

Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [Comment resolution on the initial SB comment No.117]

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Re: [Response to the initial SB for the IEEE 802.15.7 standard]

Abstract: [This document describes the comment resolution on the initial SB comment No.117]

Purpose: [To resolve the comment of initial SB comment No.117]

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Comment resolution on the initial SB comment No.117

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Comment No.117

Comment No.	Name	Page	Subclause	Line	Comment	Proposed Change
117 (line 76)	Joachim Walewski	65	5.1.12.1		I very much like the color-function support, but the implementation is rather scattered and not easily extendible. First, the MAC PIB attributes, e.g. <i>macDuringASSOCColor</i> , have different color resolutions. Some can only be chosen from the bandplan, others, for instance <i>macColorReceived</i> use the <i>phyColorFunction</i> .	(1) All MAC PIB attributes setting colors for the color-function support shall be pointers to <i>phyColorFunction</i> . (2) Introduce a hook, so that the DME can use the color-function support in for other use cases than the ones spelled out in subclause 5.1.12. The color for the packets shall be chosen from <i>phyColorFunction</i>

Table 59 – MAC PIB attributes

Attribute	Range	Description
<i>macDuringASSOCColor</i>	0-6	CVD frame is requested using <i>macDuringASSOCColor</i> bandplanID between MLME-ASSOCIATE.request and MLME-ASSOCIATE.confirm if CVD frame is sent. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75.
<i>macDuringDISASSOCColor</i>	0-6	CVD frame is transmitted using <i>macDuringDISASSOCColor</i> bandplanID between MLME-DISASSOCIATE.request and MLME-DISASSOCIATE.confirm if CVD frame is sent. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75.
<i>macDuringSCANColor</i>	0-6	CVD frame is transmitted using <i>macDuringSCANColor</i> bandplanID between MLME-SCAN.request and MLME-SCAN.confirm if CVD frame is sent. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75.
<i>macColorReceived</i>	0-255	Use <i>macColorReceived</i> for the color assignment of the CVD Frame when the ACK frame is sent and the color function for the ACK state indication is used by the CVD frame. <i>The unsigned integer is the index for the look-up table for the color function table, phyColorFunction, as shown in Table 99, PHY PIB attributes.</i>

Table 59 – MAC PIB attributes (*cont.*)

Attribute	Range	Description
<i>macColorNotReceived</i>	0-255	Use <i>macColorNotReceived</i> for the color assignment of the CVD Frame when the ACK frame is not sent but the color function for the non-ACK state indication is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.
<i>macCFAppColor</i>	0-6	Color of CVD frame for Application-dependent information. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75.

- D4 draft has 6 MAC PIB attributes in table 59 from page 176 to 177 to assign the colors for color functions.
- Only for two MAC PIB attributes, *macColorReceived* and *macColorNotReceived*, the color resolution range can be set to 0 to 255 and their values are assigned from '*phyColorFunction*' attribute which is one of the PHY PIB attributes (see the table 99).
- So, we need **to unify the color resolution ranges and the color assignment mechanism over all of 6 MAC PIB attribute** so that the color function can be well organized and systematically managed.

MAC PIB attributes for color function support

5.1.12 Color function support

5.1.12.1 CVD frame usage for MAC state indication

(*macDuringASSOCColor, macDuringDISASSOCColor,*
and macDuringSCANColor)

5.1.12.2 CVD frame usage for file-transfer status indication

(*macCFAppColor*)

5.1.12.3 CVD frame usage for channel quality indication

(?)

5.1.12.4 CVD frame usage for acknowledgment indication

(*macColorReceived, macColorNotReceived*)

- D4 draft doesn't have any MAC PIB attribute for the color assignment on the channel quality indication usage.
- So, we need **to add some MAC PIB attributes for the color assignment on the channel quality indication usage.**

Recommendation / Instruction to editor (1)

- Change the range and description to as below for the *macDuringASSOCColor* attribute in table 59.

Table 59 – MAC PIB attributes

Attribute	Range	Description
<i>macDuringASSOCColor</i>	0-6 0-255	CVD frame is requested using <i>macDuringASSOCColor</i> bandplanID between MLME-ASSOCIATE.request and MLME-ASSOCIATE.confirm if CVD frame is sent. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75. Use <i>macDuringASSOCColor</i> for the color assignment of the CVD frame when the color function for the association MAC state indication between MLME-ASSOCIATE.request and MLME-ASSOCIATE.confirm is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.

Recommendation / Instruction to editor (2)

- Change the range and description to as below for the *macDuringDISASSOCColor* attribute in table 59.

Table 59 – MAC PIB attributes

Attribute	Range	Description
<i>macDuringDISASSOCColor</i>	0-6 0-255	CVD frame is transmitted using <i>macDuringDISASSOCColor</i> bandplanID between MLME-DISASSOCIATE.request and MLME-DISASSOCIATE.confirm if CVD frame is sent. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75. Use <i>macDuringDISASSOCColor</i> for the color assignment of the CVD frame when the color function for the disassociation MAC state indication between MLME-DISASSOCIATE.request and MLME-DISASSOCIATE.confirm is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.

Recommendation / Instruction to editor (3)

- Change the range and description to as below for the *macDuringSCANColor* attribute in table 59.

Table 59 – MAC PIB attributes

Attribute	Range	Description
<i>macDuringSCANColor</i>	0-6 0-255	CVD frame is transmitted using <i>macDuringSCANColor</i> bandplanID between MLME-SCAN.request and MLME-SCAN.confirm if CVD frame is sent. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75. Use <i>macDuringSCANColor</i> for the color assignment of the CVD frame when the color function for the scan MAC state indication between MLME-SCAN.request and MLME-SCAN.confirm is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.

Recommendation / Instruction to editor (4)

- Change the range and description to as below for the *macCFAppColor* attribute in table 59.

Table 59 – MAC PIB attributes

Attribute	Range	Description
<i>macCFAppColor</i>	0-6 0-255	Color of CVD frame for Application-dependent information. The unsigned integer variable represents the desired visible light wavelength as shown in the band plan code of Table 75. Use <i>macCFAppColor</i> for the color assignment of the CVD frame when the color function for the indication of application-dependent information is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.

Recommendation / Instruction to editor (5)

- **Delete the action item column on Table 6** because the color functions cannot support the action items. The color functions provide only some instinctive information the human eye can perceive

Table 6 – Color ~~status~~ table for channel quality **indication**

Color of CVD frame	Data transmission Channel quality	Action item
Color "A"	current FER < FER #1	low data rate
Color "B"	FER #1 ≤ current FER < FER #2	medium data rate
Color "C"	current FER ≥ FER #2	high data rate

Recommendation / Instruction to editor (6)

- Add '*macCQIColorLFE_R*, *macCQIColorMFE_R*, and *macCQIColorHFE_R*' attributes as below to the table 59.

Table 59 – MAC PIB attributes

Attribute	Range	Description
<i>macCQIColorLFE_R</i>	0-255	Use <i>macCQIColorLFE_R</i> for the color assignment of the CVD frame when the color function for the channel quality indication showing the low FER is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.
<i>macCQIColorMFE_R</i>	0-255	Use <i>macCQIColorMFE_R</i> for the color assignment of the CVD frame when the color function for the channel quality indication showing the medium FER is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.
<i>macCQIColorHFE_R</i>	0-255	Use <i>macCQIColorHFE_R</i> for the color assignment of the CVD frame when the color function for the channel quality indication showing the high FER is used by the CVD frame. The unsigned integer is the index for the look-up table for the color function table, <i>phyColorFunction</i> , as shown in Table 99, PHY PIB attributes.

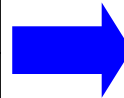
Recommendation / Instruction to editor (7)

- Change the table 5 on page 66 to as below because the color assignment is not accomplished by bandplan ID any longer.

~~Table 5 – Connection state and color band choice for indication~~

Table 5 – Color table for MAC state indication

State	Color choice	Bandplan ID range
<i>scan</i>	Color "A"	0-6
<i>association</i>	Color "B"	0-6
<i>disassociation</i>	Color "C"	0-6



State	Color choice	Color resolution range
<i>scan</i>	Color "A"	0-255
<i>association</i>	Color "B"	0-255
<i>disassociation</i>	Color "C"	0-255

Recommendation / Instruction to editor (8)

- A typo in Figure Caption (Figure 36)

Figure 36—Example of MSC for CVD frame usage
for file-transfer **statu** indication

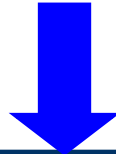


Figure 36—Example of MSC for CVD frame usage
for file-transfer **status** indication

Resolution on the commenter's 2nd point

- Introduce a hook, so that the DME can use the color-function support in for other use cases than the ones spelled out in subclause 5.1.12. The color for the packets shall be chosen from *phyColorFunction*.
- **Recommendation**

Add the new sub-clause 5.1.12.5 (Ordinary color assignment mechanism) as below to the clause 5.1.12, so that the DME can use the color-function support for other use cases than the ones spelled out in subclause 5.1.12.

Resolution details – Text for 5.1.12.5

- 5.1.12.5 Ordinary color assignment mechanism

The color function can be used beyond the applications as described from 5.1.12.1 to 5.1.12.4. The colors to support the various color functions shall be chosen from *phyColorFunction* PHY PIB attribute as shown in Table 99 by MLME-SET.request and PLME-SET.request primitives of DME in Figure 3.

Response to commenter's additional comments and questions (1)

- Introduce a hook, so that the DME can use the color-function support in for other use cases than the ones spelled out in subclause 5.1.12. The color for the packets shall be chosen from *phyColorFunction*.
- **Response**

The resolution has been already addressed on slide 15.

Response to commenter's additional comments and questions (2)

- General issue addressed: In the current implementation there are three usage examples, for which there is a unique set of MAC variables each (for instance *macColorReceived*). Question: how does one implement a use case that is not covered by the examples in 5.1.12 ?
- **Response**

5.1.12 describes 4 color function applications as examples. These color function applications can be classified into two categories. One group is the applications PHY and MAC need to know the information for the color assignment on the color function. The other is the applications PHY and MAC need not to know the information for the color assignment on the color function.

Response to commenter's additional comments and questions (2) – *cont.*

- **Response – *Cont.***

The applications belong to the first group need each MAC PIB attribute to assign the colors which correspond to the information. However, on the applications belong to the second group, we can support the color function only through a MAC PIB attribute. So, 4 color function applications described in 5.1.12 are classified into two categories. MAC state indication usage, channel quality indication usage, and acknowledgment indication usage belongs to the first group, so these applications need each MAC PIB attribute. There can be so many applications which belong to the second group, but just the file-transfer status indication usage are described in 5.1.12.2 as an example of the second group.

Response to commenter's additional comments and questions (2) – *cont.*

- Response – *Cont.*

In our conclusion, if you have another color function application besides the applications addressed in 5.1.12, then decide first whether it belongs to the first group or second group described on slide 18. If it belongs to the second group, you can support your color function application by using *macCFAppColor* which is already described in Table 59.

Response to commenter's additional comments and questions (3)

- Question not mentioned in T-CID 117, but very much related to it: do we really need a new set of variables for each usage?
- **Response**

As I addressed on previous response, the applications belong to the first group need each MAC PIB attribute to assign the colors which correspond to the information. However, If it belongs to the second group, we can support it by using *macCFAppColor* which is already described in Table 59.

Response to commenter's additional comments and questions (4)

- Distinguish between MAC-state use case (5.1.12.1) and any other use cases that entail CVD-frame transmission between data packages.
- **Response**

MAC state indication use case has already been distinguished by the sub-clause number. Just by exchanging the sub-clause number between the file-transfer status indication and acknowledgment indication, we can get a grouping effect because the file-transfer status indication (5.1.12.2) belongs to the second group and the others described in 5.1.12 belong to the first group.

Response to commenter's additional comments and questions (5)

- Open issues:
 1. Are the currently defined MAC-PIB attributes in 5.1.12.1 sufficient for „signalling“ all MAC states? If not define them and introduce pertinent text in the standard draft.
- **Response**

We think the current 3 MAC PIB attributes are good enough for the MAC states indication.

Response to commenter's additional comments and questions (6)

- Open issues:
 2. Define generic set of MAC-PIB attributes that can cover the existing use cases 5.1.12.2 and 5.1.12.3 as well as any other future use case.
- **Response**

The file-transfer status indication use case as described in 5.1.12.2 belong to the second group, but the channel quality indication use case as described in 5.1.12.3 belong to the first group. So, we cannot define generic set of MAB PIB attributes that can cover both of them. Any other future use case belong to the second group can be supported by *macCFAppColor* which is already described in Table 59.

Response to commenter's additional comments and questions (7)

- Open issues:
 3. Produce standard text for the generic MAC-PIB attributes and elucidate how they can be used for implementing 5.1.12.2 and 5.1.12.3.
- **Response**

The new sub-clause 5.1.12.5 (see slide 16) we suggest describes the ordinary color assignment mechanism. We believe this issue can be resolved by the new sub-clause 5.1.12.5.