IEEE P802.11  
Wireless LANs

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| Minutes for TGbe MAC Ad-Hoc teleconferences in March and May 2020 | | | | |
| Date: 2020-03-13 | | | | |
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|  |  |  |  |  |

Abstract

This document contains the meeting minutes for the TGbe MAC ad hoc teleconferences held in March 2020 and May 2020.

Revisions:

* Rev0: Added the minutes from the telephone conferences held on March 16, 18 and 23, 2020.

**Monday 16 March 2020, 19:00 – 22:00 ET (TGbe MAC ad hoc conference call)**

Chairman: Liwen Chu (NXP)

Secretary: Jeongki Kim (LG Electronics)

This meeting took place using a webex session.

**Introduction**

1. The Chair (Liwen Chu, NXP) calls the meeting to order at 19:04 EDT. The Chair introduces himself and the Secretary, Jeongki Kim (LG)
2. The Chair goes through the 802 and 802.11 IPR policy and procedures and asks if there is anyone that is aware of any potentially essential patents. Nobody speaks up.
3. The Chair recommends to modify their information in the webex application with name and affiliation and if cannot change them, send an e-mail to the secretary and the chairman.
4. The Chair reminds everyone to report their attendance by sending an e-mail to the Secretary and the Chairman himself. The webex app indicates about 86 people on the call.  
     
   **Recorded attendance through the webex app and/or reported attendance through e-mail:**
   * **YELLOW names are not yet confirmed**
   * Abhishek Patil (Qualcomm)
   * Akira Kishida (NTT)
   * Alan Zelenznikar (??)
   * Alfred Asterjadhi (Qualcomm)
   * Baokun Dig (??)
   * Carl Kain (??)
   * Cheng Chen (Intel)
   * Chunyu Hu (Facebook)
   * Dave Cavalcanti (Intel?)
   * Dibakar Das (Intel)
   * Dmitry Akhmetov (Intel)
   * Duncan Ho (Qualcomm)
   * Edward Au (Huawei)
   * Gabor Bajko (Mediatek)
   * Gaurav Patwardhan (Hewlett Packard Enterprises)
   * Geonjung Ko (WILUS Inc)
   * George Cherian (Qualcomm)
   * Guogang Huang (Huawei)
   * Guoqing Li (Apple)
   * H (in webex)
   * Harry Bims ???? (Bims Laboratories) – “harry” on list
   * Hedayat, Reza (Charter Communications)
   * Huizhao Wang (On, Qunatenna)
   * Insun Jang (LGE)
   * James Yee (Mediatek)
   * Jarkko Knecht (Apple)
   * Jason Yuchen Guo (Huawei)
   * Jeongki Kim (LGE)
   * Jinjing Jiang (Apple)
   * John Sun (WILUS)
   * John Yi (?????) – no affiliation
   * Jonas Sedin (Ericsson)
   * Jonghun Han (Samsung)
   * Joseph Levy (InterDigital)
   * Kazuto Yano (ATR)
   * Laurent Cariou (Intel)
   * Lei Wang (Futurewei)
   * Liangxiao Xin (Sony)
   * Li-Hsiang Sun (InterDigital)
   * Liwen Chu (NXP)
   * Li Yiqing (Huawei)
   * Mark Rison (Samsung)
   * Massinissa Lalam (Sagecom)
   * Matthew Fischer (Broadcom)
   * Ming Gan (Huawei)
   * Minyoung Park (Intel)
   * Mitsuyoshi Yukawa (Canon)
   * NaMyeong Kim (LGE)
   * Noel Stott (??)
   * Oren Kedem (??)
   * Osama Aboul-Magd (Huawei)
   * Patrice Nezou (Canon)
   * Po-kai Huang (Intel)
   * Pooya Monajemi (Cisco)
   * QG(??)
   * Rojan Chitrakar (Panasonic)
   * Ronny Yongho Kim (KNUT)
   * Sai (Cypress)
   * Sang Kim (LGE)
   * Sharan Naribole (Samsung)
   * Shubhodeep Ahikari (Broadcom)
   * Sindhu Verma (Broadcom)
   * Srinivas Kandala (Samsung)
   * Stephane Baron (Canon)
   * Subir Das (Perspecta Labs)
   * Sungjin Park (LGE)
   * Taewon Song (LGE)
   * Tomo Adachi (Toshiba)
   * Viger Pascal (Canon)
   * Xiaofei (Inter digital)
   * Yifan Zhou (Huawei)
   * Yong Liu (Apple)
   * Yonggang Fang (ZTE)
   * Yongho Seok (MediaTek)
   * Yongsu Gwak (KNUT)
   * Young Hoon Kwon (NXP)
   * Yunbo Li (Huawei)
   * Yusuke Tanaka (Sony)
   * Zhou Lan (Broadcom)

1. The Chair reminds that the agenda can be found in 11-20/425r2. Today we will go through submissions related to multi-link.

* Technical Submissions:
  + [1822r4](https://mentor.ieee.org/802.11/dcn/19/11-19-1822-04-00be-multi-link-security-consideration.pptx)–Multi-link security consideration (Po-Kai Huang) [1 SP]
  + [1963r1](https://mentor.ieee.org/802.11/dcn/19/11-19-1963-01-00be-multi-link-security-and-aggregation-operations.pptx)–Multi-Link Security And Aggregation Operations (Huizhao Wang)
  + [0054r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0054-00-00be-mld-mac-address-and-wm-address.pptx)–MLD MAC address and WM address (Po-Kai Huang)
  + [0063r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0063-00-00be-sta-mld-link-address.pptx)–STA MLD link address (Liwen Chu)
  + [1604r1](https://mentor.ieee.org/802.11/dcn/19/11-19-1604-01-00be-eht-direct-link-transmission.pptx)–EHT Direct Link Transmission (Dibakar Das)
  + [2125r0](https://mentor.ieee.org/802.11/dcn/19/11-19-2125-00-00be-eht-rts-and-cts-procedure.pptx)–EHT RTS and CTS procedure (Yongho Seok)
  + [0006r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0006-00-00be-proposed-corrections-to-channel-access-issues-in-802-11.pptx)–Proposed Corrections to Channel Access Issues in 802.11 (Shubhodeep Adhikari)
  + [0062r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0062-00-00be-protection-with-more-than-160mhz-ppdu-and-puncture-operation.pptx)–Protection with more than 160MHz PPDU and puncture operation (Liwen Chu)
  + [~~363r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-0363-00-00be-proposals-on-unused-bandwidth-utilizations.pptx)~~–Proposals on unused bandwidth utilizations (Sindhu Verma)~~
  + [384r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0384-00-00be-320-mhz-bss-configuration.pptx)–320 MHz BSS Configuration (Po-Kai Huang)
  + [398r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0398-00-00be-eht-bss-with-wider-bandwidth.pptx)–EHT BSS with wider bandwidth (Liwen Chu)
  + [399r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0399-00-00be-bw-negotiation-protection-with-more-than-160mhz-ppdu-and-puncture-operation.pptx)–BW negotiation, protection with more than 160MHz PPDU and puncture operation (Liwen Chu)
  + Agenda is slightly changed (the 1963r1 is present before 1822r4)

**Submissions**

1. [**1963r1**](https://mentor.ieee.org/802.11/dcn/19/11-19-1963-01-00be-multi-link-security-and-aggregation-operations.pptx)**–Multi-Link Security And Aggregation Operations (Huizhao Wang)**

**Summary:**

* + Establish Security Association with PMK binding at Multi-Link Device Instance level
  + Establish per Link PTKSA, GTKSA at per Link Lower-MAC level
  + Establish BA agreement at Multi-Link Device Instance level
  + Tx BA sliding window management, Rx BA reordering & scoreboard operations at the Multi-Link Device Instance level
  + Transmitter side PN assignment, and receiver side replay checking process

**Discussion:**

C:We considered that the proposal about the PTK/GTK per link. That seems to be complicated. why we have presentation proposing PTK common for all the links.

A: If you have BA agreement on MLD level you have a particular TID MPDU over different links.

C: Are you proposing we should use full state block ack?

A: I’m not proposing since the baseline already have the full stat BA For MLD spec text is how we’re gonna do full state block ack in MLD   
A: This is just another approach as option, not compete with that scheme.

C: similar to Duncun. we have already discussed in January meeting. If you started to retransmit in different links then per link PN check may have problem.

A: Same PTK cross links are fine. This is another approach.

C: we already discuss them. A little different approach.

C: Similar to duncun and po-kai. …

A: I’m not proposing reordering per link level.

C: do you still consider BA ordering per MLD level?

A: It depends on BA agreement establishment.

1. [**1822r6**](https://mentor.ieee.org/802.11/dcn/19/11-19-1822-04-00be-multi-link-security-consideration.pptx)**–Multi-link security consideration (Po-Kai Huang) [1 SP]**

* Straw Poll #2: After multi-link setup between two MLDs, do you support to use same PMK and same PTK across links with same PN space for a PTKSA and use the MLD MAC addresses to derive PMK under SAE method and PTK?

**Discussion:**

C: You wanna run this SP.

A: Based on the discussion, there are consensus on this. We can agree with it by group.

C: Can we do unanimous consent?

C: do you want to limit the PMK sharing just SAE?

A: Here, what I want to do is to use the same PMK. PMK is derived by a specific method.

C: Maybe you can have two SP here.

A: Do you want to separate them?

C: This is first straw poll.

A: I have no problem.

C: we have 10 minute per SP. Is this guideline valid for this?

C: In my opinion, if we have the different PTK on different links, we can exchange the reordering and replay detection part…. I think Huizhao presentation, different PTK in different links still works.

* **Straw Poll #2: After multi-link setup between two MLDs, do you support to use same PMK and same PTK across links with same PN space for a PTKSA?**

SP result: 35 yes/ 10 No/ 22 abstain/15 no answer

Note that this is not motion

* **Straw Poll #3: After multi-link setup between two MLDs, do you support to use the MLD MAC addresses to derive PMK under SAE method and PTK?**

**Discussion:**

C: Could you modify the SP a little bit? Like do you support to use the MLD ID (e.g., MAC address,..)...?

A: This is what we discussed in the other day.

C: MLD ID can be numerical ID.

A: It may be collision problem if we use ID. In spec we already use MAC address.

C: If we limit the MAC address, we may have issue or be wrong.

C: I supportive this SP. SAE method is done before the multi-link setup. At this time STA may not have MLD MAC address. How do we go about that?

A: We may have additional ID. This is something to use after the multi-link setup.

C: I don’t have any straw poll I would prepare for today.

A: I want to defer this.

**SP is defered.**

1. [0054r1](https://mentor.ieee.org/802.11/dcn/20/11-20-0054-00-00be-mld-mac-address-and-wm-address.pptx)–MLD MAC address and WM address (Po-Kai Huang)

**Summary:**

If different APs of a non-AP MLD shall have different MAC address then the different non-AP STS

Propose to indicate AP MLD MAC address and non-AP MLD MAC address during the multi-link setup procedure

**Discussion:**

Yonggang :

C: I have two questions. I want to clarify MLD MAC address is the address for the multi-link logical entity?

A: MAC can identify the logical entity. We used to differentiate the different MLDs.

C: What is the difference between the MAC logical entity and MLD management entity?

A: MLD is new one we agree on that. MLD doesn’t exist in current architecture.

C: Can you go to SP 2?

A: AP MLD and non-AP MLD will use this address after the setup.

A: We already agree with MLD address that identify MLD.

....

C: Then could you clarify it in that?

A: We already discussed and Duncun provided that.

**Straw Poll 1:**

**Do you agree to revise the 11be SFD as follows:**

**A MLD has a MAC address that singly identifies the MLD management entity.**

Discussion:

SP result: 42 yes/ 3 No/ 17 abstian / 19 no answer

1. [**0063r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-0063-00-00be-sta-mld-link-address.pptx)**–STA MLD link address (Liwen Chu)**

**Summary:**

It is good for unified link address selection rules for both AP MLD and STA MLD, i.e. both STA MLD and AP MLD have different link addresses for STAs affiliated with them

**Discussion:**

C:Fully support, but minor comment. You can say different STAs has different MAC address.

A: I’m fine.

C: for SA selection. Are you proposing to change the encapsulation procedure for MLD device here?

A: No I don’t change the encryption method.

C: not encryption but encapsulation process.

A: No I did not. I don’t need to figure out the MAC SAP address of STA MLD. I don’t want to change encryption or decryption.

C: SP 1, why do you want to put the restriction on the AP MLD whose affiliated AP can perform the simultaneous TX/RX?

A: I usually do not have the condition. In the last f2f the group has consensus. Many presentations disucss symmetric MAC address makes sense.

C: slide 5, you say that using the different link address is easy design for STA MLD that supports soft AP MLD ..... This is the change on the current encryption and decryption.

1. [1604r1](https://mentor.ieee.org/802.11/dcn/19/11-19-1604-01-00be-eht-direct-link-transmission.pptx)–EHT Direct Link Transmission (Dibakar Das)

**Summary:**

* + - * Benefits of Trigger based Direct Link transmission.
      * Challenges with Direct Link transmission
      * AP can share the time resource to the peer STAs\

**Discussion:**

C: P2P is neccessary of that both devices associated with the AP. We shouldn’t assume that the working assumption in secenario uplink traffic is hard for AP to know. ..... Have you thought about it? Do you have any potential solution for that?

A: Is it for the downlink or uplink?

C: for the uplink between the peer to peer of the direct link, the other STAs may not be associated with the AP. How that convince that?

A: How does the shared AP inform sharing AP about the exactly resource requirement if needed?

C: I have the question on the procedure. In your figure, slide 6, it seems that the direction transmission is jsut triggered by the AP. Then, they are ... transmission always on . Have you considered the case that the AP can trigger the uplink transmission and direct transmission together?

A: Your question is about overhear? That’s allow.

C: it seems like that the shared time is only for the peer to peer? whether the time can be used for UL MU and peer to peer at the same time in single PPDU?

C: I agree that for the d2d scenario, in some case,

**Adjourned at 22:00 EDT**

**Monday 18 March 2020, 19:00 – 22:00 ET (TGbe MAC ad hoc conference call)**

Chairman: Liwen Chu (NXP)

Secretary: Jeongki Kim (LG Electronics)

This meeting took place using a webex session.

**Introduction**

1. The Chair (Liwen Chu, NXP) calls the meeting to order at 19:04 EDT. The Chair introduces himself and the Secretary, Jeongki Kim (LG)
2. The Chair goes through the 802 and 802.11 IPR policy and procedures and asks if there is anyone that is aware of any potentially essential patents. Nobody speaks up.
3. The Chair recommends to modify their information in the webex application with name and affiliation and if cannot change them, send an e-mail to the secretary and the chairman.
4. The Chair reminds everyone to report their attendance by sending an e-mail to the Secretary and the Chairman himself. The webex app indicates about 97 people on the call.
   * Please send an e-mail only if the full information (name & affiliation) is not shown in the attendance list of webex.
   * Method to change the information at Webex: After excuting the webex application in the OS (not enter the meeting), if you push the “edit”button beside name and e-mail address information on top of the application, you can replace the name to Name & affiliation.   
       
     **Recorded attendance through the webex app and/or reported attendance through e-mail:**
   * **YELLOW names are not yet confirmed**
   * Abhishek Patil (Qualcomm)
   * Alfred Asterjadhi (Qualcomm)
   * Ali (Qualcomm)
   * Baokun Dig (??)
   * Carl Kain (??)
   * Cheng Chen (Intel)
   * Chunyu Hu (Facebook)
   * Dave Cavalcanti (Intel)
   * Dibakar Das (Intel)
   * Dmitry Akhmetov (Intel)
   * Duncan Ho (Qualcomm)
   * Edward Au (Huawei)
   * Gabor Bajko (Mediatek)
   * Gaurav Patwardhan (Hewlett Packard Enterprises)
   * Geonjung Ko (WILUS Inc)
   * George Cherian (Qualcomm)
   * Guogang Huang (Huawei)
   * Guoqing Li (Apple)
   * H (in webex)
   * Hang Su (??)
   * Hanseul Hong (Yonsei Univ.)
   * Harry Bims ???? (Bims Laboratories) – “harry” on list
   * Hirohiko INOHIZA (Canon Inc.)
   * Insun Jang (LGE)
   * James Yee (Mediatek)
   * Jarkko Knecht (Apple)
   * Jason Yuchen Guo (Huawei)
   * Jeongki Kim (LGE)
   * Jinjing Jiang (Apple)
   * John Sun (WILUS)
   * John Yi (?????) – no affiliation
   * Jonas Sedin (Ericsson)
   * Joseph Levy (InterDigital)
   * Kazuto Yano (ATR)
   * Laurent Cariou (Intel)
   * Lei Wang (Futurewei)
   * Liangxiao Xin (Sony)
   * Li-Hsiang Sun (InterDigital)
   * Lili hervieu (?? In webex)
   * Liwen Chu (NXP)
   * Liuming Lu (ZTE)
   * Manish Kumar (NXP)
   * Mark Hamiton (CommScope/Ruckus)
   * Matthew Fischer (Broadcom)
   * Ming Gan (Huawei)
   * Minyoung Park (Intel)
   * Mitsuyoshi Yukawa (Canon)
   * Mohamed Abouelseoud (Sony)
   * NaMyeong Kim (LGE)
   * Noel Stott (Keysight Technologies)
   * Osama Aboul-Magd (Huawei)
   * Patrice Nezou (Canon)
   * Paul Cheng
   * Payam Torab (Facebook)
   * Prabodh Varshney (Nokia)
   * Po-kai Huang (Intel)
   * Pooya Monajemi (Cisco)
   * Rojan Chitrakar (Panasonic)
   * Ronny Yongho Kim (KNUT)
   * Sang Kim (LGE)
   * Sharan Naribole (Samsung)
   * Shubhodeep Ahikari (Broadcom)
   * Sindhu Verma (Broadcom)
   * Srinivas Kandala (Samsung)
   * Stephane Baron (Canon)
   * Subir Das (Perspecta Labs)
   * Sungjin Park (LGE)
   * Taewon Song (LGE)
   * Tomo Adachi (Toshiba)
   * Viger Pascal (Canon)
   * Xiaofei Wang(Inter digital)
   * Xin Ge (??)
   * Yanjun Sun (Qualcomm)
   * Yifan Zhou (Huawei)
   * Yong Liu (Apple)
   * Yonggang Fang (ZTE)
   * Yongho Seok (MediaTek)
   * Yongsu Gwak (KNUT)
   * Yoshihiaa Kondo (ATR)
   * Young Hoon Kwon (NXP)
   * Yunbo Li (Huawei)
   * Yusuke Tanaka (Sony)
   * Zhiqianghan(ZTE)
   * Zhou Lan (Broadcom)

1. The Chair reminds that the agenda can be found in 11-20/425r2. Today we will go through submissions related to General MAC, ML constraints op.

* Technical Submissions:
  + [2125r0](https://mentor.ieee.org/802.11/dcn/19/11-19-2125-00-00be-eht-rts-and-cts-procedure.pptx)–EHT RTS and CTS procedure (Yongho Seok)
  + [0006r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0006-00-00be-proposed-corrections-to-channel-access-issues-in-802-11.pptx)–Proposed Corrections to Channel Access Issues in 802.11 (Shubhodeep Adhikari)
  + [0062r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0062-00-00be-protection-with-more-than-160mhz-ppdu-and-puncture-operation.pptx)–Protection with more than 160MHz PPDU and puncture operation (Liwen Chu)
  + [363r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0363-00-00be-proposals-on-unused-bandwidth-utilizations.pptx)–Proposals on unused bandwidth utilizations (Sindhu Verma)
  + [384r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0384-00-00be-320-mhz-bss-configuration.pptx)–320 MHz BSS Configuration (Po-Kai Huang)
  + [398r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0398-00-00be-eht-bss-with-wider-bandwidth.pptx)–EHT BSS with wider bandwidth (Liwen Chu)
  + [399r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0399-00-00be-bw-negotiation-protection-with-more-than-160mhz-ppdu-and-puncture-operation.pptx)–BW negotiation, protection with more than 160MHz PPDU and puncture operation (Liwen Chu)
  + [1959r0](https://mentor.ieee.org/802.11/dcn/19/11-19-1959-00-00be-constrained-multi-link-operation.pptx) Constrained Multi-Link Operation (Yongho Seok)
  + [226r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0226-00-00be-mlo-constraint-indication-and-operating-mode.pptx) MLO Constraint Indication and Operating Mode (Sharan Naribole)
  + [275r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0275-00-00be-need-for-sync-ppdu.pptx) Need for Sync PPDUs (Abhishek Patil)
  + Agenda was changed from original version.
    1. 106r1 should be in the list e.g., the same topic as 275r0.
       1. Send an e-mail before meeting if you want to change/suggest the agenda.
    2. the 2125r0 needs to be present after 0062r0
    3. Some part of 226r0 is related to ML management.
  + Again, send an e-mail if you want to change the agenda

**Submissions**

1. [1604r1](https://mentor.ieee.org/802.11/dcn/19/11-19-1604-01-00be-eht-direct-link-transmission.pptx)–EHT Direct Link Transmission (Dibakar Das) Continue to discuss (Q&A)

**Discussion:**

C: I think the idea has been … UL transmission is interesting idea and .…. Think about a complication …. Think more about that

A: 11ax already allows the Trigger based frame transmission …. can send to multiple STAs also.

C: At the multi-AP, we’re not also mentioning time resource sharing but also frequency resource. Why should we limit just your contribution to the time resource?

A: In this presentation we did not how the frequency sharing can happen? If you want to propose, we come up with the sequence.

C: I have presentation 95. If time before, I want to present the solution

C: when is the next mac time slot?

A: Is there any objection of adding the contribution now? Nobody spoke up

1. 0095r1 - **Triggered P2P transmissions, Stephane Baro**

* **Summary:**
  + P2P traffic is triggered by the AP for a “Single-User style” RU
  + a 242-tones RU aligned on a 20Mhz channel (possibly multiple of 20Mhz)
  + Uses its own preamble on its distinct channel :
  + Preferably the selected RU location corresponds to secondary channel(s)
* **Disucssion:**

C: Just clarification. Are you saying that you’re gonna adopting pddu that has different tone plan on legacy preamble, HE preamble? Don’t you have to guarantee the orthogonality as well? ....

A: I think you’re talking about slide 5 for MU PPDU format is TBD. The question on the first approach was because of SU PPDU. May be 20Mhz channel differency

C: the trigger frame is going to control the power of P2P transmission as well?

A: I think so.

C: This one is intended to the enabled multple P2P links to work.?

A: What is the multi-link P2P? Please clarify it.

C: Actually, multi P2P links.

A: we just address the single P2P.

C: what is the difference between green one and other one.?

A: serveral direct links are in serveral Rus.

C: Is this able to be harmonized with other?

.....

C: I will defer this SP.

**SP of 1604r1:**

**SP: Do you agree to add the following to SFD?**

* + 1. **Do you support that 11be defines a procedure for an AP to share time resource obtained in a TXOP for peer to peer (STA-TO-STA) frame exchanges?**
    2. SP results: 33 Yes/11No/18 abstain/30 no answer

1. [0006r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0006-00-00be-proposed-corrections-to-channel-access-issues-in-802-11.pptx)–Proposed Corrections to Channel Access Issues in 802.11 (Shubhodeep Adhikari)

**Summary:**

**CW for AC\_VO shall not be altered following the transmission of an 802.11 beacon**

* + The traffic multiplexing rules in 802.11be and 802.11ax shall require that for both DL and UL, for triggered as well as contention-based modes and for SU as well as MU-MIMO/MU-OFDMA transmissions, the following rule is followed:

The duration of transmission shall not be longer than the minimum required to transmit the traffic of equal or higher priority relative to the access category that was used to obtain access to the channel (i.e. the primary AC)

**Discussion:** Po-kai, Yunbo, Lei

C: Two comments. For this proposal 1, should you be going to Revmd or do you intend to fix this by EHT AP? It is only for 11be AP or Revmd?

A: the open for disucssion. at least for EHT AP.

C: Maybe you want to clarify. If you want to fix the other version, you can go to directly REVmd. In you proposal 2, if you want to fix for the 11ax you have to go to 11ax.

A: I understand If the group has a techincal question.

C: First, do you think we need to cosider the following packet transmission? ....

....

1. [0062r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0062-00-00be-protection-with-more-than-160mhz-ppdu-and-puncture-operation.pptx)–Protection with more than 160MHz PPDU and puncture operation (Liwen Chu)

**Summary:**

**Discussion:**

C: I think what you’re suggesting is MAC solution. I’m wondering whether there could be a PHY solution for it .

A: We don’t need the PHY header. This is MAC issue. Same as 11ac RTS/CTS. The legacy STAs do not understand that.

C: I have some questions on option 1. you envisioned that RTS/CTS both gonna be understood by the legacy STAs ... AP and STA have the same design?

A: No same. it may need a new control frame. we have one or two subtype of control frame. We will define new extended control frame format. .....

C: That’s right. I think generally I agree with the approach. .... the legacy STAs need a duration.

A: No, the legacy STAcannot understand the bandwidth in 11ac frame.

A: legacy STA cannot understand new information in new frame.

C: This could be sent using non-HT PPDU for Legacy STA to know duration of new frame

....

**SP1: Do you support that 11be defines a MAC mechanism to protect TXOP for PPDUs with >160MHz and/or PPDUs with preamble puncturing?**

41yes/5no/17abstain/31no answer

1. [2125r0](https://mentor.ieee.org/802.11/dcn/19/11-19-2125-00-00be-eht-rts-and-cts-procedure.pptx)–EHT RTS and CTS procedure (Yongho Seok)

**Summary:**

* 802.11be can efficiently utilize more wider 240/160+80/320/160+160 MHz bandwidth through the preamble puncture mechanism.
  + Because the chance that continuous channels of 240/320 MHz are idle is very low.
* proposes the RTS and CTS support for the preamble puncture mechanism (including a support of new bandwidth modes)

**Discussion:**

C: question about signaling put in any/MU RTS for puncturing mode. If we can how we will be that? I know this PHY design is in muti-RU. maybe, the punctured can already cover multi-RU signaling design.

A: Sure. I agree with you This is just one of example we need to consider puncturing information.

C: I’m not saying that we should not do that. Just want to see I agee with you.

A: Probably talking about not this one but another one.

C: Right.

C:Slide 9, EHT AP transmits on the busy channel

A: It’s typo. This is txop responder.

C: slide 12, ...

**SP 1: Do you support to transmit the MU-RTS/RTS and CTS frames in a non-HT duplicate PPDU on 20 MHz subchannels which are not punctured?**

35yes/2 no/18abstain/26no answer

The meeting was adjourned at 22:00

**Monday 23 March 2020, 10:00 – 13:00 ET (TGbe MAC ad hoc conference call)**

Chairman: Liwen Chu (NXP)

Secretary: Jeongki Kim (LG Electronics)

This meeting took place using a webex session.

**Introduction**

1. The Chair (Liwen Chu, NXP) calls the meeting to order at 10:03 EDT. The Chair introduces himself and the Secretary, Jeongki Kim
2. The Chair goes through the 802 and 802.11 IPR policy and procedures and asks if there is anyone that is aware of any potentially essential patents. Nobody speaks up.
3. The Chair recommends to modify their information in the webex application with name and affiliation and if cannot change them, send an e-mail to the secretary and the chairman.
4. The Chair reminds everyone to report their attendance by sending an e-mail to the Secretary and the Chairman himself. The webex app indicates about 73 people on the call.  
     
   **Recorded attendance through the webex app and/or reported attendance through e-mail:**
   * **YELLOW names are not yet confirmed**
   * Abhishek Patil (Qualcomm)
   * Akira Kishida (NTT)
   * Alan Zelenznikar (??)
   * Albert Bredewoud (Broadcom)
   * Alfred Asterjadhi (Qualcomm)
   * Arik Klein (??)
   * Carl Kain (??)
   * Cheng Chen (Intel)
   * Chunyu Hu (Facebook)
   * Davide Magrin (?)
   * Dibakar Das (Intel)
   * Dmitry Akhmetov (Intel)
   * Duncan Ho (Qualcomm)
   * Edward Au (Huawei)
   * Gaurav Patwardhan (Hewlett Packard Enterprises)
   * Geonjung Ko (WILUS Inc)
   * George Cherian (Qualcomm)
   * Guogang Huang (Huawei)
   * Guoqing Li (Apple)
   * Hanseul Hong (Yonsei Univ.)
   * Harry Bims ???? (Bims Laboratories) – “harry” on list
   * Hirohiko INOHIZA (Cannon)
   * Insun Jang (LGE)
   * James Yee (Mediatek)
   * Jarkko Knecht (Apple)
   * Jason Yuchen Guo (Huawei)
   * Jeongki Kim (LGE)
   * John Son (WILUS)
   * John Yi (?????) – no affiliation
   * Jon Rosdahl (Qualcomm)
   * Jonghun Han (Samsung)
   * Joseph Levy (InterDigital)
   * Kazuto Yano (ATR)
   * Lalit
   * Lei Wang (Futurewei)
   * Li-Hsiang Sun (InterDigital)
   * Lili hervieu
   * Liwen Chu (NXP)
   * Mark Rison (Samsung)
   * Ming Gan (Huawei)
   * Mohamed Abouelseoud
   * NaMyeong Kim (LGE)
   * Osama Aboul-Magd (Huawei)
   * Patrice Nezou (Canon)
   * Po-kai Huang (Intel)
   * Pooya Monajemi (Cisco)
   * qiangguo
   * Rojan Chitrakar (Panasonic)
   * Ronny Yongho Kim (KNUT)
   * Sang Kim (LGE)
   * Sharan Naribole (Samsung)
   * Sindhu Verma (Broadcom)
   * Stephane Baron (Canon)
   * Subir Das (Perspecta Labs)
   * Sungjin Park (LGE)
   * Taewon Song (LGE)
   * Tomo Adachi (Toshiba)
   * Viger Pascal (Canon)
   * Xiaofei (Inter digital)
   * Yanjun Sun (Qualcomm)
   * Yifan Zhou (Huawei)
   * Yonggang Fang (ZTE)
   * Yongho Seok (MediaTek)
   * Yongsu Gwak (KNUT)
   * Yoshihisa Kondo (ATR)
   * Young Hoon Kwon (NXP)
   * Yunbo Li (Huawei)
   * Zhiqiang Han (ZTE)
   * Zhou Lan (Broadcom)

1. The Chair reminds that the agenda can be found in 11-20/425r9. Today we will go through submissions related to General MAC, ML contraints OP.

* Technical Submissions:
  + [384r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0384-00-00be-320-mhz-bss-configuration.pptx)–320 MHz BSS Configuration (Po-Kai Huang)
  + [398r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0398-00-00be-eht-bss-with-wider-bandwidth.pptx)–EHT BSS with wider bandwidth (Liwen Chu)
  + [~~399r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-0399-00-00be-bw-negotiation-protection-with-more-than-160mhz-ppdu-and-puncture-operation.pptx)~~–BW negotiation, protection with more than 160MHz PPDU and puncture operation (Liwen Chu)~~
  + [1993r1](https://mentor.ieee.org/802.11/dcn/19/11-19-1993-01-00be-discussion-about-single-and-multiple-primary-channels-in-synchronous-multi-link.pptx) Discussion about single and multiple primary channels in synchronous multi-link (Yunbo Li)
  + [1305r0](https://mentor.ieee.org/802.11/dcn/19/11-19-1305-00-00be-synchronous-multi-link-operation.pptx) Synchronous multi-link transmission (Yongho Seok)
  + [0026r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0026-00-00be-mlo-sync-ppdus.pptx) MLA Support for Constrained Devices (Duncan Ho)
  + [0081r1](https://mentor.ieee.org/802.11/dcn/20/11-20-0081-01-00be-mlo-synch-transmission.pptx) MLO-Sync-TX (Matthew Fischer)
  + [0082r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0082-00-00be-synchronous-transmitter-medium-state-information.pptx) Synchronous-Transmitter-Medium-State-Information (Matthew Fischer)
  + [0106r1](https://mentor.ieee.org/802.11/dcn/20/11-20-0106-01-00be-follow-up-on-performance-aspects-of-mlink-ops-with-constrains.pptx) Follow up on performance aspects of multi link operations with constrains (Dmitry Akhmetov)
  + [0134r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0134-00-00be-multilink-channel-access-considering-str-capability.pptx) Multilink channel access considering STR capability (Hanseul Hong)

**Submissions**

1. 384r1–320 MHz BSS Configuration (Po-Kai Huang)

**Summary:**

* propose to have EHT channel width field and EHT CCFS field to jointly indicate BSS operating bandwidth with indication in VHT operation element and HT operation element in 2.4/5 GHz band or HE element in 6 GHz band.

**Discussion:**

C: How are the EHT channel widths indicated ?

A: For now, at this point we have 320. What i mean the SP doen’t have the size of the field. we need the field help us to do that. I have no way to say what is the size of this.

C: you think presence of EHT CCFS would tell you?

A: 320 uses a reserved field. Basically, tell me difference.

C: Is that your question?

A: I think we just make sure that 0 would not be confused actual indication. I mean what I propose aligned with Huawei done before.

C: why we use the channel width and we use the channel centerfrequecy differentiates the contiguous and non-contiguous operation. In this case you have the channel width field.

...

A: I guess probably you talk about the puncturing. This slides doen’t cover any puncturing. .... you need to tell you we need to know what is the location

.....

SP#1 384r0

* **Do you support to define EHT operation element with the following fields to indicate 320/160+160 MHz BSS bandwidth?**
  + **Channel Width field**
  + **CCFS field**

26 Yes/3No/21Abstain/19no answer

1. 398r2–EHT BSS with wider bandwidth (Liwen Chu)

**Summary:**

EHT Operation element indicates > 160/80+80MHz or not, and EHT CCFS.

* + <=160MHz channelization is announced through HT/VHT/HE Operation element
  + An EHT AP/STA uses HT/VHT/EHT Operation element to announce the BW that is not more than 160/80+80MHz and doesn’t include punctured 20MHz channels

**Discussioin:**

C:Silde 2, the punctured operating channel means that BSS channel is punctured statiscally before announcement.Right?

A: Yes. This is two. One is statiscal one. Annouced by an operating element. Another is dynamical one. This is two possbile.

C: we can puncture 20MHz channel space by CCA . I’m wondering what are the use cases or advantages with a static punctured operating channel.

A: the interference with a incumbent users.

C: Due to the incumbent STAs, the inferference of a BSS.

A: Yes, the static punctured channel is mainly used for incumbent users.

C: on slide 9 unpunctured 20MHz channel is never punctured. it may this design impacts on the PHY design.

A: This STA has a single receiver. STA need to decode from 120MHz SIG or Trigger frame. ... .

C: Slide 6, if the BA problem, what do you think about RTS/CTS? Then, the CTS cannot be sent more than 160.

A: Basically, AP will not use RTS/CTS. For MU-RTS/CTS, it can do something by MU-RTS/CTS.

C: But CTS transmission only limits to 160.

...

C: Two questions. First is for the statical proposal, when the ... probably 80 or 160. How does the legacy STA know that?

A: I did not discuss dynamic one. If this dynamic punctured address legacy STA you will not use the wider bandwidth.

....

C: Two things are I want to check with you. First is about statical puncturing. It’s incumbent. Is it only for 6GHz right?

A: At least 6GHz band. But I’m not sure for 5ghz.

C: How about 11ax?

A: what do you mean 11ax AP?

C: Basically, 11ax also is in 6GHz band. There are also incumbents

A: I can’t answer.

C: just reminder me that how we will deal with this in 11ax.

1. [1993r1](https://mentor.ieee.org/802.11/dcn/19/11-19-1993-01-00be-discussion-about-single-and-multiple-primary-channels-in-synchronous-multi-link.pptx) Discussion about single and multiple primary channels in synchronous multi-link (Yunbo Li)

**Summary:** Explain the effects and issues of multiple primary link for non-STR operation. Suggesting the single primary link

**Discussioin:**

C: I have a clarification. In your presentation, you assume a single primary link you prefered. a single primary channel is used for management frame like beacon or use for the channel access?

A: only talk about the channel access. Not touch for management. Here for channel access

C: for channel access. If one link is occupied by OBSS, we allow this MLD to transmit to other link.

A: We have the prefered solution one primary link.

...

C: clarification questions. When you access the link used on primary, ... I expected other link are you planing to ... from other link or what you have in mind?

A: It’s for simplexity It’s just PIFS sensing. ... So, My preference uses PIFS check on the secondary link.

C: Have you thought PIFS access is allowed from regulatory point.

A: Is this different from 80+80? What is difference from two scenarios?

C:Regulatory I think it may not be like policy. We cannot use PIFS. Because, PIFS is .11 terminology.

....

Chair: Please go to offine discussion. It’s not easy one.

C: Second question. You’re considering R1 or R2?

A: I agree that from the priority level, that maybe should go STR one. not thinking it’s better to complete leave to R2. .... we parallel discussion on STR and non-STR. Make it more easy.

C: non-STR should in R2, R1 preclude it.

A: At least we shouldn’t exclude it.

1. 1305r1 Synchronous multi-link transmission (Yongho Seok)

**Summary:**

To avoid that a STA transmit and receive frames on multi-link simultaneously, it may synchronize the starting times and ending times of the PPDU transmissions on multi-link.

discusses a synchronization requirement of the PPDU transmissions

**Discussioin:**

C: This PPDU alignment and ending are you motivating the constraints AP MLD or AP is non-contraints and non-AP is constraints?

A: Contraints is generalized. in the SP, AP MLD is not required. This is non-STR MLD. But Usually AP MLD regards it. ...

C: AP is STR, non-STR devices. In this case, you want to alignment the ending?

A: Yes

C: I think ending time alignment is very important for the case that ...? I don’t think we agree with fixing this requirement. ... Maybe we should run the SPs to mandate ending time alignment on AP side?

A: we can do. Basically, this is not that the AP that is aligned.

C: I’m not against this proposal. This proposal is good. Firstly make mandating the requirement on AP side. Ending time alignment is needed?

A: Do you suggest the SP?

C: In your presentation, you mention 10% of SIFS. I don’t see in other texts you . In your straw poll, that is TBD. You have other factor? What do you think?

A: Still receiving the offline comments. They want the feedback from PHY. I want to give more time for detailed value.

C: second Zhou’s comment. Probably, this SP is static is fine. We will probably need to first agree that the PPDU alignment ....

C: maybe you need to work with zhou. Mandatory requirement.

A: another separate topic..

C: I will allocate the 10 min for Q&A

**The meeting was adjourned at 13:00**