**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title |  | |
| Date Submitted | [18 Sept 2014] | |
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| Re: | [802.15 Maintenance and WNG Meeting in Bangkok, Thailand 2015] | |
| Abstract | [IEEE 802.15 Maintenance and WNG Standing Committee Minutes] | |
| Purpose | [Official minutes of the Standing Committee Session] | |
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**IEEE 802.15 Wireless Interim Meeting – Session #98**

**Bangkok, Thailand**

**Sept 14-17, 2015**

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# SC Maintenance Minutes

## Monday 14 Sept 2015

**10:30** SC Maintenance called to order by Chair, Pat Kinney, Kinney Consulting

* Presents 15-15-0689-00 SC Opening Report.
  + Chair asked if there any one has knowledge of essential patents and provides an opportunity for response: **None heard**.

Chair called for major topics to be discussed this week:

1. Security
   1. Security mode 4 (Encryption only) – delete or deprecate?
   2. Acks – based upon FCS or MIC?
2. TSCH edits (15-15-0648-01) discussion
3. IE Filtering – PIB attribute? Seems that a name ambiguity is present, i.e. MAC association permit or EB permit join-on
4. Review IE characteristic table (15-15-0090-08)
5. PAN ID
6. Multi-Rate
7. LLDN

These topics were assigned the following meeting slots:

**Agenda**

* **Monday 14 Sept, AM2:** 802.15.4 Revision - Review resolution issues & BRC calls
* **Monday 14 Sept, PM1:** 802.15.4 Revision –Security (encrypt only mode, send ACKs after FC or security ?)
* **Tuesday 15 Sept, PM1:** 802.15.4 Revision –TSCH issues (15-15-648-010)
* **Tuesday 15 Sept, PM2:** 802.15.4 Revision – IE FILTER (JOIN/ASSOC), IE TABLE
* **Wednesday 16 Sept, PM1:** 802.15.4 Revision – PAN ID REVIEW
* **Wednesday 16 Sept, PM2:** 802.15.4 Revision – MULTI-RATE REVIEW
* **Thursday 17 Sept, AM1:** 802.15.4 Revision – LLDN, AOB
* **Thursday 17 Sept, AM2:** 802.15.4 Revision – BRC membership approval, BRC call dates and times

Motion to approve the agenda, 15-15-0674-01 which includes above agenda items was made by C Powell, and seconded by G Stuebing. Upon neither discussion nor objection the motion carried.

### BRC Calls:

* On the topic of the preamble length for SUN PHYs (comment i-450)
* The range of the preamble length is 4 – 64 octets
* Default preamble length is 8 octets

### Security

Encrypt only mode – delete vs. deprecate

* Consensus was to deprecate with the following wording:

The use of security mode 4 (i.e. encryption w/o authenticity) is deprecated and shall not be used in implementations of this standard. The rationale for not using this mode is that in previous versions of the standard, security level 4 was a level which provided only data confidentiality but without data authenticity. This level was removed as such a security level is not useful. The CCM used allows trivial changes to the underlaying encrypted data unless data authenticity is provided, thus using data confidentiality only is not useful.

* Additionally there is no legacy mode – discard frames received that use mode 4 as described in 9.xxxx

### Acknowledgments

Send upon frame check or frame check and authentication check?

Many steps before MIC check such as frame version

Discussion ensued with the ambiguities of 4e confounding this issue. The discussion continues into the next meeting slot, PM1.

**12:20** SC Maintenance meeting recessed

## Monday, 14 Sept, PM1

**13:40** SC Maintenance meeting called to order

Subject of Enhanced Acknowledgments resumed

The following are excerpts from the SB draft with edits as appropriate:

### 6.7.2 Reception and rejection

For the first level of filtering, the MAC sublayer shall discard all received frames that do not contain a correct value in their FCS field in the MFR, as described in 7.2.10. The FCS field shall be verified on reception by recalculating the purported FCS over the MHR and MAC payload of the received frame and by subsequently comparing this value with the received FCS field. The FCS field of the received frame shall be considered to be correct if these values are the same and incorrect otherwise.

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If any of the third-level filtering requirements are not satisfied, the MAC sublayer shall discard the incoming frame without processing it further. If all of the third-level filtering requirements are satisfied, the frame shall be considered valid and processed further.

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For valid frames that are not broadcast, if the Frame Type field indicates one of a Multipurpose frame, a Data frame with the Frame Version set to 0b10 or a MAC command with the Frame Version field set to 0b10, and the AR field is set to request an acknowledgment, the MAC sublayer shall send an Enh-Ack frame ~~as described in 6.7.4.2~~. unless the device performs the incoming frame security procedure as per 9.2.3. If the device performs the incoming frame security procedure, if the Status is not SUCCESS, the device is not required to send an Enh-Ack. If the Enh-ACK contains IEs and/or a Frame Payload and it is in response to a secured frame, then the Enh-ACK shall be secured. If the Enh-Ack is in response to a secured frame and does not contain either IEs or a Frame Payload, then the Enh-Ack may be secured.

### 6.7.4.2 Acknowledgment

~~A frame transmitted with the AR field set to request an acknowledgment, as defined in 7.2.1.4, shall be acknowledged by the recipient.~~ If the intended recipient has received a valid frame as defined in 6.7.2 ~~correctly receives the frame~~ with the AR set to request an acknowledgement, it shall generate and send an Ack frame as defined by 6.7.2. ~~containing the value of the same DSN from the Data frame or MAC command that is being acknowledged.~~

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The receiving device may include additional content in an Enh-Ack frame using IEs. If the originator does not understand ~~the~~ a specific IE ~~content~~ of the Enh-Ack frame, ~~it~~ that IE is ignored, but the transmission is considered successful. The number and the content of the IEs included in the Enh-Ack should be limited to only those IEs with the minimal content that is required.

The Time Correction IE shall be used in all Enh-Ack frames if *macTschEnabled* is TRUE. When returning Time Correction IE, as described in 7.4.2.7, in the Enh-Ack frame the receiving device may indicate a negative acknowledgment to indicate that the frame successfully passed FCS check, but could not be transferred to a higher layer due to resource constraints (e.g., insufficient buffer space). This is treated as a failure from the sender’s perspective, and a notification of failure due to congestion is indicated to the higher layer through the MAC performance metrics. A higher layer may signal lack of buffers by setting *macNoHLBuffers* to TRUE.

When in TSCH mode, incoming frames are acknowledged using the Enh-Ack frame as described in 7.3.3. Security of the Enh-Ack frame shall match that of the incoming frame.

Instructions from 4e that were not copied into the SB draft:

*For enhanced acknowledgment frames (which are only sent after the incoming frame passes security filtering, if applicable), additional time may be required after aTurnaroundTime to complete incoming and outgoing security processing. If the enhanced acknowledgment is not sent before macEnhAckWaitDuration μs, the sender will assume the frame was not successful.*

**7.2.1.4 AR field**

The AR field specifies whether an acknowledgment is required from the recipient device on receipt of a Data frame or MAC command. If this field is set to one, the recipient device shall send an Ack frame or only if, upon reception, the frame passes the filtering described in 6.7.2. If this field is set to zero, the recipient device shall not send an Ack frame.

Group’s consensus was that the above edits to 6.7.2 and 6.7.4.2 resolved the issue of the Enh-Ack being either after FCS or MIC.

**15:36** Meeting recessed

## Tuesday, 15 Sep, PM1

**13:30** SC Maintenance meeting called to order

Focus for this meeting slot is to resolve the IE Filter (Join/Assoc) ambiguity and review the IE Table (15-15-0090-08). Minor edits was made to the document and captured as 15-15-0090-09. It was agreed that the IE tables in the draft would be replaced by the respective tables in doc 15-15-0090-09 and that the IE Termination table would be inserted into the draft.

**15:30** meeting recessed until Tuesday, PM2

## Tuesday 15 Sep, PM2

**16:00** Meeting called to order

Focus for this meeting slot is to discuss TSCH issues (15-15-648-01) and finish their resolutions.

Discussion ensued as to the intent of the TSCH Slotframe and Link IE, the intent of the priority joining, and the MLME-Set-Link.request. Changes to all of these TSCH areas including 6.2.6.3, 6.3.6, 7.4.4.2, 7.4.4.3, 8.2.20.3, and 8.4.2.2.2 were agreed upon and captured in document 15-15-0648-02.

**17:30** meeting recessed until Wednesday, PM1

## Wednesday 16 Sept PM1

**13:40** SC Maintenance called to order by Pat Kinney, chair.

Focus for this meeting is to review the PAN ID area of the standard and repair any issues.

Document 15-15-0561-04 was reviewed for errors and incompatibility with older versions of the standard. As a result changes to the PAN ID Compression sections of the draft were captured in 15-15-0561-05. This concluded the effort with PAN ID.

The multi-rate comments were reviewed. I-43 requested that the MLME-DATA-Request.primitive restore the data rate parameter. Arguments against restoring the data rate parameter were that the MAC should be responsible for determining the data rate. A straw poll on whether to restore the data rate parameter or leave it deleted ended up in a tie (most attendees did not vote), the chair then voted to restore the data rate parameter breaking the tie. Comment i-43 is thus accepted and comments i-307, i-308, i-309, i-367, and i-368 were deleted.

The LLDN issue was discussed by reviewing the minutes from the BRC calls. Given that the submitted text still has significant flaws, the consensus was to keep the resolutions as reject, i.e. LLDN will not be in the next draft.

**14:56** The meeting was recessed until Thursday AM1.

## Wednesday 16 Sept PM2

**16:00**  no meeting

## Thursday 17 Sept AM1

**08:10** SC Maintenance called to order by Pat Kinney, chair.

Focus for this meeting is have a final discussion on LLDN, and any other issues that have not be resolved.

The LLDN documentation had not changed since the last BRC discussion on LLDN, hence the errors in that text are sufficient to keep the LLDN out of the draft.

The resolutions contained within 15-15-0344-20 that had not been entered into the draft were reviewed for clarity towards editor insertion into the draft. These changes were captured in 15-15-0344-21, 15-15-0563-03. Major topics included the RIT comments resulting in A Kumar correcting the two figures, the validity of the following text in 7.2.1.3: “When operating in TSCH mode, the frame pending bit can be set to one to indicate that the recipient should stay on in the next timeslot and on the same channel if there is no link scheduled.”. P Kinney will work with TSCH users starting off with J Simon to verify this operation. Comment database review continues in the next meeting slot.

## Thursday 17 Sept AM2

**10:40** called to order by chair

Focus for this meeting is to perform administrative duties, such as BRC formation, conference call scheduling, and drafting the closing report, doc 15-15-0648-03.

The review of the comment database concluded with the review of the rogue comments followed by comments to which T Kivinen disagreed with the resolutions. Changes to the resolutions were made that T Kivinen found acceptable.

The times for the BRC calls were agreed upon, they are BRC calls will start 23 September: Mondays and Wednesdays at 8:00 PDT, 10:00 CDT, 18:00 EEST, Tuesdays and Thursdays at 00:00 JST. Agenda is Draft update, and Review resolutions inserted into the draft.

The BRC committee motion:

*SCm requests that 802.15 WG approve the formation of a Ballot Resolution Committee (BRC) for the WG balloting of the 802.15.4 Revision draft standard with the following membership:* Pat Kinney, James Gilb, Jussi Haapola, Jeritt Kent, Benjamin Rolfe, Clint Powell, Billy Verso, Kunal Shah, Fumihide Kojima, Tero Kivinen, and Tim Harrington. *The 802.15.4 Revision BRC is authorized to approve comment resolutions and to approve the start of balloting the 802.15.4 Revision draft on behalf of the 802.15 WG. Comment resolution on recirculation ballots between sessions will be conducted via reflector email and via teleconferences as announced to the reflector.*

Kunal Shah moved, C Powell seconded. Upon no opposition the motion carries with unanimous consent.

**12:13** Upon no objection, the meeting was adjoured

# SC WNG meeting

## Wednesday 16 Sept AM2

**11:02** SC WNG called to order by Chair P Kinney, Kinney Consulting

There were two presentations:

* High(er) data rate amendment for 15.4 by C Powell (15-15-655-00)
  + 2 Mb/s data rate that is simple to implement
  + what about 4g’s MR-OQPSK conflict? R: This is 2Mb/s
  + why is PAR so specific? R: want to limit the amendment to the simplest backward compatible solution
  + suggestion to take “MSK” out of PAR
  + isn’t this covered in the generic PHY? R: generic PHY doesn’t guarantee interoperability
  + presentational text of 8 – 10X doesn’t align with the PAR’s 2 Mb/s
  + Range? R: Will be reduced but still viable
  + Summary: Group is advocating elide the “minimum shift key (MSK)” and will move to approve PAR & CSD at this session’s closing plenary.
* India amendment for 15.4 by P Beecher (15-15-0734-00)
  + Plan is to prepare a PAR and CSD that will be presented at closing meeting for this session
  + Would this approach not use 6LoWPAN due to the note of “frame size supporting IPv6”? R: 6LoWPAN is not being precluded but the intention of this amendment would be to take the 15.4g FSK PHY and rebranding for this band
  + Question on presentation’s note of error detection R: no change is intended
  + Include MAC changes necessary to implement the PHY? Use IEs to implement the PHY R: channel access may need some MAC changes
  + Change to amending the existing channel plan to accommodate India