IEEE P802.11  
Wireless LANs

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| TGaz Ad Hoc Meeting Minutes  June 26th-28th, 2019  Santa Clara, CA | | | | |
| Date: 2019-06-26 | | | | |
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Abstract

Minutes for the TGaz Ad Hoc meeting, beginning on June 26th, 2019.

**IEEE 802.11 Task Group AZ**

**June 26th – 28th, 2019**

1. **TGaz Ad Hoc – Wednesday June 26th, 2019 – DAY #1**
   1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at **9.20am PST**; Technical Co-Editor: Roy Want (Google Inc.); Acting Secretary(s): Roy Want (Google Inc.), Ali Raissinia (Qualcomm).
   2. Agenda Doc. **IEEE 802.11-19/0948r1 (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: ~11 present
   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. Christian Berger (Marvell) presented document **11-19/0709r0**
      1. **Title**: LMR Intermedia and Delayed Feedback
      2. **Summary**: Resolving issues: 1) allow for delayed phase shift feedback?
      3. 2) allow for RSTA-to-ISTA LMR to be different from ISTA-to-RSTA?
      4. **Discussion of presentation**
      5. C. In the extended capability section we have a field that decides if the AP supports Phase shift feedback. Does the RSTA (AP) always support reception of phase shift feedback from ISTA? R. No.
      6. C. Both sides need to indicate a capability for delayed (D) or immediate (I) feedback before negotiation.
      7. C. One option is to provide an indication of I/D for each direction.
      8. C. The delay is only a limitation of the transmitter (not the receiver).
      9. C. Two bits are not necessary, but it might be clearer to have the summary in the IFTM
      10. **Strawpoll**   
          Allow for RSTA to ISTA LMR immediate/delayed feedback property to be different from ISTA to RSTA (first path ToA feedback)?

Yes – one can be delayed, the other immediate.

No – Both R2I and I2R have to be either immediate or delayed.

* + 1. **Results (Y/N/A):** 11/0/0
    2. **Action**: Feng will provide a submission which clarifies the function of that bit.
  1. **Break 10.45am – 11.05am**
  2. Christian Berger (Marvell) presented document **11-19/1011r1**
     1. **Title**: Problem in SIG-A with Ranging NDP
     2. **Summary**: Its desirable to have 11az Wave 1 devices with minimal PHY changes. They will potentially ignore NDPs with repeated HE-LTFs, and it’s not easy to link PHY processing to parameters received in an NDP-A.
     3. **Discussion of presentation**
     4. C. Problem is that a Pre-11az STA will decode LSIG length, and therefore interpret extra HE-LTFs as a data field.
     5. C. Why 8 x LTFs – what is the reason to send more?
     6. R. There is already a legacy preamble, and increasing the length beyond 8 provides limited return. Having more just consumes the channel capacity.
     7. **Strawpoll**

Do you support to limit the total number of HE-LTFs in non-secure HE Ranging NPDs to a maximum of 8?

* + 1. **Results (Y/N/A):** 9/3/0
    2. **Strawpoll**

Do you support to change the NSTS encoding in HE SIG-A for HE Ranging NPDs, to include all non-secure HE-LTFs, including repeated HE-LTFs?

For example: a N\_STS=2 and N\_REP=2 would encode the NSTS subfield as if there were 4 spatial streams.

* + 1. **Results (Y/N/A):** 5/4/2
  1. **Lunch at 12.00 until 1pm**
  2. Feng Jiang (Intel) presented document **11-19-1026r1**.
     1. **Title**: CR for PHY related comments.
     2. **Summary**: This submission addresses the CIDs related to sections 28.3.19a, 28.3.17b, and 28.3.17c in 11az Draft 1.0
     3. **Discussion of Presentation**
     4. C. Feng will improve the resolution to CID1370 in order to provide a technical reason for the presence of a 4us PE.
     5. C. CID1380 suggests a specific mandatory feature, hence we would need to revisit this request to perhaps add a section to describe the minimum list of what makes a device 11az compliant.
     6. C. The resolution text for CID 2517 is modified so that Editor does not replicate the proposed changes included in document 11-19-0326r1
     7. C. Discussed the assertion of IntegrityCheckError when the PHY issues RXEND.indication, and changed the corresponding amendment text to handle generic behavior for setting the Invalid Measurement Field in the corresponding LMR report.
     8. C. Proceeded to run straw poll to adopt resolution for subset of CIDs
     9. **Strawpoll**

Agree to the resolutions depicted by document 11-19-1026r2 for CIDs 1335, 1368, 1370, 2517.

* + 1. **Results (Y/N/A):** 9/0/0
  1. Feng Jiang (Intel) presented document **11-19/1028r1** addressing CRs.
     1. **Title**: CR for CID Relates Section 11.22.6.4
     2. **Summary**: This submission addresses the CIDs related with sections 11.22.6.4 in 11az Draft 1.0
     3. **Discussion of Presentation**
     4. Proceeded to run a straw poll to adopt the resolution for the stated CIDs
     5. **Strawpoll**
     6. Agree to the resolutions depicted by document 11-19-1028r1 for CIDs 2104, 2140, 1970, 2304, 2157, 2179, 2334.
     7. **Results (Y/N/A):** 8/0/0
  2. Qi Wang (Apple) presented document **11-19/883r1**
     1. **Title**: Adding Dialog Token in Ranging Trigger Frames
     2. **Summary**: For the TB ranging operation specified in 802.11az, this submission proposes to add the dialog token value in the ranging trigger frames.
     3. **Discussion of Presentation**.
     4. C. Regarding addition of dialog token in the Location Trigger frame: the members were concerned about adding an extra byte for the dialog token and suggested to perhaps reduce the bit field to 4 bits, so that reserved bits can be used for it.
     5. C. Team decided to wait for Liwen’s presentation and discussion to align everybody on the use of the dialog token for NDPA and TSF synchronization.
     6. **No strawpoll at this time.**
  3. Ali Raissinia (Qualcomm) presented document **11-19/1036r0**.
     1. **Title**: Enabling HE FTM in 6 GHz band.
     2. **Summary**: This submission proposes enabling HE SU FTM frames in the 6 GHz band.
     3. **Discussion of Presentation**
     4. C. Basis of discussion: we decided a few minor changes to the amendment text which will be added and uploaded.
     5. C. Members will discuss/review it internally with their teams, and be ready for a strawpoll later during this FTF meeting.
     6. **No strawpoll at this time.**
  4. **Any other business** – None
  5. **Recess at 5.30pm.**

1. **TGaz Ad Hoc – Thursday June 27th, 2019 – DAY #2**
   1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at **9.00am PST**; Technical Co-Editor, Roy Want (Google Inc.); Acting Secretary(s): Ali Raissinia (Qualcomm) & Roy Want (Google Inc.).
   2. Agenda Doc. **IEEE 802.11-19/0948r3 (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: ~12 present
   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. Liwen Chu (Marvell) is presenting document **11-19-0470r1**
      1. **Title:** Ranging Synchronization.
      2. **Summary:** Proposed amendment text highlighting the synchronization mechanism and the addition of a token field included in the reserved bits.
      3. C. Propose strawpoll on the entire document that addresses CID1888
      4. **Strawpoll**

Which of the following options do you support:

O1) Change NDPA DT to 4 bit and add the same DT field size using the Reserved its of the Ranging TFs?

O2) Keep the NDPA DT field as 6 bits and add another byte representing the same value to Ranging TFs?

O3) Keep the NDPA DT field as 6 bits and use the 4 reserved bits as DT for in TF poll subvariant for synchronization?

* + 1. **Results (O1/O2/O3):** 4/7/5
    2. **Strawpoll**
    3. Do you support keeping the NDPA DT field as 6 bits and add another byte representing the same value to Ranging TFs.
    4. **Results (Y/N/A**): 6/4/1
    5. **Strawpoll**

Agree to the resolutions depicted by document 11-19-470r1 with change made during discussion for CID 1888.

* + 1. **Results (Y/N/A):** 10/0/1
  1. Erik Lindskog (Samsung) presented document **11-19/1043r1**
     1. **Title**: LB240 CID Resolutions: Phase Shift ToA in Passive Location amendment addressing a CID
     2. **Summary**: This document proposes resolutions to comments related to Phase Shift TOA in Passive Location Ranging. TGaz LB240 CIDs addressed: 1515 (we are not addressing the related CID 1575 here).
     3. **Strawpoll**

If passive location is used in conjunction with phase shift feedback which of the following options do you prefer?

O1) ‘No repacking required’ – RSTA report PS TOA and PS correction, or corrected TOA.

O2) ‘Repacking required’ – RSTA reports corrected TOA.

* + 1. **Results (O1/O2/A**): 3/4/3
    2. Follow on strawpoll.
    3. **Strawpoll**

If passive location is used in conjunction with phase shift feedback which of the following options do you prefer?

O1) ‘No repacking required’ – RSTA report PS TOA and PS correction.

O2) ‘Repacking required’ – RSTA reports corrected TOA.

* + 1. **Results (O1/O2/A)**:3/5/3
  1. **Lunch Break 12.15-1.15pm**
  2. Erik Lindskog (Samsung) presented document **11-19/1041r1**
     1. **Title**: Passive Location Ranging Inheritance of TB Ranging Properties
     2. **Summary**: This document proposes resolutions to comments related to Passive Location Ranging inheritance of TB Ranging properties.

TGaz LB240 CIDs addressed: 1286, 1520, 1542, 1543, 1544, 1547, 1548, 1551, 1552, 1553, 1554, 1555, 1556, 1561, 1562, 1564, and 1565.

* + 1. **Discussion of presentation**
    2. C. Modification to TB ranging that apply to Passive Location Ranging are referenced, but clarified in other sections.
    3. C. There should be one place where the behavior of Passive Location Ranging is described, not in both Passive and TB ranging sections.
    4. R. Noted – and will examine how to address this in a later presentation.
    5. C. Is there a better name than ‘Passive Location Ranging’?
    6. C. Consider adding a diagram and formula to clarify the behavior of Passive Location Ranging.
    7. **No Strawpoll at this time.**
  1. Qi Wang (Apple) presented document **11-19/659r3**
     1. **Title**: Proposed resolutions to LB#240 CIDs on NTB ranging timing Parameters
     2. **Summary**: This submission contains a proposal to resolve CID-2275, 2276, 2277, 2278, 2279, 2280, 1654, 1220, 2431, and 1126, received during TGaz LB# 240.
     3. **Discussion of presentation**
     4. C. [2275, 2276, 2277, 2278, 2279, 1654, 1220] Immediate implies ToA here.
     5. C. Up to now, the immediate or delayed behavior is defined in the R2I FTM.
     6. C. 11.22.6.4.4.3 (in the delayed-case paragraph) Added: The ‘Immediate LMR parameter in the non-TB Ranging Specific subelement in the Ranging Parameters field is reserved in the initial FTM request frame.’
     7. C. This is a band-aid before we have completely resolved the request for immediate/delayed bit use, and meaning.
     8. C. Regarding the number of bits for Min/Max time between measurements, the AP/RSTA decides what these are because it has to manage its resources.
     9. C. **Action for Tech Editor:** Terms: Delayed Response, Delayed Feedback, Delay Reporting, Delayed LMR should be consolidated as Delayed LMR.
     10. **Strawpoll**

Agree to the resolutions depicted by document 11-19-659r4 for CIDs 2275, 2276, 2277, 2778, 2279, 2280, 1654, 1220, 2431, 1126.

* + 1. **Results (Y/N/A):**  13/0/0
  1. **Break: 3.45pm - 4.05pm**
  2. Tianyu Wu (Apple) presented document **11-19/698r2**
     1. **Title**: AoD in Passive Ranging
     2. **Summary**:Passive ranging is currently specified in 802.11az\_D1.0 [1].
     3. A pair of STAs perform TB ranging to enable client STAs to passively locate themselves using TDOA. In this submission, Anchor STAs (ASTAs) refer to the STAs that execute the TB ranging protocol to enable passive ranging.
     4. **Discussion of presentation – for strawpoll #3 proposal**
     5. C. The AOD results may have a degree of ambiguity – how do we know the quality of the estimate?
     6. R. By examining the consistency of various range/position estimates using RSSI, RTT and AoD, will provide a measure of confidence in the estimate.
     7. C. Temp compensation could be used to estimate the change in filters delays.
     8. R. The AP could also use temperature to maintain a constant D-matrix.
     9. C. LCI can be used to send information about antenna position and the D-matrix.
     10. C. Option 2 requires a survey, Option 1 doesn’t need one (but could benefit from one).
     11. **Strawpoll:**

Do you support to add a capability bit indicating that passive ranging RSTA/ISTA supports AoD measurement at PSTA. When RSTA/ISTA set the bit to 1, it shall:

Option1: RSTA/ISTA send out antenna location info and D matrix info.

Option2: RSTA/ISTA ensures the D matrix to be time invariant. (requires survey)

* + 1. **Results (O1/O2/A):** 10/2/0
  1. **Review agenda** – updated time and order for **DAY #3**
  2. **AOB for the meeting?** – None
  3. **Recess at 5.15pm.**

1. **TGaz Ad Hoc – Friday June 28th, 2019 – DAY #3**
   1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at **9.00am PST**; Technical Co-Editor, Roy Want (Google Inc.); Acting Secretary(s), Ali Raissinia (Qualcomm) & Roy Want (Google Inc.).
   2. Agenda Doc. **IEEE 802.11-19/0948r4 (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.
   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.

Agenda agreed – no objections.

* 1. Erik Lindskog (Samsung) presented document **10-19/1062r1.**
     1. **Title**: EDCA-FTM Negotiations
     2. **Summary**: This document proposes resolutions to comments related to EDCA-FTM addressing Ack for FTM frame transmissions. TGaz LB240 CIDs addressed: 1516.
     3. **Discussion of presentation**
     4. Erik proposed new amendment text to clarify ‘no preference’ in the baseline spec when the ISTA claims support for the frame format and bandwidth it negotiated in the initial fine timing measurement frame; addressing CID1516. The suggestion proceeded with a straw poll.
     5. **Strawpoll**
     6. Agree to the resolutions depicted by document 11-19-1062r1 for CID 1516.
     7. **Results (Y/N/A):** 4/0/6
  2. Qi Wang presented document **11-19-659r5.**
     1. **Title**: Proposed resolutions to LB#240 CIDs on NTB ranging timing Parameters
     2. **Summary**: This submission contains a proposal to resolve CID-2275, 2276, 2277, 2278, 2279, 2280, 1654, 1220, 2431, and 1126, received during TGaz LB# 240.
     3. **Discussion of presentation**
     4. Proposing to run a new strawpoll as there was an editorial mistake on the resolution identifying the wrong document. We ran a straw poll to adopt the new document.
     5. **Strawpoll**
     6. Agree to the resolutions depicted by document 11-19-659r5 for CIDs 2275, 2276, 2277, 2778, 2279, 2280, 1654, 1220, 2431, 1126.
     7. **Results (Y/N/A):** 9/0/1
  3. Erik Lindskog (Samsung) presented **11-19/1044r1**
     1. **Title**: LB240 CID Resolutions – Primus Broadcast Frame – Passive Location LCI Table Countdown subfield index - Amendment text
     2. **Summary**: This document proposes resolutions to comments related to Primus Broadcast Frame – Passive Location LCI Table Countdown subfield index.

TGaz LB240 CIDs addressed: 1142.

* + 1. **Discussion of Presentation**
    2. Ran a strawpoll to add the proposed changes for CID1142.
    3. **Strawpoll**

Agree to the resolutions depicted by document 11-19-1044r1 for CID 1142.

* + 1. **Results (Y/N/A):** 8/0/0
  1. **Break at 10:30am until 10:50am**
  2. Erik Lindskog (Samsung) presented document **10-19/1040r0**
     1. **Title**: LB240 CID Resolutions – Fine timing measurement parameters element - Amendment text.
     2. **Summary**: This document proposes resolutions to comments related to the Fine timing measurement parameters element. TGaz LB240 CIDs addressed: 1121, 1629, 1630, 1066, 1508, 1509, 1516, 2246, 1208, 2265, 1062, 2247, 1210, 1064, 1211, 1065, 1635, 1791, 1383, 1708, 1096, and 1089.
     3. **Discussion of Presentation**
     4. Presentation addresses CR resolution for various CIDs in which Erik is seeking to direction to resolve them.
     5. C. Decided to reject a CID that suggested not using the reserved bits for DMG/eDMG within the FTM parameter element
     6. C. Team agreed based on a strawpoll to create a new table for TB/NTB format and BW instead of table 9-281.
     7. **Strawpoll**

Do you agree to separate values used for the Format and Bandwidth field in the Ranging Parameters field from table 9-281 and create a separate table for that?

* + 1. **Results (Y/N/A):** 10/0/0.
  1. **Lunch break 12noon – 1pm**
  2. Niranjan Grandhe (Marvell) presented document **11-19/1047r2**
     1. **Title**: CR for Section 11.22.6.4.4 Part-3
     2. **Summary**: This submission proposes the comment resolution of CIDs (1161, 1805) in LB240 related to section 11.22.6.4.4
     3. **Discussion of presentation**
     4. C. Why is the Access Category (AC) chosen to be the same for all frames.
     5. C. We should not make FTM the highest category; it’s not as sensitive as voice
     6. C. The mean time between requests needs to be satisfied for location.
     7. C. Navigation is a bit like voice in that you need to send a small quantum of data regularly for navigation.
     8. C. There is a cost in servicing location which needs to be considered: move to another channel, range and then get back to the original channel
     9. C. Voice may suffer from making FTM the highest priority.
     10. C. Should it be decided by the application and not a fixed priority?
     11. C. Ranging packets are relatively small (some debate).
     12. C. We would be better informed by a simulation that showed the trade-offs rather than trying to debate this.
     13. C. Can’t trust users. Recommend its fixed.
     14. C. Provide a range of category values for users, rather than max category.
     15. C. There is an OS between the firmware and a developer, so option O1(below) is not as bad as it seems.
     16. **Strawpoll**

Which of the following ways to manage AC in NTB Ranging:

O1) Leave it to the ISTA to select the appropriate AC.

O2) Give soft guidance to ISTA how to select appropriate AC.

O3) Have the spec. define specific Access Category assignments.

* + 1. **Results (O1/O2/O3/A**): 2/2/2/5
    2. **Discussion**
    3. C. Do we need to change the time for the revMC and TB, NTB to be the same reference point. At the moment they are: L-STF, HE-LTF, 1st symbol of preamble.
    4. C. Could be a problem that implementers read it, then implement it for one protocol type and assume it’s the same for all types.
    5. C. Language updated to the start of the preamble for ToA and ToD.
    6. **Strawpoll**

Agree to the resolutions depicted by document 11-19-1047r2 for CID 1161.

* + 1. **Results (Y/N/A):** 11/0/0
  1. 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, where it has a large peak-to-average power ratio (PAPR), it needs the power amplifier to back-off more (so peaks avoid non-linear region)

-Maximizing Tx power usually reduces signal quality, typically sacrificing the back-off m the Power amplifier will go (more often) into the non-linear region; Tx signal distortion is measured as EVM error at the receiver, Vector Magnitude (EVM): Typical range -10 to -30 dB; WiFi’s 11ax has increased EVM range due to coding (1024 QAM, MU-MIMO, etc).

* + 1. **Discussion**
    2. C. Is the RSSI accurate enough to be useful feedback (errors can be 10dBm)
    3. C. The new 11ax class A devices are +/- 3dBm
    4. C. You can use distance to indicate the quality of the RSSI feedback.
    5. C. LMR needs to include the RSSI result; the value from PHY layer has to be communicated to the MAC (management layer).
    6. C. RSSI doesn’t change over a short time – but it depends on distance.
    7. **Discussion of Strawpoll**
    8. C. I’m supportive of tuning, even if it’s not the best solution.
    9. C. CRLB. – need to optimize power to reduce the non-linear region, but SNR at the receiver needs to stay above the CRLB to ensure the accuracy we expect.
    10. C. We don’t know how to measure EVM.
    11. **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. **Result (Y/N/A):** 9/0/2
  1. **Break 3pm – 3.3.12pm**
  2. Ali Raissinia (Qualcomm) presented the latest version of document **11-19/1036r3** presented on 6/26 as version r0.
     1. **Title**: Enabling HE FTM in 6 GHz band
     2. **Summary**: This submission proposes enabling HE SU FTM frames in the 6 GHz band.
     3. **Discussion:**
     4. C. Why is the new sentence proposed unique to 6GHz?
     5. C. When can I use FTM in 6GHz? If set, as the FTM Responder Bit
     6. C. We need a second bit to say we support 6GHz FTM packets, or add new text that there is no requirement to support EDCA FTM.
     7. Adding new Text option: A STA that supports TB or non-TB ranging is not required to support EDCA-based HE.
     8. **No strawpoll at this time** – will bring it back to group in Vienna.
  3. **AOB for the meeting?** – None
  4. **Adjourned at 5pm.**

**References:**

1. <https://mentor.ieee.org/802.11/dcn/19/11-19-0948-04-00az-june-ad-hoc-agenda.pptx>
2. <https://mentor.ieee.org/802.11/dcn/19/11-19-0709-00-00az-lmr-immediate-and-delayed-feedback.pptx>
3. <https://mentor.ieee.org/802.11/dcn/19/11-19-1011-00-00az-sig-a-changes-for-ranging-ndp.pptx>
4. <https://mentor.ieee.org/802.11/dcn/19/11-19-1026-02-00az-cr-for-phy-related-comments-for-lb240-part2.docx>
5. <https://mentor.ieee.org/802.11/dcn/19/11-19-1028-01-00az-lb240-cr-for-cid-relates-section-11-22-6-4.docx>
6. <https://mentor.ieee.org/802.11/dcn/19/11-19-0883-01-00az-adding-dialog-token-in-ranging-trigger-frames.doc>
7. <https://mentor.ieee.org/802.11/dcn/19/11-19-1036-04-00az-mac-he-ftm-in-6-ghz.docx>
8. <https://mentor.ieee.org/802.11/dcn/19/11-19-0470-01-00az-tb-ndp-ranging-synchronization.docx>
9. <https://mentor.ieee.org/802.11/dcn/19/11-19-1043-01-00az-lb240-cid-resolutions-phase-shift-toa-in-passive-location-amendment-text.docx>
10. <https://mentor.ieee.org/802.11/dcn/19/11-19-1041-00-00az-lb240-cid-resolutions-passive-location-ranging-inheritance-of-tb-ranging-properties-amendment-text.docx>
11. <https://mentor.ieee.org/802.11/dcn/19/11-19-0659-05-00az-proposed-resolution-to-cids-on-ntb-ranging-timing-control.doc>
12. <https://mentor.ieee.org/802.11/dcn/19/11-19-0698-02-00az-aod-in-passive-ranging.pptx>
13. <https://mentor.ieee.org/802.11/dcn/19/11-19-1062-01-00az-edca-ftm-negotiations.docx>
14. <https://mentor.ieee.org/802.11/dcn/19/11-19-0659-05-00az-proposed-resolution-to-cids-on-ntb-ranging-timing-control.doc>
15. <https://mentor.ieee.org/802.11/dcn/19/11-19-1044-01-00az-lb240-cid-resolutions-primus-broadcast-frame-passive-location-lci-table-countdown-subfield-index-amendment-text.docx>
16. <https://mentor.ieee.org/802.11/dcn/19/11-19-1040-00-00az-lb240-cid-resolutions-fine-timing-measurement-parameters-element-amendment-text.docx>
17. <https://mentor.ieee.org/802.11/dcn/19/11-19-1047-02-00az-cr-for-section-11-22-6-4-4-part3.docx>
18. <https://mentor.ieee.org/802.11/dcn/19/11-19-1051-00-00az-ndp-power-control-for-evm.pptx>