**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 the comments related to TC** | |
| Date Submitted | 4 August 2015 | |
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| Re: | Proposed comment resolutions related to the 802.15.10 Consolidated Comment Entry Form | |
| 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 | |
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**Comment #38**

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| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Kiyoshi Fukui | 8 | 4.2 | 23 | In this figure, some end devices have two connections to neighbor nodes. But, in 15.4, an end device (RFD) is supposed to have a connection to only one neighbor which is its own parent. | Modify the figure 4. |

**Resolution: AiP**

There are two types of end device. One is the “End device (RFD)” which shall be connected to only one node as specified in IEEE802.15.4. The other is the “End device (FFD)” which can be connected to one or more nodes. Those of nodes are not distinguished in figure 4. That may mislead so that L2R allows RFD to connect two or more nodes.

* ***Modify the Figure 1, Figure 2 and Figure 3 so that the two types of end device are distinguished.***

Add legends for two types of end nodes. Use a painted circle to represent the node that connected to two or more nodes (End device – FFD). Reuse a white circle to represent the node that connected to only one node (End device – RFD).

**Comment #85, #86**

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| **CID** | **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| 85 | Ed Callaway | 13 | 5.1.1.1 | 43 | "When a L2R router wants to start a L2R mesh tree, its next higher layer in a mesh root invokes the L2RLME-TREE-START.request primitive to start L2R mesh tree, and the L2R layer configures the L2R Tree process with the parameters designated by the primitive and with the related PIBs." First the device "wants" to do something, and then magically the L2R router is renamed a mesh root! Following this, a mysterious, undefined thing called an "L2R Tree process" is configured. Help stamp out anthropomorphism! Unless Skynet has already taken over, in which case forget I said anything. | "An L2R mesh tree is started when the L2R layer in the L2R router that is to become the mesh root, receives the L2RLME-TREE-START.request primitive from a higher layer. The L2R layer then configures the L2R Tree process with the parameters designated by the primitive and with the related PIBs." There should be a third sentence following these two that describes just what is meant by "configures the L2R Tree process with the parameters designated by the primitive and with the related PIBs", but I have no idea what is meant by this and so cannot provide a proposed change. |
| 86 | Kinney | 13 | 5.1.1.1 | 43 | sentence "When a L2R router wants to start a L2R mesh tree, its next higher layer in a mesh root"… needs to be rewritten:  1) does the L2R router "want" or is it the intention of a higher layer?  2) "higher layer in a mesh root"? The higher layer is in another device? it's having an out-of-device moment? | change sentence to state what editor is trying to communicate |

**Resolution: AiP**

Modify the text, MTT table and some related PIB according to above comments.

* ***Replace the 1st sentence in 2nd paragraph in 5.1.1.1 with:***

An L2R mesh tree is started when the L2R layer in the L2R router that is to become the mesh root, receives the L2RLME-TREE-START.request primitive from a higher layer. The L2R layer then prepares an MTT table. The Mesh root Address, the Depth and Sequence number in the MTT table are set as follow. The mesh root Address is set to its own address. The Depth is set to zero. The Sequence number is set to initial value as described in 5.2.1. Other entries in the MTT table are set as indicated by the parameters in the primitive.

* ***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) IE without content, i.e. all the fields after the Type field in the L2R-D IE are omitted. The L2R-D IE is defined in 6.2.1. When an FFD able to act as a coordinator receives the L2R-D IE, it replies with a EB containing a L2R-D 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, The L2R layer prepares the MTT table. Depth in MTT table is set to the value plus one in the Depth field in the received TC IE. Other entries in the MTT table are set ~~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.

* ***Modify Table 1—Entries of the L2R MTT as follow:***

**Table 1 - Entries of the L2R MTT**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| ~~Entity~~Service ID | Integer | 0x00 - 0xff | *[Addressed by 15-15-0456-03]*  Identifies an entity (ex: data collection entity, control and monitoring entity, etc.) reachable through the L2R network. An entity may be reachable through several mesh roots and a mesh root may be connected to several entities. |
| Mesh root address  Mode | Enumeration | SHORT, LONG | Indicates the address mode of the mesh root. If SHORT, a 16-bit address is used. If LONG, a 64-bit address is used. |
| Mesh root Address | As indicated by the Tree root address mode | Any 16-bit or 64-bit address | Address of the root of a tree offering routing towards an entity available. |
| Security Mode | Enumeration | As found in Table 8 | Security mode in the L2R mesh tree. |
| ~~PAN Security Level~~ | ~~Enumeration~~ | ~~As found in [15.4] Table 152~~ | ~~Security level in the PAN. Present only if the Security Mode is KMP~~ |
| DAgg | Boolean | TRUE, FALSE | If TRUE, data aggregation is allowed in the L2R network. Otherwise, data aggregation is prohibited. |
| ~~Data aggregation buffering time~~ | ~~Integer~~ | ~~0x00-0xff~~ | ~~Duration in seconds a frame may be buffered for DAgg indicated by~~ *~~l2rDAggBufferingTime~~* |
| Multi-channel operation | Boolean | TRUE, FALSE | TRUE: multi-channel operation is used.  FALSE: multi-channel operation is not used.  ~~Indicates if multiple channels and multiple PANs are used in the L2R network.~~ |
| Brother routing | Boolean | TRUE, FALSE | If TRUE, routing through a brother is allowed in the network. ~~This implies that the network can use a loop avoidance mechanism.~~ |
| DS route required | Boolean | TRUE, FALSE | If TRUE, all the devices are required to send a Route Announcement IE to build downstream routes. |
| On-demand P2P discovery | Boolean | TRUE, FALSE | If TRUE, on-demand P2P discovery is allowed. |
| Storing mode | Boolean | TRUE, FALSE | If TRUE, the network is in storing mode. Otherwise, the network is on non-storing mode and source routing should be used. |
| Security mode | Integer | 0x00 - 0x02 | 00: none, 01 : PAN credentials, 10 : KMP,  11 : Reserved. |
| Multicast subscription  in RA | Boolean | TRUE, FALSE | If TRUE, Route Announcement (RA) may contain a Multicast subscription field and multicast routing is accordingly used. Otherwise, multicast packets are flooded and filtered by the upper layer. |
| Depth | Integer | 0x00 - 0xff | Distance in hops of the current device to the mesh root. |
| Sequence number | Integer | 0x00 - 0xff | ~~Set by the mesh root and propagated. Used to know the latest tree information.~~  Indicates a latest TC IE. It is used as described in 5.2.1. |
| ~~TC IE interval~~ | ~~Integer~~ | ~~0x00 - 0xff~~ | ~~Interval between TC IE transmissions.~~ |
| Number of metrics N | Short | 0x00-0xff | Indicates the number of MTT PQM Entries. |
| ~~Set of N~~ MTT PQM Entries | Set of octets | - | ~~Set of MTT PQM Entries~~ Identifies MTT PQM entry in use defined in Table 2. |
| PathToRoot | Boolean | TRUE or FALSE | If TRUE, Path to root field in TC IE presents. |
| NLMOperation | Boolean | TRUE or FALSE | If TRUE, NLM IE is used for US routing. |
| PANCoordConnection | Boolean | TRUE or FALSE | If TRUE, the mesh root has a direct connection to the PAN coordinator. |

* ***Add parameters, PQM ID and LQT to L2RLME-TREE-START.request primitive.***

L2RLME-TREE-START.r.equest (

:

PQM ID,

LQT

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| PQM ID | Integer | 0x00 - 0xff | Identifies the metric in use in the mesh tree. The metric identifier values are listed in Table 11. |
| LQT | - | Depends on the PQM ID | Indicates the threshold of the metric that a link shared with an ancestor should satisfy. |

* ***Update the figure 4 - replacing the texts in the balloon, "L2R Mesh...." with "Prepare the MTT ".***

**Comment #91**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Ed Callaway | 13 | 5.1.1.1 | 47 | What keeps two (or more) L2R routers in the PAN from attempting to generate L2R mesh trees in the same PAN at substantially the same time? It would seem like two L2R routers that were out of range of each other could begin the 5.1.1.1 Tree starting procedure -- only to cause confusion later on, when the two growing trees reached the same network device somewhere in the middle. What a device should do in that case is undefined in the draft, I think. (This problem is minimized -- although not avoided -- in the formation of PANs themselves because 15.4 recommends that a device perform an active scan prior to starting a PAN, so that members of any other PANs in range may be identified before the second network would be started (6.3.3.1).) It seems like this would happen rather frequently, especially in the home environment. | I don't really know what to suggest here. One could punt, and state that the mechanism to prevent this problem is out of scope of the standard, but that seems like a poor solution to which I would not like my name attached. One could, I suppose, require an L2R router to transmit a special enhanced beacon as part of an active scanning process prior to becoming a root device, in a manner analogous to that of the 15.4 PAN formation, but that would only move the problem one hop further away. |

**Resolution: AiP**

Multiple mesh trees can be deployed and they can be overwrapped. Whether a joining device joins to a single tree or multiple trees is up to itself.

Add L2R Discovery before starting mesh as a mesh root.

Add L2R max depth field in the TC-IE format to announce if the device can be joined to. Add a new parameter 'L2RMaxDepth' to L2RLME-TREE-START.request primitive.

* ***Insert the sentence to describe this process at the beginning of the clause 5.1.1.1.***

Before starting a mesh tree, a next higher layer of the device may execute L2R Discovery and decide to be a mesh root if there are no mesh trees to join.

* ***Update the figure 4 – add L2R discovery before L2RLME-TREE-START.request.***
* ***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) IE without content, i.e. all the fields after the Type field in the L2R-D IE are omitted. The L2R-D IE is defined in 6.2.1. When an FFD able to act as a coordinator receives the L2R-D IE, it replies with a EB containing a L2R-D 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 and its Depth is less than its L2R Max Depth, The L2R layer prepares the MTT table. The value in the Depth filed in the received TC IE plus one is set in MTT table as the depth. Other entries in the MTT table are set ~~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.

* ***Modify the format of the TC IE as follows:***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits:0-7** | **8-14** | **15** | Octets:0/1/2 | 0/2/8 | 0/Variable | 0/1 | 0/1 | 0/1 | … |
| Length | Sub-ID | Type  =0 | Descriptor | Mesh Root Address | Entity ID List | Depth | L2R Max Depth | Sequence Number | … |

* ***Insert the subsection to describe a new field L2RMaxDepth of TC IE:***

**6.2.2.x L2R Max Depth field**

The L2R Max Depth field contains the maximum depth that the mesh tree allows a device to join.

* ***Add new entry L2RMaxDepth to the MTT.***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| L2R Max Depth | Integer | 0x00 - 0xff | Indicates the maximum depth that the mesh tree allows. |

* ***Add parameter L2RMaxDepth to the start primitive.***

L2RLME-TREE-START.request (

:

L2RMaxDepth

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| L2RMaxDepth | Integer | 0x00 - 0xff | Indicates the maximum depth that the mesh tree allows. |

**Comment #97**

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| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Kinney | 14 | 5.1.1.2 | 31 | sentence "If a PAN needs to be stopped or restarted, the L2R mesh tree(s) built upon the PAN should be stopped beforehand." Since this is a RP, the undesired outcome of stopping a PAN before stopping the mesh tree should be described. | describe what happens if the tree isn't stopped first |

**Resolution: AiP**

Since the clause 5.1.1.2 is removed by CID 98 resolution, no need to resolve this comment.

**Comment #98**

|  |  |  |  |  |  |
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| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Jussi Haapola | 14 | 5.1.1.2 | 33 | "If a mesh root does not have a direct connection to the PAN coordinator, the latter requests the mesh root to stop its L2R mesh tree with a STOP-L2R-RQ IE." What mechnaism is there that ensures a PAN coordinator knows of all mesh trees in the PAN? | State clearly if the PAN coordinator needs to be part of all mesh trees, or if not include text describing how the PAN coordinator knows of all mesh trees. |

**Resolution: AiP**

Remove this IE from the specification. And keep method to announce that PAN coordinator doesn't work anymore to the higher layer.

* Insert "A mesh root may stop its mesh tree if it is no longer able to provide it services or it has been disconnected from its PAN." in 5.1.1.4.
* ***Remove 5.1.1.2, 6.2.3, 6.2.4, 7.1.1.12 and 7.1.1.13.***
* ***Insert the following text at the beginning of the clause 5.1.1.4:***

A mesh root may stop its mesh tree if it is no longer able to provide it services or it has been disconnected from its PAN.

**Comment #123**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Noriyuki Sato | 16 | 5.1.2.1 | 36-40 | When MLME-SCAN.request is invoked, the response should be two way. One is that result is indicated one by one by MLME-BEACON-NOTIFY.indication. NHL may know scan result immediately when the device receive a beacon. The other is that result is indicated by MLME-SCAN.confirm with list of scanned beacons. NHL know channel and beacon lists after all scan has been completed. The method is toggled by MAC PIB. L2RLME-SCAN should also provide these two methods. The paragraph from l.36 to l.40 on p.16 should be updated. | It doesn’t need to add new PIB for L2RLME-SCAN and let mode of operation be changed by MAC PIB. It needs to add L2LME-SCAN.indication to transparent MLME-BEACON-NOTIFY.indication to the NHL. |

**Resolution: AiP**

Add text (and a figure) to explain what happens when this MAC PIB is changed.

* ***Modify the text of 3rd paragraph in the clause 5.1.2.1 as follows:***

When an FFD that can act as coordinator and that belongs to a L2R mesh tree receives the EBR with the L2R-D IE, it replies with an EB with a L2R-D IE containing the address of the mesh ~~mesh~~ root, the list of entities and the security mode of the L2R mesh tree it belongs to.

When macAutoRequest in MAC PIB is set to FALSE, the L2R sublayer notified a result by MLME-BEACON-NOTIFY.indication primitive each receiving an EB frame. In this case, the L2R sublayer issues a L2RLME-SCAN.indication primitive to the next higher layer each receiving MLME-BEACON-NOTIFY.indication primitive from the MAC layer. After the scan is completed the L2R sublayer invokes the L2RLME-SCAN.confirm primitive with the empty ScanResultList.

When macAutoRequest in MAC PIB is set to TRUE, the L2R sublayer notified all scan results by MLME-SCAN.confirm primitive from the MAC layer ~~A~~after the scan~~,~~ is completed. ~~t~~The L2R sublayer invokes the L2RLME-SCAN.confirm primitive with the available coordinator candidates in the ScanResultList. This procedure is illustrated in Figure 7.

* ***Add a new primitive definition after the clause 7.1.1.2 as follows***

**7.1.1.x L2RLME-SCAN.indication**

The L2RMLE-SCAN.indication primitive is used by the L2R sublayer to inform the next higher layer of the result of each EB received during the enhanced scan procedure.

L2RLME-SCAN.indication (

ScanResult

)

The parameters of the primitive are defined in Table xx.

Table xx-L2RLME-SCAN.indication parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| ScanResult | Scan result descriptor described in Table 17 | - | - |

**Comment #151**

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| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Verotiana Rabarijaona | 20 | 5.1.2.5 | 20 | If the mesh root or the PAN coordinator is within the coverage area of the device, the AA-RP, AA-RQ and ARel IEs may be transmitted without the L2R routing IE. | Insert the text in the comment at the end of the paragraph |

**Resolution: AiP**

Add an option to omit address field in Routing IE in the case it is same as one in MAC - keep to use Routing IE.

* ***Change the length of Source Address field and Destination Address field from ‘2/8’ to ‘0/2/8’ in figure 58.***
* ***Modify the descriptor field of the Routing IE as follows:***

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits:0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10-11** | **12** | **12-15** |
| Data Aggregation | Source Routing | MCO | L2R Retransmission | Delay Critical | Guaranteed Transmission | Mesh Root Address Mode | ~~Source Address Mode~~ Source Address Present | ~~Destination Address Mode~~ Destination Address Present | Intermdiate Address Mode Present | MAC AR Managemanet | E2E AR | Reserved |

Figure 57-Format of the Descriptor field of the L2R Routing IE

* ***Modify the text of the 9th and 10th paragraph in the clause 6.2.10 as follows:***

~~When the Source Address Mode field is set to 1, the Source Address field contains an extended address and if set to 0, it contains a short address.~~

When the Source Address Present field is set to 0, the source address is same as MAC source address and the Source Address field is omitted. When the Source Address Present field set to 1, the Source Address field is present.

~~When the Destination Address Mode field is set to 1, the Destination Address field contains an extended address and if set to 0, it contains a short address.~~

When the Destination Address Present field is set to 0, the destination address is same as MAC destination address and the Destination Address field is omitted. When the Destination Address Present field set to 1, the Destination Address field is present.

**Comment #492**

|  |  |  |  |  |  |
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| ***Commenter*** | ***Page*** | ***Clause*** | ***Line*** | ***Comment*** | ***Proposed change*** |
| Tero Kivinen | 75 | 7.1.1.1 | 45 | There might be other parameters needed, for example the security and IE parameters, i.e. some of those which are in the MLME-SCAN.request. | Perhaps add text that some other parameters from the MLME-SCAN.request can also be used here. |

**Resolution: AiP**

MLME-SCAN.request primitive is shown below. Necessary parameters for L2RLME-SCAN are colored red. They needs to be added to L2RLME-SCAN.request parameter.

MLME-SCAN.request (

ScanType,

ScanChannels,

ScanDuration,

ChannelPage,

SecurityLevel,

KeyIdMode,

KeySource,

KeyIndex,

LinkQualityScan,

PanIdSuppressed,

SeqNumSuppressed,

HeaderIeList,

PayloadIeList,

HeaderIeIdList,

NestedIeSubIdList,

MpmScanDurationBPan,

MpmScanDurationNbPan,

MpmScan,

MpmScanType

)

* ***Add parameters to the L2RLME-SCAN.request primitive as follow:***

L2RLME-SCAN.request (

:

SecurityLevel,

KeyIdMode,

KeySource,

KeyIndex,

LinkQualityScan,

PanIdSuppressed,

SeqNumSuppressed,

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| SecuriyLevel | Integer | As defined in Table 82 in [15.4] | As defined in Table 82 in [15.4] |
| KeyIdMode | Integer | As defined in Table 82 in [15.4] | As defined in Table 82 in [15.4] |
| KeySource | Set of octets | As defined in Table 82 in [15.4] | As defined in Table 82 in [15.4] |
| KeyIndex | Integer | As defined in Table 82 in [15.4] | As defined in Table 82 in [15.4] |
| LinkQualityScan | Boolean | As defined in Table 82 in [15.4] | As defined in Table 82 in [15.4] |
| PanIdSupperessed | Boolean | As defined in Table 82 in [15.4] | As defined in Table 82 in [15.4] |
| SeqNumSuppressed | Boolean | As defined in Table 82 in [15.4] | As defined in Table 82 in [15.4] |

**Comment #498**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Verotiana Rabarijaona | 76 | 7.1.1.1 | 34 | The parameters in this Table 15 are used to trigger a scan. What happens if a mesh tree with the required Entity ID and required mesh root is found but without satisfying the tree descriptor attributes? Does the joining device gives up the joining procedure? According to 5.1.2, the Entity ID and the mesh root address are the parameters required to join a tree | Delete this row or specify in 5.1.2 what happens if one of the parameters in the tree descriptor is not satisfied |

**Resolution: A**

* ***Remove TreeDescriptor from the parameters of L2RLME-SCAN.request primitive:***

L2RLME-SCAN.request (

ScanDuration,

ScanChannels,

ChannelPage,

EntityID,

MeshRootAddress,

~~TreeDescriptor~~

)

**Comment #511**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Tero Kivinen | 77 | 7.1.1.2 | 52 | I am pretty sure there are other errors that can happen during the scan. | Add other suitable error codes. |

**Resolution: AiP**

Add the error code and modify the related text.

* ***Modify the 2nd paragraph in the clause 5.1.1.1 as follows:***

When an FFD that can act as coordinator and that belongs to a L2R mesh tree receives the EBR with the L2R-D IE, it replies with an EB with a L2R-D IE containing the address of the mesh mesh root, the list of entities and the security mode of the L2R mesh tree it belongs to. After the scan, the L2R sublayer invokes the L2RLME-SCAN.confirm primitive with the available coordinator candidates. If the parameters of this primitive are invalid, INVALID\_PARAMETER is returned as the status. If the parameters are valid but no L2R mesh tree is found, NO\_DESIGNATED\_MESH\_TREE is returned as the status. If any error occurs in MAC scan procedure, an error code of MAC scan procedure is returned as the status. This procedure is illustrated in Figure 7.

* ***Modify Table 16 as follows:***

Table 16 - L2RLME-SCAN.confirm parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Status | ENUMERATION | SUCCESS,  ~~FAILURE,~~  INVALID\_PARAMETER,  NO\_DESIGNATED\_MESH\_TREE,  Error codes of MAC SCAN procedure | Reports the result of invoking a L2RLME-SCAN.request |

**Comment #513**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Verotiana Rabarijaona | 78 | 7.1.1.2 | 15 | A device might belong to multiple mesh trees with different mesh roots | Change this parameter to MeshRootList |

**Resolution: AiP**

A device should be able to belong to multiple mesh trees with different mesh roots. But when a device joins multiple mesh trees, it is better that the device try to join each mesh tree separately.

**Comment #534**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Verotiana Rabarijaona | 80 | 7.1.1.3 | 22 | Does this description mean that only one address mode is allowed in the L2R mesh tree? All devices have a EUI64 address so if the AddressMode is set to EUI64, there is no issue. But if the AddressMode is set to SHORT and a device is not using a short address, can it join the tree? Besides, if the address mode is already set by the mesh root, the address mode fields in the IEs are not needed. | Delete this row or specify how this parameter is used |

**Resolution: AiP**

This comment is already resolved by CID180. Current specification allows only using same address mode in a whole mesh tree.

**Comment #535, #536**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Commenter*** | ***Page*** | ***Clause*** | ***Line*** | ***Comment*** | ***Proposed change*** |
| Tero Kivinen | 80 | 7.1.1.4 | 45 | I am pretty sure there are other errors that can happen during the scan. | Add other suitable error codes. |
| Verotiana Rabarijaona | 80 | 7.1.1.4 | 48 | Specify the meaning of an "Unsupported" status | See comment |

**Resolution: AiP**

* ***Modify the 2nd paragraph in the clause 5.1.1.1 as follows:***

When a L2R router wants to start a L2R mesh tree, its next higher layer in a mesh root invokes the L2RLME-TREE-START.request primitive to start L2R mesh tree, and the L2R layer configures the L2R Tree process with the parameters designated by the primitive and with the related PIBs. The L2R sublayer then issues the L2RLME-TREE-START.confirm primitive to the next higher layer and starts periodically sending EBs containing the TC IE with the frequency indicated by *l2rTCIEInterval*. If the mesh root has a direct connection to the PAN, it sets the PAN Coord Connection field in the Descriptor of the TC IE to 1. Upon successful completion of the start-up procedure, the L2R layers sends a L2RLME-TREESTART.confirm primitive, with a status of SUCCESS, to the next higher layer. ~~If any error occurs during the start-up procedure, the primitive returns an error code for the status.~~ If the parameters of this primitive are invalid, INVALID\_PARAMETER is returned as the status. If the parameters are valid but not supported, UNSUPPORTED is returned as the status. If any error occurs in MAC data transmission, an error code of MAC transmission is returned as the status. The procedure is illustrated in Figure 4.

* ***Modify Table 19 as follows:***

Table 19 - L2RLME-TREE-START.confirm parameters

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

**Comment #539**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Commenter*** | ***Page*** | ***Clause*** | ***Line*** | ***Comment*** | ***Proposed change*** |
| Tero Kivinen | 81 | 7.1.1.6 | 37 | I am pretty sure there are other errors that can happen during the scan. | Add other suitable error codes. |

**Resolution: AiP**

* ***Modify the clause 5.1.1.4 as follows:***

To stop a L2R mesh tree, the next higher layer invokes the L2RLME-TREE-STOP.request to stop the running L2R mesh tree. The L2R layer changes the TC IE to be included in next EB so that its depth is 0xff and sends an EB with the modified TC IE, The mesh root may transmit several new TC IEs successively with the same SN to ensure the notification of all its descendants. Upon successful completion of the stop procedure, the L2R layer~~s~~ sends a L2RLME-TREE-STOP.confirm primitive, with SUCCESS, to the next higher layer. ~~If any error occurs during the stop procedure, the primitive returns an error code for the status.~~ If any error occurs in MAC data transmission, an error code of MAC transmission is returned as the status. This procedure is illustrated in Figure 6.

* ***Modify Table 21 as follows:***

Table 21 - L2RLME-TREE-STOP.confirm parameters

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

**Comment #541, R65**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***CID*** | ***Commenter*** | ***Page*** | ***Clause*** | ***Line*** | ***Comment*** | ***Proposed change*** |
| 541 | Tero Kivinen | 83 | 7.1.1.8 | 15 | Are those only error codes that can happen during this call? TRANSACTION\_EXPIRED etc? | Add other suitable error codes. |
| R65 | Charlie Perkins | 17 | 5.1.2.2 | 42 | appropriate error code | Error code must be specified. Is there a table of errors? |

**Resolution: AiP**

* ***Modify the 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) IE without content, i.e. all the fields after the Type field in the L2R-D IE are omitted. The L2R-D IE is defined in 6.2.1. When an FFD able to act as a coordinator receives the L2R-D IE, it replies with a EB containing a L2R-D 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 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~~ NO\_DESIGNATED\_MESH\_TREE. If the parameters of this primitive are invalid, INVALID\_PARAMETER is returned as the status. If any error occurs in MAC data transmission, an error code of MAC transmission is returned as the status. The L2RLME-JOIN-TREE.request and L2RLME-JOINTREE.confirm primitives are described in 7.1.1.7 and 7.1.1.8 respectively.

* ***Modify Table 23 as follows:***

Table 23 - L2RLME-JOIN-TREE.confirm parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid Range** | **Description** |
| Status | ENUMERATION | SUCCESS,  ~~INVALID\_ENTITY,~~  ~~INVALID\_TREE\_ROOT,~~  ~~INVALID\_MESH\_TREE~~  NO\_DESIGNATED\_MESH\_TREE,  Error codes of MAC DATA transmission | Reports the result of invoking a L2RLME-JOIN-TREE.request |

**Comment #544**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Commenter*** | ***Page*** | ***Clause*** | ***Line*** | ***Comment*** | ***Proposed change*** |
| Tero Kivinen | 84 | 7.1.1.10 | 15 | I am pretty sure there are other errors that can happen during the scan. | Add other suitable error codes. |

**Resolution: AiP**

* ***Modify the clause 5.1.2.4 as follows:***

The next higher layer invokes the L2RLME-TREE-LEAVE.request to disconnect from a L2R mesh tree. The L2R sublayer transmits its next scheduled EB with a TC IE with a depth 0xff. Upon successful completion of the stop procedure, the L2R layers sends a L2RLMETREE-LEAVE.confirm primitive, with a status of SUCCESS, to the next higher layer. ~~If any error occurs during the leave procedure, the primitive shall return an error code for the status.~~ If the parameters of this primitive are invalid, INVALID\_PARAMETER is returned as the status. If any error occurs in MAC data transmission, an error code of MAC transmission is returned as the status. The procedure is illustrated in Figure 10.

* ***Modify Table 25 as follows:***

Table 25 - L2RLME-LEAVE-TREE.confirm parameters

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

**Comment #549**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Verotiana Rabarijaona | 85 | 7.1.1.12 | 25 | The EntityID should be ignored if the MeshRootAddress is the broadcast address 0xff | Correct the condition upon which the parameter is ignored |

**Resolution: AiP**

L2RLME-STOP-L2R-RQ primitives are removed by CID 98 resolution. So, no need to resolve this comment.

**Comment #550**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Commenter*** | ***Page*** | ***Clause*** | ***Line*** | ***Comment*** | ***Proposed change*** |
| Tero Kivinen | 85 | 7.1.1.13 | 52 | I am pretty sure there are other errors that can happen during the scan. | Add other suitable error codes. |

**Resolution: AiP**

Since L2RLME-STOP-L2R-RQ primitives are removed by CID 98 resolution, no need to resolve this comment.

**Comment R185**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Commenter** | **Page** | **Clause** | **Line** | **Comment** | **Proposed change** |
| Charlie Perkins | 56 | 6.2.2.6 | 37 | "Hours" unit is not needed. | Make into a reserved bit? |

**Resolution: Reject**

Sleep router can use hour order interval.