Minutes IEEE P802.11  
Wireless LANs

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| IEEE 802.11 TGbh Meeting Minutes, 14 June 2021  Randomized and Changing MAC addresses (RCM) | | | | |
| Date: 2021-06-28 | | | | |
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Abstract

This document contains the minutes of the IEEE 802.11 bh telecom Interim meeting 14 June 2021.

Note: Highlighted text are action items.

Q- proceeds a question asked at the meeting

A- proceeds an answer given by the presenter

C- proceeds a comment

**Meeting June 14, 2021 1.00 to 3.00 pm ET**

**Chair: Mark Hamilton**

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

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

**Secretary: Graham Smith (SRT Wireless)**

**The teleconference was called to order by Chair 1.03 hrs. EDT,**

Agenda slide deck 11-21/0976r0

1. **Policies and procedures were presented by the chair. (Slides 4 to 14)**

There were no Patent declarations.

Copyright policy slides were presented (Slides 10 and 11)

1. **Agenda:**

* Attendance, noises/recording, meeting protocol reminders
* Policies, duty to inform, participation rules
* Organization topics (see also Backup slides):
  + PAR/CSD: [https://development.standards.ieee.org/myproject-web/public/view.html#pardetail/8770](https://development.standards.ieee.org/myproject-web/public/view.html); [11-20/1117r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1117-05-0rcm-rcm-sg-proposed-rcm-csd-draft.docx)
  + Timeline estimate
* Issues Tracking: [11-21/0332r7](https://mentor.ieee.org/802.11/dcn/21/11-21-0332-07-00bh-issues-tracking.docx)
* Contributions:
* Next meetings: Teleconference June 28, July plenary

The Chair reviewed the agenda. Any comments? None.

The proposed agenda was adopted without objection.

Attendance is listed at end of the Minutes.

1. **TGbh Issues Tracking document: 11-21/0332**

Use Cases

Previously discussed up to 4.6 “**Grocery store frequent shopper notifications**”.

Stopped at ideas on how to describe “opt-in” concepts.

C – How is Opt-in to be signaled or determined? Is it different use case if not opt-in?

A – Assume at some point the user has carried out an “opt-in” before any of this works. Needs to be in the Use Case, somehow?

C – Opt in could mean that user wants to be recognized and could overcome RCM, stop randomizing MAC, or even use the real MAC.

C – Maybe jumping ahead. Could assume user still wants some privacy.

C – Pre-association so 11q? As not looking for solution why have the last sentence? *It is likely all this is accomplished by detecting the pre-known MAC address of the customer's 802.11 device(s)' public/non-associated frames*

C – Yes. If opt-in, then device knows not to randomize MAC.

Next Use case taken from the TIG report.

**Infrastructure with different SSIDs per band**

*This use case is in reaction to two situations: first is a network where (for whatever reason, perhaps incorrectly) the network (a single LAN, really) has been deployed with different SSIDs on different bands (“XYZ24G” and “XYZ5G”, for example); and second is considering a device that will use a consistent MAC address for a given SSID, but generates a new Local-ID MAC address for each new SSID. These scenarios have both been seen, relatively commonly, in the field.*

*In combination, these two scenarios result in the network infrastructure being unable to correlate the device’s signals, location, and network interaction on the two bands, which makes band steering effectively impossible*

Q – Do we consider this within our scope?

Q – Is assumption SSIDs managed by same person?

A – Assuming same LAN, so yes.

C – Do not feel that band steering is our concern. Might have two different network profiles. If different SSIDs, band steering difficult.

C – Using different SSIDs to get devices to go to a band may be out-of-scope.

C- Rather than band steering, something about different IP addresses depending on which SSID (and hence MAC address) is used?

C – What breaks is when using 2 different SSIDs?

C – Is band steering defined for different SSIDs in Spec?

A – We think no. Infrastructure band steering not defined to work like this. So if nothing in spec., what do we fix?

C – TIG thought user assumed they had one network despite two bands.

C – Is BTM supported across ESS or across SSIDs?

C – Having two different SSIDs for same network is deployed.

C – Could we recommend not to use this type of two SSIDs (2.4 and 5)?

A – Yes, we can write recommendations.

C – Summary? We don’t like this use case as written, but there might be something?

C – First part is OK. In this combination, device may end up with two different MAC addresses on same network – is that the problem?

C – Does this break what 11aq says? Maybe that describes the use case. Starts to look like all the other use cases, changing address daily for example is another problem.

C – Creating different SSIDs is AP, not STA.

C - Present case is that STA remembers MAC address for each SSID it sees (as per 11aq). But if network uses two different SSIDs, client will create two MACs. This breaks steering.

C – Home set up tends to be static, so not a problem if two SSIDs. Does Enterprise do this differently in that it wants band steering?

A – Seeing domestic networks now wanting to steer STAs.

C – Maybe other things other than band steering that are affected.

C – Scope of our project was that recognizing that devices are doing randomization, what happens and what can we do about it?

C – In base standard, idea that a MAC address is used for each network, is OK, as well as an implementation that changes MAC, 11aq says if state is desired to be maintained, then it needs to use same MAC address. Also 802.11 - 2020 introduced ability for network to advertise a MAC address policy.

C – MAC address policy interesting but longer term thing.

C – We should keep in mind.

C - STA must use same MAC address for interactions with that AP/network.

C – Still consider that more than one SSID is more than one network.

C – There are clients that will treat as two networks. And no need to change it.

Q – Hence, is more than one SSID for a “given” network?

C – How much time do we want to spend on that question, may be 11me topic or ARC? STA has no way of figuring out one network if different SSIDs.

A – ARC looked at ESS and same DS required and same SSID for all APs on that ESS. This was sent to 11me.

C – Seems that we have talked ourselves into that this case is a deliberate attempt to have two networks. If you want an ESS and the STA changes MAC, then it has to start again. Hence need to make sure STA keeps MAC for time associated to an ESS.

C – Use of multiple SSIDs in an ESS is not allowed, but use of more than one ESS for same upper layer or same datalink layer network may be worthwhile, but probably ARC area.

Q – Does anyone object to result that we do not deal with this, i.e. out of scope for 11bh. Need a contribution to help word this.

Next Use Case,3.6.2 form 19/1442r9

**Infrastructure (home or enterprise): Probes are randomized, even to/with associated SSID**

*A client that is using Local-ID MAC addresses could easily have an implementation that generates a new Local-ID MAC address for every Probe Request. This could even apply to Probe Requests that are directed to the associated SSID, when the client would otherwise use a consistent MAC address for transmissions within an association.*

*If the client has this extreme (or approaching this extreme) an implementation of MAC address randomization, it will have a strong impact on the infrastructure’s ability to making steering decisions for that client.*

*When attached to a multiple-AP infrastructure, if the client uses the stable MAC address when probing, the infrastructure can help steer the client across both APs and bands, to give the entire network better experience. This could apply to both directed probes and broadcast probes, too.*

C – Broadcast probe is to everybody, then directed probe to an AP you may have associated with previously. Can you randomize a probe if already associated?

A – 11aq careful to only to consider unassociated.

C – In 11aq active scan, no restrictions. If associated and scans looking for another AP, may use same MAC or not, no reason to use the ‘associated’ MAC. Not great to rely on active scanning anyway.

C – Looking for a specific AP/network, may be one or more APs for a network or channel. What are we achieving on this client steering? The identification that this is same STA or another STA?

C – Do we respond differently if we know this is an STA that is already associated or same STA probing different APs? Would APs respond differently? When should the STA change its address, STA is not aware that infrastructure might know that STA is associated or not?

C – May be state information, on client side if connected to Starbucks, could be scanning for another AP in that same network or opening up to discover new networks. In one context there is state, in another could argue no state.

C – Only “shall respond” if probe directly addressed.

C – We have concept of preferred AP. Probes may be responded with a different answer. But if MAC address changes no way to track a STA and provide information about service (mine better than what you have).

C – Non-compliant by not responding. Not broken by RCM. Many time no responses at all. Hate it when APs try to do their own thing in responses. Hence do not try to make a non-compliant behavior better if broken by RCM. Waste of time.

Q – Is this within our scope?

C – Probe request elements, there are question/answers in 11be probes for example, so support that this is within our scope.

C – Not considering probe responses. Cannot be device specific. Hence, is a clarification required that probe must be specific.

C – See nothing that depends on what is in probe request.

C – Overlap information if known where STA is, also hand off threshold.

C – All based on AP side.

C – Out of scope for us?

Chair asked for help in tidying up these Use Cases, capturing the ideas and discussions in the document.

**Out of agenda and time**

**Meeting Adjoined at 3pm ET.**

**TGbh Telecon Attendance - IMAT Report**

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| Breakout | Timestamp | Name | Affiliation |
| TGbh | 6/14 | Ansley, Carol | Cox Communications Inc. |
| TGbh | 6/14 | Bajko, Gabor | MediaTek Inc. |
| TGbh | 6/14 | Hamilton, Mark | Ruckus/CommScope |
| TGbh | 6/14 | Henry, Jerome | Cisco Systems, Inc. |
| TGbh | 6/14 | Hervieu, Lili | Cable Television Laboratories Inc. (CableLabs) |
| TGbh | 6/14 | Huang, Po-Kai | Intel Corporation |
| TGbh | 6/14 | Kain, Carl | USDoT; Noblis Inc. |
| TGbh | 6/14 | Kim, Youn-Kwan | Synctechno |
| TGbh | 6/14 | Malinen, Jouni | Qualcomm Incorporated |
| TGbh | 6/14 | McCann, Stephen | Huawei Technologies Co., Ltd |
| TGbh | 6/14 | NANDAGOPALAN, SAI SHANKAR | Infineon Technologies |
| TGbh | 6/14 | Ng, Boon Loong | Samsung Research America |
| TGbh | 6/14 | Orr, Stephen | Cisco Systems, Inc. |
| TGbh | 6/14 | Riegel, Maximilian | Nokia |
| TGbh | 6/14 | RISON, Mark | Samsung Cambridge Solution Centre |
| TGbh | 6/14 | Rosdahl, Jon | Qualcomm Technologies, Inc. |
| TGbh | 6/14 | Shalom, Hai | Google |
| TGbh | 6/14 | Smith, Graham | SRT Wireless |
| TGbh | 6/14 | Sosack, Robert | Molex Incorporated |
| TGbh | 6/14 | Wang, Lei | Futurewei Technologies |
| TGbh | 6/14 | Yee, Peter | NSA-CSD |