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 Resolution for 10.21 and 10.40 | |
| Date Submitted | December 10 2024 | |
| Sources | Kangjin Yoon (Spark Microsystems)  Yoons.2k15@gmail.com |  |
| Re: |  | |
| Abstract |  | |
| Purpose | To propose resolution for “P802.15.4ab™/D01 Draft Standard for Low-Rate Wireless Networks” | |
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| --- | --- | --- | --- | --- | --- |
| CID | Pg | Ln | Comment | Proposed Change | Disposition |
| 336 | 33 | 28 | After the table 10-104 the base specification has paragraph that tells which request command is to be sent. This text requires updating. | Add instructions to add text like "If UwBControleeAssociation is TRUE, then MLME generates a HRP UWB Association Request command as specified in 10.40.4.1." | **Revised**  The new text adds “If ControllerAssociation is TRUE, then MLME generates a Controller Association Request command as specified in 10.40.4.1.” |
| 352 | 37 | 12 | Do not duplicate values here. | Remove last two sentences, they are not needed, as whether the association was successful or not can be seen frm the association status. Also small numbers would need to be spelled out if you keep duplicating this information. | **Accepted**  (Please note that the subclause 10.21.8 merged into 10.40.3. You can find the change there.) |
| 1052 | 33 | 8 | Is the word "UWB" needed here, controller should be enough since the base standard defines a controller: as "An ERDEV that controls the ranging and defines the ranging parameters by sending an RCM." | if the base standard definition is compatible with the type of device being associated with here, then delete "UWB", otherwise some new definition is needed for this to replace "UWB controller". Also review/rename the new parameter UwbControleeAssociation to ControlerAssociation (same page line 21 and in Table 10-104) | **Accepted** |
| 1053 | 33 | 28 | I think this is missing description after the parameter table to say that the (UWB) controller association command frame is sent when the new parameter is true. | Add appropriate description of the activity of the MAC in response to this primitive when the parameter is true, i.e. sending the new association command frame, and in particular indicate which of the other parameters are used / not used in doing this. | **Revised**  The new text adds “If ControllerAssociation is TRUE, then MLME generates a Controller Association Request command as specified in 10.40.4.1.”  (Same as CID#336) |
| 1054 | 33 | 28 | I think this is missing description after the parameter table to say what parameters of the indication primitive are valid in the case for this (UWB) controller association command frame being received | Add appropriate description . | **Revised**  The new text adds “If ControllerAssociation is TRUE, then CapabilityInformation, ChannelOffset, HoppingSequenceId, DsmeAssociation, Direction, AllocationOrder, and HoppingSequenceRequest shall be ignored.”  Apply the same change for MLME-ASSOCIATE.indication. |
| 1055 | 35 | 16 | Some description is probably needed here as a result of the new the parameter in the table | Add appropriate description . | **Revised**  The new text adds “If ControllerAssociation is TRUE, then ChannelOffset, HoppingSequence, DsmeAssociation, AllocationOrder, BiIndex, SuperframeId, SlotId, ChannelIndex, and AssociationStatus shall be ignored.”  The clause 10.40.4.2 and the Table 10-106 have enough description for new params. |
| 1056 | 36 | 8 | Some description is probably needed here as a result of the new the parameter in the table. Also what happens next, this is not giving any slot assignment etc to the newly associated device, is this described already or is in needed here? | Add appropriate description, of what parameters are valid in this case. And describe/ reference what happens next, slot assignment etc. | **Revised**  The new text adds “If ControllerAssociation is TRUE, then AssociationStatus, ChannelOffset, HoppingSequence, DsmeAssociation, AllocationOrder, BiIndex, SuperframeId, SlotId, and ChannelIndex shall be ignored.”  The new text adds “If the association attempt is a success, the controlee may monitor Control Messages from the controller to learn the session configuration in the AC IE and scheduling information in the Scheduling IE.” In 10.40.3. |
| 1057 | 36 | 13 | Maybe controlee is enough here | change: "HRP-EMDEV controlee" to "controlee" | **Accepted** |
| 1058 | 36 | 13 | Should the first step be scanning for AC IE with Association Availability field indicating the controller accepting such association attempts. Could either update the Passive Scan to allow for this, or have the next higher layer just turn on its receiver and examine received frames for one carrying the appropriate AC IE. | If seeing Association Availability indication from the controller should be the first step, then describe that step in the text. | **Revised**  We have a related text in 10.40.3. But the text has been refined. “A controlee shall not send the Controller Association Request command in a block when the Association Availability field is set tozero.” |
| 1266 | 164 | 19 | Since the next higher layer is in the loop here with MLME-ASSOCIATE.indication and MLME-ASSOCIATE.response primitives, we have to make sure that the requisite information is included in both to allow for this, and then change this sentence to make the parameters here come from the MLME-ASSOCIATE.response. | Check/Change MLME-ASSOCIATE.indication and MLME-ASSOCIATE.response primitives as per comment, and change the paragraph to explain how the Source Addressing Mode and Destination Addressing Mode fields values are determined from the MLME-ASSOCIATE.response primitive., | **Revised**  Change “to the same mode as indicated in the Controller Association Request command to which the CONTROLLERAssociation Response command refers.” to “according to the addressing mode specified by the MLME-ASSOCIATE.response primitive, as described in 10.21.6.1.4.”  (Similar change applied to Association Request command) |
| 1267 | 165 | 4 | Since the next higher layer is in the loop here with MLME-ASSOCIATE.indication and MLME-ASSOCIATE.response primitives, we have to make sure that the requisite information is included in both to allow for this, and then change this sentence to make the parameters here come from the MLME-ASSOCIATE.response. | Check/Change MLME-ASSOCIATE.indication and MLME-ASSOCIATE.response primitives as per comment, and change the paragraph to explain how the Destination Address field value is determined from the MLME-ASSOCIATE.response primitive., | **Revised**  Change “contain the short address or the extended address of the device requesting association, depending on the Destination Addressing Mode field setting.”  to “be set according to the controlee address specified by the MLME-ASSOCIATE.response primitive, as described in 10.40.5.1.4.”  (Similar change applied to Association Request command) |
| 1402 | 37 | 17 | Device roles missing in Figure 5. | Add controller/controlee device roles to figure. | **Accepted**  (Please note that the subclause 10.21.8 merged into 10.40.3. You can find the change there.) |
| 1436 | 33 | 28 | The description on 'UwbControleeAssociation' in Table 10-104 is not completed. Description for 'FALSE' need to be added. | add description. | **Revised**  The new text “Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10.40.3, FALSE otherwise” covers the case. |
| 1437 | 34 | 22 | The description on 'UwbControleeAssociation' in Table 10-105 is not completed. Description for 'FALSE' need to be added. | add description. | **Revised**  The new text “Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10.40.3, FALSE otherwise” covers the case. |
| 1438 | 35 | 16 | The description on 'UwbControleeAssociation' in Table 10-106 is not completed. Description for 'FALSE' need to be added. | add description. | **Revised**  The new text “Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10.40.3, FALSE otherwise” covers the case. |
| 1439 | 36 | 8 | The description on 'UwbControleeAssociation' in Table 10-107 is not completed. Description for 'FALSE' need to be added. | add description. | **Revised**  The new text “Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10.40.3, FALSE otherwise” covers the case. |

[Editor: Remove sub-clause 10.21.8 in 4ab-D01. The sub-clause 10.21.8 has been merged into 10.40.3]

Color code:

Text in black: Texts already in 4ab-D01

Text in blue without underscore: New text to be included in 4ab-D01

Text in blue with underscore: New text for changes

**10.21.6.1.2 MLME-ASSOCIATE.request**

…

The MLME-ASSOCIATE.request primitive is used by a device to request an association with a coordinator, or with a ~~UWB~~ controller.

The semantics of this primitive are as follows:

MLME-ASSOCIATE.request (  
 ChannelInfo,  
 CoordAddrMode,  
 CoordPanId,  
 CoordAddress,  
 CapabilityInformation,  
 SecurityParams,  
 ChannelOffset,  
 HoppingSequenceId,  
 DsmeAssocaition,  
 ~~UwbControlee~~ControllerAssociation,   
 ControllerCapabilityInformation,  
 Direction,  
 AllocationOrder,  
 HoppingSequenceRequest  
 )

…

Table 10-104MLME-ASSOCIATE.request parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| … | … | … | … |
| ~~UwbControleeAssociation~~  ControllerAssociation | Boolean | TRUE, FALSE | ~~When TRUE indicates~~ Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10. ~~21.8~~40.3, FALSE otherwise. |
| ControllerCapabilityInformation | Bitmap | As defined in 10.40.4.1 | The operational capabilities of the device requesting association. |
| … | … | … | … |

*Change the paragraph below the Table 10-104 as shown:*

On receipt of the MLME-ASSOCIATE.request primitive, the MLME of an unassociated device first updates the appropriate PHY and MAC PIB attributes, as described in 10.21.2, and if DsmeAssociation and ControllerAssociation are FALSE, then it then generates an Association Request command, as defined in 10.21.5.1. If DsmeAssociation is TRUE, then generates an DSME Association Request command, as defined in 10.4.12.1. If ControllerAssociation is TRUE, then MLME generates a Controller Association Request command as specified in 10.40.4.1.

If ControllerAssociation is TRUE, then CapabilityInformation, ChannelOffset, HoppingSequenceId, DsmeAssociation, Direction, AllocationOrder, and HoppingSequenceRequest shall be ignored.

…

10.21.6.1.3 MLME-ASSOCIATE.indication

*Change the first paragraph of the clause 10.21.6.1.3 as shown:*

The MLME-ASSOCIATE.indication primitive is used to indicate the reception of an Association Request command specified in 10.21.5.1, or DSME Association Request command as specified in 10.4.12.1, or Controller Association Request command as specified in 10.40.4.1.

MLME-ASSOCIATE.indication (  
 DeviceAddress,  
 CapabilityInformation,  
 SecurityParams,  
 ChannelOffset,  
 HoppingSequenceId,  
 DsmeAssocaition,  
 ~~UwbControlee~~ControllerAssociation,  
 Direction,  
 AllocationOrder,  
 HoppingSequenceRequest  
 )

Table 10-105MLME-ASSOCIATE.indication parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| … | … | … | … |
| ~~UwbControleeAssociation~~  ControllerAssociation | Boolean | TRUE, FALSE | ~~When TRUE indicates~~ Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10. ~~21.8~~40.3, FALSE otherwise. |
| ControllerCapabilityInformation | Bitmap | As defined in 10.40.4.1 | The operational capabilities of the device requesting association. |
| … | … | … | … |

*Insert the paragraph below at the end of the clause 10.21.6.1.3:*

If ControllerAssociation is TRUE, then CapabilityInformation, ChannelOffset, HoppingSequenceId, DsmeAssociation, Direction, AllocationOrder, and HoppingSequenceRequest shall be ignored.

MLME-ASSOCIATE.response (  
 DeviceAddress,  
 AssocShortAddress,   
 SecurityParams,  
 ChannelOffset,  
 HoppingSequence,  
 DsmeAssocaition,   
 ~~UwbControlee~~ControllerAssociation,   
 ControllerConfiguration,  
 ~~Uwb~~ControllerAssociationResult,   
 AllocationOrder,   
 BiIndex,   
 SuperframeId,   
 SlotId,   
 ChannelIndex,  
 AssociationStatus  
 )

Table 10-106MLME-ASSOCIATE.response parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| … | … | … | … |
| ~~UwbControleeAssociation~~  ControllerAssociation | Boolean | TRUE, FALSE | ~~When TRUE indicates~~ Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10. ~~21.8~~40.3, FALSE otherwise. |
| ControllerConfiguration | Bitmap | As defined in Figure 182 | The UWB session configurations determined by the controller as described in 10.40.4.2. |
| ~~Uwb~~ControllerAssociationResult | Enumeration | As defined in Table 47 | The association result for the ~~HRP UWB~~ Controller Association Response command defined in 10.40.4.2. |
| … | … | … | … |

*Insert the paragraph below at the end of the clause 10.21.6.1.4:*

If ControllerAssociation is TRUE, then ChannelOffset, HoppingSequence, DsmeAssociation, AllocationOrder, BiIndex, SuperframeId, SlotId, ChannelIndex, and AssociationStatus shall be ignored.

10.21.6.1.5 MLME-ASSOCIATE-confirm

…

MLME-ASSOCIATE.confirm (  
 AssocShortAddress,   
 AssociationStatus,   
 SecurityParams,  
 ChannelOffset,  
 HoppingSequence,  
 DsmeAssocaition,   
 ~~UwbControlee~~ControllerAssociation,   
 ControllerConfiguration,  
 ~~Uwb~~ControllerAssociationStatus,   
 AllocationOrder,   
 BiIndex,   
 SuperframeId,   
 SlotId,   
 ChannelIndex,  
 Status  
 )

Table 10-107MLME-ASSOCIATE.confirm parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| … | … | … | … |
| ~~UwbControleeAssociation~~  ControllerAssociation | Boolean | TRUE, FALSE | ~~When TRUE indicates~~ Set TRUE to indicate that the association is from a UWB controlee for UWB (ranging) Block association as described in 10.~~21.8~~40.3, FALSE otherwise. |
| ControllerConfiguration | Bitmap | As defined in Figure 182 | The UWB session configurations determined by the controller as described in 10.40.4.2. |
| ~~Uwb~~ControllerAssociationStatus | Enumeration | As defined in Table 47 | The association status of the association attempt from the ~~HRP UWB~~ Controller Association Response command defined in 10.40.4.2. |
| … | … | … | … |

*Insert the paragraph below at the end of the clause 10.21.6.1.5:*

If ControllerAssociation is TRUE, then AssociationStatus, ChannelOffset, HoppingSequence, DsmeAssociation, AllocationOrder, BiIndex, SuperframeId, SlotId, and ChannelIndex shall be ignored.

10.40.3 Association

A controller indicates its availability for associations with new controlees by setting the Association Availability field in the AC IE. A controlee shall not send the ~~HRP UWB~~ Controller Association Request command in a block when the Association Availability field is set to ~~one~~ zero. The ~~HRP UWB~~ Controller Association Request command shall be sent in the slots specified by the Contention Slots Info field in the AC IE, described in 10.39.7.1. If the Contention Slots Info field is not present in the AC IE, the ~~HRP UWB~~ Controller Association Request command may be sent in any unscheduled slot in the round.

A controlee is instructed to associate through the MLME-ASSOCIATE.request primitive. The MAC sublayer of an unassociated device initiates the association procedure by sending a Controller Association Request command to the controller of an existing session.

The Controller Association Request command shall be sent as described in 10.40.4.1.

A controller MAC receiving a Controller Association Request command issues the MLME-ASSOCIATE.indication primitive to the next higher layer with the ControleeAddress parameter conveying the address of the requesting controlee.

To indicate acceptance or rejection of the association request the controller’s next higher layer issues an MLME-ASSOCIATE.response primitive with the AssociationResult parameter indicating successful association if the controller’s next higher layer accepts the association request or indicating the reason for the rejection if the controller’s next higher layer rejects the association request.

Upon receipt of an MLME-ASSOCIATE.response primitive, the MAC sublayer shall send a Controller Association Response command as described in 10.40.4.2. The Controller Association Response command shall be sent in the scheduled slot in the next block, unless the controller has no available slot in the next block.

If the request is successful, the Controller Association Response command contains an Association Status field indicating a successful association. If the request fails, the Controller Association Response command contains an Association Status field indicating the reason the request failed. The controller may deny the association request based on capability information, duplicated short address, or another reason.

If the requesting controlee does not receive a Controller Association Response command from the controller in the next block, the MLME shall issue the MLME-ASSOCIATE.confirm primitive with a Status of NO\_DATA, and the association attempt shall be deemed a failure.

If the requesting controlee receives a Controller Association Response command from the controller in the next block, the MLME shall issue the MLME-ASSOCIATE.confirm primitive with a Status of SUCCESS.

The AssociationStatus parameter of the MLME-ASSOCIATE.confirm primitive provides additional information as to whether the association attempt is deemed a success or a failure. ~~If the value of AssociationStatus is either 0 or 2, the association attempt has succeeded. If the value of AssociationStatus is 1, 3, or 4, the association attempt has failed.~~ If the association attempt is a success, the controlee may monitor Control Messages from the controller to learn the session configuration in the AC IE and scheduling information in the Scheduling IE.

The Controller Association Response command shall be sent as described in 10.40.4.2.

Figure 10-X0 illustrates a sequence of messages for the controller association.

A black background with white lights

Description automatically generated

Figure 10-X0-Message sequence chart for controller association

**10.40.3.1 Short address generation**

A controlee shall use extended addressing when the controller is using its extended addressing. When the controller is using its short address, a controlee shall generate a short address and use the short address for the Controller Association Request command. How to generate the short address is out of scope of this standard. A controlee also conveys its capability information in the Controller Association Request command.

When the controller sends the Controller Association Response command to indicate success with the Association Status field value as described in Table 47, the Controller Association Response command from the controller shall contain the Session Configuration field. When the short address chosen by the controlee already exists, the controller may send Controller Association Response command with the Association Status field set to indicate a successful association with an updated short address, to update the short address for the controlee. In this case, the Controller Association Response command shall contain an Updated Short Address field whose value is unique in the session. When two or more controlees send Controller Association Request commands with the same short address in the same round, the Controller Association Response command sent by the controller shall have the Association Status field indicating that the association is denied because of duplicate short addresses, to inform the controlees to try again with a different short address.

[Editor: Updates on 10.40.4.2 Controller Association Response command, page 164, line 19]

The Source Addressing Mode field and the Destination Addressing Mode field shall be set ~~to the same mode as indicated in the HRP UWB Association Request command to which the HRP UWB Association Response command refers.~~ according to the addressing mode specified by the MLME-ASSOCIATE.response primitive, as described in 10.21.6.1.4.

[Editor: Updates on 10.40.4.1 Controller Association Request command, page 163, line 8]

The Source Addressing Mode field and the Destination Addressing Mode field shall be set ~~to the same mode as indicated by the AC IE in the control message to which the HRP UWB Association Request command refers.~~ according to the addressing mode specified by the MLME-ASSOCIATE.request primitive, as described in 10.40.5.1.2.

[Editor: Updates on 10.40.4.2 Controller Association Response command, page 165, line 4]

The Destination Address field shall ~~contain the short address or the extended address of the device requesting association, depending on the Destination Addressing Mode field setting.~~ be set according to the controlee address specified by the MLME-ASSOCIATE.response primitive, as described in 10.40.5.1.4.

[Editor: Updates on 10.40.4.1 Controller Association Request command, page 163, line 15]

The Destination Address field shall ~~contain the short address or the extended address of the device requesting association, depending on the Destination Addressing Mode field setting.~~ be set according to the controller address specified by the MLME-ASSOCIATE.request primitive, as described in 10.40.5.1.2.