IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ARC SC Mixed Mode Minutes January 2024 – Interim | | | | |
| Date: 2024-01-18 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Joseph LEVY | InterDigital Communication, Inc. | 111 W 33rd Street New York, NY 10120 | +1.631.622.4139 | [jslevy@ieee.org](mailto:jslevy@ieee.org) |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This document contains the minutes of the IEEE 802.11 ARC SC mixed mode meeting held on 15 January 2024 13:30-15:30 h EST and 18 January 2024 10:30-12:30 h EST.

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

**Contents:**

[Monday 15 January 2024 at 13:3015-15:30 EST 3](#_Toc160988704)

[Administration: 3](#_Toc160988705)

[Approval of the Agenda (Slides 16) 3](#_Toc160988706)

[“Non-infrastructure BSS” and Channel Usage (slide 19) 3](#_Toc160988707)

[WBA liaison on QoS, and L4S (slide 23) 4](#_Toc160988708)

[Recessed 13:33 h EST 5](#_Toc160988709)

[Thursday 18 January 2024 at 10:30-12:30 h EST 5](#_Toc160988710)

[Administration: 6](#_Toc160988711)

[Approval of the Agenda (Slides 16) 6](#_Toc160988712)

[Approval meeting minutes 6](#_Toc160988713)

[IEEE Std 802 project – 802REVc 7](#_Toc160988714)

[Next steps 7](#_Toc160988715)

[Adjourned: 12:35 h EST 7](#_Toc160988716)

# Monday 15 January 2024 at 13:3015-15:30 EST

## Administration:

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

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair at 18:20 HST**

Agenda slide deck: [11-23/2182r2](https://mentor.ieee.org/802.11/dcn/23/11-23-2182-02-0arc-arc-sc-agenda-jan-2024.pptx)

**Agenda Slides 4-15:**

**Registration Reminder**

**Reminders to Attendees**

**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.

**Participation:**

The chair reviewed the participation policy.

## Approval of the Agenda (Slides 16)

* **Two meeting slots this week, Monday PM1 and Thurs AM2**
* **Attendance, noises/recording, meeting protocol reminders**
* **Policies, duty to inform, participation rules**
* **Approve meeting minutes (slide 18)**
* **Contribution/discussion topics:**
  + **“Non-infrastructure BSS” and Channel Usage (slide 19) – Monday PM1**
  + **IEEE Std 802 project (slides 20-21) – Monday PM1 (Thursday as needed)**
  + **Annex G way forward (slide 22)**
  + **WBA liaison on QoS, and L4S (slide 23) – Thursday AM2**
* **Next steps (slide 24)**

The Chair reviewed the agenda and called for comments and additions.

Ganesh is only available today. So, we are rearranging some – Brian and Ganesh today. No objection to this change, as shown above.

Approved by unanimous consent.

The chair reviewed slide 17.

## “Non-infrastructure BSS” and Channel Usage (slide 19)

[11-23/2207r4](https://mentor.ieee.org/802.11/dcn/23/11-23-2207-04-0arc-channel-usage-clarity.docx)  - presented by Brian Hart

Reviewing the detailed changes provided in the contributions, which propose a new definition for non infrastructure basic service set.

A discussion was had on “stable” and “Channel-Usage-Aiding BSS”:

C – A typical home AP is a Stable BSS, but it typically does not do coordination.

A – Agreed with the comment. Added that the feature is most valuable if all APs coordinate, but it may be only in one ESS.

C – The concept of mobility is not clear – a hotspot is not mobile.

A – The assumption is to define stable as being stable for one hour. But this is a magic number, which is problematic. Channel usage aging is a better way to discuss this as it is unnatural to coordinate with something that is ephemeral. The channel usage feature is designed for “stable” BSSs, the feature doesn’t work in a rapid changing environment.

C – A mobile AP could benefit from this.

C – To be channel aiding – do we have to be Stable?

C – Concern regarding implementation, what will be built into the hardware, how is it implemented?

A – The use of this feature is a system variable; it is not a hardware issue. The customer may define it. The owner of the device needs to be responsible for the device. The default should be unstable.

C – Concerns on the immobility part – this is not specific enough. Is an elevator mobile or not. If we are introducing a requirement of immobility this is not acceptable. If the object is to clarify the standard as to what an infrastructure/non infrastructure BSS is then this may be acceptable.

A – The specification is not explicit as to which APs can transmit Channel usage aiding information. These were defined in .11b.

C – Concern was raised about changing these old requirements.

C – The elevator case should be left out; it should be considered a non-stable BSS.

A – More thought is required about these concerns.

C – What are we considering is it about how a BSS uses a channel or is it about sending channel usage messages.

A – The channel usage messages are also used for power control, so it shouldn’t be linked to only to a channel aiding BSS. A CUA-BSS is a stable infrastructure BSS that transmits the CU element.

C – Concern was raised about restricting Mobile AP behavior. A Mobile AP should not transmit channel recommendation’s, maybe it should be limited to channel and power information.

A - The 802.11 spec is not as clear as it could be – will continue to work on improving the clarity.

No clear way forward was agreed. Suggestion to focus on the Channel coordinating piece.

## WBA liaison on QoS, and L4S (slide 23)

Ganesh – [11-24/0080r1](https://mentor.ieee.org/802.11/dcn/24/11-24-0080-01-0arc-l4s-over-wi-fi-links.pptx)

C – (Slide 3) Five bi-directional @ 25 Mbps each would require 125 Mbps to meet the data rate.

R – Slide 3 is not quite correct – it is five full buffer flows of 25 Mbps – from a STA to an AP. This will be corrected on the slide. The throughput is limited by the channel usage, if OBSS is present, the variation (on slide 4) in throughput is likely related to interference. The other flows were what ever was randomly happening in the office environment, where the proof-of-concept was being evaluated.

A – The main point is the bounding of the latency – as opposed to the classic latency. This is not well described in the slides; they will be updated.

C – It is critical to understand what is being lost to gain the latency improvement, e.g., how much throughput is being lost.

R – Additional testing is being done in a controlled environment – when results are available, they will be shared. This is critical for latency dependent application. Bottom line is slide 5 – there is a trade off of throughput for improved latency. L4S allows for packet drop and latency to be managed. – Packets are identified by their headers and two queues are formed. The queues are managed so that things are balanced. This work is trying to set the parameters, these parameters may be implementation dependent. It is clear that how the selection works for Wi-Fi and Doxis will be different – so there may need to be some standardization and recommendations on what the parameters are.

C – The simulation work is using NS3 models to generate guidance on how to implement L4S in 802.11 (Wi-Fi), the limits of performance is being studied. The results will be shared when available. LF4 does not need to be deployed everywhere – just on the weakest links – so if a Wi-Fi link is poor it is important to deploy L4S on it. This is different than other approaches (e.g., .1Q QCN) which needs to be deployed everywhere in the network.

C – The user must trust the QCN – while L4S is end to end, so it only requires trusting local elements on the data path or the end-to-end entities. L4S operates at layer 3 for control and layer 4 for management.

Slide 7:

C – Appreciation for addressing L4S and 802.1Q separately.

C – The queueing could be above the 802.11 MAC or it could replace the existing queues in the 802.11 MAC.

C – These results all assume higher level management.

A – Packets can be dropped – there is ongoing work to do address how dropped packets are delt with – L4S is trying not to drop any packets, by conditioning the flow.

C – The layer 2, 3,4 queuing is fundamentally a cross layer function. The queuing happens happening at layer 4.

C – L4S is an end to end protocol – 802.11 ARC should consider how 802.11 can play a role/support this protocol. 802.11 ARC should focus on how to define the 802.11 role. The parameters are TBD – it is up to 802.11to decide what and when it needs to send things to support the protocol. Recommend using shallow queues - but not too shallow as more than 1 or 2 packets is necessary to allow aggregation.

Next steps – slide 8

Signaling support – additional work needs to be done – Genesh will be focusing on the factory automation use case and will generate/share additional information. He also plans on providing additional information as to how .1Q QCN and L4S can work together.

Note: references are provided on slide 9.

The Chair requested to be informed as to when this information will be available, and to have it provided via the ARC reflector.

## Recessed 13:33 h EST

# Thursday 18 January 2024 at 10:30-12:30 h EST

## Administration:

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

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair 10:36 EST**

Agenda slide deck: [11-23/2182r5](https://mentor.ieee.org/802.11/dcn/23/11-23-2182-05-0arc-arc-sc-agenda-jan-2024.pptx)

**Agenda Slides 4-15:**

**Registration Reminder**

**Reminders to Attendees**

**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.

**Participation:**

The chair reviewed the participation policy.

## Approval of the Agenda (Slides 16)

* **Two meeting slots this week, Monday PM1 and Thurs AM2**
* **Attendance, noises/recording, meeting protocol reminders**
* **Policies, duty to inform, participation rules**
* **Approve meeting minutes (slide 18)**
* **Contribution/discussion topics:**
  + **“Non-infrastructure BSS” and Channel Usage (slide 19) – Monday PM1 (revisit on Thursday?)**
  + **IEEE Std 802 project (slides 20-21) – Thursday AM2**
  + **Annex G way forward (slide 22) – Deferred to March**
  + **WBA liaison on QoS, and L4S (slide 23) – Monday PM1**
* **Next steps (slide 24)**

The Chair reviewed the agenda and called for comments and additions.

Approved by unanimous consent.

## Approval meeting minutes

Motion to approve the minutes of:

**Nov plenary:** [**11-23/1612r0**](https://mentor.ieee.org/802.11/dcn/23/11-23-1612-00-0arc-arc-sc-mixed-mode-minutes-november-2023-plenary.docx)

**Dec/Jan teleconferences:** [**11-23/2206r0**](https://mentor.ieee.org/802.11/dcn/23/11-23-2206-00-0arc-arc-sc-18-december-and-8-jaunary-teleconference-minutes.docx)

Discussion none.

Result: UC

## IEEE Std 802 project – 802REVc

Update of 802REVc status from 802.11 representative (Joseph Levy) verbal report

The Chair reviewed the related background/documents of interest (see slide 20 of the agenda) copied below:

* + IEEE Std 802 is undergoing a revision update
    - 802.1 is handling the official process, and is holding 802.1 Working Group letter ballots
  + WG11 (802.11) held a comment collection on D1.2, ARC reviewed on Dec 18 and Jan 8 telecons
    - Comments submitted from WG11: [11-24/0037r0](https://mentor.ieee.org/802.11/dcn/24/11-24-0037-00-0000-cc46-p802-revc-d1-2-comments.xlsx)
  + Overall comments submitted/disposition: [1-23/0037r0](https://mentor.ieee.org/802.1/dcn/23/1-23-0037-00-Mntg-p802-revc-d1-1-comments-dis.pdf) (NOTE: WG1 document!)
  + Comment resolution meets next week (Jan 23 and 24, “PM2” Europe time)
  + EPD/LPD topic: [1-23/0038r1](https://mentor.ieee.org/802.1/dcn/23/1-23-0038-01-Mntg-resolving-epd-lpd-inconsistency.pptx) (NOTE: WG1 document!)
    - Proposed new text: [11-24/0123r0](https://mentor.ieee.org/802.11/dcn/24/11-24-0123-00-0arc-proposed-text-for-rev802-epd-lpd-sections.docx)

[11-24/0123r0](https://mentor.ieee.org/802.11/dcn/24/11-24-0123-00-0arc-proposed-text-for-rev802-epd-lpd-sections.docx) - the updated document on LPD/EPD was present by Mark Hamilton

Discussion:

Suggested that an overview of the LLC: LSAP/MSAP mux/demux function.

C – HLPDE should start the paragraph as the other stuff in the diagram is.

## Next steps

Chair reviewed the topics slide 17, called for other topics.

**Contributions requested/expected:**

Annex G

Anything on 802REV before March?

Non-infrastructure BSS/Channel Usage

QoS topic

**March session planning**

1 or 2 slots?

Topics? Possibly: Annex G, Non-infrastructure BSS, 802REVc, WBA QoS liaison follow-up

**Next Teleconference(s):**

January to March teleconference plan… Any/How many telecons?

Conflicts to avoid: TGbe, REVme, TGbh, 802REVc

Continue with Monday 1PM ET (2 hours) or 2PM ET (1 hour)?

Dates to avoid??

Will be coordinated with other TG chairs, and announced later

* Will be scheduled as required, with 10 days notice. The Chair will coordinate with other TG chairs to minimize conflicts.

## Adjourned: 12:35 h EST

Final Agenda: [11-23/2182r6](https://mentor.ieee.org/802.11/dcn/23/11-23-2182-06-0arc-arc-sc-agenda-jan-2024.pptx)

Closing Report: [11-24/0188r1](https://mentor.ieee.org/802.11/dcn/24/11-24-0188-01-0arc-arc-closing-report-january-2024.pptx)