IEEE P802.11  
Wireless LANs

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| IEEE 802.11bd Task Group Meeting Minutes – March 2019 | | | | |
| Date: 2019-03-14 | | | | |
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Abstract

Minutes for the IEEE 802.11bd task group meeting starting March 11, 2019.

**Minutes**

*For minutes of the Monday AM1 ad-hoc session please see* [*IEEE 802.11-19/0299*](https://mentor.ieee.org/802.11/dcn/19/11-19-0299)

**Tuesday PM1**

1. Chair convened the meeting at 1:30pm. Approx. 75 participants in the room.
2. Agenda displayed is 0237r2
3. No objection to adopt this agenda for this meeting
4. Motion on past meeting minutes:
   1. Motion to approve the TGbd meeting minutes:
   2. Move: James Lepp
   3. Second: Bahar Sadeghi
   4. No objection to passing unanimously
5. Motion on selection procedure document:
   1. Move to accept 11-19/0030r6 as TGbd’s selection procedure document
   2. Moved: Bahar Sadeghi
   3. Second: Yonggang Fang
   4. No objection to passing unanimously
6. Presentation of the Functional Requirements Document (FRD) skeleton 11-19/0440r0
   1. This is a member contribution with plan to create a task group document maintained by the editor if accepted.
   2. No discussion.
   3. Author will bring a motion next session adopt this skeleton as the first version of the FRD
7. Presentation of the Specification Framework Document (SFD) 11-19/0441r0
   1. This is a member contribution with plan to create a task group document maintained by the editor if accepted.
   2. No discussion.
   3. Author will bring a motion next session to adopt this skeleton as the first version of the FRD
8. Chair calls for members interested in drafting the liaison response to IEEE 1609 to work with J. Levy during the meetings this week. A review of the first draft of this document will occur Tuesday PM3 session.
9. Presentation of 11-19/0311r0
   1. Discussion
   2. Comment on oversampling
   3. Comment on channel models. Matlabs *RicianChannel* model vs. pure doppler.
   4. Comment on using channel models as close to C2C channel models as possible.
   5. Comment on the k-factor in the github code the author linked to in his presentation
10. Presentation of 11-19/0310r0
    1. Discussion
    2. Comment about he latency used in the DACE simulation (slide 8). 24 bits. Prediction or averaging? No prediction.
    3. Comment on larger buffer needed for DACE. Concern this is too complex. Further discuss complexity vs performance and what complexity is acceptable.
    4. Comment on FEC. LDPC performance on 11p may be degraded, where LDPC performance on 11n or 11ac may show different results.
    5. Comment on delay affecting performance
    6. Comment on LDPC throughput gain with low SNR
    7. Suggestion to compare latency design of the DACE in this presentation with 11-19/0016
    8. Comment that point of the presentation is to compare apples to apples, not to make a specific conclusion. We can do better job at comparing simulations with each other and accounting for overhead. Performance should be measured as throughput. V2X is a lot of entities communicating, not a central node scheduling communication.
    9. Comment that members should use the same channel models so we can better compare results.
    10. Comment that some of the items compared in the presentation can be combined in a solution, not mutually exclusive.
11. Chair asks if there is any objection to amending the agenda to follow with a presentation on the same subject as the previous presentation.
12. Presentation 11-19/0371r0
    1. Discussion about whether the proposed channel models are still valid for the 500km/h.
13. Presentation 11-19/0319r0
    1. Comment on what future applications will look like. As stated in the presentation it will continue to be a diverse distribution of sizes and timing. Likely larger messages.
14. Presentation 11-19/0320r0
    1. Discussion
    2. Disagreement with assertion that adjacent channel is “not usable”. With less than 10% packet loss it can still be used
    3. Simulation with 2 vehicles is different than with 25 as in the presentation. Another vehicle can use the time to transmit so network efficiency isn’t as bad as the 2 vehicle case.
15. Chair reviewed the agenda for the next session
16. Chair recessed at 3:31pm

**Tuesday PM3**

1. Chair convened the meeting at 7:35pm. Approx. 35 participants in the room.
2. Agenda displayed is 11-19/0237r2
3. Chair called for potentially essential patents
4. No response
5. Chair presented the agenda for the session. No objection to adopting this agenda for the meeting.
6. Motion on FRD
   1. Move to accept 11-19/0440r0 as the baseline of TGbd’s Functional Requirement Document.
   2. Moved Bahar
   3. Second Rui Cao
   4. No objection to adopt unanimously
7. Motion on SFD
   1. Move to accept 11-19/0441r0 as the baseline of TGbd’s Specification Framework Document.
   2. Moved Bahar
   3. Second Rui Cao
   4. Passed unanimously
8. Presentation 11-19/0437r0
   1. Discussion
   2. Call for a volunteer to be a liaison person between IEEE 802 WG and IEEE 1609 WG
   3. John Kenney volunteers
   4. No objections from the membership to appointing John Kenney
   5. Chair will appoint John as liaison, pending confirmation from the Working Group.
   6. Strawman date for joint 1609/802.11bd teleconference in the presentation was May 1 8pm EDT.
      1. Discussion
      2. Comment: May 1 is a holiday in many countries
      3. Comment: Next 1609 meeting is April 23-24
      4. Suggestion to choose May 2, 8pm. Possible it doesn’t work, and they’ll inform us, but better to suggest a date than not to.
      5. Document will be updated with editorial fixes and brought for motion on Thursday.
9. Presentation 11-19/0332r0
   1. Discussion
   2. Question about how 20MHz fits with existing deployed 10MHz systems
   3. Question about adjacent channel interference differences between 10MHz mask and 20MHz mask
   4. Suggestion to show throughput in addition to PER in simulation results (slide 14)
   5. Comment that latency/delay also matters as a performance factor.
   6. Suggestion to use the 10MHz out of band emission mask if 20MHz is used so that ajecent channel impact is no worse.
   7. Straw polls deferred to a fugure session
10. Presentation 11-19/0342r0
    1. Discussion
    2. Discussion about 20MHz requiring both 10MHz channels to be free to use
    3. Dicussion about adjacent channel interference differences between single 10MHz, two 10MHz’s or 20MHz transmissions.
    4. Discussion about regulatory situation in Europe. Of 20MHz channels and of maximum duty cycle operation maximums.
    5. Discussion about defining an 802.11bd mask for out of band emissions
11. Presentation 332r0
    1. Slide 16 - Strawpoll 1
    2. Suggestion to include both 10MHz and 20MHz
    3. Editorial suggestions
    4. SP1: Do you agree to add the following to section 3 in 11bd SFD? -11bd supports the 10MHz bandwidth PPDUs. -11bd supports the 20MHz bandwidth PPDUs.
    5. Y 24/N 0/A 13
    6. Slide 17 - Strawpoll 2
    7. Editorial suggestions
    8. Suggestion to only include preamble in the strawpoll, don’t include the new parts shown in the figure.
    9. SP2: Do you agree to add the following to section 3 in the 11bd SFD? -11bd PPDU format includes STF, LTF and SIG, same as 10MHz 11p PPDU -duplicate 10MHz STF, LTF and SIG are used for 20MHz PPDU (figure in slides)
    10. Y 23/N 0/A 14
    11. Slide 18 – Strawpoll 3
    12. Comment its too early to answer this question as the group has to have more discussion on this topic.
    13. Straw Poll deferred
    14. Slide 19 – Strawpoll 4
    15. Do you agree to use the midamble fo mitigation of the Doppler impact in 11bd?
    16. Y 25/N 0/A 15
12. Chair recessed at 9:30pm.

**Thursday AM2**

1. Chair brought the meeting to order at 10:30am. Approx 50 participants in the room.
2. Agenda displayed is 11-19/0237r3
3. Call for potentially essential patents. No response.
4. Discussion on agenda
   1. Comment to add FRD overview before the technical submissions this session
   2. Comment to change order of doc 346 and 341 on the agenda list of technical submissions
5. Motion to adopt the agenda as amended on the screen. No objections
6. Presentation 11-19/0437r2
   1. Presenter highlighted changes in the document since last version
7. Motion on the IEEE 1609 liaison:
   1. Move to recommend the IEEE 802.11 Working Group to send 11-19/0437r3 to IEEE VT/ITS 1609 WG and CC as addressed and grant the Working Group chair editorial privilege
   2. Moved Joseph Levy
   3. Second John Kenney
   4. Y 30/N 0/A 1 Motion passes
8. Presentation 11-19/0511r0
   1. This is a joint contribution to add requirements based on the PAR to the FRD
   2. Comment to add positioning as there is a requirement for at least one positioning mechanism in the PAR
   3. Comment to qualify the R5 statement with “in the 5.9GHz band”.
   4. Editorial comment on the term “devices communicating outside the context of a BSS”.
9. Presentation 11-19/0346r0
   1. Comment on the gains in SNR vs the gains in throughput
   2. Comment that this simulation isn’t LDPC only, but LDPC plus different tone mapping
   3. Comment that some of the factors simulated are implementation-specific details – channel tracking
   4. Comment: This presentation aims to show coding gain alone.
   5. Comment that simulation was a fixed 300 bytes. For LDPC efficiency depends on padding to meet codeword sizes.
   6. Comment that codeword used in simulation is “1944” from 11n.
   7. Comment that results are similar to results C2C simulated 2 years ago. Confirm that work.
   8. Comment that in 11n there are different codewords for different MCS
   9. Strawpoll 1
   10. Do you agree to add the following text into Section 3 of SFD? “11bd amendment shall support LDPC”
   11. Y 36/N 0/A 9
   12. Strawpoll 2
   13. Do you agree to add the following text into Section 3 of SFD? “11bd amendment shall support LDPC code, with the same coding method as defined in IEEE 802.11-2012 section 19.3.11.7 (LDPC Codes)”
   14. Y 30/N 2/A 11
10. Presentation 11-19/0343r0
    1. Question about BCC vs LDPC performance
    2. Comment that a solution is also needed for enhancing the preamble.
    3. Comment about comparing results with 11p baseline
    4. Question about frequency domain spreading
    5. Comment that this targets range extension, rate is lower and efficiency is lower
    6. Comment on performance compared to just increasing power
    7. Comment about maturity of DCM
    8. Strawpoll 1 (11-19/0343r0 slide 12)
    9. Y 25/N 0/A 20
11. Presentation 0341r0
    1. Comment on PPDU formats
    2. This is on legacy coexistence – new vs old, not what the eventual 11bd PPDU or PPDUs are formatted.
    3. Comment on long age of vehicles
    4. Comment on whether 802.11 would be the place to specify when to use what format to transmit a particular format 11p or 11bd. Comment that the rules for which PPDU format to use are application specific.
    5. Comment this standard should provide the hooks and tools so that interoperability can be achieved, not specify when they are used.
    6. Comment about passing the indicator that a legacy PPDU has been detected to upper layer. Need this capability, but the decision to transmit format is up to the application. Need an above the MAC interface.
    7. Question about simulation on slide 11. Still instances but random locations. Not a motion simulation
    8. Comment on slide 10 that merging into traffic is a critical collision avoidance case. Response that this is the merge into radio range, not the highway
12. Chair announced that motions will be taken in the next session PM2 today.
13. Chair recessed at 12:30pm.

**Thursday PM2**

1. Chair brought the meeting to order at 4:00pm. Approx. 60 participants in the room.
2. Agenda displayed in 11-19/0237r3
3. Chair calls for potentially essential patents. No response.
4. Agenda amended to do the motions after presentation of 11-19/0341 finishes.
5. No objections to changing the agenda
6. Presentation 11-19/0341r0
   1. Presenter resumes after time ran out in the previous session
   2. Discussion
   3. Comment on SP1 Suggestion to change the term switch to transmit
   4. Comment on SP2 Suggestion to remove the term interval
   5. Comments on the difference between SP1 and SP2.
   6. Comment that the proposal in SP2 is too strict and doesn’t enable 11bd-only applications in the future.
   7. SP1 Y 36/N 0/A 8
   8. More discussion about the wording of strawpoll 2
   9. SP2 Y 14/N 9/A 24
   10. Comment on SP3 that indicator may or may not be needed for both broadcast/unicast frames
   11. SP3 Y 29/N 0/A 16
7. Motion section of the agenda
8. Presentation 802.11-19/0511r1
   1. Highlighting changes since the last meeting
9. Motion 1:
   1. Move to update the 11bd FRD according to the changes captured in document 11-19/0511r1.
   2. Moved: Bahar Sadeghi
   3. Seconded: Joe Levy
   4. Approved by unanimous consent. Motion passes
10. Motion 2:
    1. Move to add the following text to section 3 in 11bd SFD.
    2. “ 11bd PPDU format includes L-STF, L-LTF, and L-SIG fields as shown in Figure 3.x
    3. L-STF means short training field of 11p.
    4. L-LTF means long training field of 11p.
    5. L-SIG means signal field of 11p.”
    6. *<figure 3.1 displayed in 0414r0 slide 5>*
    7. Moved: Dongguk Lim
    8. Seconded: Hongyuan Zhang
    9. Y 33/N 0/A 9 Motion Passes
11. Motion 3:
    1. Move to add the following text to section 3 in 11bd SFD.
    2. “11bd supports the 10MHz bandwidth PPDUs.
    3. 11bd supports the 20MHz bandwidth PPDUs. ”
    4. Mover: Dongguk Lim
    5. Seconded Hongyan Zhang
    6. Passed unanimously
12. Motion 4:
    1. Move to add the following text to section 3 in 11bd SFD.
    2. “In 20MHz bandwidth, L-STF, L-LTF, and L-SIG for 10MHz PPDU are duplicated as shown in the figure below.”
    3. *<figure displayed in 0514r0 slide 7>*
    4. Mover: Dongguk Lim
    5. Second: Hongyuan Zhang
    6. Y 25 /N 0/A 19 Motion Passes
13. Motion 5:
    1. Move to add the following text into Section 3 of SFD
    2. “11bd amendment shall support LDPC”
    3. Mover: Prashant Sharma
    4. Second: Hongyuan Zhang
    5. No objection Motion Passes
14. Motion 6:
15. Comment to change “NGV” to “11bd” in the motion text displayed.
    1. Move to add the following text into Section 3 of SFD
    2. “An 11bd STA shall be capable of the following operations:
    3. To decode 11p PPDUs with TBD receive sensitivity threshold (TBD value is -85dBm or lower).
    4. To transmit PPDU format up on request from upper layer, the PPDU format can be either 11p PPDU or 11bd PPDU.”
    5. Mover: Rui Cao
    6. Second: Hongyuan Zhang
    7. No discussion
    8. Y 27/N 0/A 14 Motion Passes
16. Motion 7:
    1. Move to add the following text into Section 3 of SFD
    2. “An NGV STA shall indicate the NGV capability in MAC level, when transmitting an 11p PPDU”
    3. Mover: Rui Cao
    4. Second: Hongyuan Zhang
    5. No objection Motion Passes
17. Presentation 11-19/0237r3 slide 26 Timeline review.
    1. No plan to change the timeline at this meeting
    2. No discussion
18. Teleconference Plan (each scheduled for 2 hrs)
    1. Mar 26 10am EDT
    2. Apr 9 6pm EDT
    3. Apr 23 10am EDT
    4. May 7 6pm EDT
    5. May 21 10am EDT
    6. Even if you have a posted submission not presented this f2f meeting, please respond to the email call for teleconference agenda items. It is also possible for presenters to wait for the next f2f if they choose.
19. Presentation 11-19/0364r0
    1. Discussion:
    2. Good to consider both the long-range noise limited situation, but also the dense environment interference limited situation
    3. Don’t look just at SNR, but also at throughput
    4. Comment that we already decided on LDPC case, so future analysis would be good to consider LDPC coding
    5. Question about interleaver between inner and outer coding – this is due to legacy compatibility
    6. Comment performance would be different if interleaving would be applied
    7. Question: What length of codeword is used in the simulation
    8. Comment see reference 2, it was 300 bytes
    9. Comment that 11bd/NGV should challenge ourselves to improve the more challenging RF situations
20. Presentation 802.11-19/0365r0
    1. Comment on GNSS accuracy
    2. Comments on use cases
21. Presentation of closing report 802.11-19/0515r0
22. No Discussion
23. Chair adjourned at 5:57pm.

**Next Meetings of IEEE 802.11bd Task Group:**

Teleconferences:

Mar

Apr

May

Face to face:

Grand Hyatt Atlanta in Buckhead, Atlanta, Georgia, USA, May 13, 2019

**Notes:**

Document numbers referenced (e.g. 802.11-19/0000r0) are available on IEEE Mentor: <https://mentor.ieee.org/802.11/documents>