IEEE P802.11
Wireless LANs

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| ARC SC Meeting Minutes May 2019 |
| Date: 2019-05-14 |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC meeting sessions held on 14 May 2019 at 16:00 EDT, 15 May 2019 at 8:00 EDT, and 15 May 2019 at 16:00 EDT in Atlanta, Georgia, USA.

Note: Highlighted text are action items.

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# Tuesday, 14 May 2019, PM2

**Administration:**

**Chair: Mark Hamilton, Ruckus/Commscope (Absent)**

**Vice Chair/Acting Chair Joseph Levy, InterDigital**

**Secretary: Stephen McCann**

**Meeting called to order in ARC meeting room by Chair 16:02 EDT,**

Agenda slide deck: [11-19/0627r2](https://mentor.ieee.org/802.11/dcn/19/11-19-0627-02-0arc-arc-sc-agenda-may-2019.pptx) , proposed agenda copied here for reference:

**Tuesday, May 14, PM2**

* **Administrative: Minutes**
* **IEEE 1588 mapping to IEEE 802.11/802.1ASrev and use of FTM**
* **IETF/802 coordination**
* **IEEE 802 activities relevant to 802.11: 802.11aq, 802.1CQ and LAAP: 11-18/1934r0, 11-19/0493r0**
* **Consider IETF DetNet/time-sensitive networking input (potential relationship to RTA TIG?)**
* **Multiple MAC Addresses (and IPv6), “Multiple radios”**
* **System architecture views for common use scenarios**
* **IETF SAVI draft: https://datatracker.ietf.org/doc/draft-bi-savi-wlan**
* **“What is an ESS?”: 11-18/1051r5**
* **New topic (from REVmd)?: “What is a STA?” (See: 11-19/0106r0)**

**Wednesday, May 15, AM1**

* **MLME-RESET, versus MLME-JOIN and MLME-START (and MLME-SCAN?)**
* **“What is an ESS?” (continued)**
* **“What is a STA?” (continued)**

**Wednesday, May 15, PM2**

* **Future sessions / SC activities**
* **Above items continued, as needed**
* **TGbe (EHT) multi-band operation architecture (11-08/0949r4)**
* **AP/DS/Portal architecture and 802 and GLK concepts - 11-17/0136r2, 11-16/1512r0, 11-16/0720r0, 11-15/0454r0, 11-14/1213r1 (slides 9-11)**
* **Continue the other items, as needed**

**Administration:**

The Chair reviewed the Administrative information in the agenda document,

**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:**

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 approved by unanimous consent.

**March 2019 face-to-face minutes:** [11-19/0474r0](https://mentor.ieee.org/802.11/dcn/19/11-19-0474-00-0arc-arc-sc-meeting-minutes-march-2019.docx)

Approved by unanimous consent.

**IEEE 1588 mapping to IEEE 802.11/802.1ASrev and use of FTM**

Ganesh Venkatesan (Intel) was tasked with providing an update on this. He reported that there has been little update since the last meeting in March 2019. There may be an issue with the number of active sessions using 802.1ASrev. The solution to this may be a new layer in 802.11 to arbitrate the operation of 802.1ASrev.

There is a now a new draft of 802.1ASrev, but they are still processing comments from their initial ballot.

Chair called for any other issues related to 802.1AS – none were heard.

**IETF/802 coordination**

IETF Liaison - Peter Yee

There are a couple of items

* DetNet is related to possible items in TGbe (regarding low latency traffic)
* SAVI draft: https://datatracker.ietf.org/doc/draft-bi-savi-wlan

See the IETF liaison report to IEEE 802.11 for more information ([11-19-0878r0](https://mentor.ieee.org/802.11/dcn/19/11-19-0878-00-0000-may-2019-liaison-to-ietf-report.pptx))

**IEEE 802 activities relevant to IEEE 802.11 ARC**

It was recommended that issues regarding 802.11aq, 802.1CQ and LAAP are now considered by the new RCM TIG. Therefore, ARC should no longer be concerned with them.

**IETF DetNet issues**

A short presentation was made about this topic

It was decided that this topic could be covered by TGmd and TGbe. 11-19-0373r0 touches on this topic. There may be joint meeting between TGbe and 802.1 in the July 2019 meeting.

**IETF SAVI issues**

A short presentation was made about this topic. Note that the IETF SAVI draft was updated on May 12, 2019

**“What is an ESS?”:** [11-18/1051r5](https://mentor.ieee.org/802.11/dcn/18/11-18-1051-05-0arc-what-is-an-ess.pptx)

This document was presented.

It was decided that volunteers are required to move forward. One idea is that text could be generated for Type A and Type B within TGmd.

It was pointed out that some of the resulting clarifications may need to be liaised to the Wi-Fi Alliance.

Comment – Where did this item come from and is it important?

Comment – It was because there is no single definition of an ESS and there are conflicting understandings of what it is. It does have impacts on IP address assignment and AP roaming, reducing DHCP messages and randomization of MAC addresses.

Comment – Does the definition also include mesh APs or relay APs.

Comment – No, I don’t think they should be considered within this discussion.

**“What is a STA?” (See:** [11-19/0106r0](https://mentor.ieee.org/802.11/dcn/19/11-19-0106-00-000m-sta-and-ap.docx)**)**

There have been no contributions on this topic. However, I think it’s still beneficial to continue discussing this item.

A comment has appeared in TGmd to provide clarification of what STA means. However, it appears that TGmd has not solved the comment at the moment.

Comment – There may be some issues with STAs operating in different bands using a single MAC address, e.g. discover a network on 6GHz and then associate on 5GHz.

Comment – TDLS is also an issue together with OCT.

It was decided that there are issues here that need working on.

ARC considers a STA to be a single addressable unit and as a logical entity.

Comment – TGbc is looking at broadcasting data from a non-associated STA. It may just broadcast frames. Does this also need considering? Yes, it should be added as a new ARC item.

It appears that there are various issues within both TGbc and TGbe that need re-consideration of a “what is a STA” definition.

**Recessed:** 17:39 EDT.

# Wednesday, 15 May 2019, AM1

**Chair: Mark Hamilton, Ruckus/Commscope (Absent)**

**Vice Chair/Acting Chair Joseph Levy, InterDigital**

**Secretary Graham Smith, SRT Technologies**

**Meeting call to order in ARC meeting room by Chair 8:12 am,**

Agenda slide deck: [11-19/0627r2](https://mentor.ieee.org/802.11/dcn/19/11-19-0241-01-0arc-arc-sc-agenda-mar-2019.pptx) , proposed agenda copied here for reference:

**Wednesday, May 15, AM1**

* **MLME-RESET, versus MLME-JOIN and MLME-START (and MLME-SCAN?)**
* **“What is an ESS?” (continued)**
* **“What is a STA?” (continued)**

**Administration:**

The Chair reviewed the Administrative information in slides 5-10 in Agenda document,

**Call for Patents:**

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

**Approval of the Agenda:**

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 approved by unanimous consent.

**MLME-RESET, versus MLME-JOIN and MLME-START**

Chair went thru the agenda slide reproduced here.

Topic out of REVmd:

* No apparent requirement for an “initial” MLME-RESET, in 802.11. So, what is the initial state?
* Many MIB attributes describe taking effect at next MLME-JOIN or MLME-START.
	+ MLME-JOIN occurs at each BSS transition
	+ MLME-START occurs at less well-defined points, seems to require an MLME-RESET first
	+ Do these attributes really take effect at these points, or at the MLME-RESET?
* How about other state information, such as security association, block ack agreements, etc., etc.?
* Maybe need to consider MLME-SCAN, too?
* Is correct information provided at these primitives (and not more than needed information)?

Q -Not sure what last bullet means

List of primitives is very long, doubt if anyone has looked at the list since 2007

Being looked at in rev md.

Q - Anyone have any opinion on MLME-RESET.

A – IEEE 1609.4 sit overlap at just above the MAC and defines places in operation where MLME-RESET needs to be issued. Can only change MAC address by issuing a RESET. Not sure seen RESET anywhere else as normally assumed. They do not use JOIN or START.

Should RESET occur after reading a Beacon, before associate so you have correct attributes?

Can you do a JOIN without a RESET, what state are you in.

Is it part of a Scan? But can join without doing a scan.

Is RESET actually in the text?

We have state defining attributes.

What is the problem? No one has defined it.

Old Annex C did have an initial state but that was deleted 2007.

Cannot assume a JOIN is done at each transition. Re-associate? Maybe should be ESS.

Only place in text not in the MLME itself is

11.22.7.4. BSS Management Transition response

The MLME-RESET.request primitive is invoked to terminate the BSS. The AP shall disassociate

all STAs immediately prior to termination of the BSS.

MLME\_STOP is used to terminate a BSS if started with MLME-START 11.1.6.

11.1.6. discusses using STOP on infrastructure BSS or PBSS. 6.3.12.2.1. restricts effects STOP to a BSS previously started using START. 6.3.11.2.1. START used for everything.

It does not seem to be consistent. Why does BSS Management Transition use RESET and not STOP?

Does STOP automatically RESET the MAC?

**6.3.10.2.3 MLME-RESET shall be used prior to MLME-START**

**6.3.12.2.3 The MLME-STOP termination procedure does not reset the MAC to initial conditions. An MLME-RESET. request primitive shall be issued prior to use of the MLME-START.request primitive and subsequent to the use of an MLME-STOP.request primitive.**

**6.3.11.2.3. The MLME-START.request primitive shall not be used after successful use of the MLME-START.request primitive or successful use of the MLME-JOIN.request primitive without generating an intervening MLME-RESET.request primitive.**

We have explicit uses of RESET

Back to “initial” state. We do not discuss initial

Do we need a MLME-INITIALIZE?

Do we care about the state prior to the START? One would think so. Why does a RESET before a second START when not before the first START?

Suggest a table or such needs to be produced that looks at the order and when used of START RESET STOP and JOIN. Then maybe discrepancies can be seen, or not.

Question – definition of phrase “BSS transition” and “BSS Transition Management” do not appear to be consistent. BSS transition has been around forever. Latter term only came in later, but seems to violate the former.

4.3.19.3 BSS Transition management is defined.

“BSS transition management enables an AP to request non-AP STAs to transition to a specific AP, or to indicate to a non-AP STA a set of preferred APs, due to network load balancing or BSS Termination”

i.e. initiated by the AP

BSS transition defined in 3.1 (P157 in 2.2). Initiated by STA.

Only difference is who triggered the transition – hence no real problem.

MLME-START.confirm result

* Success,
* BSS already started or Joined
* RESET required before START
* Not supported

Agrees with STOP.

In fact, the uses of START RESET STOP and JOIN seem to be OK and consistent. JOIN appears 98 times.

Only case not covered (so far as seen) before the first activity after MAC is instantiated. Is there a problem by having it? No text to say do a reset upon instantiation of the MAC entity - there was prior to 2007 in old ANNEX C (last updated in 2003).

Sooo….is it a problem that we don’t have an initial state. Would an MLME-INITIALIZE be any different from MLME-RESET? Is it a parameter on RESET, i.e. RESET is true?

Back to bullets: taking effect at next JOIN or START.

Synchronization occurs only at a JOIN, so moving across BSSs needs a JOIN. But do not need a JOIN to do a re-association? JOIN is for a specific BSS. Roaming within ESS do I need to JOIN to go back to a previous BSS? Is there a problem if you do a JOIN?

At this point, time was called.

Chair showed agenda for PM session.

**Recessed:** 10:02 EDT.

# Wednesday, 15 May 2019, PM2

**Call to order:** 16:04 EDT

**Administration:**

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

**Vice Chair/Secretary: Joseph Levy, InterDigital**

The Chair reviewed the Administrative information in slides 5-10 in Agenda document,

**Call for Patents:**

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

**Approval of the Agenda: 11-19/0627r3**

The Chair reviewed the agenda and called for comments or amendments to the agenda – there was no response to the call (slide 12 – copied here for reference).

* **Future sessions / SC activities.**
* **Above items continued, as needed**
* **References to 802.11 in** <https://tools.ietf.org/html/draft-ietf-ipwave-ipv6-over-80211ocb-45>
* **TGbe (EHT) multi-band operation architecture (**[11-08/0949r4](https://mentor.ieee.org/802.11/dcn/08/11-08-0949-04-0arc-mac-component-breakdown-wip.ppt)**)**
* **TGbc (Broadcast) unassociated broadcast, broadcast reception**
* **AP/DS/Portal architecture and 802 and GLK concepts -** [11-17/0136r2](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-02-0arc-bridging-architecture-considerations.docx), [11-16/1512r0](https://mentor.ieee.org/802.11/dcn/16/11-16-1512-00-0arc-glk-802-1q-bridge.pptx), [11-16/0720r0](https://mentor.ieee.org/802.11/dcn/16/11-16-0720-00-0arc-stacked-architecture-discussion.pptx)**,** [11-15/0454r0](https://mentor.ieee.org/802.11/dcn/15/11-15-0454-00-0arc-some-more-ds-architecture-concepts.pptx)**,** [11-14/1213r1](https://mentor.ieee.org/802.11/dcn/14/11-14-1213-01-0arc-ap-arch-concepts-and-distribution-system-access.pptx) **(slides 9-11)**
* **Continue the other items (previous slide), as needed**

The proposed agenda was approved by unanimous consent.

Chair reviewed slide 24 – the list of ARC Future Activities and sessions (copied below for reference).

* **ARC SC meets when a specific focused task is requested of the SC for which the is sufficient volunteer interest.**
* **Continue work on architectural models, and liaison with TGs in development of their architecture as appropriate (e.g. TGbc, TGbe) - Perhaps updates on “STA” definition to handle TGbe concepts? Might have multiple radio/MAC address implications, too?**
* **Investigation of 802.11 as part of a Deterministic Network – Joint session w/802.1 & TGbe in July (TBC)**
* **Multiple MAC Address discussion (IPv6) – perhaps “multiple radios” too**
* **System architecture(s) for common use scenarios**
* **Will also follow 802.1/802.11 activities on links, bridging, and MAC Service definition – “What is an ESS?”, for example**
* **“What is a STA?” (11-19/0106) Related: What is the (“STA(s)”) architecture of off-channel TDLS?**
* **MLME-RESET, versus MLME-JOIN and MLME-START (and MLME-SCAN?)**
* **Monitor/report on IETF/802 activities, as needed**

**Monitor/report on IEEE 1588 activities and 802.1ASrev use of FTM, as needed**

**Planning:**

Future sessions / SC activities

* Plan for three individual meeting slots
* Usual slot on Wed AM1
* Another 2 slots for standalone ARC work
* Make sure not to interfere with any joint meeting between TGbe and 802.1
* Teleconferences: None planned.

Joint TGbe 802.1 session in Vienna has been proposed and is being arranged.

**References to 802.11 in** <https://tools.ietf.org/html/draft-ietf-ipwave-ipv6-over-80211ocb-45>

In paragraph - 4.2 – “In the 802.11 header, the value of the Subtype sub-field in the Frame Control field MUST be set to 8 (i.e. 'QoS Data'); the value of the Traffic Identifier (TID) sub-field of the QoS Control field of the 802.11 header MUST be set to binary 001 (i.e. User Priority 'Background', QoS Access Category 'AC\_BK').” this document should describe the use of 802.11, but not provide the bit level instructions. e.g. they should say they are using user priority “background” not instructing how the bits will be set. As saying “background” will trigger the use of QOS frames. Also note 1609 is also involved in this – This spec sits on top of 1609, which sits on top of 802.11. So, this seems to be over specifying of the interface.

It is hard to tell what level this is written at – 4.1 – the use of MTU and then saying on 802.11-OCB must be 1500 octets.

Do they mean – When this is running on 802.11-2016 the MTU is 1500?

The following is a copy of section 4.2.1 Ethernet Adaptation Layer from <https://tools.ietf.org/html/draft-ietf-ipwave-ipv6-over-80211ocb-45>, provided as reference for the following discussion.

“ An 'adaptation' layer is inserted between a MAC layer and the

 Networking layer. This is used to transform some parameters between

 their form expected by the IP stack and the form provided by the MAC

 layer.

“ An Ethernet Adaptation Layer makes an 802.11 MAC look to IP

 Networking layer as a more traditional Ethernet layer. At reception,

 this layer takes as input the IEEE 802.11 header and the Logical-Link

 Layer Control Header and produces an Ethernet II Header. At sending,

 the reverse operation is performed.

“ The operation of the Ethernet Adaptation Layer is depicted by the

 double arrow in Figure

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| 802.11 header | LLC Header | IPv6 Header | Payload |.11 Trailer|

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 802.11-to-Ethernet Adaptation Layer

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 | Ethernet II Header | IPv6 Header | Payload |

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 Figure 1: Operation of the Ethernet Adaptation Layer

“ The Receiver and Transmitter Address fields in the 802.11 header MUST

 contain the same values as the Destination and the Source Address

 fields in the Ethernet II Header, respectively. The value of the

 Type field in the LLC Header MUST be the same as the value of the

 Type field in the Ethernet II Header. That value MUST be set to

 0x86DD (IPv6).

“ The ".11 Trailer" contains solely a 4-byte Frame Check Sequence.

“ The placement of IPv6 networking layer on Ethernet Adaptation Layer

 is illustrated in Figure 2.

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 | IPv6 |

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 | Ethernet Adaptation Layer |

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 | 802.11 MAC |

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 | 802.11 PHY |

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 Figure 2: Ethernet Adaptation Layer stacked with other layers

“ (in the above figure, a 802.11 profile is represented; this is used

 also for 802.11-OCB profile.)”

Comment: Suggest they read 802.1AC – for how to do this – pointing to the 802.11 annex B.

Comment: Below figure 1, there are references to the destination and source addressed, we have issues with using Receiver and Transmitter address field in 802.11 to include the Destination and the Source Address.

Comment: This needs to be cleared up, this seems to be very confusing. What their intention is should be clarified.

Comment: Also “in the above figure, an 802.11 profile is represented; this is used also for 802.11-OCB profile.” what are these two things and why are different.

Comment: 1609 mucks with the 802.11 interface.

Comment: They should refer to 1609.3 section 5. To get the stack correct or more correct, as there are issues with 1609. Reviewed the current WAVE reference model in 4.1. and 5 describes the data plan.

Comment: Figure 1. Provides the WAVE Management entity and 1609, but more details are clause 5, hence the IETF draft should refer to clause 4 and 5. So we should also point them to 802.1AC B.1.5 also.

**Action – The ARC SC Chair to draft a reply ASAP**

**TGbe (EHT) multi-band operation architecture (**[11-08/0949r4](https://mentor.ieee.org/802.11/dcn/08/11-08-0949-04-0arc-mac-component-breakdown-wip.ppt)**)**

Concepts that are being discussed in TGbe, with architectural concepts

* Document 11-19/823r0:
	+ Shows architecture diagrams with multiple STAs, supporting a single (logical) STA interface, above them.
	+ Aspects of intra-device interference between the STAs
* Document 11-19/822r0:
	+ Looks at similar concepts, with existing architecture concepts
* Historically, 11-08/949 does have some interesting discussion about drawing a “line in the stack” at this low-level point, lower down than where 802.11ad draws it.
* Document 11-19/760r1:
	+ Discusses data frame transmission options for this “dual-STA” concept
* Document 11-19/360:
	+ Shows the “line in the stack” between the PHY and the MAC
* Document 11-19/804r0:
	+ This is different, introducing the idea that a STA can get data from multiple APs
	+ This raises the concept of massive MIMO, from these multiple APs
	+ Lots of questions about what is an “association” in this model?
* Looked at 11-08/949 briefly.

Action: The ARC SC chair to approach TGbe chair, and request collaboration on architecture concepts, as they come up.

**TGbc (Broadcast) unassociated broadcast, broadcast reception**

TGbc also has some use cases that seem to imply some new architecture concepts:

* Document 11-19/0268r4:
* Slide 3 – Stadium Video Distribution
* Slide 4 – Low Power Sensor UL Broadcast
* These have new one-to-many concepts, and non-associated data exchange concepts
* Is this a new use of OCB? What would need to change in OCB?
* Also, could be a use of GAS? At least for the up-link direction?
* Are these STAs? In the Stadium Video case, do they even have/need a MAC address?
* Slide 5 – Intelligent Transportation Broadcast: Does this add new requirements not handled by OCB? (Does OCB run on non-5.9 PHYs?)
* Slide 6 – Broadcast services for event production, looks like Slide 3 from an architecture PoV.
* Slide 7 – same comment as Slide 6.
* Document: 11-19/151r2 is a requirements document; we could review that for requirements implications of the above.

Action: The ARC SC chair to approach TGbc chair, and request collaboration on architecture concepts, as they come up.

**AP/DS/Portal architecture and 802 and GLK concepts -** [11-17/0136r2](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-02-0arc-bridging-architecture-considerations.docx), [11-16/1512r0](https://mentor.ieee.org/802.11/dcn/16/11-16-1512-00-0arc-glk-802-1q-bridge.pptx), [11-16/0720r0](https://mentor.ieee.org/802.11/dcn/16/11-16-0720-00-0arc-stacked-architecture-discussion.pptx)**,** [11-15/0454r0](https://mentor.ieee.org/802.11/dcn/15/11-15-0454-00-0arc-some-more-ds-architecture-concepts.pptx)**,** [11-14/1213r1](https://mentor.ieee.org/802.11/dcn/14/11-14-1213-01-0arc-ap-arch-concepts-and-distribution-system-access.pptx) **(slides 9-11)**

Chair called for discussion, no response

**Adjourned 17:53 EDT**

Note: final agenda slide deck is: [11-19/0627r5](https://mentor.ieee.org/802.11/dcn/19/11-19-0627-05-0arc-arc-sc-agenda-may-2019.pptx) and closing report is: [11-19/0924r0](https://mentor.ieee.org/802.11/dcn/19/11-19-0924-00-0arc-arc-closing-report-may-2019.pptx)