IEEE P802.11  
Wireless LANs

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| Minutes for TGbe MAC Ad-Hoc teleconferences in March and May 2020 | | | | |
| Date: 2020-05-11 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Liwen Chu | NXP |  |  |  |
| Jeongki Kim | LG Electronics |  |  |  |
|  |  |  |  |  |

Abstract

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

Revisions:

* Rev0: Added the minutes from the telephone conferences held on May 11, 2020.

**Monday 11 May 2020, 19:00 – 22:00 ET (TGbe MAC ad hoc conference call)**

Chairman: Jeongki Kim (LG Electronics)

Secretary: Liwen Chu (NXP)

This meeting took place using a webex session.

**Introduction**

1. The Chair (Jeongki, LG) calls the meeting to order at 19:04 EDT. The Chair introduces himself and the Secretary, Liwen Chu (NXP)
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 Jeongki Kim ([jeongki.kim@lge.com](mailto:jeongki.kim@lge.com)) and Liwen Chu ([liwen.chu@nxp.com](mailto:liwen.chu@nxp.com))
   * The Webex app indicates about 99 people on the call.  
       
     **Recorded attendance through Imat and e-mail:**

|  |  |  |
| --- | --- | --- |
| Timestamp | Name | Affiliation |
| 5/11 | Adachi, Tomoko | TOSHIBA Corporation |
| 5/11 | Akhmetov, Dmitry | Intel Corporation |
| 5/11 | Andersdotter, Amelia | None - Self-funded |
| 5/11 | Au, Kwok Shum | Huawei Technologies Co., Ltd |
| 5/11 | Bredewoud, Albert | Broadcom Corporation |
| 5/11 | Cariou, Laurent | Intel Corporation |
| 5/11 | Carney, William | Sony Corporation |
| 5/11 | CHAN, YEE | Facebook |
| 5/11 | Cheng, Paul | MediaTek Inc. |
| 5/11 | CHERIAN, GEORGE | Qualcomm Incorporated |
| 5/11 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| 5/11 | Chu, Liwen | NXP Semiconductors |
| 5/11 | Das, Dibakar | Intel Corporation |
| 5/11 | Das, Subir | Perspecta Labs Inc. |
| 5/11 | Derham, Thomas | Broadcom Corporation |
| 5/11 | de Vegt, Rolf | Qualcomm Incorporated |
| 5/11 | Ding, Baokun | Huawei Technologies Co. Ltd |
| 5/11 | Dong, Xiandong | Xiaomi Inc. |
| 5/11 | Fang, Yonggang | ZTE TX Inc |
| 5/11 | Fischer, Matthew | Broadcom Corporation |
| 5/11 | Gan, Ming | Huawei Technologies Co., Ltd |
| 5/11 | Garg, Lalit | Broadcom Corporation |
| 5/11 | Guo, Qiang | InfomTechnologies |
| 5/11 | Guo, Yuchen | Huawei Technologies Co., Ltd |
| 5/11 | Gwak, Yongsu | Personnel |
| 5/11 | Hamilton, Mark | Ruckus/CommScope |
| 5/11 | Han, Jonghun | SAMSUNG |
| 5/11 | Han, Zhiqiang | ZTE Corporation |
| 5/11 | Ho, Duncan | Qualcomm Incorporated |
| 5/11 | Hu, Chunyu | Facebook |
| 5/11 | Huang, Guogang | Huawei |
| 5/11 | Huang, Po-Kai | Intel Corporation |
| 5/11 | Inoue, Yasuhiko | Nippon Telegraph and Telephone Corporation (NTT) |
| 5/11 | Jang, Insun | LG ELECTRONICS |
| 5/11 | Jiang, Jinjing | Apple, Inc. |
| 5/11 | Jung, hyojin | Hyundai Motor Company |
| 5/11 | Kain, Carl | USDoT |
| 5/11 | Kandala, Srinivas | SAMSUNG |
| 5/11 | kim, namyeong | LG ELECTRONICS |
| 5/11 | Kim, Sang Gook | LG ELECTRONICS |
| 5/11 | Kim, Sanghyun | WILUS Inc |
| 5/11 | Kim, Yongho | Korea National University of Transportation |
| 5/11 | Kishida, Akira | Nippon Telegraph and Telephone Corporation (NTT) |
| 5/11 | Kneckt, Jarkko | Apple, Inc. |
| 5/11 | Kondo, Yoshihisa | Advanced Telecommunications Research Institute International (ATR) |
| 5/11 | Kwon, Young Hoon | NXP Semiconductors |
| 5/11 | Lalam, Massinissa | SAGEMCOM BROADBAND SAS |
| 5/11 | Levy, Joseph | InterDigital, Inc. |
| 5/11 | Li, Yiqing | Huawei Technologies Co. Ltd |
| 5/11 | Li, Yunbo | Huawei Technologies Co., Ltd |
| 5/11 | Liu, Yong | Apple, Inc. |
| 5/11 | Lou, Hanqing | InterDigital, Inc. |
| 5/11 | Lu, Liuming | ZTE Corporation |
| 5/11 | Lv, kaiying | MediaTek Inc. |
| 5/11 | Monajemi, Pooya | Cisco Systems, Inc. |
| 5/11 | NANDAGOPALAN, SAI SHANKAR | Cypress Semiconductor Corporation |
| 5/11 | Nezou, Patrice | Canon Research Centre France |
| 5/11 | Ouchi, Masatomo | Canon |
| 5/11 | Park, Minyoung | Intel Corporation |
| 5/11 | Park, Sung-jin | LG ELECTRONICS |
| 5/11 | Patil, Abhishek | Qualcomm Incorporated |
| 5/11 | Patwardhan, Gaurav | Hewlett Packard Enterprise |
| 5/11 | Raissinia, Alireza | Qualcomm Incorporated |
| 5/11 | Rosdahl, Jon | Qualcomm Technologies, Inc. |
| 5/11 | Seok, Yongho | MediaTek Inc. |
| 5/11 | Son, Ju-Hyung | WILUS Inc. |
| 5/11 | Song, Taewon | LG ELECTRONICS |
| 5/11 | Sun, Li-Hsiang | InterDigital, Inc. |
| 5/11 | Sun, Yanjun | Qualcomm Incorporated |
| 5/11 | Tanaka, Yusuke | Sony Corporation |
| 5/11 | Torab Jahromi, Payam | Facebook |
| 5/11 | Wang, Lei | Huawei R&D USA |
| 5/11 | Wang, Xiaofei | InterDigital, Inc. |
| 5/11 | Wu, Hao | XGIMI Technology Co.,Ltd |
| 5/11 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| 5/11 | Yee, James | MediaTek Inc. |
| 5/11 | yi, yongjiang | Futurewei Technologies |
| 5/11 | Yukawa, Mitsuyoshi | Canon, Inc. |
| 5/11 | Zhou, Yifan | Huawei Technologies Co., Ltd |

1. The Chair reminds that the agenda can be found in 11-20/735r0. The chair add an item about the time of additional MAC teleconference. The Chair asked for the comments bout the agenda. Hui-Zhao announced he will postpone his contribution 11-20/115. Kaiying announced her presentation 11-19/1547 was already presented. So 11-19/1547, 11-20/115 were removed from the agenda of today.
2. Discussuin of schedule time of additional teleconference:
   * Prefer 7:00om or 10:00am on Friday
   * Prefer 10:00am since it is better for Europe people.
   * It was announced in last week’s call. And there was no objection in the teleconference. It is better to comment when announcing/discussing the teleconference.
   * Zhou mentioned that his 292 is about R1, R2 discussion. It is better to move it to the session about R1, R2 discussion.
   * Tgbe chair said that it will happen in joint meeting in next week.
   * It is better in joint session since there is sone dependency between MAC PHY.
   * There was one request to defer the presentation 11-20/105 since the quthor can’t attend this meeting. 11-20/105 was removed from today’s agenda.
   * MAC chair runs the straw poll about rotating the time betweem 10:00am and 7:00pm on Wednesday.
   * The result is 31Y, 13N, 15A
3. Technical Submissions after the agenda discussion: **ML-Med Access**
   * [408r2](https://mentor.ieee.org/802.11/dcn/20/11-20-0408-02-00be-prioritized-edca-channel-access-over-latency-sensitive-links-in-mlo.pptx) Prioritized EDCA Channel Access Over Latency Sensitive Links in MLO (Chunyu Hu) [Cont.]
   * [~~1547r5~~](https://mentor.ieee.org/802.11/dcn/19/11-19-1547-05-00be-multi-link-operation-and-channel-access-discussion.pptx) ~~Multi-link-operation-and-channel-access-discussion (Kaiying Lu)~~
   * [469r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0469-00-00be-multi-link-channel-sensing.pptx) Multi-link channel sensing (Yonggang Fang)
4. Technical Submissions: **ML-General**
   * [1822r7](https://mentor.ieee.org/802.11/dcn/19/11-19-1822-07-00be-multi-link-security-consideration.pptx) Multi-link security consideration (Po-Kai Huang) [1 SP]
   * [069r2](https://mentor.ieee.org/802.11/dcn/20/11-20-0069-02-00be-multi-link-communication-mode-definition.pptx) Multi-link communication mode definition (Yonggang Fang) [2 SPs]
   * [~~105r4~~](https://mentor.ieee.org/802.11/dcn/20/11-20-0105-04-00be-link-latency-statistics-of-multi-band-operations-in-eht.pptx) ~~Link Latency Statistics of Multi-band Operations in EHT (Frank Hsu) [2 SPs]~~
   * [~~115r4~~](https://mentor.ieee.org/802.11/dcn/20/11-20-0115-04-00be-multi-link-feature-candidates-for-r1.pptx) ~~Multilink Feature Candidates For Release 1 (Huizhao Wang)~~
   * [~~292r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-0292-00-00be-mlo-typical-operating-scenarios-and-sub-feature-prioritization.pptx) ~~MLO Typical Operating Scenarios and Sub-feature prioritization (Zhou Lan)~~
   * [434r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0434-00-00be-multi-link-secured-retransmissions.pptx) Multi-link Secured Retransmissions (Rojan Chitrakar)
   * [472r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0472-00-00be-discussion-of-more-data-subfield-for-multi-link.pptx) Discussion of More Data subfield for multi-link (Yunbo Li)
   * 489r0 Applied Case Study of Multi-link Framework and Operation (Yoshihisa Kondo)
   * [562r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0562-00-00be-enhanced-multi-link-single-radio-operation.pptx) Enhanced multi-link single radio operation (Minyoung Park)
5. Technical Submissions: **MAC-General**
   * [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)
   * [463r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0463-00-00be-priority-access-support-options-for-ns-ep-serveices.pptx) Priority Access Support Options for NS/EP Services (Subir Das)
   * [468r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0468-00-00be-channel-access-category.pptx) Access-category (Yonggang Fang)
   * [569r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0569-00-00be-11be-txop-protection-and-coexistence-with-11ax.pptx) 11be-txop-protection-coexistence-11ax (Chunyu Hu)
   * [591r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0591-00-00be-channel-width-selection-for-various-frame-types-with-preamble-puncture-and-puncture-location-indication.pptx) Channel width selection for various frame types with preamble puncture and puncture location indication (Lochan Verma)
   * 624r0 EHT-Operation-Element-for-320MHz (Jason Yuchen Guo)
   * [680r0](https://mentor.ieee.org/802.11/dcn/20/11-20-0680-00-00be-operating-bandwidth-indication-for-eht-bss.pptx) Operating bandwidth indication for eht bss (Huang Guogang)

**Submissions**

1. 408r3 Prioritized EDCA Channel Access Over Latency Sensitive Links in MLO (Chunyu Hu) [Cont.]

Discussion:

C: it seems time-slot is assigned.

A: it is not same as scheduling. It is not like HCCA. It more about STAs signíng slots.

C: question about straw poll 1, traffic is mapped to different link per TID. Is this ok for straw poll 1. how the service is mapped, to TID?

A: it depends on how to define that. One key part is priritized EDCA. Mapping TID to link is not the whole solution. This (TID to link mapping) may create collision.

C: what could we have on top of multi-link features already approved? How to deal with medium access within assigned slots and outside of the assigned slots? How about admission control?

A: admission control is not sufficient. With admission control, collision still may happen. Disributing the STAs to different slots can futher save power. About EDCA parameters, more detail needs to added, e.g. parameters within and outside of assigned slots.

C: time concern, some features should be in R2 since time doesn’t allow so many features in R1.

A: agree to consider the timing about R1, R2.

Talking about whether questions should focus on the presentation or on straw poll. The chair confirm the following comments are about SPs...

C: it seems SFD already allows it, e.g. TID to link mapping, EDCA per link.

A: Per link TID mapping in the SFD may not be sufficient.

The straw polls are deferred.

1. 469r1 Multi-link Channel Access Dsicussion (Yonggang Fang)

Summary:

Medium access under multi-link to support high priority/low latency services.

Joint backoff procedure among multiple links: when one link is detected idle, the backoff counter is decreased by 1.

Discussion:

C: question about joint backoff. Get one backoff value that applies to multiple links?

A: separate CCA sensing among links. Same backoff counter applies to multiple links.

C: one back off counter for each AC. If two links are idle, how to count down the backoff counter. Another concern is regulatory concern: this operation may not be allowed.

A: the backoff counter will be decreased by 2 in the example.

C: This may not be easy to be implemented because of the process delay.

A: it should be fine since they are internal processing.

C: this is not fair to legacy STAs.

A: if you look at it from another angle, it is fair since MLD has multiple devcies.

C: more concern about fairness. How to decrease the backoff counter when multiple links are idle?

A: more than one are decreased. This is for low latency service.

C: do you estimate the gain?

A: no simulation since so many models esist.

C: clarification question: for joint medium access, do you imagine dobled CW?

A: The CW is same as the single link CW. But the CW is shared among the links.

**SP1:**

* **Do you support to include the following in SFD ?** 
  + **STAs of MLD may use the joint backoff counters during EDCA process on multi-links for HP/LL transmissions.**

The straw poll is deferred.

1. 11-19/1822r9 **Multi-link Security Consideration** (Po-kai) [1 SPs]

Discussion:

No discussion

SP3:

* **Between two MLDs, do you support to use the MLD MAC addresses to derive PMK under SAE method and PTK?**

The straw poll is approved with uanimous consent

1. 11-20/0069r5 **Multi-Link Communication Mode Discussion** (Yonggang Fang)

* **SP1:** 
  + **Do you support to define the following in SFD ?** 
    - **STR:** simultaneous transmission and reception
    - **STR Operation:** is the operation of which a transmission on one link is independent to (i.e. non-interruptible on) the operation on another link.
    - **STR-constraint Operation:** is the operation on a link may depend on the operation of another link.
    - e.g. a transmission on a link may be constrained if it causes the reception interruption on another link, or a reception on a link may be constrained if a transmission is on anther link.
    - **STR-constraint links:** A pair or group of links are in the STR-constraint Operation.

Discussion:

C: question: do you think STR/STR-constraint operation should be restricted between a pair of links?

A: can add it.

C: question on wording. Should we define STR/NSTR MLD devcie? Why do we want to define operation?

A: it is really about the operation.

C: we have STR, NSTR in SFD. Do you mean that STR-constraint is same as NSTR? It is better to unify them.

A: yes.

The straw poll is changed as follows per the discussion:

Do you support to define the following in SFD ?    
STR: simultaneous transmission and reception    
STR Operation: is the operation of which a transmission on one link is independent to (i.e. non-interruptible on) the operation on another link of MLD.    
STR-constraint Operation: is the operation on a link may depend on the operation of another link of MLD.    
i.e. a transmission on a link may be constrained if it causes the reception interruption on another link, or a reception on a link may be constrained if a transmission is on anther link of MLD.    
STR-constraint links: A pair or group of links are in the STR-constraint Operation.

16Y, 25N, 29A

1. 434r1 **Multi-link Secured Retransmissions** (Rojan Chitrakar)

Summary:

The presentation focuses on the issues related to retransmission of protected frames (CCMP/GCMP) and present a proposal to simplify the retransmission of protected frames.

MLD address instead of link address is used for encrypting/decrypting the transmitted frame.

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Discussion:

C: straw poll 1 is ok since all people agree with it.

C: AAD Nonce only happen when AP link MAC addresses of AP MLD are same and STA link addresses of STA MLD are different or AP link MAC addresses of AP MLD are different and STA link addresses of STA MLD are same.

A: agree.

C: For the TID without BA agreement, it is open question about wheter we allow retransmisison of a frame in another link.

C: similarly it is open question about whether fragment can be retransmitted in different link from the the link for original transmission.

The straw polls are differed.

1. 472r0 **Discussion of More Data subfield for multi-link** (Yunbo Li)

Summary:

The setting of More Data subfield is not accurate in MLD case, it is better to adjust it to fit MLD scenario. The following solutions are proposed:

* When AP MLD transmit a BU in one link to a non-AP MLD, if there is at least one more BU of any TID or management frames that mapping to this link present for the same non-AP MLD, the More Data subfield is set to 1, otherwise the More Data subfield is set to 0
* A QoS Null frame with More Data subfield sets to 0 is transmitted in one link to indicate no more BU of any TID or management frames that mapping to this link present

Discussion:

C: the first bullet is too restricted.

C: the setting should be based on the TID to link mapping.

The teleconference was adjourned at 10:00pm

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