**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |
| --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Intel Suggested Edits D1** |
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| Abstract | [Description of document contents.] |
| Purpose | [Description of what the author wants P802.15 to do with the information in the document.] |
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Suggested improvements to document …

1. Present the MPDU and PPDU only once in the document and then in the support clauses indicate how the subfields are configured for each PHY type.





1. The current suggestion is that all OCC PHY modes are configured via the MAC/PHY PIB. There are two reasons for this:
	1. It is anticipated that OCC will be used in conjunction with smartphone APPS, which facilitates PIB configuration management.
	2. Over-the-air configuration is not practical because of the slow minimum data rates of OCC. Over-the-air configuration implies a common mode, and the lowest rate common mode is UFSOOK at 24 fps. Assuming 1/3 FEC, the data rate for 24 fps UFSOOK is 4 bps which is painfully slow for the high rate OCC PHY modes.
2. My current comments are assuming a split between LiFi and OCC. If they don’t split then additional comments, unifying the MPDU and PPDU to include both OCC and LiFi, will have to be submitted.

**Clause 5.1.2**



Add to the document a new clauses as shown below.

1. **Add at the end of clause 5.1**

The 802.15.7-20xx superframe is highly configurable. Table X below indicates typical superframe by PHY types. PHY types IV, V and VI are configured via the MLME PIB while other PHY types are configured via configuration frames as discussed in this clause.

**Table X – Exemplary Superframe Configuration by PHY Type**

|  |  |
| --- | --- |
|  | **Superframe Configuration** |
| **PHY Type** | **Beacon** | **CAP** | **CFP** | **Inactive** |
| **I** | Optional | Optional | Optional | Optional |
| **II** | Optional | Optional | Optional | Optional |
| **III** | Optional | Optional | Optional | Optional |
| **IV** | Not Used | Used | Not Used | Not Used |
| **V** | Not Used | Used | Not Used | Not Used |
| **VI** | Not Used | Used | Not Used | Not Used |
| **VII** | Optional | Optional | Optional | Optional |
| **VIII** | Optional | Optional | Optional | Optional |

1. **Clause 5.1.3 through 5.1.3.3**



There are multiple problems in clause 5.1.3.

1. We should only have one MAC frame that is used by all PHY modes; that is, we should not have clauses that specifically indicate a different frame structure for each PHY type.
2. The title of 5.1.3 is “Packet PWM and Packet PPM” but there are subclauses pertaining to RS-FSK (5.1.3.1), VTASC (5.1.3.2) and Invisible Data Embedding (5.1.3.3). This is a mistake but my comment is to delete all these anyways.
3. The RS-FSK text is actually talking about the MAC frame and not the superframe so it is in the wrong place to begin with.

Delete these clauses and see the resolution #1.

1. **Clause 5.2**



*Add the following text to Clause 5.2 …*

Use of over-the-air MAC frame configuration shall not be done for PHY types IV, V and VI, which shall accomplish MAC frame configuration via the MAC PIB. There shall be no “base default” transmission mode for PHY types IV, V and VI. The MAC PIB shall not be transmitted; rather, it shall be written by the Device Management Entity which shall be read by the MAC layer.

*Add the following to Table 100 …*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute** | **Identifier** | **Type** | **Range** | **Description** | **Default** |
| *macFrameControl* | 0x97 | Unsigned | 2 octets | See clause 5.2.1.1 |  |
| *macSequenceNumber* | 0x98 | Unsigned | 1 octet | See clause 5.2.1.2 |  |
| *macDestinationOWPANIdentifier* | 0x99 | Unsigned | 2 octets | See clause 5.2.1.3 |  |
| *macDestinationAddress* | 0x9a | Unsigned | 2 or 8 octets  | See clause 5.2.1.4 |  |
| *macSourceOWPANIdentifier* | 0x9b | Unsigned | 2 octets | See clause 5.2.1.5 |  |
| *macSourceAdress* | 0x9c | Unsigned | 2 or 8 octets | See clause 5.2.1.6 |  |
| *macAcknowledgeField* | 0x9d | Unsigned | Variable length | See clause 5.2.1.7 |  |
| *macPollingField* | 0x9e | TBD | TBD | TBD |  |
| *macAuxiliarySecurityHeader* | 0x1f | TBD | TBD | TBD |  |
| macFramePayload | 0x100 | Unsigned | Variable Length | See clause 5.2.1.8 |  |
| *macFCS* | 0x101 | Unsigned | 2 octets | See clause 5.2.1.9 |  |

*Adding the following text as an annex …*

(Informative) The following table shows typical MAC frame format configuration for PHY types IV, V and VI. This table is informative only and the exact configuration is read from MAC PIB Table 100 as specified in clause TBD.

Table TBD – Typical MAC Frame Configuration by PHY Mode

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Frame Control | Sequence Number | Destination OWPAN Identifier | Destination Address | Source OWPAN Identifier | Acknowledge Field | Polling Field | Auxiliary Security Header | Frame Payload | FCS |
| PHY IV |
| Mode1 |  |  |  |  |  |  |  |  |  |  |
| Mode2 |  |  |  |  |  |  |  |  |  |  |
| : |  |  |  |  |  |  |  |  |  |  |
| PHY V |
| Mode1 |  |  |  |  |  |  |  |  |  |  |
| Mode2 |  |  |  |  |  |  |  |  |  |  |
| : |  |  |  |  |  |  |  |  |  |  |
| PHY VI |
| Mode1 |  |  |  |  |  |  |  |  |  |  |
| Mode2 |  |  |  |  |  |  |  |  |  |  |
| : |  |  |  |  |  |  |  |  |  |  |

*Add the following text to clause 4.4.2 …*

Use of over-the-air MAC frame configuration is forbidden for PHY types IV, V and VI. It is mandatory MAC frame configuration be done via the MAC PIB. This is due to the fact that unlike traditional wireless LAN/PAN, the data rates associated with OCC are such that the configuration overhead cannot be tolerated. This means that there is no “base default” transmission mode. In addition, it is anticipated that configuration will be with application layer “APPS” that are specifically loaded to support a particular OCC PHY mode. The MAC PIB is not transmitted; rather, it is written by the Device Management Entity and is read by the MAC layer.

-------------------------------------------------------------------

The MPDU should be defined in clause 5.2.1 and nowhere else; that is, there is only one MPDU that can be configured to service multiple PHY types. The following clauses propose alternative MPDUs and should be deleted.

* Relocate text of 5.2.2
* Relocate text of 5.2.3
* Relocate text of 5.2.4
* Relocate text of 5.2.5
* Relocate text of 5.2.6
* Relocate text of 5.2.7
* Relocate text of 5.2.8
* Relocate text of 5.2.9
* Relocate text of 5.2.10
* Delete all of 5.2.11 (assuming LiFi split offs – if it doesn’t split then we need to relocate the text)

Modify clause 5.2.1 (and it’s subclauses) to support OCC PHY as shown below (note: I’m assuming that LiFi and OCC are going to split; however, if they do not split then LiFi text needs to be added to clause 8.6).

1. Subdivide clauses 5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4, 5.2.1.5, 5.2.1.6, 5.2.1.7, 5.2.1.8, and 5.2.1.9 into two additional subclauses titled “PHY I, II and III” and “PHY IV”, “PHY V” and “PHY VI”. If LiFi does not split off then we’ll need additional PHY VII and PHY VIII clauses.

2. Edit as shown below …

**5.2.1.1 Frame Control**

 **5.2.1.1.1 PHY I, II and III**

 *Move text from clause 5.2.1.1 into this section*

 **5.2.1.1.2 PHY IV**

 **5.2.1.1.3 PHY V**

 RS-FSK frame control

 *Move text from clause 5.2.4 and 5.2.4.2 into this section (there is a numbering mistake on the subclauses. The following also need to be moved to this location: 5.2.4.3, 5.2.4.3.1, 5.2.4.2.3, 5.2.4.3.3, 5.2.4.3.4.*

 **5.2.1.1.4 PHY VI**

 VTASC frame control

 *Move text from clause 5.2.7.1 and its subclauses to this section.*

 Invisible Data embedded frame control

 *Move text from clause 5.2.8.1 and its subclauses to this section.*

**5.2.1.2 Sequence Number**

 **5.2.1.2.1 PHY I, II and III**

 *Move text from clause 5.2.1.2 into this section*

 **5.2.1.2.2 PHY IV**

 **5.2.1.2.3 PHY V**

 RS-FSK frame

 *Move text from clause 5.2.4.3.5 into this section.*

 **5.2.1.2.4 PHY VI**

 VTASC sequence number

 *Move text from clause 5.2.7.7 to this section.*

 Invisible data embedded sequence number

 *Move text from clause 5.2.8.2 to this section.*

**5.2.1.3 Destination OWPAN Identifier**

 **5.2.1.3.1 PHY I, II and III**

 *Move text from clause 5.2.1.3 into this section*

**5.2.1.3.2 PHY IV**

 **5.2.1.3.3 PHY V**

 **5.2.1.1.4 PHY VI**

**5.2.1.4 Destination Address**

 **5.2.1.4.1 PHY I, II and III**

 *Move text from clause 5.2.1.4 into this section*

 **5.2.1.4.2 PHY IV**

 **5.2.1.4.3 PHY V**

 RS-FSK frame

 *Move text from clause 5.2.4.3.6 into this section.*

 **5.2.1.4.4 PHY VI**

 VTASC Destination address field

 *Move text from clause 5.2.7.8 to this section.*

 Invisible data embedded Destination address field

 *Move text from clause 5.2.8.3 to this section.*

**5.2.1.5 Source OWPAN Identifier**

 **5.2.1.5.1 PHY I, II and III**

 *Move text from clause 5.2.1.5 into this section*

 **5.2.1.5.2 PHY IV**

 **5.2.1.5.3 PHY V**

 **5.2.1.5.4 PHY VI**

**5.2.1.6 Source Address**

 **5.2.1.6.1 PHY I, II and III**

 *Move text from clause 5.2.1.6 into this section*

 **5.2.1.6.2 PHY IV**

 Twinkle VPPM Source Address Field

 *Move text from clause 5.2.3 into this section*

 **5.2.1.6.3 PHY V**

 RS-FSK frame

 *Move text from clause 5.2.4.3.7 into this section.*

 **5.2.1.6.4 PHY VI**

 VTASC Source address

***Note: clauses 5.2.7.10 (acknowledgement) and 5.2.7.11 (polling) have not been moved pending clarification from the committee on the validity of these for use with VTASC.***

 *Move text from clause 5.2.7.8 to this section.*

 Invisible data embedded Source address

 *Move text from clause 5.2.8.4 to this section.*

**5.2.1.7 Auxiliary Security Header**

 **5.2.1.7.1 PHY I, II and III**

 *Move text from clause 5.2.1.7 into this section*

 **5.2.1.7.2 PHY IV**

 **5.2.1.7.3 PHY V**

 **5.2.1.7.4 PHY VI**

**5.2.1.8 Frame Payload**

 **5.2.1.8.1 PHY I, II and III**

 *Move text from clause 5.2.1.8 into this section*

 **5.2.1.8.2 PHY IV**

 Twinkle VPPM Payload Field

 *Move text from clause 5.2.3 into this section*

 **5.2.1.8.3 PHY V**

 RS-FSK Payload Field

 *Move text from clause 5.2.4.4 into this section.*

 PWM/PPM mode 1 Payload Field

 *Move text from clause 5.2.5.1 into this section.*

 PWM/PPM mode 2 Payload Field

 *Move text from clause 5.2.5.2 into this section.*

 PWM/PPM mode 3 Payload Field

 *Move text from clause 5.2.5.3 into this section.*

 **5.2.1.8.4 PHY VI**

 VTASC Payload field

 *Move text from clause 5.2.7.12 to this section.*

 Invisible data embedded Payload field

 *Move text from clause 5.2.8.5 to this section.*

**5.2.1.9 FCS**

 **5.2.1.9.1 PHY I, II and III**

 *Move text from clause 5.2.1.9 into this section*

 **5.2.1.9.2 PHY IV**

 **5.2.1.9.3 PHY V**

 RS-FSK frame

 *Move text from clause 5.2.4.5 into this section.*

 **5.2.1.9.4 PHY VI**

 VTASC FCS field

 *Move text from clause 5.2.7.13 to this section.*

 Invisible data embedded FCS field

 *Move text from clause 5.2.8.6 to this section.*

1. **Clause 5.2.2 and Clause 5.2.2.1**



UFSOOK is basically a simplistic protocol that exists at the PHY layer and is easier to explain at the PPDU level since it is not really conducive to the MAC MPDU.

Edits …

1. Move the reference in clause 5.2.2 to CRC-3 to the UFSOOK PSDU section as shown in resolution #12 (8.6.5.2.1 UFSOOK PSDU field). The FCS is applied to the payload only. Delete the rest of the text in 5.2.2.
2. Move the text of clause 5.2.2.1 to the UFSOOK PSDU section as shown in resolution #12 (8.6.5.2.1 UFSOOK PSDU field).
3. **Clause 5.2.4**



The MFH matches existing terminology so that is OK. The MFDU can be part of the Frame Payload field, so move it there. The MFT can be part of the FCS field so move it there. See resolution#3 for more details.

1. **Clause 5.2.5**



Move the text in clause 5.2.5, and its subclauses, to the MSDU portion of the MPDU. See resolution #3.

1. **Clause 5.2.11**



There is no control frame in 802.15.7-2011. Below is the text from 802.15.7-2011 …

**5.2.2 Format of individual frame types**

Five frame types are defined: beacon, data, acknowledgment, command, and CVD. These frame types are discussed in 5.2.2.1 through 5.2.2.4.3.

*Likewise, there is no control frame in 802.15.4-2015. So the question is where did the concept of a control frame come from? Discuss this in the committee. If no one knows then delete reference to a control frame.*

1. **Doc page 147, line 14**



See resolution #7.

1. **Clause 6.4.2**



*See the resolution for Clause 5.2 that was presented earlier in this document as resolution #3.*

1. **Clause 8.3.1**



Suggested resolution …

1. Delete the first and last rows in table 126,
2. Add a code 111 and indicate that code 111 means “ignore the wavelength band plan”. It is suggested that UV and IR use code 111.
3. **Clause 8.5.2.4.5**



DSM-PSK dimming shall be performed by controlling the "ON" time pulse width. The DSM-PSK dimming approach shall be the same as VPPM dimming and shall be performed at a high clock rate (hundreds of kHz). The step of DSM-PSK dimming depends on the step of duty cycle being controlled by VPPM.

1. **Clause 8.6**



*Add the following text to Clause 8.6 …*

Use of over-the-air PHY frame configuration shall not be done for PHY types IV, V and VI, which shall accomplish PHY frame configuration via the PHY PIB. There shall be no “base default” transmission mode for PHY types IV, V and VI. The PHY PIB shall not be transmitted; rather, it shall be written by the Device Management Entity which shall be read by the PHY layer.

*Add the following to Table 188 …*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Identifier** | **Type** | **Range** | **Description** |
| *phyPreamble* | 0x?? |  |  | See clause 8.6.1 |
| *phyPHYHeader* | 0x?? |  |  | See clause 8.6.2 |
| *phyHCS* | 0x?? |  |  | See clause 8.6.3 |
| *phyOptionalFields* | 0x?? |  |  | See clause 8.6.4 |
| *phyPSDU* | 0x?? |  |  | See clause 8.6.5 |

*Adding the following text as an annex …*

(Informative) The following table shows typical PHY frame format configuration for PHY types IV, V and VI. This table is informative only and the exact configuration is read from PHY PIB Table 188 as specified in clause 9.5.2.

Table TBD – Typical PHY Frame Configuration by PHY Mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Preamble | PHYHeader | HCS | Optional Fields | PSDU |
| Type IV |
| Mode1 |  |  |  |  |  |
| Mode2 |  |  |  |  |  |
| : |  |  |  |  |  |
| Type V |
| Mode1 |  |  |  |  |  |
| Mode2 |  |  |  |  |  |
| : |  |  |  |  |  |
| Type VI |
| Mode1 |  |  |  |  |  |
| Mode2 |  |  |  |  |  |
| : |  |  |  |  |  |

*Add the following text to clause 4.4.1.1 …*

Use of over-the-air PHY frame configuration is forbidden for PHY types IV, V and VI. It is mandatory that PHY frame configuration be done via the PHY PIB. This is due to the fact that unlike traditional wireless LAN/PAN, the data rates associated with OCC are such that the configuration overhead cannot be tolerated. This means that there is no “base default” transmission mode. In addition, it is anticipated that configuration will be with application layer “APPS” that are specifically loaded to support a particular OCC PHY mode. The PHY PIB is not transmitted; rather, it is written by the Device Management Entity and is read by the PHY layer.

------------------------------------------------------------------

The PPDU should be defined in clause 8.6 and nowhere else; that is, there is only one PPDU that can be configured to service multiple PHY types. The following clauses propose alternative PPDUs and should be deleted.

* Delete all of 8.6.6
* Delete all of 8.6.7
* Delete all of 8.6.8
* Delete all of 8.6.9
* Delete all of 8.6.10
* Delete all of 8.6.11
* Delete all of 8.7

Modify clause 8.6 to support OCC PHY as shown below (note: I’m assuming that LiFi and OCC are going to split; however, if they do not split then LiFi text needs to be added to clause 8.6).

1. Subdivide clauses 8.6.1, 8.6.2, 8.6.3, 8.6.4 and 8.6.5 into two additional subclauses titled “PHY I, II and III” and “PHY IV”, “PHY V” and “PHY VI”. If LiFi does not split off then we’ll need additional PHY VII and PHY VIII clauses.

2. Edit as shown below …

**8.6.1 Preamble field**

 **8.6.1.1 PHY I, II and III**

 *Move text from clause 8.6.1 into this section*

 **8.6.1.2 PHY IV**

 8.6.1.2.1 UFSOOK Preamble Field

 *Move text from clause 8.6.6.1.1 into this section*

 8.6.1.2.2 Twinkle VPPM Preamble Field

 *Move text from clause 8.6.6.2.1 into this section*

 8.6.1.2.3 Offset-VPWM Preamble Field

 *Move text from clause 8.6.6.3.1 into this section*

 8.6.1.2.4 S2-PSK Preamble Field

 *Move text from clause 8.6.6.4.1 into this section*

 8.6.1.2.5 S8-PSK Preamble Field

 *Move text from clause 8.6.6.5.1 into this section*

 8.6.1.2.6 HS-PSK Preamble Field

 *Move text from clause 8.6.6.6.1 into this section*

 8.6.1.2.6 Offset-VPWM Preamble Field

 *Move text from draft D1, page 375, line 8 into this section*

 **8.6.1.3 PHY V**

 8.6.1.3.1 RS-FSK Preamble Field

 *Move text from clause 8.6.7.1.1 into this section*

 8.6.1.3.2 M-FSK Preamble Field

 *Move text from clause 8.6.7.2.1 into this section*

 8.6.1.3.3 OOK Preamble Field

 *Move text from clause 8.6.7.3.1 into this section*

 8.6.1.3.4 Packet PWM Preamble Field

 TBD - *text is from clause 8.6.7.4.1*

 8.6.1.3.5 Packet PPM Preamble Field

 TBD - *text is from clause 8.6.7.4.2*

 **8.6.1.4 PHY VI**

 8.6.1.4.1 Invisible Data Embedded Preamble Field

 *Move text from clause 8.6.8.2 into this section*

 8.6.1.4.2 2D-sequential color code Preamble Field

 *Move text from clause 8.6.8.9 into this section*

 8.6.1.4.3 Invisible code Preamble Field

 *Move text from clause 8.6.9.1 into this section*

 8.6.1.4.4 Sequential scalable 2D code Preamble Field

 *Move text from clause 8.6.10.1 into this section*

 8.6.1.4.5 Invisible data embedded Preamble Field

 *Move text from clause 8.6.10.2.1 into this section*

 8.6.1.4.6 VTASC Preamble Field

 *Move text from clause 8.6.10.3.1 into this section*

**8.6.2 PHY header**

 **8.6.2.1 PHY I, II and III**

 *Move text from clause 8.6.2 into this section*

 **8.6.2.2 PHY IV**

 8.6.2.2.1 Twinkle VPPM PHY Header

 *Move text from clause 8.6.6.2.2 into this section*

8.6.2.2.2 S8-PSK PHY Header

 *Move text from clause 8.6.6.5.2 into this section*

 8.6.2.2.3 HS-PSK PHY Header

 *Move text from clause 8.6.6.6.2 into this section*

 **8.6.2.3 PHY V**

 8.6.2.3.1 M-PSK PHY Header

 *Move text from clause 8.6.7.2.3 into this section*

 8.6.2.3.2 OOK-PSK PHY Header

 *Move text from clause 8.6.7.3.2 into this section*

 **8.6.2.4 PHY VI**

 8.6.2.4.1 Invisible Data Embedded Header Field

 *Move text from clause 8.6.8.3 into this section*

 8.6.2.4.2 2D-sequential color code Header Field

 *Move text from clause 8.6.8.9.1 into this section*

 8.6.2.4.3 Invisible code Header Field

 *Move text from clause 8.6.9.1.1 into this section*

 8.6.2.4.4 Sequential scalable 2D code Header Field

 *Move text from clause 8.6.10.1.1 into this section*

 8.6.2.4.5 Invisible data embedded Header Field

 *Move text from clause 8.6.10.2.2 into this section*

 8.6.2.4.6 VTASC Header Field

 *Move text from clause 8.6.10.3.2 into this section*

**8.6.3 Header check sequence (HCS)**

 **8.6.3.1 PHY I, II and III**

 *Move text from clause 8.6.3 into this section*

 **8.6.3.2 PHY IV**

 8.6.3.2.1 HS-PSK HSC

 *Move text from clause 8.6.6.6.4 into this section*

 **8.6.3.3 PHY V**

 8.6.3.3.1 OOK HSC

 *Move text from clause 8.6.7.3.3 into this section*

 **8.6.3.4 PHY VI**

 8.6.3.4.1 2D-sequential color code HSC

 *Move text from clause 8.6.8.9.2 into this section*

 8.6.3.4.2 Invisible code HSC

 *Move text from clause 8.6.9.1.2 into this section*

**8.6.4 Optional fields**

 **8.6.4.1 PHY I, II and III**

 *Move text from clause 8.6.4 into this section*

 **8.6.4.2 PHY IV**

 8.6.4.2.1 RS-FSK Optional Field

 *Move text from clause 8.6.7.1.2, 8.6.7.1.3, 8.6.7.1.4, 8.6.7.1.5, 8.6.7.1.6, and 8.6.7.1.7 into this section*

 **8.6.4.3 PHY V**

 **8.6.4.4 PHY VI**

**8.6.5 PSDU field**

 **8.6.5.1 PHY I, II and III**

 *Move text from clause 8.6.5 into this section*

 **8.6.5.2 PHY IV**

 8.6.5.2.1 UFSOOK PSDU field

 *Move text from clause 8.6.6.1.2 and clauses 5.2.2 and 5.2.2.1 into this section*

 8.6.5.2.2 Offset-VPWM PSDU field

 *Move text from clause 8.6.6.3.2 into this section*

 8.6.5.2.3 S2-PSK PSDU field

 *Move text from clause 8.6.6.4.2 into this section*

 8.6.5.2.4 S8-PSK PSDU field

 *Move text from clause 8.6.6.5.3 into this section*

 8.6.5.2.5 HS-PSK PSDU field

 *Move text from clause 8.6.6.6.4 into this section*

 8.6.5.2.6 Offset-VPWM PSDU field

 *Move text from draft D1, PDF page 375, line 50 into this section*

 **8.6.5.3 PHY V**

 8.6.5.3.1 RS-FSK PSDU field

 *Move text from clause 8.6.7.1.9 and 8.6.7.1.10 into this section*

 8.6.5.3.2 M-FSK PSDU field

 *Move text from clause 8.6.7.2.4 into this section*

 8.6.5.3.3 OOK PSDU field

 *Move text from clause 8.6.7.3.4 into this section*

 8.6.5.3.4 Packet PWM PSDU field

 TBD - *text from clause 8.6.7.4.1*

 8.6.5.3.5 Packet PPM PSDU field

 TBD - *text from clause 8.6.7.4.2*

 **8.6.5.4 PHY VI**

 8.6.5.4.1 Invisible Data Embedded PSDU Field

 *Move text from clause 8.6.8.8 into this section*

 8.6.5.4.2 2D-sequential color code PSDU Field

 *Move text from clause 8.6.8.9.2 into this section*

 8.6.5.4.3 Invisible code PSDU Field

 *Move text from clause 8.6.9.1.3 into this section*

 8.6.5.4.4 Sequential scalable 2D code PSDU Field

 *Move text from clause 8.6.10.1.2 into this section*

 8.6.5.4.5 Invisible data embedded PSDU Field

 *Move text from clause 8.6.10.2.3 into this section*

 8.6.5.4.6 VTASC PSDU Field

 *Move text from clause 8.6.10.3.7 into this section*

1. **Clause 8.6.1**



See resolution #12.

1. **Clause 8.6.2**



See resolution #12.

1. **Clause 8.6.3**



See resolution #12.

1. **Clause 8.6.4**



See resolution #12.

1. **Clause 8.6.5**



See resolution #12.

1. **Clause 8.6.6**



See resolution #12.

1. **Clause 8.6.7**



See resolution #12.

1. **Clause 8.6.8**



See resolution #12.

1. **Clause 13.1**



Move the material from Annex G to clause 13.1 and use it as introductory material for UFSOOK.

1. **Clause 13.2**



Move the material from Annex G to clause 13.2 and use it as introductory material for UFSOOK.

1. **Clause 13.2**



Add the following clause …

13.2.4 Twinkle VPPM FEC

Twinkle VPPM uses the RS(15,11) code as shown in clause 10.2. The Reed-Solomon code may be shortened as discussed in clause 10.2.