IEEE P802.11  
Wireless LANs

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| ARC SC teleconferences minutes 7 June 2021 | | | | |
| Date: 2021-06-07 | | | | |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC teleconference held on 7 June 2021 at 13:00-15:00 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 7 June 2021, 13:00-15:00 h ET

## Administration:

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

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair 13:02 ET**

Agenda slide deck: [11-21/0919r1](https://mentor.ieee.org/802.11/dcn/21/11-21-0919-01-0arc-arc-sc-agenda-jun-7-2021.pptx)

**Call for Patents:**

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

**IEEE SA Copyright Policy:**

The Chair reviewed the Copyright policy.

**Core Principles:**

The Chair reviewed the IEEE Core Principles.

**Participation:**

The Chair reviewed the participation policy.

**Approval of the Agenda:**

* **Attendance, noises/recording, meeting protocol reminders**
* **Policies, duty to inform, participation rules**
* **Contribution/discussion topics:**
  + **802.11 TGbe’s evolving multi-link architecture contributions**
    - [**11-21/0577r1**](https://mentor.ieee.org/802.11/dcn/21/11-21-0577-01-00be-cr-mld-architecture.docx)
    - [**11-21/0396r3**](https://mentor.ieee.org/802.11/dcn/21/11-21-0396-03-00be-11be-ap-mld-architecture-discussion-2.pptx)
* **Next Steps**

The Chair reviewed the agenda and called for comments or amendments to the agenda. No comments or amendments were provided.

The proposed agenda was accepted without comment.

Chair reviewed agenda deck slide 16 – The ARC other topics slide and discussed ongoing ARC activities.

## Contributions:

[**11-21/0577r1**](https://mentor.ieee.org/802.11/dcn/21/11-21-0577-01-00be-cr-mld-architecture.docx) **– Duncan Ho (Qualcomm) presenting**

C – Regarding 5-2 – BA is just on RX side, so add null on the TX side.

C – There is block in the lower MAC – RX should be removed, as the upper block covers it.

C – A null should be added on the TX side.

R – It is about where do I grab my data base – the upper one is on the reception side. So, the Block ACK score boarding is just on the RX side.

C – The figure should be based on 5-1 – PS needs to be there. The use of “link” is potentially a problem.

R – There is no problem, see the definition in 2020

R – The definition does not mean that, also a STA is not a lower MAC and a PHY – A STA includes the MAC SAP.

R– This is not agreed.

C – The wording should change on how the MAC sends things to the PHY to: e.g., it should say that “one of the “lower” MAC sublayers sends to the corresponding PHY SAP”. Similar terminology should be used on the up link.

R – Supporting the above statement.

C – Suggestion to replace “multiplexing/demux” with “link selection”.

C – This text should be descriptive and is implementation specific.

C – Is this for group addressed frames?

R – This text is only addressing unicast frames.

C – via the DSAF – there is an error in the baseline – you don’t go through the DASF to a bridge port.

C – Does this also addresses GLK – if GLK is supported we need the 802.1Q bridge port, if not we don’t.

C – This text should be fixed in Rev-me - once it is changed it is fixed. We should remove the GLK part. It is not in R1, so it shouldn’t be there.

A – The text was changed to remove the GLK information.

C – Back to figure 5-3 – I understand the block ack scoreboarding – but it needs to be described better or provided by the figure.

A – Will think about this: where and how to describe the behavior of the different BA boxes.

C – The BlockACK reordering should be done after decryption. So, Block ACK Buffering and reordering needs to be after decryption.

A – Will reorder so that: BA Scoreboarding, Duplicate detection, MPDU Decryption, then Buffering and Reordering. (This was fixed during the meeting).

C – What are we going to do with group address traffic.

A – There could be another diagram for the group address case – still thinking about it.

C – In the baseline we don’t have this problem.

C – There is no difference in the baseline except which key is used.

R – That’s not true, if it is why don’t they say that.

R – Because there is no difference, so there is no need to state it.

R – So you are saying the baseline figure applies to both group address and individually address frames. This is new to me.

R – Based on the address 1 filtering the behavior of the blocks change.

R – I understand group addressed – we also have GLK.

C – Proposed limiting this diagram to MLO only – legacy and group address should use the “legacy” diagram.

C – The concept of Upper MAC and Lower MAC – has been used before. These are generic terms can be confusing when used here. There should be a clear designation that this partitioning is for MLO operation only, so a specific MLO upper MAC and MLO lower MAC. Upper and Lower MAC – are not in the spec but are used by implementation teams, and here it may mean something different. Upper MAC Sublayer is too generic.

R – Yes, the term is being used such that it is specific for MLO – This should be consider and discussed in TGbe.

C – How the term links is used in MLD needs to be sort out links for MLDs – these terms are defined for CAP/WAP – we may want to change the terms used to make them consistent and to clearly describe what is going on. Support for the use of the terms upper MAC and lower MAC. Adding MLO in front makes sense.

C – The terms Upper MAC and Lower Mac – came from the origin of how to segregate the MAC – everything is not in one MAC – but support having an upper MAC and lower MAC, typically the lower is in hardware, and the upper is firmware.

C – Supported appending MLO – there is discussion in 802.11 regarding PBSS with upper and lower MAC address. So, the use in MLO should be more specific.

C – MLD Upper Mac, not MLO.

R – Supporting MLD not MLO.

C – In the CAP/WAP standard, there is a similar problem – multiple application split at different location. There an example was provided, that was not normative.

R – CAP/WAP does not use upper and lower.

Moving on 5.1.5.10, and 5.1.5.11 –

C – Some concern was expressed with specification duplication. We are limited to “STA” and “AP” roles. Do we want to do this? Is mesh not in the draft now.

R – There is currently no GLK or Mesh with MLO currently.

C – 7.1 – doesn’t show how MLDs connect, but there is not backwards compatibility of legacy – this is confusing.

R – The principle is we try not to mix with legacy. The legacy has no concept of MLO.

C – This discussion is focused on just MLO for now – we will look at legacy later.

C – Want to get MLO into the specification. Nothing has changed on the left hand side of the diagram. We should add text somewhere – but we don’t need to do this now as it is.

C – There was a struggle with legacy/non-legacy behavior with GLK – looking at how GLK addressed it may help.

C – The statement that you are mapping STAs to MLDs which is not right.

R – Agreed – need to address mapping of non-AP MLD to AP MLDs – will work offline.

C – Is a non-AP MLD transparent to the DS or not? The non-AP MLD needs to be visible. It is a logic function, mapping

C – Is this done by mapping of MAC addresses in MLO?

C - The visible MLD MAC address is visible on the LAN, but over the air the STA1 and STA2 address are used.

C – How does this impact MAC address filtering?

R – There is nothing wrong or complicated with using the MAC address “tunneling”.

C – In the context of the of the DS? This section is about SAs/DAs. This is at the higher level.   
In 802.11 we take for granted how we use Address 1 and 2, and kind of ignore 3/4 – maintaining the address 1, 2, 3, and 4 is important to the routing. Once you understand the details on addressing.

C – There are requirements on the TA and RA – need to be set to the MAC address of STA and AP. These parameters are MLD MAC address.

C – The MAC service provides tuples, but the addressing may be different. I don’t think the mapping is described well enough. This should be address in Rev-me.

C – Where 4 address mapping is needed, it should be supported. If the addresses are reused/repurposed for MLO they can’t be used to support 4 address mapping in MLO.

## Next Steps:

Next meeting will address [11-21/0396r3](https://mentor.ieee.org/802.11/dcn/21/11-21-0396-03-00be-11be-ap-mld-architecture-discussion-2.pptx).

* Upcoming Teleconferences:
  + Annex G
    - June 21: 13:00 ET, 2 hours
  + TGbe multi-link architecture topic
    - June 17: 19:00 ET, 2 hours
* Contributions requested/expected:

## Adjourned: 21:02 h EDT

## Attendance:

| **Name** | **Affiliation** |
| --- | --- |
| Au, Kwok Shum | Huawei Technologies Co., Ltd |
| Fang, Yonggang | MediaTek Inc. |
| Hamilton, Mark | Ruckus/CommScope |
| Ho, Duncan | Qualcomm Incorporated |
| Huang, Po-Kai | Intel Corporation |
| Leng, Shiyang | Samsung Research America |
| Levy, Joseph | InterDigital, Inc. |
| NANDAGOPALAN, SAI SHANK | Infineon Technologies |
| Nayak, Peshal | Samsung Research America |
| Petrick, Albert | Jones-Petrick and Associates, LLC. |
| RISON, Mark | Samsung Cambridge Solution Centre |
| Shafin, Rubayet | Samsung Research America |
| Stacey, Robert | Intel Corporation |
| Torab Jahromi, Payam | Facebook |
| Wang, Lei | Futurewei Technologies |
| yi, yongjiang | Futurewei Technologies |

\* Added based on Webex participants list.