IEEE P802.11  
Wireless LANs

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| IEEE 802.11bd Task Group Meeting Minutes –  July 2020 | | | | |
| Date: 2019-05-05 | | | | |
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Abstract

This document includes minutes of all IEEE 802.11bd teleconference between the January and July face to face meetings.

*Versioning:*

R0: Uploaded after Feb 4 teleconference

R1: Uploaded after Feb 18 teleconference

R2: Uploaded after Mar 3 teleconference

R3: Uploaded after Mar 17 teleconference

R4: Uploaded after Mar 20 teleconference

R5: Uploaded after Mar 24 teleconference

R6: Uploaded after Mar 31 teleconference

R7: Uploaded after May 5 teleconference

# Tuesday, February 4, 2020

## Opening

* 1. Call to order 9:05 AM EST
  2. Chair introduced the task group leadership
  3. Chair introduced the patent policy and meeting rules.
  4. No response to the call for patents.

## Agenda

* 1. Chair presented the agenda as sent on email list: <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00192.html>
  2. Chair is verifying that presenters are on the call and order of presentations
  3. Agenda for this session has been adopted without objection

### Draft TGbd Comments on FCC NPRM Docket 19-138 (802.11-20/0104r12)

* 1. Presentation by Vice Chair Joseph Levy
     1. Oral report on the state of the document
     2. Members have been contributing
     3. Still have at least 30 days since NPRM hasn’t officially been published
     4. Document has been discussed on three weekly 802.18 calls so far.
     5. Best way to contribute is to provide the text on the reflector
     6. Several sections are awaiting contribution
  2. Discussion
     1. Discussion about timeline. If the NPRM enters the federal register after Feb 19, the 30 day window includes the EC closing plenary at March F2F. If it is before that date, then email approval is needed as previously planned.
     2. Question about breaking up document to approve subsections piece by piece
     3. Response that so far its been contribution driven.
     4. Proposed process: Joe to send an email listing missing sections and questions to the email to drive consensus in the next two weeks.

### Technical Submission (802.11-20/0102r1)

* 1. Presentation by James Lepp (BlackBerry)
  2. Discussion:
  3. Question about whether this proposal makes sense in any regulatory region at this point. Suggesting no change at this time.
  4. Discussion about preamble relating to coexistence 11bd vs 11ax in U-NII-4
  5. Member supports the idea. FCC is in deadlock. Need to start right away. Make the FCC aware of an activity for simple sharing between DSRC and Wi-Fi in U-NII-4. Deal with sharing now, deal with protection later.
  6. Comment on the [P802.11bd PAR](https://standards.ieee.org/project/802_11bd.html). It contains the word 5.9GHz band and references the annex E. That annex has not yet changed. Don’t need to change the PAR.
  7. Eventually need to make changes to the Annex depending on the outcome of FCC rulemaking process.

### Liaison from ITU-T FG-VM (802.11-20/0223r0)

* 1. Liaison was posted to 802.11 and 802.11bd email list.
  2. Zip file contains 3 documents from ITU-T FG-VM
  3. Use cases document which was recently completed
  4. Architecture document which is now under development
  5. Call for participation. FG-VM meets the week before our March Face to Face. Remote participation is possible. See the document for detailed information.
  6. Presenter suggests no response needs to be drafted. If a member disagrees please draft something.

### Closing

* 1. End of agenda
  2. Any other business? None brought forward.
  3. Meeting is adjourned at 10:00am EST

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Dongguk Lim
* Hanseul Hong
* Hiroyuki Motozuka (Panasonic)
* Ionnis Sarris (u-blox)
* Joseph Levy (Interdigital)
* Onn Haran
* Osama Abdul-Magd
* Paul Underhuber (DLR)
* Rui Yang (Interdigital)
* Sebastian Schiessl (u-blox)
* Timothy Jeffries

# Tuesday, February 18, 2020

## Opening

* 1. Call to order 9:30 AM EST after some technical difficulties starting the webex and several notices on the email reflector. <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00207.html>
  2. Chair introduced the task group leadership
  3. Chair introduced the patent policy and meeting rules.
  4. No response to the call for patents.

## Agenda

* 1. Chair presented the agenda as sent on email list: <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00202.html>
  2. Agenda for this session has been adopted without objection

### Status of TGbd Comments on FCC NPRM Docket 19-138 (802.11-20/342r0)

* 1. Presentation by Vice Chair Joseph Levy
  2. Discussion
     1. 802.18 chair commented that new text submissions are needed sooner than later. Need to vote on the final version on Thursday.
     2. Comment that the conclusion also needs to be written.
     3. 802.18 chair thanked the TGbd vice chair for his work moving this document forward.
     4. Member comments he is interested in reviewing the document.

### Draft TGbd Comments on FCC NPRM Docket 19-138 (802.18-20/0020r5)

* 1. Summary of recent changes by Vice Chair Joseph Levy
  2. Discussion
     1. Sections requiring further input were highlighted
     2. Members offering comments were directed how to present them to IEEE 802.18.

### Closing

* 1. End of agenda
  2. Any other business?
     1. John Kenney, Liaison person for IEEE 1609, provided the group with information about the next IEEE 1609 tomorrow and highlighted IEEE 802.11bd related agenda items.
     2. Vice chair mentioned the potential for drafting reply comments based on the FCC schedule dates between March 10 and April 6. Our face to face meeting Atlanta lines up with this period.
     3. No further business.
  3. Meeting is adjourned at 10:26am EST

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Dongguk Lim
* Jeongki Kim (LG)
* Joseph Levy (Interdigital)
* Alecs (Qualcomm)
* Claudio da Silva
* Rui Yang (Interdigital)
* Chenchen Liu (Huawei)
* John Kenney
* Onn Haran
* Sebastian Schiessl (u-blox)
* Stephan Sand (DLR)
* Timothy Jeffries
* Xiaofei
* Yonggang Fang
* Yan Xin
* Jay Holcomb (Itron)

Note: A 802.11 SENS telco was scheduled on the same webex so some of those participants joined the latter part of the 802.11bd call with intent to join the SENS call.

# Tuesday, March 3, 2020

## Opening

* 1. Call to order 9:00 AM EST.
  2. Chair introduced the task group leadership
  3. Chair introduced the patent policy and meeting rules.
  4. No response to the call for patents.

## Agenda

* 1. Chair presented the agenda as sent on email list: <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00214.html>
  2. Agenda for this session has been adopted without objection

### Status of TGbd Comments on FCC NPRM Docket 19-138 (802.11-20/0342r1)

* 1. Presentation by Vice Chair Joseph Levy
  2. Provided history and current status of TGbd Comments on FCC NPRM Docket 19-138
  3. 802 EC e-vote finished at midnight last night. Waiting for official tally to be announced.
  4. Question about whether the EC votes are public.
  5. Answer yes (see <http://ieee802.org/secmail/mail1.html>)
  6. Question about goodput vs PHY rate and a MAC efficiency percentage.
  7. Comment that during 11n studies were made based on 11a PHY/MAC.
  8. A member shared this link in the chat box. <https://mentor.ieee.org/802.11/dcn/13/11-13-0505-00-0hew-mac-efficiecy-analysis-for-hew-sg.pptx>
  9. Member thanked Joe and Jay for all their hard work and long hours getting this drafted and approved.
  10. Question about reply comments
  11. From timing perspective, reply comments need to be drafted and approved at March plenary to go on EC agenda. Either at Friday EC plenary, or 10 day e-mail ballot it’s the same deadline for drafting. 802.18 will have to approve on Thurs March 19 at the F2F.
  12. Will be contribution driven as usual.
  13. Suggest to organize it by quoting the submission, and adding this groups reply.
  14. A suggestion to collect contributions before the F2F and have a skeleton ready.
  15. No objection to posting skeleton in 802.18 mentor.
  16. Brief discussion about the status of the F2F meeting. EC has a telecon on Thursday. Any change will be sent on the 802.11 reflector by the chair.

### Update on IEEE 1609 discussions

* 1. Verbal presentation by John Kenney
  2. Update to 802.11-19/1982r0. Presenting informal notes from recent 1609 meeting on the call today. Will make a presentation for the F2F.
  3. Discussion about whether MA-UNITDATA-STATUS.indication() and MA-UNITDATA.indication() are triggered by transmit or receive events (or vice-versa).
  4. Need to clarify which information is on transmit and receive operations.
  5. Question about whether MPDU coding needs to be explicit or is already known implicitly
  6. Questions about the measurement period for the environment measurements.
  7. Question about specifics of canceling the transmission of a packet already in the queue.
  8. Presenter will prepare a document with the questions for the group to present at the March F2F.

### Closing

* 1. Chair (Bo Sun) will not be able to attend the March F2F and the Working Group Chair (Dorothy) has appointed Vice Chair Joseph Levy to run the 802.11bd meeting.
  2. Meeting adjourned at 10:10am EST

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Dongguk Lim
* Carl Kain
* Dick Roy
* Hanseul Hong
* Hiroki Motozuka (Panasonic)
* John Kenney (Toyota)
* Osama Abdul-Magd
* Joseph Levy (Interdigital)
* Peter Yee (NSA-CSD)
* Sebastien Schiessl (u-blox)
* Song An
* Rui Yang (Interdigital)
* Jay Holcomb (Itron)

# Tuesday, March 17, 2020

## Opening

* 1. Call to order 10:05 AM EDT.
  2. Chair, Bo Sun (ZTE), introduced the patent policy and meeting rules in document 802.11-20/0449r1
  3. No response to the call for patents.
  4. Chair presented guideline for Strawpolls during teleconference (and lessons learned during recent 802.11be calls) using the webex “polling” tool.

## Agenda

* 1. Chair presented the agenda in document 802.11-20/0449r1
  2. Discussion about the agenda
     1. Some members are unavailable today so some presentations and Strawpolls will be run on Friday Mar 20.
     2. New technical proposals will be run first. Specification text proposals will be left for after.
     3. Question about attendance requirement. Do we need 75% to maintain voting rights if member was set to lose voting rights in March Plenary.
     4. Action on the chair to bring this to the CAC (Chairs Advisory Council) meeting and have the Working Group leadership send out a clarification. Have no control of this at the Task Group level.
  3. Agenda for this session has been adopted without objection

## Meeting plan

* 1. Chair’s proposal is to have presentations and Strawpolls during Mar 17 – Mar 31 teleconferences. Editor will incorporate the submissions into a new draft 0.3 which will be sent out for a 20 day comment collection. Comments will be collated and call for comment resolution volunteers made in time for the May Interim meeting.
  2. Comment about possibility of the May meeting being cancelled. Need to plan for that outcome.
  3. Comment that some Strawpolls may be inconclusive and technical votes may be needed. Suggestion to ask WG and EC level for exemption on voting rules.
  4. Chair states leadership will work on a plan.

### NPRM review (802.11-20/0342r2)

* 1. Presentation by Vice Chair, Joseph Levy (InterDigital)
  2. Discussion
     1. Informed members of the 802.18 meeting schedule and deadlines
     2. Brief summary of the 802.18 drafting process.
     3. Informed members how to contribute to the NPRM “reply comments”

### CITS report

* 1. Presentation by Chair Bo Sun (ZTE)
  2. Discussion
     1. This is not an official liaison
     2. Chair was invited to give report to ITU CITS group. Has provided 3 reports at this time as summarized in the slides
     3. Contents all derived from public information.
     4. Expect next report to be Oct 2020
     5. Secretary asked presenter to post on mentor so a reference to it can be recorded in the minutes for the benefit of all the members.
     6. Presenter will embed this report in a Word Document and post on Mentor
     7. Secretary Note: This was subsequently posted as 802.11-20/0498r0

### Editors Report (802.11-19/2045r2)

* 1. Presentation by Technical Editor Bahar Sadeghi (Intel)
  2. Discussion
     1. No questions or comments

### Timeline review (802.11-20/0449r1)

* 1. Presentation of slide 14 of the agenda by Chair
  2. Noted that the Task Group can’t run a motion to update the timeline until the next face to face is convened
  3. No questions or comments

### Technical Submission (802.11-20/0451r0)

* 1. Presentation by Rui Cao (NXP)
  2. Discussion
  3. No comments or discussion.
  4. Straw Poll 1 “Do you agree to incorporate the spec changes in 11-20/0452r0 into 11bd spec D0.3?”
     1. Chair used webex polling tool to collect responses
     2. Straw poll Yes:18 / No:0 / Abstain:6 / No response:5

### Technical Submission (802.11-20/0453r1)

* 1. Presentation by Rui Cao (NXP)
  2. Presenter highlighting differences from r0
  3. Discussion
     1. Discussion about the “repeated LTF\_1x” performance vs” repeated LTF\_2x” with regards to the range extension properties.
     2. Comment if you do smoothing, “Repeated LTF\_1x” are the same as “LTF\_2x”. Thus, they are the same and it doesn’t provide either efficiency or range extension.
  4. Strawpoll 1 “Do you agree that NGV LTF\_1x uses 1.6us GI?”
     1. No discussion
     2. No objection. No formal count taken, consensus agreed.
  5. Strawpoll 2 “Do you agree that NGV does not support repeated LTF\_1x?”
     1. No discussion
     2. Chair used webex polling tool to collect responses
     3. Straw poll Yes:16 / No:0 / Abstain:8 / No response:4
  6. Presenter showing the spec changes in document 802.11-20/0454r0
  7. Redlines show proposed changes to the D0.2.
  8. Discussion
     1. No questions or comments
  9. Strawpoll 3 “Do you agree to incorporate the spec changes in 802.11-20/0454r0 into 11bd spec D0.3”
     1. Chair used webex polling tool to collect responses
     2. Straw poll Yes:23 / No:0 / Abstain:1 / No response:4

### Closing

* 1. With 12 minutes remaining we will proceed with Miguel’s presentation in the next meeting Friday, March 20
  2. Discussion about Strawpolls for the spec text change proposals
  3. Chair reminded the group that the next teleconference is Friday March 20, 10am EDT
  4. Secretary noted that he received a message from WG Vice Chair. Since the March plenary was cancelled, the voting rights rule has not changed. Attendance of 2 of 4 plenaries is required, and there is no March plenary the next plenary is July. Note that members can lose voting rights due to lack of participation in letter ballots.
  5. Meeting adjourned at 11:54am EDT

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Bahar Sadeghi (Intel)
* Carl Kain
* Dongguk Lim (LG Electronics)
* Carl Kain (Noblis)
* Dongguk Lim (LGE)
* Hui-Ling Lou (NXP)
* John Kenney
* Jonathan Goldberg (IEEE)
* Miguel Lopez
* Peter Yee (NSA-CSD)
* Prabohd Varshney
* Prashant Sharma
* Rui Cao (NXP)
* Michael Montemurro (BlackBerry)
* Alan Zeleznikar
* Stephen Sand (DLR)
* Yujin Noh
* Joseph Levy (Interdigital)
* Liwen Chu (NXP)
* Yan Zhang (NXP)
* Hanseul Hong (Yonsei Univ.)
* Ronny Yongho Kim (KNUT)
* Jay Holcomb (Itron)
* Matthias Wendt (Signify Research)
* Bo Yu (NXP)
* Hitoshi Morioka
* Jianwei Bei (NXP)
* Sudhir Srinivasa (NXP)
* Yossi Shaul (Autotalks)
* Ron Toledano
* Jonas Sedin (Ericsson)
* Miguel Lopez
* Hongyuan Zhang (NXP)
* Mao Yu
* Niranjan Grandhe (NXP)

# Friday, March 20, 2020

## Opening

* 1. Call to order 10:07 AM EDT.
  2. Chair, Bo Sun (ZTE), showed slide about voting rights and meeting attendance (802.11-20/0499r1)
  3. Chair introduced the patent policy and meeting rules. (802.11-20/0499r1)
  4. No response to the call for patents.

## Agenda (802.11-20/0499r1)

* 1. Chair presented the agenda in document 802.11-20/0499r1
  2. Discussion about the agenda
     1. Any discussion noted here
     2. Plan is to do presentation 0100, then run Strawpolls from the earlier presentations.
     3. If we have time after that will review spec text proposals.
     4. Comment from vice chair suggesting to have a very brief update on the reply comments from 802.18.
  3. Agenda for this session has been adopted without objection

### Technical Submission (802.11-20/0100r2)

* 1. Presentation by Rui Yang (InterDigital)
  2. Discussion
     1. Comment on slide 5. The yellow frames are supposed to be 11p PPDU, but there are tones added so they are no longer 11p PPDUs.
     2. Response that an 11p device will receive it as a 11p PPDU
     3. Comment that there are then 3 PPDUs the 11bd device needs to transmit. Regular 11p, the 11bd and this new 11p with extra tones.
     4. Further discussion about whether the extra tones on the 11p PPDU are a new PPDU format or just a minor adjustment and the overall complexity of the scheme
     5. Comment on slide 9. Discussion about the gap being SIFS. This is to allow legacy receiver to receive the 11p PPDUs.
     6. Comment that if the first PPDU is decoded successfully, there is no need to continue decoding or combining.
     7. Comments about the gains of the extra tones vs other designs
     8. Question about the transmission staying within the transmit spectral mask by using these edge tones that are normally zero.
     9. Question about SIFS separation and its affect on different types of packet loss: collision due to simultaneous transmission, or hidden terminal situations. Does the deterministic SIFS separation help with these, or is it just the fast fading losses it fixes?
     10. Comment that repetition can help reception in interference limited situations. SIFS is purely for reserving the medium.
     11. Comments about the soft combining of the MAC header as indication and receiver accidentally trying to combine two 11p PPDUs from different sources.
     12. Comment on slide 6 that there may not be 4 symbols possible, might only be one or two or three.
     13. Response that we thought of this, and this approach won’t work with less than 4 symbols.
     14. Comment. Previous commenter commented on these edge tones causing interference into adjacent channels. What about interference of similar tones from an adjacent channels. What is the performance impact on this?
     15. Response that this won’t likely impact much as far as interference due to filters and other mitigations such as they all won’t be transmitted at full power.
     16. Question: What is your preferred number of symbols (slide 5 says 4 or 8)
     17. Response: more tones the better, better detection performance.
     18. Question about how to set the power of the edge tones. Slide 6 shows 2-5dB higher than the noise level.
     19. Comment that’s based on a per-tone SNR for data tones only. For an apples to apples comparison.
     20. Discussion about Strawpolls.
     21. 1946 has a Strawpoll about whether we need to explicitly signal repetition or not. Based on outcome of that Strawpoll we may or may not need this one.

### Technical Submission (802.11-19/1946r0)

* 1. Presentation by Rui Cao (NXP)
  2. This was presented two meetings ago. Task Group waited for several competing proposals including the one just presented before making a decision.
  3. Recommendation on slide 17 is to not explicitly signal the adaptive repetition to maintain backwards compatibility.
  4. Discussion on Straw Poll 1 “The signaling of the adaptive repetition is not required”
     1. Comment that this implicit detection of repetition isn’t as reliable as having an explicit signal.
     2. Response that there are a few different implementations to aid the receiver including MAC header matching as discussed earlier.
     3. Further comments on the benefits of a PHY signal vs MAC combining solutions and fading channel failures vs collision failures.
     4. Further comments on the target application, and on the types of simulations run.
  5. Straw Poll #1 initially proposed in the presentation:
     1. Would you agree to set refine motion #19 on adaptive repetition with the following text: “The signaling of the adaptive repetition is not required”
  6. Discussion about text of the straw poll. We aren’t refining a motion, we’re making changes to our task groups Specification Framework Document (SFD). Comment that it’s a Strawpoll, not a motion doesn’t need to be precise. Comment that it’s the group agreeing a way forward for text to go in unapproved draft 0.3, will follow up with motion when we can at next face to face.
  7. Straw Poll 1: Do you agree to make the following changes in SFD “11bd shall support adaptive repetition of 11p PPDU when operating on OCB broadcast mode in 10MHz bandwidth. The inter-frame space between repeated 11p PPDUs is SIFS. There shall be no explicit signaling of the adaptive repetition indication in both PHY and MAC.”
     1. Chair used webex polling tool to collect responses
     2. Yes: 15 / No: 6 /Abstain: 5 / No response: 7
  8. Question from the presenter to the 6 No voters, were you voting No for the SIFS or the signaling part of the poll. Asks members to reach out individually.

### Closing

* 1. Chair said the remaining unfinished Strawpoll will be run next teleconference.
  2. Meeting adjourned at 11:59am EDT

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Al Petrick
* Bahar Sadeghi (Intel)
* Carl Kain (Noblis)
* Denis Sundman (Ericsson)
* Dongguk Lim (LG Electronics)
* Hanqing Lou (Interdigital)
* Hanseul Hong (Yonsei Univ.)
* Hui-Ling Lou (NXP)
* Janwei Bei (NXP)
* John Kenney
* Jonas Sedin (Ericsson)
* Joseph Levy (Interdigital)
* Li-Hsiang Sun (Interdigital)
* Lisa Ward (R&S)
* Liwen Chu (NXP)
* Manish Kumar
* Mao Yu (NXP)
* Miguel Lopez
* Peter Yee (NSA-CSD)
* Prabodh Varshney
* Prashant Sharma (NXP)
* Ronny Yongho Kim (KNUT)
* Rui Cao (NXP)
* Rui Yang (Interdigital)
* Sebastian Schiessl (u-blox)
* Stephan Sand (DLR)
* Sudir Srinivasa (NXP)
* Yan Zhang (NXP)
* Yossi Shaul (Autotalks)
* Young Hoon Kwon (NXP)
* Yujin Noh

# Tuesday, March 24, 2020

## Opening

* 1. Call to order 10:01 AM EDT.
  2. Chair introduced the task group leadership
  3. Chair introduced the patent policy and meeting rules.
  4. No response to the call for patents.

## Agenda (802.11-20/0519r1)

* 1. Chair, Bo Sun (ZTE), presented the agenda 802.11-20/0519r1
  2. No discussion on the agenda
  3. Agenda for this session has been adopted without objection

### Report on 802.18 NPRM Reply Comments drafting (802.11-20/0342r4)

* 1. Presentation by Vice Chair, Joe Levy
  2. Final 802.18 document is 802.18-20/0045r4
  3. Will go to EC for email vote today in order to file ahead of the April 6 deadline.
  4. Other organizations have asked the FCC for a 90 day extension. FCC has not yet agreed to any extension.
  5. If there is an extension of more than 15 days, 802.18 will continue to draft the document, if no extension, the plan is to file this version.
  6. Discussion
     1. Comments about deadline extension possibility, and potential to draft more comprehensive comments if more time is allocated.
  7. Secretary note: See EC thread started Mar 24: <http://ieee802.org/secmail/msg24345.html>

### Technical Submission (802.11-20/0100r2)

* 1. Presentation by Rui Yang (InterDigital)
  2. Highlighting slide 13 on the out of channel leakage due to the extra tones. This is in response to questions in the last meeting. Note that the tones in question are already added in 11bd PPDU, so there should be no additional leakage compared to 11bd.
  3. Discussion
     1. Comment that 11p PPDU is already well defined, so not clear what the extra subcarriers are. In response the presenter is updating the Strawpoll text.
     2. Presenter wants to be clear that there is no change to the 11p preamble and no change to the data format, other than adding extra tones that aren’t currently used.
     3. Discussion of wording “extra tones” vs “extra edge subcarriers”. Changing Strawpoll text to be more specific.
  4. Straw Poll “Do you support modifying 11p PPDU by using edge subcarriers i.e. [-28, -27, 27, 28], transmitted from 11bd devices as a way to signal adaptive repetition? -Specific location of those extra subcarriers and the meaning of the signal are TBD
     1. Chair used webex polling tool to collect responses
     2. Yes 8 /No 14 /Abstain 14 /No response 4

### Technical Submission (802.11-19/1946r1)

* 1. Presentation by Rui Cao (NXP)
  2. Highlighting the previous “motion #19” from last year
  3. Breaking down the Strawpoll from last time to see if we have consensus on a few details.
  4. Discussion
     1. Comment in support of SIFS
     2. Question about DIFS, response that we haven’t seen any proposals about DIFS
     3. Comment: concerns about deterministic SIFS, if this is a countdown collision then there will be collision on both initial and repeated transmission. If there is a hidden terminal, then the time is so short, there may be interference for both frames. Is there a better way to do repetition that allows us to recover from collision losses and not just channel based losses.
     4. The repetition is aimed at channel condition based losses, not collision losses. Meant to be used when channel usage is low. Gain is seen by legacy 11p devices with 32us gap.
     5. Comment that its important to keep the time short otherwise receivers will need to buffer many “not decoded” frames that it received to attempt combining.
     6. Discussion about signaling required if this were to be a variable gap. Commenter prefers the fixed gap of SIFS.
     7. Presenter states he split out this Strawpoll 2 to be about the gap, and not imply anything about signaling or not.
     8. Comment that repeating transmission should not make interference worse. Comment that this is to extend the range when there is low medium usage. The information is transmitted twice to extend the range, not to solve an interference scenario.
     9. Further discussion of collisions.
     10. Comparisons (similarities and differences) with HARQ repetition technology discussed.
     11. Chair closes the queue as much time has been used for this Strawpoll discussion
  5. Strawpoll 2: Do you agree that the time between repeated 11p PPDU is equal to the SIFS time (32 us)?
     1. Chair used webex polling tool to collect responses
     2. Yes 22 / No 6 / Abstain 8 / No response 5
  6. Strawpoll 3: Do you agree that the 11p PPDU used for adaptive repetition transmission is the same as the “half-clocked” PPDU format defined in section 17 of 802.11mc?
     1. Chair used webex polling tool to collect responses
     2. Yes 24 /No 3 /Abstain 11 /No response 4
  7. Strawpoll 4: Do you agree that no explicit signaling shall be defined for 11p PPDU adaptive repetition transmission?
     1. Chair used webex polling tool to collect responses
     2. Yes 23 / No 7 / Abstain 8 / No response 4

### Technical Submission (802.11-20/0476r0)

* 1. Presentation by Miguel Lopez (Ericsson)
  2. Discussion
     1. Comment that current design fits in current FCC regulations. Issue is based on speculated future changes to FCC rules.
     2. Question about whether these are simulated or measured results. Comparison is with random data.
     3. Comment that if its randomized that means an infinite number of preambles/midambles. Suggest to have a fixed set of them, eg. 4, to choose from.
     4. Presenter says there is similar issue in 802.11ba. There is a solution there, but not imposing that method on 11bd. However, if you use the 11ba method it would be easy to implement.
     5. Run out of time. Will continue with the Strawpoll on Thursday.

### Closing

* 1. Meeting adjourned at 11:59am EDT

Attendance:

* James Lepp (BlackBerry)
* Bahar Sadeghi (Intel)
* Bo Sun (ZTE)
* Al Petrick (InterDigital)
* Alessio Filippi (NXP)
* Bo Yu
* Carl Kain (Noblis)
* Dennis Sundman (Ericsson)
* Dongguk Lim (LG Electronics)
* Feng Jiang
* Hanqing Lou (Interdigital)
* Hanseul Hong (Yonsei University)
* Hiroyuki Motozuka (Panasonic)
* Hongyuan Zhang (NXP)
* Hui-Ling Lou (NXP)
* Jianwei Bei (NXP)
* Jeongki Kim (LG)
* John Kenney (Toyota)
* Joseph Levy (Interdigital)
* Jonas Sedin (Ericsson)
* Joseph Levy (Interdigital)
* Li-Hsiang Sun (Interdigital)
* Liwen Chu (NXP)
* Manish Kumar
* Mao Yu (NXP)
* Miguel Lopez
* Niranjan Grandhe (NXP)
* Paul Unterhuber (DLR)
* Peter Yee (NSA-CSD)
* Prabodh Varshney
* Prashant Sharma (NXP)
* Qinghua
* Ron Toledano
* Ronny Yongho Kim
* Rui Cao (NXP)
* Rui Yang (InterDigital)
* Sebastian Schiessl (u-blox)
* Song An
* Xiaofei
* Xiayu
* Yan Zhang (NXP)
* Yossi Shaul
* Young Hoon Kwon
* Yujin Noh

# Thursday, March 26, 2020

## Opening

* 1. Call to order 10:00 AM EDT.
  2. Chair introduced the task group leadership
  3. Chair introduced the patent policy and meeting rules.
  4. No response to the call for patents.

## Agenda (802.11-20/0534r1)

* 1. Chair presented the agenda
  2. Discussion about the agenda
     1. John Rosdahl (WG 1st Vice Chair) asking members on the call to record their attendance on <https://imat.ieee.org>. This is not used for voting rights, but is to streamline attendance recording by the secretary in the larger teleconferences.
     2. The secretary, James Lepp appreciates this initiative by WG leadership.
  3. Agenda for this session has been adopted without objection

### Brief update on NPRM discussion in 802.18 (802.11-20/0342r5)

* 1. Presentation by Vice Chair Joseph Levy
  2. FCC granted extension last night. This will be discussed on today’s IEEE 802.18 call.

### Technical Submission (802.11-20/0476r0)

* 1. Presentation by Miguel Lopez (Ericsson)
  2. Summarized the presentation from last meeting.
  3. Received comments about complexity. The solution in 802.11ba was to randomly or pseudorandomly shift the phase of the LTF by 0° or 180°. That is an example solution with fairly low complexity.
  4. Discussion
  5. Question: can you point out the specific submissions to 11ba
  6. Response: yes, these were not from myself, but by Steve Shellhammer and they are on mentor. (document number 802.11-18/0824r1 was shared on the chat window)
  7. Question: do you want to write this into the SFD, or just get an opinion from the group with this Strawpoll text?
  8. Response: Presenter is updating Strawpoll text. Its not written as an SFD motion, but to get feedback from the group.
  9. Strawpoll: Do you agree that the midamble design should include a procedure to suppress spectral lines?
     1. Chair used webex polling tool to collect responses
  10. Yes: 12/No: 1/Abstain: 9/No Response: 3

### Technical Text Proposals Discussion (802.11-20/0534r1 slide 12)

* 1. Presentation by Chair Bo Sun
  2. Discussion
  3. Comment from editor that 2 documents on the list 0096 and 0097 are r0 from January and are already in D0.2
  4. Author of those 2 documents is not on the call
  5. Suggestion that they may be removed from the list
  6. Comment from the Editor that she is expecting 1 or 2 more submissions before March 31.
  7. Chair suggests we defer any Strawpoll on acceptance of these text proposals for D0.3 until the next call.

### Closing

* 1. We have reached the end of the agenda.
  2. WG Vice Chair reminds the group about attendance recording at <https://imat.ieee.org>
  3. No other business for today.
  4. Meeting adjourned at 10:48am EDT

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Dorothy Stanley (HPE)
* Andras Edelmayer (Commsignia)
* Bahar Sadeghi (Intel)
* Dongguk Lim (LG Electronics)
* Hanseul Hong (Yonsei University)
* Hiroyuki Motozuka (Panasonic)
* Janwei Bei (NXP)
* John Kenney (Toyota)
* Jon Rosdahl (Qualcomm)
* Joseph Levy (InterDigital)
* Mao Yu (NXP)
* Miguel Lopez (Ericsson)
* Paul Unterhuber (DLR)
* Peter Yee (NSA-ICD)
* Prabodh Varshney (Nokia)
* Prashant Sharma (NXP)
* Ron Toledano
* Ronny Yongho Kim (Korea National University of Transportation)
* Rui Cao (NXP)
* Sebastian Schiessl (u-blox)
* Song-Haur An (Independent)
* Sudir Srinivasa (NXP)
* Yossi Shaul (AutoTalks)
* Yujin Noh (Newracom)

# Tuesday, March 31, 2020

## Opening

* 1. Call to order 10:03 AM EDT.
  2. Chair, Bo Sun (ZTE), introduced the task group leadership
  3. Chair introduced the patent policy and meeting rules.
  4. No response to the call for patents.

## Agenda (802.11-20/0547r1)

* 1. Chair presented the agenda.
  2. Discussion about the agenda
     1. Chair went over the progress to date on all the submissions since the January meeting.
     2. Chair described the process for agreeing the new text submissions on the teleconference
     3. Question about whether the two items were separate or a single step – creating a D0.3 and sending D0.3 for comment collection.
     4. If agreed today, expecting D0.3 to be available from the Editor around Apr 13.
  3. Agenda for this session has been adopted without objection

### Update on FCC NPRM 19-138 (802.11-20/0342r6 slide 6)

* 1. Presentation by Vice Chair Joseph Levy
  2. Showing updated timeline for 802.18 reply comment document (slide 6 of 342r6)
  3. Informed members of 802.18 meeting times.
  4. Discussion
     1. Discussion about EC approval dates.

### Spec text proposals (802.11-20/0547r1 slide 13)

* 1. Presentation by Chair
  2. Chair presented list of spec text proposals. These were also sent to the email reflector earlier
  3. Discussion
     1. Commenter states he has comments on one of the submissions. Doesn’t have technical comments ready for the call today.
     2. Suggestion by the chair that there will be opportunity to provide comments in the 20 day comment collection.
     3. Suggestion by the editor that there is opportunity to present something on Apr 7 teleconference if the commenter would like. If there is consensus on such proposed changes this could be incorporated by the editor at that time.
  4. Straw Poll 1
     1. Do you support the TGbd Tech Editor to generate IEEE P802.11bd D0.3 based on IEEE P802.11bd D0.2 and the spec text proposals below:
     + 11-20/0420r0
     + 11-20/0421r0
     + 11-20/0422r0
     + 11-20/0464r0
     + 11-20/0465r0
     + 11-20/0452r0
     + 11-20/0454r0
     + 11-20/0496r0
     + 11-20/0518r0
     1. Chair used webex polling tool to collect responses
     2. Yes 18/No 0/Abstain 5/No Response 2
  5. Straw Poll 2
     1. Do you support to have a 20-day TGbd internal comment collection procedure for IEEE P802.11bd D0.3 when D0.3 is available?
  6. Discussion
     1. Question: Do we want to pre-vote this now, or do we want to vote this once we have the document? For example do we want to vote on this after we see the document?
     2. If we vote this now, what do we do during the Apr 7 and Apr 14 meetings?
     3. Comment: Even during the comment collection and comment resolution periods we can discuss any technical submission above and beyond what is in the D0.3 document.
     4. Comment in support of this direction
     5. Chair used webex polling tool to collect responses
     6. Yes 23/No 0/Abstain 1/No Response 2

### Closing

* 1. Chair asked if there is any other business
  2. Chair reminded members to record their attendance
  3. Meeting adjourned at 10:40am EDT

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Andras Edelmayer (Commsignia)
* Bahar Sadeghi (Intel)
* Carl Kain (USDoT)
* Dongguk Lim (LG Electronics)
* Hanseul Hong (Yonsei Univ.)
* Hiroyuki Motozuka (Panasonic)
* Jeongki Kim (LG)
* John Kenney (Toyota)
* Jon Rosdahl (Qualcomm)
* Jonas Sedin (Ericsson)
* Joseph Levy (InterDigital)
* Liwen Chu (NXP)
* Paul Unterhuber (DLR)
* Peter Yee (NSA-ICD)
* Prabodh Varshney (Nokia)
* Prashant Sharma (NXP)
* Ron Toledano (Autotalks)
* Ronny Yongho Kim (Korea National University of Transportation)
* Rui Cao (NXP)
* Rui Yang (InterDigital)
* Sebastian Schiessl (u-blox)
* Song-Haur An (Independent)
* Yossi Shaul (Autotalks)
* Yujin Noh (Newracom)

# Tuesday, April 7, 2020

## Cancelled

* 1. <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00230.html>

# Tuesday, April 14, 2020

## Cancelled

* 1. <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00232.html>

# Tuesday, April 21, 2020

## Cancelled

* 1. <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00234.html>

# Tuesday, May 5, 2020

## Opening

* 1. Call to order 10:03 AM EDT.
  2. Chair introduced the task group leadership and confirmed secretary was on the call.
  3. Chair introduced the patent policy and meeting rules.
  4. Chair will provide instructions for updating webex names on the next call.
  5. No response to the call for patents.

## Agenda

* 1. Chair presented the agenda as sent on email list: <http://www.ieee802.org/11/email/stds-802-11-tgbd/msg00239.html>
  2. Discussion about the agenda
     1. No discussion
  3. Agenda for this session has been adopted without objection

### Editors Report (802.11-19/2045r3)

* 1. Presentation by Bahar Sadeghi (TGbd Technical Editor)
  2. Discussion
     1. No discussion

### Comment Collection Summary (802.11-20/0701r0)

* 1. Presentation by Bo Sun (TGbd Chair)
  2. Discussion
     1. Question about technical motions when they are needed. Can we have motions in the calls
     2. Suggestion to use strawpolls to determine if a majority of the group supports the resolution.

### Comment Assignment (802.11-20/802.11-20/2045r3)

* 1. Presentation by Bahar Sadeghi (TGbd Technical Editor)
  2. Editor presented slide 4 of 2045r3 (spreadsheet) and the Access Database where comments are managed
  3. Discussion
     1. Comment that the editor should update in the tool, then generate the spreadsheet so data doesn’t get out of sync.
     2. Editor asks to bear with her as she learns the new tools.
     3. Clarification that editorials are already assigned to the editor
  4. Volunteering for sections
     1. Editor went through sections and members volunteered to prepare comment resolutions
        1. Joe Levy for section 3.1 and 3.2 definitions
        2. Bahar Sadeghi for 3.4
        3. James Lepp for 4.3
        4. Liwen Chu for 5.2, discussion about other possibilities. Will finalize over email.
        5. Bahar Sadeghi for 5.3
        6. Liwen Chu for 5.4, goes with 5.2
        7. Joe Levy for section 6
        8. Liwen Chu for 9.2
        9. James Lepp for 31.1
        10. Liwen Chu for 31.2/31.2.1 – coex with 11p
        11. Hanseul Hong 31.2.2 – 20MHz mac
        12. James Lepp for 31.2.3 – AMSDU
        13. Hiroyuki Motozuka for 31.3 – 60GHz
        14. Qinghua for 32.1 – PHY intro
        15. Bo Sun for 32.2
        16. Rui Cao for 32.3.1
        17. Yujin Noh for 32.3.4
        18. Rui Cao for 32.3.5
        19. Rui Cao for 32.3.6
        20. Dongguk for 32.3.7.2
        21. Rui Cao for 37.3.7.3
        22. Rui Cao for 32.3.8
        23. Yujin Noh for 32.3.8.10 midambles
        24. Bahar Sadeghi for 32.3.9
        25. Rui Cao for 32.3.10
        26. Yujin Noh for 32.3.11 and 32.3.12
        27. Rui Cao for 32.3.13 regulatory
        28. Yujin Noh for 32.3.14 MCSs
        29. Bo Sun for 32.4 PLME
        30. Bahar Sadeghi for General
        31. James Lepp for Annex B
        32. Annex C
     2. Secretary note: Editor subsequently uploaded [802.11-20/0701r1](https://mentor.ieee.org/802.11/dcn/20/11-20-0701-01-00bd-tgbd-d0-3-comments.xlsx) with the volunteer listed in the “Assignee” column.

### Technical Submission (802.11-20/0682r0)

* 1. Presentation by Miguel Lopez (Ericsson)
  2. Discussion
     1. Question about whether randomizing the midamble causes any PAPR changes
     2. Answer the whole LTF is multiplied by -1
     3. Question about multiplying a fixed multiplier to the midamble, why not multiply the midamble as well as the data symbols up until the next midamble.
     4. Answer that would work too
     5. Discussion about whether the receiver needs to know the sequence ahead of time and the effect on channel estimation
     6. Comments on MIMO case for which two different options were presented.
     7. Comment that it might not work to apply different sequences to the 2 different transmit chains, but applying same sequence is known to work well.
     8. A member commented that option 1 (slide 8) seems simpler.
  3. Presenter has strawpoll, but suggest members review the proposals and do simulation work to choose. Invites members to email him any questions.

### Closing

* 1. Chair displayed list of future teleconferences and reminded members of schedule.
  2. Editor clariefied 2 additional sections from the assignments earlier.
  3. Meeting adjourned at 11:52am EDT

Attendance:

* James Lepp (BlackBerry)
* Bo Sun (ZTE)
* Bahar Sadeghi (Intel)
* Carl Kain (USDOT/Noblis)
* Hanseul Hong (Yonsei Univ.)
* Joseph Levy (InterDigital)
* Mao Yu (NXP)
* Miquel Lopez (Ericsson)
* Peter Yee (NSA-CSD)
* Prashant Sharma (NXP)
* Rui Cao (NXP)
* Rui Yang (InterDigital)
* Song H An (Independent)
* Yujin Noh (Newracom)
* Andras Edelmayer (Commsignia)
* Dieter Smely (Kapsch)
* Friedbert Berens (FB Consulting)
* Hiroyuki Motozuka (Panasonic)
* John Kenney (Toyota)
* Ron Toledano (Autotalks)
* Ronny Yonho Kim (Korea National University of Transportation)
* Sebastian Schiessl (u-blox)
* Stephan Sand (German Aerospace Center - DLR)

# Next Meetings

Face to face:

Sheraton Centre Montreal, Montreal, Canada, July 13, 2020

<http://www.ieee802.org/11/Meetings/Meeting_Plan.html>

Teleconferences:

Feb 4, 18, Mar 3 | Time 9:00-11:00am EST | Webex

Apr 7, 14, 21, May 5, 12, 15, 19, 22, 26, 29, Jun 2, 9, 12, 16, Jul 3, 7 | Time 10-11:59am EDT | Webex

Meeting Documents:

<https://mentor.ieee.org/802.11/documents>

Task Group Email reflector:

<http://www.ieee802.org/11/email/stds-802-11-tgbd/index.html>

Website:

<http://www.ieee802.org/11/Reports/tgbd_update.htm>