IEEE P802.11  
Wireless LANs

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| ARC SC Mixed Mode Minutes May 2025 – Interim | | | | |
| Date: 2025-05-14 | | | | |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC mixed mode meeting held on 12 May 2025 10:30-12:30 h CEST, 13 May 202,5 16:00-18:00 h CEST, and 14 May 2025 10:30-12:30 h CEST.

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

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# Monday 12 May 2025 10:30-12:30 h CEST

## Administration:

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

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair at 10:33 CEST**

Agenda slide deck: [11-25/0609r1](https://mentor.ieee.org/802.11/dcn/25/11-25-0609-01-0arc-arc-sc-agenda-may-2025.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)

* **Three meeting slots this week**
* **Attendance, noises/recording, meeting protocol reminders**
* **Policies, duty to inform, participation rules**
* **Approve meeting minutes (slide 18)**
* **Contribution/discussion topics:**
  + **Annex G way forward (slide 19) – Mon AM2 and Tues PM2**
  + **(New topic) Review MIB attribute conventions (**[**11-25/0780r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-0780-00-0arc-issues-with-mib-truthvalue-usage-patterns.docx)**) – Wed AM2**
  + **IEEE Std 802 internal alignment (slide 20) – Wed AM2 (time permitting)**
* **Next steps (slide 22)**
* **NB: See slide 17, also**

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

A new document 11-25/0923r0 has been posted – related to IEEE Std 802

Approved by unanimous consent.

## ARC - Other (slide 17)

The chair reviewed slide 17

## Approval meeting minutes (slide 18)

Motion to approve the minutes of:

**March Plenary:** [11-25/0251r0](https://mentor.ieee.org/802.11/dcn/25/11-25-0251-00-0arc-arc-sc-mixed-mode-minutes-march-2025-plenary.docx)

Move; Joseph Levy

Second Jouni Malinen

Discussion none.

Result: UC

## Annex G way forward – Step 2 (slide 19)

**Annex G way forward:**

* + - **Continue discussion on a “replacement” Annex G**
      * [**11-23/0880r8**](https://mentor.ieee.org/802.11/dcn/23/11-23-0880-08-0arc-revised-annex-g-containing-example-frame-exchange-sequences.docx) **(Harry Bims)**
      * [**11-25/0738r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-0738-00-0arc-wms-protection-mechanisms-and-frame-exchange-sequences.pptx) **(Harry Bims)**
      * [**11-25/0193r4**](https://mentor.ieee.org/802.11/dcn/25/11-25-0193-04-0arc-frame-exchange-sequence-and-fig-10-14.pptx) **(Graham Smith) – how many frame exchanges sequence(s) are there?**

**Possible Annexes?:**

* + - **“Frame Exchange” and “Frame Exchange Sequence” concepts, introduction? (Does .15 concept have any relevance/starting-point for this?); Is FES from a given STA’s perspective, or “global”?; Clarify that a sequence of Frame Exchanges is not (necessarily) a Frame Exchange Sequence – it could be just a dialog (or some other distinguishing word) of FEs.**
    - **List/”index” of frame exchanges, as a “novice” introduction/reference list?**
    - **Put an informative discussion of “architecture” (portal, etc.) versus “real-world” implementations, in an Annex also – but that’s a separate task, in a separate Annex**

**Other concepts to consider adding:**

* + - **NAV protection is still required, if a STA ends FES “early”**
    - **There are really multiple “wireless media” (different channels, etc. – and what about different “domains” as a result of beamforming?) which operate independently**
    - **Consider if/how to roll Annex O and Annex Y material into Annex G.**

[**11-25/0738r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-0738-00-0arc-wms-protection-mechanisms-and-frame-exchange-sequences.pptx)(Harry Bims) - Summary of WMs, Protection Mechanisms, and Frame Exchanges Sequences

Harry presented the document.

C - The circle on slide 4, is AP power dependent, hence a transmitter outside the circle may be heard by the AP.

(Slide 13)

C – BF coverage is different and is not as shown in in the figure, but for the discussion is making a point.

C – The WMs are not the same, but the directional patterns would look much different and is changing constantly.

C – Aren’t two STA that are communicating, don’t they have a common WM.

C – The BF STA WM is much more complex than what is shown – there is the TX area, the RX area for each STA – which is dependent on the antenna characteristics.

C – Concerned about protection of WM, as not all devices that use the WM will be 802.11 devices. RTS/CTS only works for 802.11. LBT does work for some technologies, but not all technologies use LBT.

A – Agreed that protection of WM is complex but proposed limiting the discussion to 802.11 devices for now and then worry about the more complicated use cases.

Chair – Noted this discussion is only addressing 802.11 devices.

C – What you are showing is STA1 transmitting, over the whole of the oval – suggesting removing the STA2’s transmit arrow. Also showing a station STA3 outside the yellow but withing the AP circle may help with the discussion. Asking for clarification of which STA “owns” the circle.

C – Support for the Slide 18 definition of “protection mechanisms cause …”

C – Reinforcing the concept that a STA only reacts to what is has received, protection mechanisms only impact STAs that receive the “protection” transmission.

A – Agreed and the next few slides highlight that.

Slide 23

C - The FES includes the Data, SIFS, and ACK/BA – but the DIFS and Backoff are not in the FES. The FES – includes all frames in the sequence and the gaps between them.

A – slide 24 – the FES – in the figure – starts with fragment 0 and ends with ACK2

C – The error condition, Slide 24, of a missed ACK (e.g., ACK 1). the FES does not end until error recovery has been completed.

C – Disagree with the above statement as the FES ends when error recovery begins, and there is a commitment for error recovery, but it is not the same commitment made for the FES.

C – In a TXOP retransmission is possible if an ACK is missed, the retry can been done.

C – Even if the error recovery during a TXOP is two FES not one.

On Slide 29

C – there is one FES for each STA, which end at different times. And there is still a lack of agreement on how many FESs there are 1, 3, or 4.

Discussion on the definition of FES currently in 802.11-2024, this is a new definition. But the definition is suggested to be changed by some participants and the existing definition is supported by some others.

A proposal to change the definition needs to be provided, so this can be discussed.

C – There is an old school and new world views, we need a consistent explanation for this. May be a unified definition.

**Recessed 12:32 CEST**

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# Tuesday 13 May 2025 16:00-18:00 h CEST

**Meeting called to order by the Chair at 16:22 CEST**

Agenda slide deck: [11-25/0609r2](https://mentor.ieee.org/802.11/dcn/25/11-25-0609-02-0arc-arc-sc-agenda-may-2025.pptx)

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  + **IEEE Std 802 internal alignment (slide 20) – Wed AM2 (time permitting)**
* **Next steps (slide 22)**
* **NB: See slide 17, also**

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

Approved by unanimous consent.

[11-25/0880r8](https://mentor.ieee.org/802.11/dcn/23/11-23-0880-08-0arc-revised-annex-g-containing-example-frame-exchange-sequences.docx) – presented by Harry Bims

Discussion on Active mode being included in addition to doze and awake discussion.

Additional discussion on when a FES ends – STA interpretation.

C – Why start with a discussion on FES not controlling the media. (current definition), please explain what they are and why they are useful.

Skipping G3 and G4 as they were basically discussed yesterday in the other document.

G6 -

Discussion on clause 9 references, in this clause – it should be to the behavioral clauses. (note – fix quiet time clause to remove FES from 9.4.2.254.3).

C – On “group” FES – terminology, we should clean this up. We should be much more “correct” in our choice of terms.

C – Question on adding an indication as to what protection mechanisms are used to protect WM for the FES.

C – This is not complete and will probably never be complete. Especially regarding protecting the WM. There is a lot of complexity to deal with. The combination of packets that can be exchanged. We are just providing some examples. There are too many optional behaviors to be inclusive of all FES types, behaviors, and WM protection schemes.

C – MCCA is a WM protection scheme.

C – MCCA is not a protection scheme it is an agreement on the protection of the WM.

A – These are examples with references to normative text – which will allow the reader to understand the FES.

C – There are mechanisms to VHT HE fields, when the STA is asked to be quiet, Some of the information on protection are limited to various 802.11 generations. If one of the mechanisms that are understood by a STA says the STA can’t transmit then the STA should not transmit. But this only applies to mechanisms that are understood.

A – A reader needs more of a higher understanding – on how FES work and management of the WM works. With the details being provided in the normative text.

C – This should not be comprehensive, only a compendium of examples.

C – We should be simplifying the standard. We should not make Annex G an annex that constantly needs to be updated.

C – Simplification and simple explanations should not be viewed as complete. If it is viewed that way it could be damaging.

C – Is this intended to be an introduction for new members?

A – This is just about FES –

C – There should be a reference to this annex -

Chair – reminded everyone of the agenda and the two upcoming documents to be discussed on Wednesday AM2.

Recessed 17:46 CEST

# Wednesday 14 May 2025 10:30-12:30 h CEST

**Meeting called to order by the Chair at 10:33 CEST**

Agenda slide deck: [1[11-25/0609r3](https://mentor.ieee.org/802.11/dcn/25/11-25-0609-03-0arc-arc-sc-agenda-may-2025.pptx)](https://mentor.ieee.org/802.11/dcn/25/11-25-0222-04-0arc-arc-sc-agenda-march-2025.pptx)

Agenda Slides 4-15:

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  + **IEEE Std 802 internal alignment (**[**11-25/0923r1**](https://mentor.ieee.org/802.11/dcn/25/11-25-0923-01-0arc-proposed-changes-to-802-11-definitions-based-on-802-2024.pptx)**, slide 20) – Wed AM2 (time permitting)**
* **Next steps (slide 22)**
* **NB: See slide 17, also**

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

There were none.

Approved by unanimous consent.

[**11-25/0780r1**](https://mentor.ieee.org/802.11/dcn/25/11-25-0780-01-0arc-issues-with-mib-truthvalue-usage-patterns.docx) **–** Brian Hart presented

Discussion on MLME-RESET.request – where is it used in the spec:

Used MLME-START – gets things going, but it an AP shuts down – it must do a reset to restart.

C – For the AP side – when you start a new instance of a BSS the MLME-RESET is used. I think it unreasonable that all the statistics and values could transfer from one instance to another of the BSS. If an AP starts a new BSS it will not maintain any “History”, it should start from scratch.

A – There is not a strong use case for the SetDefaultMIB parameter.

C – If an AP is set up and then looses power – it should restart as it was configured before it shut down. I don’t know if MIB variables are for this.

A – If the AP has stopped, it should come back in the same configuration. But all the STAs that were associated with the AP will have disconnected.

C – The config gets loaded when you turn the device on.

C – The SetDefaultMID parameter was adding in 1997 – but the MIB has changed significantly since 1997. Is this limited to PHY MIB variables? That is the history. The SME would provide the configuration.

There is value for maintaining PHY characteristics, and maybe some counters.

A – The underlying reason that I brought this up, if this doesn’t impact OTA compatibility, then it doesn’t matter, but I don’t agree with this.

C – It is easier to fix this by deleting the parameter.

Chair – The other ripple factor, in our MIB guidelines document – we are looking at implemented by application.

C – We are going a bit too far – there is another aspect – we have protocols that have state, but others are stateless. An AP controller collects these statistics.

A – Lets move on from this topic.

C –We are going too far, the whole reason this discussion matters at all, is that we are supposed to be guiding other TGs on how to write their MIB attributes. One part of that is the discussion in our guideline document that says Implemented is different from Activated(read-only).

There are TGs working on this now and we should fix the guidelines document or educate the TGs.

A – Implemented is a set of features. Activated variable allows a feature to be turned on/off dynamically.

Chair – This proposal is not in scope. Is this interaction in scope or out of scope of the standard?

C – This discussion makes much more sense – should not rely on the name of the MIB variable.

C – Some one said an AP lives in a box; this is not true an AP can live in multiple boxes. There are portions of the MAC that control the PHY.

A – When a BSS is started, it is an instance.

C – on the consistent use of Implemented and Activated. I see Implemented variables that are read/write. Control variables - there are 5 MIB implemented variables that are read/write. A read only, variable is only writeable prior to the start of the instance.

A – Need to clarify the start up sequences.

Chair – There are two views – system vs. component.

C – The specification deals with logical devices and the MIB is used by the specification to set behavior rules based on the instantiation.

Chair – one of the functions of ARC is to try to increase the common understanding of our specification and how things are specified. There is an instantiation with an associated MIB configuration – but how the MIB configuration got there is outside the scope of 802.11.

C – The MIB variables are a formal interface to control layers.

C – Implemented things are useful because – capabilities fields are transmitted.

C – Implemented is feature based, activated can be writable or fixed. We have implemented and activated. We may be able to fix this for the next specification.

Chair – From the keep it simple perspective, I will look for the special cases for the group and bring them for discussion. I don’t see the value in the static activated and implemented.

C – Get rid of all activated read-only variables. We don’t need to differentiate between higher level controlled setting, prior to the instantiation.

Chair – ARC doesn’t have the authority to modify the specification. So, our advice was given to TGm – and they have taken a phased approach to conform to the recommendations. In the real world we need to have things that are useful, but they may not be in scope for the standard. There are descriptions where a management entity can change the MIB.

ARC’s job is to sort all this out. The first task is to decide if there are two or three concepts.

Chair noted [11-25/0923r1](https://mentor.ieee.org/802.11/dcn/25/11-25-0923-01-0arc-proposed-changes-to-802-11-definitions-based-on-802-2024.pptx) still needs to be discussed but there is no time to do so, please review so we can discuss this in a future meeting.

## Next Steps (slide 22)

Contributions requested/expected:

Annex G

MIB attribute conventions clarification

Changes to align with IEEE Std 802 (removal of EPD/LPD, etc.)

“Other” (slide 17) – Note: this is the alignment of the “control” MLMEs.

L4S discussion if/as needed

July session planning

4 slots

Topics: Annex G, MIB attribute conventions, Changes to align w/IEEE 802, “Control” MLMEs, WBA QoS/L4S liaison follow-up

Next Teleconference(s):

May to July teleconference plan… 1 telecon to begin discussion on [11-25/0923r1](https://mentor.ieee.org/802.11/dcn/25/11-25-0923-01-0arc-proposed-changes-to-802-11-definitions-based-on-802-2024.pptx) and 802/802.11 alignment

Conflicts to avoid:

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

## Adjourned: 12:32 CEST

Final Agenda: [11-25/0609r3](https://mentor.ieee.org/802.11/dcn/25/11-25-0609-03-0arc-arc-sc-agenda-may-2025.pptx)

Closing Report: [11-25/0975r0](https://mentor.ieee.org/802.11/dcn/25/11-25-0975-00-0arc-arc-closing-report-may-2025.pptx)