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

Submission Title: comment resolution assignment
Date Submitted: June 2010
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Re:

Abstract: proposes comment resolutions for a set of CIDs

Purpose:

Comments for CIDs

- 596, 599, 600, 601, 602, 603, 604, 605, 608
- 587, 588, 589,590, 591,610, 611, 612, 613, 614, 615
- 572, 575, 592, 650, 742, 746, 775
- 598, 607, 616, 618, 619, 622, 692, 723, 740

CIDs 596, 599, 600, 601, 602, 603, 604, 605, 608

Comments related to text left in the draft related to orphan scan and energy detect

We are not using these mechanisms for VLC

Recommendation to editor:

- Accept all these comments

CIDs 587, 588, 589, 590, 591, 610, 611, 612, 613, 614, 615

Wrong table reference. MLME should not point to Table 25 (PHY PID attributes) but should be Table 85 (MAC PID attributes).

Recommendation to editor:

- Accept all these comments
- Also, update page 163, line 25 which refers to table 25

CIDs 572, 575, 592, 650, 742, 746, 775

Issue: Concept of GTS and Superframe is not flexible enough for applications

Not sure what applications it is not flexible enough. No alternative suggestion provided. Significant impact on entire draft.

Recommendation to editor:

- Reject

CIDs 598, 607, 616, 618, 619, 622, 692, 723, 740

Channel Page and phyCurrentPage

Remnants of prior draft – not applicable to VLC. See: 15-09-0633-00-004g

Recommendation to editor:

- Delete all text referring to channel page in draft. Also, delete all text referring to phyCurrentPage. Note phyCurrentPage exists in multiple places in Table 85 sometimes with a hyphen. So please search carefully.

Comments for CIDs (v2)

563, 637, 642, 763, 764, 406, 407, 643, 663, 774, 298, 299, 301

CID 563

Comment

- "physical radio channel" is not appropriate.
  Introduce physical VLC channel characteristics, especially for outdoor usage scenario, including sub-carrier dispersion by reflections and multipath propagation, effect of mist, fog and smoke, and rain fall and snow.

Suggested Remedy

- channel property of VLC have to be characterized and redefine all MAC layer tasks.

Recommendation/Instruction to editor

- Change “physical radio channel” to “physical layer”

CID 637

Comment:

- Frame version not at the start of the frame? Undesirable in at least two fundamental aspects.

Suggested remedy:

- Make this field as the first one of the frame.

Resolution/Instruction to editor:

- Accept. Move this field to first. Right shift other fields.

CID 642

Comment

- (TR) §7.2.1, p. 131, Fig. 62: The MAC frame format contains a 2-octet error detection code field (FCS), whereas the PHY packet format (cf. §6.4.1, p. 39, Fig. 21) contains a 2-octet error detection field as well. This seems illogical and, if somehow has a function that escapes me, seems less than optimal.

Suggested remedy:

- remove either the error detection code field in the PHY packet or in the MAC frame.

Resolution/instruction to editor

- Reject. The PHY HCS is to verify the header in the PHY to make sure the rate, length fields etc. are accurate. The MAC FCS is to verify the payload in the MAC.

CID 763

Comment:

- What is M1?

Instruction to editor

- Page 180. Line 42. Add “Let Device 1 support M1 color channels and let Device 2 support M2 color channels. Let K be the number of channels shared between Device 1 and Device 2, where K >= 1 for communication”.

CID 764

Comment:

- Extra text without meaning

Suggested remedy

- Delete "… in the information."

Instruction to editor

- Page 180. Line 51. Delete entire sentence containing "… in the information."

CID 406, 407

Comment:

- phyCurrentChannel
- phyChannelsSupported

Suggested remedy

- We do not have 27 channels

Instruction to editor

- Duplicate comment per CID 412,…. Resolved as per 383r0.

CID 643

Comment:

- (TR) §7.2, p. 131ff: It seems that most of the MAC specification borrows heavily from the 802.15.4-2006 specification (e.g., general frame format, transmission, reception, acknowledgement, security processing, data frame, command frame, acknowledgement frame, beacon frame). This begs the question whether it would be better to define the 802.15vlc effort as a new PHY and corresponding MAC amendments necessitated by this new PHY (similar to what 802.15.4g and 802.15.4f are doing), rather than copying large chunks of 802.15.4-2006. An advantage of the latter would be that some of the more general MAC enhancements, including, e.g., overhead reduction techniques and security enhancements (cf. 08/828r9, 08/849r0) would automatically become available to 802.15vlc as well. Since 802.15vlc only considers one new frame type, this can easily be accommodated (for frame types, cf., e.g., 10/061r0 and 09/604r6; for general amendments related to overhead reduction, cf. 08/828r9, 08/849r0, 09/604r6, 802.15.4e/D1).

Suggested remedy

- Either write this specification as a new PHY and amendments to 802.15.4-2006 or adopt the general amendments to 802.15.4-2006 considered with 802.15.4e and incorporate with the current specification. Note RS: commenter could assist with this.

Instruction to editor

- Reject. The VLC MAC is distinctive enough with features for visibility and dimming support. The VLC MAC and PHY stand on their own. 802.15.7 has its own PAR and does not require any interaction with other 802.15 specifications.

CID 663

Comment:

- Bit appears to represent bit positions in the Capability Information field.

Suggested remedy

- Change column heading to “Bit position”

Instruction to editor

- Accept. (editorial)

CID 774

Comment:

- "imperfect nature of the radio medium" is not appropriate.

Suggested remedy

- Characterize the nature of VLC channel and the major impediments on it, and re-define the transmission scenario.

Instruction to editor

- Accept in principle. (editorial). Change “radio medium” to “communication channel”

CID 298, 299, 301

Comment

- In Figure 20, in Burst mode, there are two MAC PDU #n. These should be fixed.
- Figure 20 - Burst Mode - shows the same MAC PDU being transmitted twice, in both Frame #1 and #2. This figure does not align with the text
- (SY) In Burst mode, both packets are shown with the label "MAC PDU #n". I believe that the labels should be different

Proposed Remedy

Proposed Remedy:

- Redraw the figure with correct PDU numbers.
- replace first MAC PDU #n with MAC PDU #1 and second MAC PDU #n with MAC PDU #2

Resolution

- Comment accepted in principle. However, fix is not easy.

Instruction to editor: Update Figure 23

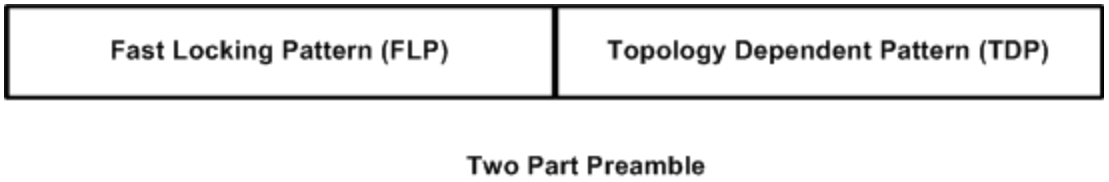


Figure 23: Two Part Preamble

Update Page 39, line 40 as follows:

- The standard defines one fast locking pattern (FLP) followed by choice of 4 topology dependent preamble (TDP) repetitions for the purposes of distinguishing different PHY topologies.

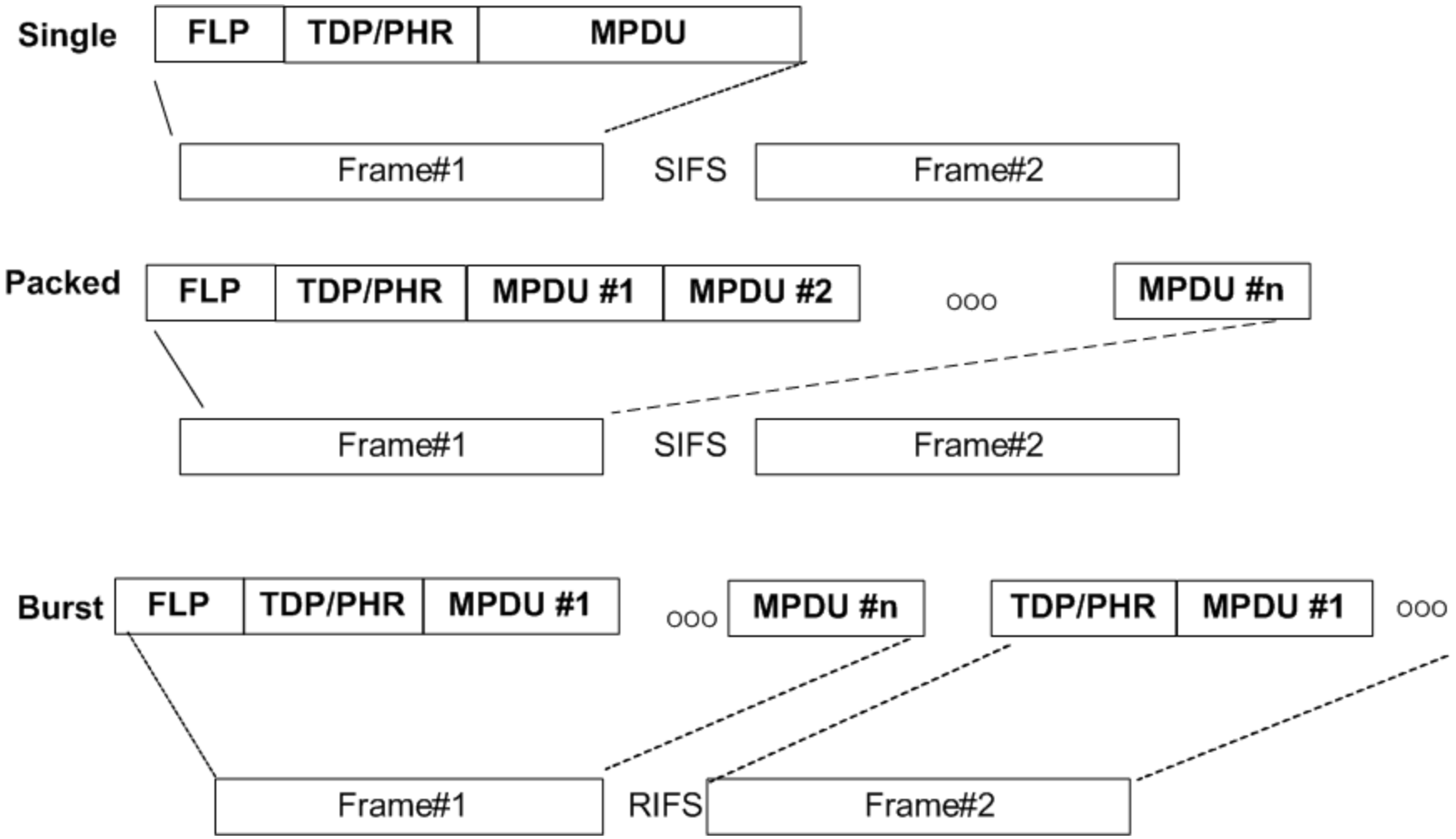
Update Page 39, line 46 as follows:

- After the fast locking pattern, 4 repetitions of one of four TDPs are sent.

Update Figure 24 Caption as follows:

- Figure 24: Proposed TDPs for various topology modes

Instruction to editor: Update Figure 20



Additional instructions to editor

Define Preamble composed of two parts: FLP – Fast Locking Pattern, TDP – Topology Dependent Pattern

Page 38, line 33. Add “The FLP shall be dropped in the burst mode.”

Update figures 13-17 (optionally) to reflect preamble sequence as being composed of FLP and TDP.

Work with Sridhar to obtain visio files for Figures 13,14,15,16,17,20.

Back-up -- V0 comments

Comments for CIDs

213, 229, 239, 237, 426, 295, ~~298, 299, 301~~, 305, 309, 393, 400, 412, 413, 414, 415, 416, 417, 419, 435c, 469

CID 213

Comment:

- The back ground information behind the assignment of seven channels in the band plan defined by Table 1 should be noted, because the number of channelized band that is seven is introduced abruptly and non-uniform spectral width requires at least any notifications. In addition the relation to Annex E may be clarified to facilitate the intent of this standard.

Suggested Remedy

- Provide rationale and set of information with regard to Table 1.

CID 213

Resolution

- DCN: 15-09-0690-00-0007 provides the motivation for the bandplan.
- While it is not necessary to explain the rationale in the standard, a brief note is added as requested by the commenter.

CID 213: Instruction to editor

Pg 22. Line 51. Add note “ The bandplan is non-uniformly distributed across the visible spectrum to account for human eye sensitivity and optical transmitter (LED) manufacturing. LEDs are designed to have narrower bandwidths for center colors since human eye is more sensitive to the center frequencies.”

CID 229,239

Comment:

- PHY1 has a number of rates close to each other between OOK and VPM (Table 2)
- PHY2 has a number of rates close to each other SNR. Need to remove some rates to have at least 2dB performance gap between the rates

Suggested Remedy:

- Remove rates close to each other
- Remove rates to create 2dB performance gap between the rates

Resolution

See DCN : **IEEE 802.15-10-0097-02-0007**

For a given optical rate, we have provided a 2 dB separation in data rates. IEEE 802.15.7 has been designed to support various applications with various LED choices. PHY I and II have multiple clock rates to support various types of LEDs. While it is preferable to use a faster LED (faster clock) and have better performance (due to more coding) for the same data rate, the standard supports slower LEDs for certain applications as well. We acknowledge the fact that this may cause some rates to very close to each other.

Instructions to editor

Page 24, line 12. Add “In addition to modulation and coding, multiple optical rates are provided for all PHY types in order to support a broad class of optical transmitters (LEDs) for various applications. The choice of optical rate used for communication is decided by the MAC during device discovery.”

CID 237, 426

Comment:

- Delete the 5 kbps mode from the OOK PHY Type 1 table

Suggested remedy:

- Doc 10/159r1 indicates that the 5 kbps is problematic because the data rate is so low and the lowest data rate is used for link establishment. Part of the problem is that so much coding is used on this mode that the "performance improvement threshold" - i.e. that threshold of SNR which is required for the FEC to start improving performance - is too high. Also the low data rate makes dimming more problematic due to the time it takes to send a null packet.

Resolution & Editor instruction

Discussed in part in Beijing.

No objection to removing the 5 kbps mode.

Also, helps solve another comment (CID 238) related to RS FEC.

Instruction to editor:

- Accept comment and delete 5 kbps mode in PHY I.

CID 295

Comment

- What are the data transmission modes? If the PHY doesn't support them, then it is most likely a problem in the PHY definition, not in the PHY implementation.

Suggested Remedy

- Change "all the data ... These are ... Burst Mode." to be "The PHY shall support the following data modes." and delete Figure 20.

Resolution and editor instructions

Accept comment without deleting Figure 20. Figure 20 was deemed useful by the committee to assist with understanding of the different modes.

Instruction to editor:

- Change "all the data ... These are ... Burst Mode." to be "The PHY shall support the following data modes."

CID 305, 309

Comment

- The draft indicates that there is a RIFS spacing, yet this spacing is not defined in the draft.
- RIFS not defined

Suggested Remedy

- Define the RIFS, probably in the same table as the SIFS.
- The Reduced Interframe Spacing (RIFS) needs to be defined.

Resolution/Instructions to editor

Update 6.1.4 for LIFS, SIFS and RIFS

Table 5 : Add minimum RIFS period as 4 symbols

CID 393

Comment

- "constants are hardware dependent and cannot be changed" is not necessarily true and is irrelevant in any case.

Suggested Remedy

- Change "constants are hardware dependent and cannot be changed" to be "constants shall not be changed"

Instruction to editor: Accept (editorial)

CID 400

Comment:

- A turnaround time of 0 symbols does not seem feasible. This constant appears to get used in the MAC ACK timing, thus an appropriate value should be chosen that gives the PHY enough time to finish processing and turn around the chains.

Suggested remedy:

- Set constant aturnaroundTime to appropriate value for this PHY

Instruction to editor: Reject. The TX and RX are independent chains in VLC PHY and hence there is no “turnaround” time required.

CID 412, 413, 414, 415, 416, 417, 419

Comment:

- In Table 25, RF channel can be replaced with "visible light" channel. What does a different channel mean? What is the difference between two different channels?
- Wrong reference 6.1.4
- Wrong reference 6.1.2 (SY)
- This table states that there are 27 possible channels, and yet 6.1.2 only shows 7 possible channels. Something doesn't match
- The range is 0-26, but there are only 7 channels.
- Delete "See description", leave cell blank, replaces the description (which is from 802.15.4) with a description of the bitmap. Alternately, make it an integer list rather than a bitmap (this is a logical interface after all), with each entry in the list being the Band ID of the channel supported.
- Row "phyChannelsSupported" … last column … text seems inappropriate

Table 25 needs to be updated

Attribute	Identifier	Type	Range	Description
phyCurrentChannel	0x00	Integer	0-26	The RF channel to use for all following transmissions and receptions (see 6.1.4).
phyChannelsSupported	0x01	Bitmap	See description	The 5 most significant bits (MSBs) (b27,... , b31) of phyChannelsSupported shall be reserved and set to 0, and the 27 LSBs (b0, b1, ... b26) shall indicate the status (1=available, 0=unavailable) for each of the 27 valid channels (bk shall indicate the status of channel k as in 6.1.2).
phyCCAMode	0x02	Integer	1-3	The CCA mode (see 6.9.5)
phyDim	0x03	Integer	0-100	0 is fully dimmed and 100 is no dimming

Instruction to editor to update table 25

Attribute	Identifier	Type	Range	Description
phyCurrentChannel	0x00	Integer	0-26 0-7	The channel to use for all following transmissions and receptions
phyChannelsSupported	0x01	Bitmap 7 LSBs (b0..b6) shall indicate the status		The 5 most significant bits (MSBs) (b27,... , b31) of phyChannelsSupported shall be reserved and set to 0, and the 27 LSBs (b0, b1, ... b26) shall indicate the status (1=available, 0=unavailable) for each of the 27 valid channels (bk
phyCCAMode	0x02	Integer	1-3	The CCA mode (see 6.9.5)
phyDim	0x03	Integer	0- 1000	0 is fully dimmed and 1000 is no dimming

CID 435c

Comment:

- What is 'Pad‘

Instruction to Editor:

- 6.6.1. Line 23 : Add “The RS encoder output is padded with zeros to form an interleaver boundary. The padded zeros are then punctured (discarded) and sent to the inner convolutional encoder”

CID 469

Comment

- Add the following sentence after the current sentence … "The extinction ratio is at the discretion of the implementer". The reason this is added is because to send a logic zero, it is not necessary to completely extinquish the LED light … it could be just slightly dimmed for a logic zero. Not specifying the extinction ratio allows the implementer to lessen the flicker effect by not doing 100% AM modulation.

Instruction to editor

- Accept.