IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CR MSCS and CID4158 | | | | | | Date: 2020-06-30 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Matthew Fischer | Broadcom |  |  | [Matthew.fischer@broadcom.com](mailto:Matthew.fischer@broadcom.com) | | Thomas Derham | Broadcom |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

Proposed language to address TGmd D3.0 SA1 CIDs 4159, 4160 on MSCS and CID 4158.

Changes are referenced to TGmd D3.2.

**REVISION NOTES:**

**R0**:

initial

**R1**:

Update to D3.2

Update doc references

**R2**:

Add MLME changes

Make the use of (Re)Association and (re)association consistent – one is the frame, the other is the action

Remove the reference to CID 4160 from the heading in the changes section, since CI D 4160 resolution is reject and therefore, no proposed changes are related to CID 4160

Add “receipt of an MSCS Descriptor element” in 11.26.3 changes because for the (re)association case, the item received is not the MSCS Request frame, but the MSCS Descriptor element

Update doc references

**R3**:

One mixed case of ReAsso fixed

Update doc references

**R4**:

Fixed some header numbering – e.g. 6.3.7.4.2 -> 6.3.7.5.2, etc.

9.4.2.121 – changed three instances of “data field” to “Data field” as this is a named field for the general format of a subelement

11.26.3 - Changed the wording of the receipt of a (re)association frame to make it more restrictive

Update doc references

**R5**:

11.26.3 – added the word “Request” after “(Re)Association” in one place

Update doc references

**R6**:

9.4.2.121 SCS Descriptor element – moved the changes for this element to the 9.4.2.243 MSCS Descriptor element subclause

9.4.2.242 – added this new change, which corrects an error related to SCS and MSCS operation

11.26.3 – added “MSCS Status subelement” in two places

11.26.3 – split the first sentence into two, since the (Re)Association case cannot indicate “change”

Update doc references

**R7**:

Changed one instance of Re(Assocation) to (Re)Association

Move MSCS Status subelement ID from 0 to 1, mark 0 as Reserved

Add MSCS and SCS to items to be deleted during reassocaition in 11.3.5.4 c)

11.26.3 deleted two occurrences of “respectively”

Update doc references

**R8**:

9.4.2.243 - Improved language that describes the MSCS Status subelement field and contents

Update doc references

**R9**:

9.4.2.243 - Improved language that describes the MSCS Status subelement field and contents

9.4.2.243 – add language to indicate that certain fields are reserved when the element is transmitted in an (Re)Association Response frame with a value of SUCCESS in the Data field of the MSCS Status field

9.4.2.243 – modify the paragraph that indicates in which frames the element can appear

11.26.3 – slight wording change to avoid ambiguity of phrase-level modifiers

11.26.3 – fix an ambiguity with respect to the inclusion of “Change” in the response to qualify that this requirement is only true for the non-success case (second to last sentence of the section)

Update doc references

**R10**:

9.4.2.243 – during R9 changes, had forgotten to add “Response” as qualifier for (Re)Association frames

9.4.2.243 – MSCS Status is a subelement, not a field

9.4.2.243 – reordered some change text because the new R9 added change text included a paragraph that was already in R8, thereby creating a duplicate paragraph, that duplication is resolved with the moves and changes of R10

9.4.2.243 – additional conditions specifying when certain fields are reserved

11.26.3 – wording changes to avoid unnecessary inclusion of the MSCS Descriptor element in the (Re)Association Response frame, but to allow it if a suggested set of parameters is to be included by the rejecting AP

Update doc references

**R11**:

Add a co-author

Update doc references

**R12**:

11.26.3 – Change incorrect MSCS Descriptor List field to TCLAS Mask Elements field

11.26.3 – break up a sentence to indicate that in the case of MSCS setup SUCCESS, the (Re)Association Response MSCS descriptor element Request Type field is set to “Add”

Update doc references

**R13**:

11.26.3 – eliminate the name TCLAS Mask Elements field, because the predicate is based on more than just this field

Update doc references

**R14**:

6.3 - Fix some MSCS primitives where text “if dot11MSCSActivated is true; otherwise not present” was previously missing in reference to optional presence of the MSCS Descriptor IE

11.26.3 - Editorially tidied-up long sentences with multiple conditions that previously had multiple “ands” or “ors” between each condition: Consistent format: “XXX is YYY if ConditionA, ConditionB, or ConditionC”

9.4.2.243 - Deleted lengthy sentence that describes all possible ways the MSCS Descriptor IE might be used, to avoid future spec rot. Reference to usage to the element in MSCS (11.26.3) remains.

**R15**:

11.26.3 – describe setting of Request Type field under various conditions

Update doc references

**R16**:

11.26.3 – remove anything that implies the presence of an MSCS Descriptor element in the case of MSCS Response frame with status of success

11.26.3 – use terms “accept” and “decline”, removing things like deny, etc

11.26.3 – split main paragraph in three

11.26.3 – remove added sentence for what happens when a change is declined, as that is already described elsewhere in the baseline text, now included in this document and with a modification of denies to declines

Update doc references

**END OF REVISION NOTES**

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGmd Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGmd Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGmd Editor: Editing instructions preceded by “TGmd Editor” are instructions to the TGmd editor to modify existing material in the TGmd draft. As a result of adopting the changes, the TGmd editor will execute the instructions rather than copy them to the TGmd Draft.***

**CIDs**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Page** | **Comment** | **Proposed Change** | **Resolution (Proposed)** |
| 4158 | Fischer, Matthew | 10.6.13.3 | 1799.00 | The formula "2x(VHT-MCS + 1) + 8x(NSS - 1)" is not correct. | Change to "2xVHT-MCS -1 + 8x(NSS - 1)" | Revise - TGmd editor to make changes as shown in 11-20/0516r16 that are marked with CID 4158 which generally agree with the commenter’s suggestion. |
| 4159 | Fischer, Matthew | 11.26.3 | 2451.00 | The MSCS could be optimized for fast Initial link setup and fast BSS transitions. At the moment the MSCS requires separate request and response frames which makes MSCS setup slow and adds signaling overheads. | Please include th MSCS setup signaling to the (Re) association request and response frames. | Revise - TGmd editor to make changes as shown in 11-20/0516r16 that are marked with CID 4159 which generally agree with the commenter’s suggestion. |
| 4160 | Fischer, Matthew | 11.26.3 | 2451.00 | The MSCS could have optional capability to maintain the DL frames UP mappiong tuples for the whole ESS. For instance, if a STA transition BSS from AP1 to AP2, the AP2 could use the learned DL UP settings from the AP1. This would eliminate the delay for the new AP to learn the UP settings from the UL frames transmitted by the STA. | Please define an optional ESS capability that allows the same MCSC DL frames UP mapping tuples to be used within the ESS. | Reject – the commenter has not provided enough information for the TG to make changes that would satisfy the comment. |
|  |  |  |  |  |  |  |

**Discussion:**

**Proposed Changes to TGmd D3.2:**

**CID 4158**

***TGmd editor: within TGmd D3.2, in 10.6.13.3 Additional rate selection constraints for VHT PPDUs, change the text as shown:***

**10.6.13.3 Additional rate selection constraints for VHT PPDUs**

If the channel width of the PPDU is equal to CBW80, CBW160, or CBW80+80, then the STA should not use a <VHT-MCS, NSS> tuple if the VHT-MCS is equal to 0 or 1 and both the HTMCS values 2xVHT-MCS + 8x(NSS – 1) and 2xVHT-MCS – 1 + 8x(NSS – 1) are marked as unsupported in the Rx MCS bitmask of the HT Capabilities element of the receiver STA.

**CID 4159**

***TGmd editor: within TGmd D3.2, modify 6.3.7.2.2 Semantics of the service primitive as described:***

**6.3.7.2.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-ASSOCIATE.request:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-ASSOCIATE.request (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true;  otherwise not present. |

***TGmd editor: within TGmd D3.2, modify 6.3.7.3.2 Semantics of the service primitive as described:***

**6.3.7.3.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-ASSOCIATE.confirm:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-ASSOCIATE.confirm (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true; otherwise not present. |

***TGmd editor: within TGmd D3.2, modify 6.3.7.4.2 Semantics of the service primitive as described:***

**6.3.7.4.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-ASSOCIATE.indication:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-ASSOCIATE.indication (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true; otherwise not present. |

***TGmd editor: within TGmd D3.2, modify 6.3.7.5.2 Semantics of the service primitive as described:***

**6.3.7.5.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-ASSOCIATE.response:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-ASSOCIATE. response (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true; otherwise not present. |

***TGmd editor: within TGmd D3.2, modify 6.3.8.2.2 Semantics of the service primitive as described:***

**6.3.8.2.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-REASSOCIATE.request:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-REASSOCIATE.request (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true;  otherwise not present. |

***TGmd editor: within TGmd D3.2, modify 6.3.8.3.2 Semantics of the service primitive as described:***

**6.3.8.3.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-REASSOCIATE.confirm:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-REASSOCIATE.confirm (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true; otherwise not present. |

***TGmd editor: within TGmd D3.2, modify 6.3.8.4.2 Semantics of the service primitive as described:***

**6.3.8.4.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-REASSOCIATE.indication:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-REASSOCIATE.indication (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true; otherwise not present. |

***TGmd editor: within TGmd D3.2, modify 6.3.8.5.2 Semantics of the service primitive as described:***

**6.3.8.5.2 Semantics of the service primitive**

***TGmd editor: add the following parameter to the parameter list of the MLME-REASSOCIATE.response:***

MSCS Descriptor

***TGmd editor: add the following new row to the table of parameters of the MLME-REASSOCIATE. response (note that the header row is shown for convenience and is not part of the changes):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| MSCS Descriptor | As defined in the MSCS Descriptor element | As defined in 9.4.2.243 (MSCS Descriptor element) | The parameters used to classify streams using the  procedures defined in 11.26.3 (MSCS procedures).  Optionally present if dot11MSCSActivated is true; otherwise not present. |

***TGmd editor: within TGmd D3.2, insert a new row as shown into the frame format table for each of the following frames:***

**9.3.3.5 Association Request frame format**

**Table 9-36—Association Request frame body**

**9.3.3.6 Association Response frame format**

**Table 9-37—Association Response frame body**

**9.3.3.7 Reassociation Request frame format**

**Table 9-38—Reassociation Request frame body**

**9.3.3.8 Reassociation Response frame format**

**Table 9-39—Reassociation Response frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | MSCS Descriptor | The MSCS Descriptor element is optionally present if dot11MSCSActivated is true; otherwise not present. |

***TGmd editor: within TGmd D3.2, change the bullet item in subclause 9.6.2.242 TCLAS Mask element, as shown:***

**9.4.2.242 TCLAS Mask element**

* Protocol Number or Next Header subfield

**9.4.2.243 MSCS Descriptor element**

***TGmd editor: within TGmd D3.2, within subclause 9.4.2.243 MSCS Descriptor element, modify the text as shown:***

The User Priority Control field is shown in Figure 9-783 (User Priority Control field). This field is

reserved when the Request Type field is “Remove”, when the element is present in a (Re)Association Response frame with a value of “SUCCESS” in the Data field of the MSCS Status subelement, or when the element is present in a (Re)Association Response frame with a value other than “SUCCESS” in the Data field of the MSCS Status subelement and a value of “Add” in the Request Type field.

The Stream Timeout subfield is 4 octets in length, and indicates the minimum timeout value, in TUs, for

maintaining a variable *UP{tuple}* in the MSCS list. This subfield is reserved when the Request Type field is

“Remove”, when the element is present in a (Re)Association Response frame with a value of “SUCCESS” in the Data field of the MSCS Status subelement, or when the element is present in a (Re)Association Response frame with a value other than “SUCCESS” in the Data field of the MSCS Status subelement and a value of “Add” in the Request Type field.

The TCLAS Mask Elements field contains zero or more TCLAS Mask elements to specify how incoming MSDUs are classified into streams in MSCS, as defined in 9.4.2.242 (TCLAS Mask element). One or more TCLAS Mask elements are present when the Request Type field is “Add” or “Change”; no TCLAS Mask elements are present when the Request Type field is “Remove”, when the element is present in a (Re)Association Response frame with a value of “SUCCESS” in the Data field of the MSCS Status subelement, or when the element is present in a (Re)Association Response frame with a value other than “SUCCESS” in the Data field of the MSCS Status subelement and a value of “Add” in the Request Type field.

The Optional Subelements field contains zero or more subelements. The subelement format and ordering of subelements are defined in 9.4.3 (Subelements). The subelements allowed in the MSCS Descriptor element are defined in Table 9-QQRR Optional subelement IDs for MSCS Descriptor element

The use of the MSCS Descriptor element is described in 11.26.3 (MSCS procedures).

***TGmd editor: within TGmd D3.2, insert the following table and paragraph of text into subclause 9.4.2.243 MSCS Descriptor element:***

**Table 9-QQRR—Optional subelement IDs for MSCS Descriptor element**

|  |  |  |
| --- | --- | --- |
| **Sublement ID** | **Name** | **Extensible** |
| 0 | Reserved |  |
| 1 | MSCS Status | No |
| 2-220 | Reserved |  |
| 221 | Vendor specific | Vendor defined |
| 222–255 | Reserved |  |

The MSCS Status subelement Data field has the same format as the Status Code field shown in Figure 9-92 (Status Code field format) and contains the status of the requested MSCS setup, as indicated in Table 9-52 (Status codes).

***TGmd editor: within TGmd D3.2, within subclause 9.4.2.243 MSCS Descriptor element, modify the text as shown:***

***TGmd editor: within TGmd D3.2, change the heading of subclause 9.6.18.6 MCSC Request frame format, as shown:***

**9.6.18.6 MSCS Request frame format**

***TGmd editor: within TGmd D3.2, change the heading of subclause 9.6.18.7 MCSC Response frame format, as shown:***

**9.6.18.7 MSCS Response frame format**

***TGmd editor: within TGmd D3.2, in 11.3.5.4 Non-AP and non-PCP STA reassociation initiation procedures, change the text as shown:***

**11.3.5.4 Non-AP and non-PCP STA reassociation initiation procedures**

13) GLK-GCR agreement

14) MSCS

15) SCS

***TGmd editor: within TGmd D3.2, in 11.26.3MSCS procedures, change the text as shown:***

**11.26.3 MSCS procedures**

A non-AP STA that supports MSCS may request use of MSCS, or request to update parameters of the currently active MSCS, by sending an MSCS Request frame that includes an MSCS Descriptor element with the Request Type field set to “Add” or “Change”, respectively. A non-AP STA that supports MSCS may request use of MSCS by sending a (Re)Association Request frame that includes an MSCS Descriptor element with the Request Type field set to “Add”. The MSCS Descriptor element identifies how MSDUs are classified into streams and indicates parameters that determine the priority to assign to the classified MSDUs.

In a TCLAS Mask element in an MSCS Descriptor element, the Classifier Type subfield shall be set to a value that corresponds to a classifier of MSDUs, i.e., less than or equal to 5, or equal to 10.

Upon receipt of an MSCS Request frame from an associated non-AP STA or receipt from a non-AP STA of a (Re)Association Request frame containing an MSCS Descriptor element, the AP shall respond with a corresponding MSCS Response frame or with a (Re)Association Response frame containing an MSCS Descriptor element, respectively. When the AP accepts the MSCS request in response to an MSCS Request frame, it shall set the Status field in the MSCS Response frame to “SUCCESS” and shall not include an MSCS Descriptor element in the frame. When the AP accepts the MSCS request in response to a (Re)Association Request frame, it shall set the Status field in the MSCS Status subelement of the MSCS Descriptor element of the (Re)Association Response frame to “SUCCESS” and set the Request Type field to “Add”.

A value of “REQUEST\_DECLINED”, “REQUESTED\_TCLAS\_NOT\_SUPPORTED”, or “INSUFFICIENT\_TCLAS\_PROCESSING\_RESOURCES” shall be set in the Status field in the MSCS Response frame or in the MSCS Status subelement of the MSCS Descriptor element of the (Re)Association Response frame, when the AP declines the MSCS request; an MSCS Descriptor element is optionally present in the MSCS Response frame for this case. If an MSCS Descriptor element is present in an MSCS Response frame that does not indicate a status of “SUCCESS”, the Request Type field is set to “Change” and the element indicates a suggested set of parameters that could be accepted by the AP in response to a subsequent request by the non-AP STA. In the MSCS Descriptor element of a (Re)Association Response frame with a value in the Status field other than “SUCCESS”, the Request Type field is set to “Add” if no suggested set of parameters is indicated, or set to “Change” if the element indicates a suggested set of parameters that could be accepted by the AP in response to a subsequent request by the non-AP.

The AP shall decline an MSCS request with the Request Type field set to “Add” or “Change” if a TCLAS Mask element is not present. When the AP does not accept an MSCS request in response to an MSCS Request frame with a Request Type field value of “Change”, the existing MSCS is unchanged.

An AP has a maximum of one active MSCS per non-AP STA. A non-AP STA shall not sent an MSCS request to an AP with the Request Type field set to “Add” if MSCS is currently active with that AP. An AP shall decline an MSCS request with the Request Type field set to “Add” if MSCS is currently active for the requesting non-AP STA.

If MSCS for a non-AP STA is currently active and the AP declines an MSCS request from the non-AP STA with Request Type field set to “Change”, the previously accepted parameters continue to apply.

**End of proposed changes.**