Minutes IEEE P802.11
Wireless LANs

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| IEEE 802.11 TGbh Plenary Meeting Minutes, July 10-13, 2023Randomized and Changing MAC addresses (RCM) |
| Date: 2023-07-14 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Peter Yee | NSA-CSD | Mountain View, CA, US |  | peter@akayla.com |

Abstract

This document contains the minutes of the IEEE 802.11bh plenary meeting of July 10-13, 2023.

Note: Highlighted text are action items.

Q- proceeds a question asked at the meeting

A- proceeds an answer

C- proceeds a comment

**(Minutes from the ad hoc meeting on Monday the 10th at 8 a.m. CET are posted separately.)**

**Meeting May 18th, 2023, 1:30 p.m. to 3:30 p.m. CET**

**Chair: Mark Hamilton (Ruckus/CommScope)**

**Vice Chair: Peter Yee (NSA-CSD/AKAYLA)**

**Vice Chair: Stephen Orr (Cisco)**

**Secretary: Peter Yee**

**Editor: Carol Ansley (Cox Communications)**

**The teleconference was called to order by the Chair at 1:34 p.m. CET.**

Agenda slide deck [11-23/0967r06](https://mentor.ieee.org/802.11/dcn/23/11-23-0967-06-00bh-agenda-tgbh-2023-july-plenary.pptx)

1. **Policies and procedures were presented by Chair Mark Hamilton. (Slides 4 to 15)**

There were no Patent declarations.

Copyright policy slides were presented (Slides 11 and 12)

1. **Agenda:**
* **Attendance, noises/recording, meeting protocol**
* **Policies, duty to inform, participation rules**
* **Organization topics:**
	+ July Plenary meetings: Monday, 08:00-10:00; Tuesday, 13:30-15:30; Wednesday 8:00-10:00; Thursday 8:00-10:00
* **Approve May interim minutes (slide 17)**
* **Publication of D1.0 motion (slide 20)**
* **Discussion on response to WBA liaisons:**
	+ [11-21/0703r0](https://mentor.ieee.org/802.11/dcn/21/11-21-0703-00-0000-2021-april-liaison-from-wba.docx), [11-21/1141r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1141-00-00bh-excerpts-of-wba-document-wi-fi-id-scope.pptx), [11-22/0668r0](https://mentor.ieee.org/802.11/dcn/22/11-22-0668-00-0000-liaison-statement-from-wba-re-wi-fi-devices-identification-group.pdf), [11-22/0653r0](https://mentor.ieee.org/802.11/dcn/22/11-22-0653-00-0000-2022-march-wba-whitepaper-re-device-identification.pdf)
	+ [11-23/0888r0](https://mentor.ieee.org/802.11/dcn/23/11-23-0888-00-00bh-wba-liaison-discussion.pptx) Stephen Orr
* **Comment Resolution -** [**11-23/1152r6**](https://mentor.ieee.org/802.11/dcn/23/11-23-1152-06-00bh-ieee-802-11bh-lb274-comments.xlsx) **(start at blue line, CID 20)**
	+ 802c (CID 228), and CIDs 7 & 21 (address collision problem) - [11-23/1231r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1231-00-00bh-introduction-to-ieee-802c-slap.pptx) (De la Oliva)
	+ CIDs 78, 95, 96, 142 - [11-23/1235r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1235-00-00bh-cr-for-cids-in-subclause-6-3.docx) (Yang)
	+ [11-23/1245r4](https://mentor.ieee.org/802.11/dcn/23/11-23-1245-04-00bh-cid-resolutions-irm-1.docx) (Numerous CIDs) (Smith)
	+ REVme CID 4069 (when there’s time)
	+ Discussion on response to WBA liaisons

Stephen Orr (Cisco) moved “to approve the minutes of the May meeting” ([11-23/0857r02](https://mentor.ieee.org/802.11/dcn/23/11-23-0857-02-00bh-minutes-tgbh-interim-meeting-may-2023.docx)). Jay Yang (ZTE) seconded the motion. The minutes were approved with unanimous consent.

1. **Publication of D1.0**

With nearly 92% voting in favor of approval of Draft 1.0 of IEEE 802.11bh, the chair offered text for a motion to make to P802.11bh D1.0 available for sale. The motion reads:

“Approve making P802.11bh D1.0 available for purchase from the IEEE Store.”

The motion was made by Stephen Orr and seconded by Jay Yang. The vote on the motion was 16/0/2 (Y/N/A).

1. **Discussion of WBA Liaisons**

Stephen Orr is asking for help from the task group members to flesh out the initial response found in [11-23/0888r00](https://mentor.ieee.org/802.11/dcn/23/11-23-0888-00-00bh-wba-liaison-discussion.pptx). He will attempt to have the response in good shape by tomorrow’s meeting so that there’s the possibility of gaining WG approval to send the response to WBA out of this plenary session.

1. **Comment Resolution**

The comment resolution spreadsheet is found in [11-23/1152r06](https://mentor.ieee.org/802.11/dcn/23/11-23-1152-06-00bh-ieee-802-11bh-lb274-comments.xlsx).

Antonio de la Oliva (InterDigital) has put together an introduction to IEEE 802c SLAP [Structure Local Address Plan] ([11-23/1231r00](https://mentor.ieee.org/802.11/dcn/23/11-23-1231-00-00bh-introduction-to-ieee-802c-slap.pptx)), as input to CIDs 228, 7, 21, and 114. While this is an optional feature, de la Oliva believes it to be a good idea for us to use and hence he is socializing the concept. IEEE 802c defines Local MAC address usage. These addresses are not globally unique nor are they necessarily persistent. In IEEE 802.11bh, these addresses could be used as IRM addresses.

The question is whether the random MAC addresses use 44 bits or 46 bits. This would not be negotiated. It would, however, be helpful if the implementation could communicate, in a secure manner, what local address policy was being used. The address space would be used with the IRM scheme for the specification by the non-AP STA of its next MAC address. Not everyone supports use of 44 bits due to the quartering of the address space that entails (vs. 46 bit addresses). It was pointed out that earlier discussions of what MAC space to employ fell on the side of using the whole space, although that was not a unanimous decision either. The choice made here will also have an effect on IEEE 802.11bi. For privacy purposes, a larger space is advantageous, but it’s not clear that 44 bits is insufficient. IEEE 802.11REVme has a feature to advertise what policy is being in use so that STAs can choose addresses that don’t conflict with other STAs on the network. The IEEE RAC will review whatever IEEE 802.11bh decides to do if it varies from existing IEEE 802.11 choices that have already been reviewed by the RAC. The scope of these identifiers has caused confusion. IRM(A) addresses supplied to an AP by a STA are for use in the next (Re)Association. They aren’t short-term addresses excepting that a STA (re)associates frequently.

Given the confusion displayed by the participants, de la Oliva will consider next steps before running a straw poll.

Jay Yang presented [11-23/1235r00](https://mentor.ieee.org/802.11/dcn/23/11-23-1235-00-00bh-cr-for-cids-in-subclause-6-3.docx) in response to CIDs 78, 95, 96, and 142. The proposed comment resolutions would make use of MIB variables (dot11DeviceIDActivated, dot11IRMActivated) being true rather than using textual descriptions of what those MIB variables mean. While these changes are written only in response to subclause 6.3 CIDs, they could be applied elsewhere in the document. It will have to be determined if there are other CIDs that cover the same issue in other subclauses. Yang will submit a revision of his resolutions based on today’s discussion, but they are basically palatable to the participants and ready for a future motion.

Graham Smith (SRT Wireless) offered [11-23/1245r04](https://mentor.ieee.org/802.11/dcn/23/11-23-1245-04-00bh-cid-resolutions-irm-1.docx) on “CID resolutions IRM – 1”, which addresses CIDs 2, 3, 4, 5, 6, 7, 15, 17, 20, 21, 22, 23, 25, 28, 37, 38, 49, 51, 57, 58, 59, 60, 61, 62, 64, 65, 66, 67, 68, 69, 70, 81, 89, 114, 128, 135, 137, 140, 148, 149, 164, 168, 169, 193, 196, 197, 198, 207, 208, 214, 224, 240, and 294. CIDs 2, 3, 4, 5, 6, 7, 15, and 17 will need some additional, separate discussion. CIDs 20 and 89 are similar but are also covered in resolutions from Jay Yang, who will take them over. CID 22 (and 25, 51, 168, 169, and 193) are resolved by changing “IRM MAC address” (or “IRM MAC” in one other place) in the text to simply “IRM”. CID 193 requires additional work to resolve aside from the terminology change. A discussion of ESS vs AP/ESS will also be needed, along the lines of whatever the baseline IEEE 802.11 specification does for sharing of context between APs in an ESS.

**The meeting was recessed at 3:30 p.m. CET.**

**Meeting July 12th, 2023, 8:00 a.m. to 10:00 a.m. CET**

**Chair: Mark Hamilton (Ruckus/CommScope)**

**Vice Chair: Peter Yee (NSA-CSD/AKAYLA)**

**Vice Chair: Stephen Orr (Cisco)**

**Secretary: Peter Yee**

**Editor: Carol Ansley (Cox Communications)**

**The teleconference was called to order by the Chair at 8:03 a.m. CET.**

Agenda slide deck [11-23/0967r08](https://mentor.ieee.org/802.11/dcn/23/11-23-0967-08-00bh-agenda-tgbh-2023-july-plenary.pptx)

1. **Policies and procedures were presented by Chair Mark Hamilton. (Slides 4 to 15)**

There were no Patent declarations.

Copyright policy slides were presented (Slides 11 and 12)

1. **Agenda:**
* **Attendance, noises/recording, meeting protocol**
* **Policies, duty to inform, participation rules**
* **Organization topics:**
	+ July Plenary meetings: Monday, 08:00-10:00; Tuesday, 13:30-15:30; Wednesday 8:00-10:00; Thursday 8:00-10:00
* **Discussion on response to WBA liaisons:** [**11-21/0703r0**](https://mentor.ieee.org/802.11/dcn/21/11-21-0703-00-0000-2021-april-liaison-from-wba.docx)**,** [**11-21/1141r0**](https://mentor.ieee.org/802.11/dcn/21/11-21-1141-00-00bh-excerpts-of-wba-document-wi-fi-id-scope.pptx)**,** [**11-22/0668r0**](https://mentor.ieee.org/802.11/dcn/22/11-22-0668-00-0000-liaison-statement-from-wba-re-wi-fi-devices-identification-group.pdf)**,** [**11-22/0653r0**](https://mentor.ieee.org/802.11/dcn/22/11-22-0653-00-0000-2022-march-wba-whitepaper-re-device-identification.pdf)
	+ [11-23/0888r0](https://mentor.ieee.org/802.11/dcn/23/11-23-0888-00-00bh-wba-liaison-discussion.pptx) Stephen Orr
* **Comment Resolution -** [**11-23/1152r7**](https://mentor.ieee.org/802.11/dcn/23/11-23-1152-07-00bh-ieee-802-11bh-lb274-comments.xlsx)**, Topics list (next slide)**
	+ CID 228 (IEEE 802c relationship/use) -  [11-23/1231r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1231-00-00bh-introduction-to-ieee-802c-slap.pptx) (DeLaOliva)
	+ CIDs 7, 21 & 114 (address collision problem)
	+ Continue [11-23/1245r5](https://mentor.ieee.org/802.11/dcn/23/11-23-1245-05-00bh-cid-resolutions-irm-1.docx) (Numerous CIDs) (Smith)
	+ Annex B, CIDs 110, 152 - [11-23/1250r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1250-00-00bh-cr-for-cids-in-annex-b.docx) (Yang)
	+ CID 138 - [11-23/1261r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1261-00-00bh-802-11bh-d1-0-cr-rejects.docx) (Lumbatis)
	+ REVme CID 4069 (when there’s time)
1. **TGbi coordination around MAC address usage**

Based on hallway discussions, Antonio de la Oliva believes we need to have a joint meeting with TGbi. The concern is over how IRM interacts with TGbi’s own efforts to provide privacy for MAC addresses by allowing mid-association address changes. Opinions in the room varied over whether there would in fact be addressing clashes and whether there was value in discussing the topic with TGbi. At this time, it doesn’t appear that a face-to-face meeting with TGbi is merited, but advocates for such should put together arguments for why it is needed.

1. **WBA liaison response update**

Stephen Orr showed the mapping of TGbh to WBA use cases ([11-23/0888r00](https://mentor.ieee.org/802.11/dcn/23/11-23-0888-00-00bh-wba-liaison-discussion.pptx), slides 6 and 7). He’s soliciting input from the group. The mapping isn’t something we will send to them, but it is helpful in determining which parts of their request we are covering and which parts we are not. We should probably highlight areas that we think they should not be doing despite a potential solution being available in IEEE 802.11bh. Now that IEEE 802.11bh D1.0 is available, we can now layer on which of the TGbh use cases are covered by the two mechanisms in the draft and how. We can also reevaluate the TGbh use cases for whether they are covered in D1.0 at all. Orr will take the group’s input and produce an output for task group discussion and then sending it to WBA. A separate response to WBA could be sent to note that D1.0 is available and that a more detailed response is being generated.

1. **Comment resolution status**

Hamilton has been marking preliminarily resolved comments in the comment resolution spreadsheet ([11-23/1152r07](https://mentor.ieee.org/802.11/dcn/23/11-23-1152-07-00bh-ieee-802-11bh-lb274-comments.xlsx)). He wishes to run a motion tomorrow to approve these resolutions.

Okan Mutgan (Nokia) presented [11-23/1262r00](https://mentor.ieee.org/802.11/dcn/23/11-23-1262-00-00bh-lb274-cr-for-cid7-21-114.pptx), which responds to CIDs 7, 21, and 114 about IRM collisions/conflicts. His proposal has two approaches: 1) update the IRM Status field in the IRM IE that allows an indication of a duplicate IRM; 2) add a code to de-authenticate/disassociate that IRM duplicate. He prefers the latter because it’s appropriate for the FILS, PASN, and ordinary IRM paths in the specification. There doesn’t appear to be a suitable frame to carry the expanded IRM Status field in all cases. He does note a case where a first STA supplies an IRM and then goes away. Then, a second STA supplies the same IRM. In this case, he believes the AP can’t correctly recognize that the second STA is not the first one. There seems to be support for signaling duplicate addresses, but there’s substantial disagreement with deauthenticating/disassociating as the means of passing that signal. Another way to provide the duplicate address indication would be via a new Robust Action frame. An additional possibility would be for the AP to supply a recommended (and non-duplicate) IRM to the STA, which can choose to the use the AP-supplied IRM or not. There’s not a lot of support for AP-generated IRMs. Mutgan did not run the straw poll in his presentation because it doesn’t cover the Robust Action frame method.

Graham Smith has updated his comment resolutions in [11-23/1245r05](https://mentor.ieee.org/802.11/dcn/23/11-23-1245-05-00bh-cid-resolutions-irm-1.docx). For CID 51, he’s not sure where the suggested term “IRM mechanism” or “IRM operation” would be applicable. He therefore lumps it in purely with CID 22 that is resolved by the term “IRM MAC address” being renamed to the non-redundant “IRM”. He would like to reject CID 51 because there’s no apparent confusion even with putting the word “an” before “IRM”. He recommends accepting CID 28 to remove nearly identical text in two notes appearing twice on the same page, but it would probably make sense to request the commenter to propose a combination of the slightly differing text in the two notes. Jerome Henry (Cisco) agreed to take over responsibility for this CID and propose new text. For CIDs 23 and 135, he proposes revised introductory text that clarifies the ability of a STA to use both Device ID and IRM, noting that they do not clash. These CIDs will need further work before they are accepted.

**The meeting was recessed at 10:00 a.m. CET.**

**Meeting July 13th, 2023, 8:00 a.m. to 10:00 a.m. CET**

**Chair: Mark Hamilton (Ruckus/CommScope)**

**Vice Chair: Peter Yee (NSA-CSD/AKAYLA)**

**Vice Chair: Stephen Orr (Cisco)**

**Secretary: Peter Yee**

**Editor: Carol Ansley (Cox Communications)**

**The teleconference was called to order by the Chair at 8:03 a.m. CET.**

Agenda slide deck [11-23/0967r10](https://mentor.ieee.org/802.11/dcn/23/11-23-0967-10-00bh-agenda-tgbh-2023-july-plenary.pptx)

1. **Policies and procedures were presented by Chair Mark Hamilton. (Slides 4 to 15)**

There were no Patent declarations.

Copyright policy slides were presented (Slides 11 and 12)

1. **Agenda:**
* **Attendance, noises/recording, meeting protocol**
* **Policies, duty to inform, participation rules**
* **Organization topics:**
	+ July Plenary meetings: Monday, 08:00-10:00; Tuesday, 13:30-15:30; Wednesday 8:00-10:00; Thursday 8:00-10:00
* **Teleconference and September planning**
* **Motion on completed resolutions (**[**11-22/0651r20**](https://mentor.ieee.org/802.11/dcn/22/11-22-0651-20-00bh-tgbh-motions-list.pptx)**, Motion #19)**
* **Straw poll on 802c (**[**11-23/1231r01**](https://mentor.ieee.org/802.11/dcn/23/11-23-1231-00-00bh-introduction-to-ieee-802c-slap.pptx)**)**
* **Discussion on response to WBA liaisons:**
	+ [11-21/0703r0](https://mentor.ieee.org/802.11/dcn/21/11-21-0703-00-0000-2021-april-liaison-from-wba.docx), [11-21/1141r0](https://mentor.ieee.org/802.11/dcn/21/11-21-1141-00-00bh-excerpts-of-wba-document-wi-fi-id-scope.pptx), [11-22/0668r0](https://mentor.ieee.org/802.11/dcn/22/11-22-0668-00-0000-liaison-statement-from-wba-re-wi-fi-devices-identification-group.pdf), [11-22/0653r0](https://mentor.ieee.org/802.11/dcn/22/11-22-0653-00-0000-2022-march-wba-whitepaper-re-device-identification.pdf)
	+ [11-23/0888r0](https://mentor.ieee.org/802.11/dcn/23/11-23-0888-00-00bh-wba-liaison-discussion.pptx) Stephen Orr
* **Comment Resolution -** [**11-23/1152r9**](https://mentor.ieee.org/802.11/dcn/23/11-23-1152-09-00bh-ieee-802-11bh-lb274-comments.xlsx)
	+ Presentation to TGbi, on MLO/MLD interaction with TGbh mechanisms (if ready)
	+ Continue [11-23/1245r6](https://mentor.ieee.org/802.11/dcn/23/11-23-1245-06-00bh-cid-resolutions-irm-1.docx) (Numerous CIDs) (Smith) (up to 1 hour)
	+ Annex B, CIDs 110, 152 - [11-23/1250r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1250-00-00bh-cr-for-cids-in-annex-b.docx) (Yang)
	+ CID 138 - [11-23/1261r1](https://mentor.ieee.org/802.11/dcn/23/11-23-1261-01-00bh-802-11bh-d1-0-cr-rejects.docx) (Lumbatis)
	+ CID 28 - [11-23/1280r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1280-00-00bh-cid-28-resolution-proposal.docx) (Henry)
	+ Misc CIDs [11-23/1285r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1285-00-00bh-lb274-cid-resolutions.docx) (Mutgan)
	+ Status code [11-23/1286r0](https://mentor.ieee.org/802.11/dcn/23/11-23-1286-00-00bh-cr-for-the-status-code.pptx) (Yang)
	+ Device ID/opaque identifier (CIDs 8, 9, 10, 11, 36, 272) [11-23/1258r2](https://mentor.ieee.org/802.11/dcn/23/11-23-1258-02-00bh-comment-resolutions-draft-3-0-section-12-7.docx) (Lumbatis)
	+ REVme CID 4069 (when there’s time)
1. **Teleconference and September planning**

The expectation will be for the usual 4 meeting slots during the September interim meeting. The time will be used to continue work on comment resolution for the initial letter ballot and to generate a response to the WBA liaisons.

Teleconferences will be held weekly between July 25th and the September interim meeting during the usual Tuesday 9:30-11:30 a.m. ET slot except for August 15th.

1. **Motion on completed resolutions**

The motions list is found in [11-22/0651r20](https://mentor.ieee.org/802.11/dcn/22/11-22-0651-20-00bh-tgbh-motions-list.pptx).

Kurt Lumbatis (ZaiNar) made a motion that reads, ‘Move to approve the resolutions of LB274 comments, and incorporate the text changes into the P802.11bh draft, as indicated in [11-23/1152r8](https://mentor.ieee.org/802.11/dcn/23/11-23-1152-07-00bh-ieee-802-11bh-lb274-comments.xlsx) for CIDs marked “Ready for motion”: CIDs 22, 25, 51, 78, 95, 96, 142, 168, 169.’ The motion was passed with unanimous consent.

1. **Straw poll on 802c**

Antonio de la Oliva ran a straw poll reading, “Should the procedure by which the STA selects IRM follow the IEEE 802c SLAP (Structured Local Address Plan)?”

This scheme will result in 44 bits available for random MAC addresses rather than 46. Opinions, while mostly in favor, vary on whether this is a good scheme and whether/where it was mandatory to employ. Indication by the AP of the local policy needs to be done securely, perhaps in EAPOL-Key message 3/4 or in a FILS Authentication frame. De la Oliva is running the straw poll in order to determine if he should spend time on writing up text for the proposal.

The results of the poll were 6/13/5 (Y/N/A).

1. **Discussion on response to WBA liaisons**

Stephen Orr is not available to present an update on [11-23/0888r00](https://mentor.ieee.org/802.11/dcn/23/11-23-0888-00-00bh-wba-liaison-discussion.pptx). Hamilton will be put together a couple of paragraphs as a personal contribution to the plenary to let the WBA know that Draft 1.0 is available and give them a general status update rather than waiting several more months.

1. **Continuation of comment resolutions in** [**11-23/1245r06**](https://mentor.ieee.org/802.11/dcn/23/11-23-1245-06-00bh-cid-resolutions-irm-1.docx)

Graham Smith continued comment resolution with CID 23 in [11-23/1245r06](https://mentor.ieee.org/802.11/dcn/23/11-23-1245-06-00bh-cid-resolutions-irm-1.docx). The resolution for CID 23 is to add an explanatory note about Device ID and IRM independence. The note was wordsmithed extensively.

1. **Comment resolution: status code**

Jay Yang briefed [11-23/1286r00](https://mentor.ieee.org/802.11/dcn/23/11-23-1286-00-00bh-cr-for-the-status-code.pptx), which deals with status-related CIDs 15, 17, 134, 132, 100, and 101 (in that order). All of these CIDs request removal of either the Device ID Status field or the IRM Status field. He explained troubleshooting procedures in home environments and how status codes can be helpful when troubleshooting. His argument is that the Status fields should not be removed, and instead, the comments should be rejected. Many participants had troubles following the requirement for Status fields in order to facilitate troubleshooting. No conclusion was reached owing to a lack of time, but it will likely be revisited during a teleconference.

**The meeting was adjourned at 10:00 a.m. CET.**