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

Submission Title: comment resolution assignment
Date Submitted: June 2010
Source: Sridhar Rajagopal [Samsung Electronics]
Address:
Contact Information: [sridhar.r@samsung.com]

Re:

Abstract: proposes comment resolutions for a set of CIDs

Purpose:

Comments for CIDs (v5)

241, 297, 396, 581, 647, 672, 673, 679, 680, 752, 762, 767, 772

CID 241

Data rate is not mentioned in SIFS time and LIFS period. SIFS and LIS is usually fixed and cannot change with data rate.

- SIFS and LIFS period should be at the lowest data rate

Instruction to editor

- Accept in principle. Mention that SIFS and LIFS are fixed to 40 symbols at the currently negotiated clock rate. Add RIFS to the list as well. Update Figure 107 to include example of RIFS for burst mode.

CID 752

There is no mention of RIFS here.

- Delete RIFS from rest of document due to lack of its description here.

Instruction to editor

- Accept in principle. Reject suggestion. See resolution to CID 214.

CID 297

How does packed mode fit with MAC interface primitives MCPS-DATA.request and MCPS-DATA.indication, where one msdu is passed at a time.

- Needs description somewhare of how this works including what the MAC does and how it fits in with the MAC API.

Instruction to editor

- Accept. Add text in 7.1.1.1 MCPS-DATA.request (page 66, line 49) that "In the packed mode, multiple MSDU are passed via a local SSCS entity to a single peer SSCS entity. Update Table 30 and 32 for "burst mode bit. Repeat text in 7.1.1.3 MCPS-DATA.indication.

CID 396

In Table 23, how can Band plan ID be specified - especially when multiple light sources are used?

- Need to explain how this Babd plan ID works - especially when multiple light sources are used.

Instruction to editor

- Reject. See line 44 in Section 6.4.2. The band plan ID field in this case shall be that of the lowest band plan ID.

CID 581

Missing indications of diamonds and asteriks.

- The text prior to table 35 indicates there should be diamonds and asteriks in table 35 … but table 35 does not have any. Evidently they got removed. Technical editor needs to research 15.4 to see if there is a problem here.

Instruction to editor

- Accept. This is a global issue regarding mandatory vs. optional. Suggestion is that we only mention key mandatory items in the spec and leave other things to a higher body such as a VLC alliance
- Delete line 32-33 "Primitives marked with a diamond (¨) are optional for a device. Primitives marked with an asterisk (*) are optional for either or both a device and a coordinator."

CID 647

The addressing mode value should not be used to provide a shortcut for the broadcast address. This is especially true, since the same definition is applied to the source addressing field, and there is no broadcast source address!

- define 01 as "Address field contains an 8-bit simple address", define an address with all 1s of any length as broadcast address.

Instruction to editor

- Accept in principle but reject remedy. We already agreed to make 0x01 as reserved.
- Add clarification text "Address with all 1's of 16 or 32 bit is defined as the broadcast address"

CID 672

Incorrect terminology in table 74, but why do we need this table?

- P2P should be peer-to-peer and P2MP should be STAR … how about broadcast. But why do we need this information in the topology support capability. What is gained by having this info. Delete this table if not needed.

Instruction to editor

- Accept in part. Accept naming change per suggested remedy and add broadcast support. Increase bit width to 3 bits. LSB for P2P, middle for broadcast and MSB for STAR.
- Add clarification text "At least one of the topology fields shall be set. This information is provided to assist upper layers"

CID 673

Reference to infrastructure, mobile and vehicle …

- What is the difference between mobile and vehicle devices? Why do we need this device type information in regards to infrastructure, mobile and vehicle? I don't' understand the need for this table!

Instruction to editor

- Accept in part.
- Add clarification text "This information is provided to assist up*per layers"*
- *Update Annex D with table showing definitions of mobile, infrastructure, vehicle as developed in TCD.*

CID 679

Confusion on intent of table

- It looks like we get CQI information only for one band, but I may bit multiple bands. How do I get CQI info on the other bands? Should the number of rows in table 77 equal the number of bands used as indicated by the bit map?

Instruction to editor

- Accept.
- Add clarification text in line 24, Subclause 7.2.3.3 "CQI IE is 14 octets in length and the CQI information is provided for all band plan IDs. If a band plan ID is not supported, CQI of 0 shall be reported."

CID 680

If table 78 contains all othe subfields of the data payload field, then where does the "real" data go?

- Add another column for the real data

Instruction to editor

- Accept.
- Table 78 is Data Payload Field which specified in 7.2.1.8. Real data goes in payload which is variable. we have to add column in MAC payload in Table 78 for data payload field and real data as shown in figure 81.
- *Update Table 78 to show variable payload field after data type field.*

CID 762

There is no Active Scan command defined in 7.2.2.3 MAC command frames

- remove this active scan command

Instruction to editor

- Reject. "active scan" is not a command frame. It is an operation. It is provided using MLME-SCAN.request

CID 767

scanning with channel aggregation

- How is scanning ith channel aggregation accomplised? Does aggregation cause problems for this proceed. For example, if you use a white LED you might declare MCS success on a sub-optimal channel because not all the channels were scanned.

Instruction to editor

- Reject. Channel aggregation is a TX concept. Scanning is a RX concept and is unrelated to channel aggregation.

CID 772

(TR) §7.6.6.3, p. 193, l. 20: The sentence "If the requesting device does not receive a data frame from the coordinator within *macMaxFrameTotalWaitTime* CAP symbols in a beacon-enabled VLC PAN, or symbols in a nonbeacon-enabled VLC PAN,…" seems to be missing a MAC PIB parameter.

- **Suggested remedy:** Correct accordingly (Note RS: not sure which parameter this should be).

Instruction to editor

- Reject. *macMaxFrameTotalWaitTime is defined in* 7.4.2 MAC PIB attributes (page 163)

Comments for CIDs (v4)

594, 620, 621, 841

566, 567, 568, 569, 570, 571,573, 574

593, 595, 639, 685, 690

719, 724, 725, 726, 737

765, 768, 770, 805

CID 594, 620, 621, 841

Comments related to FFD/RFD left behind in text

Agreement in TG7 was to rename FFD as co-ordinator and RFD as device

Instructions to editor:

- Accept these comments
- Change FFD to co-ordinator
- Change RFD to device

CID 566, 567, 568, 569, 570, 571,573, 574

Comments related to Table 30 – TBD for data rate range

The data rate range needs to be filled with valid MCS numbers

Instructions to editor:

- Accept these comments. Update Table 30 with the MCS numbers as defined in next page
- Also, update Table 32 with the same numbers

MCS table proposed

MCS indication		PHY type	Data rate	unit
0	000000	1	11.67	kbps
1	000001	1	24.44	kbps
2	000010	1	48.89	kbps
3	000011	1	73.3	kbps
4	000100	1	100	kbps
5	000101	1	35.56	kbps
6	000110	1	71.11	kbps
7	000111	1	124.4	kbps
8	001000	1	266.6	kbps
16	010000	2	1.25	mbps
17	010001	2	2	mbps
18	010010	2	2.5	mbps
19	010011	2	4	mbps
20	010100	2	5	mbps
21	010101	2	6	mbps
22	010110	2	9.6	mbps
23	010111	2	12	mbps
24	011000	2	19.2	mbps
25	011001	2	24	mbps
26	011010	2	38.4	mbps
27	011011	2	48	mbps
28	011100	2	76.8	mbps
29	011101	2	96	mbps
32	100000	3	12	mbps
33	100001	3	18	mbps
34	100010	3	24	mbps
35	100011	3	36	mbps
36	100100	3	48	mbps
37	100101	3	72	mbps
38	100110	3	96	mbps
others			Reserved	

First 2 MSBs provide information on PHY type

5 kbps rate deleted from PHY 1 as agreed in Beijing

LSBs provide information on data rate

Use this MCS table for MCS indication in the PHY header

Update Table 23 to reflect this information [update 400r0]

Rajagopal

CID 593

RANGING_NOT_SUPPORTED is not described making the statement in 7.1.9.2.3 false.

Suggested remedy:

- Delete RANGING_NOT_SUPPORTED

Instructions to editor:

- Accept resolution

CID 595

Second row, 3rd column is a 27 bit field. The field description indicates these bits are used for channel selection.

Suggested remedy:

- Is 27 bits necessary?

Instructions to editor:

- Accept resolution. Only 7 bits are needed.
- See resolution for Table 25 (CID 412 – 419). Also, present on the 3rd last slide of this document.

CID 639

WPAN ID Compression is no longer applicable, since there are not two WPAN ID in the frame format

Suggested remedy:

- Remove

Instructions to editor:

- accept

CID 685, 690

VLC coordinator or a co-ordinator

Suggested remedy:

- What is meant by "the coordinator or a coordinator"? Do we have multiple coordinator communication options in 15.7? Or is this left over from 15.4?

Instructions to editor:

- accept - delete second coordinator

CID 719, 724, 725, 726

Change Terminology - no CSMA in 15.7

Suggested remedy:

- change "macMaxCSMABackoffs" to "macMaxBackoffs"

Instructions to editor:

- Accept suggested remedies for all the above CIDs

CID 737

what is NHL mean?

Suggested remedy:

- Define and add to acronym list.

Instructions to editor:

- Accept comment but reject remedy.
- Delete sentence containing NHL.
- NHL seems to stand for Network Header Length. Delete that sentence. Not used anywhere in document and not relevant/required.

CID 765

assumption made which might not be true

Suggested remedy:

- ~~*Since*~~ *If there is independent hardware for each color at the transmitter and receiver, parallel transmissions are possible as long as guard color channels are not used for any particular color choice.*

Instructions to editor:

- Accept resolution
- Change "Since" to "If"

CID 768

What *above* conditions are being referred to? Use of above is ambiguous.

Suggested remedy:

- Replace **above** with more specific information.

Instructions to editor:

- Accept resolution
- Change "Above conditions" to "If none of the conditions for disassocation are satisfied, .."

CID 770

"the nature of radio communications" is not appropriate. ….

Suggested remedy:

- Re-define the operating space of VLC and corresponding MAC functionalities from scratch.

Instructions to editor:

- Accept resolution but reject remedy
- delete "Due to the nature of radio communications"

CID 805

Figures xx and yy do not exist

Suggested remedy:

- Unknown

Instructions to editor:

- Accept resolution but reject remedy
- Replace Figure xx with Table 2 and Figure yy with Table 3

Comments for CIDs (v3)

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
- phyChannelIsSupported

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

Fast Locking Pattern (FLP)	Topology Dependent Pattern (TDP)

Two Part Preamble

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.
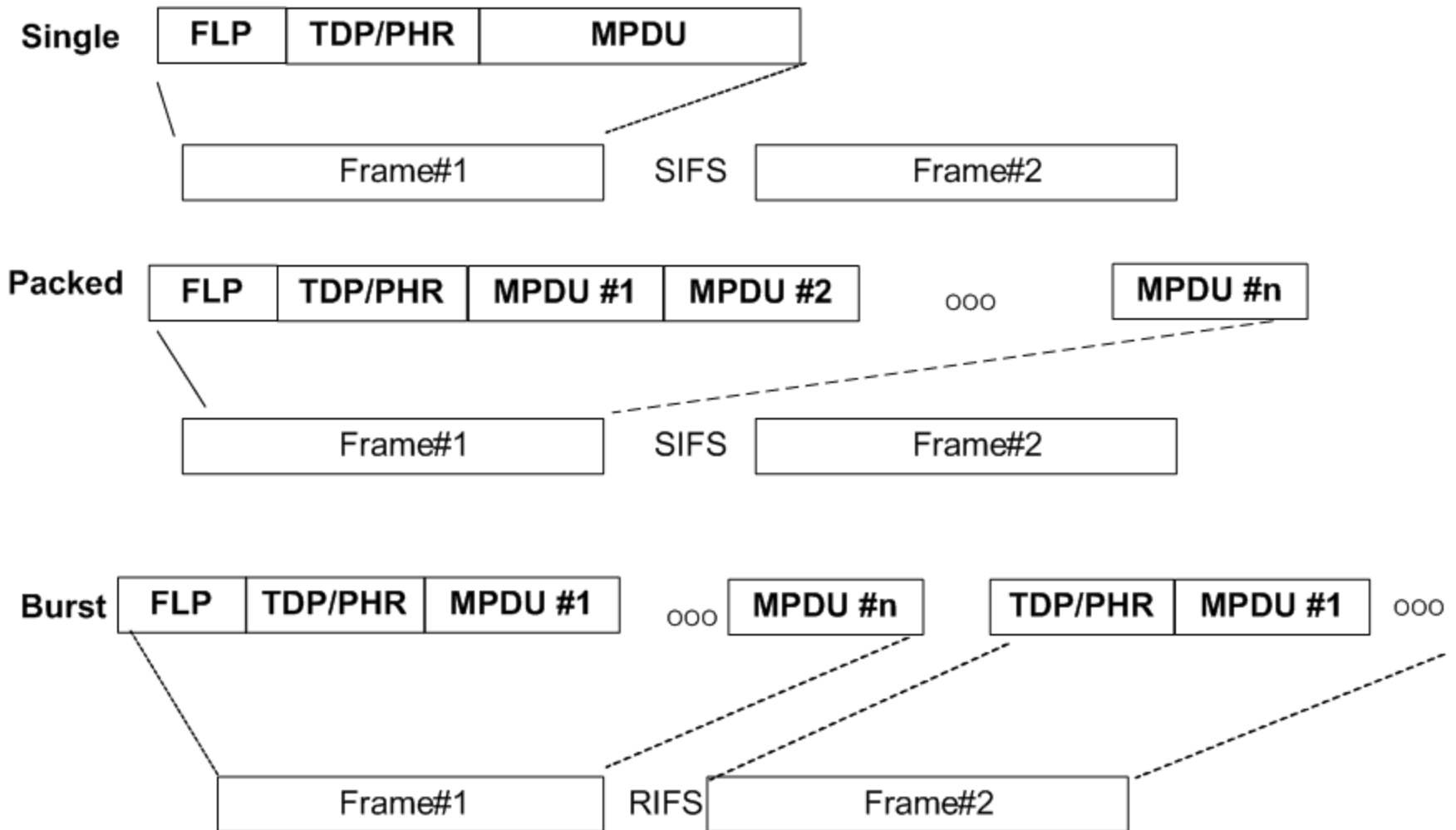
Update Page 39, line 46 as follows:

- 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.