IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TGaz Ad Hoc Meeting Minutes  September 4th-6th, 2019  Santa Clara, CA | | | | |
| Date: 2019-09-04 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | Email |
| Roy Want | Google Inc | 1541 Morton Ave, Los Altos, CA 94024 | +1-650-691-3600 | roywant@google.com |
| Ganesh Vankatesan | Intel Inc | 2111 NE 25th Ave, Hillsboro, OR 97124 | 503 334 6720 | ganesh.venkatesan@intel.com |

Abstract

Minutes for the TGaz Ad Hoc meeting, beginning on Sep 4th, 2019.

**IEEE 802.11 Task Group AZ**

**Sep 4th – 6th, 2019**

1. **TGaz Ad Hoc – Wednesday Sep 4th, 2019 – DAY #1**
   1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at **9.27am PST**; Technical Co-Editor: Roy Want (Google Inc.); Acting Secretary(s): Roy Want (Google Inc), Ganesh Venkatesan (Intel).
   2. Agenda Doc. **IEEE 802.11-19/1363r1 (in progress)**
   3. Review Patent Policy and logistics
      1. Chair reviewed the IEEE-SA Patent Policy, and, and logistics – no clarifications requested.
      2. Chair called for any potentially essential patents, no one stepped up.
      3. Chair reviewed IEEE 802 WG participation as an individual professional, and anti-trust requirements – no clarification requested.
      4. Recorded Participation requirement
         1. Headcount: ~10 present, 1 person on webex-telecon.
   4. Review Agenda
      1. Agenda review and setting: reviewed submissions for the ad hoc meeting.
      2. Chair called for any additional feedback and changes to agenda.
         1. Agenda agreed – no objections.
   5. Qi Want (Apple) presented document **11-19/1460r0**
      1. **Title**: Proposed resolution to a few LB#240 CIDs on DMG/EDMG ranging
      2. **Summary**: This submission contains proposals to resolve LB#240 CID-1058, 2145 and 2146, all related to DMG/EDMG ranging.
      3. **Presentation postponed to later** (technical problems)
   6. Jerome Henry (Cisco) presented document **11-19/1466r0**
      1. **Title**: Some editorial CIDs
      2. **Summary**: This document presents resolutions to Clause 9 CIDs: 1789, 1790, 1942, 1958, 1966, 1967, 1969, 1974, 1993, 1999.
      3. **Discussion**
      4. C. [CID #**1942**] Ask the original contributor.
      5. C. [CID #**1967**] NDPA -> NDP Announcement.
      6. C. [CID #**1969**] Discussion of ‘nominally’ -> ‘typically’, bandwidth -> RUs
      7. C. [CID #**1974**] AoA is measured relative to the station that measured it.
      8. CIDs #1993, #1999 and #1994 need to wait for D1.4.
      9. **Strawpoll**  
         Agree to the resolutions depicted by document 11-19-1466r1 for CIDs 1789, 1790, 1958, 1966, 1967, 1969 and 1974.
      10. **Results** (Y/N/A): 10/0/0
   7. **Lunch 12.30 – 1.10pm**
   8. Ganesh Venkatesan (Intel) presented document **11-19/1454r0**
      1. **Title:** CR for Misc CIDs
      2. **Summary:** This document proposes resolutions to LB240 CIDs: 1104 1366 1729 1847 1124 2310 2281 2303 1560 1545 1536 1537 1538 1539 1540 2156 2204 2256 1984.
      3. **Discussion**
      4. C. [CID #**1104**] Are we the first group to have a trigger subvariant type?
      5. R. Yes. 1. To avoid exhausting all the variant types (4 bits, with 8 codes used)  
         2. to reuse the station-info fields.
      6. C. [CID #**1366**] Issue with transmission is that it might interfere with somebody else. Best to set CS to one.
      7. C. [CID #**1124**] Is this a negotiation?
      8. R. Requested by ISTA assigned by RSTA.
      9. C. [CID #**2310**] Similar to comment resolution in 11-19/659r7.
      10. C. [CID #**2303**] CFO security issue:   
          Large CFO implies an attack. What section should this go in?
      11. R. Needs to go in the secure mode.
      12. Remove #1729, #1849, #1124 for strawpoll in document 11-19/1454r1.
      13. **Strawpoll**:

Agree to the resolutions depicted by document **11-19-1454r1** for CIDs 1104, 1366, 2310, 2281, 2303, 1560, 1545, 1536, 1537, 1538, 1539, 1540, 2156, 2204, 2256  and 1984.

* + 1. **Results (Y/N/A):** 9/0/0
  1. Qi Wang (Apple) presented document **11-19/1460r0**
     1. **Title**: Proposed resolution to a few LB#240 CIDs on DMG/EDMG ranging
     2. **Summary**: This submission contains proposals to resolve LB#240 CID-1058, 2145 and 2146, all related to DMG/EDMG ranging.
     3. **Discussion**
     4. C. [CID #**1058**] What is the LTFVECTOR/
     5. R. LTFVECTOR parameter is used when you are expected to receive an HE Ranging NDP and TB Ranging NDP. LTFVECTOR conveys the: LTF\_SEQUENCE, LTF\_OFFSET, LTF\_N\_SDS and the LTF\_REP.
     6. [CID #**2145**, #**2146**] moved to revision 1460r1 for vote,
     7. In the future it was suggested to vote on changes to Table 8-4.
     8. **Strawpoll**
     9. Agree to the resolutions depicted by document **11-19-1460r1** for CIDs 2145 and 2146.
     10. **Results (Y/N/A):** 8/0/0
  2. Ganesh Venkatesan (Intel) presented document **11-19/1461r0**
     1. **Title**: CR for Misc CIDs on 9.4.2.279
     2. **Summary**: This document resolves following CIDs: 1123 1125 1127 1386 1462 1468 1475 1709 2437 2434 1710, 1581 1648 1651 1658 1711, 1333, 1334.
     3. **Discussion**
     4. C. [CID #**1123**] Rejected. Don’t need the addition of secure LTF required.
     5. R. Many edits required to have this ready for a Strawpoll.
     6. Strawpoll for **11-19/1461r1** deferred until DAY #2

1. **TGaz Ad Hoc – Thursday Sep 5th, 2019 – DAY #2**
   1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at **9.09 AM PDT**;
   2. Technical Co-Editor: Roy Want (Google Inc.); Acting Secretary(s): Roy Want (Google Inc), Ganesh Venkatesan (Intel) and Christian Berger (Marvell).
   3. Agenda Doc. **IEEE 802.11-19/1363r4 (in progress)**
   4. Review Patent Policy and logistics
      1. Chair reviewed the IEEE-SA Patent Policy, and, and logistics – no clarifications requested.
      2. Chair called for any potentially essential patents, no one stepped up.
      3. Chair reviewed IEEE 802 WG participation as an individual professional, and anti-trust requirements – no clarification requested.
      4. Recorded Participation requirement
         1. Headcount: 8 present physically, 1 via Webex
   5. Review Agenda
      1. Agenda review and setting: reviewed submissions for the ad hoc meeting.
      2. Chair called for any additional feedback and changes to agenda.
         1. Agenda agreed – no objections.
   6. Ganesh Venkatesan (Intel) presented document **11-19/1461r1 (continued from previous day)**
      1. **Title**: Misc CIDs on Ranging Parameters field
      2. **Summary**: Resolutions to a set of LB240 CIDs assigned to Dibakar Das
      3. **Discussion**:
      4. CID #**1468**: What is R2I AoA Requested subfield in IFTM
         1. C: Should be reserved?
         2. R: Should indicate RSTA behavior
         3. C: If beacon indicates support, can outcome change?
         4. Resolution: Revised
      5. CID #**1475**: MaxToAAvailableExp in TB specific session?
         1. C. Resolution: Reject?
         2. C: Applies to TB at all?
         3. R: Yes, refers to session timeout
         4. New resolution: rename to “MaxSessionExp”
      6. CID #**1709**: AID/RID definition?
         1. C: Do all ISTA have an RID or associated STAs use AID in place of RID?
         2. R: Only unassociated ISTAs have an RID
         3. Resolution: Revised
      7. CID #**2434**: Moved to DCN 1489
      8. CID #**2437**:
         1. C. AP can be initiator?
         2. Resolution: Revised, related to CID #**1709**
      9. CID #**1710**: BSS color field, set how if BSS color disabled?
         1. C: Need to add a color disabled subfield?
         2. R: No, 8 bit field BSS color information is 6 bit BSS color, 1 bit needed.
         3. Resolution: Revised, but needs more work, bring back later
      10. CID #**1581**: Naming conflict RSTA2ISTA Phase Shift vs. R2I ToA Type
          1. Resolution: revised, fix Section 11 for consistency.
      11. CID #**1648**: How is R2I ToA Type set in IFTM?
          1. Needs more work, bring back later.
      12. CID **1651**: Is Ranging priority used in Non-TB Ranging?
          1. Resolution: Revised, needs more work, bring back later.
      13. CID #**1658**: Clarify that TB or non-TB specific can be included in IFTMR and IFTM.
          1. Resolution: Revised
      14. CID #**1711**: Clarify
          1. Resolution: Revised (see **11-19-481r6**)
      15. CID #**1333**, #**1234**: DL STS choice 2 vs. 3 bit?
          1. Bring back later.
      16. **Strawpoll**

Agree to the resolutions depicted by document **11-19-1461r1** for CIDs 1123, 1125, 1127, 1386, 1462, 1468, 1709, 2437, 1581, 1658 and 1711.

* 1. **Results (Y/N/A):**  5/0/2
  2. Nehru Bhandaru (Broadcom) presented document **11-19/1402r1** 
     1. **Title**: lb240-sec-res-aug
     2. **Summary**: Resolutions to a set of LB240 CIDs related to Security.
     3. **Discussion**
     4. CID #**1447**
        1. C. Figure and table references are easier to track if they also include the caption text associated with them.
     5. CID **#1107**
        1. C. Clarified that the MIC field is 16 octets long in the text. To address the backward compatibility issue, the resolution now states that implementations that detect a MIC field that is of length different from what the implementation uses, the implementation would just ignore the element.
        2. C. Other issues noted in the draft – inconsistencies and incorrect example derivations For example, describe what the operators & and ~ mean. & is the bit-wise AND operator; and ~ is the 1’s complement (mask operation)
     6. **Strawpoll**

Agree to the resolutions depicted by document **11-19-1402r2** for CIDs 1853, 1918, 1447, 1107, 2016

* + 1. **Results (Y/N/A):** 7/0/0
    2. **Strawpoll**

Agree to the text changes in doc **11-19-1402r2** under clause identified by “D1402-02 discussion” to resolve inconsistencies and fixes to example key derivations. 

* + 1. **Results** **(Y/N/A):** 7/0/0
  1. Ganesh Venkatesan (Intel) presented document **11-19-1483r0.**
     1. **Title**: Changes to D1.2 for consistent use of terminology
     2. **Summary**: mostly editorial changes to render the use of various terms to be consistent across the draft
     3. **Discussion**:
        1. Reviewed changes to table of contents
        2. Discussion of terminology
        3. Detailed look at changes
        4. C. Consider coming up with a short name for “EDCA based ranging where value of Format and Bandwidth is in the range 31 through 41”
        5. To be finished tomorrow.
  2. **Recess at 5.30 PM PDT**

1. **TGaz Ad Hoc – Friday Sep 6th, 2019 – DAY #3**
   1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at **9.05AM PDT**; Technical Co-Editor: Roy Want (Google Inc.); Acting Secretary(s): Roy Want (Google Inc), Ganesh Venkatesan (Intel), and Christian Berger (Marvell).
   2. Agenda Doc. **IEEE 802.11-19/1363r6 (in progress)**
   3. Review Patent Policy and logistics
      1. Chair reviewed the IEEE-SA Patent Policy, and, and logistics – no clarifications requested.
      2. Chair called for any potentially essential patents, no one stepped up.
      3. Chair reviewed IEEE 802 WG participation as an individual professional, and anti-trust requirements – no clarification requested.
      4. Recorded Participation requirement
         1. Headcount: 14 members present, no remote attendee on WebEx
   4. Review Agenda
      1. Agenda review and setting: reviewed submissions for the ad hoc meeting.
      2. Chair called for any additional feedback and changes to agenda.
         1. Agenda agreed – no objections.
   5. Ganesh Venkatesan (Intel) presented document **11-19/1483r1 (continuation from day #2)**
      1. **Title**: Changes to D1.2 for consistent use of terminology.
      2. **Summary**: mostly editorial changes to render the use of various terms to be consistent across the draft
      3. **Strawpoll**

Agree to the text changes in doc 11-19-1483r2 to resolve inconsistencies and fixes to TOC and terminology. 

* + 1. **Results (Y/N/A)**: 11/0/0.
  1. Feng Jiang (Intel) presented document **11-19/1438r1**
     1. **Title**: CR for a few PHY related CIDs
     2. **Summary**: Addresses CID 2499, 2435 and 2436
     3. **Discussion**
     4. C. This submission was presented in an earlier teleconference and the discussion at this time is a follow up.
     5. C. [CID #**2499**] What is ‘conventional number of HE-LTF”? .11ax uses *NHE-LTF* for this number (which is the number of HE-LTF used based on the number of space-time streams N\_STS).
     6. C. [CID #**2499**] Should we reference N\_STS or NUM\_STS? (.11ax also has *NSTS* and LTF\_N\_STS)?
     7. R. Use *NSTS* instead of N\_STS
     8. C. [CID #**2435**, #**2436**] The meaning of the value of the PTSF Timer in the context of Availability Window is missing in .11az (the partial TSF timer derivation remains the same as it is in IEEE802.11-2016). The value in the Partial TSF Timer field corresponds to the value of the RSTA’s TSF at the start of the first Availability Window.
     9. **Strawpoll – deferred to the afternoon session.**
  2. Feng Jiang (Intel) presented document **11-19/1479r1**
     1. **Title**: CR for miscellaneous LB240 CIDs
     2. **Summary**: Addresses CIDs
     3. **Discussion**
     4. C. [CID **#1922**] – the integrity check built into the .11az protocol provides a means to detect and report success/failure which addresses the issues that the commenter raises. Reject with the response, “the commenter does not propose any new transmit behaviour to address the security concerns raised by the comment”.
     5. C. [CID **#1055**]– add a zero-power GI to the specification (Clause 3.4). This should be added to Clause 3.2 instead of Clause 3.4.
     6. C. [CID **#2274**] – timestamp reference should be start of the preamble (and not start of the first HE-LTF).
     7. C. [CID **#2274**] **--** ‘time stamp’ should be ‘timestamp’, “ToA” should be “TOA”, “field’s value” should be “field”
     8. C. [CID **#1339**]**–** Reject providing the rationale why zero power-GI is needed (required to compute linear correlation with inter-symbol interference due to Packet Extension). How zero power-GI is implemented is out-of-scope of the standard (implementation-specific).
     9. C. [CID **#2363**] **–** both the concerns raised by this CID are already in D1.0 (P105L29-33 and P148). Is there a MU format NDP definition? The NDP format is still SU PPDU. This should be clarified in the response to the commenter. In the resolution state that the SU PPDU NDP is sent to multiple users. This (that SU PPDU NDP is sent to multiple users for channel estimation) is not in the specification (and may need to be added).
     10. C. [CID **#1700**] **–** Reject. CCA on the secondary channel may fail (but Energy Detect will not).
     11. C. [CID **#2501, 2500**] – how does the PHY detect integrity check failure? This is implementation specific and specification does not describe it. Should we just restate ‘integrity check failure’ as ‘integrity check error’? This field used to be called ‘consistency error’ and after discussions the term ‘integrity check failure’ was the outcome. May need to agree on a different term (future discussion).
     12. **Strawpoll**  
         Agree to the resolutions depicted by document 11-19-1479r2 for CIDs 1922, 1055, 2274, 1339, 2363, 1700, 2501 and 2500.
     13. **Results (Y/N/A):** 11/0/0
  3. **Lunch**: 12.15pm - 1.22pm
  4. Feng Jiang (Intel) finished Strawpoll for the document **11-19/1438r3**
     1. **Strawpoll**

Agree to the resolutions depicted by document **11-19-1438r3** for CIDs 2499, 2435, and 2436 .

* + 1. **Results (Y/N/A):** 10/0/1

* 1. Erik Lindskog (Samsung) presented document **11-19/1043r3**
     1. **Title**: LB240 CID Resolutions - Phase Shift TOA in Passive Location – Amendment text
     2. **Summary**: This document proposes resolutions to comments related Phase Shift TOA in Passive Location Ranging. The changes here are in relation to [1].
     3. TGaz LB240 CIDs addressed: 1515
     4. **Discussion**:
     5. C. Discussion relative to 11-19/455r2.
     6. C. Suggest we do not require ToA measurements from the infrastructure.
     7. C. Because they cancel out in the DToA equations, so only need the phase shift.
     8. C. Should we only use phase-shift as a result?
     9. C. Do we need to have two methods for passive location?
     10. C. Plan to go through details today, leaving time to think about it and then Strawpoll in Hanoi.
  2. **Coffee Break**; 2.45pm – 3.00PM
  3. Ganesh Vankatesan (Intel) presented document **11-19/0678r4**
     1. **Title**: CR for CID 1115
     2. **Summary**: This submission addresses CID 1115 concerning the Multi-BSSID capability in 11az ranging.
     3. **Discussion**
     4. C. Three options 1) The unassociated STAs don’t have a way to support Multi-BSSID 2) Mandate 3) Need extra bit similar to 11ax.
     5. C. Need option 3 to make option 1 better.
     6. C. Option 2 has simplicity and is more efficient.
     7. **Strawpoll**

Which of the options depicted in slide 6 of 11-19-678r5 for receive of .11az-specific control frames containing TA set to Transmitted BSSID would you support?

\*Single option.

* + 1. **Results (O1/O2/O3/A**): 2/6/3/1
    2. **Strawpoll**

Do you support option 2 depicted in slide 6 of 11-19-678r5 for receive of .11az-specific control frames containing TA set to Transmitted BSSID?

* + 1. **Results** (Y/N/A): 9/2/2
  1. **Short Break:**  3.55 - 4.05pm
  2. Christian Berger (Marvell) presented document **11-19/1051r1**
     1. **Title**: NDP Power Control for EVM
     2. **Summary:** Trade-off between Tx power and Tx EVM

In any wireless communication

* Especially OFDM in WiFi, has large (PAPR)
* Needs power amplifier to back off (so peaks avoid non-linear region)

Maximizing Tx power usually reduces signal quality

* Typically sacrifice back-off
* Power amplifier will go (more often) into non-linear region

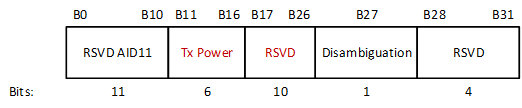
Tx signal distortion is measured as Error Vector Magnitude (EVM)

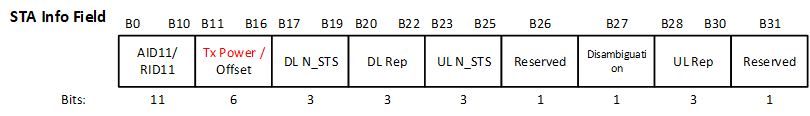
* Typical range -10 to -30 dB
* WiFi’s 11ax has increased EVM range (1024 QAM, MU-MIMO, etc)
  + 1. **Discusssion**
    2. C. Agreed that if we share RSSI we can calculate pathloss.
    3. R. However we don’t know what the signal quality is.
    4. C. We would need to share SINR.
    5. C. A WiFi packet sniffer may confuse the two versions of the packet (Strawpoll #2 below) if it loses the context of the protocol.
    6. **Strawpoll**

Do you support to add subfields in Ranging NPD-A and LMR to facilitate tx-power and EVM optimization in Non-TB Ranging?

* + 1. **Results (Y/N/A):** 6/4/2
    2. **Strawpoll**

Do you support to add the Tx Power subfield in the NTB Ranging NPD-A as presented in Option: 

Option I (Extra Field): ****

Option II (Reuse Offset)**: **

* + 1. **Results** **(O1/O2/A):** 3/4/5
  1. Christian Berger (Marvell) presented document **11-19/1011r1**
     1. **Title:** SIG-A Changes for Ranging NDP
     2. **Summary:** Problem in SIG-A with Ranging NDP

Repetition of HE-LTFs

* Pre-11az STAs will decode LSIG length
* Compare with NSTS in SIG-A
* Interpret extra HE-LTFs as Data field
* Will also affect 11ax based sniffers

Desirable to have 11az Wave 1 devices with minimal PHY changes

* Will potentially ignore NDPs with repeated HE-LTFs
* Re-use current P-matrix for decoding
* Not easy to link PHY processing to parameters received in NDP-A
  + 1. **Discussion**
    2. C. Discussion of issue that LTF repetition might not be 1, 2, 4 or 8 (e.g 3 or 5) which would be a problem for some implementations.
    3. **No Strawpoll at this time.**
  1. Qi Wang (Apple) presented document **11-19/1504r0**
     1. **Title:** Proposed resolution to LB240 CID-1058.
     2. **Summary:** This submission contains proposals to resolve LB#240 CID-1058**.**
     3. **Discussion:**
     4. C. Table 8-3 CID #1058, removed from 8-4 shared parameters   
        and moved to 8-3.
     5. **Strawpoll**

Agree to the resolutions depicted by document 11-19-1504r0 for CIDs 1058.

* + 1. **Results (Y/N/A): 12/0/0**
  1. Chair thanked Nehru for hosting the TGaz meeting at Broadcom.
  2. There is no Telecon next week. The next IEEE TGaz meeting will be in Hanoi.
  3. **AOB for the meeting?** – None
  4. **Adjourned at 5.30pm.**

**References:**

1. <https://mentor.ieee.org/802.11/dcn/19/11-19-1363-07-00az-tgaz-sep-ad-hoc-agenda.pptx>
2. <https://mentor.ieee.org/802.11/dcn/19/11-19-1460-01-00az-proposed-resolution-to-a-few-lb-240-cids-on-dmg-edmg-ranging.doc>
3. <https://mentor.ieee.org/802.11/dcn/19/11-19-1466-02-00az-various-editorial-cids.docx>
4. <https://mentor.ieee.org/802.11/dcn/19/11-19-1454-01-00az-cr-for-misc-cids.docx>
5. <https://mentor.ieee.org/802.11/dcn/19/11-19-1460-01-00az-proposed-resolution-to-a-few-lb-240-cids-on-dmg-edmg-ranging.doc>
6. <https://mentor.ieee.org/802.11/dcn/19/11-19-1461-01-00az-cr-for-misc-cids-on-ranging-parameters-field.docx>
7. <https://mentor.ieee.org/802.11/dcn/19/11-19-1402-02-00az-lb40-sec-res-aug.docx>
8. <https://mentor.ieee.org/802.11/dcn/19/11-19-1483-02-00az-changes-to-d1-2-for-consistent-use-of-terminology.docx>
9. <https://mentor.ieee.org/802.11/dcn/19/11-19-1438-03-00az-cr-for-phy-related-comments-for-lb240-part3.docx>
10. <https://mentor.ieee.org/802.11/dcn/19/11-19-1479-02-00az-cr-for-miscellaneous-cids-in-lb240.docx>
11. <https://mentor.ieee.org/802.11/dcn/19/11-19-1043-03-00az-lb240-cid-resolutions-phase-shift-toa-in-passive-location-amendment-text.docx>
12. <https://mentor.ieee.org/802.11/dcn/19/11-19-0678-05-00az-cr-for-cid-1115.pptx>
13. <https://mentor.ieee.org/802.11/dcn/19/11-19-1051-01-00az-ndp-power-control-for-evm.pptx>
14. <https://mentor.ieee.org/802.11/dcn/19/11-19-1011-01-00az-sig-a-changes-for-ranging-ndp.pptx>
15. <https://mentor.ieee.org/802.11/dcn/19/11-19-1504-00-00az-proposed-resolution-to-lb240-cid-1058.doc>