**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:***

The next higher layer of the joiner can invoke L2RLME-AA-RQ.request primitive to request a short address to the PAN coordinator. When the L2R layer receives the L2RLME-AA-RQ.request primitive from its higher layer for first short address assignment ~~If a device wants to be assigned a short address,~~ it ~~may~~ invokes MCPS-DATA.request primitive to transmit an MP frame with Address Assignment Request (AA-RQ) IE and Routing IE to the coordinator that it associated to. If the AA-RQ IE is successfully transmitted to the coordinator, the L2R layer 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, INVALID\_PARAMETER is returned as the status. If any error occurs during MAC data transmission, the error code of MAC transmission is returned as the status. When the coordinator received the AA-RQ IE successfully, the L2R layer of the coordinator invokes MCPS-DATA.request primitive to transmit an MP frame with the received AA-RQ IE and Routing IE to one of mesh roots that has 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 delivers the AA-RQ message to the PAN coordinator. If the short address in the Allocated Address field is not available, the PAN coordinator registers one of available short addresses to the joiner. If there is no available short address, nothing is registered and FALSE is returned. Otherwise, the PAN coordinator registers the joiner’s new address as requested. The PAN coordinator registers configured allowable expiration time for the registered short address if the requested expiration time in the AA-RQ message is not allowable. Otherwise, the requested time is registered as the expiration time for that address. Then the next higher layer of the mesh root invokes the L2RLME-AA-RP.request primitive as the PAN coordinator registered and then the L2R layer of the mesh root replies with an Address Assignment Reply (AA-RP) IE to the coordinator that the joiner associated to. If the AA-RP IE is successfully transmitted, the L2R layer of the mesh root 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, INVALID\_PARAMETER is returned as the status. If any error occurs during MAC data transmission, the error code of MAC transmission is returned as the status. The coordinator that the joiner associated to forwards the AA-RP IE received from the mesh root to the joiner referring the ‘Joining Device Extended Address’ in the AA-RP IE. If the joiner is an end device that is RFD, the coordinator updates its child address stored during MAC association according to the received AA-RP IE. The L2R layer of the joiner that receives the AA-RP IE issues the L2RLME-AA-RP.indication primitive to the next higher layer. The AA-RQ IE and AA-RP IE are described in 6.2.14 and 6.2.15 respectively.

Unless the next higher layer of a device updates the expiration time of its short address by issuing the L2RLME-AA-RQ.request primitive before the expiration time of the assigned short address is expired, the assigned short address is expired by the PAN coordinator and it may be used for another device. When the L2RLME-AA-RQ.request primitive is invoked in the L2R layer of the device that has an assigned short address, the device 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, INVALID\_PARAMETER is returned as the status. If any error occurs during MAC data transmission, the error code of MAC transmission is returned as the status.

If the short address in the Allocated Address field is not available, coordinator registered and then the L2R layer of the mesh root replies with an Address Assignment Reply (AA-RP) IE to the coordinator that the joiner associated to.

If the AA-RQ IE in the MP frame is successfully received, the next higher layer of the mesh root is informed the reception of the AA-RQ IE by L2RLME-AA.RQ.indication and delivers the AA-RQ message to the PAN coordinator. If the short address in the AA-RQ message is already assigned to the originator of the AA-RQ IE or is available as a new address assignment, the PAN coordinator moves to registration process of expiration time. If the requested address is not available for the originator of the AA-RQ IE, the PAN coordinator registers one of available short addresses to the originator of the AA-RQ IE. If there is no available short address, nothing is registered and FALSE is returned.

The PAN coordinator registers configured allowable expiration time for the registered short address if the requested expiration time in the AA-RQ message is not allowable. Otherwise, the requested time is registered as the expiration time for that address.

Then the next higher layer of the mesh root invokes the L2RLME-AA-RP.request primitive as the PAN coordinator registered and then the L2R layer of the mesh root replies with an Address Assignment Reply (AA-RP) IE to the originator of the AA-RQ IE. If the AA-RP IE is successfully transmitted, the L2R layer of the mesh root 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, INVALID\_PARAMETER is returned as the status. If any error occurs during MAC data transmission, the error code of MAC transmission is returned as the status. The L2R layer of the device that receives the AA-RP IE issues the L2RLME-AA-RP.indication primitive to the next higher layer.

If next higher layer invokes the L2RLME-ARel.request primitive, an Address Release (ARel) IE is transmitted through a mesh root connected to the PAN coordinator and the assigned address in the PAN coordinator is released. 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, INVALID\_PARAMETER is returned as the status. If any error occurs during MAC data transmission, the error code of MAC transmission is returned as 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.

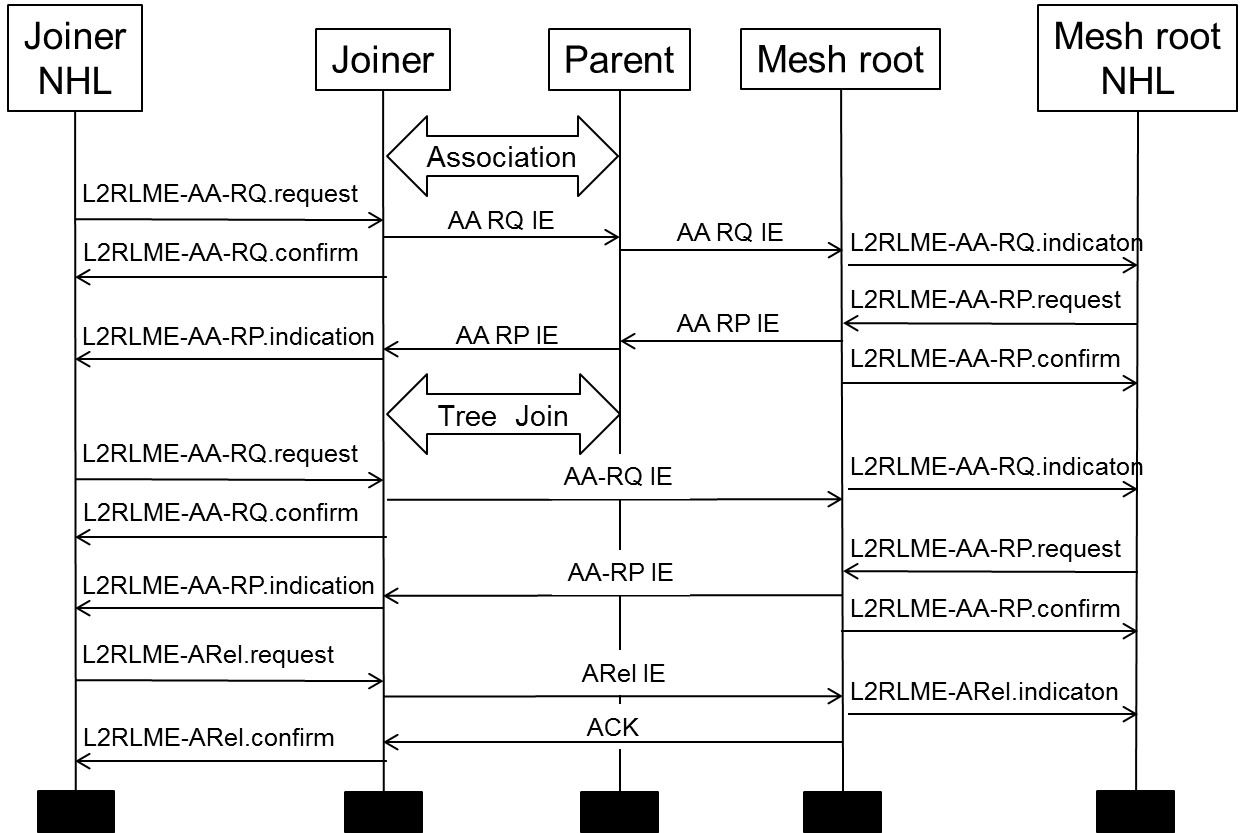


Figure x-Address Assignment Procedure

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 | 0x0000-0xfeff, 0xffff | Already allocated short address or short address expected to be allocated. If there is no preference of assigning short address, it is set to 0xffff. |
| 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 | 0x0000-0xfeff, 0xffff | 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 | 0x00-0xfeff | 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 | 0x0000-0xfeff | 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 | 0x0000-0xfeff | 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 | 0x0000-0xfeff | Allocated short address |