IEEE P802.11 Wireless LANs

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| Minutes for TGbe MAC Ad-Hoc teleconferences in November 2020 and Janunary 2021 | | | | |
| Date: 2020-11-02 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | Email |
| Jeongki Kim | LG Electronics |  |  |  |
| Liwen Chu | NXP |  |  |  |
|  |  |  |  |  |

Abstract

This document contains the meeting minutes for the TGbe MAC ad hoc teleconferences held in November 2020 and January 2021.

Revisions:

* Rev0: Added the minutes from the telephone conferences held on November 02, 2020.
* Rev1: Added the minutes from the telephone conferences held on November 05, 2020.

**Monday 02 November 2020, 19:00 –21:00 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, NXP) calls the meeting to order at 19:05am 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 using IMAT for recording the attendance.
   * Please record your attendance during the conference call by using the IMAT system:
     1. 1) login to [imat](https://imat.ieee.org/attendance), 2) select “802.11 Telecons (<Month>)” entry, 3) select “C/LM/WG802.11 Attendance” entry, 4) click “TGbe <MAC/PHY/Joint> conference call that you are attending.
   * If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Liwen Chu ([liwen.chu@nxp.com](mailto:liwen.chu@nxp.com)) and Jeongki Kim ([jeongki.kim@lge.com](mailto:jeongki.kim@lge.com))

**Recorded attendance through Imat and e-mail:**

|  |  |  |
| --- | --- | --- |
| Timestamp | Name | Affiliation |
| 11/2 | Abdelaal, Rana | Broadcom Corporation |
| 11/2 | AbidRabbu, Shaima' | Istanbul Medipol University; Vestel |
| 11/2 | Aboulmagd, Osama | Huawei Technologies Co.,  Ltd |
| 11/2 | Abushattal, Abdelrahman | Istanbul Medipol university ;Vestel |
| 11/2 | Adachi, Tomoko | TOSHIBA Corporation |
| 11/2 | Adhikari, Shubhodeep | Broadcom Corporation |
| 11/2 | Agarwal, Peyush | Broadcom Corporation |
| 11/2 | Akhmetov, Dmitry | Intel Corporation |
| 11/2 | Aldana, Carlos | Facebook |
| 11/2 | Asai, Yusuke | Nippon Telegraph and Telephone Corporation (NTT) |
| 11/2 | Au, Oscar | Origin Wireless |
| 11/2 | Baek, SunHee | LG ELECTRONICS |
| 11/2 | Bajko, Gabor | MediaTek Inc. |
| 11/2 | Banerjea, Raja | Qualcomm Incorporated |
| 11/2 | Bankov, Dmitry | IITP RAS |
| 11/2 | Bapat, Sanjay | Maxlinear |
| 11/2 | baron, stephane | Canon Research Centre France |
| 11/2 | Berkema, Alan | HP Inc. |
| 11/2 | Boldy, David | Broadcom Corporation |
| 11/2 | Bravo, Daniel | Intel Corporation |
| 11/2 | Cariou, Laurent | Intel Corporation |
| 11/2 | Carney, William | Sony Corporation |
| 11/2 | Cavalcanti, Dave | Intel Corporation |
| 11/2 | Cepni, Gurkan | Apple, Inc. |
| 11/2 | CHAN, YEE | Facebook |
| 11/2 | Chen, Evelyn | Ericsson AB |
| 11/2 | chen, jindou | Huawei Technologies Co. Ltd |
| 11/2 | Chen, Na | MaxLinear Corp |
| 11/2 | Cheng, Paul | MediaTek Inc. |
| 11/2 | CHERIAN, GEORGE | Qualcomm Incorporated |
| 11/2 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| 11/2 | Coffey, John | Realtek Semiconductor Corp. |
| 11/2 | Cordeiro, Carlos | Intel Corporation |
| 11/2 | Das, Dibakar | Intel Corporation |
| 11/2 | Das, Subir | Perspecta Labs Inc. |
| 11/2 | da Silva, Claudio | Intel Corporation |
| 11/2 | Derham, Thomas | Broadcom Corporation |
| 11/2 | de Vegt, Rolf | Qualcomm Incorporated |
| 11/2 | Ding, Baokun | Huawei Technologies Co. Ltd |
| 11/2 | Dong, Xiandong | Xiaomi Inc. |
| 11/2 | Du, Zhenguo | Huawei Technologies Co.,  Ltd |
| 11/2 | Erceg, Vinko | Broadcom Corporation |
| 11/2 | Fang, Juan | Intel |
| 11/2 | Fang, Yonggang | Self |
| 11/2 | Fischer, Matthew | Broadcom Corporation |
| 11/2 | Gan, Ming | Huawei Technologies Co., Ltd |
| 11/2 | Garg, Lalit | Broadcom Corporation |
| 11/2 | Ghosh, Chittabrata | Intel Corporation |
| 11/2 | Gidvani, Ravi | SAMSUNG |
| 11/2 | Guo, Yuchen | Huawei Technologies Co., Ltd |
| 11/2 | Haider, Muhammad Kumail | Facebook |
| 11/2 | Hamilton, Mark | Ruckus/CommScope |
| 11/2 | Han, Jonghun | SAMSUNG |
| 11/2 | HAN, Xiao | Huawei Technologies Co., Ltd |
| 11/2 | Han, Zhiqiang | ZTE Corporation |
| 11/2 | Hansen, Christopher | Covariant Corporation |
| 11/2 | Henry, Jerome | Cisco Systems, Inc. |
| 11/2 | Hirata, Ryuichi | Sony Corporation |
| 11/2 | Hiroki, Shigeru | Canon |
| 11/2 | Ho, Duncan | Qualcomm Incorporated |
| 11/2 | Hong, Hanseul | WILUS Inc. |
| 11/2 | Hsu, Chien-Fang | MediaTek Inc. |
| 11/2 | Hu, Chunyu | Facebook |
| 11/2 | Hu, Glenn | Tencent |
| 11/2 | Huang, Guogang | Huawei |
| 11/2 | Huang, Po-Kai | Intel Corporation |
| 11/2 | IDO, Tetsuo | Canon |
| 11/2 | Inohiza, Hirohiko | Canon |
| 11/2 | Inoue, Yasuhiko | Nippon Telegraph and Telephone Corporation (NTT) |
| 11/2 | Jang, Insun | LG ELECTRONICS |
| 11/2 | Ji, Chenhe | Huawei Technologies Co. Ltd |
| 11/2 | Jiang, Jinjing | Apple, Inc. |
| 11/2 | Jones, Vincent Knowles IV | Qualcomm Incorporated |
| 11/2 | Jung, hyojin | Hyundai Motor Company |
| 11/2 | JUNG, MYUNG CHEUL | Pantech Inc. |
| 11/2 | Kain, Carl | USDoT |
| 11/2 | Kakani, Naveen | Qualcomm Incorporated |
| 11/2 | kamath, Manoj | Broadcom Corporation |
| 11/2 | Kandala, Srinivas | SAMSUNG |
| 11/2 | Kang, Hyunduk | Electronics and Telecommunications Research Institute (ETRI) |
| 11/2 | Khan, Naseem | Leidos Engineering. LLC |
| 11/2 | Kim, Jeongki | LG ELECTRONICS |
| 11/2 | kim, namyeong | LG ELECTRONICS |
| 11/2 | Kim, Sang Gook | LG ELECTRONICS |
| 11/2 | Kim, Sanghyun | WILUS Inc |
| 11/2 | Kim, Yongho | Korea National University of Transportation |
| 11/2 | Kishida, Akira | Nippon Telegraph and Telephone Corporation (NTT) |
| 11/2 | Klein, Arik | Huawei Technologies Co. Ltd |
| 11/2 | Klimakov, Andrey | Huawei Technologies Co., Ltd |
| 11/2 | Kneckt, Jarkko | Apple, Inc. |
| 11/2 | Ko, Geonjung | WILUS Inc. |
| 11/2 | Kondo, Yoshihisa | Advanced Telecommunications Research Institute International (ATR) |
| 11/2 | Kondylis, George | Broadcom Corporation |
| 11/2 | kristem, vinod | Intel Corporation |
| 11/2 | Kumar, Manish | Marvell Semiconductor, Inc. |
| 11/2 | Kwak, Jin-Sam | WILUS Inc. |
| 11/2 | Kwon, Young Hoon | NXP Semiconductors |
| 11/2 | Lan, Zhou | Broadcom Corporation |
| 11/2 | Lee, Hyeong Ho | Netvision Telecom Inc. |
| 11/2 | Lee, Jae Seung | Electronics and Telecommunications Research Institute (ETRI) |
| 11/2 | Lee, Nancy | Signify |
| 11/2 | Lepp, James | BlackBerry |
| 11/2 | Levitsky, Ilya | IITP RAS |
| 11/2 | Levy, Joseph | InterDigital, Inc. |
| 11/2 | Li, Bo | Northwestern Polytechnical University |
| 11/2 | Li, Jianhui | Huawei Technologies Co.,  Ltd |
| 11/2 | Li, Nan | ZTE Corporation |
| 11/2 | Li, Yanchun | Huawei Technologies France S.A.S.U. |
| 11/2 | Li, Yiqing | Huawei Technologies Co. Ltd |
| 11/2 | Li, Yunbo | Huawei Technologies Co., Ltd |
| 11/2 | Lindskog, Erik | SAMSUNG |
| 11/2 | Liu, Jeff | Broadcom Corporation |
| 11/2 | Liu, Jianfei | HUAWEI |
| 11/2 | Liu, Yong | Apple, Inc. |
| 11/2 | Lou, Hanqing | InterDigital, Inc. |
| 11/2 | Lu, kaiying | MediaTek Inc. |
| 11/2 | Lu, Liuming | ZTE Corporation |
| 11/2 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| 11/2 | Ma, Mengyao | HUAWEI |
| 11/2 | Mashimo, Hiroshi | Canon |
| 11/2 | Mehrnoush, Morteza | Facebook |
| 11/2 | Merlin, Simone | Qualcomm Incorporated |
| 11/2 | Monajemi, Pooya | Cisco Systems, Inc. |
| 11/2 | Montemurro, Michael | Huawei |
| 11/2 | Moon, Juseong | Korea National University of Transportation |
| 11/2 | Murti, Wisnu | SeoulTech |
| 11/2 | Myles, Andrew | Cisco Systems, Inc. |
| 11/2 | NAGATA, KENGO | Nippon Telegraph and Telephone Corporation (NTT) |
| 11/2 | Nakano, Hiroki | CAHI Corporation; Kyoto University |
| 11/2 | NANDAGOPALAN, SAI SHANKAR | Cypress Semiconductor Corporation |
| 11/2 | Naribole, Sharan | SAMSUNG |
| 11/2 | Nezou, Patrice | Canon Research Centre France |
| 11/2 | Nguyen, An | DHS/CISA |
| 11/2 | Nurani Krishnan, Neelakantan | Qualcomm Incorporated |
| 11/2 | Okada, Hiraku | Nagoya University |
| 11/2 | Orr, Stephen | Cisco Systems, Inc. |
| 11/2 | Ouchi, Masatomo | Canon |
| 11/2 | Palayur, Saju | Maxlinear Inc |
| 11/2 | Palm, Stephen | Broadcom Corporation |
| 11/2 | Pan, Chun | HUAWEI |
| 11/2 | Park, Minyoung | Intel Corporation |
| 11/2 | Patil, Abhishek | Qualcomm Incorporated |
| 11/2 | Patwardhan, Gaurav | Hewlett Packard Enterprise |
| 11/2 | Perahia, Eldad | Hewlett Packard Enterprise |
| 11/2 | Petrick, Albert | InterDigital, Inc. |
| 11/2 | Petry, Brian | Broadcom Corporation |
| 11/2 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| 11/2 | QIU, WEI | Huawei Technologies Co., Ltd |
| 11/2 | Raissinia, Alireza | Qualcomm Incorporated |
| 11/2 | Rantala, Enrico-Henrik | Nokia |
| 11/2 | Rege, Kiran | Perspecta Labs |
| 11/2 | Regev, Dror | Toga Networks (a Huawei Company) |
| 11/2 | Rolfe, Benjamin | Blind Creek Associates |
| 11/2 | Rosdahl, Jon | Qualcomm Technologies, Inc. |
| 11/2 | Salem, Mohamed | Huawei Technologies Co., Ltd |
| 11/2 | Sambasivan, Sam | AT&T |
| 11/2 | Sandhu, Shivraj | Qualcomm Incorporated |
| 11/2 | Seok, Yongho | MediaTek Inc. |
| 11/2 | Shen, Xiaoman | Huawei Technologies Co.,  Ltd |
| 11/2 | Son, Ju-Hyung | WILUS Inc. |
| 11/2 | Stacey, Robert | Intel Corporation |
| 11/2 | Stott, Noel | Keysight Technologies |
| 11/2 | Su, Hang | Broadcom Corporation |
| 11/2 | SU, HONGJIA | Huawei Technologies Co.,  Ltd |
| 11/2 | Sumi, Takenori | Mitsubishi Electric Corporation |
| 11/2 | Sun, Li-Hsiang | InterDigital, Inc. |
| 11/2 | Sun, Yanjun | Qualcomm Incorporated |
| 11/2 | Sun, Yingxiang | Huawei Technologies Co. Ltd |
| 11/2 | Sundaram, Rajesh | Broadcom Corporation |
| 11/2 | SURACI, FRANK | U.S. Department of Homeland Security |
| 11/2 | Tadahal, Shivkumar | Broadcom Corporation |
| 11/2 | Tan, Danny | Huawei Technologies Co., Ltd |
| 11/2 | Tanaka, Yusuke | Sony Corporation |
| 11/2 | Tolpin, Alexander | Intel Corporation |
| 11/2 | Tomoyuki, Takada | Canon |
| 11/2 | Torab Jahromi, Payam | Facebook |
| 11/2 | Umehara, Makoto | Canon |
| 11/2 | Verma, Sindhu | Broadcom Corporation |
| 11/2 | Vicent Colonques, Santiago | Maxlinear Corp |
| 11/2 | VIGER, Pascal | Canon Research Centre France |
| 11/2 | Wang, Chao Chun | MediaTek Inc. |
| 11/2 | Wang, Hao | Tencent |
| 11/2 | Wang, Huizhao | Quantenna Communications, Inc. |
| 11/2 | Wang, Lei | Huawei R&D USA |
| 11/2 | Wang, Qi | Huawei Technologies Co., Ltd |
| 11/2 | Wang, Qi | Apple, Inc. |
| 11/2 | Wang, Xiaofei | InterDigital, Inc. |
| 11/2 | Want, Roy | Google |
| 11/2 | Wu, Hao | XGIMI Technology Co.Ltd |
| 11/2 | Wullert, John | Perspecta Labs |
| 11/2 | Xin, Liangxiao | Sony Corporation |
| 11/2 | Xu, Yanchao | Zeku |
| 11/2 | Xue, Qi | Qualcomm Incorporated |
| 11/2 | Yan, Zhongjiang | Northwestern Polytechnical University |
| 11/2 | Yang, Bo | Huawei Technologies Co. Ltd |
| 11/2 | Yang, Jay | Nokia |
| 11/2 | Yang, Mao | Northwestern Polytechnical University |
| 11/2 | Yang, Xun | Huawei Technologies Co., Ltd |
| 11/2 | Yang, Yunsong | Futurewei Technologies |
| 11/2 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| 11/2 | Yee, James | MediaTek Inc. |
| 11/2 | yi, yongjiang | Futurewei Technologies |
| 11/2 | Yoshikawa, Yuki | Canon |
| 11/2 | Zein, Nader | NEC Laboratories Europe |
| 11/2 | Zeng, Yan | Huawei Technologies Co.,  Ltd |
| 11/2 | Zhang, Meihong | Huawei Technologies Co., Ltd |
| 11/2 | Zhou, Yifan | Huawei Technologies Co., Ltd |
| 11/2 | Zou, Tristan | Qualcomm Incorporated |
| 11/2 | Zuo, Xin | Tencent |

The Chair reminds that the agenda can be found in 11-20/1615r5. The agenda is modified

**Submissions**

* 1. [992r4](https://mentor.ieee.org/802.11/dcn/20/11-20-0992-04-00be-mac-pdt-nsep-tbds.docx) **MLO mandatory/optional** Laurent Cariou [7 SPs]

**SP #2:**

* **Do you agree to add the following to the SFD**
  + the MLO basic framework support is mandatory for 11be AP and 11be STA
    - discovery procedure, Setup procedures, Security procedures, default mapping (all TIDs mapped to all links, all setup links enabled), TIM indicating BUs at MLD level, BA at MLD level, Power save per link, Power state change indications per link
    - Note: TSF alignment rules on AP MLD side TBD
    - Note: Single radio single band capable STA and AP TBD
    - Note: TID-mapping and other link operations (enable/disable/add/remove) are TBD

**Discussion:**

C: Several TBD are here.

C: Not sure that some parts should be basic framework. Mandatory is fine.

C: I’m not sure that the TSF alignment rules should be TBD. Maybe it’s motion or SP?

A: I haven’t run the SP.

C: how does the single radio single band capable STA perform the MLO operation?

C: Those should not be note.

SP text is changed as following:

**SP #2:**

* **Do you agree to add the following to the SFD**

the support of the following MLO features is mandatory for 11be AP and 11be STA- discovery procedure, Setup procedures, Security procedures, default mapping (all TIDs mapped to all links, all setup links enabled), TIM indicating BUs at MLD level, BA at MLD level, Power save per link, Power state change indications per link, BSS parameter critical update procedure

Note: the above does not preclude other functionalities being added to the list

68/8/31

* 1. [1722r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1722-00-00be-mac-pdt-nsep-tbds.docx) PDT for TBDs Subir Das

Summary: Proposes the PDT for NS/NE priority access

Discussion:

C: What information is getting for this authorization?

C: How is this authorized?

C: This information is going to be out of the scope.

C: AP can also use other procedures for this authorization information.

A: Yes. It could be. Interaction with SSPN.

A: Basically, If the SSPNInterfaceActivated is set to true, this NSEP service via SSPN could be supported

C: What is the old AP and new AP for?

A: That is related to reassociation.

C: The second last paragraph has still TBD. Is this neogotiation for enabling or disalbing?

A: This is not about enable and disable.

C: After disable, this priority access is not used?

A: Yes

C: Is this diable procedure two way handshake procedure?

C: What happen if the non-AP does not respond this request?

SP is defered

* 1. [1312r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1312-00-00be-triggered-su-ppdu-for-11ber1.pptx) Triggered SU PPDU for 11be R1 Dibakar Das

Summary: Proposing for non-AP to send UL/P2P SU PPDU through the resource allocated by AP

Discussion:

C: This is similar to HCCA mechanism.

A: HCCA triggers the CF-Poll frame.

C: slide 5, after MU-RTS and CTS, STA sends PPDU here, in 11ax, AP sends PPDUs. This is differece between them.

C: Why do you use MU-RTS instead of Trigger frame?

A: MU-RTS is also the type of Trigger frame.

C: This scheme is also for single link. This could be adopt to multi-link?

A: Yes.

C: In this case, TXOP duration is different on each link?

A: It depends on the STA type. STR STA has different TXOP on each link. NSTR could have the same TXOP.

C: P2P STA also has PIFS error recovery procedure?

C: slide 5, NAV resetting rule discussion. If STA receives MU-RTS frame and does not receive CTS , the STA can reset the NAV.

C: Why this STA need to know intra-TXOP SP?

C: I have similar comment on the sequence of MU-RTS/CTS procedure.

C: It seems like RDG.

A: RDG can allow the entire time duration for it. RDG can control only one STA.

C: You may extend this to more than one STA?

A: Yes. Maybe R2

C: If this is for single User, why not use RTS/CTS procedure?

C: New type of Trigger frame is good to me instead of reuse MU-RTS. You don’t need to combine this allocation and channel protection mechanism.

SP is defered

* 1. [1730r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1730-01-00be-ul-sync-channel-access-procedure.pptx) UL Sync Channel Access Procedure Yongho Seok et. al. [1 SP]

Summary: Proposing that when BO becomes zero, the STA does not send a frame and keeps BO , and then the STA MLD can send the frame with other link’s transmission

Discussion:

C: channel is busy, if slot boundary is aligned busy/idle status, what happens?

C: When BO becomes zero and keep BO, if the channel is busy, SP text can not cover that procedure. In this case, STA needs to check the channel status.

* **Do you support an STA that is affiliated with a non-STR MLD shall follow the channel access procedure described below?**
  1. The STA may initiate transmission on a link when the medium is idle and one of the following conditions is met:
     1. The backoff counter of the STA reaches zero on a slot boundary of that link.
     2. The backoff counter of the STA is already zero, and the backoff counter of another STA of the affiliated MLD reaches zero on a slot boundary of the link that the other STA operates.
  2. When the backoff counter of the STA reaches zero, it may choose to not transmit and keep its backoff counter at zero.
  3. If the backoff counter of the STA has already reached zero, it may perform a new backoff procedure. CW[AC] and QSRC[AC] is left unchanged.

SP is deferred

The meeting was recessed at 21:00 ET

**Thursday 05 November 2020, 09:00 –11:00 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, NXP) calls the meeting to order at 09:00am 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 using IMAT for recording the attendance.
   * Please record your attendance during the conference call by using the IMAT system:
     1. 1) login to [imat](https://imat.ieee.org/attendance), 2) select “802.11 Telecons (<Month>)” entry, 3) select “C/LM/WG802.11 Attendance” entry, 4) click “TGbe <MAC/PHY/Joint> conference call that you are attending.
   * If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Liwen Chu ([liwen.chu@nxp.com](mailto:liwen.chu@nxp.com)) and Jeongki Kim ([jeongki.kim@lge.com](mailto:jeongki.kim@lge.com))

**Recorded attendance through Imat and e-mail:**

The Chair reminds that the agenda can be found in 11-20/1615r5. The agenda is modified

**Submissions**

1. [992r4](https://mentor.ieee.org/802.11/dcn/20/11-20-0992-04-00be-mac-pdt-nsep-tbds.docx) **MLO mandatory/optional** Laurent Cariou [7 SPs]

* **SP #5: Do you agree to add the following to the SFD**
  + An AP MLD shall support operation with single radio non-AP MLD

Discussion:

C: The SP text is not clear to me. What does it mean support here?

A: Ok, I can change it based on the comment.

* **SP #5: Do you agree to add the following to the SFD**

An AP MLD shall be able to serve a single radio non-AP MLD

**Approved with unanimous consent**

* **SP#7: Do you agree to add the following to the SFD:**
  + An STR AP MLD with 2 or more affiliated EHT APs
    - shall be capable to receive a PPDU on one each EHT AP link independently to the transmit/reception status on the other affiliated EHT APs links
    - shall be capable to transmit concurrent PPDUs simultaneously to the same non-AP MLD by at least two affiliated EHT APs on at least one pair of links among all the affiliated EHT APs possible pairs of links
    - shall support asynch channel access across all the affiliated EHT APs links

Discussion:

C: This requirement is AP MLD only?

A: Yes

C: On second bullet, is it for non-STR?

A: It’s for STR. This is just for channel aggregation.

C: Do we need all the affiliated EHT APs there?

A: I can delete it.

C: at least one pair of links…? Do you mean that there are two APs?

A: Yes, I can change it like that.

C: AP MLD only contains EHT APs?

A: Currently it’s right. At the future, it can mean other than EHT AP.

C: Add the note.

C: concurrent PPDU means the alignment of start time?

A: No, it means overlapped.

SP texts are changed.

**SP#7: Do you agree to add the following to the SFD:**

An STR AP MLD with 2 or more affiliated EHT APs

* shall be capable to receive a PPDU on each affiliated EHT AP independently to the transmit/reception status on the other affiliated EHT APs
* shall be capable to transmit concurrent PPDUs simultaneously to the same non-AP MLD by at least two affiliated EHT APs on at least 2 affiliated EHT APs of the AP MLD
* shall support asynch channel access across all the affiliated EHT APs linksNote: all APs affiliated with an AP MLD are EHT APs

96/6/42

1. [1730r](https://mentor.ieee.org/802.11/dcn/20/11-20-1730-03-00be-ul-sync-channel-access-procedure.pptx)3 UL Sync Channel Access Procedure Yongho Seok et. al. [1 SP]

Summary: Added slide 8 compared to previous version which is relate to busy channel status. In busy cases, STA may not perform a new backoff procedure or may perform a new backoff procedure.

Discussion:

C: In slide 8, if the STA3 checks the CCA before sending the frame, how long the STA need to wait? SIFS or PIFS? Do we need anything?

C: may not or may? What does it mean? Does it mean STA’s decision?

A: Yes

A: This is general direction. We will have more discussion on the details.

* **Do you support an STA that is affiliated with a non-STR MLD shall follow the channel access procedure described below?**
  1. The STA may initiate transmission on a link when the medium is idle and one of the following conditions is met:
     1. The backoff counter of the STA reaches zero on a slot boundary of that link.
     2. The backoff counter of the STA is already zero, and the backoff counter of another STA of the affiliated MLD reaches zero on a slot boundary of the link that the other STA operates.
  2. When the backoff counter of the STA reaches zero, it may choose to not transmit and keep its backoff counter at zero.
  3. If the backoff counter of the STA has already reached zero, it may perform a new backoff procedure. CW[AC] and QSRC[AC] is left unchanged.

82/23/52

1. [968r2](https://mentor.ieee.org/802.11/dcn/20/11-20-0968-02-00be-multi-link-rts-cts-operations-with-non-str-sta-mld.pptx) Multi-link RTS-CTS operations with non-STR STA MLD Ronny Y. Kim

Summary: Proposes **several cases for a semi-synchronized ML RTS-CTS procedure**

* + Case1: Second link’s backoff success < First link’s CTS TX start time
  + Case2: Second link’s backoff success < First link’s PPDU TX start time
  + Case3: Second link’s backoff success > First link’s PPDU TX start time

**it is recommended not to transmit RTS frame on the second link when using a semi-synchronized ML transmission**

Discussion:

C: slide 7, you’re suggesting that AP2 sends CTS-to-self. STA2 sets the NAV based on it. In case of multiple frame exchanges, STA2 may not change any frame.

A: I’ll think about it more.

C: slide 7, if AP is non-STR AP, it’s not possible.

A: Here, I don’t consider non-STR AP. Just STR AP.

C: AP2 sends CTS-to-self. Here if the channel is busy, how does the AP send it?

A: We can reuse the UL sync tx mechanism.

C: Is it yongho’s suggestion?

A: Yes.

A: CTS to self is just to protect the TXOP.

C: Do you consider only CTS frame?

A: Yes, here STA just sends on link 1. The lengths are same on both links.

C: RTS is mandatory in 11ax based on the frame length.

C: Similar to old Zhou’s contributions. Please check it.

A: I haven’t checked it.

C: Why do you prevent to send RTS? AP can send RTS.

C: We already discussed these issues several months ago. I don’t like them. RTS and CTS are short frames. I don’t think it’s critical issue.

Not running SP

1. [1062r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1062-00-00be-error-recovery-for-non-str-mld.pptx) Error recovery for non-STR MLD Yunbo Li

Summary:

* **Potential error recovery scenarios for response non-STR MLD are listed, and possible solutions are introduced;**
* **Several factors are considered during the design**
  + Avoid simultaneous transmit and receive for non-STR non-AP MLD
  + Initiating AP MLD may also be non-STR MLD (soft AP)
  + Delay of cross link information exchange

Discussion:

C: slide 5, Regarding the STR AP, the start time of PPDU is not critical. Just end time is critical.

A: This is just non-STR AP.

C: Ok, slide 10,

A: Here, the start time can not be aligned.

C: There are several cases, one is that BA only on one link is not received, the other case is that Bas on two links are not received.

A: Additionally, delayed cross link exchanged delay can be considered.

C: slide 11 seems like be covered by Younghoon’s contribution.

A: it does not consider cross link delay.

C: slide 5, are you proposing that the gap between BA and next PPDU is PIFS?

A: if you consider delayed cross link

C: slide 7, the gap between BA10 and PPDU11 should be PIFS?

A: Yes right. It should be changed.

C: BA size could be different on each link corresponding to MCS and several factors. But you’re assuming the size is same.

C: If the exchanged delay is larger, how can the AP or non-AP sychronize?

A: If the delay happens, how can the PPDU be synchronized? We can have more offline discussion

* SP 1: **Do you agree to allow PIFS time interval between the ending of successful response frame and following PPDU for non-STR AP MLD in R1?**

C: Are you allowing only PIFS here or PIFS and SIFS?

A: Basically, STA chooses SIFS after successful reception.

C: Is it within TXOP?

A: Yes.

C: Is this only for non-STR AP?

A: non-STR non-AP MLD can be used

C: how about STR AP?

A: No issue for STR AP.

SP is defered

The meeting is adjourned at 11am ET.