IEEE P802.11
Wireless LANs

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| 11bh D0.2 CR for device ID in PASN |
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Abstract

This submission proposes resolutions for device ID support for PASN in P802.11bh/D0.2:

Revisions:

Rev 0: Initial version of the document.

Rev 1: Modification based on the previous discussion (reduced to one option where device ID is exchanged in Auth Msg2 and Auth Msg3 encrypted)

Rev 2: Modification based on 22/1329r17 and 23/0129r4.

Rev 3: Proposed text modification for two options (Option 1- Device ID exchange in PASN Auth Msg2 & Msg3, Option 2- Device ID exchange in PASN Auth Msg1 & Msg2)

Rev 4: Proposed text modification for Option 2 (Device ID exchange in PASN Auth Msg1 & Msg2) based on 23/0129r7.

Rev 5: Fixed typos, added a picture and explanation, modified the text (including Kurt’s additions)

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbh D0.2 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbh D0.2 Draft. (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbh Editor: Editing instructions preceded by “TGbh Editor” are instructions to the TGbh editor to modify existing material in the TGbh draft. As a result of adopting the changes, the TGbh editor will execute the instructions rather than copy them to the TGbh Draft.***

**Discussion**

Based on the discussion on 22/1732r2, this document proposes that AP/ESS and non-AP STA should exchange device ID in PASN authentication as follows: (referred to as Option 2 in 22/1732r2):

- AP/ESS should assign device ID to non-AP STA encrypted in Auth Msg2

- non-AP STA should use the assigned device ID unencrypted in Auth Msg1

Note:

To fully cover the use case, device ID (or opaque ID, if used) should be exchanged

- for each FTM session and

- for each return to the same ESS

Example Scenario:

Non-AP STA activates Device ID in Auth Msg1 (set Device ID Active field to 1in RSNXE).

Non-AP STA is assigned unique Device ID/opaque ID in each Auth Msg2.

Non-AP STA uses previously assigned Device ID/opaque ID in each Auth Msg1 (while using different MAC addresses (MAC1, MAC2, MAC3, MAC4) for each FTM session session and for each return to the same ESS (AP1 & AP2).

Device ID/opaque ID is encrypted differently in each PASN Auth Msg2.

Assigned Device ID/opaque ID is used only once in PASN Auth Msg1, thus, is not trackable it to third parties (see green color for third party exposure).



**Figure 1** – Device ID usage in PASN



**Figure 2** – Opaque ID usage in PASN

**Proposed Text**(Proposed text modifications are for Draft 11bh 0.2 and 802.11az-2022)

***TGbh editor:******Modify the subclause 12.2.11.1 Device ID indication*** *as follows:*

Note to Editor: This text is taken from of 23/0129r7 therefore, the proposed text is based on this

 **12.2.11.1 Device ID indication**

A non-AP STA indicates activation of device ID for a particular ESS by setting the Device ID Active field to 1 in the Extended RSN Capabilities field (see 9.4.2.241 - RSNExtension Element) in (Re)Association Request frames or first PASN frame (when using PASN) sent to any AP in the ESS. An AP indicates activation of Device ID by setting the Device ID Active field to 1 in the Extended RSN Capabilities field in Beacon, (Re)Association Response, ~~and~~ Probe Response, and second PASN (when using PASN) frames. All APs in a given ESS shall set this field to the same value.

A STA shall not send a device ID to any STA that does not indicate Device ID is active.

A non-AP STA shall send a device ID when required by the procedures described below via the following frames (known as “non-AP STA Identity frames”):

1. When using FILS authentication in the Device ID element in the (Re)Association Request frame.
2. When not using FILS authentication in the Device ID KDE in message 2 of the 4 way handshake.
3. When using PASN authentication in the Device ID element in the first PASN frame.

An AP shall send a device ID when required by the procedures described below via the following frames (known as “AP Identity frames”):

1. When using FILS authentication in the Device ID element in the (Re)Association Response frame.
2. When not using FILS authentication, in the Device ID KDE in message 3 of the 4 way handshake.
3. When using PASN authentication in the Device ID element in the second PASN frame.

A non-AP STA that is associating with any AP in an ESS or that is using PASN with any AP in an ESS, when Device ID is active for both the non-AP STA and the AP and the non-AP STA has not previously associated or used PASN with any AP in the ESS, shall not send a device ID in the non-AP STA Identity frame. Similarly, if the non-AP STA is associating with any AP in an ESS or that is using PASN with any AP in an ESS, when Device ID is active for both the non-AP STA and the AP but the non-AP STA no longer has a device ID for that ESS for implementation-specific reasons (for example, configuration changes have lost the device ID, or sufficient time has passed since the last association to the ESS so that the device ID has been deleted), then the non-AP STA shall not send a device ID in the non-AP STA Identity frame.

A non-AP STA that is associating or using PASN with any AP in an ESS with Device ID active for both the non-AP STA and the AP and the non-AP STA has a saved device ID for the ESS shall send the most recently received device ID for that ESS in the non-AP STA Identity frame.

When an AP with Device ID active receives a non-AP STA Identity frame from a non-AP STA with Device ID active and the received device ID is recognized, the AP shall perform one of the following actions:

1. Send a zero-length device ID (indicating the current device ID is maintained) and set Identifier Status to “Recognized” in the appropriate AP Identity frame.
2. Assign a new device ID to the non-AP STA, send the device ID, and set Identifier Status to “Recognized” in the appropriate AP Identity frame.

When an AP with Device ID active receives a first PASN frame containing a device ID which is recognized, the AP shall assign a new device ID to the non-AP STA, send the device ID with the Identifier Status set to “Recognized’ and send the device ID in the second PASN frame.

When a non-AP STA receives an AP Identity frame with Identifier Status equal to “Recognized” it can proceed with the assumption that the shared identity state with the AP or ESS (as per the concepts of 12.2.10) is now bound to the non-AP STA’s current MAC address.

When a non-AP STA receives an AP Identity frame with the Identifier Status equal to “Not Recognized”, it must assume that no shared identity state exists with the AP or ESS (as per the concepts of 12.2.10) and the non-AP STA must (re)establish any desired, shared identity state per the procedures previously described.

Figure 12-X shows an example of the device ID exchange in PASN. The example illustrates that the non-AP STA performs PASN to establish FTM session(s) with the ESS containing AP1 and AP2. The non-AP STA with MAC1 first initiates the connection with AP1 by sending first PASN frame with device ID active. Upon receiving the first PASN frame, AP1 assigns a device ID (devID1) encrypted to the non-AP STA in the second PASN frame (note that the encrypted form of devID1, i.e., “aa” is seen in the clear). Non-AP STA then continues to establish an FTM session with AP1. When the non-AP STA with MAC2 (non-AP STA changing its MAC from MAC1 to MAC2) performs PASN with AP2 to establish another FTM session, the non-AP STA sends previously assigned device ID (devID1) to AP2 in the first PASN frame. Upon receiving the device ID (devID1) in first PASN frame, AP2 assigns another device ID (devID2) encrypted to the non-AP STA in the second PASN frame (“bb” is seen in the clear). Non-AP STA then proceeds to establish the FTM session. Similarly, when non-AP STA with MAC3 returns to the same ESS (after deauthenticating from the ESS), it sends the previously assigned device ID (devID2) and is assigned another device ID encrypted (devID3) that will be used in the subsequent PASN for another FTM session.



Figure 12-X — Example of device ID exchange in PASN

***TGbh editor: Modify the subclause 12.12.3.2 PASN Frame Construction and Processing*** *as follows:*

**12.12.3.2 PASN Frame Construction and Processing**

**The first PASN Authentication frame** (see 9.3.3.11 (Authentication frame format)) of the exchange is constructed as follows:

— 9.4.1.1 (Authentication Algorithm Number field) set to 7 (PASN Authentication)

— 9.4.1.2 (Authentication Transaction Sequence Number field) set to 1;

— Including the constructed RSN

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— If dot11RSNAOperatingChannelValidationActivated is true including an OCI Element containing an OCI element as defined in 9.4.2.236 (OCI element).

— If dot11DeviceIDActivated is true, including a Device ID element containing a device identifier as defined in (9.4.2.296a Device ID element), if any.

**The AP begins the construction the second PASN frame** as follows:

— 9.4.1.1 (Authentication Algorithm Number field) set to 7 (PASN Authentication)

— 9.4.1.2 (Authentication Transaction Sequence Number field) set to 2

— Status code indicating the processing status

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— If dot11RSNAOperatingChannelValidationActivated is true, including an OCI Element containing an OCI element as defined in 9.4.2.236 (OCI element), if dot11RSNAOperatingChannelValidationActivated is true — 9.4.2.118 (A MIC element) with MIC computed as specified in 12.12.8.1 (MIC computation for PASN second frame.

— If dot11DeviceIDActivated is true, including a Device ID element containing a device identifier as defined in (9.4.2.296a Device ID element), if any. The Device ID element shall be encrypted with the cipher suite of AES-128-CMAC.

— 9.4.2.118 (A MIC element) with MIC computed as specified in 12.12.8.1 (MIC computation for PASN second frame)