IEEE P802.11  
Wireless LANs

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| ARC SC teleconferences minutes 16 Nov 2020 | | | | |
| Date: 2020-11-16 | | | | |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC teleconference held on 16 November 2020 at 19:00-21:00 h ET.

Note: Highlighted text are action items. A- precedes comments from the document’s author, C- precedes comments, R- precedes responses to comments

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# Monday 16 November 2020, 19:00-21:00 h ET

## Administration

**Chair: Mark Hamilton, Ruckus/CommScope**

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair 19:03 ET**

Agenda slide deck: [11-20/1827r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1827-01-0arc-arc-sc-agenda-16-nov-2020.pptx)

**Call for Patents:**

The Chair reviewed the Patent policy and called for potentially essential patents – there was no response to the call.

**Participation:**

The chair reviewed the participation policy

**Approval of the Agenda:**

**ARC Agenda – 16 Nov 2020**

**Introductory Info**

**802.11 TGbe’s evolving multi-link architecture**

* + **How does the architecture (still evolving) within 802.11 TGbe fit into or affect the overall (baseline) 802.11 architecture?**
  + **Contributions:**
  + [**11-20/1639r5**](https://mentor.ieee.org/802.11/dcn/20/11-20-1639-05-00be-11be-ap-mld-architecture-discussion.pptx) **- 11be AP MLD Architecture Discussion - Mark Hamilton**
  + [**11-20/1122r3**](https://mentor.ieee.org/802.11/dcn/20/11-20-1122-03-00be-802-11be-architecture-association-discussion.pptx) **- 802.11be Architecture/Association Discussion - Joe Levy**

The Chair reviewed the agenda and called for comments or amendments to the agenda - there was no response to the call.

The proposed agenda was accepted without comment.

## 802.11 TGbe’s evolving multi-link architecture contributions

Chair provided an overview of the documents to be discussed, a call was made for additional contributions.

None were provided.

[**11-20/1639r5**](https://mentor.ieee.org/802.11/dcn/20/11-20-1639-05-00be-11be-ap-mld-architecture-discussion.pptx) **- 11be AP MLD Architecture Discussion - Mark Hamilton**

Reviewed by Mark Hamilton.

Discussion on slide 11:

C – some non-data functions do not go though the stack as shown, there should be more paths available coming out of the Address 1 address filtering box. Also, the packet number is necessary for integrity protection - there is MPDU integrity protection, which is different than MSDU integrity protection.

R – agreed the figure does not show this correctly.

Regarding PS in MLO:

C- There is an agreement in the PS section of the motions document that states that each STA has its own PS state and mode. TGbe agreed per link PS mode/state. (motion 110)

Discussion on slide 16:

C – There is not a need for a central data base. It does not need to implement this way. But you need to need to remember the state of each link. The TGbe draft requires that the AP keep track of PS state and the MLD must keep track of that PS state for each link. There are many parameters which the AP MLD must keep track of for each link in the MLD. This is the same as the current requirement that an AP must know the state and parameters for each link, an AP MLD must do so for multiple links.

R – The figure just shows one big data base that is used all by all of the elements – but this is logical and not meant to be implementation.

C – For the “BSSs” on Slide 16 - each link AP would have its own BSS – but once we have an MLO – we would have a “combined BSS” see slide 17. The BSS is an agreement of the state of things.

C – If you have an association do you have a BSS?

C – A BSS requires synchronization – hence the figurer seems to imply synchronization between the different BSSs in the “multi-link” are you adding synchronization? Synchronization meaning TFS synchronization, no clock drift, and a common time. Non-STR alignment is based on transmission alignment not the TFS, so it does not require synchronization. While TFS is part of a BSS. We do not need to discuss STR/non-STR issue as part of this discussion.

A – This figure is not implying synchronization and that is not what we are trying to discuss. The intent is to discuss that we have a legacy AP – how do we think about the non-AP STAs that are communicating with the Legacy APs.

The author quickly reviewed slides 18 through 20. Note on slide 18 there is an error the intent was that the “upper MLD MAC” box on the left should be labeled “MAC”. Even though separate PHYs are shown on the left and right, they are logical PHYs and may share the same PHY hardware, similar to the shared PHY concept on slide 19. Each BSS would need its own beacon.

On slide 20 – expanding to Alternative 2.

Discussion on alternative 1:

C – Having a beacon for legacy and one for MLO would duplicate the beacon, this something TGbe does not want to do. TGbe has defined an MLD element – which defines the MLD – so there is no need for separate beacons. The intent is for the legacy and MLD use the same beacon and DTIM, etc. TGbe does not want to duplicate these things.

C – This could be drawn as two legacy MAC stacks, with one as anchor, providing the interface to the upper layer – having access to the low MACs and PHYs. Some of the MLD will be served by the right-hand side and others by the left-hand side. For MLO operation only one of the upper MACs would be used at any time, but the stacks would need to cooperate with each other.

A – If there are two stacks there would need to be a way to synchronize many of the stack parameters of the two stacks.

C – Only one stack would be active (the other would be deactivated) for MLO. But, for legacy operation both could be activated one for each legacy link.

Some additional architectural drawing was done to try to clarify the ideas – agreement on the drawing was not reached.

C – In practice a non-AP STA entering an area would probably first only see the low frequency link, and then as it got closer it would see the high frequency link. So, when it associated with the MLD it is likely it could only see the low frequency link.

A – When an MLD capable device associates the AP is aware it is an MLD device.

Some discussion on association as a “legacy” STA or a MLO capable STA and what that means. This topic caused a discussion on association, disassociation and reassociation. The capabilities of an MLD to associate/reassociate with a legacy or an AP MLD was discussed. There does not seem to be an agreed TGbe position at this time, it was indicated that a presentation on MLD reconfiguration without requiring disassociation will be made in TGbe soon. Currently there is no agreement on reassociation.

C – Adding a new link or capability should not require a tear down, there should be a way to make changes.

C – Why would there be a need to drastically change the configuration so dynamically – it would be best to end the association and then associate to the new configuration.

It was proposed that the two MAC stacks are the same – just in different states. If you can do the mapping you can merge the processes – you can merge the two MAC SAPs. The AP knows which state machine to use when talking to an associated STA or non-AP MLD STA.

A discussion on how to change capability of the association was started but not finished as time expire.

## Next Steps:

**Next Teleconference(s):**

Note: There is a TGbc teleconference 17 November 10:00-12:00 h ET – the TGbc architecture will be discussed.

Next ARC SC TGbe related teleconference:

* Monday, 7 December 19:00-21:00 ET

## Adjourned – 20:58 h EDT.

**Attendance:**

| **Name** | **Affiliation** |
| --- | --- |
| Adachi, Tomoko | TOSHIBA Corporation |
| Asterjadhi, Alfred\* | Qualcomm Inc |
| Anand, A | Maxlinear |
| Ansley, Carol | IEEE member / Self Employed |
| Au, Kwok Shum | Huawei Technologies Co., Ltd |
| Roy, Richard\* | Self |
| Dong, Xiandong | Xiaomi Inc. |
| Hamilton, Mark | Ruckus/CommScope |
| Hu, Chunyu\* | Facebook |
| Huang, Po-Kai | Intel Corporation |
| Levy, Joseph | InterDigital, Inc. |
| Patil, Abhishek | Qualcomm Incorporated |
| Petrick, Albert | Jones-Petrick and Associates, LLC. |
| Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| Rosdahl, Jon | Qualcomm Technologies, Inc. |
| Roy, Richard | SRA International |
| Torab, Payam\* | Facebook |
| Yang, Jay | Nokia |
| Yang, Yunsong | Futurewei Technologies |
| Yi, Yongjiang John\* | Futurewei |

\* Added based on Webex participants list