**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#2067, #2076, #2079, #2080, #2103, #2116** |
| Date Submitted | 20 Jan 2016 |
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| Re: | Proposed comment resolutions related to the 802.15.10 Consolidated Comment Entry Form, CID #2067, #2076, #2079, #2080, #2103 and #2116 |
| Abstract | This document provides a proposed comment resolutions for the comments which are related to MT and NT of D3 of 802.15.10 |
| Purpose | To propose |
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1. **CID#2067, #2076, #2079**

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| 2067 | Verotiana Rabarijaona | NICT | 15 | 5.1.2.2.1 | 16 | "After joining an L2R mesh, if a device receives a TC IE from another L2R mesh with the same serviceprovided and a better PQM, and if the MeshRootAddress indicated in the L2RLME-JOIN-MESH.requestprimitive was 0xffff or 0xffffffffffffffff, the L2R sublayer decides whether or not to disconnect from thecurrent L2R mesh and join the new one." This can work only if the security settings are the same for all L2r meshes, otherwise a device should not be able to receive a TC IE from a different mesh. the whole idea behind separating the discovery and the joining procedures with the L2R-D IE and the TC IE after the first LB was so that the routing information would be secure, to avoid any device outside of the mesh accessing them. | Revise/remove anything related to processing TC IEs from unknown L2R mesh.  |
| 2076 | Kiyoshi Fukui | OKI | 16 | 5.1.2.2.2 | 53 | NT has no information for MT. So, any entries of the MT can not be set according to the information retrieved from the NT. | Clarify it. |
| 2079 | Verotiana Rabarijaona | NICT | 18 | 5.1.2.2.2 | 1 | "Whenever the device receives a TC IE from an L2R mesh other than the current mesh with a better PQM,the L2R sublayer informs the next higher layer by with the L2RLME-NOTIFY.indication primitive wherethe Notification is set to BETTER\_MESH\_DETECT. If The next higher layer decides whether or not torequest the L2R to disconnect from the current L2R mesh and join to the new L2R mesh." This is related to the TC IE from unknown L2R mesh issue. | Revise/remove anything related to processing TC IEs from unknown L2R mesh.  |

**Resolution: AiP**

Make clear the condition to be able to receive TC IEs other than the L2R mesh the device joined.

Correct the initialization and update procedure for MT and global NT.

* ***Modify the section 5.1.2.2.1 and 5.1.2.2.2 as follows***

**5.1.2.2.1 Mesh selection by the L2R sublayer**

If *l2rMeshSelection* is TRUE, the mesh selection is handled by the L2R sublayer. When a device wishes to join a mesh, the next higher layer invokes the L2RLME-JOIN-MESH.request primitive to request the L2R sublayer to join a mesh with the ServiceID and the MeshRootAddress indicated in the primitive. The MeshRootAddress is set to the broadcast address if the addres of the desired mesh root is unknown by the higher layers. Upon reception of this primitive, the L2R sublayer initiates an enhanced active scan and broadcasts an EBR with a TC IE with an empty Content field. The TC IE is defined in 6.1.2. When an L2R router receives the TC IE, it immediately replies with an EB containing a TC IE then resumes its regular periodic TC IE transmissions. When the device receives a TC IE, it computes its own depth and PQM as described in 5.2.1 and creates (regardless of the condition to record the parameters) or updates an MT entry related to the L2R mesh advertised in the TC IE. The device also creates (regardless of the condition to record the element) or updates a global NT entry for the neighbor transmitting the TC IE. If TC IEs from another mesh in same PAN can be decrypted or not encrypted and the device receives multiple TC IEs from different meshes, the device creates as many MTs as meshes. At the end of the scan, the L2R sublayer selects the mesh with the appropriate service providing the best PQM. If multiple meshes with different PQMs are available, the algorithm to select the L2R mesh is out of the scope of this document. The device is allowed to join an L2R mesh if its depth does not exceed the value in the L2R Max Depth field of the TC IE. The device deletes unnecessary MTs, MT entries or MT elements and global NT entries or elements according to the condition to record as described in 5.2.1. The device then transmits its own TC IE. The L2R sublayer sends an L2RLME-JOIN-MESH.confirm primitive with a SUCCESS Status to the next higher layer. This procedure is illustrated in Figure 7.

If no TC IE is received during the scan or if no mesh satisfies the requirements, the L2R sublayer may reattempt to trigger an enhanced active scan to find the desired L2R mesh up to *l2rMaxScanRetry* times*.* The L2RLME-JOIN-MESH.request and L2RLME-JOIN-MESH.confirm primitives are described in 7.1.1.8 and 7.1.1.9 respectively.

After joining an L2R mesh, if the MeshRootAddress indicated in the L2RLME-JOIN-MESH.request primitive was 0xffff or 0xffffffffffffffff and TC IEs from another mesh in same PAN can be decrypted or not encrypted, when a device receives a TC IE from another L2R mesh with the same service provided and a better PQM, the L2R sublayer decides whether or not to disconnect from the current L2R mesh and join the new one.

If the joining device is an L2R router, the L2R sublayer starts the periodic transmission of EBs with a TC IE at an interval of *l2rTcIeInterval*. The value of *l2rTcIeInterval* may differ from device to device depending on their sleeping or duty cycling patterns.

If the DS Route Required field of the TC IE Descriptor field is set to 1, L2R routers and end devices transmit MP frames with a route announcement IE (RA IE) or a short route announcement IE (SRA IE) periodically at an interval of *l2rRaIeInterval*.

**5.1.2.2.2 Mesh selection by the next higher layer**

If *l2rMeshSelection* is FALSE, when a device wishes to join a mesh, the next higher layer invokes the L2RLME-MESH-DISCOVERY.request primitive to request the L2R sublayer to scan discover the L2R meshes around the joining device. Upon reception of this primitive, the joining device initiates an enhanced active scan and broadcasts an EBR with a TC IE with an empty Content field. When an L2R router receives the TC IE, it replies with an EB containing a TC IE. When the device receives a TC IE, it computes its own depth and PQM as described in 5.2.1. The device creates (regardless of the condition to record the parameters) or updates an MT entry related to the L2R mesh advertised in the TC IE. The device also creates (regardless of the condition to record the parameters) or updates a global NT entry for the neighbor transmitting the TC IE. If TC IEs from another mesh in same PAN can be decrypted or not encrypted and the device receives multiple TC IEs from different meshes, the device creates as many MTs as meshes. At the end of the scan, the L2R sublayer informs reports the scan result to the next higher layer with the L2RLME-MESH-DISCOVERY.confirm primitive. The next higher layer selects the L2R mesh to join and informs the L2R sublayer by issuing the L2RLME-MESHSELECT.request primitive. The device deletes unnecessary MTs, MT entries or MT elements, and global NT entries or elements according to the condition to record as described in 5.2.1. The device then transmits its own TC IE. The L2R sublayer sends an L2RLME-MESH-SELECT.confirm primitive with a SUCCESS Status to the next higher layer. This procedure is illustrated in Figure 8.

If TC IEs from another mesh in same PAN can be decrypted or not encrypted, whenever the device receives a TC IE from an L2R mesh other than the current mesh with a better PQM, the L2R sublayer informs the next higher layer by with the L2RLME-NOTIFY.indication primitive where the Notification is set to BETTER\_MESH\_DETECT. If the next higher layer decides whether or not to request the L2R to disconnect from the current L2R mesh and join to the new L2R mesh. The L2RLMEMESH-DISCOVERY.request, L2RLME-MESH-DISCOVERY.confirm, L2RLME-MESHSELECT.request and L2RLME-MESH-SELECT.confirm are described in 7.1.1.10, 7.1.1.11, 7.1.1.12 and 7.1.1.13 respectively.

If the joining device is an L2R router, the L2R sublayer starts the periodic transmission of EBs with a TC IE at an interval of *l2rTcIeInterval*. The value of *l2rTcIeInterval* may differ from device to device depending on their sleeping or duty cycling patterns.

If the DS Route Required field of the TC IE Descriptor field is set to 1, L2R routers and end devices transmit MP frames with an RA IE or an SRA IE periodically at an interval of *l2rRaIeInterval*.

* ***On p.23, delete:***

— “A” indicates that the parameter is to be recorded at all times.

* ***Replace “A” with “M” in the last column of table 1 and table 5***

The information with the condition to record set to “C, N or U” does not make sense on their own if M denies the recording of over elements. Therefore, the information recorded upon satisfying “C, N or U” should be recorded only if the neighbor satisfies M first.

* ***Replace the footnote below table 4 with:***

M: Depends on the *l2rMeshRecordMode*, C: When M is satisfied and additionally MCO is enabled, U: When M is satisfied and additionally if the PHY is UWB

* ***Replace the footnote below table 5 with:***

M: Depends on the *l2rMeshRecordMode*, N: When M is satisfied and additionally NLMOperation in the MT is true

1. **CID#2080**

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| 2080 | Verotiana Rabarijaona | NICT | 18 | 5.1.2.3 | 16 | "Procedure to rejoin an L2R mesh"This procedure should differ depending on whether the mesh is selected by the L2R or by the NHL.  | Add a subclause to describe the case when the selection is made by the NHL |

**Resolution: AiP**

According to the comment, add a description for each case.

* ***Modify the section 5.1.2.3 as follows.***

**5.1.2.3 Procedure to rejoin an L2R mesh**

If a device has no neighbor left in its neighbor table (NT), it is disconnected from the L2R mesh. Upon detection of the disconnection, the L2R sublayer issues an L2RLME-DISCONNECT-MESH.indication primitive to the next higher layer. The L2RLME-DISCONNECT-MESH.indication primitive is described 7.1.1.16.

The device may rediscover all the existing L2R meshes according to the procedure illustrated in Figure 5 and associate with the appropriate PAN. If the device wishes to remain within the same PAN, it may try to rediscover the L2R meshes within its PAN according to the procedure illustrated in Figure 6. Then the device try to join according to the procedure illustrated in Figure 7 if *l2rMeshSelection* is TRUE or according to the procedure illustrated in Figure 8 if *l2rMeshSelection* is FALSE.

The next higher layer should request an orphan scan process as described in IEEE Std 802.15.4-2015 in order to reestablish the connection to the PAN if it has lost connection with its coordinator before trying to rejoin the L2R mesh. This procedure is illustrated in Figure 9.

1. **CID#2103**

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| 2103 | Verotiana Rabarijaona | NICT | 23 | 5.2.1 | 18 | "A device may optionally manage the MTs other than that of the L2R mesh it has joined. The parameters in each MT are recorded or omitted depending on the condition to record as follows:" This is related to the TC IE from unknown L2R mesh issue | Revise/remove anything related to processing TC IEs from unknown L2R mesh.  |

**Resolution: AiP**

According to the comment, modifies some texts.

* ***Modifies the 1st paragraph in the section 5.2.1 as follows***

An L2R mesh is managed based on the information retrieved from the layer 2 routing information base (L2IB) attributes found in Table 48 in 7.3, in the L2R Discovery (L2R-D IE) and in the TC IE. The relevant information is stored in a mesh table (MT) illustrated in Table 1. A device manages as many MTs as the number of L2R meshes it has joined. A device manages as many MTs as the number of L2R meshes it has joined. If TC IEs from another mesh in same PAN can be decrypted or not encrypted, a device may optionally manage the MTs other than that of the L2R mesh it has joined. The parameters in each MT are recorded or omitted depending on the condition to record as follows:

1. **CID#2116**

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| 2116 | Verotiana Rabarijaona | NICT | 25 | 5.2.1 | 31 | "The device should clear the MT and NT related to the L2R mesh advertised in the TC IE." Which part of the NT should be cleared? This is related to the TC IE from an unknown L2R mesh issue | Revise/remove anything related to processing TC IEs from unknown L2R mesh.  |

**Resolution: AiP**

According to the comment, modifies some texts.

* ***Modifies 2nd paragraph on P.25 as follows***

If a device receives a TC IE with a MSN between 0xf0 and 0xff, it concludes that the mesh root is in initialization phase. If a device receives a TC IE with a MSN between 0xf0 and 0xff after receiving a TC IE with a MSN between 0x00 and 0xef, it concludes that the mesh root has been reinitialized. The device should clear the MT and NT related to the L2R mesh advertised in the TC IE. If the metric used in the L2R mesh before reinitializing is not used in any L2R mesh including the reinitialized L2R mesh, the metric is deleted from the LQM list in all global NT entries. The use of the values 0xf0 - 0xff by the mesh root is optional.