



ADDENDA

**ANSI/ASHRAE Addendum n to
ANSI/ASHRAE Standard 135.1-2011**

Method of Test for Conformance to BACnet[®]

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

FOREWORD

The purpose of this addendum is to present a proposed change for publication. These modifications are the result of change proposals made pursuant to the ASHRAE continuous maintenance procedures and of deliberations within Standing Standard Project Committee 135. The proposed changes are summarized below.

- 135.1-2011n-1. Restrict The "Non-Documented" Test To Standard Object Types, p. 1.**
- 135.1-2011n-2. Add Router Binding Test, p. 2.**
- 135.1-2011n-3. Update Priority_For_Writing Tests, p. 4.**
- 135.1-2011n-4. Make Trend Log Tests Generic, p. 6.**
- 135.1-2011n-5. Bring Attention To Change In Length Of BACnetLogStatus, p. 12.**
- 135.1-2011n-6. Clarify That "Ignore Remote Packets" Test is Not for Use with Intervening Router, p. 14.**
- 135.1-2011n-7. Modify B/IP Test For NAT Operation, p. 15.**

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135.1-2011 and Addenda is indicated through the use of *italics*, while deletions are indicated by ~~striketrough~~. Where entirely new subclauses are proposed to be added, plain type is used throughout. Only this new and deleted text is open to comment at this time. All other material in this addendum is provided for context only and is not open for public review comment except as it relates to the proposed changes.

135.1-2011n-1. Restrict The "Non-Documented" Test To Standard Object Types.

Rationale

Restrict the test to standard object types.

[Change **Clause 7.1.2**, p. 32]

7.1.2 Non-documented Property Test

Purpose: To verify that all properties contained in every *standard* object are documented in the EPICS.

Test Concept: For each *standard* object in the EPICS database, attempt to read each standard property that the EPICS does not document as being part of the object.

Test Steps:

1. REPEAT X = (a tester selected set of *standard* objects) DO {
 REPEAT Y = (0 through 511) DO {
 IF (the property Y is not in the EPICS for object X) THEN
 TRANSMIT ReadProperty-Request,
 'Object Identifier' = X,
 'Property Identifier' = Y
 RECEIVE BACnet-Error-PDU,
 Error Class =PROPERTY,
 Error Code =UNKNOWN_PROPERTY
 }
 }
}

Notes to Tester: The objects selected by the tester should include one instance of each supported *standard* object type. Where some instances of an object type differ in the set of supported properties, the allowable value ranges for a property, or the writability of a property, then one instance of each variant of that object type should be selected.

135.1-2011n-2. Add Router Binding Test.

Rationale

This test is added to allow for routing binding via the broadcasting on the local network a confirmed service destined for a device on a different network.

This also clarifies that the RECEIVE statement should take this allowance into account.

[Change **Clause 6.2.7**, p. 28]

6.2.7 RECEIVE Statement

The RECEIVE procedure is used to define a message from the IUT.

<receive statement> ::= RECEIVE (<packet desc> | '(' <packet desc> ')' ['|' '(' <packet desc> ')'] ...)

The <pdu specification> parameter is the same as used in the TRANSMIT statement. If unspecified, the SOURCE defaults to IUT and DESTINATION defaults to TD. *Note: When DESTINATION refers to a device on a remote network, DA is allowed to be a local MAC broadcast.*

...

[Add new **Clause 10.7.X**, p. 406]

10.7.X Reuse Router Binding Found By Broadcast

Purpose: This test verifies that a device which uses a local broadcast of a confirmed-request PDU (and thus in which the data-expecting-reply (DER) of the NPDU control octet is set) to route to a device on a remote network uses the address information from the response for subsequent requests to that device.

Test Concept: Configure the IUT so that it will use a local network broadcast of a confirmed-request PDU (i.e., the data-expecting-reply of the NPCI octet is set) in order to locate a router on the local network towards the specified remote device. TD impersonates a local router, responding with a PDU that appears to have been routed from RD. The IUT communicates with RD again but does not use a local network broadcast because it does not need to, having retained the address binding to TD which is impersonating the local router.

Configuration Requirements: The IUT shall be configured to request information from a device on a remote network, RD, using a BACnetAddress (network number and MAC address), and to use a MAC broadcast of a confirmed request PDU in order to locate a router to that network, on the local network, in order to communicate to that device. If the IUT cannot be configured in this fashion, then this test shall be skipped.

BACnet Reference Clause: 6.5.3.

Test Steps:

1. MAKE (IUT initiate a request to RD)
2. RECEIVE
 - SA = IUT,
 - DA = MAC BROADCAST,
 - DNET = (network number of RD),
 - DADR = (MAC address of RD),
 - APDU Type = Confirmed-Request
3. TRANSMIT
 - SA = TD,
 - DA = IUT,
 - SNET = (network number of RD),
 - SADR = (MAC address of RD),

- APDU Type = Simple-ACK | Complex-ACK | Error-PDU | Reject-PDU
4. MAKE (IUT initiate a request to RD)
 5. RECEIVE
 - SA = IUT,
 - DA = TD,
 - DNET = (network address of RD),
 - DADR = (MAC address of RD),
 - APDU Type = Confirmed-Request
 6. TRANSMIT BACnet-Simple-ACK-PDU

135.1-2011n-3. Update Priority_For_Writing Tests.

Rationale

These changes allow the IUT to leave out the Priority parameter when the target property is known to be not commandable.

[Change Clause 7.3.2.23.11.3, p. 113]

Note to Tester: The Priority parameter for the WriteProperty-Request may be left out if the Schedule is configured with a value of 16 in its Priority_For_Writing property *or if the target property is a standard property of a standard object for which commandability is not an option*. The test shall pass regardless of the order in which the IUT generates the WriteProperty-Requests in steps 2 and 5.

[Change Clause 7.3.2.23.11.4, p. 114]

Note to Tester: The Priority parameter for the WriteProperty-Request may be left out if the Schedule is configured with a value of 16 in its Priority_For_Writing property *or if the target property is a standard property of a standard object for which commandability is not an option*. The test shall pass or fail regardless of the order in which the IUT generates the WriteProperty-Requests in steps 2 and 5.

[Change Clause 7.3.2.23.8, p. 101]

7.3.2.23.8 List_Of_Object_Property_Reference External Test

Dependencies: ReadProperty Service Execution Tests, 9.18; TimeSynchronization Service Execution Tests, 9.30.

BACnet Reference Clause: 12.24.10.

Purpose: To verify that the Schedule object writes to object properties contained in a device other than the IUT.

Test Concept: The Schedule object is configured to write to a property of another object in the same device and a property of an object in the TD. The IUT's clock is then set to a time between a pair of scheduled write operations, and verification of the first write operation's data value is performed. The time is advanced to the second time, the Schedule object's Present_Value is checked, and verifications of the write operation are performed. If the IUT does not support writes to object properties contained in a device other than the IUT, then this test shall not be performed.

Configuration Requirements: The TD is configured to indicate that it supports the WriteProperty-Request service but not WritePropertyMultiple-Request. The IUT is configured with a Schedule object containing a List_Of_Object_Property_References property that references a property of an object contained in the TD. The Schedule object is configured with either a Weekly_Schedule or an active Exception_Schedule, during a period where Effective_Period is active, with at least two consecutive entries with distinguishable values in the List of BACnetTimeValues, and with no Exception_Schedules at a higher priority. D1 represents the date and time of the first of these two BACnetTimeValues, with corresponding value V1, while D2 and V2 (a value distinguishable from V1) represent the second BACnetTimeValue. A time Dt is defined to occur between D1 and D2.

Test Steps:

1. (TRANSMIT TimeSynchronization-Request, 'Time' = D₁) | MAKE (the local date and time = D₁)
2. **WAIT Schedule Evaluation Fail Time**
3. VERIFY Present_Value = V₁
4. (TRANSMIT TimeSynchronization-Request, 'Time' = D₂) | MAKE (the local date and time = D₂)
5. **BEFORE Schedule Evaluation Fail Time**
RECEIVE WriteProperty-Request,
 'Object Identifier' = (the referenced object in the TD),
 'Property Identifier' = (the referenced property in the TD),
 'Property Value' = V₂,
 'Priority' = (the value of the Schedule object's Priority_For_Writing property)
6. **WAIT Schedule Evaluation Fail Time**

7. VERIFY Present_Value = V_2

Note to Tester: Any WriteProperty request generated by the IUT may have a Priority parameter. If included, it shall be in the range 1-16, excluding 6.

Note to Tester: The Priority parameter for the WriteProperty-Request may be left out if the Schedule is configured with a value of 16 in its Priority_For_Writing property or if the target property is a standard property of a standard object for which commandability is not an option.

135.1-2011n-4. Make Trend Log Tests Generic.

Rationale

Make the Trend Log tests generic so they may be applied to other logging objects.

[Change **Clause 7.3.2.24.1**, p. 115]

7.3.2.24.1 ~~Log_Enable~~ Test

Dependencies: ReadProperty Service Execution Tests, 9.18; WriteProperty Service Execution Tests, 9.22.

BACnet Reference Clause: 12.25.5.

Purpose: To verify that the ~~Log_Enable~~ property enables and disables the logging of data by the ~~Trend_Log~~ *logging* object.

Test Concept: The ~~Trend_Log~~ *logging object* is configured to acquire data by each means (~~polling and COV subscription~~) available to the implementation. ~~Log_Enable~~ is enabled and the collection of one or more records in the Log_Buffer is confirmed. ~~Log_Enable~~ is then disabled and non-collection of records is confirmed.

~~The COV increment used is either the Client_COV_Increment property of the Trend_Log or the COV_Increment property of the monitored object, depending on the configuration of the Trend_Log object being tested.~~

Configuration Requirements: Start_Time, if present, shall be configured with a date and time preceding the beginning of the test. Stop_Time, if ~~present shall present, shall~~ be configured with a time that will occur after the completion of the test. Stop_When_Full, if configurable, shall be set to FALSE.

Test Steps:

1. READ I = Log_Interval
2. WRITE ~~Log_Enable~~ = FALSE
3. WRITE Record_Count = 0
4. WAIT **Internal Processing Fail Time**
5. WRITE ~~Log_Enable~~ = TRUE
6. READ X = Total_Record_Count
7. ~~IF (I = 0) THEN~~
 - ~~— MAKE (monitored value change more than the COV increment)~~
 - ~~— ELSE~~
 - ~~— WAIT (I)~~
7. *MAKE (IUT collect another record)*
8. WAIT (**Notification Fail Time + Internal Processing Fail Time**)
9. VERIFY Total_Record_Count > X
10. WRITE ~~Log_Enable~~ = FALSE
11. READ Y = Total_Record_Count
12. ~~IF (I = 0) THEN~~
 - ~~— MAKE (monitored value change more than the COV increment)~~
 - ~~— ELSE~~
 - ~~— WAIT (I)~~
12. *MAKE (IUT collect another record)*
13. WAIT (**Notification Fail Time + Internal Processing Fail Time**)
14. VERIFY Total_Record_Count = Y

Note to Tester: For each MAKE (IUT collect another record), perform the following actions:

*IF (Event Log Object) THEN
MAKE (Event Log Object collect another record)*

ELSE

IF (COV subscription in use) THEN

MAKE (monitored value change sufficient to generate another record)

ELSE IF (interval or period logging is in use) THEN

WAIT (Log_Interval)

ELSE

MAKE (Trend Log or Trend Log Multiple Object collect another record)

[Change **Clause 7.3.2.24.3**, p. 117]

7.3.2.24.3 Stop_Time Test

Dependencies: ReadProperty Service Execution Tests, 9.18; WriteProperty Service Execution Tests, 9.22.

BACnet Reference Clause: 12.25.7.

Purpose: To verify that logging is disabled at the time specified by Stop_Time.

Test Concept: The ~~Trend-Log logging object~~ is configured to acquire data by each means (~~polling and COV subscription~~) available to the implementation. The test is begun at some time prior to the time specified in Start_Time and collection of records is confirmed. Non-collection of records after the time specified by Stop_Time is then confirmed.

Configuration Requirements: Stop_Time shall be configured with a date and time such that steps 1 through 9 will be concluded before that time. Start_Time, if present, shall be configured with date and time preceding the initiation of the test. Stop_When_Full, if configurable, shall be set to FALSE.

Test Steps:

1. WRITE ~~Log_Enable~~ = FALSE
2. WAIT **Internal Processing Fail Time**
3. WRITE Record_Count = 0
4. WRITE ~~Log_Enable~~ = TRUE
5. READ X = Total_Record_Count
6. WAIT **Internal Processing Fail Time**
7. ~~IF (COV subscription in use) THEN~~
~~—MAKE (monitored value change more than Client_COV_Increment)~~
~~—ELSE~~
~~—WAIT (Log_Interval)~~
7. MAKE (IUT collect another record)
8. WAIT (**Notification Fail Time** + **Internal Processing Fail Time**)
9. VERIFY Total_Record_Count > (~~value X returned in step 5~~)X
10. WHILE (IUT clock is earlier than Stop_Time) DO {}
11. WAIT (**Notification Fail Time** + **Internal Processing Fail Time**)
12. READ X = Total_Record_Count
13. ~~IF (COV subscription in use) THEN~~
~~—MAKE (monitored value change more than Client_COV_Increment)~~
~~—ELSE~~
~~—WAIT (Log_Interval)~~
13. MAKE (IUT collect another record)
14. WAIT (**Notification Fail Time** + **Internal Processing Fail Time**)
15. VERIFY Total_Record_Count = (~~value X returned in step 14~~)X

Note to Tester: For each MAKE (IUT collect another record), perform the following actions:

IF (Event Log Object) THEN

MAKE (Event Log Object collect another record)

ELSE

IF (COV subscription in use) THEN

MAKE (monitored value change sufficient to generate another record)
ELSE IF (interval or period logging is in use) THEN
WAIT (Log_Interval)
ELSE
MAKE (Trend Log or Trend Log Multiple Object collect another record)

[Change **Clause 7.3.2.24.9**, p. 122]

7.3.2.24.9 Total_Record_Count Test

Dependencies: ReadProperty Service Execution Tests, 9.18; WriteProperty Service Execution Tests, 9.22.

BACnet Reference Clause: 12.25.16.

Purpose: To verify that the Total_Record_Count property increments for each record added to the Log_Buffer, even after Buffer_Size records have been added. (Note: it is not reasonable to test for the requirement of BACnet Clause 12.23.16 that the value wrap from $2^{32}-1$ to 0; even if a record was collected every 100th of a second it could take more than 497 days to complete the test.)

Test Concept: The ~~Trend Log~~ *logging object* is configured to acquire data by whatever means. Record_Count is set to zero and Total_Record_Count is read. Collection of data proceeds until Record_Count changes, collection is halted and Total_Record_Count is checked that it has incremented by Record_Count. If, for whatever reason, the IUT cannot be configured such that the TD is able to halt collection before Buffer_Size records are collected this test shall not be performed.

Configuration Requirements: Start_Time, if present, shall be configured with a date and time preceding the beginning of the test. Stop_Time, if present, shall be configured with the latest possible date and time in order that it occur after the end of the test. ~~Log_Enable~~ shall be set to FALSE.

Test Steps:

1. WRITE Record_Count = 0
2. WAIT **Internal Processing Fail Time**
3. READ X = Total_Record_Count
4. READ Y = Record_Count
5. WRITE ~~Log_Enable~~ = TRUE
6. WHILE (Record_Count = $\theta Y + 1$) DO { }
7. WRITE ~~Log_Enable~~ = FALSE
8. WAIT **Internal Processing Fail Time**
9. IF (Total_Record_Count - X != Record_Count - Y) THEN
 ERROR "Total_Record_Count has incorrect value."

135.1-2011n-5. Bring Attention To Change In Length Of BACnetLogStatus.

Rationale

A note is added to the test bringing the tester's attention to the length change in the BACnetLogStatus production and to make the test generic for all logging objects.

[Change **Clause 7.3.2.24.13**, p. 125]

7.3.2.24.13 Log-Status Test

Dependencies: ReadRange Service Execution Tests, 9.21; WriteProperty Service Execution Tests, 9.22.

BACnet Reference Clause: 12.25.14.

Purpose: To verify proper logging of log-disabled and buffer-purged events.

Test Concept: The buffer is cleared. Then the Enable property is changed and it is verified that the Record_Count property is changed and it is verified that the status entry is made correctly in the Log_Buffer. The Record_Count is also set to zero while the Enable property is FALSE and it is verified that the buffer-purged event is recorded into the Log_Buffer.

Test Configuration: The ~~Trend-Log~~ logging object, O1, is configured to acquire data by whatever means available. Configure the logging such that the entire test may be run without the trend buffer overflowing.

Test Steps:

1. WRITE Enable = FALSE
2. WRITE Record_Count = 0
3. VERIFY Record_Count = 1
4. TRANSMIT ReadRange
 'Object Identifier' = O1,
 'Property Identifier' = Log_Buffer,
 'Reference Index' = 1,
 'Count' = 1
5. RECEIVE ReadRange-Ack
 'Object Identifier' = O1,
 'Property Identifier' = Log_Buffer,
 'Result Flags' = (True, True, False),
 'Item Count' = 1
 'Item Data' = ((a buffer purged record))
6. WRITE Enable = TRUE
7. WRITE Enable = FALSE
8. TRANSMIT ReadRange
 'Object Identifier' = O1,
 'Property Identifier' = Log_Buffer,
 'Reference Index' = 1,
 'Count' = 2
9. RECEIVE ReadRangeAck
 'Object Identifier' = O1,
 'Property Identifier' = Log_Buffer,
 'Result Flags' = (True, False, False),
 'Item Count' = 2
 'Item Data' = ((a buffer purged record), (a log-enable record))
10. TRANSMIT ReadRange
 'Object Identifier' = O1,
 'Property Identifier' = Log_Buffer,
 'Reference Time' = (2154-12-31, 23:59:59.99),

'Count' = -1
11. RECEIVE ReadRangeAck
'Object Identifier' = O1,
'Property Identifier' = Log_Buffer,
'Result Flags' = (False, True, False),
'Item Count' = 1
'Item Data' = ((a log-disable record))

Notes to Tester: When the IUT's Protocol_Revision < 7, the length of BACnetLogStatus shall be 2; otherwise, it shall be 3.

135.1-2011n-6. Clarify That "Ignore Remote Packets" Test is Not for Use with Intervening Router.

Rationale

Clarify that the new test 10.X.1 cannot be applied in a test setup where there is a router between the TD and the IUT.

[Change **Clause 10.6.1**, p. 400]

10.6.1 Ignore Remote packets

BACnet Reference Clause: 6.5.2.1, 6.5.4

Purpose: This test case verifies that the non-router IUT will quietly accept and discard packets destined for remote networks.

Test Concept: The TD transmits both broadcast and directed requests to the IUT with DNET (not equal to x'FFFF') and DADR in the Network Layer header. The IUT is required to silently drop the requests because it is not a router.

Test Steps:

1. TRANSMIT
DA = BROADCAST,
SA = TD,
DNET = DNET3,
DADR = BROADCAST,
Hop Count = 255,
BACnet-Unconfirmed-Request-PDU,
'Service Choice' = who-Is
2. WAIT **Internal Processing Fail Time**
3. CHECK (that the IUT did not send an I-Am)
4. TRANSMIT
DA = IUT,
SA = TD,
DNET = DNET3,
DADR = IUT,
Hop Count = 255,
BACnet-Confirmed-Request-PDU,
'Service Choice' = ReadProperty-Request,
'Object Identifier' = O2 (any BACnet standard object in IUT),
'Property Identifier' = P2 (any required property of the specified object)
5. WAIT **Internal Processing Fail Time**
6. CHECK (that the IUT did not send a response to the ReadProperty)

Notes to Tester: Ensure that the packets transmitted in Step 1 and Step 4 will actually reach the IUT by transmitting them on the local network of the IUT. It is impossible to perform this test through a router.

135.1-2011n-7. Modify B/IP Test For NAT Operation.

Rationale

The BBMD tests are modified to take allow for testing IUTs operating in NAT mode.

[Change **Clause 14.2**, p. 519]

14.2 BBMD B/IP Device with a Server Application

This group of tests verifies that a BBMD B/IP device with a server application will correctly process NPDU's conveyed in the NPDU portion of Forwarded-NPDU, Original-Broadcast-NPDU and Original-Unicast-NPDU messages.

Configuration Requirements: A server application shall be running in the IUT. For one-hop distribution tests, the Internet Routers in Figure 14-1 must be configured to forward directed broadcasts. *For two-hop distribution tests utilizing Internet Routers providing Network Address Translation (NAT), the IUT must be configured for NAT operation. In addition, the Internet Routers must be configured to port-forward the UDP port in use by the B/IP network.*

...

[Change **Clause 14.2.1.2**, p. 5]

14.2.1.2 Execute Forwarded-NPDU (Two-hop Distribution)

Configuration Requirements: The IUT shall be configured with a BDT that contains:

B/IP Address	Broadcast Distribution Mask
IUT	255.255.255.255
BBMD1	255.255.255.255

When the IUT is configured for NAT, the Originating-Device in Forwarded-NPDUs that originate at the IUT, OD, is equal to the Global IP Address and Port of the IUT's Internet Router. When the IUT is not configured for NAT operation, OD is equal to the IUT.

Test Steps:

1. TRANSMIT
DA = IUT,
SA = BBMD1,
Forwarded-NPDU,
Originating-Device = BBMD1,
NPDU = Who-Is
2. RECEIVE
DA = Local IP Broadcast,
SA = IUT,
Forwarded-NPDU,
Originating-Device = BBMD1,
NPDU = Who-Is
3. RECEIVE
DA = Local IP Broadcast,
SA = IUT,
Original-Broadcast-NPDU,
NPDU = I-Am
4. RECEIVE
DA = BBMD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~OD~~IUT,

NPDU = I-Am

Notes to Tester: The order of the messages transmitted by the IUT is not significant.

[Change **Clause 14.2.2.2**, p. 522]

14.2.2.2 Execute Original-Broadcast-NPDU (Two-hop Distribution)

Configuration Requirements: The IUT shall be configured with a BDT that contains:

B/IP Address	Broadcast Distribution Mask
IUT	255.255.255.255
BBMD1	255.255.255.255

When the IUT is configured for NAT, the Originating-Device in Forwarded-NPDUs that originate at the IUT, OD, is equal to the Global IP Address and Port of the IUT's Internet Router. When the IUT is not configured for NAT operation, OD is equal to the IUT.

Test Steps:

1. TRANSMIT
DA = Local IP Broadcast,
SA = D1,
Original-Broadcast-NPDU,
NPDU = Who-Is
2. RECEIVE
DA = BBMD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D1,
NPDU = Who-Is
3. RECEIVE
DA = Local IP Broadcast,
SA = IUT,
Original-Broadcast-NPDU,
NPDU = I-Am
4. RECEIVE
DA=BBMD1,
SA=IUT,
Forwarded-NPDU,
Originating-Device = OD~~IUT~~,
NPDU = I-Am

Notes to Tester: The order of the messages transmitted by the IUT is not significant.

[Change **Clause 14.7.1.2**, p. 536]

14.7.1.2 Broadcast Message from Directly Connected IP Subnet (Two-hop Distribution)

Configuration Requirements: The BDT shall contain the following three entries:

B/IP Address	Broadcast Distribution Mask
IUT	255.255.255.255
BBMD1	255.255.255.255
BBMD2	255.255.255.255

When the IUT is configured for NAT, the Originating-Device in Forwarded-NPDUs that originate at the IUT, OD, is equal to the Global IP Address and Port of the IUT's Internet Router. When the IUT is not configured for NAT operation, OD is equal to the IUT.

Steps 2-5 are the distribution of the Who-Is request to the devices considered to be members of the BACnet network; steps 6-10 are the distribution of the I-Am response from the local application.

Test Steps:

1. TRANSMIT
DA = Local IP Broadcast,
SA = D1,
Original-Broadcast-NPDU,
NPDU = Who-Is
2. RECEIVE
DA = BBMD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D1,
NPDU = Who-Is
3. RECEIVE
DA = BBMD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D1,
NPDU = Who-Is
4. RECEIVE
DA = FD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D1,
NPDU = Who-Is
5. RECEIVE
DA = FD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D1,
NPDU = Who-Is
6. RECEIVE
DA = Local IP Broadcast,
SA = IUT,
Original-Broadcast-NPDU,
NPDU = I-Am
7. RECEIVE
DA = BBMD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~OD~~IUT,
NPDU = I-Am
8. RECEIVE
DA = BBMD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~OD~~IUT,
NPDU = I-Am
9. RECEIVE
DA = FD1,
SA = IUT,
Forwarded-NPDU,

Originating-Device = ~~OD~~IUT,
NPDU = I-Am

10. RECEIVE

DA = FD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~OD~~IUT,
NPDU = I-Am

Notes to Tester: The order of the messages transmitted by the IUT is not significant.

[Change **Clause 14.7.2.2**, p. 538]

14.7.2.2 Broadcast Message Forwarded by a Peer BBMD (Two-hop Distribution)

Configuration Requirements: The BDT shall be configured as in test 14.7.1.2

When the IUT is configured for NAT, the Originating-Device in Forwarded-NPDUs that originate at the IUT, OD, is equal to the Global IP Address and Port of the IUT's Internet Router. When the IUT is not configured for NAT operation, OD is equal to the IUT.

Steps 2-4 are the distribution of the Who-Is request to the devices considered to be members of the BACnet network; steps 5-9 are the distribution of the I-Am response from the local application.

Test Steps:

1. TRANSMIT

DA = IUT,
SA = BBMD1,
Forwarded-NPDU,
Originating-Device = D2,
NPDU = Who-Is

2. RECEIVE

DA = Local IP Broadcast,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D2,
NPDU = Who-Is

3. RECEIVE

DA = FD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D2,
NPDU = Who-Is

4. RECEIVE

DA = FD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = D2,
NPDU = Who-Is

5. RECEIVE

DA = Local IP Broadcast,
SA = IUT,
Original-Broadcast-NPDU,
NPDU = I-Am

6. RECEIVE

DA = BBMD1,
SA = IUT,
Forwarded-NPDU,

- Originating-Device = ~~ODIUT~~,
NPDU = I-Am
7. RECEIVE
DA = BBMD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~ODIUT~~,
NPDU = I-Am
 8. RECEIVE
DA = FD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~ODIUT~~,
NPDU = I-Am
 9. RECEIVE
DA = FD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~ODIUT~~,
NPDU = I-Am

Notes to Tester: The order of the messages transmitted by the IUT is not significant.

[Change **Clause 14.7.3.2**, p. 541]

14.7.3.2 Broadcast Message from a Foreign Device (Two-hop Distribution)

Configuration Requirements: The BDT and FDT shall be configured as in test 14.7.1.2.

When the IUT is configured for NAT, the Originating-Device in Forwarded-NPDUs that originate at the IUT, OD, is equal to the Global IP Address and Port of the IUT's Internet Router. When the IUT is not configured for NAT operation, OD is equal to the IUT.

Steps 2-5 are the distribution of the Who-Is request to the devices considered to be members of the BACnet network; steps 6-10 are the distribution of the I-Am response from the local application.

Test Steps:

1. TRANSMIT
DA = IUT,
SA = FD1,
Distribute-Broadcast-To-Network,
NPDU = Who-Is
2. RECEIVE
DA = Local IP Broadcast,
SA = IUT,
Forwarded-NPDU,
Originating-Device = FD1,
NPDU = Who-Is
3. RECEIVE
DA = BBMD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = FD1,
NPDU = Who-Is
4. RECEIVE
DA = BBMD2,
SA = IUT,
Forwarded-NPDU,

- Originating-Device = FD1,
NPDU = Who-Is
5. RECEIVE
DA = FD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = FD1,
NPDU = Who-Is
 6. RECEIVE
DA = Local IP Broadcast,
SA = IUT,
Original-Broadcast-NPDU,
NPDU = I-Am
 7. RECEIVE
DA = BBMD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~ODIUT~~,
NPDU = I-Am
 8. RECEIVE DA = BBMD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~ODIUT~~,
NPDU = I-Am
 9. RECEIVE
DA = FD1,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~ODIUT~~,
NPDU = I-Am
 10. RECEIVE
DA = FD2,
SA = IUT,
Forwarded-NPDU,
Originating-Device = ~~ODIUT~~,
NPDU = I-Am

Notes to Tester: The order of the messages transmitted by the IUT is not significant.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

