IEEE P802.11  
Wireless LANs

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| IEEE 802.11bd Task Group Meeting Minutes – May 2019 | | | | |
| Date: 2019-05-16 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| James Lepp | BlackBerry | 1001 Farrar Road, Ottawa, Canada |  | jlepp@blackberry.com |
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Abstract

Minutes for the IEEE 802.11bd task group meeting starting May 13, 2019.

**Minutes**

**Monday PM3**

1. Chair convened the meeting at 7:30pm. Approx. 50 participants in the room.
2. Agenda displayed is 802.11-19/0595r2.
3. Chair read patent policy slides and called for potentially essential patents.
4. No response to the call for patents.
5. Chair read rules and procedures slides.
6. **Agenda**
   1. Chair presented the agenda 802.11-19/0595r2
   2. Discussion on the agenda
   3. No discussion
   4. Minor comments on a duplicate entry in the list of presentations
   5. Agenda is accepted by unanimous consent.
7. **Minutes**
   1. Motion: Approve the following minutes for TGbd March meeting and TCs before May meeting: 802.11-19/0300r0 and 802.11-19/0569r2
   2. Moved: James Lepp
   3. Second: Joe Levy
   4. Motion passed unanimously
8. **Liaisons**
   1. List of 4 liaisons presented on screen
   2. No volunteers for *Wi-Fi Alliance* or *SAE International* liaisons at this time
   3. Bo will present a response to *ITU-T CITS*
   4. James will present briefly the liaison from *ITU-T FG-VM*
9. Presentation 802.11-19/0843r0
   1. Author presented the liaison response to 802.11-19/0636r0
   2. Discussion
   3. Typos and spelling were corrected
   4. Move to adopt the content in 11-19/0843r0 for IEEE 802.11 WG’s approval to send to ITU-T CITS and grant the 802.11 WG chair editorial privilege.
   5. Moved Dongguk Lim
   6. Second: Rui yang
   7. Y33/N0/A2
10. Liaison 802.11-19/0852r0
    1. Brief presentation of the liaison and the attached document (use case document)
    2. Presenter highlighted the instructions to get involved
    3. Presenter briefly showed Figure 1: architecture for context
11. Presentation: email from 802.18 chair about 5.9GHz activities
    1. <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00069.html>
    2. Presenter invited members to attend 802.18 in Tuesday AM2 if they are interested in this discussion
    3. Comment: For more context members may remember what we contributed in the St. Louis meeting on this topic. Particularly fairness, coexistence and backwards compatibility. 802.18 is handling the interface to the FCC for this activity
12. **Technical Presentations**
13. Presentation 802.11-19/0366r3 – Insun Jang
    1. Discussion:
    2. Discussion about fairness between 802.11bd and 802.11p.
    3. Comment about whether to have both 10MHz sub-parts of the 20MHz channel as primary and secondary (like 802.11n), or whether we need to treat both as primary channels in their sensitivity detection.
    4. Discussion about how to pick which of the two channels is primary and secondary if there is or isn’t dynamic channel width operations
    5. Discussion about using dynamic channel width, or fixed 10 or 20MHz.
    6. Strawpolls postponed until other 20MHz related presentations are discussed.
14. Presentation 802.11-19/0082r3 – Michael Fischer
    1. Comments on advantages and disadvantages of soft switch
    2. Discussion of the ranges of the intermediate states.
    3. Discussion about advantages and disadvantages of dual messages, soft combining gain and channel load loss.
    4. Comment that the CCA level is different for legacy and new modulation because the second part isn’t protected by an L-SIG. It will be treated as non-802.11 energy.
    5. Comment: Figure on slide 6 is missing a training field in the NGV PPDU, this needs to be added.
    6. Comment: If we accept that the rules for transmission can be set on a frame by frame basis, then this could be fine-tuned on an application basis and the need to do a general tech percentage isn’t needed.
    7. Comment: a soft switching capability could be more dimensional decision space
    8. Comment: don’t think that with hard switch can meet the use cases and the goals of the PAR.
    9. Comment: on slide 7, bit3 is called R4 and bit 4 is called R.
15. Chair recessed at 9:29pm

**Tuesday PM3**

1. Chair convened the meeting at 8:00pm. Approx. 40 participants in the room.
2. Agenda displayed is 11-19/0595r2
3. Presentation 802.11-19/0375r1
   1. Discussion:
   2. Discussion about AMSDU vs AMPDU types of aggregation.
   3. Comment that aggregation is effective even at low MCS
   4. Comment that there have been many studies on 802.11 aggregation mechanisms, but little work on broadcast modes aggregation. Could easily support unicast modes of OCB.
   5. Discussion about some use cases such as platooning and other future proofing
   6. Comment that burst mode could be used.
   7. Straw Poll 1:
      1. **Should 802.11bd consider frame aggregation?**
      2. **17 Yes/0 No/9 Abstain**
4. Presentation 802.11-19/0376r1
   1. Discussion:
   2. Comment about having only one MCS table vs multiple
   3. Comment about data rate and channel occupancy
5. Presentation 802.11-19/0349r1
   1. Discussion:
   2. Question: discussion about extra ½ slot time and NAV deferral.
   3. Comment: overlapping two concepts: extended duration field in unicast frame exchange to indicate capability, but this is about changing TXOP size.
   4. Discussion about block-ack and fixed frame length
   5. Comment: need a mechanism that is consistent
   6. Straw poll 1:
      1. **Do you support that the Duration/ID field in a group-addressed frame carry the information of whether the transmitter of the group-addressed frame is NGV device or 11p device?**
      2. Discussion:
      3. In the broadcast PPDU you’re using the different duration period as the indication?
      4. See slide 2
      5. **Y11/N0/A15**
   7. Straw Poll 2:
      1. **Do you support that the Duration/ID field in a unicast frame carry the information of whether the transmitter of the unicast frame is NGV device or 11p device?**
      2. Discussion:
      3. Comment: is this similar to another presentation later in the week?
      4. Comment: Need more information on why the mechanism can’t be the same for group-addressed and unicast. Not sure why you’re proposing two different solutions.
      5. **Y10/N0/A17**
   8. Comment: is this method extensible to future generations, or only useful to distinguish 11p and NGV?
   9. Comment: Yes
   10. Comment: there is a future presentation on that.
6. Presentation 802.11-19/0688r1
   1. Strawpoll 1:
      1. **Do you agree to add the following text into Section 3 of SFD? NGV devices shall support 256 QAM. The QAM constellation mapping is the same as in 21.3.10.9 (Constellation mapping)?**
      2. **Y21/N0/A9**
   2. Strawpoll 2:
      1. **Do you agree to add the following text into Section 3 of SFD? NGV devices shall support LDPC codes with the same code structure and coding methods as defined in 19.3.11.7 (LDPC Codes)”**
      2. **Y26/N0/A4**
   3. Discussion about wording of strawpoll 3
   4. Discussion about number of spatial streams in the DATA portion or other portions of the PPDU.
   5. Comment to limit this to just broadcast mode and not unicast mode
   6. Strawpoll 3:
      1. Do you agree that 11bd only supports single spatial stream PPDU when operating on OCB broadcast mode (for Section 3 of the SFD)?
      2. Y17/N0/A14
7. Presentation 802.11-19/0683r0
   1. Discussion:
   2. Discussion about impact of NGV PPDU having longer range than 802.11p PPDU.
   3. Question about rate adaptation
   4. Strawpoll shown:
      1. Do you support that: If the TXOP responder can only reach the TXOP holder by using the NGV PPDU, the NGV PPDU is used for the responding frame. Otherwise the 11p PPDU is used for the responding frame. The responding PPDU has the same BW as the soliciting PPDU. 20MHz responding PPDU will be duplicated if legacy PPDU is used.
   5. Further discussion about response being limited to a control frame or other type of frame.
8. Chair indicated that time is up, and this presentation will continue in PM2 session.
9. Chair recessed at 10:00am.

**Tuesday PM2**

1. Chair brought the meeting to order at 4pm. Approx. 45 participants in the room.
2. Agenda displayed is 11-19/0595r3
3. Chair informed the group that there are many presentations remaining and only 3 sessions. Asks that presenters limit themselves to 20 minutes
4. Chair suggests a change in the order of presentations, grouping numerology related presentations, then subsequently grouping mid-amble proposals
5. No objections to this change to the agenda
6. Presentation 802.11-19/0683r1
   1. Strawpoll:
      1. **Do you support that: If the TXOP responder can only reach the TXOP holder by using the NGV PPDU, the NGV PPDU is used for the responding frame. Otherwise the 11p PPDU is used for the responding frame. The responding PPDU has the same BW as the soliciting PPDU. If the bandwidth of the soliciting frame is 20MHz, the responder will transmit the responding frame in 11p duplicated PPDUs.**
      2. **Y10/N0/A19**
7. Presentation 802.11-19/0686r1 – Prashant Sharma
   1. Question about ways to ensure the out-of-band mask for 20MHz is the same as 10MHz.
   2. Comment: 40MHz half clocked doesn’t meet the mask. Need 10+10 or a new 20MHz with more complex digital filter. My analysis is that the 4% efficiency loss of 10+10 design is worth it compared to restricting filter requirement
   3. Comment that there is another way to do this. Will provide more information in future.
   4. Comment: 10+10 is the tone plan. Will discuss the mask later but intend to have the same roll-off as 10.
   5. Comment that implementer can implement 10+10 with two radios or with one radio.
   6. Strawpolls deferred until after other related presentations
8. Presentation 802.11-19/0739r2 – Dongguk Lim
   1. Discussion:
   2. Comment: two separate topics in the same presentation. Numerology, which matches fairly closely conclusion of previous presentation. Regarding preamble portion, it’s a bit early to decide this before other features are set such as single spatial stream, STBC, and other features.
   3. Comment: regarding STF we haven’t decided on spatial stream for both unicast and broadcast, so too early to decide
9. Presentation 802.11-19/0686r1
   1. Straw poll 1
      1. **Do you agree to add the following text into section 3 of SFD: 10MHz 11bd Data symbol shall use 11ac 20MHz OFDM numerology?**
      2. **Y19/N0/A12**
   2. Discussion about straw poll 2
      1. Do you agree to add the following text into section 3 of SFD? 10MHz 11bd Data symbol shall use 11bd 10MHz + 11bd 10MHz OFDM
   3. Comment: How did you come up with the mask in the slides?
   4. Comment: Change the poll to ask about only tone spacing only. Both options (40MHz 11ax downclocked and 10+10 are both the same tone spacing). Leave exact tone plan to next meeting.
   5. Comment: another strawpoll is the same as that suggestion
10. Presentation 0739r2
    1. Discussion about Straw Poll 5
    2. Comment this straw poll text is not clear. Concept of “half-clocked” is not defined. Need to specify whether you mean symbol duration or carrier spacing.
    3. Comment: half clocked is already defined in 802.11n
    4. Comment: then you need to change that text.
    5. Presenter briefly displayed 802.11md Draft 1.6 section 17.1.1
    6. Comment: There are still many different interpretations of the strawpoll text.
    7. Strawpoll 5:
       1. **Do you agree to add the following to section 3 in 11bd SFD? 11bd PPDU shall support the same subcarrier spacing in both 10MHz PPDU and 20MHz PPDU**
       2. **Y23/N0/A9**
    8. Discussion about Straw Poll 1
       1. Do you agree to add the following to section 3 in 11bd SFD: 1bd PPDU includes an NGV-Signal field for indication of transmission information?
    9. Question about what to call the repeated L-SIG in slide 4, it needs to be called something else.
    10. Comment to add to the strawpoll that the location of the NGV SIG field is TBD
    11. Straw Poll 1:
        1. **Do you agree to add the following to section 3 in 11bd SFD: 1bd PPDU includes an NGV-Signal field to indicate the transmission information? The location of NGV-SIG field is TBD.**
        2. **Y20/N0/A7**
    12. Straw poll 3:
        1. **Which option do you support for packet classification?**
        2. **Option 1: using NGV-SIG field**
        3. **Option 2: using repeated L-SIG**
        4. **Option 3: Need more information**
        5. Comment that it is still early to decide this
        6. **1:0/2:10/3:18**
11. Presentation 802.11-19/0684r0 – Prashant Sharma
    1. Question: why limit to only one of broadcast or unicast
    2. Discussion about fixed or varying midamble
    3. Request for packet error rates in addition to goodput graphs.
    4. Discussion about channel models.
    5. Comment: midamble period should be variable and indicated in the NGV-SIG field
    6. Comment: choose only one midamble for each MCS.
    7. Comment: consider designing midambles based on the speed of the vehicle.
    8. Comment: we could use the midamble period of 6 as it is good or best performance in most channel models. Should we choose only one midamble period for all MCS, then 6 is the best choice.
    9. Comment: its hard for the transmitter to know the channel its operating on, so its hard for the transmitter to make a choice if there is a flexible midamble period
    10. Comment: the higher layers do know more about the operation of the vehicle, for example the speed of the vehicle, and could set the midamble period to be used by the application. Can also have a default in case the upper layer doesn’t set it. It is a trade-off as midamble takes bits on the air and can affect medium usage.
    11. Comment: this flexible midamble idea may add complexity
    12. Comment: just showing SNR comparison is misleading. Eb/N0 is important to look at because it shows channel capacity issues.
12. Chair asked the task group if they support the chair asking for an additional meeting slot on Wednesday or Thursday afternoon
13. Group is in agreement, with a preference to not have it Thursday PM2.
14. Chair recessed at 5:56pm.

**Wednesday PM2**

1. Chair brought the meeting to order at 4:00pm. Approx. 40 participants in the room.
2. Agenda displayed is 11-19/0595r3
3. Chair informed the group that this session was added with the newly approve changes to the working group agenda at the mid-week plenary this morning
4. Chair informed the group that the plan is to run any motions members bring in AM2 on Thursday, the last session for the week.
5. No discussion from the floor
6. Revised agenda adopted
7. Presentation 802.11-19/0685r1 – Preshant Sharma
   1. Question: did you compare to 802.11p.
   2. Comment: not in this chart, but that was compared in previous presentation, where it was shown that the blue curve here is better than l1p.
   3. Question: have you checked lower midamble period without repetition. That might provide more insight.
   4. Comment: another presenter has a similar presentation and requesting to run his strawpolls first.
   5. Comment: a request from one individual that they want to defer strawpoll on LTF in midamble to next meeting, so they have more time to consult several companies on this issue.
8. Presentation 802.11-19/0740r1 – Dongguk Lim
   1. Discussion:
   2. Question about using midambles with BCC
   3. Comment that midamble may not always be present based on the length of the frame, on for example a short frame less than 10 symbols. Suggest to change strawpoll text.
   4. Other comment to clarify the text.
   5. Strawpoll 1:
      1. **Do you agree to add the followings into section 3 of the 11bd SFD? 11bd PPDU design shall support Midamble(s) in Data field. Midamble is composed by long training field, with design TBD. Midamble periodicity is TBD.**
      2. **Y27/N0/A3**
   6. Question: we saw several presentations that show the periodicity affects the performance of the system, what is your justification for restricting the design to only one?
   7. Comment: we can get the performance gain by using target PER.
   8. Comment: gain mainly comes from OCB broadcast traffic. Transmitter has no feedback on the conditions of the channel.
   9. Comment: disagree that the transmitter has no idea about the environment. Also disagree that it is very complex to include variable midamble periods
   10. Question: does the strawpoll mean a single period for all MCSs, or one per MCS?
   11. Comment: we only use the low MCS
   12. Comment that this strawpoll disagrees with the result of the previous strawpoll.
   13. Comment that BCC doesn’t need midambles
   14. Comment that there are elements missing to make this decision at this time.
   15. Comment that the use cases and channel models haven’t all been analysed enough to make this decision on midamble design. Need to collect more data.
   16. Strawpoll 2:
       1. **Do you agree to add the following into section 3 of 11bd SFD? 11bd only defines one midamble periodicity.**
       2. **Y5/N7/A13**
9. Presentation 802.11-19/0685r1 – Preshant Sharma
   1. Straw Poll 1: Do you agree that 11bd shall support compressed LTF in Midamble?
   2. Comment: still disagree with this strawpoll
   3. Comment: do you have simulation results to support this? Particularly based on number of spatial streams.
   4. Comment for broadcast 11bd will only support one spatial stream for broadcast at least
   5. Comment does it have to support this LTF for multiple spatial streams? This needs simulation.
   6. Comment: 802.11ax development of midamble wasn’t done with doppler channel models
   7. Discussion about what “shall support” intends in the strawpoll text
   8. Comment: intend that compressed and non-compressed are still up for discussion, just want to state that compressed is required.
      1. **Straw Poll 1: Do you agree that 11bd shall support compressed LTF in Midamble, at-least for single spatial stream?**
      2. **Y16/N2/A20**
10. Presentation 802.11-19/715r0 – Onn Haran
    1. Discussion:
    2. Discussion about 10MHz vs 20MHz in current and future deployments, as well as differing channelization in different regulatory domains.
    3. Comment about the 10MHz channels being contiguous or non-continuous
    4. Comment about the ability to dynamically transmit 10 or 20 based on condition of the channel is useful
    5. Discussion about the need for 1 or 2 radios to determine channel access
    6. Comment: agree with analysis of transmitter, but why restrict the receiver it could receive on 10 or 20 Mhz.
    7. Strawpoll #1:
       1. **Do you agree to add the following text into Section 3 of SFD? 802.11bd 20MHz channel shall have an option to be used as a whole, without transmitting or receiving in single 10MHz subchannel.**
       2. **Y2/N14/A17**
    8. Strawpoll 2:
       1. **Which of the scheme is preferred for 10MHz channel roles definition?**
       2. **1: Preconfigured roles: 1**
       3. **2: Dynamic roles: 11**
       4. **3: No roles: 6**
       5. **4: Abstain: 18**
11. Presentation 802.11-19/0807r1
    1. Discussion
    2. Comment for clarification. For each option in the presentation, one slide shows the success case, and the next slide shows the failure case.
    3. Question: you show when contention channel is busy, what happens when the extension channel is busy? It does not transmit. But alternatives can be discussed later.
    4. Comment: Have you considered channel bonding more generally?
    5. Comment: comparing to BSS, there is no common channel used by all STAs. The terminology for this scenario is different
    6. Comment: term “service channel” is already used in 1609.4, so please check your use of this term
    7. Comment that the use cases in US and EU do not have a concept of primary and secondary and all channels are equal.
12. Chair recessed at 6:00pm.

**Thursday AM1**

1. Chair brought the meeting to order at 8:01am. Approx. 50 participants in the room.
2. Agenda displayed is 11-19/0595r4
3. Agenda adopted with no comments or objections
4. Presentation 802.11-19/0276r3 – Michael Fischer
   1. Comment that we need to work out the details for the “number of stations detected during measurement…”. Is it the number of unique MAC addresses seen or something similar?
   2. Comment: why do we need to define all of the “magic” if it is already working today in DSRC devices. Need to be careful how we define or redefine things that are already working.
   3. Comment: we need to define the interface, but do we need to define the functionality behind the interface?
   4. Comment: how much information is really needed about traffic between two other stations?
   5. Comment: make clear privacy related information regarding this radio environment status vector content
   6. Comment: design proposed it to enable existing parameters and not override current 802.11
   7. Comment about providing this data for all 802.11, not just OCB.
   8. Comment: SAE and ETSI already are looking for this information. Similar but not the same. Idea is to provide the information in a consistent way at the 802.11bd vector.
   9. Comment: strawpolls are for information and our upcoming discussions with IEEE 1609, not ready to update the SFD at this point.
   10. Straw Poll 1:
       1. **Do you agree to add the following text into Section 3.2 of SFD?**
       2. **New parameters shall be defined for the MAC service primitives, for use at NGV stations:**
       3. **MA-UNITDATA.request (source address, destination address, routing information, data, priority, service class, radio environment request vector)**
       4. **MA-UNITDATA.indication (source address, destination address, routing information, data, reception status, priority, service class, radio environment status vector)**
       5. **MA-UNITDATA-STATUS.indication (source address, destination address, transmission status, provided priority, provided service class, radio environment status vector)**
       6. **Y3/N1/A22**
   11. Straw Poll 2:
       1. **Do you agree to add the following text into Section 3.2 of SFD?**
       2. **The elements of the Radio Environment Request Vector include:**
       3. **Transmission format (legacy/NGV, data rate/MCS, repetitions, etc.)**
       4. **Coding alternatives (BCC, LDPC, etc.)**
       5. **Spatial stream alternatives (MIMO, STBC, etc.)**
       6. **Aggregation alternatives**
       7. **PHY alternatives (band, channel, power level, etc.)**
       8. **Expiry time (time after which this MSDU is discarded if not transmitted)**
       9. **Y0/N0/A(all)**
   12. Straw Poll 4:
       1. **Do you agree to add the following text into Section 3.2 of SFD?**
       2. **The MLME SAP shall be extended with primitives**
       3. **MLME-AddressChange.request (MAC address)**
       4. **MLME-AddressChange.confirm (accepted, rejected)**
       5. **Y3/N0/A19**
5. Chair lead a short discussion about grouping several presentations on the topic of 20MHz
6. Presentation 802.11-19/0807r1
   1. Straw Poll 1:
      1. **Which option do you prefer for 20MHz channel access?**
      2. **1) Service Channel as Contention Channel (11n like access)**
      3. **2) Dual Contention Channels**
      4. **3) Dynamic Contention Channel for Channel Access**
      5. **4) None of the above**
      6. **1:0/2:0/3:6/4:21**
7. Presentation 802.11-19/0366r5
   1. Straw Poll 1:
      1. **Do you agree to support that 11bd device operating on 10MHz bandwidth and 11bd device operating on 20MHz bandwidth can coexist in a 20MHz channel? Note that the transmission of 11bd PPDU is possible only after guaranteeing that no 11p devices are detected.**
      2. Comment that this is a requirement of the PAR for coexistence, so the straw poll is not necessary
      3. **Y20/N0/A11**
   2. Strawpoll 2:
      1. **Do you agree to add the following text into 11bd SFD? To transmit 20MHz bandwidth PPDU, an 11bd STA shall operate on an OCB primary channel. OCB primary channel means a 10MHz channel that 11bd STAs first sense and access to transmit 20MHz bandwidth PPDU.**
      2. **Y8/N4/A20**
   3. Strawpoll 3:
      1. **Do you agree to add the following text into 11bd SFD? To transmit 20MHz bandwidth PPDU, an 11bd STA shall perform the following action: Transmit a 20 MHz PPDU on OCB primary channel and OCB secondary channel if OCB secondary channel was idle during a TBD interval immediately preceding the start of the TXOP with TBD sensitivity threshold. OCB secondary channel means the 10MHz channel as one of 20MHz channel except for the OCB primary channel**
      2. **Y6/N4/A20**
   4. Straw Poll 4:
      1. **Which option do you prefer?**
      2. **Option 1 (Dynamic bandwidth operation): An 11bd STA shall transmit a 10 MHz PPDU on OCB primary channel if OCB secondary channel was busy during a TBD interval immediately preceding the start of the TXOP with TBD sensitivity threshold**
      3. **Option 2 (Static bandwidth operation): An 11bd STA shall not transmit a 10 MHz PPDU on OCB primary channel if OCB secondary channel was busy during a TBD interval immediately preceding the start of the TXOP with TBD sensitivity threshold**
      4. **Option 3 None of them**
      5. **Option 4 Abstain**
      6. **1:6/2:1/3:7/4:17**
8. Presentation 802.11-19/0716r0
   1. Comment: should we define the threshold for in-channel instead of out-of-channel.
   2. Strawpoll:
      1. **Do you agree that 802.11bd shall include detector of adjacent channel reception?**
      2. Comment: we didn’t yet define the spectrum mask yet, and this is needed to design the adjacent channel detector.
      3. Comment: this strawpoll is about the general concept, specific values can be defined later.
      4. Comment: there is a mask today, don’t expect much change in 11bd.
      5. Comment: in your presentation you don’t distinguish if its above or below channel, just that it is present in either
      6. Question on why you detect adjacent channel
      7. Comment: to defer transmission if adjacent is busy
      8. Question: does this inhibit the backoff counters which are currently based entirely on in-channel
      9. **Y7/N1/A20**
9. Editor’s Presentation 802.11-19/0495r1 – Functional Requirements Document
   1. No changes since last meeting
10. Editor’s Presentation 802.11-19/0497r1 – Specification Framework Document
    1. Changes summarized and shown on screen
    2. No comments or discussion
    3. Editor announces that if members have any comments or concerns to contact her.
11. Presentation 802.11-19/0717r0
    1. Comment on broadcast ACK vs block ACK
    2. Question about how much information needs to be reported. Is it based on MAC address?
    3. Comment that this might apply more to CAM than BSM due to timing
    4. Comment this would be used by applications that transmit less often than 100ms
12. Chair recessed at 10am

**Thursday AM2**

1. Chair brought the meeting to order at 10:30am. Approx. 50 participants in the room.
2. Agenda displayed is 11-19/0595r4
3. Chair made call for potentially essential patents
4. No response
5. Presentation 802.11-19/0717r0
   1. **Strawpoll 1: Do you agree to add that 802.11bd shall facilitate enhanced reliability?**
   2. **Y13/N0/A21**
6. **Technical Motions**
7. Presentation 802.11-19/0514r3
   1. FRD&SFD Motion #8
      1. Move to add the following text to section 3 in 11bd SFD: “11bd shall support the same subcarrier spacing in both 10 MHz PPDU and 20MHz PPDU”
      2. Moved Dongguk Lim
      3. Second Hongyuan Zhang
      4. Passed unanimously
8. FRD&SFD Motion #9
   1. Move to add the following text to section 3 in 11bd SFD: “11bd PPDU includes a NGV-Signal field to indicate the transmission information” “The location of NGV-SIG field is TBD”
   2. Moved Dongguk Lim
   3. Second Hongyuan Zhang
   4. Passed Unanimously
9. FRD&SFD Motion #10
   1. Move to add the following text to section 3 in 11bd SFD: “11bd PPDU design shall support Midamble(s) in Data field. Midamble is composed by long training field, with design TBD. Midamble periodicity is TBD.”
   2. Moved Dongguk Lim
   3. Second Hongyuan Zhang
   4. Result: Y8/N1/A8 Motion Passes
10. FRD & SFD Motion #11
    1. Move to add the following text to section 3.1 of the SFD: “11bd devices shall support 256 QAM. The 256 QAM constellation mapping is the same as that defined in 21.3.10.9 (Constellation mapping)”
    2. Moved Hongyuan Zhang
    3. Second Dongguk Lim
    4. Discussion about whether the text should be about 802.11bd “devices” or 802.11bd “amendment”. And whether the 256 QAM is mandatory to implement. Intention of the motion is that it is mandatory to implement 256 QAM in 802.11bd devices.
    5. Y15/N2/A10 Motion Passes
11. FRD & SFD Motion #12
    1. Move to add the following text to Section 3.1 of the SFD: “11bd devices shall support LDPC codes, with the same code structure and coding methods as defined in 19.3.11.7 (LDPC Codes)”
    2. Mover Hongyuan
    3. Second Dongguk Lim
    4. Passes unanimously
12. FRD & SFD Motion #13
    1. Move to add the following text to section 3.1 of the SFD: “10MHz 11bd Data symbol shall use 11ac 20MHz OFDM numerology.”
    2. Moved Prashant Sharma
    3. Second Dongguk Lim
    4. Passes unanimously
13. FRD & SFD Motion #14
    1. Move to add the following text to section 3 in 11bd SFD: “11bd device operating on 10MHz bandwidth and 11bd device operating on 20MHz bandwidth can coexist in a 20MHz channel.”
    2. Moved Insun Jang
    3. Second Dongguk Lim
    4. Discussion:
    5. Comment that this text is not needed in the SFD as we have already agreed to coexistence concept in the PAR text.
    6. Move to table the Motion
    7. Move: Hiroshi Mano
    8. Second: Michael Fischer
    9. Motion to table passes unanimously
14. FRD & SFD Motion #15
    1. Move to include the following text in section 3 of SFD: “11bd only supports single spatial stream PPDU when operating in OCB broadcast mode.”
    2. Moved Hongyuan Zhang
    3. Second: Dongguk Lim
    4. Passes unanimously
15. FRD & SFD Motion #16
    1. Move to include the following text to section 3 in 11bd SFD: “When an 11bd STA transmits an 11p group-addressed or unicast PPDU, the Duration/ID field of a frame in an 11p PPDU indicates that transmitter of the PPDU is an NGV capable STA”
    2. Comment: this text only states one mechanism for indicating a capability and isn’t restrictive of other such mechanisms
    3. Moved: Liwen Chu
    4. Seconded: Michael Fischer
    5. Passes unanimously
16. Move to take Motion #14 off the table
    1. Moved: James Lepp
    2. Second: Michael Fischer
    3. Passes Unanimously
17. Motion #14
    1. Move to add the following text to section 3 in 11bd SFD: “Operation of 11bd device with 10MHz bandwidth is allowed in a 20MHz channel.”
    2. Previous mover Insun Jang
    3. Previous mover Dongguk Lim
    4. Discussion about what the text means about 10MHz operation within 20MHz channel. A member is suggesting this motion is premature as different mechanisms have been presented. Question about whether it is different bandwidths for the same service or different services
    5. Y15/N6/A9 Motion fails
18. **802.18 report**
    1. Oral presentation of the 802.18 progress this week
    2. In 802.18 this week a letter to the FCC was approved regarding the radio frequency band 802.11bd is targeting. See 802.18-19/0064r3.
19. **Discussion of the Timeline** (802.11-19/0595r4 Slide 22)
    1. Chair announces the timeline will be kept as is. The task group will need to make decision in July meeting whether we can meet the current target of draft 0.1 in September and amend timeline as needed.
    2. No comments or discussion.
20. **Teleconference Plan**
    1. Chair presented the following proposal for teleconferences
       1. May 21
       2. Jun 4 6PM
       3. June 18 10AM
       4. June 25 10AM
       5. July 2 6PM
       6. Aug 6 10AM
    2. No objection to this teleconference plan
21. **Discussion about Ad Hoc groups**
    1. Proposal is to have MAC and PHY ad-hocs starting at the July meeting.
    2. Discussion: show an example using our current list of outstanding presentations and how they would be classified
    3. Discussion: For each ad-hoc group there would be two co-chairs. The duties of the co-chairs will be that one would chair the meeting, and the other would take the minutes.
       1. Motion: Move to form two ad-hoc groups: MAC and PHY and two co-chairs for each ad-hoc group.
       2. Mover: Hongyuan Zhang
       3. Second: Al Petrick
       4. Discussion: if there are topics that affect both MAC and PHY they will be scheduled in the TG sessions as opposed to ad-hoc sessions. Comment that its better to use ad-hocs for comment resolution but should be careful to have full consensus when developing initial draft of the standard.
       5. Y13/N0/A12 Motion Passes
22. **Technical Submissions**
23. Presentation 802.11-19/0083r2
    1. Comment: about the “16” added. To disambiguate the response from a non-NGV station from an NGV station.
    2. Comment about ensuring capability is reserved to enable future amendments
    3. Straw Poll 1:
       1. **Do you agree with the following? NGV stations should indicate capabilities in frames carried in 802.11p PPDUs using assigned capability indication increment values, added to the duration values that legacy-only stations would use in the equivalent frames?**
       2. **Y12/N0/A20**
24. **Closing report**
25. Chair showed the TGbd closing report in 802.11-19/0926r0 that he will bring to the WG closing plenary tomorrow.
26. No discussion or objections.
27. **Technical submissions**
28. Presentation 802.11-19/0083r3
    1. Strawpoll #2
       1. **Do you agree to add the following text into Section 3.4 of SFD? “NGV (and subsequent) capabilities shall be indicated by adding a Capability Indication Increment value to the calculated duration value for use in the duration fields of frames carried within 802.11p PPDUs. The initial CII value assignments shall be as shown on slide 7 of 11-19/0083r4. The CII usage and interpretation rules shall be based on the material shown on slides 4 and 5 of 11-19/0083r2.”**
       2. Discussion: member states its too early for him to decide on this value. Comment that there shouldn’t be references like this in the SFD, but another comment that there already are similar motions/strawpolls.
       3. **Y6/N9/A14**
29. Presentation 802.11-19/0776r0
    1. Discussion
    2. Comment: how many symbols is 800 bytes, and suggest you add a midamble
    3. Discussion about whether DCM can be combined with both BCC or LDPC
    4. Comment: good analysis of DCM, but have you considered other techniques to achieve the better sensitivity
    5. Only simulating latency of lowest MCS. 2 symbol latency for this MCS may be optimistic.
    6. Comment to try to use existing technology from existing 802.11 amendments for 802.11bd before we decide to go with something new.
    7. Comment on other ways to improve receiver sensitivity for example with at ¼ code rate. Some mechanisms need new hardware, some do not. Consider the most cost efficient.
30. Chair adjourned at 12:30pm.

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

Teleconferences:

June 4 6pm ET

June 18 10 am ET

June 25 10am ET

July 2 6pm ET

August 6 10am ET

Face to face:

Austria Center Vienna, July 15, 2019

**Notes:**

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