the NPO at Protocol_Level = PROTOCOL and Network_Type = IPV4 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	
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	

9.3.12 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = IPV4, 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	

9.3.13 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = IPV4 and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

***BTL~~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	

9.3.14 Supports the Routing_Table Property

The IUT contains a Network Port object with Network Type = IPV4 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	

9.3.15 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = IPV4 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	
135.1-2023 - 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.
	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.*
	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	

9.3.16 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = IPV4 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	

9.3.17 Supports the RENEW_FD_REGISTRATION Command

The IUT contains a Network Port object with Network Type = IPV4, 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	

9.3.18 Supports the RENEW_DHCP Command

The IUT contains a Network Port object with Network Type = IPV4, 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	

9.3.19 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = IPV4, 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	

9.3.20 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = IPV4 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	

9.3.21 Supports the VALIDATE_CHANGES Command

The IUT contains a Network Port object with Network Type = IPV4 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	

9.4Data Link Layer - ZigBee

~~9.4.2 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.~~

~~135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test~~		
	~~Test Conditionality~~	~~Must be executed.~~
	~~Test Directives~~	~~Perform at least once.~~ ~~Repeat each time the network is reconfigured for a test.~~
	~~Testing Hints~~	

9.4.2 Supports the Network Port Object

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

135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test		
	Test Conditionality	Must be executed is the IUT support DS-WP-B.
	Test Directives	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	
135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.4.3 Supports Configurable Out_Of_Service Property

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

9.4.4 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = ZIGBEE, 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 = ZIGBEE that references a NPO at Protocol_Level = PHYSICAL and Network_Type = ZIGBEE.
	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	

9.4.5 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = ZIGBEE, 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	

9.4.6 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = ZIGBEE and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

***BTL*~~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	

9.4.7 Supports the Routing_Table Property

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

9.4.8 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = ZIGBEE 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	
135.1-2023 - 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 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.
	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	

9.4.9 Supports the DISCARD_CHANGES Command

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

9.4.10 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = ZIGBEE, 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	

9.4.11 Supports the RESTART_PORT Command

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

9.4.12 Supports the VALIDATE_CHANGES Command

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

9.5Data Link Layer - Ethernet

~~9.5.2 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.~~

~~135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test~~		
	~~Test Conditionality~~	~~Must be executed.~~
	~~Test Directives~~	~~Perform at least once.~~ ~~Repeat each time the network is reconfigured for a test.~~
	~~Testing Hints~~	

9.5.2 Supports the Network Port Object

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

135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object 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	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	
135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.5.3 Supports Configurable Out_Of_Service Property

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

9.5.4 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = ETHERNET, 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 = ETHERNET that references a NPO at Protocol_Level = PHYSICAL and Network_Type = ETHERNET.
	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	

9.5.5 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = ETHERNET, 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	

9.5.6 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = ETHERNET and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

***BTL*~~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	

9.5.7 Supports the Routing_Table Property

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

9.5.8 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = ETHERNET 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	
135.1-2023 - 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 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.
	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	

9.5.9 Supports the DISCARD_CHANGES Command

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

9.5.10 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = ETHERNET, 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	

9.5.11 Supports the RESTART_PORT Command

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

9.5.12 Supports the VALIDATE_CHANGES Command

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

9.6Data Link Layer - ARCNET

~~9.6.2 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.~~

~~**135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test**~~		
	~~**Test Conditionality**~~	~~Must be executed.~~
	~~**Test Directives**~~	~~Perform at least once.~~ ~~Repeat each time the network is reconfigured for a test.~~
	~~**Testing Hints**~~	

9.6.2 Supports the Network Port Object

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

135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object 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	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	
135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.6.3 Supports Configurable Out_Of_Service Property

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

9.6.4 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = ARCNET, 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 = ARCNET that references a NPO at Protocol_Level = PHYSICAL and Network_Type = ARCNET.
	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	

9.6.5 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = ARCNET, 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	

9.6.6 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = ARCNET and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

***BTL~~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	

9.6.7 Supports the Routing_Table Property

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

9.6.8 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = ARCNET 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	
135.1-2023 - 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 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.
	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	

9.6.9 Supports the DISCARD_CHANGES Command

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

9.6.10 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = ARCNET, 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	

9.6.11 Supports the RESTART_PORT Command

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

9.6.12 Supports the VALIDATE_CHANGES Command

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

9.7Data Link Layer - LonTalk

~~9.7.2 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.~~

~~**135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test**~~		
	~~**Test Conditionality**~~	~~Must be executed.~~
	~~**Test Directives**~~	~~Perform at least once.~~ ~~Repeat each time the network is reconfigured for a test.~~
	~~**Testing Hints**~~	

9.7.2 Supports the Network Port Object

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

135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object 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	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	

135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.7.3 Supports Configurable Out_Of_Service Property

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

9.7.4 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = LONTALK, 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 = LONTALK that references a NPO at Protocol_Level = PHYSICAL and Network_Type = LONTALK.
	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	

9.7.5 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = LONTALK, 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	

9.7.6 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = LONTALK and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

***BTL~~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	

9.7.7 Supports the Routing_Table Property

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

9.7.8 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = LONTALK 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	
135.1-2023 - 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 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.
	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	

9.7.9 Supports the DISCARD_CHANGES Command

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

9.7.10 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = LONTALK, 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	

9.7.11 Supports the RESTART_PORT Command

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

9.7.12 Supports the VALIDATE_CHANGES Command

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

9.8Data Link Layer - IPv6

~~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.~~

~~**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 = IPV6 and contains writable properties.~~
	~~**Testing Hints**~~	

9.8.5 Supports DHCP

135.1-2023 - 7.3.2.46.7.2 - Basic IPv6 DHCP Test		
	Test Conditionality	Must be executed.
	Test Directives	
	Testing Hints	

9.8.6 Supports the Network Port Object

The IUT contains a Network Port object with Network Type = IPV6.

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 = IPV6 and contains writable properties.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	
	Testing Hints	
135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.8.7 Supports Configurable Out_Of_Service Property

The IUT contains a Network Port object with Network Type = IPV6 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	

9.8.8 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = IPV6, 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 = IPV6 that references a NPO at Protocol_Level = PROTOCOL and Network_Type = IPV6. This NPO references a NPO at Protocol_Level = PHYSICAL and Network_Type = ETHERNET. Alternatively, the NPO at Protocol_Level = PROTOCOL and Network_Type = IPV6 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	
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	

9.8.9 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = IPV6, 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	

9.8.10 Supports Writable Network_Number Property

The IUT contains a Network Port object with Network Type = IPV6 and Protocol_Level = BACNET_APPLICATION that contains a writable Network_Number property.

BTL~~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	

9.8.11 Supports the Routing_Table Property

The IUT contains a Network Port object with Network Type = IPV6 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	

9.8.12 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = IPV6 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	
135.1-2023 - 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.
	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.
	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	

9.8.13 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = IPV6 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	

9.8.14 Supports the RENEW_FD_REGISTRATION Command

The IUT contains a Network Port object with Network Type = IPV6, 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	

9.8.15 Supports the RENEW_DHCP Command

The IUT contains a Network Port object with Network Type = IPV6, 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	

9.8.16 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = IPV6, 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	

9.8.17 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = IPV6 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	

9.8.18 Supports the VALIDATE_CHANGES Command

The IUT contains a Network Port object with Network Type = IPV6 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	

9.9Data Link Layer - Secure Connect

~~9.9.7 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.~~

~~**135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object Test**~~		
	~~**Test Conditionality**~~	~~Must be executed.~~
	~~**Test Directives**~~	~~Perform at least once.~~ ~~Repeat each time the network is reconfigured for a test.~~
	~~**Testing Hints**~~	

~~9.9.8Supports Data Attributes as of Protocol Revision 25~~

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

9.9.7 Supports the Network Port Object

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

135.1-2023 - 7.3.2.46.1.1 - Configure Network Through Network Port Object 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	Perform at least once. Repeat each time the network is reconfigured for a test.
	Testing Hints	
135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	
	Testing Hints	Note that almost all Network Port objects have mandated writable properties, so take care to verify that a IUT which claims no writable properties in its Network Port objects is allowed to make such a claim.
135.1-2023 - 9.18.1.8 - ReadProperty of the Network Port Object using the Unknown Instance		
	Test Conditionality	Must be executed
	Test Directives	

	Testing Hints	
135.1-2023 - 9.20.1.14 - ReadPropertyMultiple of the Network Port Object using the Unknown Instance		
	Test Conditionality	If the IUT does not support execution of ReadPropertyMultiple this test shall be skipped.
	Test Directives	
	Testing Hints	

9.9.8 Supports Configurable Out_Of_Service Property

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

9.9.9 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = SECURE_CONNECT, 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 device claims Protocol_Revision >= 24.~~
	~~**Test Directives**~~	~~Verify the device contains a Network Port object for each Protocol_Level for this Network_Type.~~
	~~**Testing Hints**~~	
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. 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	

9.9.10 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = SECURE_CONNECT, 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	

9.9.11 Supports Writable Network_Number Property

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

***BTL*~~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	

9.9.12 Supports the Routing_Table Property

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

9.9.13 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = SECURE_CONNECT, 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	
135.1-2023 - 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	

9.9.14 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = SECURE_CONNECT, 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	

9.9.15 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = SECURE_CONNECT, 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	

9.9.16 Supports the GENERATE_CSR_FILE Command

The IUT contains a Network Port object with Network Type = SECURE_CONNECT, 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	

9.9.17 Supports the VALIDATE_CHANGES Command

The IUT contains a Network Port object with Network Type = SECURE_CONNECT, Protocol_Level = BACNET_APPLICATION, 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	

9.10 Data Link Layer - Virtual Network

9.10.1 Base Requirements

Contact BTL for Interim Tests for this functionality.

~~Base requirements must be met by any IUT that is a router to a virtual network or is a virtual BACnet device.~~

~~**Verify EPICS**~~		
	~~**Test Conditionality**~~	~~If the device claims Protocol_Revision 16 or lower, this test shall be skipped.~~
	~~**Test Directives**~~	~~Verify that the device contains a Network Port object with a Network_Type of VIRTUAL.~~
	~~**Testing Hints**~~	

9.X Data Link Layer - Proprietary

9.X.1 Base Requirements

There are no base requirements for this section.

9.X.2 Supports the Network Port Object

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

135.1-2023 - 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	If the IUT does not support any Network Port objects with writable properties, this test shall be skipped.
	Test Directives	

	Testing Hints	

9.X.3 Supports Configurable Out_Of_Service Property

The IUT contains a Network Port object with Network Type = 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.X.4 Supports Hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = proprietary, Protocol_Level = NON_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 = NON_BACNET_APPLICATION and Network_Type = <proprietary> that references a NPO at Protocol_Level = PROTOCOL or PHYSICAL with any valid Network_Type. Any NPOs in the hierarchy with Protocol_Level = PROTOCOL shall reference a NPO at Protocol_Level = PROTOCOL or Protocol_Level = PHYSICAL with any valid Network_Type. The final NPO must be at Protocol_Level = PHYSICAL.
	Testing Hints	

9.X.5 Supports Non-hierarchical Network Port Objects

The IUT contains a Network Port object with Network Type = proprietary, Protocol_Level = NON_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 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.X.6 Supports the Network Port Object Command Property

The IUT contains a Network Port object with Network Type = proprietary 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	
135.1-2023 - 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 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.
	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.X.7 Supports the DISCARD_CHANGES Command

The IUT contains a Network Port object with Network Type = proprietary 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.X.8 Supports the RESTART_AUTONEGOTIATION Command

The IUT contains a Network Port object with Network Type = proprietary and Protocol_Level = NON_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.X.9 Supports the RESTART_PORT Command

The IUT contains a Network Port object with Network Type = proprietary 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.X.10 Supports the VALIDATE_CHANGES Command

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

Specified Test Changes

[Add new section in BTL Specified Tests.**]**

7.3.2.46.3.2 DISCARD_CHANGES Command Tests

[Move and renumber existing test from 135.1-2023 and put into BTL Specified Tests]]

~~**7.3.2.46.3.2 DISCARD_CHANGES Command Test**~~

7.3.2.46.3.2.X1 DISCARD_CHANGES Command Test

Reason for change: No change, renumbered clause only and changed test step numbering. This was needed to add the DISCARD_CHANGES failure test.

Purpose: To verify that the Network Port discards pending changes when the Command DISCARD_CHANGES is received.

Test Concept: Write values to one or more properties, P1 .. Px, which utilize the pending changes functionality. Write DISCARD_CHANGES to the Command property and verify that the properties have reverted to their previous values.

Configuration Requirements: Execute the test on a Network Port object which supports the DISCARD_CHANGES command. This test shall be skipped if the IUT does not support the DISCARD_CHANGES command.

Test Steps:

-- save initial values of the properties and change each one to a new value
1. REPEAT I = (in the range 1 through the number of properties being written) DO {
2. V[I] = READ P[I]
3. WRITE P[I] = (a value different than V[I], if possible)
   }

-- discard the changes
4. WRITE Command = DISCARD_CHANGES
5. WAIT **Activate Changes Fail Time**

-- verify that no changes are pending any more
6. VERIFY Changes_Pending = FALSE
7. VERIFY Command = IDLE

-- verify that the properties have reverted in value, and that the old value remains in use by the port
8. REPEAT I = (in the range 1 through the number of properties being written) DO {
9. VERIFY P[I] = V[I]
10. CHECK(the value V[I] is in use by the network port)
    }

-- command the device to activate any changes which should have no effect
11. TRANSMIT ReinitializeDevice-Request
    'Reinitialized State of Device' = WARMSTART | ACTIVATE_CHANGES
    'Password' = (any valid password)
12. RECEIVE BACnet-SimpleACK-PDU
13. MAKE(reconfigure the TD and other devices on the network to the new network settings)
14. WAIT **Activate Changes Fail Time**
15. VERIFY Command = IDLE

-- verify that the properties retain their original values, and that that value remains in use by the port
16. REPEAT I = (in the range 1 through the number of properties being written) DO {
17. VERIFY P[I] = V[I]
18. CHECK(the value V[I] is in use by the network port)
    }

[Add new test to BTL Specified Tests]

7.3.2.46.3.2.X2 DISCARD_CHANGES Command Failure Test

Reason for change: No test existed.

Purpose: To verify that Network Port object responds to DISCARD_CHANGES commands when the command is not supported.

Test Concept: Attempt to command a Network Port which does not support the DISCARD_CHANGES. Verify that the attempt fails with an Error Class of PROPERTY and an error code of VALUE_OUT_OF_RANGE.

Configuration Requirements: Select a Network Port which supports writable properties that set the Changes_Pending property to TRUE.

Test Steps:

1. TRANSMIT WriteProperty-Request,
   'Object Identifier' = (the Network Port object),
   'Property Identifier' = (any writable property that results in Changes_Pending = TRUE),

'Property Value' = (any valid value)
2. RECEIVE BACnet-SimpleACK-PDU
3. TRANSMIT WriteProperty-Request,
'Object Identifier' = (the Network Port object),
'Property Identifier' = Command,
'Property Value' = DISCARD_CHANGES,
4. RECEIVE BACnet-Error-PDU
'Error Class' = PROPERTY,
'Error Code' = VALUE_OUT_OF_RANGE
5. VERIFY Command = IDLE

[Move from 135.1-2023 into BTL Specified Tests and modify as specified]

7.3.2.46.4.1 Valid Hierarchy Test

Reason for Change: The test no longer needs to test all NPOs at BACNET_APPLICATION as the test now referenced in each DLL.

Purpose: To verify that the set of network port objects in the IUT are organized in a valid hierarchy.

Test Concept: *Starting with the* ~~Visit each~~ Network Port object *(NP)* which represents a configured application layer port~~. Ensure that the top Network Port object has a Protocol_Level of~~ (BACNET_APPLICATION or NON_BACNET_APPLICATION)~~. Visit~~ *visit* each Network Port object in the hierarchy ensuring that the Protocol_Level properties are valid.

Test Steps:

~~1. REPEAT NP = (object id of each *hierarchical* Network Port object which has a Protocol_Level of BACNET_APPLICATION or NON_BACNET_APPLICATION) {~~
~~2. REPEAT NPx = (object id of each Network Port object , *Reference_Port* in NP's hierarchy) {~~
~~PL = READ (Network Port, NPx), Protocol_Level~~
~~IF PL is BACNET_APPLICATION or NON_BACNET_APPLICATION THEN~~
~~ERROR Invalid Protocol_Level in child Network Port object~~
~~IF PL is PHYSICAL THEN~~
~~VERIFY (Network Port, NPx), Reference_Port = 4194303~~
~~}~~
~~*IF (Protocol_Revision >= 24 and Additional_Reference_Ports is present) THEN*~~
~~*IF (NP, Reference_Port property is not present) THEN*~~
~~*ERROR missing Reference_Port property*~~
~~*REPEAT (for each entry Network Port object, Additional_Reference_Ports) DO {*~~
~~*REPEAT NPx = (object id of each Network Port object, Additional_Reference_Ports in NP's hierarchy) DO {*~~
~~*PL = READ (Network Port, NPx), Protocol_Level*~~
~~*IF PL is BACNET_APPLICATION or NON_BACNET_APPLICATION THEN*~~
~~*ERROR Invalid Protocol_Level in child Network Port object*~~
~~*IF PL is PHYSICAL THEN*~~
~~*VERIFY (Network Port, NPx), Additional_Reference_Ports = (empty list)*~~
~~*}*~~
~~}~~

1. REPEAT NPx = (object id of each Network Port object, Reference_Port in NP's hierarchy) {
2. PL = READ (Network Port, NPx), Protocol_Level
3. IF (PL is BACNET_APPLICATION or NON_BACNET_APPLICATION) THEN
4. ERROR Invalid Protocol_Level in child Network Port object
5. IF (PL is PHYSICAL) THEN
6. VERIFY (Network Port, NPx), Reference_Port = 4194303
}
7. IF (Protocol_Revision >= 24 and Additional_Reference_Ports is present) THEN {
8. IF (NP, Reference_Port property is not present) THEN
9. ERROR missing Reference_Port property
10. REPEAT (for each entry Network Port object, Additional_Reference_Ports) DO {

11. REPEAT NPx = (object id of each Network Port object, Additional_Reference_Ports in NP's hierarchy) DO {
12. PL = READ (Network Port, NPx), Protocol_Level
13. IF PL is BACNET_APPLICATION or NON_BACNET_APPLICATION THEN
14 ERROR Invalid Protocol_Level in child Network Port object
15. IF PL is PHYSICAL THEN
16. VERIFY (Network Port, NPx), Additional_Reference_Ports = (empty list)
}
}

[Move from 135.1-2023 into BTL Specified Tests and modify as specified]

7.3.2.46.4.2 Properties in Referenced Network Port Reflected in Top Network Port Object

Reason for Change: The test no longer needs to test all NPOs at BACNET_APPLICATION is the test now referenced in each DLL

Purpose: To verify that properties in referenced Network Port objects are reflected in the top Network Port object.

Test Concept: *The* ~~Visit each~~ Network Port object *(NP)* which represents a configured BACnet application layer port. Visit each Network Port object in the hierarchy ensuring that the properties in the referenced Network Port object exist and have the same value in the top Network Port object.

Test Steps:

~~1. REPEAT NP = (object id of each Network Port object which has a Protocol_Level of BACNET_APPLICATION) DO {~~
~~-- verify that the required properties exist for this Network Port object based on its Network_Type~~
~~REPEAT P = (each required property for NP's Network_Type, see Table 12-72) DO {~~
~~VERIFY (Network Port, NP), P = (any valid value)~~
~~}~~
~~REPEAT NPx = (object id of each Network Port object in NP's hierarchy) DO {~~
~~-- verify that the expected properties exist in the Network Port object based on its Network_Type and Protocol_Level. In addition, verify that the property value is inherited into NP (unless already inherited from a different Network Port)~~
~~REPEAT P = (each expected property in NPx based on its Network_Type and Protocol_Level as defined in Table 12-73) DO {~~
~~V1 = READ (Network Port, NPx), P~~
~~IF P is not in a higher Network Port object in this hierarchy THEN~~
~~VERIFY (Network Port, NP), P = V1~~
~~}~~
~~}~~
~~}~~

-- verify that the required properties exist for this Network Port object based on its Network_Type
1. REPEAT P = (each required property for NP's Network_Type, see Table 12-72) DO {
2. VERIFY (Network Port, NP), P = (any valid value)
}
3. REPEAT NPx = (object id of each Network Port object in NP's hierarchy) DO {
-- verify that the expected properties exist in the Network Port object based
-- on its Network_Type and Protocol_Level. In addition, verify that the property
-- value is inherited into NP (unless already inherited from a different Network Port)
4. REPEAT P = (each expected property in NPx based on its Network_Type and
Protocol_Level as defined in Table 12-73) DO {
5. V1 = READ (Network Port, NPx), P
6. IF (P is not in a higher Network Port object in this hierarchy) THEN
7. VERIFY (Network Port, NP), P = V1
}
}