**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **Proposed Comment Resolutions for CID 125, 137, 130, 147, 148** | |
| Date Submitted | 13 July 2015 | |
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| Re: | Proposed comment resolutions related to the 802.15.10 Consolidated Comment Entry Form, CID 125, 137, 130, 147, 148 | |
| Abstract | This document provides a proposed comment resolutions for the comments which are related to the security section of D1 of 802.15.10 | |
| Purpose | To propose | |
| Notice | This document has been prepared to assist the IEEE P802.15. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. | |
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**Comment #125, #137**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| 125 | Soo-Young Chang | 17 | 5.1.2.1 | 3 | In Figure 7, the scan type should be informed by the MAC first before the L2R layer sends a scan request. | Modify Figure 7 and text in Page 16 lines 36-40. |
| 137 | Jussi Haapola | 17 | 5.1.2.1 | 2-20 | There is something wrong with Figure 7; either the arrows point to wrong directions or the temporal sequence is incorrect. | Fix Figure 7 or if it is correct, provide an interpretation how to enable the communication flow. |

**Resolution: AiP**

All arrows are opposite in the current figure. They shall be corrected.

* ***Reverse the direction of all arrows in figure 7.***

**Comment #130**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Verotiana Rabarijaona | 17 | 5.1.2.2 | 25 | This paragraph is not consistent with Fig. 8. The join procedure should use the TC IE and not the L2R-D IE | Correct the paragraph to be consistent with Fig, 8 |

**Resolution: AiP**

Replace L2R-D IE with TC IE and delete the unnecessary description about security.

* ***Modify the first paragraph of clause 5.1.2.2 as follows:***

A device may join a L2R mesh tree if it already joined a L2R PAN. A device may join several L2R mesh trees if necessary. When a device wishes to join a tree, the next higher layer invokes the L2RLME-JOINTREE.request primitive to request the L2R sublayer to join a mesh tree with the EntityID and the TreeRootID indicated in the primitive. Upon reception of this primitive, the L2R sublayer initiates an enhanced active scan to discover the existing mesh trees. During the enhanced active scan, the joining device broadcasts an EBR with an ~~L2R Discovery (L2R-D)~~ TC IE without content, i.e. all the fields after the Type field in ~~the L2R-D~~ TC IE are omitted. The ~~L2R-D~~ TC IE is defined in ~~6.2.1~~6.2.2. When an FFD able to act as a coordinator receives the ~~L2R-D~~TC IE, it replies with a EB containing a ~~L2R-D~~TC IE ~~without encryption, unless the encryption key of a beacon is known to all the devices~~. ~~In the latter case the encryption keys exchange occur prior to any L2R operation and is out of the scope of this document.~~ If the device receives a ~~L2R-D~~TC IE with the required Entity ID and Mesh Root Address fields, it configures its mesh tree according to the information retrieved from the TC IE and transmits its own TC IE. The L2R sublayer sends a L2RLMEJOIN-TREE.confirm primitive with a SUCCESS Status to the next higher layer. This procedure is illustrated in Figure 8. If no mesh tree satisfies the requirements, the L2R sublayer may reattempt to trigger an enhanced scan to find the desired L2R mesh tree up to l2rMaxScanRetry. If the desired L2R mesh tree is not found after l2rMaxScanRetry enhanced scans, the Status parameter of the L2RLME-JOIN-TREE.confirm primitive is set to the appropriate error code. The L2RLME-JOIN-TREE.request and L2RLME-JOINTREE.confirm primitives are described in 7.1.1.7 and 7.1.1.8 respectively.

**Comment #147, #148**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| 147 | Noriyuki Sato | 20 | 5.1.2.5 | 3 | Address assignment mechanism should hire timeout mechanism to prevent zombie address (unused but not released). | Add time out mechanism. |
| 148 | Noriyuki Sato | 20 | 5.1.2.5 | 3 | Considering using indirect transmission for end-device, the result of address assignment shall be known to the parent which cares the end-device, or the parent device cannot manage indirect transmission in the case that the dst address is short address of the end device. | Address assignment should be done via parent device, or the assigned address should be informed to the parent device to which the end device associate. |

**Resolution: AiP**

Add expiration mechanism of address assignment and modify the related IE frame format.

Add primitives related to address assignment.

Modify the text related to above modification.

* ***Modify the clause 5.1.2.5 as follows:***

When the L2R layer in the L2R device receive the L2RLME-AA-RQ.request primitive from its higher layer after joining a PAN but before assigning a short address, ~~If a device wants to be assigned a short address,~~ it ~~may~~ transmits an Address Assignment Request (AA-RQ) IE to the coordinator that it associated to. If the AA-RQ IE is successfully transmitted, it issues the L2RLME-AA-RQ.confirm primitive, with a status of SUCCESS, to the next higher layer. If the parameters of this primitive are invalid, it returns INVALID\_PARAMETER for the status. If any error occurs in MAC data transmission, it returns an error code of MAC transmission for the status. Then the L2R layer of the coordinator forwards the AA-RQ IE to a mesh root with a direct connection to the PAN coordinator. If a mesh root is connected to the PAN coordinator, it informs the devices in the L2R mesh tree with the PAN Coord Connection field in the Descriptor field of the TC IE. The L2R layer of the mesh root that receives the AA-RQ IE issues the L2RLME-AA-RQ.indication primitive to the next higher layer. The next higher layer asks the PAN coordinator to assign a short address to the device via the direct connection to the PAN coordinator. If the short address in the Allocated Address field is available, the PAN coordinator may assign it to the device. Otherwise the PAN coordinator assigns one of available short addresses to the device. The PAN coordinator also assigns expiration time of the assigned short address which may be more than the time in the Expiration Time field and keep assigned short address until the expiration time is expired. Then the next higher layer of the mesh root issues the L2RLME-AA-RP.request primitive. The L2R layer of the mesh root replies with an Address Assignment Reply (AA-RP) IE to the coordinator that the device associated to. If the PAN coordinator successfully allocated a short address and its expiration time, the AA-RP is sent with a Status field set to 1 and the allocated address and its expiration time ~~is~~ are included in the Allocated Address field and the Expiration Time field respectively; otherwise, the Status field is set to 0 and the Allocated Address field and the Expiration Time field ~~is~~ are omitted. If the AA-RP IE is successfully transmitted, the L2R layer of the mesh tree issues the L2RLME-AA-RP.confirm primitive, with a status of SUCCESS, to the next higher layer. If the parameters of this primitive are invalid, it returns INVALID\_PARAMETER for the status. If any error occurs in MAC data transmission, it returns an error code of MAC transmission for the status. The coordinator that the device associated to forward the AA-RP IE sent from the mesh root to the device. If the device is an end device, the coordinator updates its child information according to the received AA-RP IE. The L2R layer of the device that receives the AA-RP IE issues the L2RLME-AA-RP.indication primitive to the next higher layer. The TC IE, AA-RQ IE and AA-RP IE are described in 6.2.2, 6.2.14 and 6.2.15 respectively.

Before the expiration time of the assigned short address is expired, the next higher layer of a device need to update the expiration time of its short address by issuing the L2RLME-AA-RQ.request primitive. When the L2R layer of the device that has already assigned its short address receives the L2RLME-AA-RQ.request primitive, it sends an AA-RQ IE to the mesh root with a direct connection to the PAN coordinator directly. If the AA-RQ IE is successfully transmitted, the L2R layer of the mesh tree issues the L2RLME-AA-RQ.confirm primitive, with a status of SUCCESS, to the next higher layer. If the parameters of this primitive are invalid, it returns INVALID\_PARAMETER for the status. If any error occurs in MAC data transmission, it returns an error code of MAC transmission for the status. The next higher layer of the mesh root is informed the reception of the AA-RQ IE by L2RLME-AA.RQ.indication. If the short address in the AA-RQ IE is already assigned, the next higher layer of the mesh root may ask the PAN coordinator to update its expiration time. The next higher layer of the mesh root issues the L2RLME-AA-RP.request primitive. The L2R layer of the mesh root replies with an AA-RP IE to the device. If the PAN coordinator successfully updates an expiration time, the AA-RP is sent with a Status field set to 1 and the allocated address and its expiration time are included in the Allocated Address field and the Expiration Time field respectively; otherwise, the Status field is set to 0 and the Allocated Address field and the Expiration Time field are omitted. If the AA-RP IE is successfully transmitted, the L2R layer of the mesh tree issues the L2RLME-AA-RP.confirm primitive, with a status of SUCCESS, to the next higher layer. If the parameters of this primitive are invalid, it returns INVALID\_PARAMETER for the status. If any error occurs in MAC data transmission, it returns an error code of MAC transmission for the status. When the device receives the AA-RP IE, the next higher layer of the device is informed by the L2RLME-AA-RP.indication primitive.

If a device does not need a previously assigned short address anymore for any reason such as leaving the PAN, the next higher layer of the device issues the L2RLME-ARel.request primitive to ~~it~~ inform~~s~~ the PAN coordinator by transmitting an Address Release (ARel) IE through a mesh root connected to the PAN coordinator. If the ARel IE is successfully transmitted, the L2R layer of the mesh tree issues the L2RLME-ARel.confirm primitive, with a status of SUCCESS, to the next higher layer. If the parameters of this primitive are invalid, it returns INVALID\_PARAMETER for the status. If any error occurs in MAC data transmission, it returns an error code of MAC transmission for the status. When the mesh root receives the ARel IE, the next higher layer of the mesh tree is informed by the L2RLME-ARel.indication primitive. The ARel IE is described in 6.2.16. These procedure is illustrated in Figure x.

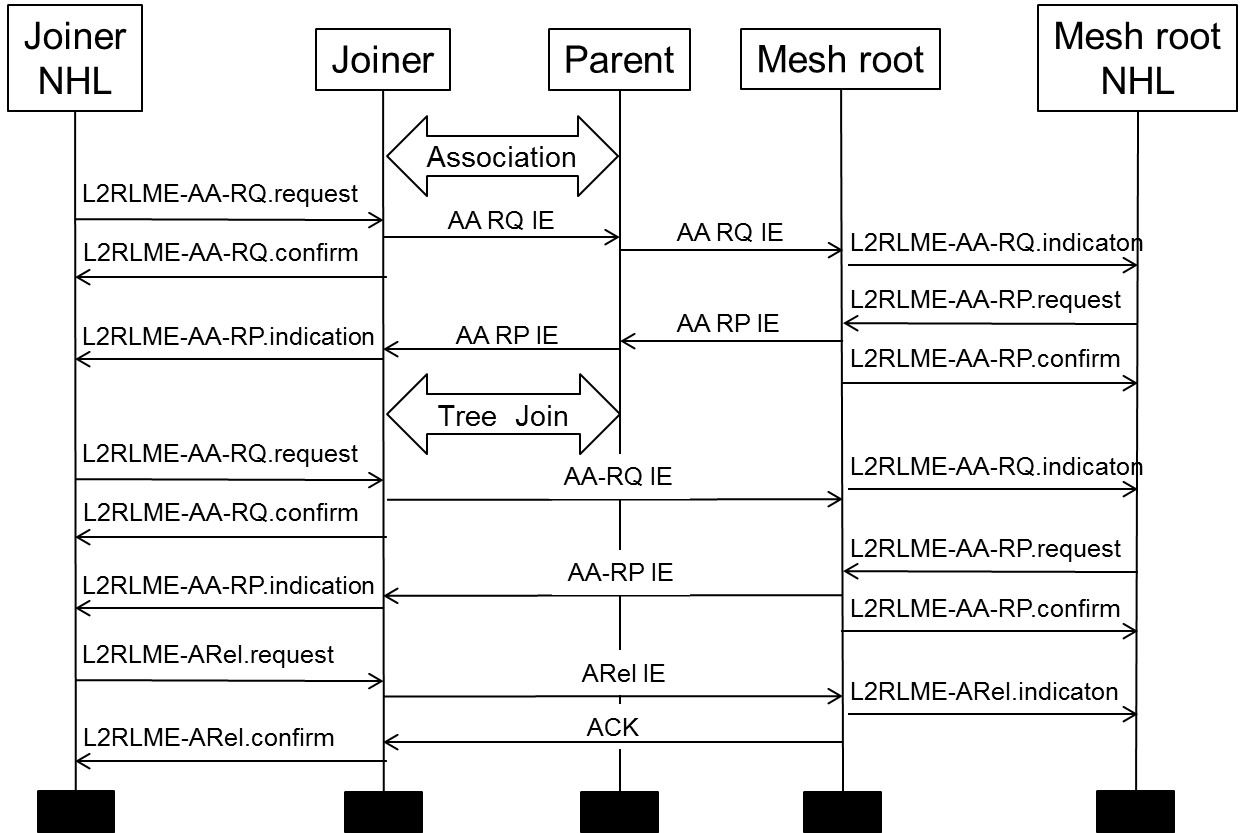


Figure x-Address Assignment Procedure

If multiple PANs are present, L2R routing uses long addresses. In this case, short address assignment is out of the scope of this document.

The AA-RQ, AA-RP and ARel IEs are transmitted within a MP frame along with a L2R Routing IE in order to route them to the mesh root.

* ***Modify the figure 63 as follows:***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bits:0-7** | **8-14** | **15** | **Octet:8** | **2** | **1** |
| Length | Sub-ID | Type=0 | Joining Device  Extended Address | Allocated  Address | Expiration Time |

Figure 63-Format of the AA-RQ IE

* ***Modify the text and the figure after Figure 63 in the clause 6.2.14 as follows:***

**6.2.14.1 Joining Device Extended Address field**

The Joining Device Extended Address field contains the extended address of the device attempting to join the PAN.

**6.2.14.2 Allocated Address field**

The Allocated Address field contains the short address that is already allocated to the device or is expected to be allocated to the device.

**6.2.14.3 Expiration Time field**

The Expiration Time field contains the expiration time of the short address in the Allocated Address field. The Expiration Time field is formatted as illustrated in Figure xx.

|  |  |
| --- | --- |
| **Bits:0** | **1-7** |
| Unit | Value |

Figure xx-Format of the Expiration Time field

The Unit field in the Expiration time field format indicates the unit of the Expiration time value and may take one of the values listed in Table xx.

Table xx-Expiration Time units

|  |  |
| --- | --- |
| **Value b0** | **Description** |
| 0 | Minutes |
| 1 | Hour |

* ***Modify the figure 64 as follows:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits:0-7** | **8-14** | **15** | **16** | **17-23** | **Octet:8** | **0/2** | **0/1** |
| Length | Sub-ID | Type=0 | Status | Reserved | Joining Device  Extended Address | Allocated  Address | Expiration  Time |

Figure 64-Format of the AA-RP IE

* ***Modify the clause 6.2.15.1 as follows:***

**6.2.15.1 Status field**

When the Status field is set to 1, the AA request has been approved and AA-RP IE contains an Allocated Address field and an Expiration Time field. Otherwise the AA request has been denied and the Allocated Address field and the Expiration Time field ~~is~~ are omitted.

* ***Add the following clause after 6.2.15.3:***

**6.2.15.4 Expiration Time field**

The Expiration Time field contains the expiration time of the assigned short address in the Allocated Address field.

* ***Modify the figure 65 as follows:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Bits:0-7** | **8-14** | **15** | **Octet:8** | **2** |
| Length | Sub-ID | Type=0 | Extended  Address | Short  Address |

Figure 65-Format of the AA-Rel IE

* ***Add the text after Figure 65 as follows:***

**6.2.16.1 Extended Address field**

The Extended Address field contains the extended address of the device that is going to send this IE.

**6.2.16.2 Short Address field**

The Short Address field contains the short address assigned to the device that is going to send this IE.

* ***Add the new clause after the clause 7.1.2.2 as follows:***

**7.1.3 Primitives to manage a short address assignment**

**7.1.3.1 L2RLME-AA-RQ.request**

The L2RLME-AA-RQ.request primitive is used by the next higher layer to request the L2R sublayer to initiate the short address assignment procedure when its short address is not assigned or to update the expiration time of its assigned short address when its short address is already assigned.

The semantics of this primitive are:

L2RLME-AA-RQ.request (

AllocatedAddress,

ExpirationTimeUnit

ExpirationTime

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-AA-RQ.request parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| AllocatedAddress | Short address | 0x00-0x7f, 0xff | Already allocated short address or short address expected to be allocated. If there is no preference of assigning short address, it is set to 0xff. |
| ExpirationTimeUnit | ENUMERATION | Minute, Hour | Unit of the ExpirationTime. |
| ExpirationTime | Integer | 0x00-0x7f | Expiration time expected to be allocated in ExpirationTimeUnit. |

**7.1.3.2 L2RLME-AA-RQ.confirm**

The L2RLME-AA-RQ.confirm primitive is used by the L2R sublayer to inform the next higher layer of the result of the short address assignment request.

The semantics of this primitive are:

L2RLME-AA-RQ.confirm (

Status

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-AA-RQ.confirm parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Status | ENUMERATION | SUCCESS, INVALID\_PARAMETER, Error codes of MAC DATA transmission | Reports the result of invoking a L2RLME-AA-RQ.request |

**7.1.3.3 L2RLME-AA-RQ.indication**

The L2RLME-AA-RQ.indication primitive is used by the L2R sublayer to inform the next higher layer of reception of AA-RQ IE.

The semantics of this primitive are:

L2RLME-AA-RQ.indication (

ExtendedAddress,

ShortAddress,

ExpirationTimeUnit,

ExpirationTime

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-AA-RQ.indication parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| ExtendedAddress | Extended address | 0x0000000000000000 – 0xffffffffffffffff | Extended address of the device that sent the AA-RQ IE. |
| Short address | Short address | 0x00-0x7f, 0xff | Allocated short address. The value of 0xff means no preference for assigning short address. |
| ExpirationTimeUnit | ENUMERATION | Minute, Hour | Unit of the ExpirationTime. |
| ExpirationTime | Integer | 0x00-0x7f | Expiration time expected to be allocated in ExpirationTimeUnit. |

**7.1.3.4 L2RLME-AA-RP.request**

The L2RLME-AA-RP.request primitive is used by the next higher layer to request the L2R sublayer to reply an AA-RP IE.

The semantics of this primitive are:

L2RLME-AA-RP.request (

Status,

ExtendedAddress

AllocatedAddress,

ExpirationTimeUnit,

ExpirationTime

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-AA-RP.request parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Status | Boolean | True, False | If True, short address and available time is successfully allocated or updated. Otherwise, False. |
| ExtendedAddress | Extended address | 0x0000000000000000 – 0xffffffffffffffff | Extended address of the device that sent the AA-RQ IE. |
| AllocatedAddress | Short address | 0x00-0x7f | Allocated short address. |
| ExpirationTimeUnit | ENUMERATION | Minute, Hour | Unit of the ExpirationTime. |
| ExpirationTime | Integer | 0x00-0x7f | Expiration time in ExpirationTimeUnit. |

**7.1.3.5 L2RLME-AA-RP.confirm**

The L2RLME-AA-RP.confirm primitive is used by the L2R sublayer to inform the next higher layer of the result of the short address assignment request.

The semantics of this primitive are:

L2RLME-AA-RP.confirm (

Status

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-AA-RP.confirm parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Status | ENUMERATION | SUCCESS, INVALID\_PARAMETER, Error codes of MAC DATA transmission | Reports the result of invoking a L2RLME-AA-RP.request |

**7.1.3.6 L2RLME-AA-RP.indication**

The L2RLME-AA-RP.indication primitive is used by the L2R sublayer to inform the next higher layer of reception of AA-RP IE.

The semantics of this primitive are:

L2RLME-AA-RP.indication (

Status,

ExtendedAddress,

ShortAddress,

ExpirationTimeUnit,

ExpirationTime

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-AA-RP.indication parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Status | Boolean | True, False | If True, short address and available time is successfully allocated or updated. Otherwise, False. |
| ExtendedAddress | Extended address | 0x0000000000000000 – 0xffffffffffffffff | Extended address of the device that sent the AA-RQ IE. |
| Short address | Short address | 0x00-0x7f | Allocated short address |
| ExpirationTimeUnit | ENUMERATION | Minute, Hour | Unit of the ExpirationTime. |
| ExpirationTime | Integer | 0x00-0x7f | Expiration time expected to be allocated in ExpirationTimeUnit. |

**7.1.3.7 L2RLME-ARel.request**

The L2RLME-ARel.request primitive is used by the next higher layer to request the L2R sublayer to release the allocated short address.

The semantics of this primitive are:

L2RLME-AA-RP.request (

AllocatedAddress,

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-ARel.request parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| AllocatedAddress | Short address | 0x00-0x7f | Allocated short address. |

**7.1.3.8 L2RLME-ARel.confirm**

The L2RLME-ARel.confirm primitive is used by the L2R sublayer to inform the next higher layer of the result of the L2RLME-ARel.request.

The semantics of this primitive are:

L2RLME-ARel.confirm (

Status

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-ARel.confirm parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Status | ENUMERATION | SUCCESS, INVALID\_PARAMETER, Error codes of MAC DATA transmission | Reports the result of invoking a L2RLME-ARel.request |

**7.1.3.9 L2RLME-ARel.indication**

The L2RLME-ARel.indication primitive is used by the L2R sublayer to inform the next higher layer of reception of ARel IE.

The semantics of this primitive are:

L2RLME-ARel.indication (

ExtendedAddress,

ShortAddress,

)

The primitive parameters are defined in Table xx.

Table xx - L2RLME-ARel.indication parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| ExtendedAddress | Extended address | 0x0000000000000000 – 0xffffffffffffffff | Extended address of the device that sent the ARel IE. |
| Short address | Short address | 0x00-0x7f | Allocated short address |