**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
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| Date Submitted | [16 March 2012] | |
| Source | [] [] [address] | Voice: [ ] Fax: [ ] E-mail: [ ] |
| Re: | [Task Group 802.15.4k Plenary Meeting in Waikoloa] | |
| Abstract | [Task Group 802.15.4k Minutes.] | |
| Purpose | [Official minutes of the Task Group Session | |
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**IEEE 802.15 Plenary Meeting – Session #77**

**Hilton Waikoloa Village, Waikoloa, Hawaii, USA**

**March 11-16, 2012**

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# Monday, 12 Mar 2012, 13:30 (PM1)

**13:33** Chair called meeting to order.

Chair presented opening report 15-12-0126-00-004k:

Chair displayed the IEEE-SA slides #1 through #4 of the IEEE patent policy.

Chair asked if anyone in the meeting was personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance? There were no responses.

**Key Discussion Points**

* Draft text from document 15-12-089-02-004k will be reviewed, discussion, and text changes will be proposed

**Agenda for Waikoloa**

Chair presented the agenda 15-12-0092-02. Discussion ensued as to subgroup leads/subeditors. Group consensus was that David Howard is the DSSS subgroup lead, Cristina Seibert is the FSK lead, Ben Rolfe is the MAC lead, Qing Li is the Coexistence lead, and P Kinney will be the temporary General/Annex lead. Motion to *approve the agenda (15-12-0092-03)* was made by Ben Rolfe and seconded by Seong-Soon Joo. Upon neither discussion nor objection the motion carries by unanimous consent.

**Approval of Previous Minutes**

Motion to *approve the minutes from Jacksonville 15-12-0081-00* was made by Steve Jillings and seconded by David Howard. Upon neither discussion nor objection the motion carries by unanimous consent.

**14:40** Presentation on Radio Specification Analysis of Draft FSK PHY by Steve Jillings (15-12-0014-03)

Discussion**:**

* Since PHY for EU 169 MHz band is no different that that in TG4g, do not include it in TG4k
* Discussion on dynamic data rate capability

**15:10**  Meeting recessed until Monday PM1

# Monday, 12 Mar 2012, 16:00 (PM2)

**16:08 Korean Regulation for 917 MHz** by Tae-Joon Park (15-12-0122-00)

* 917-923 MHz, 2 MHz channels (slide 6) transmit power limitation: first two slots are 3 mw and the third is 10 mw, center frequencies are specified by the regulation
* clarification made for 200 KHz channels on slide 3 and 600 kHz channels on slide 5

**16:20 DSSS Draft review**

David Howard led the review of the DSSS sections of the draft document (15-12-0089-02)

* M Al Ameen agreed to send information on a 32-bit preamble
* Cristina Seibert agreed to send information on preamble range
* As per Tae-Joon Park’s presentation, it was agreed to remove the 400-470 MHz band for S Korea
* Wilson Wang agreed to fill in the TBDs for the 470-510 MHz and 779-787 MHz Chinese bands
* 902-928 MHz band for NA/Australia, it was agreed to remove any chip rates beyond 1000 kchips/sec
* agreed to add column to Table 73 to show occupied bandwidth
* Shimada/Kato to provide chip rates and other appropriate information for the 920-928 MHz Japan band
* M Al Ameen/Tae-Joon Park to propose characteristics for 917-923.5 MHz Korea band
* Shu Kato to propose a lower chip rate for the 2450 MHz band to 1000/2000 kchips/sec
* Tech editor to change 19.1.2.3 to refer to TG4g 16.3.2.6 instead of 802.11 and delete text describing this FEC
* D Howard to enhance text describing the 19.1.2.4 interleaver subclause
* Delete figure 65 Gold code generator
* M Al Ameen to update Fig 61to include OVSF code generator 19.1.2.6.2
* Remove figure 66
* in 19.1.2.7.1 change “table TBD” to Table 73
* in 19.1.2.7.1 and 19.1.2.7.2 delete all pulse shaping references e.g. “The pulse shape is described in 11.2.5.1”

**17:45** meeting recessed until Tuesday AM1

# Tuesday, 13 Mar 2012, 8:00 (AM1)

**8:15** **FSK draft review**

Cristina Seibert led the review of the FSK portions of draft 15-12-0089-02.

* Do we really need 2047 octet frames? Seems like an overly large number. Comment made that, due to included fragmentation, this requirement merely imposes a memory requirement on a device.
* C Seibert will devise a channel page for LECIM
* Definition of GFSK or FSK? The standard (i.e. a/b/c/d/e/f/g/h/i and maybe j) already includes use of these terms

**8:59** Cristina Seibert presented a “proposal on FSK PHY Interleaver” (15-12-0134-00)

* Need to add a bit in the overhead to indicate whether PHR format (e.g. FEC) is included?
  + FEC is a provisioned element that is known prior to transmission, hence no bit is required
  + Limit traceback to short header would allow for a simpler receiver
* Is the complexity warranted to save one bit? Should we restrict PHY to always 2 octets?
* Performance of this proposal in an AWGN environment? Reply that interleaving is meant to assist in a burst error environment and will not help AWGN situations, i.e. don’t enable in purely AWGN environments.
* What is the burst error duration? This would impact the interleaver’s performance. Reply that a longer interleaver would involve adding additional pad bit.
* Convolutional codes often include an interleaver.
* Viterbi is non-trivial. Reply: yes, but the PHR is its own block.
* Use the SFD to signal a long or short PHR? Reply: yes, but this approach has concerns as well.
* Conclusion: the current scheme is flawed, this proposal is one way to correct this flaw.
* It was agreed that the process for this issue will be that:
  + C Seibert to send out a proposal that will resolve the current approach’s flaws to TG4k via the reflector
  + Any member may respond to this email with alternate proposals before AM1, Thursday, 15 March
  + During AM1, Thursday, a discussion will be held on the proposal(s) and the group’s consensus will be taken as to the resolution that will be adopted
  + Intended result is that all FSK changes to the draft text will be defined by end of AM1, Thursday

**9:40** Chair recessed until AM2

# Tuesday, 13 Mar 2012, 10:30 (AM2)

**10:40** **Review MAC Fragmentation text**

Meeting called to order. Ben Rolfe led the discussion on the fragmentation mechanism (15-12-0140-00).

* Request made that the fragmentation engine allows up to 128 fragments versus the 32/64 proposed
* Argument made that each device should/shall support a minimum message size of 512 octets
* Concern that the fragmentation ID is not general enough to handle non-4k applications such as KMP, it was agreed to discuss this aspect offline
* Can transaction requests be denied? Yes Can ongoing transactions be aborted? Yes
* Action Items
  + Seong-Soon Joo is responsible for the resolution of RSLN TBDs
  + Delete TBD in 5.1.7
  + Remove 5.1.13
  + Rolfe/Kinney responsible for fragment retry count or timeout for full transaction
  + Youcy Yang responsible for 5.3.12.2 and 5.3.12.3
  + B Rolfe is responsible for I-Ackspan TBD
  + Delete change to Table 51
  + Jussi Haapola responsible priority PIB attributes for non-DSME/non-RSLN modes
  + B Zhao responsible for *macCSNeffectTimeout* TBD
  + B Rolfe responsible for *macIACKTtimeout*
  + B Rolfe responsible for *macRITEnabled*

**12:30** Chair recessed until PM1

# Tuesday, 13 Mar 2012, 13:30 (PM1)

**13:40** **Review other MAC text**

Wun-Cheol Jeong presented “Extended DSME MAC for LECIM” (15-12-0141-01)

* Modifying the allocation order alleviates need to change MO
* Question asked as to is this proposal within the scope of TG4k
  + Significant discussion ensued as to the justification that the proposal fulfills the PAR’s scope (i.e. or is this scope creep?)
  + A straw poll was conducted to show the group’s support for the effort on this proposal to continue, i.e. those in the room that support this proposal effort to continue to the next point of defining the specific text necessary to implement the proposal: 19/0/8, Wun-Cheol is asked to continue to develop the proposal.
* Action Item:
  + Wun-Cheol Jeong to define the specific text necessary for the draft to support the Extended DSME MAC for LECIM proposal by AM2 Thursday, 15 March.

**15:05** Chair recessed until PM2

# Tuesday, 13 Mar 2011, 16:00 (PM2)

**16:15** **Review General clause and Annex text**

Ben Rolfe led the group on the text changes to 802.15.4-2011 proposed for TG4k.

* 4.4.2 text will be moved to the informative annex P.1.1
* in 4.5.1.1 exchange the references 4.5.1.5 and 4.5.1.2, change 5.2.4.3.4 to 5.2.4.24
* start subclause 4.5.1.6 with the third paragraph of 4.5.1.5
* in 4.5.4.1a change xref to 5.1.1.4.5
* in 4.5.4.2 change xref to 5.1.1.4.5
* In 4.5.4.1a delete all sentences after the 2nd sentence
* delete 1st sentence of 4.5.4.2 “When priority channel access…
* rewrite 4.5.4.2a to reduce text verbosity and enhance clarity
* 4.5.4.2a move fragment and fragment sequence definitions to clause 3
* figure 6a delete terms “PHY SAP” and “802.15.4k ELDR PHY”
* 4.5.4.3.1 delete “incremental acknowledge” from the first sentence
* change 4.5.4.3.1 to read “and which fragments need to be retransmitted”
* 4.5.4.3.1 delete “~~The number of fragment status reports grouped into an I-ACK is controlled by the higher layer.~~ ”
* 4.5.4.3.2 change first xref to 5.4.2.3
* 4.5.4.3.2 change xref to IE definition to subclause stating this IE
* 4.5.4.4 delete 3rd sentence and change next sentence to “The FVS is described in 5.4.1.2”
* in 5.4 change fragment check sequence to FVS
* rewrite 4.5.4.6 to enhance clarity
* rewrite 4.5.5.3 to enhance clarity
* remove reference to Wikipedia in P.1, and rewrite following sentences to stand alone and that examples include
* change P.1.2 to refer to a document
* P.1.3the following assumptions and precepts…”
* P.1.3.1 commissioning parameters are not expected to change over the duration of the network

**17:45** Wun-Cheol Jeong presented Channel Hopping for DSME MAC Fragments (15-12-0150-00)

Action Item:

* Wun-Cheol will prepare text for Annex P

**18:00** Meeting recessed at comment CID244.

# Wednesday, 14 Mar 2012, 13:30 (PM1)

**13:40** **Review Coexistence document**

Chair called the meeting to order, Qing Li led the discussion.

* need to add additional bands for Japan
  + S Kato to provide text for the draft
* Comment made that coexistence needs to be a “living document” to allow for changes during the 802.15.4k development
* Need to include 802.22 in this analysis due to possible conflict with 434 MHz
* Need to cite all modulations within each standard
* Need parameters by 15 Mar to start coexistence modeling
* Difference between 4k analysis and that done for 4g? some differences in the parameters, also more bands such as 15.6, 15.4f, 802.22, etc.

**14:40** Meeting recessed by chair

# Wednesday, 14 Mar 2012, 16:00 (PM2)

**16:08** **Edit DSSS text**

Meeting called to order, David Howard led the effort to resolve TBDs and prepare instructions to the technical editor to amend the draft text.

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| --- | --- |
| M Al Ameen agreed to send information on a 32-bit preamble |  |
| Cristina Seibert agreed to send information on preamble range |  |
| As per Tae-Joon Park’s presentation, it was agreed to remove the 400-470 MHz band for S Korea | done |
| Wilson Wang agreed to fill in the TBDs for the 470-510 MHz and 779-787 MHz Chinese bands | done |
| 902-928 MHz band for NA/Australia, it was agreed to remove any chip rates beyond 1000 kchips/sec | done |
| agreed to add column to Table 73 to show occupied bandwidth | done |
| Shimada/Kato to provide chip rates and other appropriate information for the 920-928 MHz Japan band | Scheduled for Thursday PM1 |
| M Al Ameen/Tae-Joon Park to propose characteristics for 917-923.5 MHz Korea band | chip rate entry remains to be done |
| Shu Kato to propose a lower chip rate for the 2450 MHz band to 1000/2000 kchips/sec | Scheduled for Thursday PM1 |
| Tech editor to change 19.1.2.3 to refer to TG4g 16.3.2.6 instead of 802.11 and delete text describing this FEC |  |
| D Howard to enhance text describing the 19.1.2.4 interleaver subclause | Ongoing, plan is to finish by end of 15 March |
| Delete figure 65 Gold code generator |  |
| M Al Ameen to update Fig 61to include OVSF code generator 19.1.2.6.2 |  |
| Remove figure 66 |  |
| in 19.1.2.7.1 change “table TBD” to Table 73 |  |
| in 19.1.2.7.1 and 19.1.2.7.2 delete all pulse shaping references e.g. “The pulse shape is described in 11.2.5.1” |  |
| S Jillings to propose additional channels in the 863-870 band by PM1 Thursday |  |
| Wilson - 32-bit preamble be generated and its properties verified |  |

* Why only 3 channels at 868 MHz rather than using the whole band? Request for recommendation resulted in this configuration.

**17:22** Meeting recessed by chair at CID 570

# Thursday, 15 Mar 2012, 8:00 (AM1)

**8:25** **Edit FSK text**

Meeting called to order.

C Seibert led discussion on FSK issues and TBDs**.**

Changes to the interleaver were discussed, instructions to the tech editor for the modified interleaver are captured in 15-12-0134-00.

C Seibert discussed other miscellaneous changes that will be forwarded to the editor.

Channel page 9 will be assigned for LECIM given approval by J Gilb, 802.15 WG editor.

C Seibert announced that a managed IE will be assigned for LECIM.

**8:40** Proposals for Amendments to the FSK PHY of LECIM draft 15-12-89-02 (15-12-151-02) presented by S Jillings. The following action items were derived from this presentation:

1. Add PHY bands for Aus/NZ
2. Delete 2.4 GHz band from FSK PHY
3. Enhance sensitivity definition
4. Add ACR and AACR and CCR and blocking requirements
5. Enhance modulation description
6. Add MAC mechanism for adaptive data rate

PHY bands for Aus/NZ

* No opposition to adding these PHY bands
* S Jillings – define channel frequency assignment

Delete 2.4 GHz band from FSK/PHY

Enhance sensitivity definition (subclause 19.2.4.6)

* No opposition to enhancing sensitivity definition
* Antenna gain was discussed as a component of the 120 dB path loss requirement
* Significant discussion ensued as to the need for a sensitivity requirement
* Wait on this change until consensus is reached, to be discussed on first conference call after this session

**10:05** meeting recessed until Thursday AM2

# Thursday, 15 Mar 2012, 10:30 (AM2)

**11:00** **Edit MAC fragmentation**

Meeting called to order by chair.

B Rolfe led the review of the status of MAC TBDs**.**

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| --- | --- |
| Seong-Soon Joo is responsible for the resolution of RSLN TBDs | tbd |
| Delete TBD in 5.1.7 |  |
| Remove 5.1.13 |  |
| Rolfe/Kinney responsible for fragment retry count or timeout for full transaction | tbd |
| Youcy Yang responsible for 5.3.12.2 and 5.3.12.3 | tbd |
| B Rolfe is responsible for I-Ackspan TBD | tbd |
| Delete change to Table 51 |  |
| Jussi Haapola responsible priority PIB attributes for non-DSME/non-RSLN modes | done |
| B Zhao responsible for *macCSNeffectTimeout* TBD | tbd |
| B Rolfe responsible for *macIACKTtimeout* | tbd |
| B Rolfe responsible for *macRITEnabled* | done |
| Wun-Cheol Jeong to define the specific text necessary for the draft to support the Extended DSME MAC for LECIM proposal | tbd: defaults |
|  |  |

**11:47** meeting recessed until Thursday PM1

# Thursday, 15 Mar 2012, 13:30 (PM1)

**14:30** **Edit Clause 4, Annex P, Coexistence**

Chair called meeting to order.

S Jillings presented Proposals for Amendments to the DSSS PHY of LECIM draft (15-12-0176-00)

* Five additional channels for 863-870 MHz band (subclause 19.1.2)
* Although there was no opposition to this change, D Howard requested that C Seibert review this presentation before adding these channels to the draft

C Seibert reopened discussion on the FSK sensitivity continuing on from AM1

* Change subclause 19.2.4.6 “under the conditions specified in 8.1.7, a compliant device shall be capable of achieving a sensitivity of Ptx-120 where Ptx is the maximum transmit power permitted by regulatory requirements in the band of operation, in units dBm.”

Chair led the group in reviewing the draft’s status and planning future activities as documented in the TG4k closing report, doc 15-12-0181-00.

Shu Kato presented Proposed 900 MHz and 430 MHz Channelization for IEEE802.15.4k (15-12-0189-00)

* It was agreed that this presentation should be studied and discussed on the next conference call

**16:30** Session adjourned