IEEE P802.11
Wireless LANs

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| ARC SC Teleconferences Minutes November 2021 - Plenary |
| Date: 2021-11-08 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Joseph LEVY | InterDigital Communication, Inc. | 111 W 33rd StreetNew York, NY 10120 | +1.631.622.4139 | jslevy@ieee.org  |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC teleconferences held on 08 November 13:30-15:30 h ET, 10 November 11:15-1:15 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 08 November 2021 at 13:30-15:30 h ET

## Administration:

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

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair 13:30 ET**

Agenda slide deck: [11-21/1625r3](https://mentor.ieee.org/802.11/dcn/21/11-21-1625-03-0arc-arc-sc-agenda-nov-2021.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**

**8 Nov 2021, 13:30 ET:**

* Reminder: 2 meetings this week: Monday 13:30 ET, Wednesday 11:15 ET
* Attendance, noises/recording, meeting protocol reminders
* Policies, duty to inform, participation rules
* Prior meeting minutes
* Contribution/discussion topics:
	+ Annex G way forward
	+ Clause 6
	+ TGbe informative annex
	+ Other topics?

**10 Nov 2021, 11:15 ET:**

* Attendance, noises/recording, meeting protocol reminders
* Policies, duty to inform, participation rules
* Contribution/discussion topics:
	+ Annex G way forward
	+ 802.1CQ (related to TGbh and/or TGbi)
	+ IEEE Std 802 revision
	+ TGbe informative annex
	+ Other topics?
* Next steps

The Chair reviewed the agenda and called for comments or amendments to the agenda.

**Approval of Minutes (slide 19)**

**Move to approve the minutes of:**

Telecons:

August 9 - [11-21/1318r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1318-00-0arc-arc-sc-teleconference-minutes-09-august-2021.docx)

August 30 - [11-21/1424r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1424-00-0arc-arc-sc-teleconference-minutes-30-august-2021.docx)

September 2 - [11-21/1447r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1447-00-0arc-arc-sc-teleconference-minutes-2-september-2021.docx)

September 9 - [11-21/1474r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1474-00-0arc-arc-sc-teleconference-minutes-9-september-2021.docx)

October 11 - [11-21/1671r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1671-00-0arc-arc-sc-teleconference-minutes-11-october-2021.docx)

October 28 - [11-21/1742r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1742-00-0arc-arc-sc-teleconference-minutes-28-october-2021.docx)

September plenary:

[11-21/1506r0](https://interdigital-my.sharepoint.com/personal/joseph_levy_interdigital_com/Documents/802/21_11_Electronic_Plenary/ARC/11-21/1506r0)

Moved: Joseph Levy

Second: Harry Bims

**These minutes were approved by unanimous consent**

## Annex G way forward contribution/discussion

**Current plan:**

**Frame Exchange Sequence clean-up:** [**11-21/1782r0**](https://mentor.ieee.org/802.11/dcn/21/11-21-1782-00-000m-annex-g-cids-resolution.docx) **– Graham Smith**

Graham Smith (SR Technologies) – presented/reviewed [11-21/1782r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1782-00-000m-annex-g-cids-resolution.docx) – an TGm document.

* + Written for TGme
	+ Stepped through the entire document.
	+ Change to Annex G – change “(normative)” to “(informative)”

Discussion/comments:

There was a general appreciation (several participants expressed appreciation) of Graham Smiths efforts to provide this contribution.

C – All frame exchange sequences are called out as frame exchange sequences should be included. The current definition, may not work for MU-MIMO, also for AP’s that overlap – does any single AP really control the WM? The definition may need to be improved and support the concept of molding Annex G into something useful.

C – Proposal to use the following in the definition: “a sequence of frames that attempts to maintain”.

C – Suggestion to change “control of the WM” to “control of the BSS WM”

C – Proposed new definition: “frame exchange sequence: a sequence of frame transmissions across the WM between two STAs, in which the time delay between successive transmissions is either pre-determined (in which case the time delay is always an IFS) or determined by the first frame in the frame exchange sequence.”

Discussion followed with general agreement.

Chair – so we will make that one change.

**Motion:**

802.11 ARC SC supports the proposed Change in 11-211782r1, and recommends that REVme consider these changes as resolution to the referenced CIDs.

Moved: Graham Smith

Second: Joseph Levy

Agreed by unanimous Consent (117 WebEx attendees)

[**11-21/1797r0**](https://mentor.ieee.org/802.11/dcn/21/11-21-1797-00-0arc-proposal-for-new-annex-g-frame-exchange-sequence-descriptions.docx) **“Proposal for New Annex G Frame Exchange Sequence Descriptions”** **– Harry Bims presenting**

C – Figure 3.8 does not seem to be MU Cascading.

R - This figure seems to be in the wrong place.

C – Are you proposing that the status of the WM is viewed from the STA or the APs point of view. For the MU case with a multi-cast MPDU sent to 3 stations the AP would wait for three BAs, when the first STA sends its BA it should not terminate the STA’s frame exchange sequence (FES) as the STA should wait till all the STAs have sent their BAs. Also, a STA that fragments a frame, the sequence of fragmented frames is not considered a single FES – each Fragment/ACK is a FES.

C – At prior meetings a matrix style description of FESs was proposed what is the status?

R - Not planning to do that now.

C – Will annex G be normative?

R – I’m not wedded to the idea.

C - Concern was expressed about non-normative figures and the maintenance of this content.

R – Adding the figure in annex G, would allow this to be done with out changing the normative text in the main body of the specification.

C – Previous versions of this document had other types of frame exchanges. Will only FES be included?

R – Yes. I think adding a description of non-FES frame exchanges with FES is confusing.

C – How will fragment bursts be deal with, assuming they are not sent as a burst.

R – A fragment burst would be a FES, but the “normal” fragment exchange is a sequence of FESs.

C – Is a FES always an exchange of frames where there is no other use of the WM except for transmission of frames in the FES and if there are other frames it is not a FES.

R – Yes.

C – Where there are FES sequences happening in parallel (MU based), the proposed view is that each pair of STAs have their own FES.

R – There is not just 1 WM for MU, you have different WMs for MU.

Chair – There have been different view of this – do others still hold the view that the FES is between all the MU users: that there is only one FES for the MU case?

C – The FES is for all MU STAs so that they don’t interfere with the completion of the FES of the other STAs. We took out the idea that it was between two STAs. So, it’s not two STAs – it is about all the STAs involved.

C – Was the text changed to clarify this definition of FES? It this is adopted this should be reviewed.

C – When a FES ends it does not necessarily mean the AP has stopped controlling the WM.

C – The concept of an extended FES, an FES that applies to all the MU STAs, would needlessly restrict the ability of the STA that has completed its FES (e.g., sent its BA).

C – When BA MU exchanges are happening the AP maintains control of the WM. The individual STAs may or may not see all the traffic on the WM, but since the AP is controlling the WM there should be no collisions during the MU BA exchange.

C – It is dangerous that a STA could see a different FES than the other STAs in the MU. The definition was changed to address this view.

C – There may be hidden node issues problems – the reserve medium time is controlled by the AP. If the STA has reserved the TSOP.

Chair – Maybe additional off-line discussions on this topic are necessary.

The NAV is set to cover the entire MU BA activity, as the NAV is set to cover the entire TXOP.

C – We overly complicating things which don’t matter.

Chair – we need to check what people do today. Let’s work this offline, preferably on the ARC reflector, so all can participate.

C – Regarding the question: should Annex G should go away or not. The history is that Annex G was provide from the beginning of the standard and it was SDL code. Given that we have deleted SDL code, we should remove Annex G in its entirety.

R – Different sections of the specification have different views on what a frame exchange and what a FES are. I think Annex G should be used to clarify what a FES is to a novice reader and the normative text should clearly state what is a FES and what it is not. This needs to be clear.

C – When it was SDL code, it was at best consistent with the normative text in the specification, if you take the same variable and define it twice the definitions will never match. So, given that the SDL code was eliminated, and dual definitions were introduced, the best way forward is to remove Annex G.

Chair – I see a call for a straw poll – so I think we should ask what Annex G is doing for us, or could do for us. We can discuss this on out next call.

## Recessed: 15:30

# Wednesday 10 November 2021 at 11:15-13:15 h ET

## Administration:

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

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair 11:16 h ET**

Agenda slide deck: [11-21/1625r5](https://mentor.ieee.org/802.11/dcn/21/11-21-1625-05-0arc-arc-sc-agenda-nov-2021.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:**

* Attendance, noises/recording, meeting protocol reminders
* Policies, duty to inform, participation rules
* **Contribution/discussion topics:**
	+ 802.1CQ (related to TGbh and/or TGbi?)
	+ IEEE Std 802 revision
	+ Clause 6
	+ Annex G way forward
	+ TGbe informative annex
	+ Other topics?
* **Next steps**

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.

## 802.1CQ (related to TGbh and/or TGbi?)

[11-21/1836r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1836-00-0arc-address-block-assignment-with-p802-1cq-barc.pptx) – Roger Marks

C – How does the assignment these addresses interact with privacy concerns?

R – If a device is “talking”, the sender, there is an assignment – but since it is granted dynamically, this removes the privacy.

C – When a device joins the group how does it identify itself, does it need to identify itself?

R – This contribution does not specifically discuss how the privacy discussion relates to 802.11bh or 802.11bi.

C – Regarding the BARC and the nature of an address block (AB) on Slide 9, what if device is in Doze state?

R – This is not intended for wireless LAN – the assumption is all devices are on and present on the LAN.

C – Regarding slide 11 Registrar behavior and slide 12 the possible meaning of these addresses. These are structured addresses – the standard won’t tell you how to use the extra information provided by the structure, but it could be used to speed performance of routing.

C – Regarding slide 13: How would this work for .11? .11 association is based on a single MAC address – the block concept seems to be problematic for this.

R - Looking at the ANQP policy to possibly provide a solution to using these address blocks.

C – Changing the address to another address in the block will interrupt network behavior.

C - The TUA addresses are only used during association before an address is used for routing (very similar to 3GPP). Slide 14 – WLAN issues. Leaning on ANQP as a possible solution. The device can get both unicast and multicast addresses.

C - How can a STA use the multiple addresses in the MAC address block?

Slide 15 – its not a random address but it is a fleeting address and is assigned/claimed. The structure will aid routing if used by the network. The implication on 802.11bh and 802.11bi are interesting, and it may be interesting to think how this may be added to .11 in TGm.

C – TGbi should review this contribution, also a presentation to TGbi may be beneficial and maybe to WNG.

C – Can two STAs use the same TUA?

R – It is unlikely that two devices would use the same TUA, but if they do there is no harm as the TUA signaling simply fails and the devices would just try again with different TUAs.

C – Concern regarding the random selector in the device.

R – This concern was raised in the last ballot. An address could try to use the same address block.

C – Does this document discuss how to deal with conflict?

R – Don’t have answer.

C – If IoT devices use global address the address space will be used up, this is the issue. So, if the IoT device is not assigned a global address and is assigned an address by the local network, then there will be plenty of address. This is similar to what is done with IP addresses now. These addresses are dynamically, providing an alternative to the Global address, but Global address will still work, this is simply another way for address to be assigned that could make the network more efficient.

C – How does a device claim an address when it is no longer on the network?

A – There is a registrar that keeps track of the addresses, the device would request the address that it used the last time it was on the network and if the address has not been reused, it may get the address back. The registrar – maintains the state of all the blocks – there is a data block of all the addresses. There is an expired date – and until the assignment expires the address is not eligible to be assigned. Learning in bridges is similar – so the registrations will be managed, and time is considered.

C – So this is similar to the 3GPP TIMSI?

C – There are 10^13, so the local address space is big – there is no problem to be liberal with the address for the TUA.

Chair – what are the next steps. Should make TGbh should be aware of this – the majority of this stuff should be discussed in TGbi.

C – Can you provide some insight on how the address structure could be used?

R – 802.1CQ is not trying to specify how the address structure could be used, but there is a hint in 802.1CQ where it discusses the bridge behavior, but 802.1CQ does not specify bridge behavior, bridge behavior is in 802.1Q – the bridge may not need to learn it may be able to be “instructed” based on the address structure (slide 12). For example, if you have TSN streams to be carried through the network – the core network may be aware of this addressing structure and allow things to flow to the correct location in the network.

Chair - Back to the next steps: Do we think there is further work in ARC here.

C – There is the PS issue – also the use of ANQP/GAS extensions.

R – This is really for the wired part of the network – but there is blank section on what to do with this over wireless. How 802.1CQ responds to an 802.11 device, does a STA need to be able to talk to a BARC register? Some thoughts on these concepts may be beneficial.

Chair – 802.11 is not the only wireless protocol, .15/.16 may need to be considered and those WGs consulted. The ARC group is a good place for general discussions, but we don’t have the facility to make changes to the specification, so to make any changes to the specification the activity would need to move from ARC to a TG.

C – How does 802.11 GLK, which supports general LAN support impact how this could be used by 802.11?

C – 802.16 would probably be interested and are currently active, 15.3 may be interested (15.3 supports 48 bit addresses), and 15.6 is also a possibility.

The principal behind the BARC protocol is that there is LAN. Additional discussion on how to maintain the claimed address or via the register was had.

The assumption is that the devices are end points on the LAN, it is not a bridged LAN, the use of 48 bit address are required.

Chair – so .15 may have some interest. It is for a bridged link – it does apply for end points. So, there should be a heads up to 802.11 TGbh and TGbi and all the wireless groups should also be made aware of this. TGbh is looking at a much narrower scope: on identification when random MAC addresses are used. TGbi is looking at broader privacy issues.

The author agreed to try to make a presentation to TGbi and try to circulate 802.1CQ more broadly. Noting that 802.1CQ would benefit from experts to enhance the document. 802.1CQ will also be shared with the ITF and a general 802 review should also proceed.

Chair – when is the next draft coming out?

R – 0.7 posted, 0.8 is being created, so the next draft will hopefully be available next month, recommend that ARC review the 0.8 draft when it comes out.

Chair – TGbh should be aware of this work – but it shouldn’t be a distraction.

The author will ask TGbi for time to present.

## IEEE Std 802 revision

[11-21/1844r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1844-00-0arc-evolution-time-for-the-ieee-802-architecture.pptx) Roger Marks

A- Std 802 – must be revised/updated as IEEE SA rules require specifications to be maintained to keep their active standard status. There for it is proposed do a general revision of Std 802. Nendica has work ongoing: ELLA (Evolved Link Layer Architecture) that is possibly related to Std 802. The 802.1 Chair announced a Technical Plenary to discuss the need to update Std 802. This will probably lead to a PAR for a revision of Std 802.

What do the IEEE 802 standards have in common? Largely they share addresses. From slide 7 – the standard claims to define the 802 architecture – but it really doesn’t – the 802 architecture does not seem to be defined anywhere – the 802 specification only define the MAC service.

C – The only thing binding the 802 standards, are the addresses, and the standards also can have frame exchanges.

R - Side 8 – All of the 802 MACs operate under the same LLC, but no one know what the LLC is at this point. This was in Std. 802.2, but 802.2 is old and no longer an active standard. The only thing it says in Std. 802 about Std. 802.2 is that 802.2 has been deprecated, but where it has been deprecated is not clear – hence the issues LPD and EPD. Slide 9 – we withdrew 802.2, so there is currently no specification that defines how networks talk to 802 networks. The interface for each MAC is unique and the interface is specified.

C - Ethernet uses the LLC – the others really don’t.

R – All the Stds use LLC – but it is not defined. There is other stuff in the LLC beside protocol identifiers and the service is not well defined. What should the LLC see is on slide 10, the LLC could multiplex/demultiplex and also support of VLAN should be in the LLC.

C – On slide 10 – basically you are talking about what is in the standards – regarding the layer above the MAC, everything is currently working, but the standard itself doesn’t exist, so is this post engineering work?

R – That is one perspective, we could just standardize what is there now. But we could also do more: providing/defining additional services and clarifying behavior. The need to write different interfaces for each type of 802 is burdensome as we only have the vestiges of the non-connected LLC. So, we should look at what the connected capabilities and clarify things.

R – The additional work proposed is an improvement – adding an improvement should not break the current implementation. So, it is important to balance any advantage the additional work would provide with the impact to currently existing solutions.

R – Defining the LSAP should allow for moving to the MSAP – we don’t need to figure out all the details when we provide the Architecture. If we do this properly it will be backward compatible.

C – Most of what need to be defined in the LLC is in the 802 specifications, but it is not clearly done. With billions of devices out there – how does this work get done without breaking things.

R – 802 has pictures of frames on the MAC. but how do the frames get there? How do two LSAPs talk to each other? These things should be able to be defined and not impact backward compatibility.

Chair - The 802.1 Plenary will be on Dec 2 4-6pm ET – please contact the chair if you need more details.

## Next Steps:

**Contributions requested/expected:**

* Annex G
* Clause 6
* TGbe/MLO informative annex

**January 802.11 Interim - telecons planning**

* 2 slots
* Topics:

**Next Teleconference(s):**

* Nov to Jan teleconference plan:
	+ Two Planed
	+ Conflicts to avoid: TGbe, REVme, TGbd, AANI, TGbh
	+ Split topics across times, to get equal access in different time zones
	+ Monday 1PM ET? Thursday 7PM ET?
	+ Dates to avoid? (Contact the Chair if you have interest and potential conflicts)
	+ Will be coordinated with other TG chairs, and announced later

## Adjourned: 13:16 h EDT

Final Agenda: [11-21/1625r6](https://mentor.ieee.org/802.11/dcn/21/11-21-1625-06-0arc-arc-sc-agenda-nov-2021.pptx), ARC closing report November 2021: [11-21/1870r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1870-00-0arc-arc-closing-report-nov-2021.pptx)